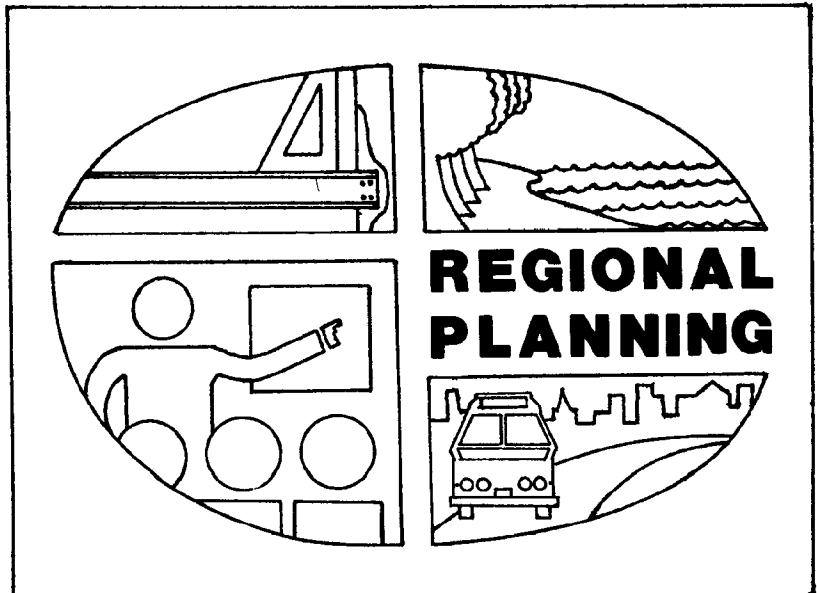
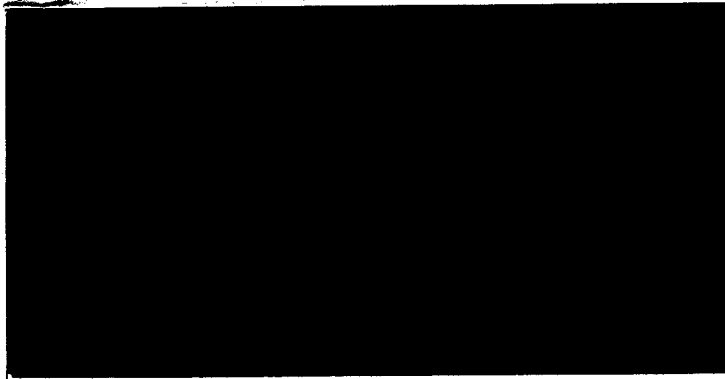


Rockingham
Planning
Commission

121 Water Street, Exeter, N.H. 03833 (603)-778-0885



SB
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1989

OPEN SPACE AND RECREATION PLAN

for the

TOWN OF STRATHAM

June, 1989

U. S. DEPARTMENT OF COMMERCE
COASTAL SERVICES CENTER
2234 SOUTH HOBSON STREET
CHARLESTON, SC 29405

Prepared for the

CONSERVATION COMMISSION

and the

PLANNING BOARD

by the

ROCKINGHAM PLANNING COMMISSION

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PREFACE

"What are the natural features which make a township handsome? A river, with its waterfalls and meadows, a lake, a hill, a cliff or individual rocks, a forest, and ancient trees standing singly. Such things are beautiful; they have a high use which dollars and cents never represent. If the inhabitants of a town were wise, they would seek to preserve these things...for such things educate more than any hired teachers or preachers...

It would be worth the while if in each town there were a committee appointed to see that the beauty of the town received no detriment. If we have the largest boulder in the county, then it should not belong to an individual, nor be made into door-steps.

As in many countries precious metals belong to the crown, so here more precious natural objects of rare beauty should belong to the public.

Not only the channel but one or both banks of every river should be a public highway. The only use of a river is not to float on it."

- Henry David Thoreau
1861

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I. INTRODUCTION

I. INTRODUCTION

The Town of Stratham possesses a rich legacy of forest and fields, streams and marshes, hilltops and shores. Together, these exceptional natural resources provide the Town's citizens with clean water, habitat for wildlife, protection from flooding, aesthetic and recreational enjoyment, and, in general, a high quality of environment.

But these features are being continually threatened by development, and their conservation and recreational values will be lost if steps are not taken to protect them. The unprecedented population growth of recent years is resulting in increased traffic congestion on the roads, the development of forests and farms, decreased recreation opportunities, and the loss of scenic views. These trends will continue - to the detriment of both present and future generations - unless a coordinated plan for natural resource preservation is adopted.

The following plan incorporates natural resource planning principles in order to guide future development toward the most suitable lands, and away from sensitive resource-rich areas with high open space value. It identifies the Town's most important open spaces, and recommends strategies for their protection. Used in conjunction with Stratham's Master Plan, this document can serve as a useful guide for public officials and citizens in their efforts to achieve a balance of community growth and protection of the natural environment.

II. OPEN SPACE - GENERAL DESCRIPTION

II. OPEN SPACE - GENERAL DESCRIPTION

A. MULTIPLE RESOURCE VALUES

This plan provides the Stratham Conservation Commission with a general natural resources inventory of the Town. This inventory is used to examine present conditions, and identify any resource problems or opportunities. Using these areas of critical concern as a base, the plan presents recommendations and strategies for their protection.

For the purposes of this plan, open space is defined as sites having natural resources and features worthy of conservation or protection. It can be comprised of areas that contain forests, farmland, floodplains, or wetlands. Open space can also be scenic vistas, recreational areas, or historic sites.

Too often open space is considered to be merely lands that are not currently being used. The multiple resource values of open space lands are often overlooked. Open space values can be categorized as follows:

- 1) recreation;
- 2) forestry and agriculture;
- 3) environmental protection, (e.g. erosion control, flood retention, ground-water recharge);
- 4) habitat for flora and fauna;
- 5) aesthetics, (i.e., pleasant scenery, visual relief, maintenance of rural character);
- 6) education/research; and
- 7) historic/archeological sites.

It is difficult to quantify all of the benefits which open space provides, especially in monetary terms. Most public open space uses 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 and control are often the most practical sources of preservation efforts.

B. ECONOMIC CONSIDERATIONS

Traditional arguments favoring the preservation of open space have not rested upon economic considerations. Instead they have been based upon the need for conservation of natural resources, the need for public recreation facilities, and the attractiveness of green spaces. However, in addition to these factors, open space lands can produce substantial economic benefits. Open space creates economic values in the following ways:

- 1) Prevents public expenditures in the sense that other types of development can have a net cost to the Town, especially residential development;
- 2) Produces private income through commercial open space uses, including golf courses, agricultural business and timber harvesting;

- 3) Adds value to adjacent properties; and
- 4) Maintains the various "natural process" values which if disrupted may require enormous expenditures 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, but does not hold true for most residential development. For example, the residents of new neighborhoods, having made substantial personal investments in their new homes, expect to receive adequate public services (e.g., education, safety, road maintenance, etc.) in return for their property taxes. So, the "increased tax base" argument assumes that "residential development produces public revenues in excess of public costs." But, according to a study by the American Farmland Trust, this assumption has almost always proven false: "...the costs of the public services required to serve new residential communities usually exceeds the tax revenues generated by the them..." (source: Density - Related Public Costs, American Farmland Trust, Washington D.C., 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 residential 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. Examples of open spaces which provide direct monetary returns include a farm field, timber stand, campground, or golf course. In addition, user fees charged for income-producing lands owned by the Town could be contributed to a specific fund for open space acquisition.

An example of a less direct but measureable economic benefit is what has been termed "location rent", which is the added property value of a house or lot situated close 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 percent in the vicinity of park and recreation areas. The increased value to the landowner from preserved open space is shared by the municipality as well. Because relative property values are higher, assessed valuations and tax revenues are also higher.

In some circumstances, 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 water body can be calculated. After a flood occurs, 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 water elsewhere when the water supply has been polluted or the recharge rate diminished). But the intrinsic values of open space (e.g., scenic views, unique ecological areas, or historic sites) are more difficult to quantify. Still, these intrinsic values are important to consider because they are an integral part of the Town's character and natural heritage.

III. PHYSICAL CHARACTERISTICS AND LAND USE

III. PHYSICAL CHARACTERISTICS AND LAND USE

A. LOCATION AND SIZE

Stratham is located within the "first tier" and "second tier" boundaries of the New Hampshire Coastal Zone. It is bordered by Greenland, North Hampton, Hampton, Exeter, Newfields, and Newmarket (see Map 1 - "Location Map"). The Town boundaries encompass an area of 14.3 square miles (9,152 acres). A small portion of Great Bay is contained within Stratham, and the tidal Squamscott River serves as the Town's western border. South of N.H. Route 108, the Squamscott River corridor is part of the State's "second tier" coastal area.

B. GEOLOGY

Introduction

Topography and soils influence the suitability of land for various uses. These land features are shaped primarily by surficial geology which in turn is a product of the most recent glacial period. The following discussion on geology is presented as a prelude to the Topography and Soils sections.

1. Bedrock Geology

In southeastern New Hampshire, bedrock was formed from layers of sea bottom sediments deposited and compacted over millions of years into sedimentary rock. These rock formations were transformed through uplifting, folding, and tremendous heat and pressure into what is known as metamorphic rock. Virtually all of the bedrock in Stratham falls into this category. Two types of metamorphic rock are found: the Eliot formation running in a north/south direction through the central part of Town and the Kittery formation running in bands along the westerly and easterly boundaries. (See Map 2 - "Flood Hazards and Geology".)

This geologic process was augmented by the rising of molten rock of a volcanic origin from the earth's interior. Once cooled and hardened, this material became igneous rock. Small traces of an igneous formation are found on the Stratham border near the Winniconic Mill, and near the Exeter/Hampton border.

2. Surficial Geology

The upper layers of geologic materials above bedrock forming the earth's surface are known as surficial deposits. In southeastern New Hampshire, these materials were deposited by a glacier more than 10,000 years ago. There are four types of surficial materials in Stratham (described below).

Till. As the mile thick glacier advanced from the northwest, it deposited layers of debris made of sand, silt, clay, and gravel known as till. Roughly a third of Stratham's surficial geology is characterized by till which is found on the hills and ridges of the central part of Town. Till usually provides adequate loading capacity

Location Map

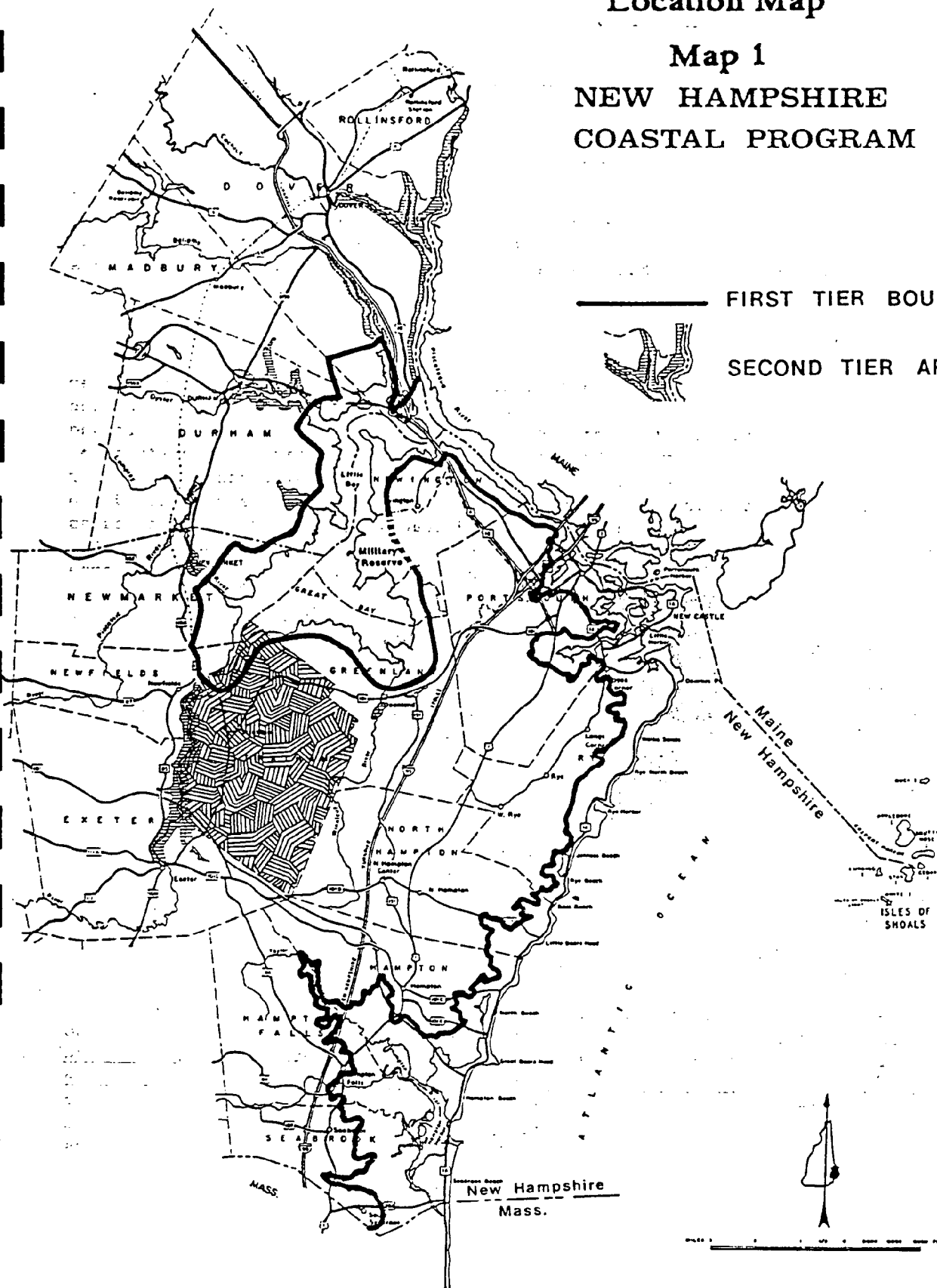
Map 1

NEW HAMPSHIRE COASTAL PROGRAM

———— FIRST TIER BOUNDARY



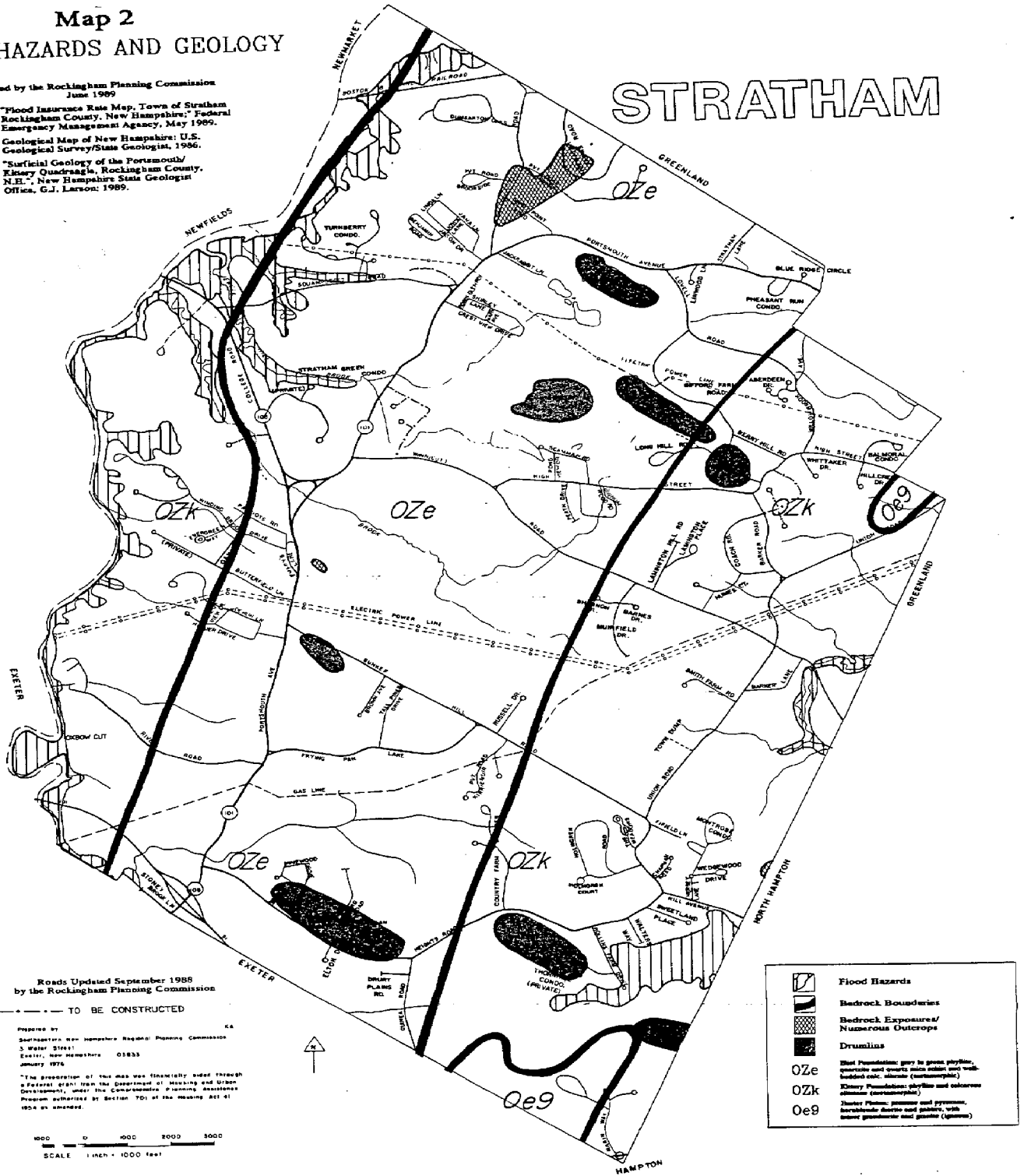
———— SECOND TIER AREA



Map 2 FLOOD HAZARDS AND GEOLOGY

Prepared by the Rockingham Planning Commission
June 1989

SOURCES: "Flood Insurance Rate Map, Town of Stratham, Rockingham County, New Hampshire," Federal Emergency Management Agency, May 1989.
"Geological Map of New Hampshire," U.S. Geological Survey/State Geologist, 1906.
"Surficial Geology of the Portsmouth-Kenney Quadrangle, Rockingham County, N.H.," New Hampshire State Geologist Office, G.J. Larson, 1989.



Roads Updated September 1988
by the Rockingham Planning Commission

--- TO BE CONSTRUCTED

Prepared by
Seaford/Harris New Hampshire Regional Planning Commission
3 Water Street
Exeter, New Hampshire 03833
January 1976

"The preparation of this map was financially aided through Federal grant from the Department of Housing and Urban Development, under the Comprehensive Planning Assistance Program authorized by Section 701 of the Housing Act of 1954 as amended.

for foundations, indicating it is suitable for development. However, if hardpan (an impermeable layer) is located within 18" to 24" below the surface, conditions may not be adequate for septic systems.

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 with a high bearing capacity and are easily excavated. This material is also termed as "stratified drift". A band of stratified drifts deposits crosses central Stratham from west to southeast. This formation may contain large quantities of water making it a potential source for a municipal water supply. (See Map 8 - "Aquifers," and Section IV.C for further discussion.)

Outwash and Shore Deposits. The glacial melt waters carried away sands and fine gravels and deposited them along the shorelines of ancient seas. A scattering of these deposits is located along Route 108. Because of their good bearing capacity and moderate permeability, these materials are very suitable for development.

Marine deposits. The formation of these deposits resulted from the following processes: melting glacier caused a rise in sea level and the inundation of most of southeastern New Hampshire; marine sediments were formed along the bottom of the ancient sea and 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 Stratham, marine clays are the predominant materials found in up to sixty percent of the land area. They are found in the low-lying areas along the Squamscott River and the drainage ways of Jewett Hill Brook, Mill Brook and Winniconic Brook. 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 and special engineering and design.

C. TOPOGRAPHY

The present day topography is generally a result of the underlying bedrock, the effects of glaciation, and the weathering conditions that have occurred since the most recent glacier. Erosion and deposition caused by the glacier, and the formations created are the greatest factors in determining today's topography.

Stratham's terrain is predominantly rolling with gentle slopes of 0-8 percent. The topography ranges from a low of slightly above mean sea level at the Squamscott River's edge to a high of 290 feet at Jewett Hill.

The valleys between the uplands consist of pockets of wetlands and small ponds and brooks on the eastern part of Town. To the west, the lowlands stretching to the River's edge are characterized by alluvial plains and tidal marshes.

A group of six drumlins, all above 200 feet in elevation, are located within Stratham. Drumlins are hills with smooth, rounded surfaces, consisting almost entirely of glacial till deposits. Among these hills is the Town-owned Stratham Hill (noted for its scenic vistas of Great Bay), Long Hill, Jewett Hill, and Barkers Hill. Bunker Hill and Rollins Hill form a crescent shaped ridge to the south. Stratham Heights and Pine Hill are relatively smaller drumlins (180 and 160 feet, respectively) and are also located in the southern part of Town (as depicted on Map 2 - "Flood Hazards and Geology").

The hills of Stratham add character and scenic beauty to the Town's landscape. These hills are part of the western divide of the entire New Hampshire coastal area, and as pronounced examples of glacial formations, are among the region's most unique landforms. Stratham's hills warrant protection, and mechanisms for their preservation should be explored.

D. 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 can be directed away from those areas least suitable 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 foundations and septic systems. Other soils are better suited for agricultural use because of level topography, good drainage and lack of stoniness - important considerations in defining and establishing agricultural districts.

1. Development Suitability

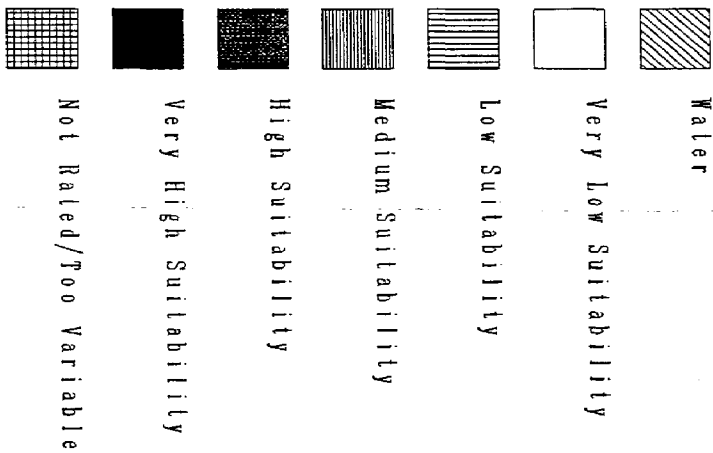
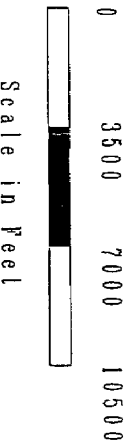
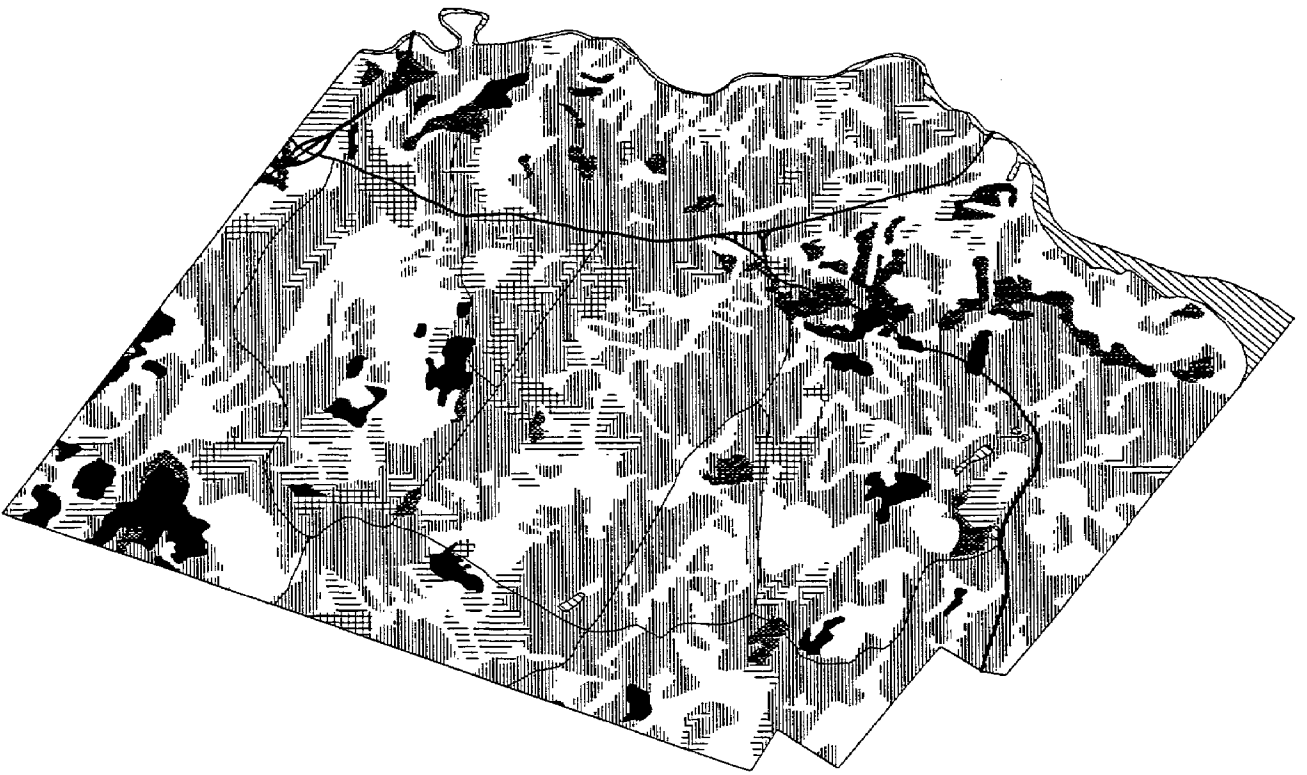
The lack of a centralized sewer in Stratham has heightened the importance of soil-based information in the land use planning process. The dependence on on-site wastewater disposal requires careful evaluation of soil conditions to ensure adequate wastewater disposal and protection of groundwater, public health and the environment.

Poor soils and steep slopes cause severe limitations for on-site sewage disposal systems, hence restricting development. Map 3 - "Soil Suitability for Septic Systems" - depicts the general areas of Stratham which have different soil potentials for septic system development. Five categories were used based on assorted soil characteristics. For example, soils with low and very low suitability typically have limitations due to steep slopes or high water tables (as well as high shrink-swell properties, short depths to bedrock and stoniness).

2. Agriculture and Forestry

Soils 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.

Town of Stratham Soil Suitability for Septic Systems Map 3



Sources: "Soils Potential for Development - Rockingham County"; U.S.D.A.-Soil Conservation Service and Rockingham County Conservation Dist.; May 1987.
 Rockingham County, N.H. Soils Map; U.S.D.A.-Soil Conservation Service; March 1986.
 Preliminary Data - Subject to Change
 Prepared by the Rockingham Planning Commission, May 1989
 SRC

Important agricultural soils include "prime farmland" and "farmland of Statewide importance". As defined by the U.S.D.A. Soil Conservation Service, "prime farmland" soils include those that are best suited for producing food, feed, forage, fiber, and oilseed crops. "Prime farmland" has the soil quality, growing season and moisture content needed to produce sustained high yields when managed according to modern farming methods. It can be farmed continuously or nearly continuously without degrading the environment and will produce the most for the least amount of energy used. It requires the least investment to remain productive and is not susceptible to the leaching of fertilizer or pesticide applications (source: Soils of New Hampshire; S.A.L. Pilgrim and N.K. Peterson; N.H. Agricultural Experiment Station, UNH and U.S.D.A. SCS; December 1979). "Farmland of Statewide importance" has many of the same attributes as "prime farmland" but is generally of lesser quality.

As depicted on Map 4 - "Farmland Soils," Stratham contains an extensive amount of agricultural soils. In fact, according to the 1985 Stratham Master Plan, Stratham has the largest amount of land suitable for agricultural use in Rockingham County. This corresponds to the fact that Stratham has one of the highest percentages (60%) of agricultural soil in the County (Newington has 64%, however much of this land is located within Pease Air Force Base).

The U.S.D.A. 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.

The soils information mapped in this section was taken from a soil survey map for the Town of Stratham, which was prepared by the Soil Conservation Service in March 1980, and digitized by the Complex Systems Research Center (UNH). Soil maps are an important tool for making generalized land use determinations. However, these maps are not intended for site-specific evaluations due to their scale, accuracy, and the likelihood of other soil types being found within the broader classifications. For specific assessments, on-site field investigation is necessary.

E. LAND USE AND ZONING

1. Land Use




The previous sections focused on the natural, pre-developed conditions of land in Stratham and various open space land uses. These conditions, however, are modified by man-made changes in land use. For example, soils may be classified as suitable for agricultural use, but once a shopping center is placed on them, they are no longer suitable.

Approximately one-third of Stratham is forested, and about 15% is in farmland. During 1953 to 1974, 6% of the Town's forested land and 22% of the Town's farmlands were lost to development. Between 1974 and 1982, Stratham lost an additional 25% of forest land and 41% of farmland to development. Overall, about 120 acres per year

Town of Stratham Farmland Soils Map 4



Scale in Feet

-  Water
-  Prime Farmland
-  Farmland of Statewide Importance

Sources: "Important Farmlands in Rockingham County, New Hampshire"; U.S.D.A.-Soil Conservation Service and Rockingham County Conservation Dist.; Feb. 1988
 Rockingham County, N.H. Soils Map: U.S.D.A.-Soil Conservation Service, July 1983
 Preliminary Data -- Subject to Change.
 Prepared by the Rockingham Planning Commission, June 1989. SFC

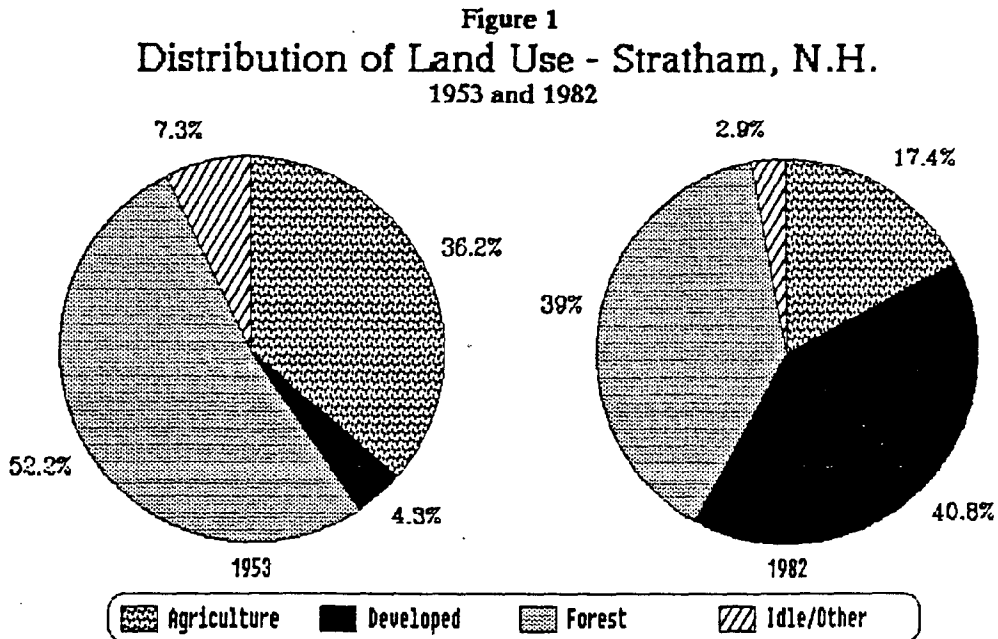
were converted to urban uses between 1953 and 1982. This trend toward urbanization, consisting primarily of residential development, has led to a corresponding reduction in open space. Table 1 below shows the estimated land use categories for those years.

Table 1
EXISTING LAND USE: 1953, 1974, 1982
Town of Stratham, New Hampshire

<u>Land Use</u>	<u>1953</u>	<u>1974</u>	<u>1982</u>	<u>% Change</u> <u>1953-1982</u>
Agriculture	3,490	2,650	1,670	-52
Developed	415	1,575	3,925	945.8
Forest	5,025	5,085	3,750	-25
Idle	465	115	95	-79
Other (marshland, etc.)	240	210	185	-22
Water	320	320	330	3
Total Acreage:	9,955			

Source: Land Use Change: Rockingham County, New Hampshire, 1953-1982; Wm. Befort, A.E. Luloff, M. Morrone; NH Agricultural Experiment Station, UNH, Durham, NH; 1987.

Figure 1 - "Distribution of Land Use" - provides a graphic illustration of the land use changes between 1953 and 1982.



Source: Befort, Luloff, Morrone, UNH 1987.

Map 5 - "Current Land Use" - shows the general use of land in Stratham in 1989. The map also depicts parcels for which development proposals have been approved by the Planning Board but not yet built. These parcels have been labelled as "future residential".

Stratham has had a very significant increase in residential units between 1985 and 1989 (see Appendix 1 - "Current Land Use, 1985" - for comparison with Map 5). Many new roads, serving residential developments, have been constructed during the past four years. Most of this new development has occurred along the eastern half of Stratham. Commercial development, while expanding, has been primarily confined to N.H. Route 101. The amount of land used for industrial purposes has increased, with this growth taking place at the existing industrial park at the southern tip of Town. This area is accessed by N.H. Route 101D, and is served by Exeter municipal sewer and water.

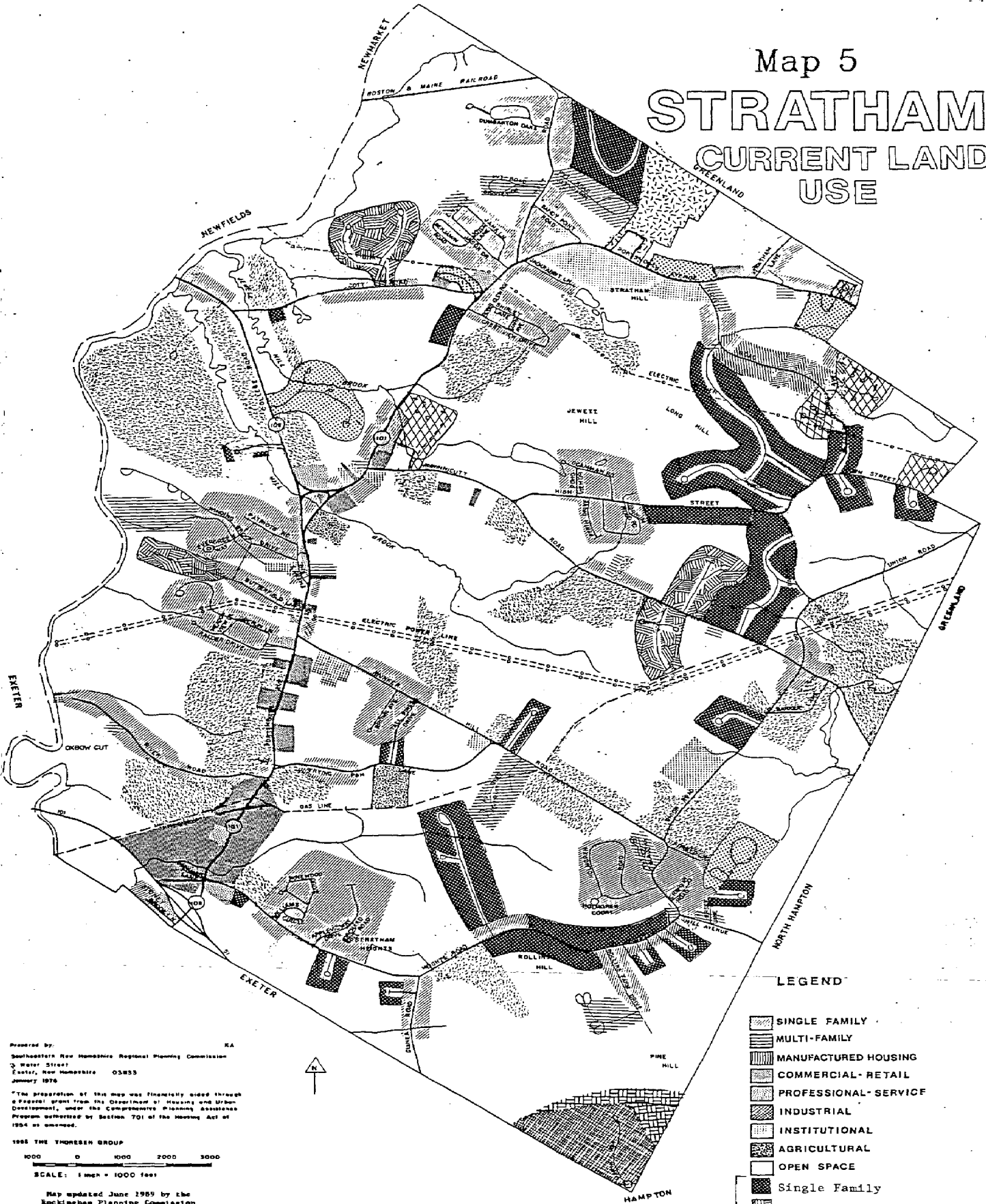
2. Zoning

Another consideration for open space planning is the Town's zoning districts. Stratham presently has nine zoning districts: Residential/Agricultural, Manufactured Housing, Professional/Residential, Town Center, General Commercial, Office/Research Park, Industrial, Wetlands Conservation, and Shoreland Protection. These zoning districts, except for the latter two, are depicted on Map 6 - "Zoning Districts".

The Wetlands Conservation and Shoreland Protection Districts are overlay districts superimposed on all other districts. These ordinances restrict the use of and encroachment on wetlands and shorelands (lands which abut all rivers and streams and Great Bay). The wetlands and shoreland overlay districts are excellent mechanisms for protecting fragile and beneficial open space lands.

Stratham's "Cluster 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 an adjacent area to common open space in perpetuity. Stratham's cluster ordinance provides flexibility in the design of development so that fragile areas and other important open space lands (e.g., floodplains, wetlands, hillsides, and farmland) can be left undeveloped.

Map 5 STRATHAM CURRENT LAND USE



LEGEND

- SINGLE FAMILY
- MULTI-FAMILY
- MANUFACTURED HOUSING
- COMMERCIAL-RETAIL
- PROFESSIONAL-SERVICE
- INDUSTRIAL
- INSTITUTIONAL
- AGRICULTURAL
- OPEN SPACE
- Single Family
- Single Fam. Cluster
- Multi Fam. Cluster
- Industrial
- Quasi Public
- Future Residential

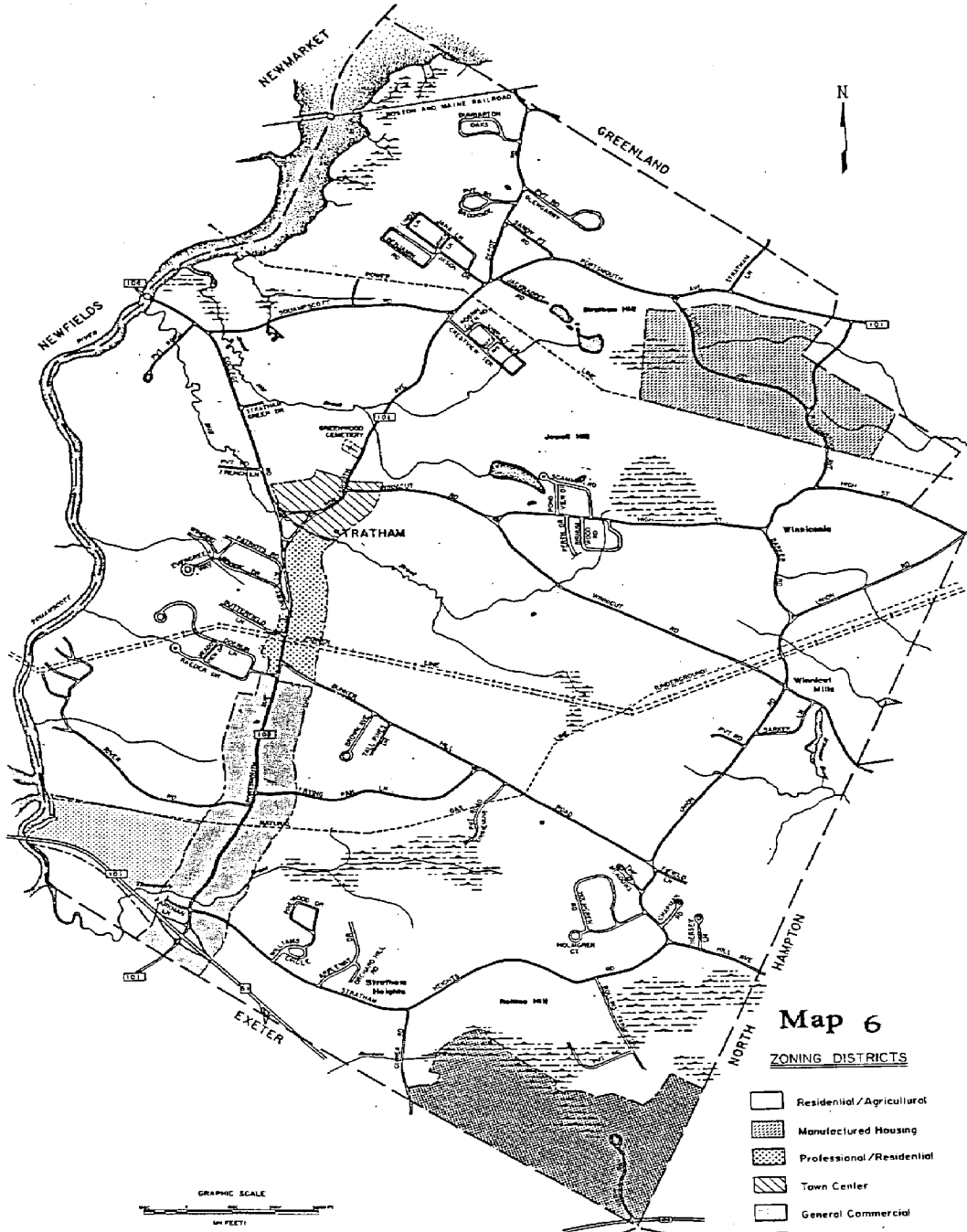
POST 1985
DEVELOPMENT

Prepared by: KA
Southeastern New Hampshire Regional Planning Commission
Water Street
Exeter, New Hampshire 05853
January 1976

*The preparation of this map was financially aided through a Federal grant from the Department of Housing and Urban Development, under the Comprehensive Planning Assistance Program authorized by Section 701 of the Housing Act of 1954 as amended.

1985 THE THOMPSON GROUP
0 1000 2000 3000
SCALE: 1 inch = 1000 feet

Map updated June 1985 by the
Rockingham Planning Commission



Map 6

ZONING DISTRICTS

- Residential/Agricultural
- Manufactured Housing
- Professional/Residential
- Town Center
- General Commercial
- Office/Research Park
- Industrial



<p>engineering planning management development</p>	<p>STRATHAM, NH TOWN-WIDE WATER STUDY</p>	<p>DRAWN BY: DRP CHECKED BY: WAT PROJ. ENG.: WAT</p>	<p>DATE: NOV, 1988 SHEET NO.: C10887 DRAW NO.: CR216</p>
	<p>ZONING</p>	<p>FIGURE 8</p>	

IV. OPEN SPACE VALUES, INVENTORY, AND ANALYSIS

IV. OPEN SPACE VALUES, INVENTORY, AND ANALYSIS

As was mentioned in Section II, open space lands have many resource values. For the purposes of this plan, the resource values of open space are:

A) recreation; B) forestry and agriculture; C) environmental protection; D) habitat; E) aesthetics; F) education/research; and G) historic/archeological sites.

Section IV describes each of the seven open space values, and provides a descriptive inventory. For analysis, the Town's needs are evaluated, and recommendations given.

A. RECREATION

1. Values

The importance of outdoor recreation is widely accepted. It is one of the best ways to understand and appreciate the environment. For many residents, the decision to live in Stratham is strongly influenced by the diversity of opportunities to interact with the environment through outdoor recreation. Overall, recreational opportunities are of value for individual enjoyment, building of community through group activities, and educating both children and adults about open spaces and natural resources.

2. Inventory

Stratham has many locations for outdoor recreation. Activities which take place on general open spaces throughout Town include boating, fishing, hunting, hiking, jogging, picnicking, bird watching, horseback riding, bicycling, cross-country skiing, and snowmobiling. Many of these activities also take place at Stratham's designated public recreation facilities.

One of the unique recreational facilities in the Seacoast and the State of New Hampshire is the 108-acre Stratham Hill Park. Located on Portsmouth Avenue east of the Town Center, the park contains woodlands, the second highest hill in Stratham (elevation 286 feet), extensive playfields, and picnic facilities.

Stratham Memorial School's nine acre site containing a playground is located on Bunker Hill Avenue near Portsmouth Avenue. The one and one-half acres Town Landing is located off River Road. It has a boat ramp and provides public access to the Squamscott River.

There are two public recreational facilities in Stratham, however neither is a Town-owned facility. They are the New Hampshire Vocational Technical College recreation facilities located on Portsmouth Avenue across from the Stratham Hill Park, and the Fish and Game access area to the Squamscott River and Great Bay at Chapman's Landing. The access area is near the bridge over the Squamscott River on Route 108. At the end of Stratham's Depot Road, in Greenland, there is also a right-of-way to Great Bay.

It should be noted that the construction of a new elementary school is currently under way, to be completed by September 1989. This 37-acre site, located on Gifford Farm Road, will contain two baseball fields, two "multi-purpose" fields, and two outdoor basketball courts.

The five recreation areas (as well as the playing area of the new school) are marked on Map 10 - "Open Space Values" - and are further described below.

a. **Stratham Hill Park.**

The developed part of the 108-acre park contains: two ballfields, one paved basketball court, a concert shell, a skating rink area, a horse pulling area, a natural amphitheatre, a barn, a garage, two concession stands, three 4-H buildings (one of which is enclosed), a fenced corral near the middle 4-H building, a caretaker's building, a small house, toilet facilities, a pavillion with picnic facilities consisting of two fireplaces and 12 tables, an adjacent small children's climbing structure area, and a parking lot. There is a part-time caretaker who lives on the grounds.

The forested part of the park contains Stratham Hill. For 40 years the Lookout Tower was used by the State as a Forest Fire Service Lookout Station. There are outstanding scenic views from the Lookout Tower (as described in section IV.E).

The park is widely used as a recreation facility. Groups use the playing fields for softball, Little League and soccer. Numerous organizations use the whole facility for picnics and recreation field days.

In 1973 a long-range woodland plan for Stratham Hill Park was developed by the Rockingham County Extension Forest Service. The plan focused on forest management for recreational use, actual timber production, and wildlife management to improve the natural habitat. Since the 1973 plan was completed, thinning of trees has occurred in the recreation area and the recreation area has been expanded. There has been no formal timber harvest and little has been done to implement the plan.

b. **Stratham Memorial School.**

The elementary school site contains approximately 9 acres and is owned by the Town. The playground is behind the school and is fenced around the outer perimeter. A hot top area on the lower level adjacent to the school contains several climbing bars and a small game area near the parking lot. On the upper level is the main play area. It contains a large ball field, a traditional swing set with four swings, an extensive tire playground area with swings, climbing sections, and rings, and several hilly areas. The playground is widely used in the summer and after school for recreation. Softball, Little League and soccer games are played at the field on the upper level.

c. **Town Landing.**

The Town of Stratham owns 1 1/2 acres of land at the end of River Road which provides access to the Squamscott River. The landing is one of two public access points on the River in Stratham. The boat ramp area is not paved. There is room for parking several trailers and vehicles. Since the river is tidal, the access and use are limited. There are no picnic tables or facilities at the site.

d. **New Hampshire Vocational Technical College.**

The New Hampshire Vocational Technical College in Stratham was completed in 1984. On the 91 acre campus, several ball fields were constructed behind the college buildings. The fields include one hardball field, two soccer fields and two softball fields. One soccer field overlaps with the softball fields, so all fields cannot be in use simultaneously.

These fields complement the picnic area which has five tables and an outdoor fireplace near the college buildings. There is an informal volleyball court in the picnic area too. According to the Dean's Office, these recreational facilities are available to be used by Stratham residents as well as the students.

e. **Chapman's Landing.**

Acquired on December 7, 1984 as a U.S. Fish and Wildlife project, the State of New Hampshire bought Chapman's Landing to provide a boat launch facility with parking on the tidal Squamscott River near Great Bay. The seven-acre site has a concrete boat launch area, about an acre of parking, and a chemical toilet.

3. **Analysis**

The New Hampshire Office of State Planning has established guidelines to assist communities in recreation planning. Table 2 - "Selected Standards for Outdoor Recreation Facilities and Present Needs" - lists certain standards from the OSP's 1989 State Comprehensive Outdoor Recreation Plan. Standards for recreational facilities are helpful in evaluating town needs for playfields, ball courts, and playgrounds, and can be used for preliminary planning. However, standards can be unresponsive to any special needs a town may have.

Table 2

Selected Standards for Outdoor Recreation Facilities and Present Needs

Town of Stratham, New Hampshire

<u>Facility</u>	<u>Standard Per^a 1000 Persons</u>	<u>Stratham^b Standard</u>	<u>Existing Facilities</u>	<u>Facility Needs</u>
Baseball Diamond	1.1	4-5	4	0-1
Basketball Courts	0.8	3-4	1	2-3
Boat/Fishing Access	1.8	7-8	2	5-6
Ice Skating Area	0.14	0-1	1	0
Open Space/Natural Areas (acres)	51.0	222	197 ^c	25
Parks, Community (acres)	6.0	26	108	0
Playgrounds (town and school)	0.5	2-3	3	0
Soccer Fields	0.16	0-1	2	0
Tennis Courts	0.95	4-5	0	4-5
Trails, Hiking (miles)	2.2	9-10	1	8-9

^a Source: New Hampshire Outdoors 1988-1993; N.H. State Comprehensive Outdoor Recreation Plan; Office of State Planning and Department of Resources and Economic Development; 1989.

^b Based on a Town population of 4,345 (Source: Stratham Master Plan Update 1989; estimated using housing data).

^c Sum total for: land next to the new elementary school (86 acres); the non-developed area of Stratham Hill Park (105 acres); a two-acre Town parcel along the Squamscott River; and land owned by the N.H. Fish and Game Department (6 acres).

The recreational activities which take place in Stratham have been grouped into five categories: a) organized sports; b) family-related recreation; c) water-related recreation; d) trail-related recreation; and e) hunting.

a. **Organized Sports.** This category includes activities such as baseball, softball, basketball, tennis, and the like. With the facilities located at Stratham Hill Park and the Vocational Technical College, the Town has a good stock of playing fields. However, according to the the figures from Table 2, there is a need for two to three basketball courts, and four to five tennis courts. (The need for basketball courts will be met by the facilities at the new school.)

b. **Family-Related Recreation.** This category involves facilities such as playgrounds, skating areas, and picnic tables. Both Stratham Hill Park and the Stratham Memorial School serve to fulfill most of these needs. However, in April of 1984, a University of New Hampshire report recommended that two additional picnic areas be established within Stratham Hill Park (source: Management Plan for Stratham Hill Park - Stratham, New Hampshire; Forest Management Seminar, UNH; April 1984).

- c. **Water-Related Recreation.** Relative to other towns within Rockingham County, Stratham has many streams and rivers. The Town also contains a portion of Great Bay. Water-related recreational activities include fishing, boating, swimming, and skating.

The Squamscott River, Winnicut Mills Pond, and Mill Pond are the most commonly fished water bodies in Stratham. (These waters are used for skating as well.) The Squamscott River and Great Bay are currently being stocked with anadromous fish by the N.H. Fish and Game Department as part of a Statewide restoration program. This program involves stocking the River with game fish such as rainbow smelt, river herring, American shad, Pacific salmon, steelhead, brown trout, and Atlantic salmon.

The Squamscott River and Great Bay are also the most suitable waters for boating. Canoeing and motor-boating are particularly popular (as well as sculling by Phillips Exeter Academy crew teams) along the Squamscott River. As previously described, Stratham has two public access areas: the Town Landing and Chapman's Landing. Table 2 indicates that the Town is in need of more boating/fishing access areas.

There are no waters within Stratham that are of sufficient volume or quality to be suitable for public swimming. According to the New Hampshire Water Quality Report to Congress 305(b), the Squamscott River does not meet its legislative classification for water quality of "B" (source: N.H. Department of Environmental Services, Water Supply and Pollution Control Division; April 1988). Although a classification of "B" or "C" means that the water is fishable, swimming is not advisable in "C" class waters. The report states that the water quality problems of the Squamscott River are caused by the Exeter Wastewater Treatment Facility. The treatment plant is presently being upgraded, which will mitigate its impact to the River.

All water-related recreation requires high water quality for an ideal experience. Poor quality affects the safe enjoyment of water recreation and impairs its aesthetic appeal. Stratham must safeguard its surface water quality, particularly that of the Squamscott River and Great Bay, in order to provide the opportunity of sports fishing, boating and swimming for present and future townspeople.

- d. **Trail-Related Recreation.** There are many examples of small communities creating trail systems accessible to the public. These trails can be used for hiking, walking, jogging, bicycling, cross-country skiing, and horseback riding. Trails can also be segregated for recreational vehicles such as snowmobiles.

In the Seacoast Region, the Town of Hampstead provides the best example of a multi-purpose trail system, developed and managed by the community. This system consists of a public trail network which offers a variety of recreational, environmental, and educational opportunities within reasonable reach of every resident's home.

An interpretive guide, which describes points of interest throughout the trail system, is available. For more information on developing a public trail system, see the Feasibility Study Report - A Town-wide, Multi-purpose Trail System for Hampstead, New Hampshire (by E.B. Shore, in collaboration with the Hampstead Trails Committee, and the Hampstead Recreation Commission; May 1988).

Much of Hampstead's efforts involved contacting private landowners to gain access across their land to expand the trail system. Landowners have opted to donate their land, sell or donate ten-foot strips across their land (outright or by easement), or sign an agreement which "permits passage". Under the latter agreement, landowners have the option to revoke that permission if the trail is ever misused or the land is vandalized. In terms of liability, there are N.H. statutes which legally protect landowners who allow the public to use their land for recreational purposes. These landowners cannot be sued for injuries if they do not charge a fee and are not willfully negligent.

At present, Stratham Hill Park contains approximately one mile of trails. Relative to State standards, the Town should have eight to nine more miles of hiking trails. Table 2 also indicates that Stratham should have 25 acres of "open space/natural areas." These areas typically provide the best conditions for trail systems.

Even with the substantial population growth of the 80's, the Town of Stratham still has numerous locations on which to create a greenbelt/trail network. The Town should focus its attentions in the following areas: 1) along the Squamscott River and Great Bay; 2) through or along publicly owned parcels such as Stratham Hill Park, the Memorial School, etc.; 3) along quasi-public lands, such as utility easements and railroad corridors; and 4) along areas that would link important open spaces throughout Town such as Stratham Hill, Jewett Hill, Long Hill, and other scenic areas. (See Map 11 - "Protected Open Spaces and Public Lands" - for parcel identification.) In addition, the Planning Board should seek to establish trail corridors when reviewing cluster development proposals.

- e. **Hunting.** The Great Bay estuary is an important way-station on the Atlantic waterfowl "fly way" which has resulted, for generations, in excellent bird-hunting opportunities. Other types of game that are hunted in Stratham include deer, coyotes, raccoons, rabbits, and turkeys. The large undeveloped tracts throughout Stratham (depicted on Map 11) are the Town's prime hunting areas.

"Open space/natural areas" are well-suited for hunting. Table 2 indicates that Stratham falls short of the State standard for open space/natural land by 25 acres. Increasing these areas would provide expanded hunting opportunities for townspeople.

It can be stated generally that, as Stratham grows, the Town needs to maintain and expand its recreational opportunities. The Town should consider its projected population growth and, in turn, plan for and protect

its critical open space lands. Otherwise, existing open space areas and facilities will become overused, to the detriment of all users and to the environment.

B. AGRICULTURE/FORESTRY

1. Agriculture

a. Values

Aside from its obvious agricultural importance, farmland has value as a scenic and recreational resource, as wildlife habitat, and as an area for aquifer recharge. Farming also has economic and social importance, especially to the local and regional economy.

1) Recreation and Scenic Quality

Farmlands are typically wide open areas of rolling fields and pastures. They provide pleasant scenery and act to maintain a town's rural character. In addition, farmlands are well-suited for many types of recreation, including hunting, cross-country skiing, and birdwatching. But cropland and open fields are frequently the most imperiled areas in a community because these lands are the easiest to develop. It is ironic that the attractiveness of a town's rural character threatens its existence, as farmlands are developed into residential neighborhoods.

2) Wildlife

The habitat requirements of many wildlife species, e.g., pheasant, grouse, songbirds, mice, rabbits, woodchucks, foxes, and deer, include open fields and the edges between fields and woodland. The loss of farmland thereby restricts the habitat and range of resident wildlife.

3) Aquifer Recharge

Groundwater supplies are replenished by the infiltration of water through the ground. Infiltration cannot occur if the ground surface is overlain with impervious material such as roofs 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 suitable for agriculture - those which retain moisture for plants - function also as water filters, and thus provide ideal recharge conditions. The loss of farmland to development means both the loss of critical recharge surface area and the loss of water volume, as runoff is artificially directed away from the development.

However, some agriculture practices, the use and storage of highly concentrated fertilizers and pesticides, can have serious negative impacts on groundwater resources. Proper agricultural management will prevent nutrient, bacterial, or chemical contamination to the groundwater.

4) Economic and Social

Farming as an industry and as a land use have direct and indirect economic values. The local production of food-stuffs 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 in Section II.B, the indirect economic benefits of farming relate to the 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 services to additional families is typically greater than the increased property tax revenue.

b. Inventory

Many areas throughout Stratham are currently being used for agriculture. These areas are depicted on Map 10 - "Open Space Values". In Town, agricultural lands are used to grow the following: hay, vegetables, feed corn (for silage), and forage crops (for grazing). To a lesser degree, other agricultural products are grown, such as fruits, grains, and flowers. Another agricultural use is horse farming, which can involve horse rearing, boarding, and trading. Most horse farms also provide riding lessons.

Table 3 - "Principal Commercial Farms" - lists Stratham's significant commercial farms, including their general classification and contiguous land area. The farm locations are depicted on Map 10.

Table 3

PRINCIPAL COMMERCIAL FARMS

Town of Stratham, New Hampshire

<u>Farm Name</u>	<u>Type</u>	<u>Estimated Contiguous Acreage</u>
Scamman Farm	Dairy	210
Stuart Farm	Dairy	180
Wiggin Farm	Vegetable	115
Mill Valley Farm	Vegetable, Fruit	100
Barker Farm	Vegetable	85
Centerton Farms	Horse	30

c. Analysis

As in other parts of Rockingham County, the contribution of agriculture to the Town's economy and work force has been steadily declining. This trend was discussed in Section III.E. If agricultural land conversion continues at past rates, then the future of farming in Stratham looks bleak.

However, there are currently several mechanisms designed to aid the farmer and save farmland. These include the current use assessment program; the Trust for New Hampshire Lands program; and the Development Rights Program of the N.H. Department of Agriculture. (These mechanisms, and others, are described in Section VII.C - "Methods for Open Space Protection.")

Acquisition of development rights is one of the most effective means of preserving farmland. After conveying these rights, the farmer still retains 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. The Stuart farm (depicted on Map 10) provides the best example of farmland preservation, through the acquisition of development rights, in Stratham as well as in the Seacoast Region. In 1981, the Stuarts sold the development rights of 173 acres to the N.H. Department of Agriculture.

Obviously, purchasing development rights is costly and cannot be applied to every situation. In the absence of unlimited financial resources there are several land use controls which provide varying degrees of protection: a) cluster development, b) agricultural zoning, and c) floodplain conservation zoning.

- a) Stratham has adopted a cluster development ordinance, which is an example of a relatively creative land use control mechanism. This ordinance promotes the preservation of agricultural land by allowing all buildings to be clustered on a specified minimum acreage of the development, while keeping the rest of the site open. A cluster approach to farmland preservation does not require either large public expenditures (to purchase development rights to farmland) or large private sacrifices. With a cluster ordinance, farmers who view their land as their "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 fields could continue to be farmed on a lease-back system from the community association which controls the open space as a permanent conservation area.
- b) An agricultural district is intended for working farms which have demonstrated a long range commitment to agricultural use. Commitments may include the selling of development

rights, the placement of property in current use, and the ongoing use of the land in crops, pasture, or tree farms. An agricultural district serves to protect agricultural areas.

Keeping agriculture in Stratham is important to the residents. But residential development next to farms can create conflicts in use. For example, many of the "side effects" of farming - the odors of fertilizers and manure, and the noises of machinery - can be offensive to nearby homeowners. By defining agricultural areas and addressing the needs of farmers, future conflicts may be avoided.

- c) Floodplain areas typically contain high quality farmland soils. Floodplain conservation zoning would prohibit building, but would allow agricultural uses on floodplains. Protecting floodplains from development can be justified on the basis of protecting public health and safety.

In Stratham, and throughout the Seacoast Region, there is a lack of public knowledge regarding the need for farmland protection, as well as the laws and programs available for protection. There is also a lack of public support (including support from farmers) for farmland preservation efforts. Clearly, Stratham has many opportunities to protect its agricultural land resources and to encourage the farming industry. Without a concentrated and coordinated effort to preserve farmland by the Town, landowners, and developers, farmland resources will continue to dwindle until active farms become more like museums than integral parts of the Town's economy and landscape.

2. 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., watershed protection, air quality and 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 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 town with money to cover the cost of managing the timber stand, while helping to increase the future yield of forest products.

2) Watershed Protection

The broad category of watershed 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 ground surface. By slowing the rate of runoff, forests serve to reduce flood levels, prevent the erosion of soils, and filter pollutants from runoff.

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 of winter. Hence, forests can reduce home heating and cooling costs. In addition, forests act as filters by removing particulates and absorbing carbon-dioxide from the air.

4) Wildlife

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, from which it obtains food and shelter. The greater the number of interfaces between landscape types, the greater abundance of wildlife habitat. Conversely, in a densely canopied forest, where deep shade inhibits the growth of understory plants, the variety of animal species is reduced. Thus, a forest management program to improve the wildlife habitat increases the number of vegetative types and landscape types.

5) Recreation and Scenic Quality

Throughout Stratham, the pattern of forested land alternating with farmland and developed land gives the Town its rural character. The complexity and diversity which determine the wildlife value of a forest also determine the scenic and recreational value (e.g., for bird watching and hunting. 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 the Rockingham County Extension Service, there are three significant "managed woodlands" in Stratham. These areas are shown on Map 10 - "Open Space Values". The predominant tree species are Spruce, Douglas Fir, and Scotch Pine. Each forested area is managed for multiple-use purposes, i.e., woodland wildlife and wood products.

As described in Section IV.A, Stratham Hill Park is a 108-acre tract owned by the Town. Approximately 105 acres of this park is forested. As previously cited, a forest management plan for the Park was drafted in April 1984. This report provides a forest inventory from 1978, and various recommendations including forest thinning, timber stand improvement methods, and a commercial harvest in one area. Moreover, recommendations regarding wildlife were made such as thinning the White Pine, leaving slash, and

adding plantings near the tower. The report points out that the income from a commercial harvest sale could be used to make other improvements in the Park.

c. Analysis

Much of Stratham is currently forested with mature trees, (over 40 feet tall and harvestable). As discussed in Section III.E, the acreage of forest land in Town has decreased over the years. Even though forestry is not as important to the Town's economy as farming, forested lands provide important saleable wood products such as saw logs and cordwood. As with farmland, there are currently methods which help to preserve forest land. These include tax incentives (e.g., the current use assessment program), and the Trust for New Hampshire Lands program.

As stated in the previous section regarding farmland, the Town has played an active role in promoting natural resource protection by adopting a cluster ordinance. With buildings being clustered in a certain area of the development, forest management practices can be implemented on the remaining open space.

In regard to public land, the Town should consider taking a more active role in the management of Stratham Hill Park. Proper management would allow multiple forest uses. For possible future expansion, municipal officials should monitor the lands surrounding Stratham Hill Park in the event that this land becomes available for Town acquisition.

As is true for farmland, development pressure on Stratham's forested areas will continue to intensify. The Town should seek to have forest lands of manageable size (greater than ten acres) preserved through sound, long-term forest management programs which provide for all forest benefits, including watershed protection, wildlife habitat, recreation, and aesthetics.

C. ENVIRONMENTAL PROTECTION

1. Surface Water

a. Values

As with all natural resources, surface waters have multiple, interrelated values. Surface water is a key resource for fish, wildlife habitat, recreation, aesthetics, and groundwater recharge.

1) Fisheries and Wildlife

Water is an essential element in any wildlife habitat. Ponds, streams, and rivers (and Great Bay) provide food, water, and protection for waterfowl, songbirds, and birds of prey (e.g., the Great Blue Heron and the Double-crested Cormorant), and for many small animals and game species. Obviously, clean surface water is important for a healthy and diverse fish population.

2) Recreation and Aesthetics

Areas that have good fisheries or wildlife habitat also have a high recreational value for fishermen and hunters. Other recreational pursuits include swimming and boating, which require sufficient area, clean water, and adequate access. Moreover, water bodies provide some of the highest quality scenic views. Examples of scenic waters range from the meandering stream on up to the expanse of Great Bay.

3) Groundwater Recharge

The quantity and quality of surface water and groundwater are closely related. When there is little rain, groundwater is released to maintain streamflow. When flooding occurs, excess water soaks 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 the quality of surface water has a bearing on that of groundwater, actions to protect one will provide some degree of protection to the other.

b. Inventory

Stratham has approximately 330 acres of surface water, which is equivalent to 3.3 percent of its total acreage (see Table 1). The Town contains three regional watersheds - the drainage areas for the Squamscott River, Great Bay and the New Hampshire Coast. These watersheds were identified on the "New Hampshire Hydrologic Unit Map" (source: U.S. Department of Agriculture, Soil Conservation Service, May 1982). The watershed boundaries shown on Map 7 - "Perennial Surface Waters" - were delineated by the Rockingham Planning Commission using topographic maps (source: Exeter, Newmarket, and Portsmouth 7.5 minute topographic maps; U. S. Geological Survey).

As discussed in Section IV.A, Stratham is fortunate to have many streams and rivers. The Town also contains a portion of Great Bay. In addition, ponds make up part of Stratham's surface water system. These water bodies are described below, and depicted on Map 7.

1) Great Bay

The northwestern border of Stratham is within Great Bay. It is generally agreed that the mouth of the Squamscott River ends, and the shores of the Bay begin, at the Boston & Maine railroad bridge. The total water surface of Great Bay covers 5,696 acres (8.9 sq.mi.) at mean high water and 2,688 acres (4.2 sq.mi.) at mean low water (source: Great Bay National Estuarine Research Reserve Management Plan - Draft; N.H. Office of State Planning; January, 1989). Approximately 50% of the aerial surface of Great Bay is exposed as mudflat at low tide. The total length of shoreline along Great Bay within Stratham remains at 0.6 miles.

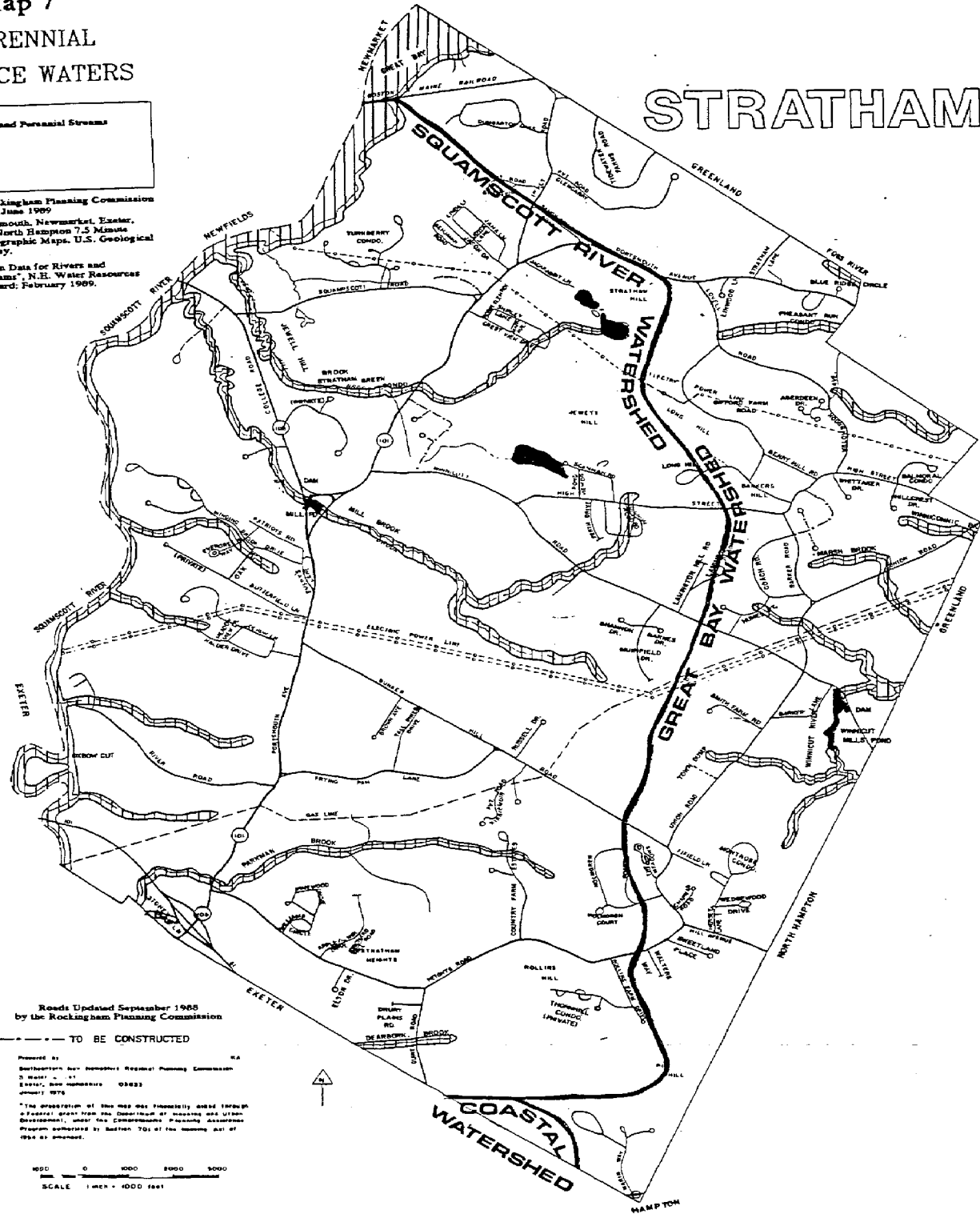
Map 7 PERENNIAL SURFACE WATERS

STRATHAM

	Rivers and Perennial Streams
	Ponds
	Dams

Prepared by the Rockingham Planning Commission
June 1969

SOURCE: Portsmouth, Newmarket, Exeter, and North Hampton 7.5 Minute Topographic Maps, U.S. Geological Survey.
"Dam Data for Rivers and Streams", N.H. Water Resources Board; February 1969.



Roads Updated September 1968
by the Rockingham Planning Commission

--- TO BE CONSTRUCTED

Prepared by
Southcoast Bay Regional Planning Commission
2 Water - St
Exeter, New Hampshire 03822
January 1976

"The preparation of this map was financially aided through a Federal grant from the Department of Housing and Urban Development, under the Comprehensive Planning Assistance Program authorized by Section 701 of the Housing Act of 1968 as amended."

0 1000 2000 3000
SCALE 1 inch = 4000 feet

Great Bay is an outstanding resource for the citizens of Stratham. The Bay supports recreational and commercial shellfishing for oysters and, to a lesser extent, clams. Great Bay is also a prime area for recreational boating.

2) Rivers and Streams

Stratham has a total of 22 flowing water bodies. These perennial streams and rivers include: Marsh Brook, Winniconic Brook, Brackett Brook, Foss Brook, Thompson Brook, Willow Brook, Winnicut River, Dearborn Brook, Mill Brook, Jewett Hill Brook, Parkman Brook, Wheelwright Creek, Squamscott River, and nine unnamed streams.

The tidal Squamscott River is the Town's largest river, and is among the largest of the Seacoast Region. A unique feature of the Squamscott River is its oxbow, a landform created by the meandering path of the River. In 1880, the Oxbow was cut through to create a straight channel for shipping (source: The Exeter-Squamscott River of Many Uses; O. Tardiff; printed by CGC, Rye, N.H.; 1986). At that time, and during subsequent dredgings of the River, the Oxbow was substantially filled with dredging spoils. Today, a canoe-sized boat can travel the Oxbow, but only during high tide.

3) Ponds

Stratham contains five sizeable ponds: Winnicut Mills Pond, Mill Pond, and three unnamed ponds. The unnamed ponds are located adjacent to the drumlins Jewett Hill and Stratham Hill. These ponds are depressions formed by the glacier which also formed the hills.

4) Water Quality

In Town, only the Squamscott River does not meet its legislative classification of "B" for water quality (source: New Hampshire Water Quality Report to Congress 305(b), N.H. Department of Environmental Services, Water Supply and Pollution Control Division; April 1988). Class "B" waters are swimmable and fishable, but would not be potable without treatment. As previously stated in Section IV.A, the water quality problems of the Squamscott River are caused by the Exeter Wastewater Treatment Facility. The treatment plant is presently being upgraded, which will mitigate its impact to the River.

b. Analysis

The Great Bay estuarine system, covering approximately 17 square miles is one of the largest and most pristine estuaries along the east coast of the United States. This system is formed by the convergence of seven rivers: the Salmon Falls, Cocheco, Bellamy, Oyster, Lamprey, Squamscott, and Winnicut.

This estuarine system will soon (expected in late 1989) be designated as the Great Bay National Estuarine Research Reserve

by the National Oceanic and Atmospheric Administration (NOAA). The Great Bay reserve will be one of 17 throughout the country. The research reserve system is a non-regulatory federal program that emphasizes research, education, and land protection. The Office of State Planning has provided the initiative in establishing the program in New Hampshire, although once under full implementation, the State Fish and Game Department will assume program responsibility.

Another organization committed to conserving the land and water resources of Great Bay is the Great Bay Estuarine System Conservation Trust (GBESCT). The GBESCT is a private, non-profit citizen's group whose membership is drawn largely from the Seacoast area. Although originally organized as a local land trust, the GBESCT also has worked to protect water quality, as well as air quality and critical marine habitat.

All of Great Bay's tributaries are now closed to shellfish harvesting because of improperly treated or untreated sewage. Another threat to the Bay comes from development and unwise construction of buildings. To promote the protection of the Great Bay Estuary, the Town should work with the abutting land-owners, the Office of State Planning, the GBESCT, the Water Supply and Pollution Control Division, the Fish and Game Department, the Rockingham County Conservation District, and the Rockingham Planning Commission on wise land stewardship of the watershed.

Furthermore, in order to prevent further degradation to the water quality of the Squamscott River and Great Bay, the Town should avoid any conditions which precipitate the need for a wastewater treatment facility (using surface water disposal).

Surface waters are important because they provide ecological, scenic and recreational value to the Town and are often hydrologically related to groundwater. In general, there is a direct relationship between land use and water quality. Uses in areas with poor suitability can degrade and contaminate both surface and groundwater, increase flood hazards, destroy water-based wildlife, and interfere with scenic and recreational values. It is the responsibility of the Town to take precautions to protect all water resources from incompatible uses and, in so doing, protect the health and general welfare of the community.

As a final note, the Oxbow is a prime asset for Stratham and the Region. It is a unique and scenic land form with educational value and high visibility (especially from N.H. Route 101). The Oxbow also has significant recreation potential. It would be beneficial to many if the Oxbow was dredged (enough for at least canoe travel at low tide). Although this ambitious endeavor seems unlikely in today's economic climate, it is recommended that the Town coordinate its efforts with the Town of Exeter before approaching State and federal agencies with this long-term goal.

2. Wetlands

a. Values

Wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and indigenous plant and animal communities. Marshes, swamps, and bogs have been well known features of the landscape for centuries, but only relatively recently have attempts been made to group these landscape units under the single term of "wetlands."

Historically, wetlands have been considered to be wastelands of little value to society and have been subject to dumping, filling, and draining with little thought given to the consequences. But the role of wetlands in maintaining and improving environmental quality has recently become more fully understood. And, as more land gets developed, the benefits that wetlands provide become more significant. With increased development, the demand for clean water supplies, flood protection, wildlife habitat, and recreation also increases.

Wetlands pose considerable development constraints. They severely restrict all types of building development because of high water table conditions, poor drainage, slow percolation rates for septic systems, highly unstable conditions for foundations, and susceptibility to flooding. Costs to overcome these limitations and the potential environmental damage can be prohibitive.

Wetlands are important, valuable natural resources and are worthy of protection from inappropriate use. They have been found, in general, to provide critical ecological and socially valuable functions, including:

- 1) act as flood water storage areas;
- 2) absorb and filter pollutants and sediments;
- 3) help maintain groundwater and surface water levels;
- 4) provide habitat and reproduction areas for plants, fish, and wildlife;
- 5) provide opportunities for recreation and education; and
- 6) contribute to scenic value.

These values are described further below. (Also see diagrams in Appendix I - "Function 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 the surrounding wetlands where the vegetation acts to temporarily detain the water. The protection of all wetlands in a predominantly rural community wisely anticipates future development which causes increased runoff, higher flood levels, and greater likelihood of flooding.

2) Water Quality

Along with controlling flood waters, wetlands also serve to maintain water quality. They have a "self-cleaning" ability which, if not overtaxed, can filter or absorb pollutants from runoff before they enter an adjoining watercourse. In many respects, wetlands function much like sophisticated sewage treatment plants by removing nutrients and other pollutants prior to discharge to a waterway. This is done at virtually no cost to the taxpaying public. In addition, a wetland acts as a buffer zone to trap sediments resulting from natural and man-induced erosion.

3) Water Supply

The flood storage function of wetlands also serves to collect surface runoff and route it into the ground, thereby recharging the groundwater. During low-flow periods this stored groundwater can then replenish nearby surface water.

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 many fish and wildlife. Coastal wetlands also 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 activities such as bird watching, hiking, fishing, hunting, photography, and environmental education. High quality wetlands can also be used for biological research or as outdoor classrooms for students of all ages.

6) Aesthetics

Wetlands add to the Town's scenic landscape. The relatively flat landform and diversified vegetation of wetlands create a distinctive visual character. Wetland vegetation provides unusual seasonal variations in color. Visible wildlife also contributes to wetlands' character.

b. Inventory

Wetland types found in Stratham include shrub swamps, shallow and deep marshes, meadows, and forested swamps. Lands with soil having a seasonally high water table, and classified as poorly or very poorly drained soils by the U.S.D.A. Soil Conservation Service, are also considered to be wetlands.

Stratham's area of wetland soils is approximately 3,275 acres, which is 35.8 percent of the Town's total land area. Map 8 - "Wetlands" - depicts these areas as poorly drained and very poorly drained soils. Very poorly drained soils can be categorized as muck, peat, ponded, or "other". Many of the wetland areas in Stratham are adjacent to rivers and streams. Significant areas of wetlands are located in the following parts of Town: east of Stratham Heights Road; along Parkman Brook; between High Street and Long Hill; along the Squamscott River and Great Bay; and just south of Stratham Hill. The latter area contains an important White Cedar Swamp. Located adjacent to the new elementary school, this wetland can provide many educational opportunities for Stratham students.

The salt marsh along both sides of the mouth of the Squamscott River represents approximately one half of all the marsh in the Great Bay estuarine system - over 400 acres (source: Great Bay National Estuarine Research Reserve Management Plan - Draft; N.H. Office of State Planning, Concord, NH; January 1989). This complex of extensive salt marsh and adjacent farmland is prime habitat for migratory waterfowl. In addition, four rare and endangered plants have been identified in this area by the N.H. Natural Heritage Inventory (see Section IV.D for further discussion).

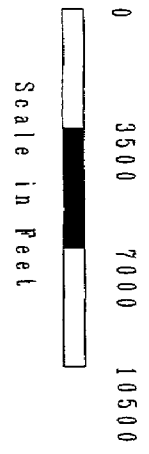
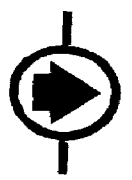
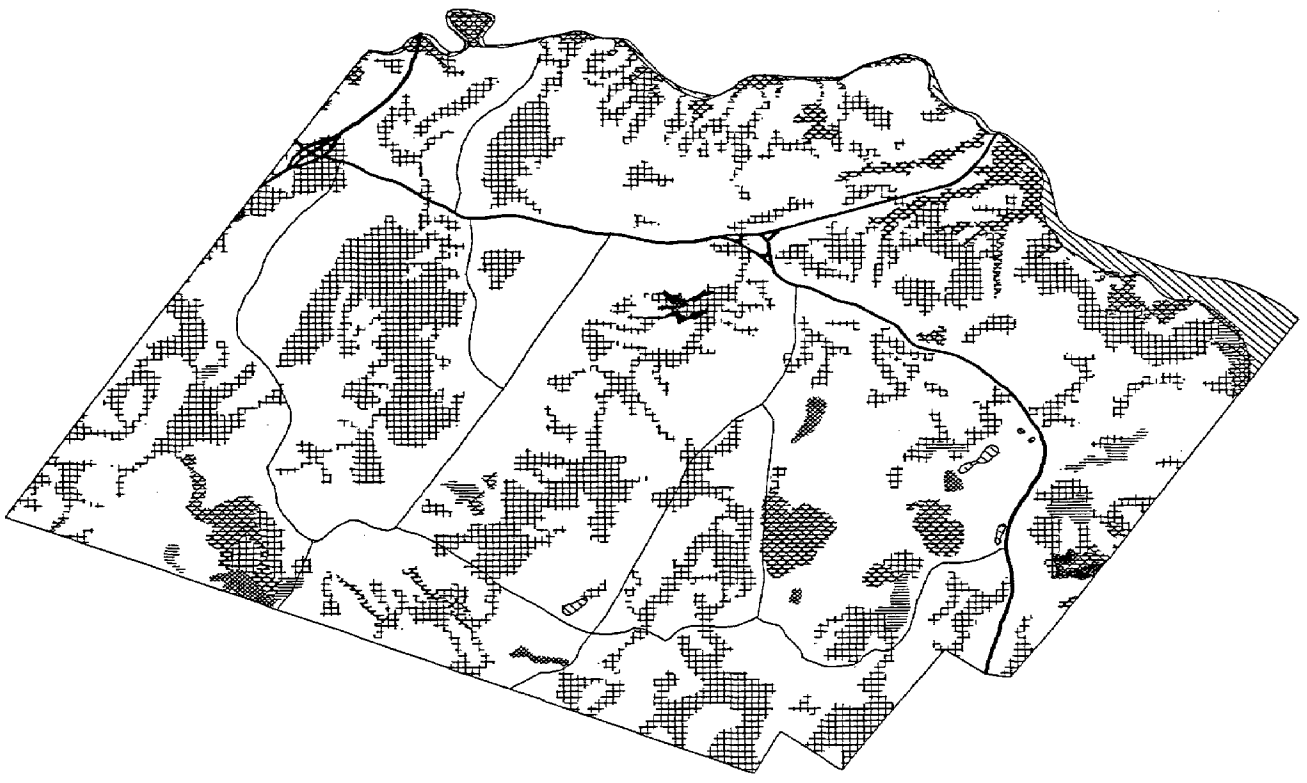
c. Analysis







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

There is an ongoing need to protect wetlands in Stratham. Statewide, wetlands are under increasing development pressure due to the depletion of the most developable land. Although the U.S. 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 regulations look at each dredge and fill request as a separate application, resulting in a piecemeal approach. In addition, the inadequate number of federal and State inspectors means that some wetlands are not sufficiently protected. A local wetlands ordinance enables the community to protect wetlands in a Town-wide context. Unlike State and federal rules, local regulations can give the Town control over the location of structures and septic systems in relation to wetlands.

For these reasons, local control over the use of wetlands should remain in effect indefinitely. The Town of Stratham has recognized the importance of preserving wetlands, and has acted accordingly by establishing a Wetlands Conservation District ordinance.

Town of Stralham Wetlands Map 8



	Water
	Poorly Drained
	Muck
	Peat
	Ponded
	Other Very Poorly Drained

Very Poorly
Drained

Sources: "Soils Potential for Development-
Rockingham County", U.S.D.A.-Soil
Conservation Service and Rockingham
County Conservation Dist., May 1987.
Rockingham County, N.H. Soils Map:
U.S.D.A.-Soil Conservation Service,
March 1988
Preliminary Data - Subject to Change.
Prepared by the Rockingham Planning
Commission, May 1989
SKC

3. Floodplains

a. Values

Flooding is a natural feature of the riverine system and adjacent wetland network. Periodic flooding fertilizes the floodplain soils, maintains their productivity and that of the river corridor, and provides habitat for the animals and plants that have adapted to live there.

During flooding, enormous quantities of water are stored temporarily on and in floodplain soils, and within tributary wetlands. At these times, the groundwater reservoirs are recharged. As the flood levels decline, the stored water is slowly released back into the river. Natural vegetation slows the flow of water during the flood and helps prevent erosion. In this way, the wetlands and floodplains naturally moderate the extremes of the flooding river.

In fact, floodplains are often closely linked to wetlands. Both function to reduce peak flood levels by storing and slowly releasing floodwaters. The most significant difference between floodplains and wetlands is that floodplains are associated with a river or stream, whereas wetlands can be more isolated.

b. Inventory

In 1988, the Federal Emergency Management Agency mapped the flood hazard areas in Stratham for use in the National Flood Insurance Program. This flood zone was designated for the 100-year storm based on topography and previous flooding history.

As is true for the Town's wetlands, the 100-year flood zone surrounds the major water courses flowing through Stratham. These areas are depicted on Map 2 - "Flood Hazards and Geology". The largest zone lies adjacent to the Squamscott River. Another large flood area surrounds Dearborn Brook.

c. Analysis

At the 1989 Town Meeting, the Stratham voters adopted a Floodplain Management District ordinance, which establishes land use control measures for Stratham's flood prone areas. This ordinance was necessary to keep the Town in good standing with the National Flood Insurance Program, and remain eligible for flood insurance.

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

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 encroaching on a floodplain may also lead to surface water contamination caused by flooding damage to septic systems, and the general flushing-out of materials around a house or parking lot, such as trash, paint, gasoline, oil, etc.

Areas prone to flooding need to be protected in order to maintain their capacity to absorb, store, and transmit runoff and floodwater. Floodplains are part of a river or stream, and should be respected as such.

4. Shorelands

Shorelands are herein defined as those lands located along the water's edge of a stream, river, or Great Bay. Much of the discussion below pertains to the riparian corridors of rivers and major streams. For ease of discussion, the term "river" will also include major streams (such as those which flow year-round and are depicted on a U.S.G.S. topography map).

a. Values

A river corridor serves many functions and has significant ecological and aesthetic values, as described below.

1) Wildlife

In general, river corridors provide one of the richest habitats for fish, wildlife, and plants. Many fish and wildlife populations 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. (See Section IV.D for further discussion.) This concept is in contrast with what have been called "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 was discussed in the previous section (IV.C.3 - "Floodplains").

3) Pollution Abatement and Filtration

Natural corridors along a river have been termed as "filter strips" because the shoreland vegetation acts to filter out sediment and pollutants from surface water runoff. 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, and agricultural pesticides. An absolute minimum of 50 ft. (preferably 75 ft. or more) is needed to protect rivers and marshes from these substances,

according to research results from North Carolina, recently published by the Smithsonian Environmental Research Center (source: Planning for the Changing Rural Landscape of New England: Blending Theory and Practice; New England Center, UNH; November 1987).

River corridors can be environmentally sensitive as well. 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 a riverbank. During low-flow periods, the contaminated groundwater can then seep into the river.

4) Riverbank Stabilization

Riverbanks denuded of vegetation can be vulnerable to erosion. The roots of trees and other plants along a natural shoreline stabilizes the banks from the erosive forces of wave action, flood flows, and overland runoff.

5) Recreation

River corridors can provide some of the best recreational opportunities in the Region. Examples include canoeing, hiking, fishing, birding, picnicking, horse trails, and cross-country skiing.

6) Aesthetics

The changes in flow, the diversity of vegetation, and the associated variety of wildlife, all contribute to the scenic qualities of a river corridor. River corridors are prime areas for interacting with the natural environment.

7) Unique Natural Features

Examples of unique natural features along a River include waterfalls, rapids, meanders, and oxbows. In addition, rare and endangered plant species are often located along river corridors.

b. Inventory

As previously stated, shorelands are found along surface water bodies. Stratham's water bodies are shown on Map 7.

There is no set width for "shoreland." As a general rule, the shoreland values described above diminish as the distance between development and the water's edge decreases. Literature on this subject indicates that shoreland widths range from 50 to 200 feet.

Aside from numerous road crossings, and some buildings along N.H. Route 101 and the Squamscott River, Stratham continues to maintain many miles of natural shoreland.

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 developer to gain value from a river (a public resource) and at the same time exclude the public from using the river by blocking physical and/or visual access.

Fortunately, the Town of Stratham has recognized the importance of protecting shorelands and has established a Shoreland Protection District. This ordinance establishes a shoreland overlay district with construction setbacks from the seasonal high water mark and restriction on the removal of natural vegetation (i.e., no clearcutting) within a buffer zone adjacent to the water.

The establishment of a Shoreland Protection District promotes the following objectives:

- 1) Discourage development in flood hazard areas;
- 2) Protect public waters from pollution;
- 3) Prevent erosion;
- 4) Conserve and protect aquatic and terrestrial habitat associated with riparian areas; and
- 5) Preserve and enhance those recreational and aesthetic values associated with natural shorelines and river environment.

Stratham's Shoreland Protection District not only promotes the above objectives, but also preserves the option for future acquisitions and easements by the Town.

5. Groundwater

a. Values

Groundwater provides the primary supply of potable water for the Region. Favorable groundwater potential is typically found in areas of unconsolidated sediment and, to a lesser extent, bedrock fractures. Because of its high porosity, transmissivity, and hydraulic conductivity, areas of "stratified drift" (as defined in Section III.B) can yield the greatest volumes of water when pumped. The term "aquifer" is herein defined as earth material containing sufficient quantities of groundwater for pumping.

The primary value of groundwater is as a source of water supply for individuals and for community water systems. Because of the great difference in treatment costs, municipalities more frequently choose to develop public water supplies from groundwater. Groundwater supplies are less costly to develop than man-made surface water supplies, in terms of land-taking, engineering, and maintenance.

Groundwater has an additional environmental value, in the recharge of surface water bodies and wetlands. A seasonally high water table may rise close to or above the ground surface, creating a wetland during the wet months of the year, and providing moisture to the wetland vegetation.

b. Inventory

As previously discussed, the groundwater occurrence in Town can be based on surficial geology, especially in areas of stratified drift. The latest and most reliable source of information concerning stratified drift aquifers is from the N.H. State Geologist Office, which has recently finalized the surficial geology maps for the Exeter, NH, Newmarket, NH, and the Portsmouth, NH/ Kittery, ME quadrangles. These maps identified Stratham's "aquifer" as a stratified sand and gravel deposit. This stratified drift formation is approximately one-half mile wide and generally follows Bunker Hill Avenue. This area has been depicted on Map 9 - "Aquifers."

c. Analysis

Groundwater is a very valuable resource for the Town of Stratham. It has the potential to provide the Town with drinking water for many generations to come. However, the resource is vulnerable to contamination or depletion if not properly managed and protected.

Groundwater quality can be impaired by a variety of materials. Sources of groundwater contaminants include landfills, commercial and industrial wastes, agricultural fertilizers, human sewage, road salting, etc. Groundwater quantity is reduced by contamination of available groundwater supplies, over-pumping in the aquifer zone, and increasing impervious surfaces such as roof tops and parking lots, thereby preventing recharge of the aquifer.

The Town should adopt an Aquifer Protection District. The ordinance would establish an aquifer overlay district with certain use regulations, in order to protect the Town's present and future water supply.

In the meantime, the Town should: 1) reduce its use of road salt along Bunker Hill Avenue and other roads which overlay the Town's aquifer; and 2) discourage the placement of community septic systems within the aquifer area.

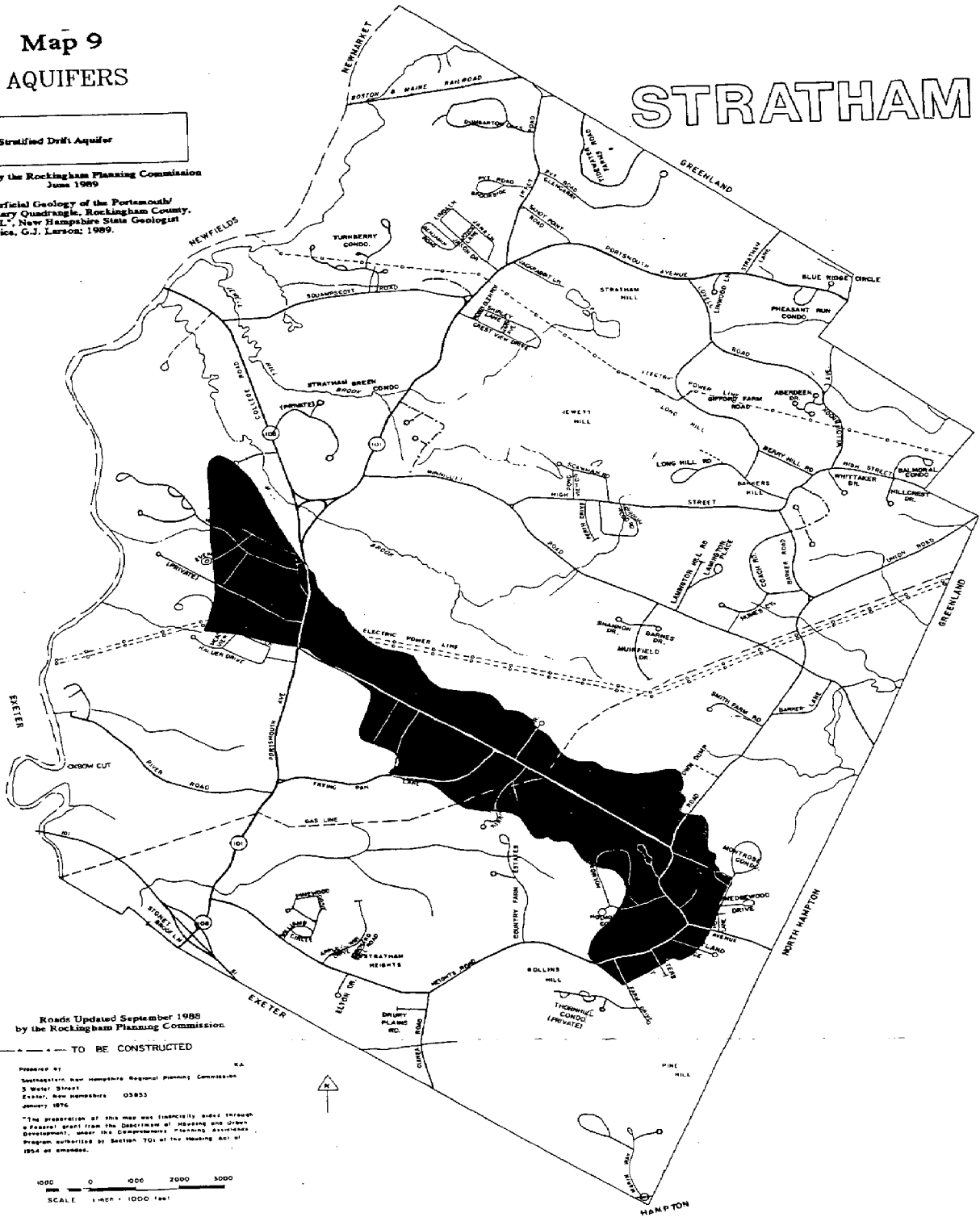
Map 9 AQUIFERS


Stratified Drift Aquifer

Prepared by the Rockingham Planning Commission
June 1989

Source: "Superficial Geology of the Portsmouth/
Kinary Quadrangle, Rockingham County,
N.H.", New Hampshire State Geologist
Office, G.J. Larson, 1989.

STRATHAM



Roads Updated September 1988
by the Rockingham Planning Commission

TO BE CONSTRUCTED

Prepared by
 Southwestern New Hampshire Regional Planning Commission
 3 Water Street
 Exeter, New Hampshire 03833
 January 1976

"The preparation of this map was financially aided through
 a Federal grant from the Department of Housing and Urban
 Development, under the Comprehensive Planning Assistance
 Program authorized by Section 701 of the Housing Act of
 1954 as amended."

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 SCALE 1 inch = 1000 feet

D. HABITAT

This section describes the natural habitat for wildlife and for rare and endangered plants.

1. Values

All wildlife have three basic requirements for survival: food, cover, and water. Fish, amphibians, and waterfowl require 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. Furbearers 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 are 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 amount of edge. Edge is the transitional area between habitat types and 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 land practices, regrowth of 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 integrity of that area.

Plants also require certain environmental conditions for survival. Wetland vegetation provides a good example of plants requiring a specific set of conditions, i.e., soil type and water table elevation.

2. Inventory

a. Wildlife

As discussed in Section IV.C.1, the Great Bay Estuary provides prime habitat for many wildlife species. According to a N.H. Fish and Game study, more than 90,000 birds reside in the estuary (source: Inventory of the Natural Resources of Great Bay Estuarine System; N.H. Fish and Game Department; December 1981). Thousands of Canada geese and black ducks rest and feed in the fall. Osprey are common in the spring and fall migration. Three rare and endangered animal species which live within in the estuary include the bald eagle, common tern, and the common loon.

Terrestrial mammals which utilize Great Bay include 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 live in the Great Bay is contained in the Fish and Game study cited above, as well as in the Great Bay National Estuarine Research Reserve Management Plan (previously cited in Section IV.C.1).

In addition to excellent coastal habitat, Stratham also has important inland habitat areas. Examples include: wetlands; river and stream corridors: forests such as coniferous, hardwood, and mixed woodlands; and open lands comprised of meadows and fields. These habitat types support a wide range of animals including game species such as deer, coyotes, raccoons, rabbits, and turkeys.

Stratham's prime wildlife habitat areas include the Squamscott River corridor and an extensive tract surrounding the Winnicut River.

b. Vegetation

Natural plant communities in Stratham are typical of coastal New Hampshire, with vegetative patterns reflecting soils and moisture conditions. However, the N.H. Natural Heritage Inventory has identified six rare and endangered plant species which grow in the Town. The common names of these plants are: Small Spike-rush, Sharp Flowered Manna-grass, Engelmann's Quillwort, Marsh Elder, Exserted Knotweed, and Stout Bulrush. All of these species, except for Small Spike-rush, are "imperiled in the State because of rarity". Small Spike-rush is critically imperiled because of "extreme rarity." These terms are explained more fully in Appendix III - "Rare and Endangered Plants." The areas in which these plants grow are shown on Map 10 - "Open Space Values."

3. Analysis

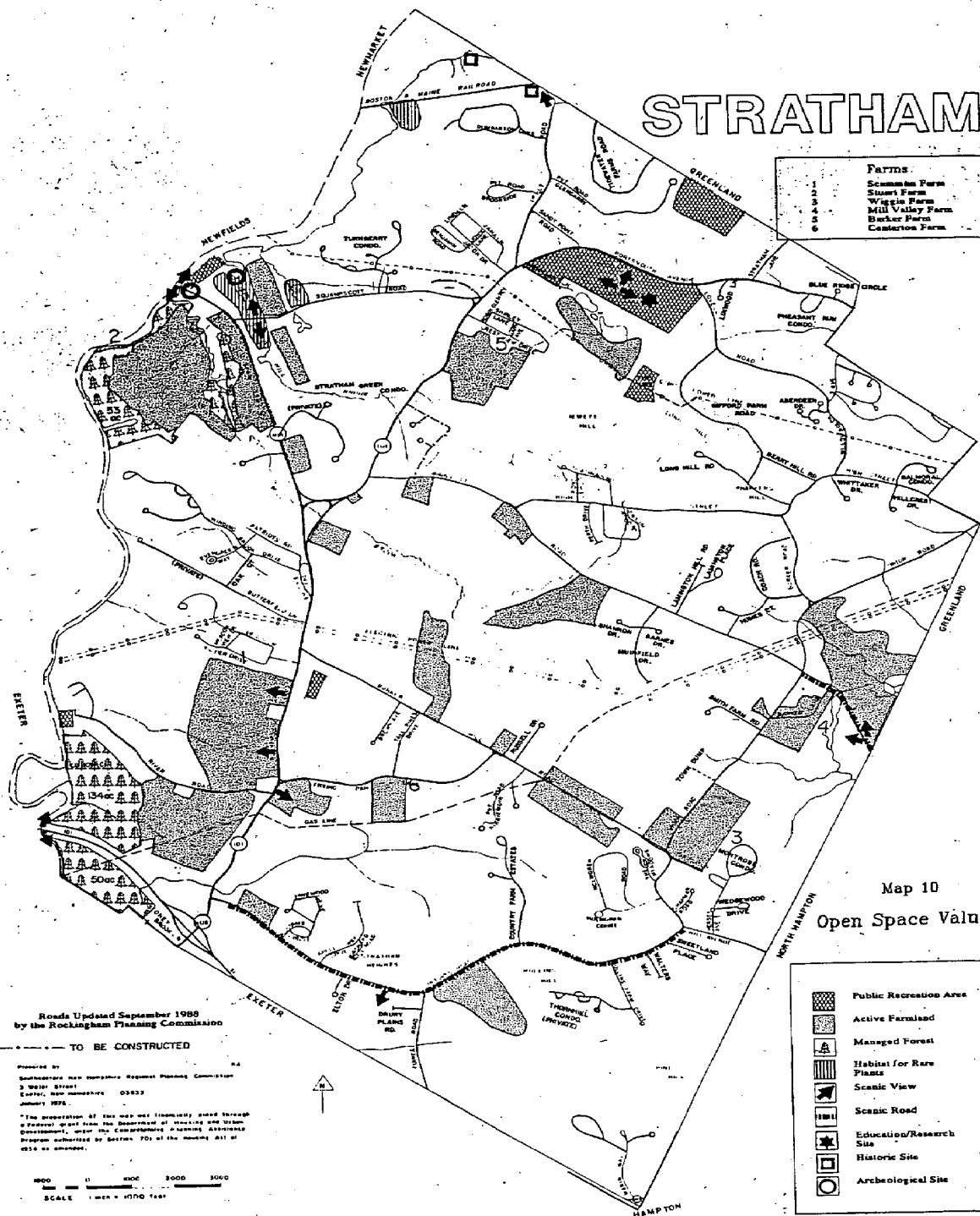
a. Wildlife

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. (The ranges for pine marten and white tail deer are roughly 640 acres.) Plant species also require contiguous areas to proliferate.

In addition, small, isolated habitats have less diversity of plant and animal species than those that are large and contiguous. Each species has its own mix 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 land is developed 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. It is thus important to consider conservation lands not only as individual parcels, but also in relation to other protected

STRATHAM



- Farms:**
- 1 Scammon Farm
 - 2 Shurt Farm
 - 3 Wiggie Farm
 - 4 Mill Valley Farm
 - 5 Barker Farm
 - 6 Constantine Farm

Map 10
Open Space Values

- Public Recreation Area
- Active Farmland
- Managed Forest
- Habitat for Rare Plants
- Scenic View
- Scenic Road
- Education/Research Site
- Historic Site
- Archeological Site

Roads Updated September 1988
by the Rockingham Planning Commission

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Prepared by:
Southcoast New Hampshire Regional Planning Commission
3 Water Street
Exeter, New Hampshire 03823
January 1978.

"The presentation of this map was thoroughly reviewed through a Federal grant from the Department of Housing and Urban Development, under the Comprehensive Planning Assistance Program authorized by Section 701 of the Housing Act of 1954 as amended."

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SCALE 1 inch = 1000 feet

Prepared by the Rockingham Planning Commission

lands. For these reasons, the Town should endeavor to acquire lands which are contiguous to publicly-owned or otherwise protected parcels. Therefore, the Town should seek to preserve corridors that link large tracts of open space in order to maintain habitat integrity. (The Town's large contiguous tracts are shown on Map 11 - "Protected Open Space and Public Lands.")

b. Vegetation

Six rare and endangered plants have been identified in Stratham. 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 Stratham's natural heritage.

E. AESTHETICS

1. Values

Open space maintains a Town's rural character by providing pleasant scenery and visual relief from developed lands. It provides natural buffers against noise and reduces "overcrowding of land." In general, scenic resources contribute to the quality of life for townspeople and is a key element of the Region's tourist economy.

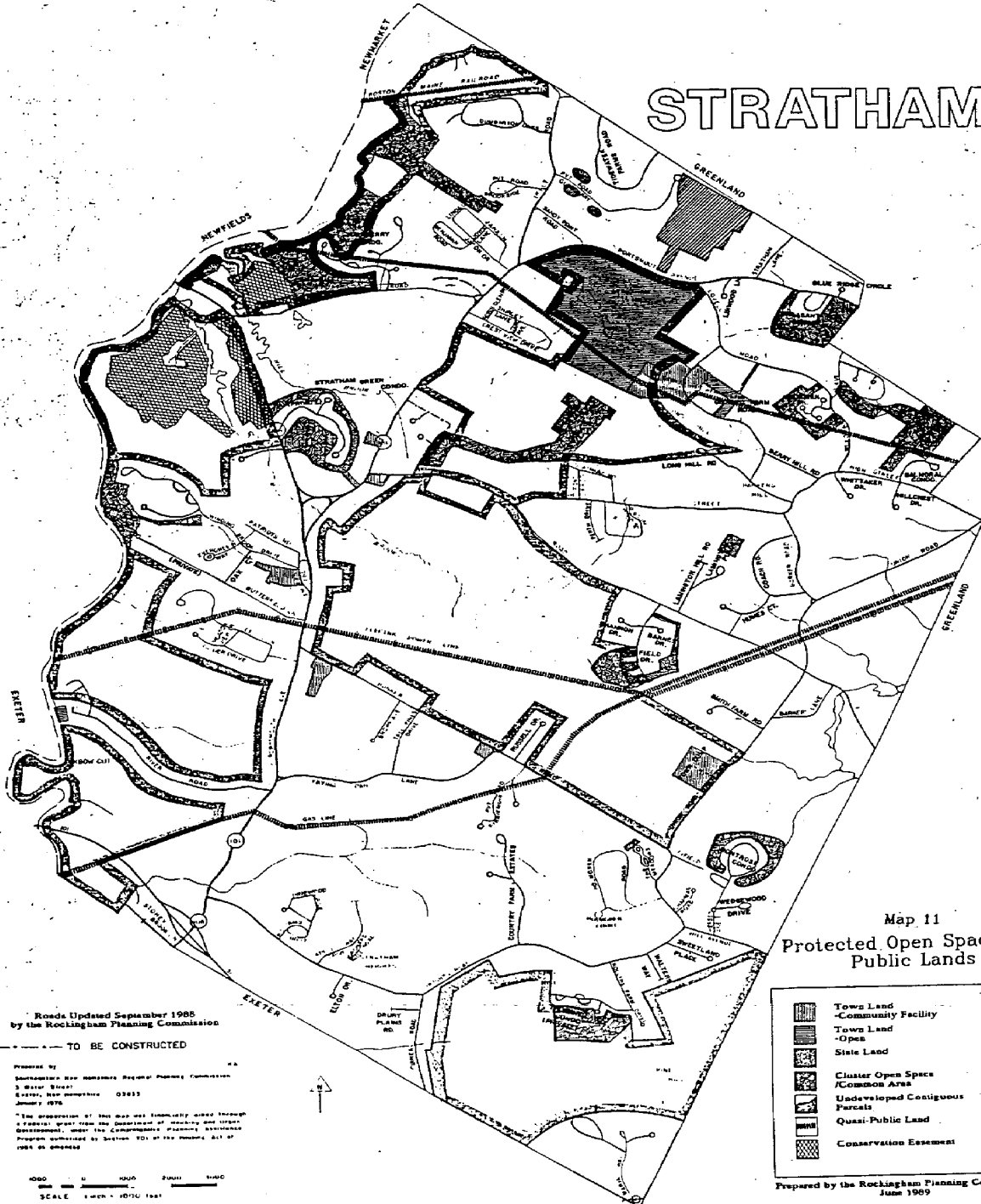
Visual-cultural values of such areas consist of an array of inter-related, intangible values which benefit the public. Wetlands, for example, contribute directly to the scenic value of landscapes and add to landscape diversity. This value of aesthetics is achieved through direct recreational usage and from distance viewing. The recreational values vary greatly according to user and landform type. Recreational activities may range from bird watching and picnicking to walking, canoeing, hunting, and fishing.

In general, aesthetic values are difficult to measure. Researchers have attempted to measure the values of scenic views through preference studies. Most of these studies have indicated that natural landscapes are preferred over landscapes which contain obtrusive structures (source: A Proposed Method for Coastal Scenic Landscape Assessment; H. Dominie and M. Droege; Maine State Planning Office; October 1987).

2. Inventory

Stratham's visual character is one of its most priceless assets. The diversity of landforms of farmland, rolling hills, forested areas, marsh, river corridors, and Great Bay add to the uniqueness and richness of Stratham's character. The Town has many significant scenic views. Scenic landscapes are viewed mostly from Town and State roads by residents and visitors.

STRATHAM



Map 11
Protected Open Space and
Public Lands

- Town Land - Community Facility
- Town Land - Open
- Site Land
- Cluster Open Space / Common Area
- Undeveloped Contiguous Parcels
- Quasi-Public Land
- Conservation Easement

Roads Updated September 1985
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Prepared by
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3 Water Street
Exeter, New Hampshire 03833
January 1978

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feet
SCALE 1 inch = 1000 feet

Prepared by the Rockingham Planning Commission
June 1969

A "scenic road" is typically a rural Town road, which has a relatively low volume of traffic. The term "scenic road" as used in this plan is not to be confused with Scenic Road Designation, RSA 231:157.) A scenic road can derive its aesthetic qualities from the contrast of open fields and woodland, architectural features, stone walls, and occasional vistas.

The Town's scenic roads and most outstanding scenic views have been identified on Map 10 - "Open Space Values". A brief description of each is provided below. (With the exception of Stratham Hill, all scenic views are seen from public roads.)

a. Scenic Views

- Scamman Farm. Looking west from N.H. Route 101, an outstanding view of rolling farmland (with cows often grazing), with impressive sunset views. This is one of the most scenic views in the Seacoast Region and is seen by thousands of people each day (the average daily traffic along this part of Route 101 exceeds 20,000 cars as of December 1988). On the other side of the highway there is another scenic view, with expansive, rolling farm fields. (Selective cutting of trees would significantly improve this view.)

- Squamscott River. There are two bridges for State highways which cross the River - N.H. Route 101 and 108. From these bridges, in both directions, there are prime views of the Squamscott River Corridor containing tidal marsh and trees. These are "gateways" into Stratham.

- Stratham Hill. One of the Region's most (if not the most) panoramic views. Much of the Great Bay Estuary, as well as surrounding communities, can be seen from the top of Stratham Hill.

- Winnicutt River. This is a large area along Winnicut Road at the North Hampton town line. Looking west, and descending along Barton Hill into Stratham, there are scenic views of the Winnicut River, farmland, and forested areas.

- Stratham Heights. At the highest elevation of Stratham Heights Road, looking south into the Town of Exeter, there is a panoramic view of rolling fields and trees.

- Jewett Hill Brook. As Squamscott Road crosses the brook, there are scenic views in both directions of the Jewett Hill Brook corridor and associated wetlands.

b. Scenic Roads

- Stratham Heights Road. From the intersection of Bunker Hill Avenue to almost Route 101, there is pleasant scenery with ample views of farmland and forest land; especially looking south.

- Winnicut Road. From the North Hampton town line to the intersection of Union Road, there are many views of farm fields, forestland, and the Winnicut River corridor.

3. Analysis

One of the Town's most valuable resources is the scenic quality of its landscapes. These scenic resources provide a unique visual experience for residents, and help to attract tourists - who in turn contribute to the Town's economy. For the most part, Stratham's scenic landscapes are privately owned. Nevertheless, the public "uses" the visual landscape. A tangible public benefit is thereby derived from these private properties. Outstanding scenic views, therefore, deserve protection whenever possible.

In general, agricultural land is the primary contributor to the high landscape quality of Stratham and the Region. However, farmland is particularly vulnerable to development. It is common for development to be proposed in open areas, which were once farm fields, due to good soils, lack of clearing costs, and extensive panoramic views from the subdivided parcels. This type of development is highly visible and severely detracts from the aesthetics of the original farmland.

There is a great need to protect the scenic views which serve as "gateways" to the Town. As people enter into Stratham, the scenic quality of the immediate surroundings greatly influences the observer's impression of the Town. This open space also acts as a visual buffer between towns by interrupting what may one day be a road lined with buildings.

Stratham should protect its prominent scenic views from obtrusive development. Scenic resource protection measures include encouraging cluster development as well as the purchase of visually important land 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.

F. EDUCATION/RESEARCH

1. Values

By using open space lands as outdoor classrooms, people of all ages can learn about the natural world. Many areas (e.g., wetlands, forest land) 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.

2. Inventory

The most significant area in Stratham that is used for education and/or research is that part of Town within the Great Bay estuary. The unique qualities of the estuary have attracted many different organizations and government agencies which have conducted scientific and educational activities. The University of New Hampshire, at the Jackson Estuarine Laboratory, has been the primary agency to conduct research and educa-

tion on the Great Bay estuary. Other such agencies and organizations include: the N.H. Department of Fish and Game; the Piscataqua Gundalow Project; the Great Bay Estuarine System Conservation Trust; the Audubon Society of New Hampshire; the Institute for the Study of Earth, Oceans, and Space; the N.H. Office of State Planning; and the N.H. Department of Environmental Services, Water Supply and Pollution Control Division, and the Rockingham Planning Commission. (For a more complete description of these programs, see the Great Bay National Estuarine Research Reserve Management Plan, previously cited.)

As discussed throughout this plan, there are many open space lands Stratham with educational potential. The primary site which is actively being used for educational purposes is Stratham Hill Park. Since Stratham Hill is one of New Hampshire's finest drumlin formations, the University of New Hampshire uses the Park to demonstrate the effects of glacial movement and its impact on the Seacoast Region. Various farms throughout Town also provide educational field trips to pre-school and kindergarten classes from Stratham and surrounding towns.

3. 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.

In April 1984, a Forest Management Seminar at the University of New Hampshire produced a report entitled Management Plan for Stratham Hill Park (cited in Section IV.A). The report explores a variety of environmental education and recreation uses which could be compatible in an integrated use park. The report recommends environmental education through class programs and self-taught demonstrations. It notes that geology, weather, soils, biology, forestry, wetlands, wildlife, chemistry, and environmental issues could be studied at the park.

The Town should promote increased conservation awareness and education at the primary and secondary school levels. The Conservation Commission could work with the School Department in arranging for conservation-related field trips, workshops, and lectures. Potential sites for educational field trips include: Stratham Hill Park, the Squamscott River, a farm, a managed forest, or a prime wetland area.

Moreover, the Town should work with the N.H. Fish and Game Department toward developing opportunities for education and research within the Great Bay estuary. The Town can thereby play an active role in this important function of the Great Bay Estuarine Research Reserve program.

G. HISTORIC/ARCHEOLOGICAL SITES

1. Historic Sites

Since this plan focuses on open space lands, this section will discuss only historic sites, rather than historic structures.

a. Values

Although historic sites enhance town character, the ultimate value of preserving them is educational. Historic sites are an important part of the Town's historical and cultural heritage. It is important for the townspeople to be aware of the events in history which have shaped the Town's present condition, and society in general. If development occurs on these sites, their value is lost and cannot be replaced elsewhere.

b. Inventory

This plan identifies two historic sites (see Map 10):

1. Town Landing: The landing site of the first Colonial people, at Sandy Point in 1633; on what was to be incorporated as the Town of Stratham.
2. The Thomas Wiggin gravesite: Thomas Wiggin was the first settler in Stratham. This site is located above five hundred yards west of the old Depot on the south side of the railroad tracks.

(Source: Historic Districts; Southeastern New Hampshire Regional Planning Commission; Exeter, NH; June 1973).

c. Analysis

The sites described above contribute to Stratham's unique history and cultural heritage. It is therefore, in the public interest to protect them. For privately owned sites (e.g., Thomas Wiggin gravesite), negotiations for easements may be the best means of protection.

2. Archeological Sites

a. Values

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 at least 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 Native American Indian culture by European explorers and colonists. For most of this period, 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, 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, and pockets of farmable soils, important to late prehistoric horticulturalists).

b. Inventory

Two prehistoric sites have been recorded in Stratham by the N.H. Division of Historical Resources. One site is located in the vicinity of the confluence of Jewett Hill Brook and the Squamscott River, and the other is near the confluence of Mill Brook and the Squamscott River (see Map 10). According to the State Archeologist, these sites were used as semi-permanent villages or seasonal camps by Native Americans, and are probably about 1,000 years old.

Within the Coastal Region, the distribution of recorded prehistoric archeological sites is as follows: 52% in the Upper Riverine System; 6% in the Lower Riverine System; 9% in the Riverine Tidal System; 20% in the Estuarine System; 5% in the Marine System; 5% in the Lacustrine System (lakes); and 3% within the Palustrine System (marsh, bog, swamp). The sites in Stratham have been recorded in the Riverine Tidal System.

c. Analysis

The following is a paraphrased excerpt from a memo written by Gary Hume, State Archeologist, regarding archeological sites in the Seacoast Region.

Most recorded sites in the Coastal Region are located on flat, dry areas within 125 meters of various water bodies. 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 DHR recommends that before development takes place along the Region's waterfront areas, builders and/or planning boards check with them 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. The discovery should be reported to the local police who will, in turn, notify a medical examiner and the State Archeologist when it is 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 water bodies. They left behind them many sites which can yield information about their culture. Archeologists have just begun this study. Unfortunately, the rapid development which has taken place in the Coastal Region has destroyed many sites. Based upon a field check in 1986 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.

As with its historic sites, Stratham should work toward protecting the only two known archeological sites in Town.

V. OWNERSHIP OF OPEN SPACE LAND

V. OWNERSHIP OF OPEN SPACE LAND

This section briefly describes the sizeable publicly-owned and protected lands in Stratham. These parcels, as well as other incidental parcels, are depicted on Map 11 - "Protected Open Space and Public Lands." It should be noted that even though a parcel is publicly-owned, it is not necessarily protected forever. The Conservation Commission should encourage the Board of Selectmen to put covenants (land restrictions) on critical Town-owned open spaces. This concept applies to State-owned lands as well. If the State is not interested in any permanent means of protection, the Commission should pursue an option or right of first refusal for the land. The following is an inventory and description of public and protected lands in Stratham (shown on Map 11).

A. PUBLIC

1. Town

The Town of Stratham owns a significant amount of open space, most of which is located in the vicinity of Stratham Hill. The Town's major land holdings include: Stratham Hill Park (108 acres); the "Gifford" land, adjacent to Stratham Hill Park (86 acres); the site of the new elementary school (37 acres); and the conservation land which lies between Lovell Road and Gifford Farm Road (13 acres).

2. State

The State of New Hampshire owns two parcels in Town, both of which are located adjacent to the Squamscott River at Chapman's Landing. This site has a total area of about seven acres, and is managed by the N.H. Fish and Game Department.

B. QUASI-PUBLIC

In Stratham, quasi-public lands include those which are owned by the Boston and Maine Railroad; and transmission-line easements owned by the Public Service Company of New Hampshire for electricity, and by Northern Utilities for gas. These corridors can provide important links to open space lands.

The 91-acre site of the New Hampshire Vocational Technical College is also included in this category. As discussed in Section IV.A, this tract contains several playing fields available for public use.

C. PRIVATE PROTECTED LAND

In Stratham, there are generally two types of mechanisms which have protected privately-owned open space lands: 1) conservation easements; and 2) cluster development.

1. Conservation Easements

- a) Stuart Farm. This site is located in northwestern Stratham, and is bisected by Mill Brook. At 173 acres, this is the Town's

largest tract of protected land. As discussed in Section IV.B, the conservation easement (development rights) is held by the N.H. Department of Agriculture. Public access is allowed by permission only.

- b) Wiggin Conservation Land. This 37-acre parcel is located adjacent to Jewett Hill Brook. This land is ecologically important - containing rare and endangered plants, and comprising a portion of the tidal wetland system of the Squamscott River. The conservation easement is held by the State of New Hampshire. Public access for transitory recreational purposes is allowed.
- c) Turnberry Open Space. This land is the open space portion of the Turnberry Condominium development. It is a 61-acre tract located next to the Wiggin parcel (described above), adjacent to the Squamscott River. It also contains a significant amount of tidal wetlands. The easement is held by the Society for Protection of New Hampshire Forests. Public access is allowed by permission only.
- d) Salt River Open Space. This 51-acre tract is the open space portion of the Salt River Condominium development. Like the parcels described above, this land has ecological importance and contains tidal wetlands. The easement is held by the Rockingham County Conservation District, and public access is permitted.

2. Cluster Development

In 1983, the Town of Stratham adopted a cluster development provision in its Zoning Ordinance. The cluster ordinance has led to many tracts of open space being protected, in perpetuity, especially along the Squamscott River.

The following is a list of the cluster developments which have set aside significant tracts of open space to remain undeveloped, in perpetuity:

Glengarry	The Meadows
Pheasant Run	Thornhill
Aberdeen East	Stratham Woods
Aberdeen West	Peninsula
Balmoral	Stratham Green
Lamington	Turnberry
Muirfield	Salt River
Montrose	

D. LARGE TRACTS

Map 11 depicts the locations of Stratham's remaining tracts of contiguous open space (labeled as "undeveloped contiguous parcels"). Significant concentrations of open space are located along the Squamscott River, between N.H. Route 101 and Jewett Hill, and in the central and southern parts of Town.

Large tracts of open space are important to consider when planning for the Town's future open space needs. In general, the larger tracts of open space land are of greater value in terms of open space benefits, e.g., farming, forestry, recreation, wildlife habitat, aesthetics, etc. For this reason, the Town should endeavor to acquire and/or protect those large lots which are contiguous to publicly-owned or otherwise protected parcels.

VI. GOALS AND RECOMMENDATIONS

VI. GOALS AND RECOMMENDATIONS

In January, 1989, the Stratham Conservation Commission developed long term goals and objectives to aid in guiding the Commission's activities and in determining yearly goals. The Commission should be applauded for carrying out this exemplary process. These goals, as well as those in the Master Plan, were incorporated into the formulation of the following - which create a framework within which to operate and prioritize areas on which to focus energies. Objectives were then set forth as actions to be taken in order to incrementally achieve long range goals. Goals are established and described below - ordered according to Section IV of this plan.

IV. OPEN SPACE VALUES, INVENTORY, AND ANALYSIS

A. RECREATION

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

Recommendations:

- Planning Board should seek to establish trail corridors when reviewing cluster development proposals.
- Seek funding sources for additional facilities in order to meet State standards for outdoor recreation facilities.
- Designate funds for recreational facility improvements through capital improvement programming.
- Develop a long range plan for the Stratham Hill Park and adjacent Town property.
- Conduct an inventory of possible recreation land sites that may become available for donation/acquisition and target those that are most desirable for public acquisition.
- Encourage developers of large subdivisions to donate a portion of their parcels for use by the residents of the Town.
- Seek to establish a public hiking trail (see Map 12) by interconnecting, through easements and other agreements with landowners, a network of trails linking public conservation and recreation lands.

B. AGRICULTURE/FORESTRY

Goal: To preserve significant farm and forest land for resource production and preservation of rural character.

Recommendations:

1. Agriculture

-- Conduct an inventory of possible agricultural lands that may become available for donation/protection.

-- Contact landowners regarding possible preservation techniques (e.g., LCIP, donation of conservation easements, purchase of development rights).

-- Provide Current Use Assessment information to farmland owners who qualify, to make retention of agricultural lands more economically feasible.

-- Educate farmland owners about creative development techniques so that, if necessary, financial needs may be met while preserving important farmland.

2. Forestry

-- Write and implement a management plan for Stratham Hill park with assistance from the County Forester.

-- Monitor lands surrounding Stratham Hill Park as to their availability for Town purchase; and establish a Town Forest.

-- Seek to have forested lands of manageable size (greater than ten acres) preserved through sound, long-term forest management programs which provide for all forest benefits, including watershed protection, wildlife habitat, recreation, and aesthetics.

C. ENVIRONMENTAL PROTECTION

Goal: To protect all environmentally sensitive areas by preventing detrimental alteration, development, or pollution.

Recommendations:

1. Surface Water

-- 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.

-- Seek funding sources (e.g., Trust for New Hampshire Lands) to acquire/protect lands abutting the Squamscott River and Great Bay according to priority.

-- Review Town ordinances and regulations to ensure compliance with standards as those for erosion and sedimentation controls and pollution controls.

-- In order to prevent further degradation of the Squamscott River water quality, avoid any conditions which precipitate the need for a wastewater treatment facility (using surface water disposal).

2. Wetlands

-- Perform a wetlands evaluation and adopt Prime Wetlands designation for the municipality's most important wetlands.

-- Encourage the enforcement of current zoning, subdivision and site plan review regulations, as well as state and federal rules/laws pertaining to wetlands.

-- Review Town ordinances and regulations to see that they adequately protect wetlands.

-- Continue to review Dredge and Fill applications.

-- Protect the most important wetlands by easement and/or acquisition.

3. Floodplains

-- See that the Town, as a participant in the National Flood Insurance Program, keeps its floodplain ordinance up to date and consistent with the program's requirements.

-- Attempt to acquire lands or interest in lands in floodplain areas - especially those along the Squamscott River and Great Bay.

-- Review proposed developments or alterations in floodplains for compliance with local, state, and federal requirements - especially with respect to waste water disposal and erosion.

4. Shorelands

-- Improve public access to the water bodies in Town by acquiring more shorefront land or easements.

-- Maintain Shoreland Protection District to prevent detrimental alteration of the land close to the shores.

5. Groundwater

-- Perform an inventory of well water quality and continue to monitor.

-- Perform an inventory of possible future public water sources and adopt an aquifer protection ordinance.

-- Conduct an inventory of all underground storage tanks.

D. HABITAT

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

Recommendations:

-- Hire a consultant to identify and inventory habitats for game and non-game wildlife populations that are valued but not rare; these may include deer yards, freshwater riparian habitats, and saltwater wetlands associated with estuarine systems. In addition, important migration corridors for wildlife should be identified.

-- Seek to protect habitat areas for rare and/or endangered species through conservation easements or fee-simple acquisition.

-- Attempt to preserve corridors that link large tracts of open space in order to maintain habitat integrity.

E. AESTHETICS

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

Recommendations:

-- Protect high quality scenic views along public roads through easements (or acquisition).

F. EDUCATION/RESEARCH

Goal: To provide adequate opportunities for education and research by protecting existing unique sites and acquiring areas which will offer expanded opportunities.

Recommendations:

-- Work with the N.H. Fish and Game Department toward developing opportunities for education and research within the Great Bay estuary.

-- Promote increased conservation awareness and education at the primary and secondary school levels. The Conservation Commission should work with the School Board in arranging for conservation-related field trips, workshops, and lectures.

G. HISTORIC/ARCHEOLOGICAL SITES

Goal: To preserve historical archeological sites of significance and provide public education about them as they are an important and irreplaceable part of Stratham's cultural heritage.

Recommendations:

-- Pursue permanent protection of the identified significant historic/archeological sites in Town.

-- Work with the N.H. Department of Historic Resources to inventory archeological sites of significance.

VII. OPEN SPACE PLAN

VII. OPEN SPACE PLAN

A. GENERAL

Stratham is fortunate to have many high-quality natural resources and open spaces. Section IV evaluated the Town's land according to the seven identified resource values of open space. These types of open space were then depicted on a series of maps. Through this process, specific areas have been designated which possess multiple resource values and warrant protection. These areas include wetlands, floodplains, shorelands, aquifer recharge areas, unique scenic views, prime farmland, rare habitat, and sites of recreational, educational, historical, or archeological significance.

What this process has proven is that even with extensive protection of the identified environmentally sensitive areas and high quality open space lands, there is ample land available throughout Town for future development.

Map 11 shows the publicly-owned State and Town lands, power line and railroad rights-of-way, and parcels protected by easements or covenants. Benefits from these open spaces can be maximized through greenbelt linkages and trail systems.

For this reason, Map 12 - "Open Space Protection Plan" - proposes a trail network which links important open space areas throughout Stratham using some sections of the PSNH power line and Northern Utilities gas line easements. This trail system would provide superb recreational and educational opportunities to the townspeople. It should be noted that utility easements do not necessarily give the public a right of passage. Therefore, in creating a trail network, the easement owners as well as landowners along the easement must be contacted.

It would be unrealistic to expect to preserve all of the identified areas in their natural state; therefore some decisions were made regarding recommendations for parcel protection. The process of prioritizing areas for conservation/protection was carried out by evaluating the findings of this plan (e.g., type of resource value, location, Town's specific open space needs).

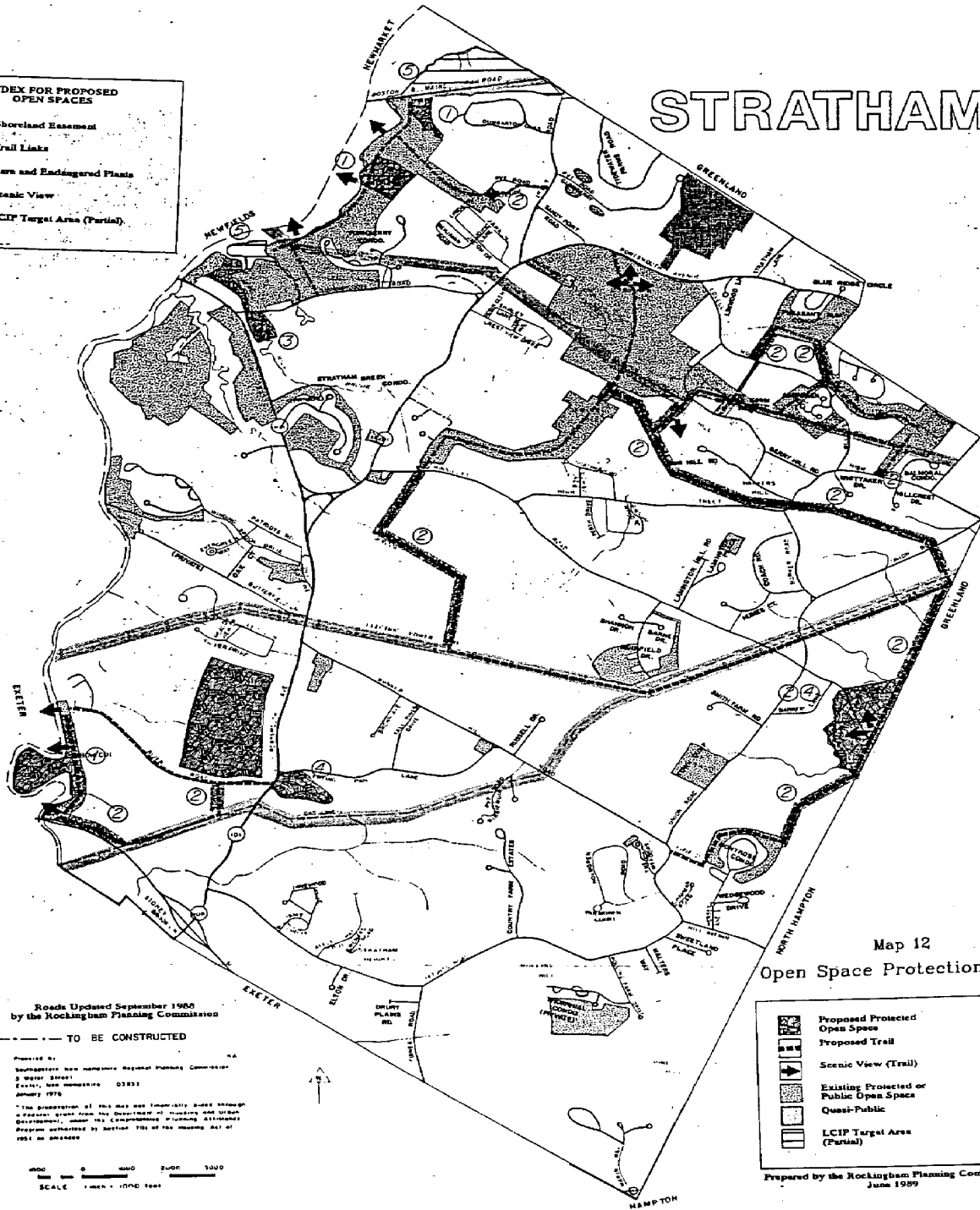
The Conservation Commission, the Planning Board, the Board of Selectmen, and Town Meeting can use this plan to make strategic decisions regarding recommended parcels. The plan will also be useful to the Recreation Commission in their efforts to expand and improve recreational facilities. For example, if land is proposed for development, the Planning Board can use this plan to evaluate the design of the development. The Town, by using this plan, can target areas for protection. Once targetted the Conservation Commission and Selectmen should actively pursue their protection, either through conservation easements or outright acquisition.

It would be very helpful to inventory all open space areas in Town. A property study - including such information as tax map lot number, name and address of owner, acreage, appraised value, and a map showing property boundaries - would be a valuable tool as a starting point for landowner contact and parcel protection. In 1988, the Rockingham Planning Commission performed an inventory of sizeable properties along the Squamscott River

STRATHAM

INDEX FOR PROPOSED OPEN SPACES

- ① Shoreland Easement
- ② Trail Links
- ③ Rare and Endangered Plants
- ④ Scenic View
- ⑤ LCIP Target Area (Partial)



Map 12
Open Space Protection Plan

Legend

- Proposed Protected Open Space
- Proposed Trail
- Scenic View (Trail)
- Existing Protected or Public Open Space
- Quasi-Public
- LCIP Target Area (Partial)

Roads Updated September 1966
by the Rockingham Planning Commission

--- TO BE CONSTRUCTED

Prepared by:
Southeastern New Hampshire Regional Planning Commission
3 Water Street
Exeter, New Hampshire 03833
January 1976

*The preparation of this map may have indirectly aided through a Federal grant from the Department of Housing and Urban Development, under the Comprehensive Planning Assistance Program authorized by Section 701 of the Housing Act of 1954 as amended.

SCALE 1" = 1,000 FEET

Prepared by the Rockingham Planning Commission
June 1969

in Stratham, Exeter, and Newfields (see Squamscott River Property Study, Rockingham Planning Commission, 1988). It is recommended that Stratham, with assistance from the RPC, conduct such an inventory of all valuable natural resource areas in Town.

B. THE PLAN

The areas shown on Map 12 consist of parcels already protected and areas designated to become part of Stratham's open space system. They are categorized as follows.

Existing Public and Protected Open Space. As discussed in Section V, these areas include: Town and State owned lands, open space protected through cluster development, and lands protected by conservation easements. These areas are depicted on Map 11 as well.

Quasi-Public Lands. Also discussed in Section V, these lands include: the Boston and Maine Railroad right-of-way; the Public Service Company of N.H. power line easements; the Northern Utilities' gas line easement; and the land owned by the N.H. Vocational Technical College (depicted on Map 11).

Proposed Protected Open Space. These are areas which are recommended for conservation/protection because of their multiple resource values. Fee simple acquisition is the optimal method of protection, however, for financial reasons, conservation easements will most likely be the most practical mechanism for land protection. The following section, VII.C - "Methods for Open Space Protection" presents a wide array of methods to protect open space.

Proposed Trail. The concept of a public trail system was described in Section IV.A.3. As stated earlier, community trails would provide a variety of recreational and educational opportunities. If developed, a trail system would be an incredible asset to the Town.

LCIP Target Area (Partial). This information was obtained from an overlay map drafted by the N.H. Office of State Planning and the UNH Complex Systems Research Center in 1988. This map is used in conjunction with the Land Conservation Investment Program (LCIP), funded through the Trust for New Hampshire Lands (see Section VII.C, for further discussion). This overlay was based on information contained in the U.S. Geological Survey topography maps (photorevised 1973). Map 12 does not show all of the areas on the LCIP map due to the following reasons:

- 1) The map was prepared using the 1973 USGS maps. Some areas on the USGS map, where development was not shown, were included on the LCIP map; but some parcels have been developed since 1973, and are no longer suitable for conservation purposes; or
- 2) some parcels have already been protected through full acquisition, or through conservation easements, by the Town or State (see Section V for a discussion of protected parcels).

Open Space Areas Proposed for Protection

The following is a brief discussion of the areas designated on Map 12 as "proposed protected open space". The numbered paragraphs below correspond to the numbers shown on the map.

1. Shoreland Easement. By protecting these shoreland corridors, views could be maintained and a future trail system could be developed. These areas also contain floodplains and wetlands. In the northwestern part of Town, the designated tract would serve as a link to existing protected areas.
2. Trail Links. These areas are shown in various locations along "proposed trails." The areas would be needed to link important open space areas throughout Town. The trail widths shown on Map 12 are not necessarily drawn to scale. The optimal width will vary on a case-by-case basis (e.g., 150 to 300 feet may be desirable along the Squamscott River). In general, a wide trail corridor is more effectively buffered from surrounding uses than a narrow one. Nevertheless, easements for public trails through private lands typically range from 10 to 30 feet in width.

Potential scenic outlooks along these trails would be from Long Hill, in the vicinity of Winnicut Road and from the banks of the Squamscott River (as depicted on Map 12).

3. Rare and Endangered Plants. This area, located along the mouth of Jewett Hill Brook, should be protected in order to preserve the rare and endangered plant species described in Section IV.D. The N.H. Natural Heritage Inventory should be consulted for assistance toward this goal. Moreover, this area contains: an important archeological site warranting protection (see Section IV.G); scenic views (see Section IV.E); and floodplains (see Section IV.C.3).
4. Scenic Views. These areas provide outstanding scenic views from public roads for both residents and visitors, and should be protected from development to the greatest extent possible. These areas include: the Winnicut River Valley along Winnicut Road (containing floodplains and wetlands), at the "entrance" to Stratham from North Hampton; and the expansive, rolling farmland along N.H. Route 101 (containing a large area of wetlands).
5. LCIP Target Area (Partial). Because of their outstanding natural resource values, the Town should work with the Land Conservation Investment Program toward protecting these areas.

C. METHODS FOR OPEN SPACE PROTECTION

The previous section described the open space lands which are recommended for protection. The next step is to present the various methods available to protect open space for plan implementation.

1. Voluntary Land Protection Techniques

- a. Land Purchase (fee-simple interest): Purchase of land will give the Town ultimate control over its use, but may also be the most expensive means of land acquisition. However, federal and State matching grants (discussed in Section 3 below) can greatly reduce purchase costs. The Town should use its "Land Conservation" fund as capital to purchase critical open space lands.
- b. Option: In some cases where landowners are not interested in any permanent protect method, they may be willing to grant or sell an option to the Town for purchase of the property. The two parties would then agree on a purchase price and a specified amount of time during which the Town could purchase the land at that price. Sometimes an option will require a percentage of the purchase price up front, which can be used toward the price if the parcel is bought. This mechanism is useful in situations where a landowner wants to sell, but the Town needs time to secure funding. If the parcel is not purchased within the specified time frame, the option expires and the land can go on the market.
- c. Right of First Refusal: This method is similar to an option except that it simply guarantees the Town the opportunity to purchase the land for a price equal to a bona fide offer from another party. Once the Town acquires rights of first refusal on the high priority parcels, they will then have a means to become aware of potential sales and the opportunity to respond.
- d. Purchase and Resale (also known as "limited development"): An increasingly necessary option is the purchase of a property and its subsequent resale, of all or part, with restrictions or limited development opportunities. In this way, the Town may be able to recoup more than its purchase cost through some creative planning and tasteful development on that part of the land not critical to open space benefits.
- e. Bargain Sale/Purchase: Buying the land for less than its fair market value reduces the purchase price for the Town and offers tax deductions to the seller. The difference between the fair market value and the bargain sale price may be used as a charitable donation by the landowner. Used in concert with the Trust for New Hampshire Lands, Land and Water Conservation Funds, or Pitman-Robertson funds (administered through the Department of Resource and Economic Development), a bargain sale of 50% could eliminate any expense for the Town.
- f. Easements (less-than-fee interests):
 - Conservation easement: Sometimes called a conservation restriction, this mechanism is a practical way for private landowners to protect environmentally significant land while retaining their ownership. Easements provide permanent protection from uses of land that could damage or destroy its scenic, ecological, and natural resource values. Generally, easements are donated (but they may be sold)

to a non-profit conservation organization or public agency which enforces the restrictions in perpetuity. The terms of the easement run with the land and apply to all future owners. Each easement is tailored to fit the natural characteristics of the land, the personal needs of the owners, and the objectives of the organization or agency. Whether purchased or received as a donation, an easement is a less expensive method of protection than fee-simple purchase.

- Purchase of Development Rights: If a conservation organization or government body is interested in purchasing it, a landowner may sell his easement. See Section 3.b below.

Both of these methods provide tax benefits to the landowner by decreasing the assessed value. In addition, donation of a conservation easement usually qualifies as a charitable donation and allows for a deduction for federal income taxes (see the following Section "Tax Incentives").

g. Tax Incentives:

- Donation: Landowners who donate their land, or easement restrictions, can receive tax benefits in the form of federal income tax deductions, potential estate tax benefits, and relief from property taxes.
- Current Use Assessment Program: Authorized by NH RSA 79-A, this property tax abatement program generally provides for reduced property assessments on parcels of field, farm, forest and wetland of 10 acres or more or on "natural preserves" of any size, recreational land of any size, or farmland generating more than \$2,500 annually. Once in the program, a landowner cannot develop his parcel without paying a penalty. The current use status remains with the land even if it is sold. If the land is ever developed, the current owner is assessed a land use change tax equal to 10% of the fair market value of the property at the time the land use change occurs. While this mechanism provides an incentive for landowners to avoid developing their land, it does not protect or preserve parcels because current use is an optional designation.

Landowners who have active farmland in current use may qualify for a further reduction in their tax assessment under the 1988 changes in RSA 79-A:5. These changes allowed the soil potential index (SPI) to be used in computing property taxes. The Rockingham County Conservation District has further information on this program.

2. Regulation and Zoning

Through land use regulation, Stratham can conserve open space areas in the interest of environmental quality and public health and welfare. Zoning helps the Town keep one person's development from

putting a tax burden on others. Stratham's Wetlands Conservation District and Cluster Development ordinances are good examples of protecting open space through zoning. As discussed in Section IV B, a cluster development ordinance allows houses to be grouped together, while maintaining the Town's overall housing density. This is possible because more open land is preserved giving the developer the opportunity to save valuable groups of trees, wetlands, shorelands, etc., while building the same number of housing units. The resulting open space amenities of cluster developments can lead to significant increases in property values. At the same time, service and development costs are lower than for conventional, sprawling developments because utility lines and roads are not as extensive and site preparation costs are reduced by cutting fewer trees, less site grading and so on.

3. Public Programs:

- a. Designation of Prime Wetlands: This program would permit the Town to designate some wetlands within its borders as "prime wetlands" because of their size, unspoiled character, fragility or uniqueness. Once prime wetlands are designated, the NH Wetlands Board is required to give special consideration to these areas. The Wetlands Board will not issue a dredge and fill permit: 1) without a public hearing; and 2) if the proposed project impairs the value of the wetland.
- b. Acquisition of Agricultural Land Development Rights: This program is administered by the Agricultural Land Preservation Committee (ALPC) within the NH Department of Agriculture and is designed to save important farmland throughout New Hampshire.

If the ALPC designates a farmland parcel as an "agricultural preservation restriction area," the state will purchase the land's development rights in order to limit the land's use to agricultural production. Criteria used to make this designation include:

- 1) soils potential and suitability;
- 2) threat of development;
- 3) cost of development rights;
- 4) present status of land.

The State of New Hampshire appropriated \$3 million in 1979 and \$2 million in 1985 to purchase development rights on important agricultural land in the state.

- c. Trust for New Hampshire Lands: This is a private non-profit corporation formed in October, 1986 by representatives from the business, conservation, and government sectors. Funded by grants and private donations, the Trust has two primary goals: 1) to protect up to 100,000 acres of prime natural land throughout the state for conservation and recreation purposes; and 2) to enable towns to identify and retain important natural landscapes that enhance the community's character. The Trust is accomplishing its land preservation goals through voluntary negotiation with landowners, and relies on land protection methods

such as fee-simple acquisition, bargain sales, conservation easements, and purchase of development rights.

In May 1987, the Legislature created the Land Conservation Investment Program (LCIP), a state program within the Office of State Planning. As the public arm of the Trust, it receives all monies appropriated by the Legislature and uses them for the land acquisition. In 1987, \$20 million was appropriated; and in 1989, \$18 million. The program provides funding which must be matched by Towns in the form of cash, land, or interest in land. All administrative costs (e.g., salaries) are paid by the Trust. There are six land agents throughout the State to assist municipalities with landowner contact and the application process.

In May 1989, Stratham received funding from the LCIP and the Federal Research Reserve Program to protect a 30-acre parcel on Squamscott Road (cited as the Wiggin Conservation Land in section V.C). In June 1989, the Town applied to the LCIP for funding to protect a 39 acre parcel at the mouth of the Squamscott River.

- d. Federal Grants: There are two federal grant programs for the purchase of conservation land: 1) The Land and Water Conservation Fund offers grants of up to 50% of the fair market value of lands acquired by governmental units or public recreation (funding maximum is \$25,000). Conservation lands could qualify; 2) The N.H. Department of Fish & Game receives Pitman-Robertson Funds which cover 75% of the fair market value of lands acquired by the Department for Wildlife Protection.

4. **Conservation Commission**

The Conservation Commission, as well as the Selectmen, play a critical role in the conservation and preservation of open space in Stratham.

Conservation Commissions typically provide information and instruction to other town officials regarding the open space protection methods described above. In addition, they are the people most often implementing them.

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 inventory open space; natural, aesthetic, and ecological areas; marshlands; swamps; and other wetlands and make recommendations to the selectmen, on the use of such lands. In addition, RSA 36-A:4 allows the conservation commissions to receive gifts of property or money that are intended for conservation purposes, subject to the approval of the selectmen. The commission is then responsible for managing the acquired land.

It is recommended that the Conservation Commission petition the Selectmen (signed by at least ten registered voters) to insert into the Town Meeting warrant the following articles:

1. Place all "current use" program penalties in the conservation fund. This fund is used for conservation purposes i.e., land acquisition, purchase of development rights, etc.
2. Authorize the Conservation Commission to retain the unexpended balance of its annual appropriation, said funds to be placed in a conservation fund as authorized by RSA 36-A:5.

RSA 36-A:5, I was amended in July, 1987 to allow Conservation Commissions by majority vote, to expend monies from the conservation fund without further approval of Town Meeting.

VIII. CONCLUSION

VIII. CONCLUSION

The open space resources of Stratham constitute an important component of the Town's landscape. Open space provides the basic visual identity of the community and provides recreational and ecological values as well. Without adequate openspace, the quality of life of the community would be reduced.

The open space plan has been prepared in order to guide the community in protecting its open space and recreational resources. The Plan is not a regulatory document. Rather it contains recommendations that, if acted upon in a timely manner, can help ensure that important open space lands are protected and preserved in the future as the Town continues to develop. The Plan should be adopted as part of the Stratham Master Plan so that the Planning Board can use it when making development decisions.

In addition to presenting a natural resources inventory for Stratham, the plan establishes a logical network of protected open space. The Plan of protected open space (as depicted on Map 12 and described in Section VII) is based on four objectives: to protect critical natural resources, to create an interconnected trail system for recreational use, to link important habitat areas through wildlife corridors, and to build on the existing base of protected open space land.

In order to carry forth the recommendations of this Plan, the Town should carefully consider the methods of protecting open space lands, contained in Section VII.C.

The conservation of valuable and unique natural resources and the preservation of open space is important to Stratham. It is one way to maintain the community's character in spite of its continued growth. All the Town boards, but especially the Conservation Commission and Planning Board, should play an active and ongoing role in this endeavor.

APPENDICES

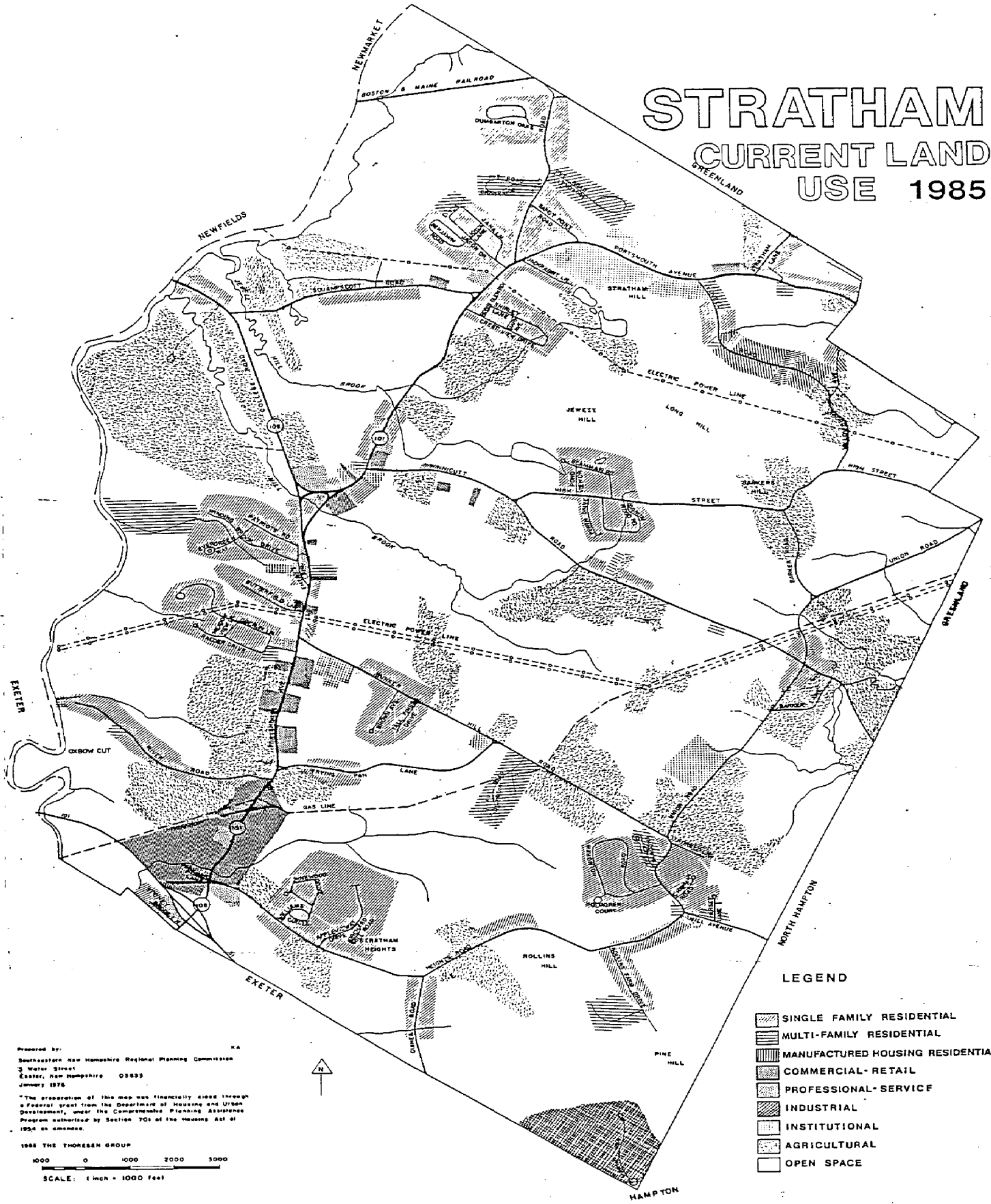
APPENDIX I - Current Land Use, 1985

APPENDIX II - Functions of Wetlands





APPENDIX III - Rare and Endangered Plants

STRATHAM

CURRENT LAND USE 1985



LEGEND

-  SINGLE FAMILY RESIDENTIAL
-  MULTI-FAMILY RESIDENTIAL
-  MANUFACTURED HOUSING RESIDENTIAL
-  COMMERCIAL-RETAIL
-  PROFESSIONAL-SERVICE
-  INDUSTRIAL
-  INSTITUTIONAL
-  AGRICULTURAL
-  OPEN SPACE

Prepared by: KA
 Southeastern New Hampshire Regional Planning Commission
 3 Water Street
 Exeter, New Hampshire 03835
 January 1976

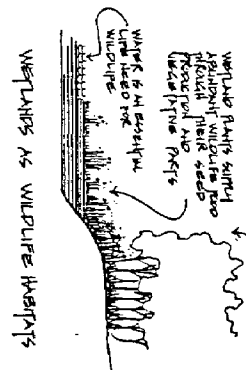
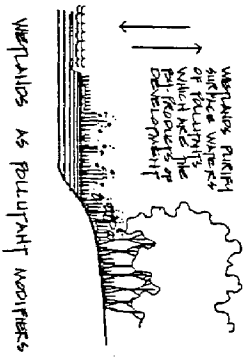
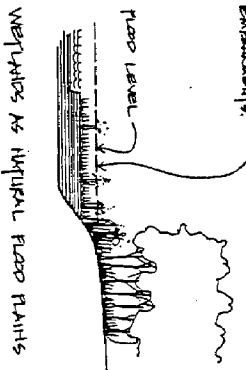
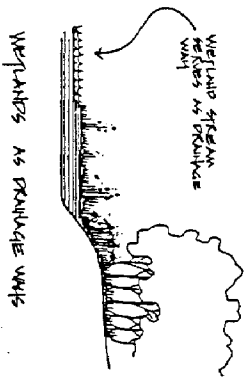
The preparation of this map was financially aided through a Federal grant from the Department of Housing and Urban Development, under the Comprehensive Planning Assistance Program authorized by Section 701 of the Housing Act of 1954 as amended.

1988 THE THORSEN GROUP
 1000 0 1000 2000 3000
 SCALE: 1 inch = 1000 Feet

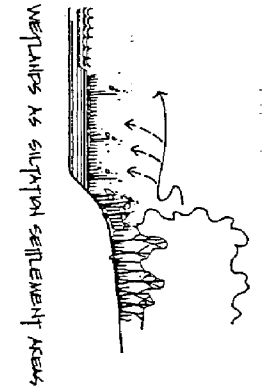
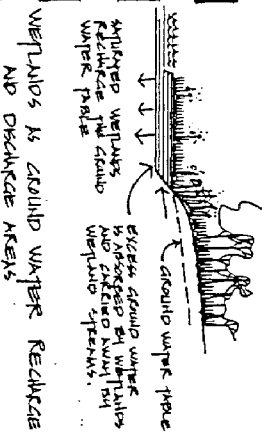
FUNCTIONS OF

WETLANDS

Surface water flowing in riparian wetlands and wetland systems

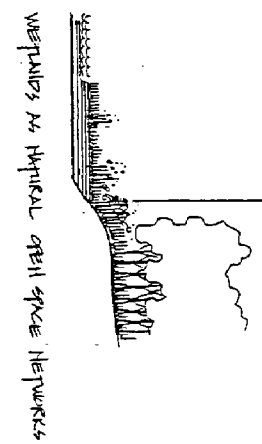


Surface drainage water containing sediments is filtered by wetlands and sediments in riparian wetlands is carried downstream.



Hydrologic and hydrologic values of wetlands vary with their physical and chemical characteristics and the hydrologic and other values they provide.

Wetland area of wetlands should be reserved to protect wetland hydrologic and other values, such as fish, etc.



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

Town of Stratham

Status				Scientific Name	Common Name
SRank	GRank	Federal	State		
S1	G5		ST	ELEOCHARIS PARVULA	SMALL SPIKE-RUSH
S2	G5		SE	GLYCERIA ACUTIFLORA	SHARP FLOWERED MANNA-GRASS
S2	G4			ISOETES ENGELMANNII	ENGELMANN'S QUILLWORT
S2	G5T5		ST	IVA FRUTESCENS VAR. ORARIA	MARSH ELDER
S2	G7		ST	POLYGONUM EXSERTUM	EXSERTED KNOTWEED
S2	G7		ST	POLYGONUM EXSERTUM	EXSERTED KNOTWEED
S2	G5		ST	SCIRPUS ROBUSTUS	STOUT BULRUSH

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

