

V. NATURAL AND CULTURAL RESOURCES ELEMENT

TOWN OF SOUTH KINGSTOWN, RI

COMPREHENSIVE PLAN

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* Technical Appendices are in a separate document.

A. Introduction

The purpose of this element of the Comprehensive Plan is to provide an inventory of the Town's natural and cultural resources and to develop a management and protection strategy for these resources.

The primary goal of the Town is to provide the necessary protection for the environmental and cultural resources of the area. This involves pursuing proactive protection strategies and a balanced pattern of residential and commercial growth. A secondary goal is to promote a broader public consciousness of the issues. Public support and understanding is critical to establishing an effective protection program.

B. Natural Resources Inventory

1. Geology

a. **Bedrock Geology** - Both igneous and metamorphic rock formations are the predominant bedrock in the area. They range in age from the Precambrian to the Pennsylvanian or younger (Moore, 1964). The northern half of the Town is underlain by gneisses of the Mississippian (or older) age, and the southern half of the Town is underlain by Pennsylvanian (or younger) age granite that reaches into Connecticut on the west and into Narragansett Bay on the east. The southeastern section of Town lies in the Narragansett Basin, a structural basin which stretches from the mouth of the Narragansett Bay into Massachusetts. Most of the basin is underlain with a sedimentary rock, but in South Kingstown the basin was found to be the Pennsylvanian granite.

b. **Surficial Geology** - With the exception of some shoreline features and the organic accumulations in wetlands, all of the topography in South Kingstown is attributable to the forces of glacial erosion and deposition (Quinn, 1979). The geology of New England has been shaped by the last period of glaciation, almost 17,000 years ago. One of the most apparent effects of the glacier was a disruption of the drainage patterns, causing formation of extensive marshes and other wetlands. Worden's Pond, and the adjacent Great Swamp area, is an example of a partially filled glacial depression. The southern boundary of this lake basin is the belt of low hills and ridges called the Charlestown Moraine, which is one of the best-formed end moraines in New England (Kaye, 1960). The Moraine is between one and two miles wide and as high as 150 feet in places. In South Kingstown, the Charlestown Moraine (located just north of Route 1) is the result of rocks and soil left by the glacier as it retreated. This blocked the drainage and created many wetlands to the north. Worden's Pond and the Great Swamp are the direct result of the blocked drainage. These areas are believed to be the former site of glacial Lake Worden, which at one time occupied all of Worden's Pond and the Great Swamp. The area to the south of the Moraine is mostly low lying, relatively flat outwash plains. Another result of the glacial action is the diversity of soil types found here. Our water-rich deposits of sands and gravels (aquifers), rich agricultural soils, numerous kettle ponds (formed by blocks of ice which depressed the landscape), and rocky uplands are all a direct result of glacial action.

c. **Coastal Geology** - The Rhode Island shoreline also is a result of previous glacial action and the forces of erosion and deposition. These two forces create a constantly changing coastline, filled with such dynamic features as marshes, bays, estuaries, barrier

beaches, spits, sand dunes, and salt ponds. The combination of wind and wave action causes these features to move and to change continually. In addition, the impacts of human activity can exert powerful and sometimes undesirable changes on the natural features.

Normally, a beach face is made of sand, deposited by the waves. However, when a beach intersects a deposit of glacial gravels, the result can be a cobbled beach front formed as the waves wash away the sand. South Kingstown has a number of these beaches, including sections of Green Hill, Browning, Moonstone, and the Matunuck beaches.

2. Soils

The Soil Survey of Rhode Island has identified 96 soil types within South Kingstown (Rector, 1981). Soils have different characteristics depending on such factors as the clay/silt/sand ratio and the structure of the soil. These characteristics determine the soil properties, a key in considering the soil suitability for land uses. Such characteristics as permeability, bearing capacity, erosivity, depth to water table, and depth to bedrock are important considerations in effective land use planning.

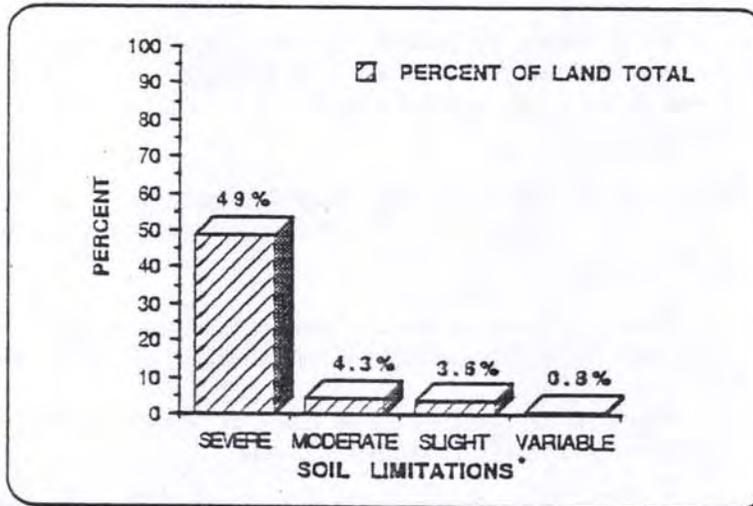
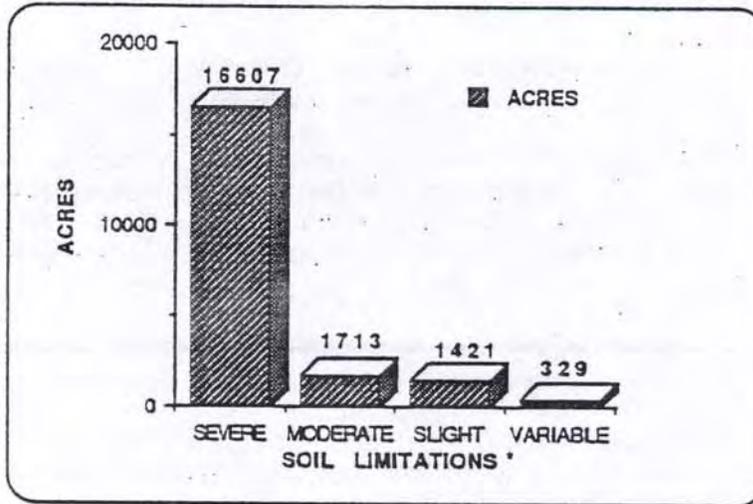
The Soil Survey of Rhode Island defines certain use limitations for each soil type. For example, a soil may have severe limitations for septic systems because of high water table or rapid permeability. In South Kingstown, almost 50 percent of the unsewered residentially zoned land under 2 acres has severe, moderate to severe, or slight to severe septic system limitations (Figure 1). In such areas, careful consideration must be given to the allowable land use because of the danger of failing septic systems and the resulting ground and surface water contamination. Because some soils are susceptible to erosion, careful erosion and sediment control precautions must be taken before, during, and after construction. In some cases, development on an unsuitable soil may lead to permanent loss or degradation of a natural resource. Flood hazards can be increased, as can the amount of standing water which serves as mosquito breeding sites. Prime agricultural lands may be lost to highways, shopping centers, and housing developments. Planning land use with a knowledge of soil characteristics will ensure that construction problems are minimized and that valuable natural resources are protected (see Section 10 for a discussion of the agricultural lands).

3. Wetlands

South Kingstown has 9,539 acres of freshwater wetlands and 2,915 acres of coastal wetlands, which represents approximately 27 percent of the total land area in the Town (see Figures 2 and 3).

a. Definition and Function - Because of its glacial geology and coastal location, South Kingstown has many acres and classes of wetland. The term wetland usually brings to mind a swamp, a bog, or a marsh. In fact, wetlands include a number of different land types. Aquatic beds, beaches, flood plains, wet meadows, swamps, bogs, and marshes are examples. The common characteristic of a wetland is that the area be at least periodically saturated or covered with water. Wetlands can be defined by soil characteristics (hydric soils), vegetation, or hydrology (Army Corps of Engineers, 1989).

FIGURE 1 SEPTIC SYSTEM SOIL LIMITATIONS
UNSEWERED LAND
Town of South Kingstown



- * SEVERE - SEVERE, MODERATE TO SEVERE, SLIGHT TO SEVERE CONSTRAINTS
- MODERATE - MODERATE CONSTRAINTS
- SLIGHT - SLIGHT TO MODERATE CONSTRAINTS
- VARIABLE - VARIABLE CONSTRAINTS

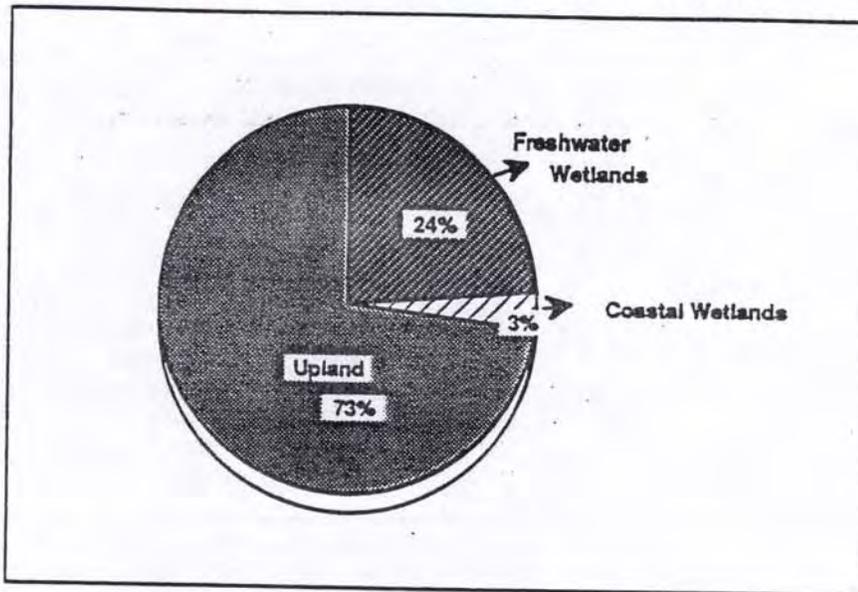
RHODE ISLAND GEOGRAPHIC INFORMATION SYSTEM, 1990

Prepared by the South Kingstown Planning Department

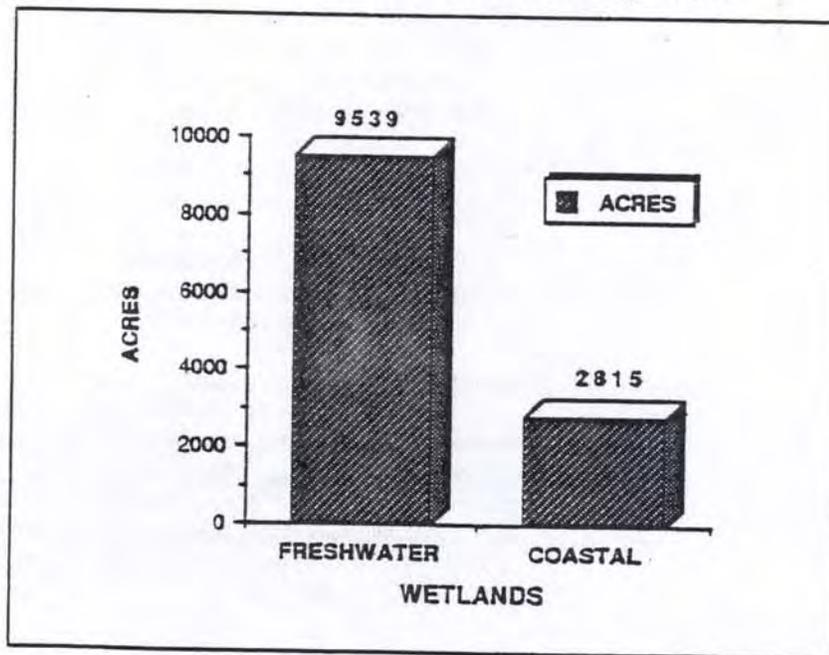
In Rhode Island, freshwater wetlands are defined by the Freshwater Wetlands Act, R.I.G.L. Title 2, Chapter 1, Sect. 2-1-18 et seq. Wetlands are protected and regulated by federal, state, and local laws because they provide many valuable functions. These are:

- 1) Pollution abatement is provided by wetlands. Pollutants can be trapped and held in wetlands through a variety of chemical, physical, and biological processes.
- 2) Wetlands serve as a mechanism of flood control because they are able to store water after heavy rain. Water then slowly is released during a later period, thus mitigating flooding downstream. As we lose more and more wetlands, the remaining wetlands serve a much greater role in floodwater storage and flood prevention (Novitski, 1981).
- 3) Habitats for plant and animal life is an important function of wetlands. Many animals live there permanently, but many also use wetlands as places to feed, to breed, or to rest during migration. Wetlands are the sites of many rare and endangered plants and animals. Salt marshes have a higher net primary productivity (in grams/carbon/year) than a tropical rainforest or any freshwater wetlands (Tiner, 1985). Because coastal wetlands are areas of high productivity, they function as an important food source for a variety of wildlife and a nursery to many commercial fish species (See Technical Appendix V.A1.0).
- 4) Many scenic landscapes are provided by wetlands -- whether it is a meandering river through the fall foliage, the morning mist over a marsh, or a sunset over a lake or beach, wetlands form an important part of our stock of scenic places.
- 5) Recreation often revolves around wetland area. Boating, hiking, hunting, fishing, wildlife observation, and photography are just a few of the activities which involve wetlands for recreation.
- 6) Wetlands play an important role in oxygen production. Wetlands support a large plant population, which is a major source of oxygen we use to live.
- 7) Wetlands provide valuable open space which serves to maintain the aesthetics and health of the environment.
- 8) Many wetlands provide groundwater recharge during part or all of the year. As the need for potable water increases, the ability of wetlands to replenish our underground water supplies will become more important. The water quality of the wetlands which recharge our drinking water also will be an important issue.

**FIGURE 2 PERCENTAGE OF LAND TOTAL
Town of South Kingstown**



**FIGURE 3 TOTAL ACRES OF WETLANDS
Town of South Kingstown**



Rhode Island Geographic Information Systems, 1990

Prepared by the South Kingstown Planning Department

b. Freshwater Wetlands - Freshwater wetlands include wooded swamps, marshes, bogs, aquatic beds, wet meadows, and floodplains. Descriptions of wetland types can be found in Cowardin, et al, 1979. Bogs, fens and open water areas are described in Golet and Davies, 1982.

1) Description

- a) Forested wetlands are commonly referred to as swamps. In Rhode Island (as in the Northeast), most of our forested wetlands are dominated by red maples (see Technical Appendix V.A2.0 for a complete list of common wetland species). Ash, willow, birch, and dogwood trees also may be found in these areas. Common shrubs include blueberry, winterberry, spicebush, alder, and buttonbush. Forested wetlands often have trees growing from mossy mounds surrounded by low, wet areas.
- b) Scrub shrub wetlands are areas which are dominated by shrubs or young trees. In addition to the above species, common shrubs in southern New England wetlands include swamp rose, steplebush, and viburnums.
- c) Wet meadows are areas in which grasses, sedges, and rushes are the primary vegetation. If these areas are not mowed, burned, or grazed, they may soon fill with shrubs and trees.
- d) Marshes are areas which are seasonally flooded with water and support a nonpersistent vegetation. Cattails, bulrushes, and phragmites are found in freshwater marshes. These areas are especially important to waterfowl and other wildlife.
- e) Aquatic beds are found in ponds and lakes. These open areas support many microscopic plants and may support some rooted and floating vegetation (water lilies, pondweed, water shield, and duckweed are some examples). In the shallow areas along ponds, stands of juncuses, pickerel weed, arrow arum, arrowheads, and wild rice may be found.
- f) Bogs are saturated areas of high acidity, low temperatures, restricted drainage, and low nutrient availability. The common plants are mosses, bog laurel, leatherleaf, pitcher plants, sundew, sweet gale, and bog cotton. A bog often has a thick deposit of peat (partially decomposed matter) which quakes when walked on. Fens are saturated areas which receive more nutrients than a bog. In a fen the sphagnum does not quake and the dominant plants are carexes.

2) Inventory - South Kingstown has a total of 9,539 acres of freshwater wetlands, which comprise approximately 25 percent of the Town (RIGIS, 1990). If a 50 foot buffer were placed around all the wetlands, the land covered would approximately double in size. Almost 70 percent of the freshwater wetlands are forested (swamps), while marshes and wet meadows make up only one percent. South Kingstown has only 45 acres of rivers, as contrasted with 2,300 acres of lakes (1,075 acres are in Worden's Pond). Bogs and fens comprise less than 0.01 percent of the freshwater wetlands in the Town.

Figures 4 and 5 give the specific acreage for each freshwater wetland type and the percentage of the Town that it represents. Again, it should be noted that placing a 50 foot buffer around these wetlands increases the land area covered about twice -- to over 50 percent of the Town.

Worden's Pond (1,075 acres) is the largest natural lake in the State, and the Great Swamp is the largest forested wetland in southern New England (Guthrie and Stolgitis, 1977). Many small ponds and streams are found throughout the Town, remnants of the past glacial action -- ice carving out valleys and altering drainage patterns. A 1,200 acre area east of Ministerial Road has 10 kettlehole ponds and is an important site for rare and endangered species (person. Comm, Joanne Michaud, RIDEM, 1990). The Chipuxet River winds south from Hundred Acre and Thirty Acre Pond, emptying into Worden's Pond. The Queen River, in the northwestern corner of Town, feeds Glen Rock Reservoir, which then forms the western boundary of the Town, the Usquepaugh River. Many brooks flow through large wetland areas in the northern section of Town -- Chickasheen, Genessee, White Horn, and Mink brooks are a few. In the eastern section of Town, Asa Pond, Rocky Brook Reservoir, Peace Dale Reservoir, and Indian Lake are the larger surface water bodies. In the northeastern section of Town, the Saugatucket Pond feeds the Saugatucket River which runs through the center of Wakefield before emptying into Point Judith Pond to the south.

c. Coastal Wetlands

Coastal wetlands include salt marshes, estuarine scrub shrub wetlands, beaches (unconsolidated shores, rocky shores), and estuarine and tidal waters (salt ponds and estuarine rivers). A description of these wetland classes is found in Cowardin, et al, 1979.

The Town has prepared a Harbor Management Plan (1991) to identify and to address issues related to Town tidal waters. Such issues as moorings, public access, current uses, water quality, and a resource inventory are included. A copy of this Plan is on file in the Planning Department.

FIGURE 4 FRESHWATER WETLANDS ACREAGE
Town of South Kingstown

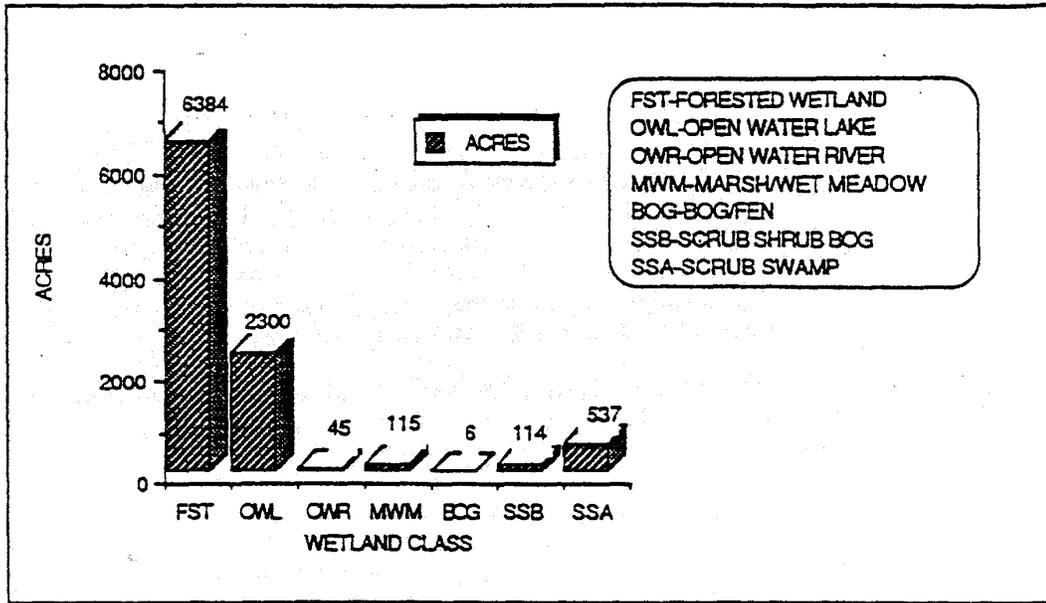
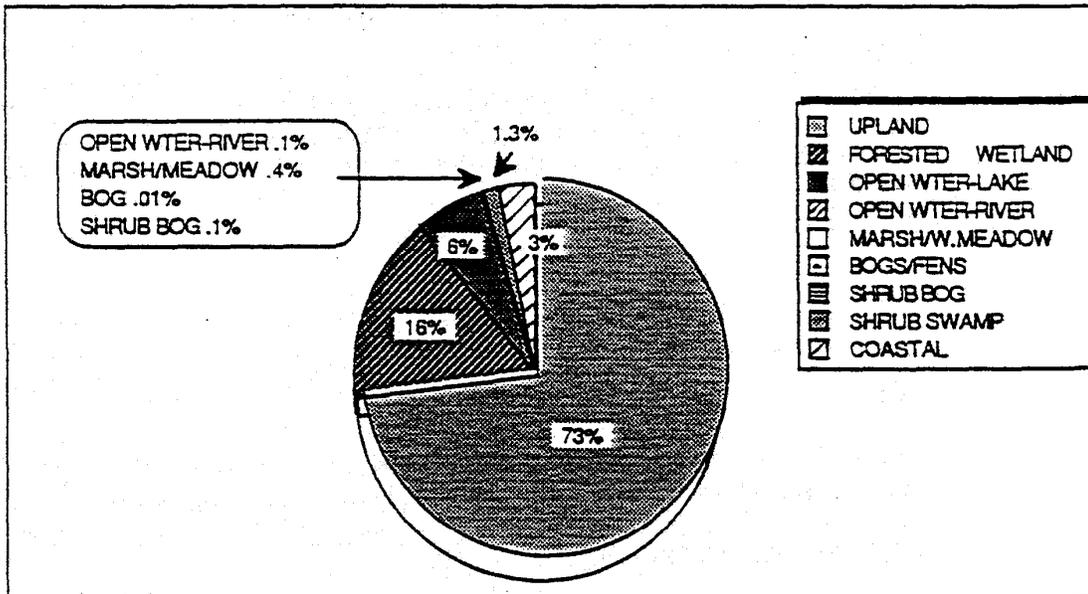


FIGURE 5 PERCENTAGE OF TOTAL LAND AREA
Town of South Kingstown



Rhode Island Geographic Information System, 1990

Prepared by the South Kingstown Planning Department

1) Description

- a) Barrier Beaches - Barrier beaches are narrow strips of beach running parallel to the mainland and are deposited by wave and wind action. These beaches usually serve as a buffer between the ocean and salt ponds, salt marshes, or some type of coastal wetland. As the sands shift with the dynamic forces of erosion and deposition, the beach faces continual change. Barrier beaches may be sandy or contain cobbles and other sediments and serve as important nesting and feeding spots for shore birds, including the least tern and the endangered piping plover. As previously noted, many of the South Kingstown beaches have exposed glacial gravels, which changes the sandy beach face into one filled with cobbles.
- b) Salt Marsh/Mud Flats - In a salt marsh, the process of sediment being deposited and trapped is balanced by the force of erosion (which prevents filling of the marsh). A salt marsh is an area which regularly is covered with salt water and has the following dominant vegetation (Technical Appendix V.A2.0 for a listing of common species): reed grass, cord grasses (*Spartina*), cattails, sea lavender, black grass, saltwort, and marsh elder.

Salt marshes and their contiguous wetlands have large numbers of shellfish and act as a nursery and spawning ground for several species of commercial and recreational fish and shell fish (Appendix A1.0). The combination of brackish, shallow water, circulation patterns, water temperatures, and protection from certain predators make estuaries and salt ponds of the most highly productive ecosystems. A brackish marsh is a transitional area which may include the following plant species: reed grass, beach rose, and salt meadow grass.

- c) Salt Ponds - These actually are embayments, areas which are shallow and receive inputs of both salt and fresh water. The salinity of a pond depends on the amount of salt water entering (either from breachways or ocean washing over the dunes) and the amount of fresh water entering from the upland (groundwater, streams, or surface runoff). It is this dynamic combination of brackish, shallow water, barrier beaches, and salt marshes that creates such a unique environment.
- d) Estuaries - The most productive of the aquatic habitats is the area where fresh and salt water mix (estuarine). Plankton communities, sea grasses and many species of fin and shellfish are found.
- e) Associated Habitats
- (1) Sand dunes are the vegetated lands which slope upward from the beach. Dunes are important because the vegetation (usually beach grass) traps sand that protects the inland wetlands and prevents the erosion of the barrier beach. As the grasses trap the sand, the dune grows. The grasses also stabilize the area as

their underground root systems, or rhizomes, weave a lateral network under the dunes. Areas of severe erosion may occur when the beach grass, a species sensitive to foot traffic dies as a consequence of being trampled. Other species that may be found on the dune crest and back dune are: beach rose, beach pea, seaside goldenrod, and Dusty Miller. Toward the back dune, beach grass may be replaced by switch-grass, beachheath and bayberry. The vegetative cover attracts such small mammals as the eastern cottontail and the meadow vole.

As the back dune becomes more protected, the number of vegetative species increases. These shrub areas, with the understory, provide cover and nesting areas for a variety of wildlife. The areas serve as an important food source for both native and migrating birds.

- (2) Fresh water wetlands may buffer the salt and brackish area from the upland areas. These are described in the previous section.

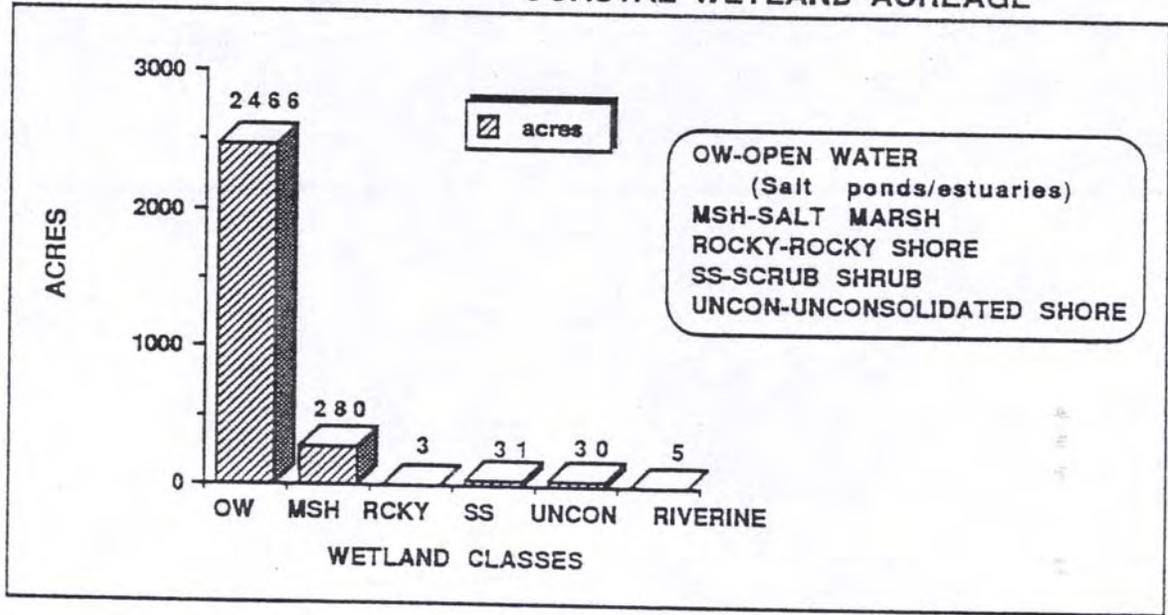
2) Inventory

South Kingstown has approximately 350 acres of coastal wetlands, with an additional 2,466 acres of salt ponds and estuarine rivers (Figure 6). As indicated on the graph, there are only 280 acres of salt marsh remaining in South Kingstown. Additionally, there are relatively few acres of the remaining wetland classes (beaches, riverine, and scrub shrub).

The Town of South Kingstown has over four miles of undeveloped barrier beaches and over one mile of developed barrier beaches, as designated by the Rhode Island Coastal Resources Management Program. Construction is prohibited on an undeveloped barrier beach, except where the primary purpose of the project is protection, maintenance, restoration or improvement of the feature as a conservation area or natural storm buffer (Olsen and Seavey, 1983).

The coastal boundaries of South Kingstown include five coastal ponds and one estuarine river (Figure 7). The water bodies are, from east to west, the Pettaquamscutt River (or Narrow River), Point Judith Pond, Potter Pond, Card Pond, Trustom Pond, and Green Hill Pond. South Kingstown is bounded on the west by the Town of Charlestown, which claims the most westerly portion of Green Hill Pond. South Kingstown shares a significant portion of its coastal resources with the Town of Narragansett, as the eastern Town boundary splits both Point Judith Pond and the Narrow River.

FIGURE 6 COASTAL WETLAND ACREAGE



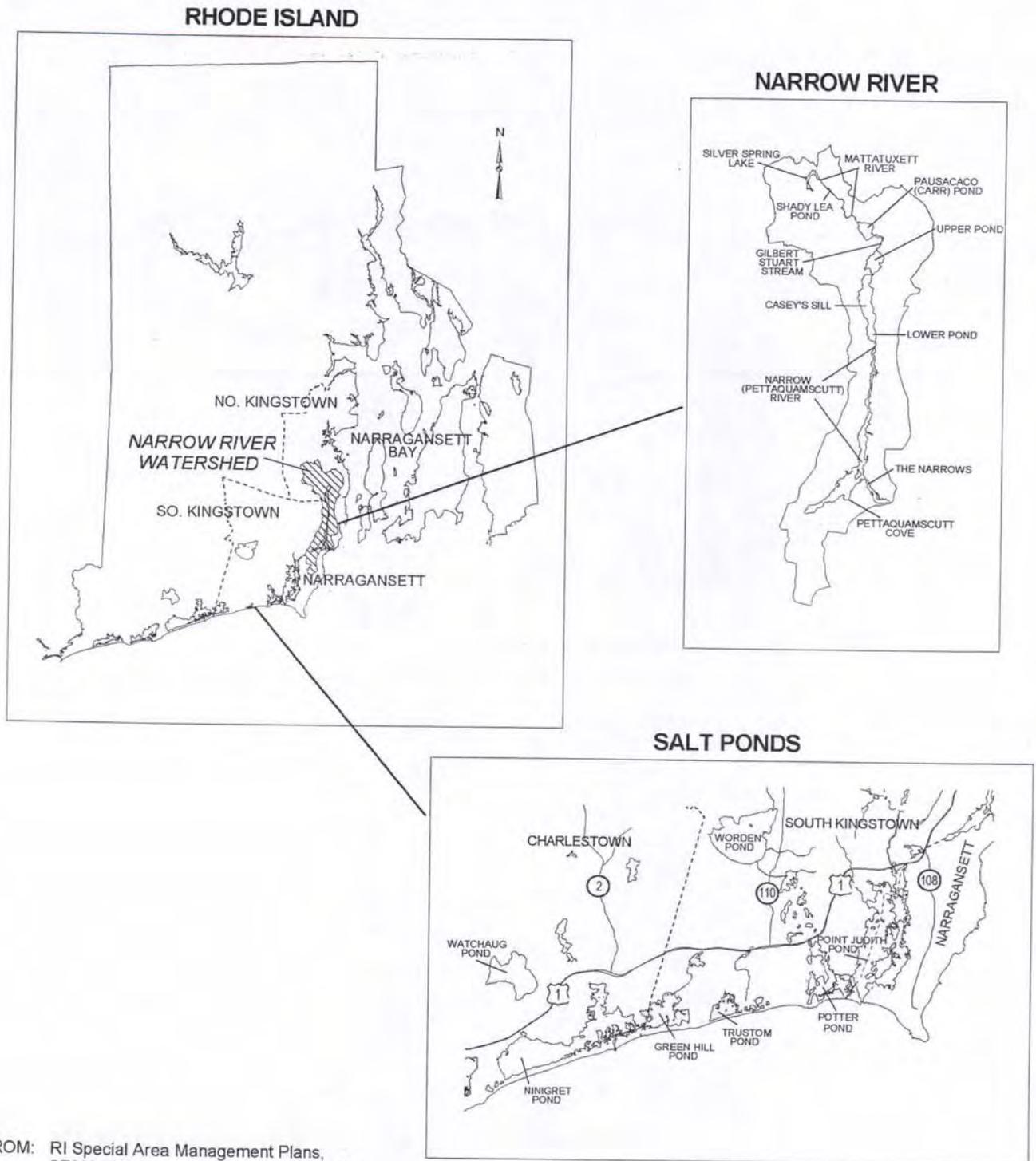
Rhode Island Geographic Information System, 1990

Prepared by the South Kingstown Planning Dept.

FIGURE 7

COASTAL WATERS

Town of South Kingstown



FROM: RI Special Area Management Plans,
CRMC, 1984, as amended through 1999

	Acreage	Average Depth (feet)
Green Hill	431	2.5
Potter	329	2
Point Judith	1530	6*
Trustom	160	1.5
Card	43	1.5
i. Narrow River	83	4**

* many areas less than 3 feet in the main channel.

** at MLW; and 2 northern basins of 50 foot depth.

(From NOAA charts #13218, 13219 and 13221.)

- a) Point Judith and Potter Ponds - Point Judith Pond receives a major water input from the Saugatucket River to the north, while the southern portion of the pond is open to Block Island Sound. The construction of a permanent channel in the early 1900's resulted in a marked change in the physical, chemical and biological nature of the pond. For the past ten years, the Rhode Island Marine Fisheries Council has designated Point Judith, Green Hill, and Potter Ponds as Shellfish Management Areas. There are three commercially harvested species of shellfish in the Pond: the soft shell clam, the bay scallop, and the quahog. In addition, hundreds of recreational fishermen use the pond. Such species as flounder, perch, and eels have been harvested (see Technical Appendix A1.0 for list of species found in the ponds). However, in 1991, the State prohibited the harvesting of winter flounder in the salt ponds. Point Judith also supports a small shellfish hatchery aquaculture operation. In addition, in 1990, the State stocked the pond with 100,000 bay scallops.

Because of its greater depth and predominantly soft bottom, Potter Pond supports a limited recreational shellfishery, primarily being used by residents who live around the pond.

- b) Green Hill Pond - In 1962 a channel was constructed to connect Green Hill Pond to Ninigret Pond in Charlestown. This has resulted in the decrease of -several important fish species. Fresh water input is from groundwater, Factory Pond Brook and surface water runoff. The major resource of the pond is the oyster, which may be harvested in October after the State lifts the pollution closure imposed during the summer.

- c) Narrow (Pettaquamscutt) River - The Narrow River is actually a tidal inlet and an estuary, an area where fresh and salt water mix. The area contains floodplains and salt marshes which are valuable habitat to a diversity of wildlife, including a number of rare and endangered species. Shellfish resources remain plentiful in the river. Prior to the water quality degradation and closure by RIDEM, the Narrow River supported a substantial recreational and seasonal commercial shellfishery (Howard-Strobel, 1987). In October 1988, Congress passed legislation authorizing the creation of the Pettaquamscutt Cove National Wildlife Refuge. As of January, 1992, the U.S. Fish & Wildlife Service had purchased 10 tracts of land totaling 145 acres within the boundaries.

3) Water Quality

In 1983, the CRMC devised a classification scheme for the coastal waters of the State.

NOTE: A more detailed description is found in The State of Rhode Island Coastal Resources Management Program, 1983.

Type 1: Conservation areas

Type 2: Low-intensity Use

Type 3: High-intensity Boating

Type 4: Multipurpose waters

Type 5: Commercial and Recreational Harbors

Type 6: Industrial Waterfronts and Commercial Navigation Channels

Trustom and Card Ponds are Type 1 waters. Green Hill and Potter Ponds are Type 2 waters, with the exception of the northern most cove in Potter Pond being Type 1 water. Point Judith Pond contains Types 1, 2, 3, 4, 5 and 6 waters (See Technical Appendix V.A3.0). The Narrow River contains both Types 1 and 2 waters. The two areas of conservation waters are found at the head of the river in North Kingstown and at the most southerly portion, Pettaquamscutt Cove, in South Kingstown.

In 1988, RIDEM revised the water quality standards (RIDEM, Water Quality Regulations for Water Pollution Control, 1988). The State has classified all fresh and salt water bodies and assigned water quality standards for each. It should be noted that these classifications reflect the RIDEM standards for the area and may not necessarily indicate the actual current water quality.

- Class SA: Suitable for all sea water uses, including shell fishing and all water contact sports.
- Class SB: Suitable for water contact sports; excellent wildlife habitat.
- Class SC: Suitable for wildlife habitat; recreational boating.

The water quality classifications set for Green Hill, Trustom, Card, Potter, and Point Judith Ponds and the Narrow River are SA waters. The exceptions are the SB classification assigned to three areas in Point Judith Pond: the upper Pond (including the Saugatucket River downstream of the Main Street Dam); the area around Galilee where the pond meets the ocean; and the area around Snug Harbor.

Despite Green Hill Pond's SA classification, it does not meet SA classification in the summer months. During this time, the coliform counts in the pond exceed SA standard and shell fishing is prohibited. None of the Narrow River currently meets its SA classification. Under certain conditions, parts of the Narrow River may even exceed the SB standards. Shell fishing is prohibited in the entire river. Parts of the upper Point Judith Pond also do not meet the SA classification and therefore are closed to shell fishing (see Figure 8).

d. Environmental Considerations - Coastal and Freshwater Wetlands

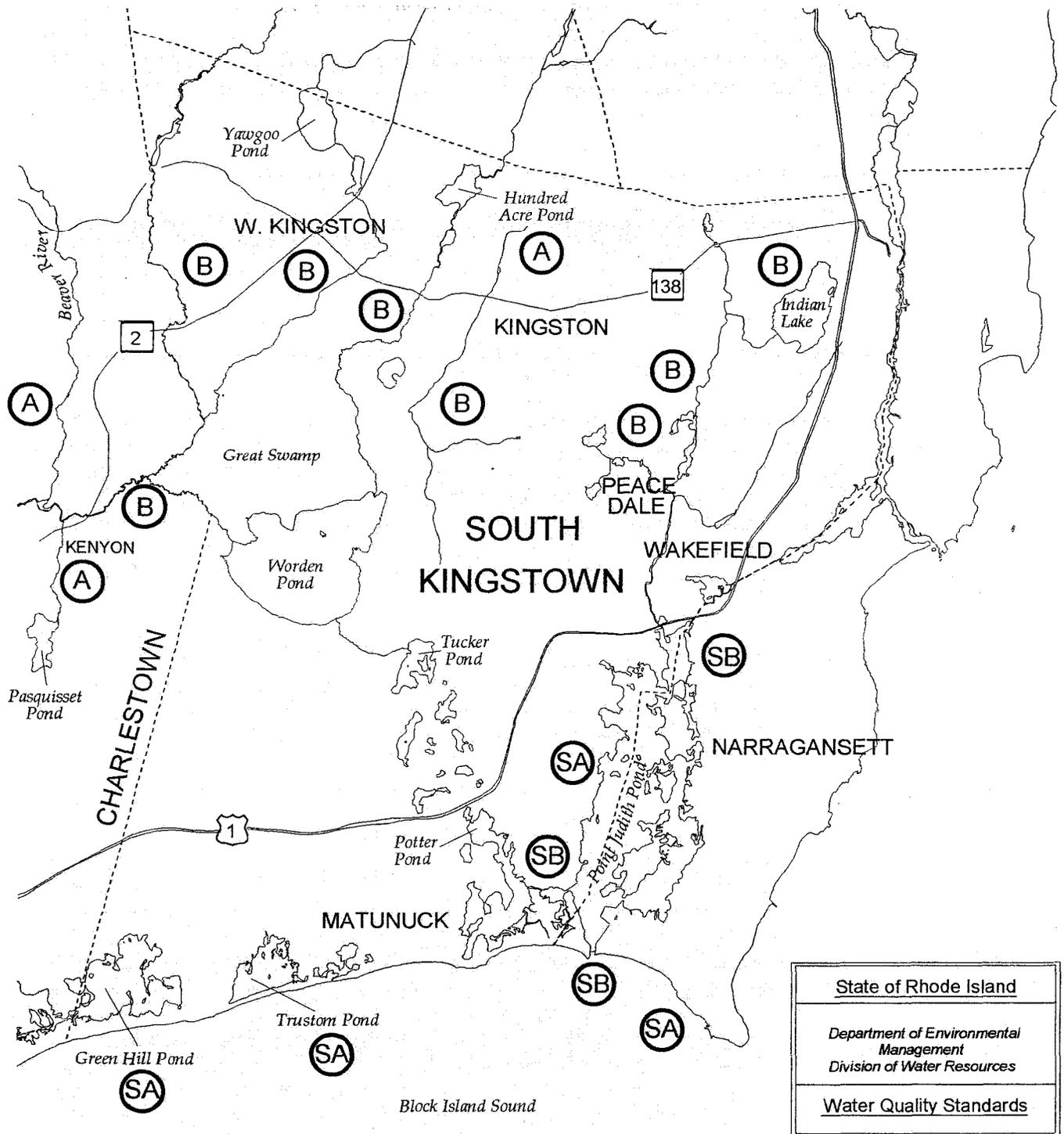
1) Non-point source pollution poses a direct threat to many ponds, bogs, marshes and other wetlands. Non-point source pollution is contamination that does not come from a single, large point (as in an air stack or discharge pipe). The State considers the following non-point source pollution: a) stormwater runoff from roads, lawns, construction sites, and agricultural fields; b) erosion and sedimentation; c) septic systems; d) underground storage tanks; e) road deicers; f) fertilizers and pesticides (RIDEM, 1989).

The problem is that, unlike the contaminants from a smoke stack or large outfall pipe which can be treated before entering the environment, non-point pollution sources occur over a widespread area. This makes identification and treatment a problem. A single septic system or fertilized lawn may not pose a serious threat. However, added together with all the neighbors, there can be a serious contamination threat. Often, it is the cumulative effect of non-point sources which contaminates the land and water. The following are sources of non-point source pollution:

a) Septic systems - a significant source of contamination in the watersheds is septic systems. It is estimated that only 40 percent of existing septic systems in the United States are functioning properly (Kaplan, 1988). It has also been estimated that only 32 percent of the total land area in the United States has soils capable of treating on-site sewage (US EPA, 1983). It is difficult to estimate the number of improperly functioning septic systems in South Kingstown for a variety of reasons: 1) failed systems often are not reported as the owners devise some "quick fix"; 2) RIDEM approved systems may not provide adequate treatment of effluent; and, 3) many systems predate RIDEM regulations (1970) and do not meet current operational standards. Although the exact number of systems falling into these categories has not been assessed, the combination of these factors seems to indicate that improperly functioning septic systems are a significant problem. A conventional septic system consists of a concrete septic tank which is connected to pipes in a leaching field. A septic system is designed to reduce the amount of solids; bacteria and viruses from a home's wastewater; it is not designed to remove nitrates and heavy metals. In a properly functioning system, phosphorus is removed as it attaches to the soil particles near the leach field. Nitrates pass easily through the soils to ground and surface waters. A critical part of the treatment process is the amount of time the wastewater is in contact with the soil around the leaching area. As the water passes through the soil, physical, chemical, and biological

FIGURE 8

RI DEM WATER QUALITY STANDARDS



processes treat it (Canter and Knox, 1986). The problem is that under certain site conditions, the septic systems fail to treat the wastewater. A failed septic system is one in which: a) wastewater backs up into the house; b) wastewater flows so quickly through sandy soils to the groundwater that it is not treated; or c) the land is so rocky, the soil is already wet (high water table, flooding), or the soil is too tight (fine silts and clays) -- that the wastewater ponds in the yard and runs off untreated into a waterbody. In contrast a cesspool (most systems built before 1970 and the adoption of RIDEM regulations) is usually little more than a 55 gallon drum receiving the waste from the home. It provides little or no treatment.

It appears that a major source of water degradation in the coastal waters is septic systems in such brackish waters as the Narrow River and the salt ponds, nitrogen has been found to be the limiting nutrient. Excess nitrogen can cause the growth of scummy algae in salt ponds or estuaries. Excess nutrients accelerate the process of the pond filling in, or aging, called eutrophication. Septic systems are not designed to remove nitrogen. Therefore, many of the septic systems built in proximity to the salt ponds or Narrow River, even if functioning properly, contribute nitrogen (in the form of nitrate) to the ground and surface waters. The EPA has determined that coliform bacteria is the primary contaminant of concern in estuaries and embayments (as in a salt pond) (US EPA, 1983). The coliform test is only for the bacteria, but it serves as an indicator of the presence of other pathogens.

The reasons for the growing contamination threat from septic systems in the salt pond and Narrow River watersheds are many:

- (1) Sandy soils allow the effluent to move through the soil too rapidly to be treated.
- (2) High water tables causes the effluent to pond in the yard instead of moving into the ground. The ponded effluent then can flow, untreated, directly into a surface water body. Siting a septic system on a steep slope can cause the effluent to break out of the slope and run off, untreated, into a water body. Rocky areas inhibit the functioning of a septic system.
- (3) Many septic systems were sized and designed for one or two bedroom summer homes. Conversion of summer homes to year-round residences is common. These conversions, with the additional people and bedrooms, can cause the undersized septic system to be overloaded and to fail.
- (4) Many septic systems are only cesspools, built before the 1970 State standards were enacted. Cesspools provide little or no treatment of waste effluent.

- (5) Many lots are too small to provide enough land for proper treatment of wastewater. Many lots, which are now considered substandard by current zoning, have grandfathered rights to construct a dwelling with a septic system.
- (6) These water bodies do not receive a large amount of flushing from fresh or ocean water. This means that the contaminants become concentrated in the ponds over time. When development becomes too dense, dilution is no longer effective in mitigating the nitrate loading.
- (7) After a storm, septic systems may fail causing the effluent to pool above the ground. It then washes away, untreated, into the surface waters. See the above Section 2B for a discussion of non-point source pollution.

As previously noted, almost 50 percent of the unsewered, residentially zoned land under two acres has severe, severe to moderate, or severe to slight septic system limitations.

In addition to this, there are 23 acres of commercially zoned land, 52 acres of commercial waterfront land, and 155 acres of manufacturing land which are unsewered (RIGIS, 1990) and have severe septic limitations.

- (b) Soil Erosion - Serious water degradation also can be caused by soil erosion and stormwater runoff which transports many contaminants (heavy metals, nutrients, pesticides, fertilizer, sediments, and others). Erosion can cause water quality problems due to an increase in sediment and organic matter. This: a) reduces the amount of light needed for plant and animal growth; b) smothers insects that serve as fish food and live in the bottom community; c) injures spawning and juvenile fish; d) clogs organisms' gills/filters; e) reduces ability of organisms to capture prey; e) transports contaminants which adhere to the soil particles; and, f) can decrease the available oxygen needed for life. The process of erosion can cause significant habitat changes and therefore can impact directly the type of fisheries in a water body.
- (c) Stormwater Runoff - Stormwater runoff from impervious surfaces (roads/rooftops/parking lots) contributes heavy metals, sediments, hydrocarbons, pathogens, nutrients and other contaminants to the water. In a 1983 Nationwide Urban Runoff Program Study, the US EPA found that the predominant pollutants of concern are such heavy metals as copper, lead, and zinc; phosphorus and nitrogen; and sediment. The report also indicated that these heavy metals pose a significant threat to aquatic life in the northeast. In fresh water ecosystems, phosphorus is the limiting nutrient. Excess phosphorus causes eutrophication, or accelerated aging, in ponds and lakes. Sources include fertilizers, detergents, and septic systems in which the effluent has ponded on the ground surface.

Other contaminants are hydrocarbons from oil and gas which leaks from vehicles. Because hydrocarbons are less dense than water, they float on the surface creating a blue/green sheen. However, hydrocarbons have a strong affinity to sediment particles and may attach to the sediment and settle to the bottom of the water column. If these hydrocarbons are not removed by some treatment process, they can cause negative impacts on the bottom dwelling organisms.

The application of fertilizers, pesticides, and herbicides for both home and agricultural use can degrade both ground and surface water. The excess runs off into surface water and can seep into the groundwater. Because some freshwater wetland systems are groundwater fed, the quality of groundwater directly affects the wetland. In Rhode Island, there are only drinking water standards for **SIX** of the over 4,000 pesticides registered in the State. Therefore, many pesticides which pose a direct threat to humans and to the environment may go undetected in both ground and surface waters. Many of these pesticides are among the United States Environmental Protection Agency's 120 Priority Pollutants.

- (d) Deicing Practices - A non-point pollution concern in freshwater wetlands is the chlorides used in deicing practices. Because sodium chloride is extremely soluble, almost all that is applied finds its way into the ground or surface waters. Some organisms can only exist in a small range- of salinity and hence may be adversely affected by changes in the salinity of the water.

- (e) Underground Storage Tanks (UST) - UST's pose yet another threat to water quality (Freeze and Cherry, 1979). Leaks from both regulated tanks (gasoline) and unregulated tanks (home heating fuel oil) are a growing cause of groundwater pollution. Ground and surface water are closely connected -- contamination of groundwater can quickly move into a surface water body. One gallon of gasoline can contaminate up to one million gallons of water -- or the drinking water supply of a 50,000 person community (Snow, 1986). The Town already has had several private wells contaminated by leaking gasoline tanks which has necessitated the extension of a public water supply. The problem is that approximately 85 percent of these tanks are made of steel and have no protection against corrosion. Some experts estimate that one out of three of these tanks leak. Current RIDEM regulations do not adequately address such important issues as tank installation, inspection, and monitoring. Another problem is the presence of unregulated UST's, many of which are for home heating fuel oil. The State has passed enabling legislation which allows municipalities to regulate these tanks.

2) Point Source Pollution - Such point source pollution as landfills, underground injection control wells, and surface impoundments also pose a threat to the wetlands. A list of potential pollution sources is found in the South Kingstown Water Quality Protection Plan, 1991. At this time, RIDEM prohibits direct discharge into SA waters (see section on water quality). There are several point discharges into the salt ponds, which are mainly from stormwater pipes from both Town and State roads. There are also several point discharges in Narragansett

which impact on the South Kingstown waters. Specifically, results of a 1986 DEM shoreline survey showed that there were at least seven direct discharge pipes into Point Judith Pond.

3) Land Development - Loss of wetlands has a cumulative impact. As an area loses wetlands to development, the remaining wetlands play an increasingly important role in flood control, pollution abatement, and as wildlife habitat (Motts, 1981; Novitski, 1981). A primary concern is the effect of the loss of wetlands due to land development. The United States already has lost over half of all its wetlands (Kusler, 1988).

Land use has a direct impact on the health of wetlands. Therefore, it is important to consider both the number of acres and the designated land use for each wetland class. From this information, a town can determine which wetlands are in need of additional protection through either regulatory or non regulatory means. Figures 9 and 10 show the actual number of acres of wetlands for the major zoning designations. The numbers indicate that most of the forested wetlands are zoned residentially. Twenty-two percent of the forested wetlands are zoned as residential, while 27 percent are zoned public. Figure 9 shows that the majority of bog lands are in public ownership, while the other wetlands are predominately private and residentially zoned. The numbers indicate that the wetland classes of bogs, rivers, and marshes are in need of additional protective measures as there are very few acres of these left in Town.

As indicated in Figure 10, most of the coastal wetlands are zoned for residential use. About 60 percent of the salt marshes in the Town are zoned for residential use, with 28 percent zoned as public, and 4 percent as commercial. However, the beaches are zoned as 12 percent residential, and 58 percent public, and 3 percent commercial.

A 1990 Planning Department inventory of all coastal waterfront lots showed that Green Hill Pond appears to be the most threatened by contamination from development, with the potential to double the development of waterfront lots. There are approximately 85 developed waterfront lots with an average area of 0.8 acres and approximately 93 undeveloped lots averaging one acre in size (Figure 11). Parts of the Pond have already been seasonally closed to shell fishing due to bacteria, and the Pond experiences algal blooms. It is not unreasonable to attribute part of both problems to failing septic systems.

Potter Pond has the potential for a 25 percent increase in development, with an average lot size of 2.8 acres for undeveloped lots and 2 acres for developed lots. Point Judith Pond could see an increase of 34 percent, as lots averaging 20 acres are developed. The Narrow River could experience a 50 percent increase in development. The average undeveloped lots are 5.7 acres, while the developed lots average 2.4 acres in size.

FIGURE 9 FRESHWATER WETLANDS ZONING
Town of South Kingstown

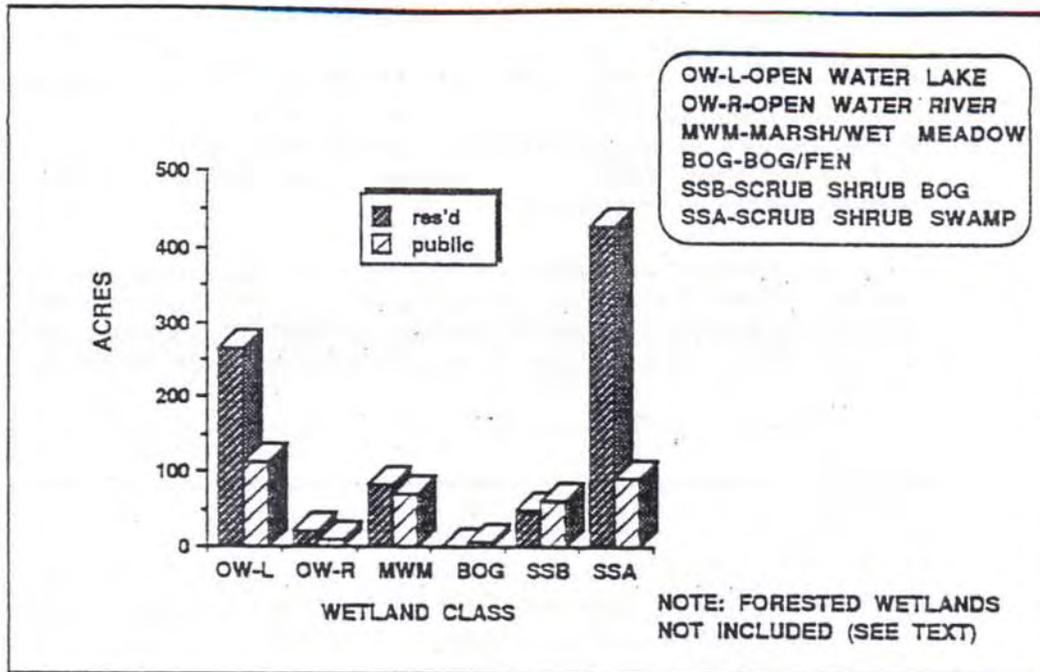
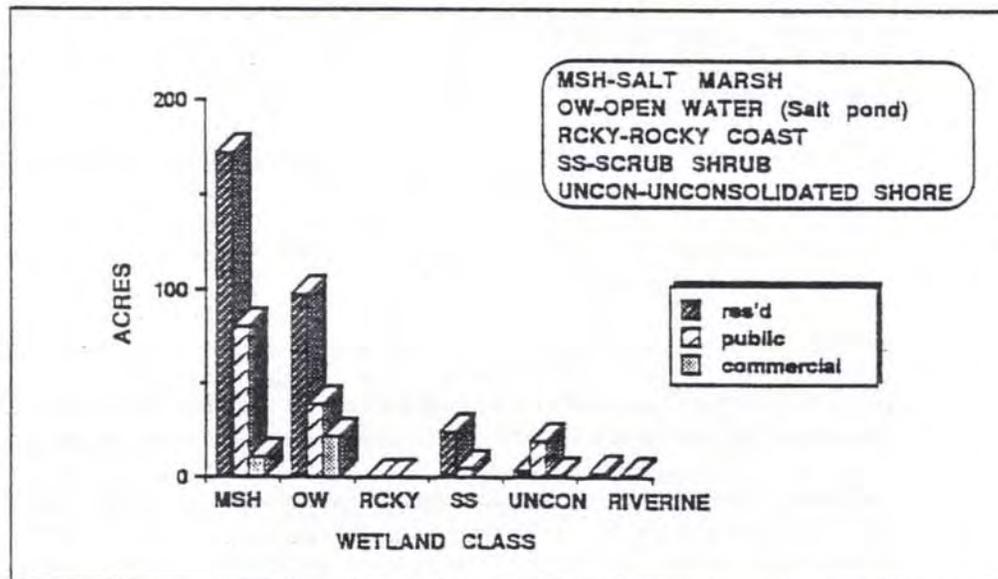


FIGURE 10 COASTAL WETLAND ZONING
Town of South Kingstown



RHODE ISLAND GEOGRAPHIC INFORMATION SYSTEM, 1990

Prepared by the South Kingstown Planning Department

It should be noted that these are only lots which abut the waterfront, and the inventory does not take into account the remainder of the lots in proximity to the water bodies. Many groundwater studies have shown that the flow from other lots enters the ponds. Similarly, overland flow of water enters the ponds. The impact of these lots must, then also be considered in determining the nutrient and pathogen loading to the water bodies.

Construction which is too close to or in wetlands can cause serious construction problems. Buildings may be subject to basement flooding, septic systems may fail, and roads may buckle from frost heave. Additionally, damage to wetlands can occur from filling or improper erosion and sediment control measures.

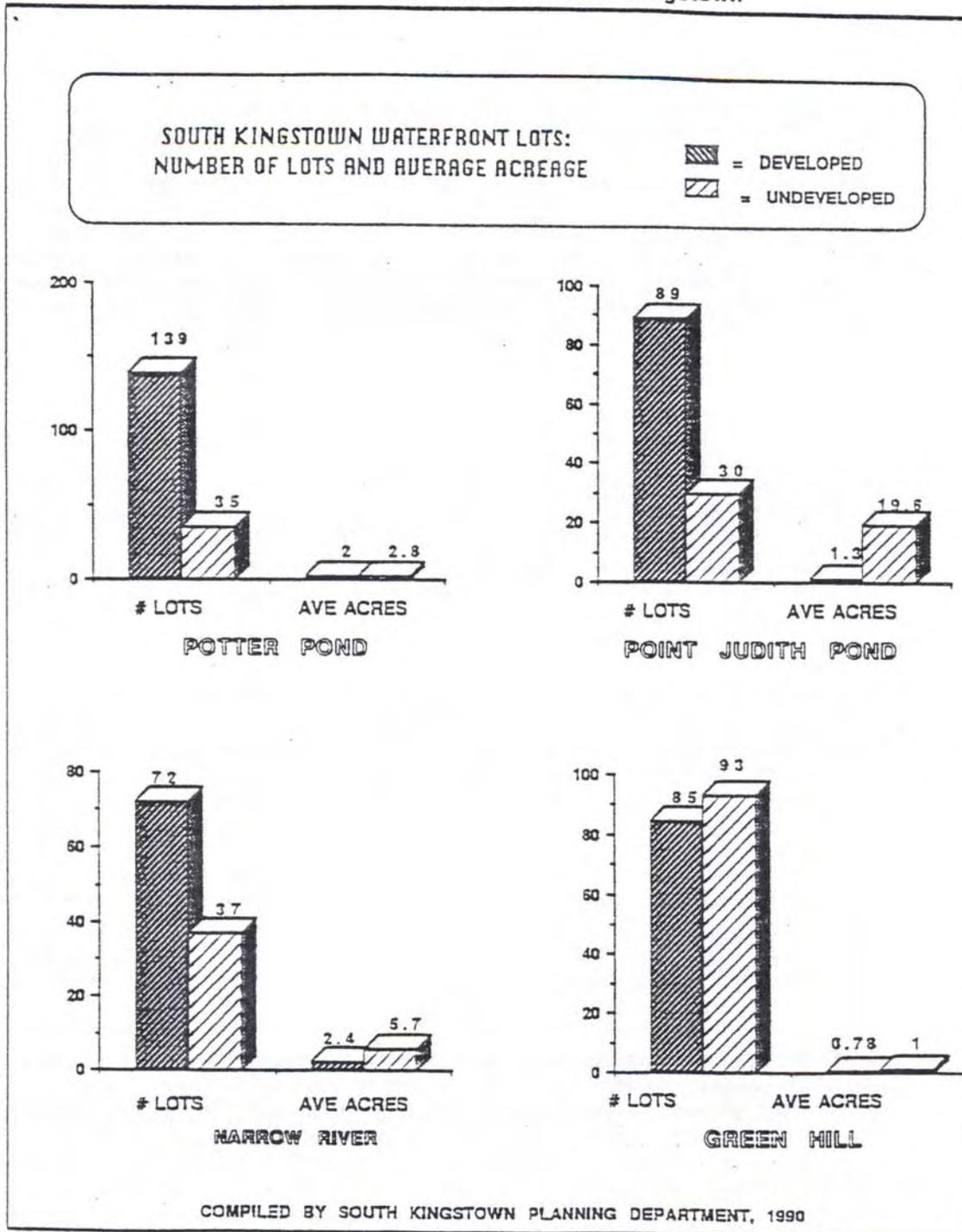
4) Shoreline Erosion and Flooding - The coastline is a dynamic feature. The predominant shifting has been as the coastline recedes. Such action can cause hazards to those living in proximity to the shore. The degree of these threats is a function of the type of shoreline feature and the severity of storms. The 1938 hurricane killed 311 people and destroyed almost 2,000 homes. In 1954, Hurricane Carol killed 15 people and destroyed 3,800 homes. During this storm most beaches lost 25 to 50 feet (Kaye, 1950). There have been two recent hurricanes, Hurricane Gloria in 1986 and Hurricane Bob in 1991. Neither caused tremendous damage to South Kingstown.

Specific recommendations for hurricane preparedness are made in the Coastal Resources Management Council's Hurricane Management Plan, 1969.

5) Recreational and Commercial Uses - Recreational and commercial uses on the waters present yet another source of contamination. The US Environmental Protection Agency has determined that the discharge of marine sewage may degrade water quality by: 1) locally increasing biological oxygen demand (BOD); and 2) increasing the microbial pathogens in the areas (US EPA, 1985). Studies done in Puget Sound, Long Island Sound, Narragansett Bay, and Chesapeake Bay have shown that discharge from boats can be a significant source of fecal coliform bacteria in coastal waters, a condition which becomes more pronounced in areas with a high density of boats and limited hydrologic flushing rates (Milliken and Lee, 1990; JRB Associates, 1980).

Another problem associated with boat sewage is the chemicals used as disinfectant -- chlorine and formaldehyde are examples which can be toxic to marine life when discharged into shallow waters. Other possible sources of contamination are gasoline and oil leaks, boat motors, boat repair operations, and anti-fouling boat paints, improper trash disposal, bilge water, and garbage (materials discarded from recreational and small commercial boats). Bilge water can contain oils and heavy metal contaminants. Fuel spills can occur in the water from leaking tanks, engines, and outboard. These pose a direct threat to water quality and can be a fire hazard. Garbage thrown overboard can contain many pollutants -- heavy metals, solvents, degreasers, and plastic are examples.

FIGURE 11 COASTAL WATERFRONT LOT ZONING
Town of South Kingstown



Prepared by the South Kingstown Planning Dept.

4. Groundwater

As a result of previous glacial activity, numerous outwash deposits (sands and gravels) which yield high quantities of groundwater are found in South Kingstown. The Rhode Island Department of Environmental Management (RIDEM) has designated large areas as GAA, the highest quality rating for drinking water (Figure 12). The major part of the GAA area is the critical portion of the recharge area to the groundwater reservoirs. South Kingstown relies solely on groundwater for its potable water. In 1988, the aquifers in the Town were designated by the United States Environmental Protection Agency as the Pawcatuck Sole Source Aquifer. These aquifers are part of the ten interconnected aquifers in the Pawcatuck Basin Watershed. A Sole Source Aquifer means that the area obtains more than 51 percent of its drinking water from an aquifer, and that there is no reasonable alternate source of potable water. The Pawcatuck Basin Sole Source Aquifer includes all or portions of ten Rhode Island towns and sections of four Connecticut towns (Figure 13).

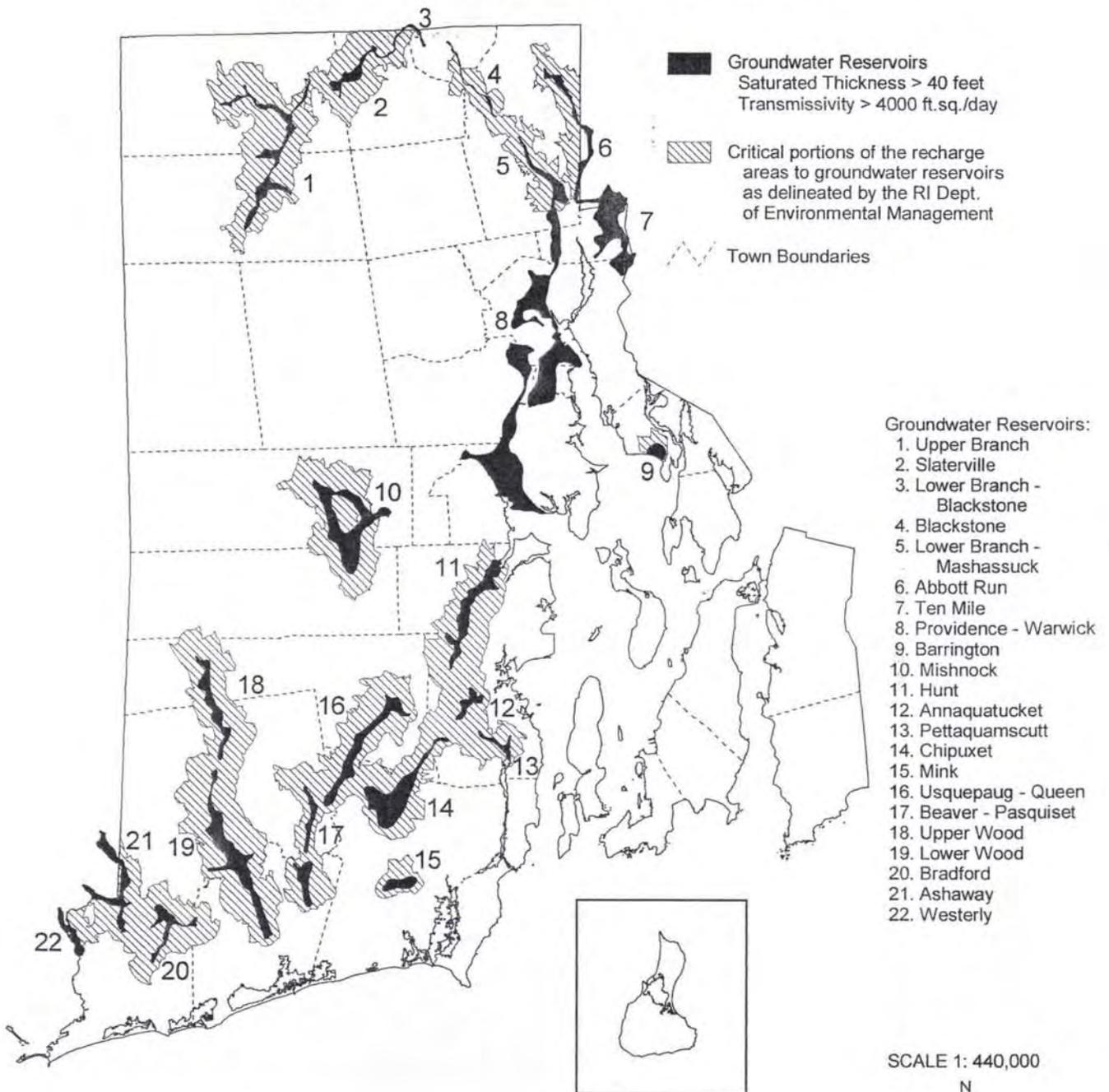
It should be noted that these ten aquifers in the Pawcatuck Sole Source Aquifer are not separated by any major groundwater divide. Therefore, the Mink, the Queen, and the Chipuxet aquifers in South Kingstown are considered to be a part of this large single aquifer system. Another important consideration in developing a groundwater protection strategy is that, because of the geology of the region, the groundwater is closely connected to the surface water bodies. This means that contamination of a surface water body probably will affect the quality of the groundwater. The watersheds (the land basin which drains all the streams and rainfall to a common outlet) for the groundwater resources must be protected.

a. Groundwater Reservoirs and Recharge Areas - South Kingstown has three groundwater reservoirs, as delineated by the Rhode Island Department of Environmental Management (RIDEM): the Chipuxet, the Mink, and the Queen/Usquepaug. The RIDEM defines a groundwater reservoir as having a saturated thickness of 40 feet and a transmissivity of 4,000 feet squared per day. The critical portions of the recharge areas for the groundwater reservoirs and the Factory Pond outwash region also have been delineated by RIDEM. The Groundwater Section of the RIDEM has defined the critical portion of the recharge areas for the ground-water reservoirs as: a) the aquifer areas (groundwater reservoirs and portions of the surrounding stratified drift); and, b) the adjacent areas (areas of till and bedrock from which water that percolates to the water table flows through the subsurface to the aquifer area without first discharging to a perennial stream). Details on the delineation method are noted in the South Kingstown Water Quality Protection Plan (Draft, 1991).

The Chipuxet groundwater reservoir is approximately 3.1 square miles, with the majority falling within South Kingstown and the northern end falling in Exeter. The Queen groundwater reservoir is approximately 0.9 square miles, and lies within both South Kingstown and Exeter. The Queen and the Chipuxet share a critical recharge area, the total being approximately 11.2 square miles. The Chipuxet recharge area extends into both Exeter and North Kingstown. The Mink groundwater reservoir is approximately 0.7 square miles. The Mink and the Factory Pond recharge areas each cover approximately 2.6 square miles (RIGIS, 1990) and both lie completely within South Kingstown.

FIGURE 12

GROUNDWATER RESERVOIRS AND THE CRITICAL PORTIONS OF THEIR RECHARGE AREAS

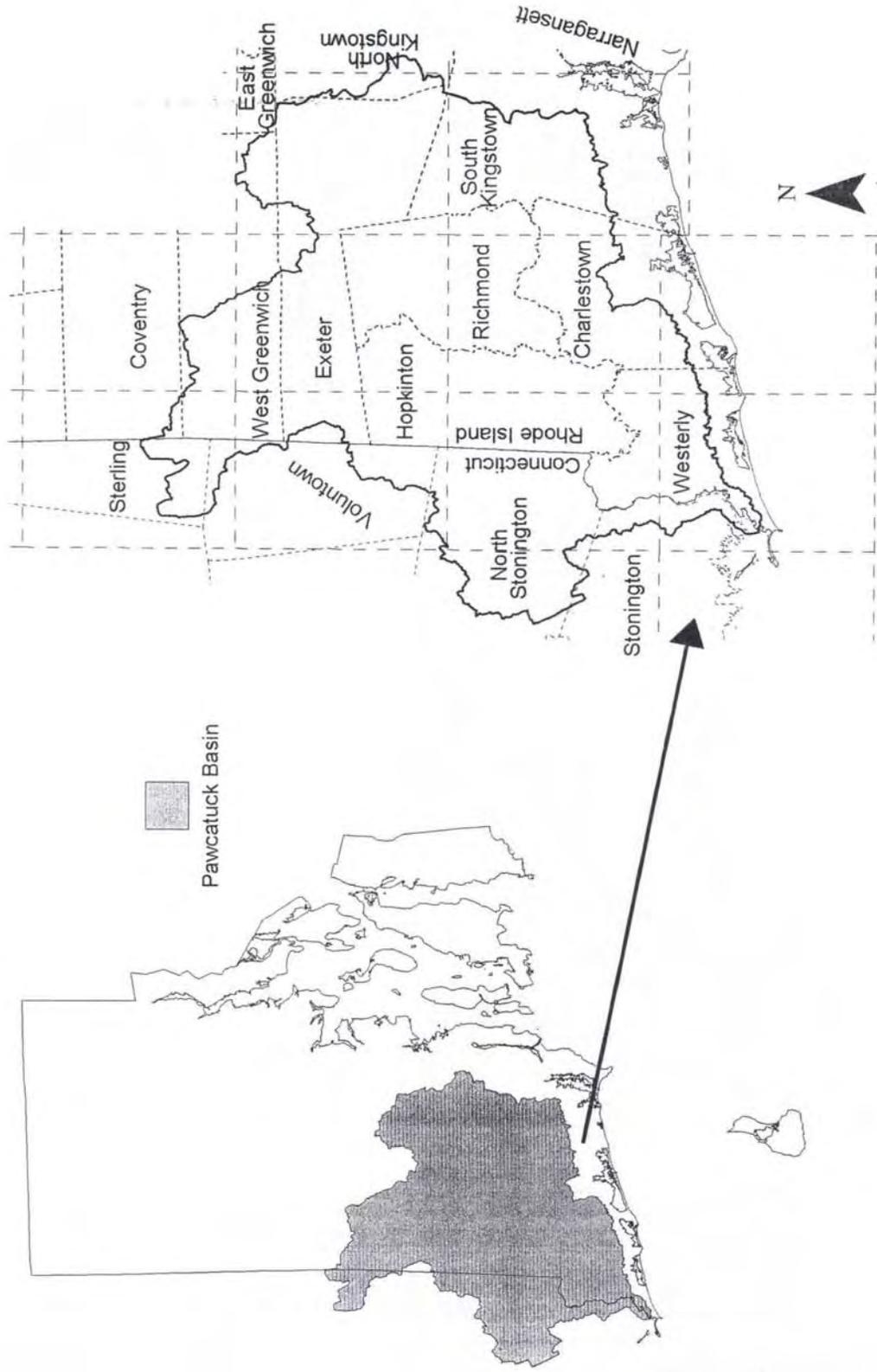


NOTES: RIDEM did not delineate recharge areas to those groundwater reservoirs or portions of groundwater reservoirs where the groundwater quality is known or presumed to be unsuitable for drinking water use without treatment.

The groundwater reservoirs were initially delineated by the R.I. Water Resources Board. Three groundwater reservoirs (#12, 14, 19) were modified by DEM using data from the U.S. Geological Survey.

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FIGURE 13 Pawcatuck Sole Source Aquifer



A small section of approximately 17 acres, of the Beaver recharge area also lies within the Town (a groundwater reservoir in Richmond).

b. Groundwater Reservoirs and Recharge Areas Current Use and Potential Yield - There are six public supply wells in the Chipuxet groundwater reservoir (Kingston Water District (2 wells) and the University of Rhode Island (4 wells) and two public supply well fields in the Mink groundwater reservoir (Wakefield Water Company).. South Kingstown currently has no public supply wells in the Queen/Usquepaug. Average daily yield from public water systems is about 1.3 MGD from the Chipuxet, approximately 2.7 MGD from the Mink, 0.5 MGD from Factory Pond, and approximately 1.12 MGD from the Queen (wells not in South Kingstown).

The safe yield of an aquifer has been defined as the amount of water that can be withdrawn from it annually without producing an undesired result (Freeze and Cherry, 1979). However, more refinement of the definition is needed before the definition is workable. That is, the acceptable impact to surface water (i.e. the length of time that streams run dry or the degree to which the water level in ponds drop as a result of pumping) must be specified. In Rhode Island this has not been done. It is important to make the distinction between safe yield and potential yield. While safe yield means, in a general way, the amount of water you can pump without undesired effects, the potential yield simply means the amount of water that can be pumped within a specified period of time - regardless of effect.

With this distinction in mind, note that the wells at Factory Pond have been reported to have a potential yield of 1.64 MGD (South Shore Water District, 1990). In a 1981 report, Rhode Island Statewide Planning reported that the total average daily yield for the Queen/Usquepaugh was 5.12 MGD. There are no exact figures for the Mink, although the Wakefield Water Company has indicated that the potential pumping capacity of their wells is a total of 7.5 MGD. However, in a Statewide Planning Report published in 1981, it was stated that the Mink Aquifer should not be pumped at more than 2.4 MGD or the groundwater supplies would be seriously depleted.

There have been several studies done regarding the amount of water which can be withdrawn from the Chipuxet Aquifer. In 1966, a United States Geological Survey Water-Supply Paper indicated that the Chipuxet had a safe yield of 8.6 MGD (Allen, 1966). However, two important facts must be noted: 1) this number is based on only two and one half years of data; and, 2) pumping would cause a drying of the rivers for a period of anywhere from a few days to a month or more every year. Another USGS study (Johnston & Dickerman, 1985), based on twelve years of data, concluded that 3.0 MGD could be pumped from the Aquifer, but it would cause a drying of the River for seven consecutive days every three years. With regard to the safe yield of the Chipuxet Aquifer, it is clear that criteria must be established for what is an acceptable amount of water to maintain in the streams and rivers. Only when that has been determined, can a safe yield of the Chipuxet Aquifer be established.

Another source of groundwater, located to the south of the Pawcatuck Sole Source Aquifer, is the outwash around Factory Pond in which the Town has two public supply wells (South Shore Water District). Current pumping from these wells is 0.5 MGD, with a potential yield of 1.64 MGD. Various studies have indicated that most of the water pumped from the wells comes from Factory Pond.

From Figure 14, it can be seen that no aquifer currently is being pumped to capacity. Of specific concern is the possible future demand on the Chipuxet groundwater reservoir, some of which lies in Exeter. There are several potential well fields in the Chipuxet which, if developed to capacity, could exceed the aquifer's safe sustainable yield of three MGD. Over pumping would have a direct impact on the flow of surface water bodies.

c. Environmental Considerations -- Groundwater

1) Current and Future Land Use

NOTE: Minimum residential lot sizes under current South Kingstown zoning RLD 200 = approx. five acres; RR80 = approx. 2 acres; R40 = approx. 1 acre; R30 approx. 3/4 acres; R20 = approx. 1/2 acre.

The Chipuxet groundwater reservoir has mixed zoning. A central strip of a manufacturing zone and a R20 zone is surrounded by RLD 200. The critical portion of the recharge area is zone RR80. In the Mink, the groundwater reservoir is zoned approximately 90 percent RLD 200, with the remainder RR80. The critical portion of the recharge area in the Mink is zoned both RR80 and R40. The Queen/Usquepaug groundwater reservoir and critical portion of the recharge area are both zoned RR80. The Factory Pond recharge area is zoned as RLD 200 on the northern and eastern portions, R30 on the south-westerly portions, and RR80 on the southerly end.

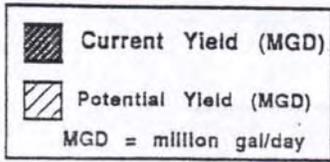
The results of an initial inventory for the groundwater reservoirs and Factory Pond critical portion of the recharge area show that Factory Pond and the Chipuxet contain the most undeveloped lots and undeveloped acreage (Figure 15). Information compiled on total acreage and average lot size can provide additional insights into planning protection strategies and future land use.

Over the Chipuxet groundwater reservoir and recharge area, there are approximately 107 acres of vacant developable land zoned manufacturing. There also are many large farms (turf and potato) in the flat, sandy outwash of these recharge areas. Pumping irrigation waters from private, unmonitored wells or from nearby rivers is common practice. The amount of water use and the runoff and infiltration from irrigation practices is yet another issue which must be considered in devising a water protection plan.

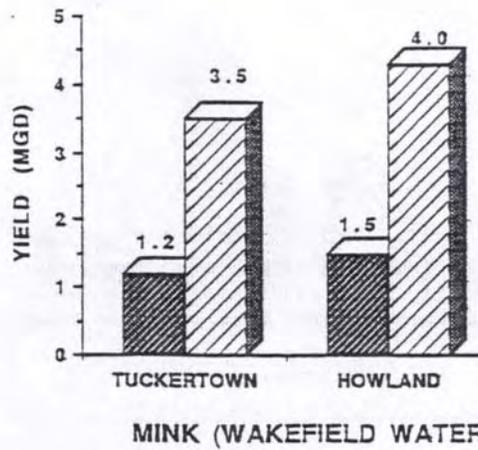
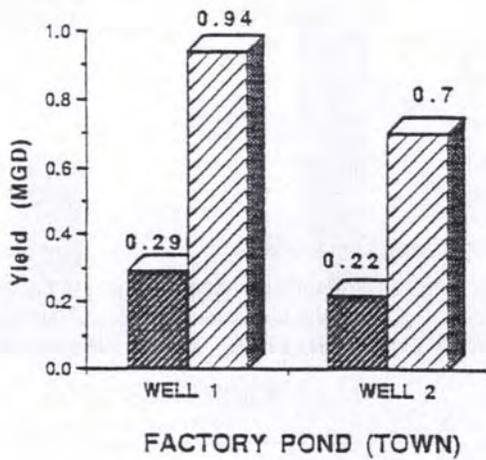
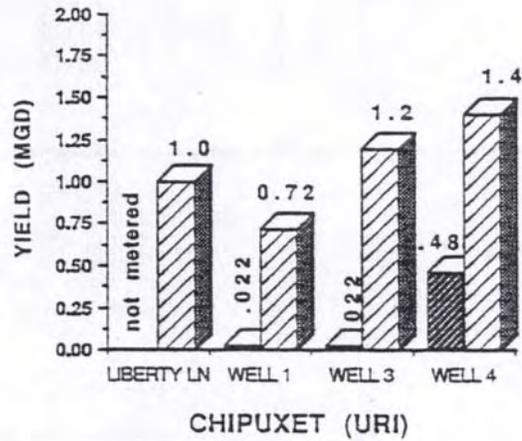
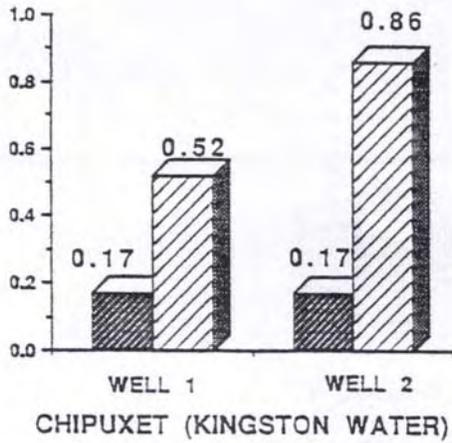
Of major concern is the principal arterial, U.S. Route 1, which lies approximately 400 feet from the northern tip of Factory Pond. The Factory Pond recharge area contains approximately four miles of State roads, six and one-half miles of Town roads, and five miles of private roads (RIGIS, 1991). There is a need to protect recharge areas and the groundwater reservoirs from highway runoff.

In 1991, the Town passed a Groundwater Protection Overlay District to protect and to preserve the ground and surface waters in the groundwater reservoir and recharge areas for public water supplies (Map 5.3).

FIGURE 14
SOUTH KINGSTOWN PUBLIC WATER SUPPLY DATA

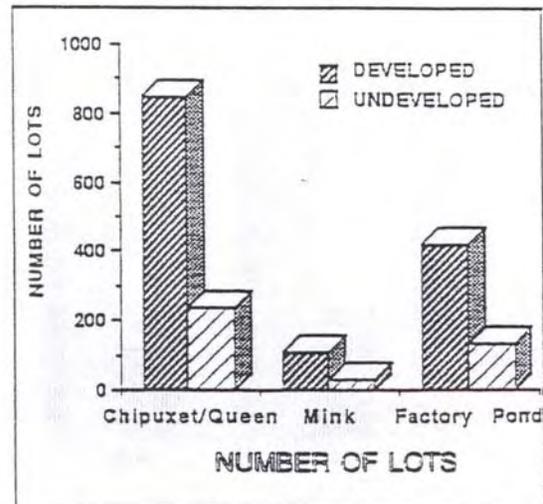
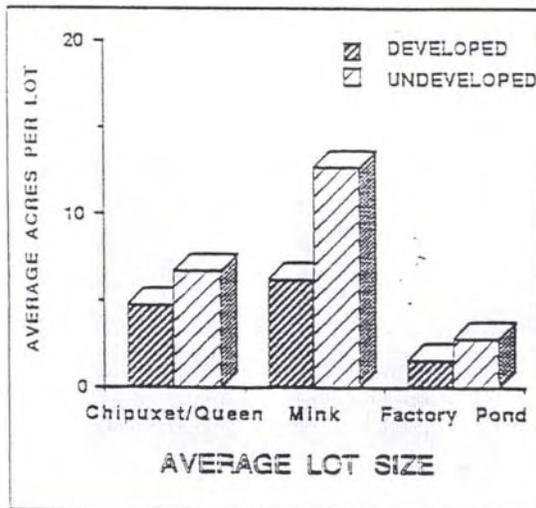
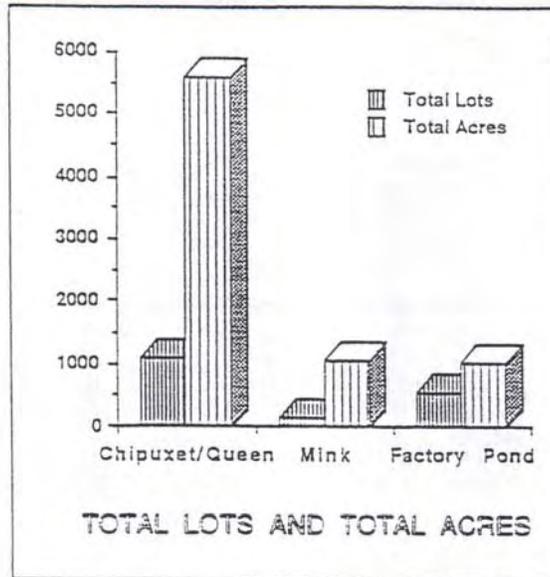


NOTE: See Section 2.4.2 for a discussion of safe versus potential yield.



Prepared by the South Kingstown Planning Department.
 Information from water suppliers, 1990.

FIGURE 15
 SOUTH KINGSTOWN GROUNDWATER PROTECTION OVERLAY DISTRICT
 CHIPUXET/QUEEN, MINK, AND FACTORY POND*



COMPILED BY THE SOUTH KINGSTOWN PLANNING DEPARTMENT, 1990
 * DATA FOR THE CHIPUXET/QUEEN AND MINK RECHARGE AREAS
 AND FACTORY POND AREA OF CONTRIBUTION TO THE PUBLIC WELLS

- 2.) Contamination Sources - Other serious non-point threats are runoff from development (roads and other paved surfaces) and the impacts of individual sewage disposal systems on both ground and surface waters (ISDS Task Force, 1987). In particular, the cumulative effect of sewage disposal systems from a total build-out of the industrially-zoned areas in West Kingston was studied in a 1993 report (Dowdell, 1993). This report concluded that nitrate concentrations would exceed levels recommended by EPA as safe for drinking water if the area was totally developed without public sewers. An inventory of potential / current contamination sources is found in the South Kingstown Water Quality Protection Plan Draft, 1991.

In addition to such point sources of pollution as landfills, surface impoundments, underground injection control facilities, there are many non-point sources of contamination. Agricultural practices, common in the South County area, can cause groundwater contamination both from runoff and infiltration of the fertilizers/pesticides in irrigation waters into the groundwater. Other serious non-point threats are runoff from development (roads and construction) and the impacts of individual sewage disposal systems on both ground and surface waters (ISDS Task Force, 1987). An inventory of potential/current contamination sources is found in the South Kingstown Water Quality Protection Plan Draft, 1991).

One of the most serious potential sources of contamination is from the storage and handling of chemicals, fuels, and hazardous waste at the commercial and manufacturing sites located over the groundwater reservoirs and in the recharge areas. Best management practices must be implemented.

5. Watersheds

- a. Definition - No matter where you are on land, you are in a watershed. A watershed is a land basin which drains all the streams and rainfall to a common outlet (think of a bathtub). The hills and valleys in the landscape define the boundary by determining the size and shape of the basin.

South Kingstown has several major watersheds to consider. The largest is the Wood-Pawcatuck watershed, which includes portions of ten Rhode Island towns (about one-third of our State) and four Connecticut towns (see Map 5.2). The outlet for the Pawcatuck Watershed is Little Narragansett Bay. In this watershed, the surface and groundwater watersheds are coincident in most places (the Sole Source Aquifer boundary follows the surface watershed).

Another major watershed is the salt pond watershed, which is bounded on the east by Route 108, on the north by Route 1 in Narragansett and along Tuckertown Road and the Narragansett Trail into Charlestown. This watershed drains into the Block Island Sound. A third major watershed in the town, is the Narrow River Watershed which is shared with both North Kingstown and Narragansett. The Watershed drains into the Narrow River which then empties into the southern end of Narragansett Bay.

Within these larger watersheds are sub-watersheds (or sub-basins), marked by the hills and valleys in the landscape. As defined by RIDEM, there are 7 sub-watersheds in South

Kingstown: Green Hill Pond, Point Judith Pond, Pettaquamscutt (Narrow) River, Chickasheen, Chipuxet, Saugatucket, and Pawcatuck River sub-basins. As can be seen from Map 5.2, most are shared with other towns.

b. Environmental Considerations - Because watersheds, or drainage patterns, do not recognize town boundaries a town's land use can impact its neighbor's water supply. The activities in a watershed can directly affect the quality of both ground and surface waters. A pollution source at one end of the watershed can cause contamination many miles away (think of the bathtub draining). Surface water and groundwater are closely connected -- pollution in one can easily pollute another. As discussed in the previous section, these areas are very susceptible to contamination because of the geology of the area, the interconnection of the ground and surface waters, and the varied land uses within these large watersheds. Therefore, a major environmental consideration is a land use plan which considers the watershed boundaries, the locations of the Town's primary drinking water supplies, and the Town's major surface water bodies. In addition, it is imperative that the planning efforts reflect coordination among towns which share the Town's watersheds. Inappropriate land use or a serious contamination problem in an adjacent town could cause serious damage to the Town's resources.

6. Upland Vegetation

The Town of South Kingstown has a diversity of vegetation types because of the varied topography and soils. Today, approximately 40 percent, or 15,096 acres, of the Town is forested (RIGIS, 1988). This represents a loss of 7,620 acres from 1937, when almost 60 percent of the Town was in forests (USDA, 1979). The uplands support large oak forests, the forest type which dominates southern New England. Oaks are found primarily on the warmer, southerly exposed slopes. Because the soils in these areas tend to be acidic and oak leaves are slow to decompose, the understory in these forests is limited to mostly blueberries, rhododendrons, azaleas, and laurel.

Stands of white pine (*Pinus strobus*) also are found, yet because the trees are not shade tolerant and seedlings do not germinate well in organic soils, white pines are not found in mature forests (as are the oaks). White pines may live to be 400 years old, but have been a heavily exploited tree, being cut and sold for ship masts. Another vegetative cover is pitch pine (*Pinus rigida*), found in the sandy outwash soils. Many acres of pine barrens are found in South Kingstown. The pine barren habitat -- dry, sandy soils, supports several rare and endangered species. Hemlocks (*Tsuga canadensis*) and Beech (*Fagus grandifolia*) often are found on the northerly, cooler slopes, as they are more shade tolerant trees and not resistant to fire.

Much of the forest land in Rhode Island was cleared at one time for grazing, farming, or timber. The post-agricultural fields are marked by stands of gray birch, red cedar, white pine, sumac, juniper, and dogwood, to name a few species. Each forest type represents a distinct habitat which provides homes for a diversity of plants and animals. Additionally, the transition zones from one forest type to another, or from a forest to a field, are among the richest areas for plant and animal life.

7. Rare and Endangered Species

South Kingstown is the single most important town in Rhode Island for rare species and natural communities (pers. comm., Joanne Michaud, RIDEM, 1990). About 20 percent of the State's most significant sites occur in the Town. The Rhode Island Department of Environmental Management's Natural Heritage Program (RINHP) has mapped the areas of critical habitat for these species of ecological significance. Several areas in the Town merit specific note.

- a.) The Great Swamp: This includes Worden Pond and the contiguous wetlands. Of the 140 sites identified throughout the state, The RINHP and the Nature Conservancy ranked this as second in terms of its ecological importance. The Swamp is host to at least 13 occurrences of rare invertebrates.
- b.) Matunuck Hills: The area includes approximately 1,200 acres on the Charlestown moraine in these 10 kettle ponds and adjacent wetlands, at least 17 different state-listed rare plant species are found. This site is ranked fourth of the 140 in the state for biological diversity significance.
- c.) Pitch Pine/Scrub Oak Barrens: This is a large area which lies south-southeast of Worden Pond, off Gravelly Hill and Shannock Roads. The area is ranked sixth out of 140 in the state for biological significance, providing habitat for over a dozen species of State-listed plants and animals.
- d.) Queen River: The area includes the wetlands along the Queen River from the northern end of Glen Rock Reservoir and reaches almost to Bear Swamp.
- e.) Pettaquamscutt River: The area includes much of the Narrow River watershed. In October, 1988, Congress passed legislation authorizing the creation of the Pettaquamscutt Cove National Wildlife Refuge.
- f.) Factory Pond: The Factory Pond wetland complex supports a habitat which has a number of rare and endangered species, including a unique 12 acre dwarf Atlantic White Cedar bog.
- g.) Trustom and Card Ponds: The ponds and the associated wetlands, which include almost all of Green Hill Swamp to the west, support rare habitat and species.
- h.) Other areas: a) Tuck Point in Green Hill Pond; b) the ponds and wetlands from Gooseberry Island to Matunuck State Beach and the southern corner of Potter Pond; and c) Bull Head Pond.

8. State and Federal Land

This category of natural resources includes all State and federally-owned land. Additional information on the area is given in the Open Space and Recreation Element and in the Harbor Management Plan, 1990.

- a. National Wildlife Refuges - Trustom Pond and Pettaquamscutt Cove are the two National Wildlife Refuges in South Kingstown.

1) Trustom Pond National Wildlife Refuge - This 642 acre refuge was established in 1974 for the primary purpose of providing nesting, resting, and feeding habitat for migratory birds. Its secondary purpose is to provide quality wildlife-oriented recreation opportunities. It includes 1.5 miles of barrier beach (Moonstone Beach) and Card and Trustom Ponds. The habitats on the refuge include: fields, marshes, mudflats, freshwater pond and wooded swamps, brackish pond, shrubland, barrier beach and dune systems, and croplands. Waterfowl hunting is allowed on 52 acres, which are separate from the 3 miles of trails.

2) Pettaquamscutt Cove National Wildlife Refuge - In 1988, legislation was passed to establish the 600 acre Pettaquamscutt Cove (Narrow River) National Wildlife Refuge (See Figure 16). The Fish and Wildlife Service is in the process of acquiring land within the boundary which includes the Cove, associated salt marshes and tidal flats, and a buffer of forested upland habitat.

b. State - There are approximately 3,300 acres of State land dedicated to conservation in the Town (see Open Space and Recreation Element). The largest parcel is 2,666 acres in the Great Swamp Management Area.

9. Open Space

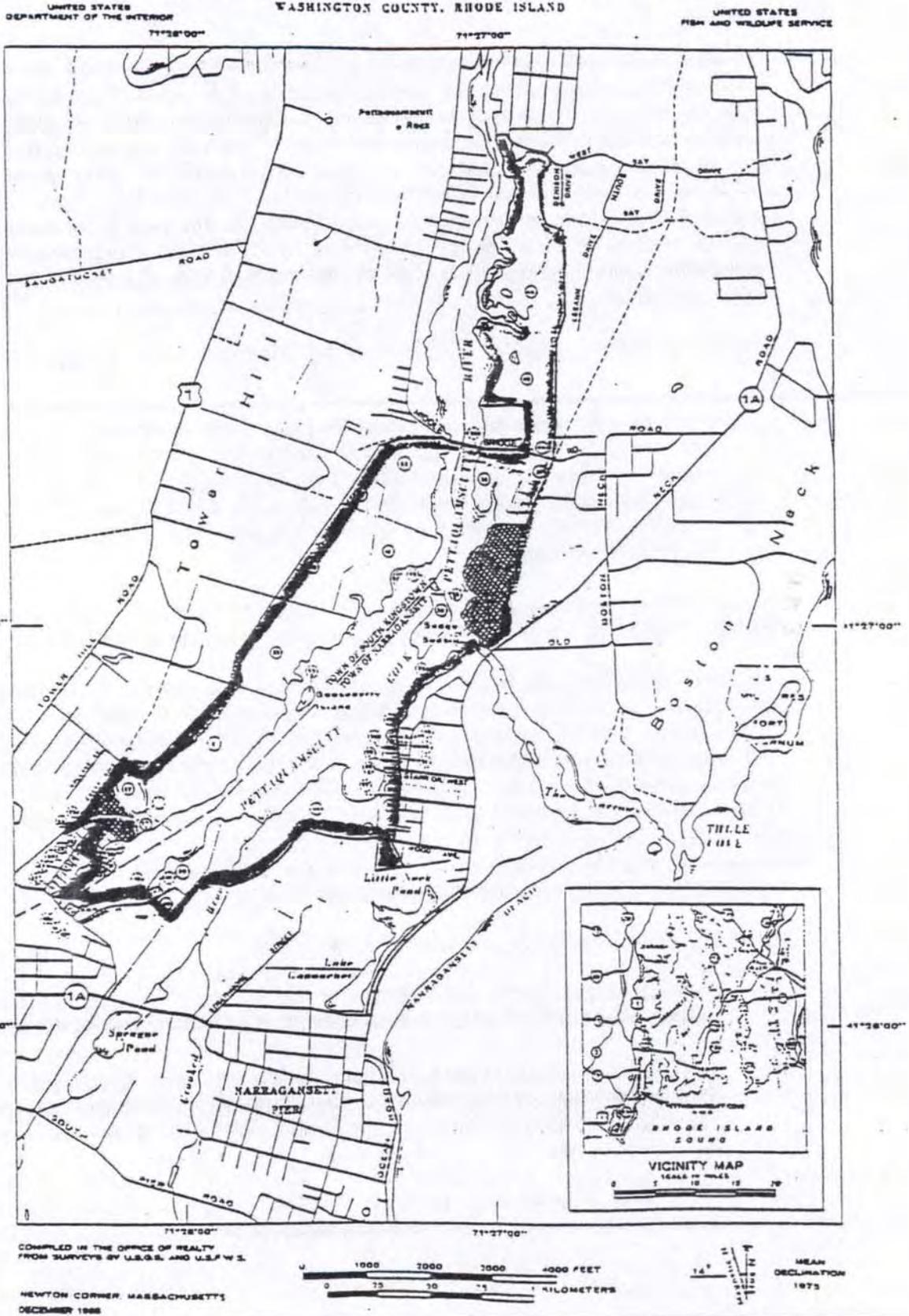
An open space plan can serve as a major organizing component in the overall pattern of development. Open space is a valuable part of a community plan for its diverse benefits to the residents. Recreation areas, wildlife habitats, scenic areas, pollution abatement, and buffers are some of the benefits of open space. Open space can be used to preserve and to protect groundwater resources, agricultural lands, and significant natural features.

In addition, lands which could pose a danger to humans if developed can be set aside as open space. Dangers from flooding, erosion and coastal storms can be minimized by incorporating these lands into an open space plan. The open space network within the Town should contain agricultural areas, groundwater reservoir and recharge areas, wetlands, nature study educational areas, parks and wildlife habitats. The Town should strive to create a pattern of open space which serves to maximize the effect of each protected parcel of land. The plan should create a pattern of open space and recreation areas which are linked in a corridor or network. This approach could be enhanced by joining private, quasi-public and public open space into a continuous linear system.

See Open Space and Recreation Element for additional information.

FIGURE 16

PETTAQUAMSCUTT COVE NATIONAL WILDLIFE REFUGE



10. Agricultural Land

The agricultural landscape has long been a part of New England history. Much of Rhode Island was at one time cleared for farming purposes as indicated by the many stonewalls which wind through fields and second growth forests (areas where trees have grown in abandoned fields or areas that were once logged). The State has recognized that prime agricultural land is an important natural resource which needs to be preserved. In 1981, the Governor's Task Force of Agricultural Preservation reported that, "Certain agricultural land should be preserved because it is best suited to that use, and adequate land is available elsewhere for other activities." The Task Force also recommended that the northeastern region of the country strive to become less agriculturally dependent on the rest of the nation.

In 1982, the State passed the Farmland Preservation Act (RI GL 42-82-1) which states that:

The general assembly recognizes that land suitable for food production in the State has become extremely scarce and valuable resource... that agriculture is an important part of the state's economy, environment, and quality of life, and that local food production will become increasingly important to the people of the State...

Subsequent to the passage of this Act, the voters in the State have approved bond issues for the purchase of farm development rights (see following section).

Yet much farmland has been lost to commercial and residential development or abandoned. Only 24 percent of the farmland in the State in 1945 exists today -- a decrease from 300,000 acres to 73,000 acres (USDA, 1988). In South Kingstown, over half of the farmland has been lost. In 1937, 26 percent of the Town was in pastures and haylands (or 9,767 acres), and in 1988, only 13 percent of the land was in pastures and haylands (or 5,051 acres) (USDA, 1979 and RIGIS, 1988). Such uses as housing, commercial buildings, and roadways threaten the agricultural lands with irreversible destruction. Agricultural land use in 1990 is shown on Map 2.1. Land which has been protected for agricultural preservation is shown on Map 5.4.

There are many reasons to protect our farmland areas.

- a) Farmlands contribute to our open space and, therefore, help to maintain the rural character of the Town which makes it attractive as both a place to live and to visit.
- b) Farmlands contribute to the economic activity of the Town. It has been noted that Rhode Island farmers contribute substantial economic activity for the size of the State (Smith, 1987). Additionally, the Town's tourism industry is strengthened by its rural character.
- c) Farmlands provide a tax base for the Town, without the attendant services expenditures involved with residential development.

- d) Farmland preservation efforts can be incorporated with affordable housing initiatives. In 1990, the RI General Assembly established the RI Housing and Conservation Trust Fund. When this program receives funding, it may be possible to combine affordable housing with the purchase of conservation areas or development rights to farms. The approach has been successful in other states.

Therefore, it is important that the Town consider the potential impacts of various development to the agricultural land resource. Protection options are discussed in the following sections.

11 Areas of Critical Concern

These are areas which represent such important natural resources as habitats for rare and endangered species, groundwater reservoirs and recharge areas to drinking water supplies, barrier beaches, representative wetland classes which are in danger of destruction, wetlands with important wildlife, educational, and pollution mitigation value, and threatened agricultural lands.

Through RIGIS mapping efforts, many of these areas have been identified. From Figure 17, it can be seen that there are approximately 350 acres in Town in which Natural Heritage boundaries for rare and endangered species (see Section 8) overlap with groundwater reservoirs and recharge areas. Approximately 147 acres of these lands are wetlands.

It should be noted that the figures represent current land use, therefore, the lands which appear as agricultural, forest, and wetlands may be developed in the future. Using the information on Map 5.3, it is possible to locate the Natural Heritage areas and to develop protection strategies for the sites. Additional wetland protection for certain areas may be a possibility. Examples of wetland areas needing additional protection are: a) the limited acreage of bogs, marshes, and riverine wetlands; and b) the wetlands which support rare and endangered species.

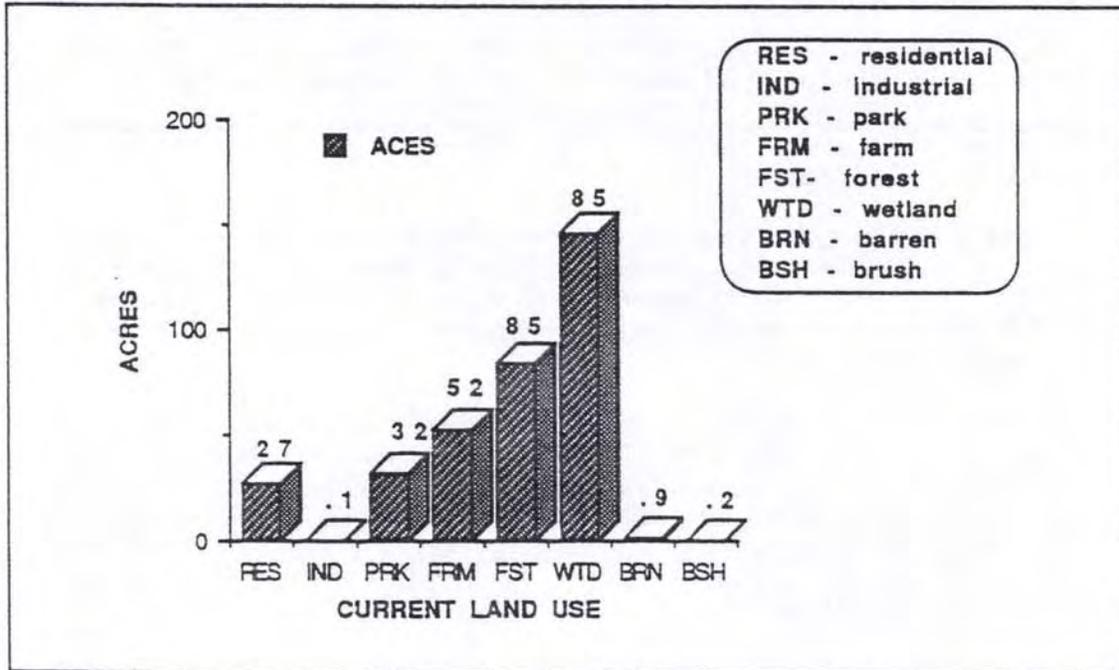
Another area of concern is the Salt Pond and Narrow River Special Management areas. There are over 3,100 acres of land designated as Natural Heritage areas for rare and endangered species (3,600 acres of land and water) which fall within these boundaries.

Finally, there is much concern regarding industrially-zoned land located above the Chipuxet aquifer in West Kingston. Industries which use excessive volumes of water and/or which discharge significant amounts of industrial effluent into ISDS's should be prohibited in this area. Even clean light industry, however, can degrade groundwater quality. An increased employee population can generate domestic sewage to the point where nutrients in groundwater reach unacceptable levels.

12. Flood Zones

Flood zones are defined herein as those areas where there is a 1% chance of a flood occurrence in a given year. These areas subject to flooding are geographically dispersed throughout South Kingstown (see Fig. 18) with the largest areas associated with coastal, riverine and estuarine features. Both 'A' flood zones and 'V' flood zones are present in

FIGURE 17 CURRENT LAND USE: NATURAL HERITAGE AREAS/
GROUNDWATER RESERVOIR AND RECHARGE AREAS
Town of South Kingstown



RHODE ISLAND GEOGRAPHIC INFORMATION SYSTEM, 1990

Prepared by the South Kingstown Planning Dept.

TOWN OF SOUTH KINGSTOWN, RI

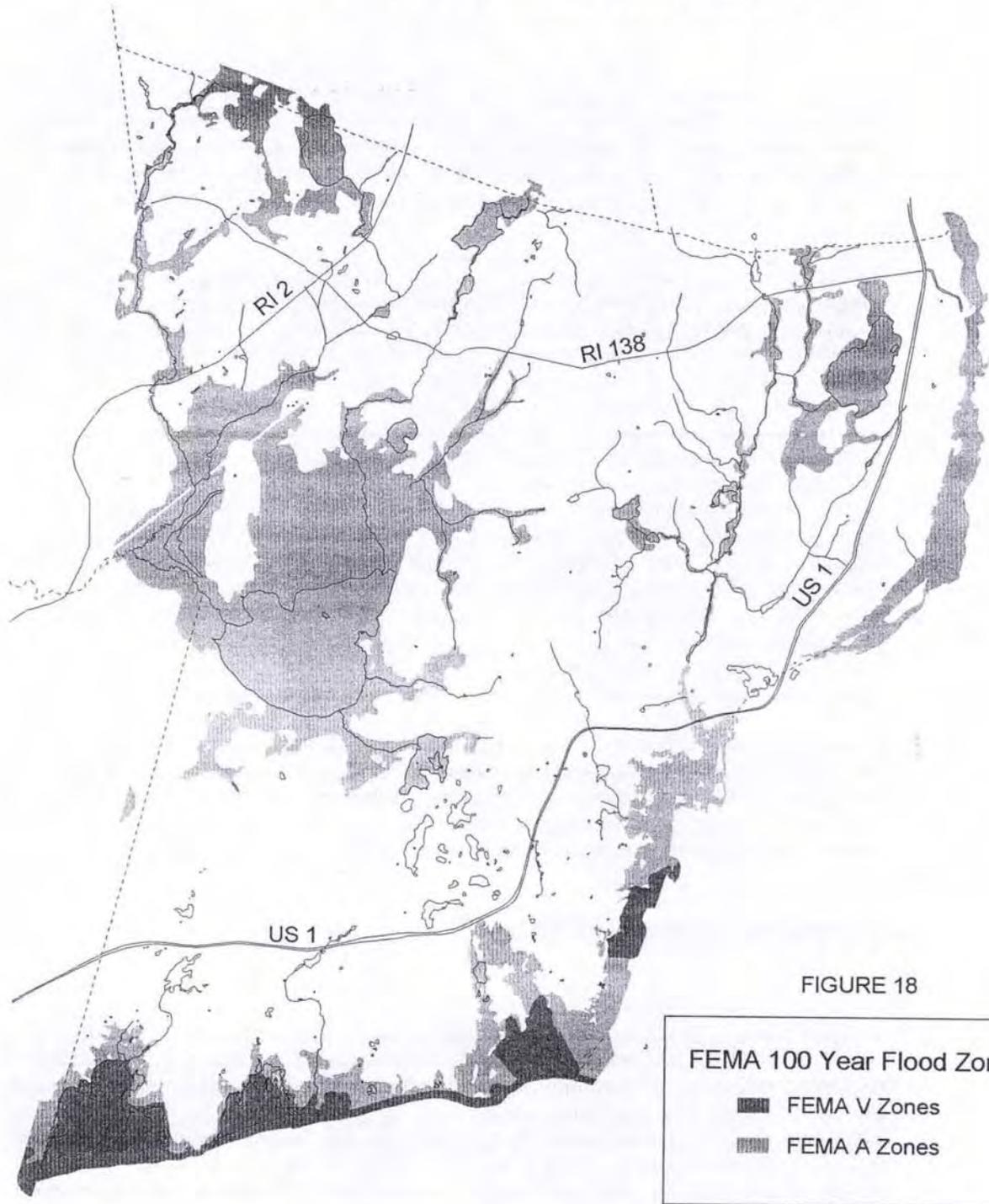


FIGURE 18

FEMA 100 Year Flood Zones

- FEMA V Zones
- ▨ FEMA A Zones

RIGIS (c) 1995
RI Dept. of Admin.
Division of Planning
Revised: 8/00 JML

South Kingstown. These particular flood zones are designated by the Federal Emergency Management Agency and are identified on the applicable Flood Insurance Rate Maps distributed by that agency. Flood elevations where related wave and storm surge action occurs are designated as 'V' (velocity) zones and impact those lands contiguous to the shoreline along the South Shore coastal region. These 'V zone' areas are predominantly located from the shoreline inland to the furthest extent of the salt ponds.

100 year flood zones ('A' zones) are prevalent in inland areas, especially within the extensive linear floodplains and bottomlands adjacent to rivers and streams. Most notable are the floodplains associated with the Saugatucket River, Chipuxet River, Usquepaug River, Pettaquamscutt River and Mink Brook. Extensive flood zones are also noted in lowlands, many of which would be classified as wetland. The largest such area would be the Great Swamp/Worden Pond region.

Activities in flood zones within South Kingstown are regulated under both the Zoning Ordinance and the Subdivision and Land Development Regulations. Article 12 of the Zoning Ordinance establishes a High Flood Danger District (HFD) that incorporates the areas between the ocean and the coastal ponds. Construction of residential structures within the HFD is allowed only by special use permit. All applications for residential construction in the HFD require preparation of an Environmental Impact Statement. Strict adherence to specific design criteria is required for all Zoning Board of Review approved special use permits. Article 5 of the Zoning Ordinance establishes those conditions, which include use of hurricane clips, a minimum timber pile diameter, minimum piling penetration depth and installation of 'breakaway walls' where applicable.

Article 13 of the Subdivision and Land Development Regulations requires that the Planning Board review proposed subdivisions within special flood hazard areas to ensure that: plans provide for flood damage protection; utilities are constructed to minimize flood damage; and, drainage is adequate to reduce flood hazard exposure to residents. These special flood hazard areas include the HFD as well as 100 year 'A' and 'V' flood zones.

C. Land Conservation and Protection Strategies

1. Regulatory

A town's zoning and subdivision regulations are its strongest method of controlling land use. A comprehensive land use plan can be realized in large measure by implementing the zoning ordinance. Therefore, the zoning regulations and map must reflect the goals and policies of this Comprehensive Plan. South Kingstown's Land Use Plan and Zoning Ordinance, and other environmental and land use regulations, should address such issues as critical resource protection, groundwater protection, wetlands protection, erosion and sediment control, stormwater management, and open space preservation. Regulatory methods which can be used in South Kingstown to provide such controls are discussed below.

a. Overlay Districts - An overlay district is an option which allows restrictions or conditions to be placed on activities in designated areas without changing the current zoning. The purpose of an overlay district could be to protect such natural resources as groundwater, rivers and streams, critical habitats, open space, and agricultural lands.

1.) Groundwater Overlay Protection District (GPOD) - In 1991 the Town amended the Zoning Ordinance so as to create the Groundwater Protection Overlay District (Map 5.3). The GPOD restricts uses in groundwater reservoir and recharge areas and requires performance standards for permitted uses. This overlay district is a very important tool in regulating land uses in the West Kingston industrial district located above the Chipuxet Aquifer. Site plan review procedures are used in order to implement Best Management Practices (BMP's) in order to mitigate or eliminate the potentially harmful effects from stormwater runoff, storage of materials, septic systems, use of hazardous materials, industrial processing water and the like.

2) River Corridor Protection - Adoption of this overlay district would allow the Town to require certain protection measures and/or site design standards within the designated river corridors. These can include river conservation buffers in which certain building is prohibited and site design/ density criteria for any type of development.

3) Critical Resource Protection Overlay - Various critical resource areas can be designated (i.e., bogs/fens and marshes; natural heritage areas of rare and endangered species) and specific restrictions and site standards can be required.

4) Agricultural Land Overlay - Agricultural overlays are developed to preserve agriculture lands and to preserve open space. Such criteria as aquifer recharge areas, large tracts of undeveloped land, site identified under the State Natural Heritage Program, areas of scenic beauty, and areas of historical or cultural interest could be considered for inclusion in the overlay district (Yarn and Arendt, 1989).

b. Cluster Zoning - The use of cluster zoning is an important tool for preserving open space. The Town's cluster zoning ordinance and subdivision regulations need to be revised and expanded to provide greater incentives for its use in preservation of agricultural lands and other natural resources. The adoption of mandatory cluster zoning should be considered as a method of protection of the natural resources described above.

c. Regulatory - The Subdivision Regulations control how land is developed for new residential developments, industrial parks, office parks, etc.. Standards for development are specified in the Regulations to control construction of streets, drainage systems and other public improvements, to provide adequate open space and to mitigate environmental impacts. These Regulations also carry out the design policies set forth in the Comprehensive Plan and the design standards prescribed in the Zoning Ordinance. Their primary focus is on development of

land for residential subdivisions. Since over 83 percent of the land in the Town is zoned for residential use only, the Subdivision Regulations will have a direct effect on the quality of the environment and the overall character of the Town.

2. Non-Regulatory

There are many non-regulatory options for dealing with land development.

a. Land Inventory - A land inventory can be used to prioritize sites and to provide the basis for a focused land protection strategy program.

b. Coordination with other agencies - There are a number of conservation organizations with whom the Town can work to implement land protection strategies.

Such organizations include the Nature Conservancy, the Audubon Society of Rhode Island, Wood Pawcatuck Watershed Association, the Narrow River Preservation Association, and the Trust for Public Lands. The South Kingstown Land Trust and the Narrow River Land Trust are private, nonprofit land trusts which also work to protect land in South Kingstown watersheds. Similarly, the towns of Narragansett and North Kingstown have land trusts which also could be involved with lands in our shared watersheds. The option of coordinating with adjacent towns on conservation projects should be pursued.

The following State programs are available for land conservation programs,

1.) The Farm, Forest, and Open Space Program is a program administered through the Town's (Tax Assessor office) which provides current use assessment for farm, forest, or open space land for tax credits. The land must be at least five acres and have produced \$2,500 in income in either of the two preceding years. A drawback is that the program only runs for either a ten or fifteen year period. Farms which are currently involved in these programs should be considered for more permanent protection programs. In 1990, there were approximately 2,000 acres in South Kingstown involved in this program. These areas are shown on Map 5.5

2.) The Open Space and Recreation Bond is a program which allows open space to be purchased in perpetuity for conservation purposes. To date, only recreation land has been purchased by the Town through this program. The Town currently (1991) is working with The Nature Conservancy to open space lands around Factory Pond.

3.) The Natural Heritage Revolving Loan Program offers a five year loan at zero percent interest to towns for the purchase of open space. South Kingstown has not been involved with this program to date.

4.) The Agricultural Land Preservation Program is a program in which the State purchases development rights to farms. The State has purchased the development rights to 266 acres of farmland in South Kingstown and currently is negotiating for development rights on 327 additional acres.

5.) The 1986 Open Space and Agricultural Bond has made money available to towns to purchase the development rights to farms. The South Kingstown Land Trust has applied for funding to purchase the development rights on two parcels in South Kingstown.

6.) The Land and Water Conservation Program is a federal program which makes money available to communities for conservation purposes. The Weeden Farm (21 acres) was purchased by the Town using these funds.

c. Public Education

Public education concerning the variety of land protection options available is a key component to any land conservation program.

1) Conservation Easements - This is a legal agreement a property owner makes to determine the type or amount of development on land. Think of land ownership as a bundle of straws -- an owner can give away some and still keep many of them. For example, a landowner may want to keep the land and create an easement which limits or prohibits the construction of buildings on the property for generations to come. Easements can be written to meet specific intentions and must be monitored by some organization (i.e., a land trust, Nature Conservancy or the RI Audubon Society). As an example, the Nature Conservancy may hold an easement on a parcel of land which prohibits building within 300 feet of a river bank or clear cutting of forests.

It is important to note that conservation easements are more permanent than deed restrictions, which may be rescinded by a court at a later date if the purpose is deemed no longer applicable (Diehl and Barrett, 1988).

2) Purchase of Development Rights - The program involves paying the owner the difference between the value of the highest and best use of the land and the current undeveloped use (i.e., as farmland, forestland, or open space). The owner then agrees, through deed restriction or conservation easement, to keep the land in its current use.

3.) Donations

- A landowner can donate all or a portion of the land and claim some income tax deduction.
- Donations can be made through a will.
- A landowner can donate land but retain the right (and the rights of those designated) to live on the land for their lifetimes.

4.) Sale

- The land can be sold with certain restrictions outlined at the time of sale (i.e. only allow houses to be built in certain areas, a certain amount must be kept as open space to preserve the farm-like appearance or to protect the wetlands).
- The land can be sold as a bargain sale, which means it is sold to a nonprofit group at less than market value, and the owner may deduct the difference as a charitable contribution.

5.) Tax Incentives

- Conservation easements and land sales which involve conservation restrictions often provide the landowner with tax credits.

3. Conservation Commission

The South Kingstown Conservation Commission plays a valuable role in reviewing development proposals, ordinances, and managing Tri-Pond Park. The commission reviews the environmental impacts of development proposals and makes recommendations to: a) the Planning Board, Zoning Board and the Town Council; and b) RIDEM and RICRMC.

The Conservation Commission should give advisory opinions to the Planning development applications involving the groundwater reservoir or the Factory Pond recharge areas, development of farmlands, rare and endangered species habitats, areas in the Salt Pond or Narrow River Special Area Management Plan areas, and other critical resource areas.

D. Goals, Policies, and Implementation

1. Compliance with State Guide Plan

The State Comprehensive Planning Act includes the following statement regarding the contents of the Natural and Cultural Resources Element:

Shall provide an inventory of the significant natural resource areas such as water, soils, prime agricultural lands, natural vegetation systems, wildlife, wetlands, aquifers, coastal features, flood plains and other natural resources and the policies for the protection of and management of such areas. The element shall include policies for the protection of historic and cultural resources of the municipality and the state. The policies and implementation techniques must be identified for inclusion in the implementation program element.

The Act also requires consistency with the following

- State Guide Plan Elements:

- 152 Ocean State Outdoors
- 121 Land Use 2010: State Land Use Policies and Plan
- 161 Forest Resources Management Plan
- 710 through 715: Water Resources Management and Water Quality Management Plans
- 721 Water Supply Policies for Rhode Island.

- The programs and regulations of the Rhode Island Department of Environmental Management with respect to wetlands, water quality classifications, non-point source pollution management, groundwater protection, endangered species, other natural resource areas and related features.
- The protection goals of the Rhode Island Natural Heritage Program with respect to rare and endangered species, significant ecological communities, and other unique natural features.
- The designations, rules, plans, and policies of the Rhode Island Coastal Resources Management Program is the overall document, and Special Area Management- Plans have been completed for Providence Harbor, Newport Harbor, the Narrow River, and coastal ponds from Westerly to Narragansett.
- Surveys, plans, policies and register listings of the Rhode Island Historical Preservation Commission with respect to historic places and archaeological resources.
- Goals (1), (4), (5), and (6) of the Act.
- Internal consistency with other local plan elements.

2. Goals

Overall Goal of the Natural Resources Element: To preserve, protect, and enhance the Town's natural resources, many of which are not renewable

The Town recognizes the need to preserve and to protect its natural resources for the current and future use of South Kingstown residents. The preservation and protection strategies should be comprehensive and proactive.

Goal 1

To protect and to preserve the quality and quantity of the Town's potable water supply.

Policy 1.1 - The Town recognizes that most of its drinking water is from a Sole Source Aquifer and that no reasonable alternate source exists. Therefore, a Town priority is the protection of the groundwater resources. Because the ground and surface waters are interconnected, strategies must be implemented to preserve quality of ground and surface waters.

Policy 1.2 - The Town is aware that the supply of potable water from the aquifers is limited. The Town will work toward protecting the quantity of potable water and will link growth management plans to the amount of water available for both residential and non-residential uses.

Policy 1.3 - The Town will give priority use to drinking water.

Policy 1.4 - The Town recognizes that a watershed management approach to resource protection and utilization is necessary. It is therefore necessary to plan on a Town-wide basis and to coordinate resource management issues. It also means that such programs as erosion and sediment control, stormwater management, aquifer use and protection, and open space acquisition need to be planned on both a Town-wide and inter-town basis.

Policy 1.5 - The Town will support the extension of public water and sewers to the industrially-zoned areas of West Kingston in order to substantially reduce contamination to the groundwater aquifer. It is the policy of the Town that such infrastructure not be used as a catalyst for more intensive future residential-non-residential growth outside of these areas.

Implementation

- Groundwater Protection Overlay District - The Town has adopted a groundwater protection overlay district (1991) to include the groundwater reservoirs and the recharge areas as delineated by RIDEM. The purpose of the ordinance is to protect, to preserve, and to maintain the quality and supply of groundwater in the Town of South Kingstown. This ordinance shall be monitored for its effectiveness and updated as necessary.

Responsible Party: Planning Department; Planning Board

- State Groundwater Legislation - The Town shall endorse State legislation to regulate groundwater withdrawal.

Responsible Party: Town Council

- Potable Water Needs

a) The Town shall project the potable water needs of South Kingstown for the next twenty (20) years and develop a water use priority for water pumped from GAA areas to include both residential and nonresidential uses. The recommendations of the Chipuxet Aquifer Management Committee shall be incorporated into a South Kingstown long-range Aquifer Management Plan.

Responsible Party: Planning Department; Public Utilities Department

b) In addition, the Town shall work with the State in developing a program to monitor and to regulate the amount of water withdrawn from all aquifers in the Town and used for both residential and non-residential purposes.

Responsible Party: Planning Department; Public Utilities Department in conjunction with private water suppliers

- Emergency Spill Response Plan - The Town shall coordinate development of an emergency plan for response to hazardous material spills with area water departments, the State and adjacent towns.

Responsible Party: Town Manager's Office; Planning Department; Public Utilities Department

- Land Inventory - The Town shall identify lands overlying groundwater reservoirs and recharge areas which may be available for direct purchases or purchase of development rights and develop a priority list. The recharge areas and the Well Head Protection Areas, as defined by the Rhode Island Department of Environmental Management, will be used as the boundaries for the study area.

Responsible Party: Planning Department

- Coordination with Water Supply Agencies - The Town shall work with water suppliers and adjacent towns to develop compatible water protection plans.

Responsible Party: Public Utilities Department; Planning Department

- Identify Watershed Areas - The Town shall work with RIDOT to put signage on major roads identifying watershed areas.

Responsible Party: Planning Department; Department of Public Works

- Deicing Practices - The Town shall work with the State to implement salting practices which minimize degradation of ground and surface waters in GAA watershed areas.

Responsible Party: Town Manager's Office; Planning Department; Department of Public Works

- Well Head Protection Areas - The Town shall implement a Well Head Protection Area (WHPA) for public water supply wells. The WHPA developed by the RIDEM will provide additional protection to the Town's water resources.

Responsible Party: Town Council; Planning Department; Planning Board

- Public Education - The Town shall develop a public education program on groundwater issues: water conservation, household hazardous waste, septic systems, underground storage tanks (home heating fuel), pesticides, and other groundwater information.

Responsible Party: Planning Department; Conservation Commission

- Underground Injection Control (UIC) - The Town shall inventory potential sources of contamination from underground injection control (UIC) sites. Using aerial maps, Town and State records, and other sources of information, all Town UIC sites shall be identified and any unregistered UIC's reported to RIDEM.

Responsible Party: Planning Department; Building Inspector's Office

- Underground Storage Tanks (UST) - The Town shall implement ordinances on underground storage tanks to address the issues of tank monitoring strategies, tank removal, and tank prohibitions.

Responsible Party: Town Council; Planning Department; Planning Board; Conservation Commission

- Water Supply Management Plan - The Town shall adopt and implement a Water Supply Management Plan, as required by Title 46, Chapter 15.4 of the General Laws of Rhode Island.

Responsible Party: Town Council; Planning Department; Planning Board; Conservation Commission

- Public Sewer Extension - The Town will amend its Wastewater Management Ordinance to permit the extension of public sewer service to the areas presently zoned manufacturing M1 in West Kingston. Limited areas of residential and commercial use immediately adjacent to the M1 zone may be included in the sewer service district. No sewer service shall be provided into areas currently zoned residential R-R80 or RLD 200.
Responsible Party: Town Council, Utilities Department

Goal 2

To protect and to preserve both freshwater and coastal wetland resources

Policy 2.1 - The Town will work toward protecting the integrity of the varied wetlands which serve many important ecological and economic functions. Protection efforts will be directed toward swamps, marshes, bogs, floodplains, wet meadows, aquatic beds, beaches, and all other wetlands as defined by RIDEM Fresh Water Wetlands Act, as amended, 1985. The Town will pursue both regulatory and non regulatory options for ensuring the protection of these resources.

Policy 2.2 - The Town recognizes that the irreplaceable coastal resources need comprehensive protection. The Town will take a watershed approach, critical to preserving these fragile resources, to address land use, stormwater runoff, and all point and non-point source pollution. The Town will pursue management strategies consistent with the Coastal Resources Management Council's Special Area Management Plan for the Salt Ponds (1984) and the Special Area Management Plan for the Narrow River (1986).

Policy 2.3 - The Town will work toward developing a corridor of open space throughout the Town to ensure the protection of wetlands, agricultural lands, scenic features, groundwater reservoirs and recharge areas, and wildlife habitat.

Policy 2.4 - The Town supports the concept of corridor zoning to provide for a conservation zone or greenway along selected rivers within the Town, in order to both maintain the rural character of the Town and to protect river resources.

Policy 2.6 - The Town recognizes that barrier beaches form an important and fragile ecosystem and need special protection. The Town does not support development on barrier beaches.

Implementation

- Inventory and Prioritize Critical Protection Areas - Using RIGIS and other means of inventorying land, the Town shall identify the following areas of critical concern:
 - a. sites with rare and endangered species;
 - b. sites which are rare or are representative samples of wetland types;
 - c. wetlands near pollution sources which-serve as nutrient/sediment filters;
 - d. wetlands which recharge/discharge groundwater;
 - e. shoreline sites which control erosion and floods;
 - f. sites with good educational/recreational/open space/aesthetic uses and,
 - g. sites with vernal pools.

Responsible Party: Planning Department; Conservation Commission

- Wetland Protection Ordinance

a. The Town shall adopt a wetland protection ordinance to protect specific areas identified as critical wetland resource areas.

b. The Town shall adopt a river corridor overlay protection district to protect: a) the wildlife habitat associated with the rivers; b) the scenic, rural quality associated with the rivers; and c) the water quality of the rivers.

c. The Town shall develop a freshwater ponds and lakes management plan to address such issues as docks, public access and land use in the watershed.

Responsible Party: Town Council; Planning Department; Planning Board; Conservation Commission

- Waste Water Management District (WWMD) - The Town shall adopt a Town-wide WWMD. Implementation of a WWMD would allow the Town to inspect septic systems to ensure pumping every two or three years (depending on proximity to a critical resource area) and to require upgrading of failed systems. Adoption of such a program would decrease the amount of ground and surface water contamination from improperly functioning septic systems. The WWMD first shall be implemented in the salt pond area.

Responsible Party: Town Council; Planning Department; Planning Board

- Pump-out Facilities for Marine Sewage Disposal - The Town shall work with the State and private sector to develop a plan to site, finance, and maintain the pump-out facilities needed to service boats in the coastal waters.

- Responsible Party: Town Council; Town Manager's Office; Planning Department

- State Wetland Permit Tracking System - The Town shall develop a system to track the State wetland permits to identify areas of wetland disturbance and to monitor compliance with local and State approval conditions.

Responsible Party: Planning Department; Conservation Commission

- Wetlands Protection Checklist - The Town shall develop a wetlands protection checklist for development proposals. This would formalize recommendations made in the Rhode Island Soil Erosion and Sediment Control Handbook (1989), as amended, and the RIDEM Stormwater Management Recommendations (1988), as amended. The checklist shall be used by the Conservation Commission and Planning Board to ensure a consistent wetland protection policy.

Responsible Party: Planning Department; Conservation Commission; Planning Board

- Special Area Management (SAM) Plans

a. The Town shall amend the Zoning Map to reflect the recommendations of the RICRMC Narrow River SAM Plan (1986) and the Salt Ponds SAM Plan (1984);

b. The Town shall pass a Town Council Resolution endorsing both SAM plans.

Responsible Party: Town Council; Planning Department; Planning Board

- Harbor Management - The Town shall adopt and implement a Harbor Management Plan. Financing and enforcement are a critical part of implementation.

Responsible Party: Town Manager's Office

- Barrier Beaches - The Town shall work with RICRMC to ensure the protection of undeveloped barrier beaches in South Kingstown, specifically, Green Hill, Browning, and Moonstone beaches. The Town, will work to support the policies outlined in the RICRMC Coastal Resources Management Program, 1990, as amended. The Town shall work to minimize development on developed barrier beaches and to ensure that any construction is done in a way which creates the least environmental impact.

Responsible Party: Planning Department; Conservation Commission

Goal 3

To protect and preserve agricultural land within the Town

Policy 3.1 - The Town supports the preservation of farmland for farming activities. The Town supports utilizing a combination regulatory techniques (zoning) and of public and private funding resources (land trusts, easements, purchase of development rights) to achieve the necessary protection.

Policy 3.2 - The Town recognizes that there is a significant amount of agricultural activity in South Kingstown. There is the potential for ground and surface water degradation from fertilizers, pesticides, stormwater, and soil erosion. The Town will work with appropriate agencies to mitigate the potential contamination of the water resources from these sources.

Implementation

- Agricultural Lands

a. The Town shall consider developing a farmland/open space overlay district based on prime agricultural soils, historic farm use, character of the surrounding area, and open space. Development shall be guided to appropriate areas on the property through site plan and review.

b. The Town shall identify location and owners of agricultural lands in South Kingstown. The Town shall work with the State Agricultural Land Preservation Commission and other protection programs to promote such land conservation practices as conservation easement and purchase of farmland development rights.

c. The Town shall pursue a public education program to make land owners aware of the variety of protection options and environmentally sound management practices.

d. The Town shall consider mandatory cluster zoning for significant residential developments proposed in areas of agricultural use of soils.

Responsible Party: Planning Department; Planning Board; Conservation Commission

Goal 4

To protect and to preserve other natural resource areas within the Town

Policy 4.1 - The Town recognizes that areas of critical concern, or environmental sensitivity, need protection. Such factors as groundwater resources, wetland functions, rare and endangered species habitat value, and agricultural/open space value will be considered a priority in identifying areas for protection.

Policy 4.2 - The Town recognizes that native species of trees and forests are a major natural resource in the Town, providing abatement for noise, water, air, and land pollution. Trees also contribute to the rural character of the Town. The Town supports protection of this valuable resource.

Policy 4.3 - The Town recognizes that natural resource preservation and conservation will be realized more effectively if protection efforts are coordinated with other towns, State and Federal agencies, and private conservation groups.

Policy 4.4 - The Town recognizes that a litter control program, coordinated with RIDEM, is needed to improve the aesthetics of the Town.

Implementation

- Subdivision Regulations - The Subdivision Regulations will be revised in accordance with State enabling legislation to implement the natural resource protection policies of this Plan. Included in these regulations will be appropriate requirements for the following:

- a. Protection of the existing natural and built environment and mitigation of all significant negative impacts of any proposed development on the existing environment;

- b. Promotion of land developments which are well-integrated into the natural environment and which concentrate development in areas which can best support intensive use;

- c. Promotion of adequate technical review of all proposed land developments and subdivisions;

- d. Encourage the dedication of adequate open space, recreation space, and buffer areas, and;

- e. Protection of areas of outstanding scenic value.

- Earth Removal

- a. The Town shall implement a grading permit process to ensure that projects are done in a manner which minimizes disturbance and are consistent with the recommendation in the Rhode Island Soil Erosion and Sediment Control Handbook, 1989, as amended.

- b. The Town shall amend the existing earth removal ordinance to address specific mining practices, phasing of projects, and reclamation procedures to be completed before new project phases are begun. These practices shall be done in a manner consistent with the Rhode Island Soil Erosion and Sediment Control Handbook, 1989, as amended.

Responsible Party: Planning Department; Planning Board

- Trees and Habitats

a. The Town shall implement a tree ordinance which includes a Tree Conservation Plan to ensure protection of the natural resource.

b. The Town shall inventory the indigenous habitat types (using RIGIS) and identify areas which need protection. The protection program shall be coordinated with State and conservation organization programs.

Responsible Party: Town Council; Planning Board; Planning Department; Conservation Commission; Tree Warden; Department of Public Works

- Site Plan Review - The Town shall revise the Zoning Ordinance requirements for site plan review to include such specific recommendations for protection of natural resources as ground and surface water, wetlands, soil, and trees.

Responsible Party: Town Council; Planning Department; Planning Board; Conservation Commission

- Soil Erosion and Sediment Control

a. The Town shall adopt a Soil Erosion and Sediment Control Ordinance.

b. The Town shall identify sites which pose erosion, sedimentation, and stormwater runoff problems.

Responsible Party: Town Council; Planning Board; Planning Department; Conservation Commission

- Cooperative Resource Planning with Other Towns and Organizations

a. The Town shall work with adjacent towns to develop compatible resource protection plans.

b. The Town shall work with the Rhode Island Nature Conservancy, the South Kingstown and Narrow River Land Trusts, the water suppliers, and the State to protect environmentally sensitive areas through acquisition, easements, or purchase of development rights. Additional non regulatory protection strategies shall be identified.

Responsible Party: Town Manager's Office; Planning Department

- Conservation Commission

The Conservation Commission shall strengthen its activities in the following areas:

a. pursuing acquisition by gift, purchase, or lease of lands identified as having significant conservation value;

b. management of these lands and improvement of their value for conservation or passive recreation;

c. active advocacy for environmental legislation at the State and local level;

d. developing public education and information programs; and,

e. working with the Planning Department to develop a tracking system for approval conditions for development included in approvals to ensure compliance.

Responsible Party: Conservation Commission; Planning Department

- Greenways - The Town shall pursue acquisition and protection strategies for developing greenways or natural corridors along rivers and other waterways in Town. An inventory should be done to determine the areas to be targeted for protection. A feasibility study for implementation of this program should be conducted.

Responsible Party: Town Council; Planning Department; Town Manager's Office.

- Narrow River Stormwater Management Study - The Town shall participate in this study. This is a study to develop a comprehensive, tri-town management plan for the Narrow River watershed. The study is being funded (1991-93) by an Aqua Fund grant to the towns of Narragansett, South Kingstown and North Kingstown. Once completed, the recommendations and findings shall be incorporated into the Comprehensive Plan.

Responsible Party: Planning Department; Department of Public Works

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CULTURAL RESOURCES

F. Introduction

Cultural resources help define the identity of a town by providing continuity of time and place. The cumulative effects of circumstances unique to each place cultivate, over time, a locale-specific character. This character is embodied in the historic buildings, structures, and sites, as well as the prehistoric sites, that comprise the town.

Since the passage of the National Historic Preservation Act (NHPA) in 1966, awareness of local cultural resources has grown and tremendous strides have been made toward preserving the buildings, structures, and sites that reflect the unique history and individual character of a town.

The Town of South Kingstown, with its rich and varied history, has long recognized the importance of preserving the cultural features that contribute to its singular identity. This element of the Comprehensive Plan presents the means by which South Kingstown will continue to protect the physical remains of its heritage as the town moves into the future.

G. The Context for Planning

1. The History of South Kingstown

South Kingstown has been host to human occupation for nearly 10,000 years. Nomadic bands of hunter-gatherers moved about the land taking advantage of the indigenous plants, animals, and seafood for their sustenance. Living along the coast where seafood was abundant during the spring and summer, the population would move to camps further inland during the fall and winter to areas near favored hunting grounds and supplies of firewood. The introduction of agriculture around 1000 A.D. resulted in a more sedentary lifestyle and the development of extended political organization. When European settlers arrived to the area in the 17th century, the Narragansett Indians were the most powerful tribe in the area and respected as the best farmers.

Although European colonists began arriving in the 1600's, settlement remained sparse until the eighteenth century. Traditionally, agriculture was the dominant economic activity, and many early farmsteads are still visible across the landscape. Small, family farms were established throughout the town. Their principle crops included corn, potatoes and oats. Sheep and cows also were raised to supply wool and dairy products.

Unique to New England, and rather reminiscent of the Southern plantation society, a group called the Narragansett Planters thrived between the 1660's and the Revolutionary War. Estates thousands of acres in size were worked by a large labor force including tenants, hired hands, indentured servants, and American Indian and African slaves. By 1748, South Kingstown had the highest number of slaves in the colony. Horses, cattle and sheep, and their by-products, were the mainstays of the Narragansett plantation system. Corn, tobacco, rye, hemp and flax were also raised.

The development of a transportation network in the Town played a key role in its growth. The first railroad line was built in 1837, and the Narragansett Pier Railroad was opened in 1876. This provided an important incentive to the growth of industries, summer tourism, and the improvement of the road system.

During the nineteenth century, manufacturing began to replace farming in the South Kingstown economy. Grist mills and saw mills harnessed the power of South Kingstown's many waterways. The mills transformed villages, including Wakefield, Peace Dale and Rocky Brook, into thriving communities. Several other, smaller hamlets were grouped more informally around mills, including Glen Rock, Mooresfield, and Usquepaug. Later in the nineteenth century, textile mills and fulling mills also were established.

In 1889, the Rhode Island College of Agriculture and Mechanical Arts, a land grant school, was founded in Kingston. The school, renamed Rhode Island College in 1909, grew considerably in the 20th century and became the University of Rhode Island in 1951. Its location in Kingston helped maintain the intellectual and artisan character of South Kingstown's only non-industrial village.

While fishing and shellfishing activities have always occurred along the South Kingstown shore, the industry was never a dominant factor in the Town's economy. The role of the shore gained prominence in the late-19th and early-20th centuries as it was developed to serve a growing influx of summer visitors and residents. Boarding houses and cottages were built, along with high-style estates and mansions.

Although agriculture remains an important industry in South Kingstown, growth in the community has been primarily residential since the turn of the century. In addition to the construction of new houses and housing subdivisions, abandoned barns have been converted into residences.

The history of South Kingstown is reflected in the variety of buildings, sites and structures distributed across the landscape of the town. Their stylistic and geographical relationships are a direct reflection of the forces that shaped the community that is South Kingstown today.

2. The Role of Cultural Resources in Defining South Kingstown

Preservation of South Kingstown's history has been a concern to its residents for over thirty years. In 1959, the Village of Kingston became one of the first local historic districts in Rhode Island after the State passed legislation allowing for their creation. Since that time, the Kingston Historic District has been added to the State and National Registers of Historic Places along with historic districts in Peace Dale and Usquepaug Road. Several other areas in Town have great potential for designation as local, state and national historic districts. To date, however, Kingston remains the only locally designated district in South Kingstown with a local historic district commission and design review.

Incorporating the information published in 1984 by the Rhode Island Historical Preservation Commission in Historic and Architectural Resources of South Kingstown, Rhode Island: A Preliminary Report, the 1986 South Kingstown Comprehensive Plan established three goals for future preservation activities that would preserve the diversity of South Kingstown's landscape and cultural properties. The plan called for future actions to take into account:

- the attitude and objectives of the community toward establishing and maintaining the historic context of South Kingstown;

- delineation and preservation of the historic identity of the villages in South Kingstown; and,
- cooperation with private sector in protecting and/or buffering historic sites contained within land being developed (South Kingstown 1986:1-23).

The Rhode Island State Land Use Policies and Plan, Land Use 2010, emphasizes the role of cultural resource protection in maintaining districts and individual buildings by encouraging rehabilitation and adaptive reuse of properties within a framework established by a local review body. The State Plan established the following goals designed to strengthen programs and facilitate preservation activities:

Table 1
Preservation Guidelines

- Promote greater use of historic district zoning;
- Identify historic neighborhoods and communities and recognize their importance in planning and development activities;
- Promote understanding of older development patterns so that their historic character will not be submerged or lost;
- Encourage the protection of open space areas derived from early patterns of farmland and complexes of farm building;
- Expand financial incentives to preserve and maintain historic structures and districts; Seek viable adaptive uses for historic buildings;
- Consider an approach similar to the Environmental Review Team concept to harness the expertise of public and non-profit historic preservation agencies to suggest alternatives when important historic places are threatened; and,
- Capitalize on the significance of historic buildings and areas as tourist attractions.

Following the principles established by the State Plan and the goals of the 1986 Town Plan, the local Historic District Ordinance states as its purpose:

to safeguard the heritage of the town by preserving districts which reflect elements of its cultural, social, economic, political and architectural history, to stabilize and improve property values in such districts, to foster civic beauty, to strengthen the local economy and to promote the use of such historic districts for the education, pleasure and welfare of the citizens of the town (Town of South Kingstown 1989: Article II, Section 11-16).

By protecting the cultural resources of South Kingstown, the ordinance maintains the sense of place inherent in the community as identified by its historic structures and sites.

H. Resource Inventory and Analysis

1. Inventory of Cultural Resources in South Kingstown

The long history of South Kingstown is reflected in the assortment of historic buildings and structures, as well as historic and prehistoric archaeological sites, present throughout town. These existing features embody the diverse aspects of South Kingstown's past and create South Kingstown's unique personality.

a. Archaeological Resources - The abundance of resources in South Kingstown has encouraged habitation of the area for thousands of years. The history of the various resident groups is contained in the archaeological record as well as the built environment. Prehistoric and historic archaeological sites contain valuable information about the land use and social history of South Kingstown.

ii.

1.) Prehistoric Sites - The combination of inland and coastal resources and a mild climate was conducive to prehistoric occupation. Evidence of prehistoric camps and villages is found throughout town, especially in the area of the Salt Ponds along Block Island Sound and Narragansett Bay. Ceramic fragments dating as far back as 3100 years were recovered from the Potter Pond Archaeological District located along the southern shore of South Kingstown. The district contains a variety of sites including household settlements and resource processing and disposal areas.

2.) Historic Sites - The locations of old mills, farmsteads, and residences comprise the majority of historic archaeological sites. All of these are important aids in understanding the settlement patterns and lifestyles of earlier residents.

3.) Underwater Sites - Many shipwrecks are known to have occurred off the coast of South Kingstown. The remains of these boats remain largely intact and undisturbed, capturing a moment of time inside. Among the wrecks is that of the John Paul, which went down off Green Hill on February 10, 1893.

b. Existing Historic Sites and Structures - The type of historic buildings, structures and sites found in South Kingstown range from vernacular cottages and agricultural buildings to high-style, landed, estates. They represent architectural styles, cultural values, and modes of living from the late 17th century through the present. The development of South Kingstown is legible in the distribution of buildings, residential, commercial, and industrial, across the landscape.

In each pocket of settlement, the styles and type of buildings convey the history of that particular community within the larger town. These buildings, in addition to the buildings and features found across landscape, create a sense of place and contribute a dimension to the quality of life in South Kingstown.

1.) Villages - The Town of South Kingstown contains thirteen smaller, historically unique villages and hamlets. Each has its own traditional character reflecting the resources available at that location. The majority of the villages were founded around commercial or industrial ventures. Dwellings for workers followed, as did churches, schools, and commercial establishments to support the resident population.

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- Centers of Government - Kingston, originally known as Little Rest, was organized in the 1770's as the county seat of Washington County. The County Courthouse was among the first Town buildings to be constructed. The Federal style building was significantly remodeled in 1876 with the addition of a mansard roof and central pavilion when it was converted into the town library. Other government buildings include two granite block structures, a jail, constructed in 1792 and a records office, the first fire-proof building in Rhode Island, built in 1857, and the current County Courthouse, constructed in the Romanesque Revival style circa 1900. This is one of the only non-industrial villages in South Kingstown. Instead, artisans and other professionals settled in Little Rest. The establishment of a land grant college (later the University of Rhode Island) in 1889 solidified Kingston's position as the intellectual center of the community. Many of the extant early Federal and Greek Revival buildings, including a bank, several schools and taverns, are characteristic of Kingston in addition to the late 19th century and early 20th century buildings built following the formation of the college.

- Mill Villages - Six villages and hamlets in South Kingstown (Peace Dale, Rocky Brook, Glen Rock, Usquepaug, Mooresfield, and Biscuit City) were settled around mills.

The largest and most formal of these is Peace Dale, which developed around the mills of Rowland Hazard, the first built in 1847. In addition to his mill complexes, Hazard designed the Peace Dale Congregational Church, the Town Hall, and several bridges. Residences of the mill owners and workers were built along with such requisite support facilities as schools, a post office, and a few commercial establishments.

The other hamlets evolved as a collection of residences and farmsteads around a mill or, what is today often, the former site of a mill. These communities also included schools and churches to serve the population, as well as a few commercial establishments. In the case of Biscuit City, the entire hamlet is now an archaeological site composed of mill ruins and house foundations.

- Transportation Centers - The villages of West Kingston and Perryville grew around transportation facilities. West Kingston was founded in 1837 when the New York, Providence and Boston Railroad built a station there. Perryville originated as a cluster of farms around a stage coach stop in the early 18th century. Several houses and a store or church developed around each node. Today, Perryville is characterized by 18th century Georgian and Federal style houses, while the houses of West Kingston are primarily later, nineteenth century styles featuring bracketed eaves and mansard roofs.

- Commercial Centers - Two South Kingstown villages served primarily as commercial districts: Wakefield and Fisk Flats. Fisk Flats, a small hamlet between Peace Dale and Rocky Brook, originally served as the commercial center of Peace Dale. Wakefield, founded around one of South Kingstown's many mills, grew into the main commercial center for the town. Both locations feature a variety of nineteenth and early twentieth century commercial blocks, in addition to residences

and churches. Among these are a nineteenth century flat iron building and two early twentieth century diners.

- Summer Colonies - Along the shores of Narragansett Bay and Block Island Sound, the communities of Green Hill, Matunuck Hills, and Matunuck Beach evolved to house the influx of summer residents to the area. The houses, built in a variety of late 19th century styles, range from group boarding houses to small, vernacular cottages to high style, shingled estates designed by the leading, turn-of-the-century architects, including Stanford White of the firm McKim, Mead and White.

2.) Farmsteads and Residences - Scattered across the countryside are residential and agricultural structures dating from the late seventeenth century through the present. Perhaps the earliest extant house in South Kingstown, the Samuel Perry House, was reputedly constructed in 1696. Many of the earliest farms include residences within a complex of agricultural out-buildings and surrounding farm land. Remnants of farms, houses and an occasional outbuilding are visible, although commonly without the encompassing acreage as a result of ongoing development. However, a sense of the Town's settlement patterns can be gleaned by looking at the age and distribution of the farmhouses. In addition to vernacular 18th and 19th century houses which feature such stylistic details as fanlights above the doors, pedimented gables, and bracketed eaves, are the large, architect-designed houses from the estates of South Kingstown's leading families.

3.) Educational Facilities - Schools in South Kingstown run the gamut in size and sophistication from 19th century, one-room schoolhouses to the Kingston Seminary (a coeducational academy opened in 1829), to the University of Rhode Island campus, established in 1889. The majority of historic schools continue to be used as educational facilities, while the smaller schools serve the elementary students in the various neighborhoods.

4.) Religious Facilities - The numerous churches in South Kingstown attest to the cultural and ethnic diversity of South Kingstown's population. The buildings range stylistically from one-story, vernacular structures to classic, early-19th-century New England Meeting Houses to structures incorporating elements of the later-19th century Gothic and Shingle styles. Almost all still are used actively.

5.) Places of Assembly - Several structures in South Kingstown were built specifically as meeting places. These include three granges (one constructed in the late nineteenth century and two built during the early twentieth century) and a 1903 Masonic hall.

6.) Recreational Facilities - The second oldest youth camp in the world, Camp Fuller, is one of three, early twentieth century summer camps in South Kingstown. Camp Fuller is affiliated with the Y. M. C.A. while the other two, Camp Hoffman and Camp Aquapaug are affiliated with the Girl Scouts and Boy Scouts respectively. Structures dating from the 1930's are still in use at all three facilities. An important aspect to each camp is the landscape that has evolved over 60 years of activity.

7.) Engineering Structures - Historic bridges cross South Kingstown's many streams. These include arched stone bridges from the late nineteenth century; single arched, bridges of reinforced concrete built in the 1920's and 1930's; and, wooden decked, steel truss bridges. Other engineering structures in town include the mine shaft from the Cajoot Lead Mine, a source of graphite from prehistoric times to the mid-19th century which is still visible, although it has been filled in and an observation tower at Hannah Robinson Rock, built in 1936-1937, which served as a signal tower for the U.S. Army Signal Corps during World War 11.

8.) Cemeteries and Stone Walls - Stone walls and historic cemeteries are common features of the South Kingstown landscape. Ninety-nine historic cemeteries in South Kingstown have been identified by the Rhode Island Veterans' Cemetery Office. These range from small family plots (the Rose Family Cemetery which contains 4550 stones within a walled enclosure and dates from the late 19th century to the early 20th century) to larger burial grounds, which may be associated with nearby churches (the Usquepaug Cemetery across from the Queen's River Baptist Church). A complete list of these cemeteries can be found in Technical Appendix V.A7.0.

9.) Monuments - A variety of monuments can be found around South Kingstown. These markers, generally of stone or concrete, commemorate various people and events in South Kingstown's history. These range from a 1906 monument commemorating the site of the 1675 Great Swamp Fight to the "Carter Killed Jackson" Monument, a granite marker inscribed with an account of the murder of William Jackson by Thomas Carter in 1751. More formal monuments are found in Peace Dale. One honors deceased members of Narragansett Engine Company #1, established in Peace Dale in 1867. Another, a dressed granite sculpture entitled The Weaver was created by Daniel Chester French in 1920 in memory of Rowland Hazard and his sons.

2. Analysis of Preservation Activities in South Kingstown

The preliminary survey published by the Rhode Island Historical Preservation Commission in 1984 identified 337 historic buildings and structures in South Kingstown (Figure 18; Table 2). Concentrations of resources were identified in the eastern portion of town, specifically in the villages of Wakefield, Peace Dale, and Kingston. The buildings reflect the architectural styles of the 17th century through the 20th century, as well as the various lifestyles and occupations of South Kingstown residents over the past 300 years.

Many preservation activities have already taken place in South Kingstown, providing a solid base upon which future actions can build.

a.) Buildings Listed on the National Register of Historic Places - The National Register of Historic Places was established in 1966 by the National Historic Preservation Act to identify public and private owned cultural resources and to encourage maintenance and planning for compatible use of the designated properties. Properties nominated to the National Register must meet one of four criteria:

Criteria A: Association with events that have made a significant contribution to the broad patterns of our history;

Criteria B: Association with the lives of persons significant in our past;

Criteria C: Embodiment of the distinctive characteristics of a type, period, or method of construction or representative of the work of a master, or possessing high artistic values, or representing a significant and distinguishable entity whose components may lack individual distinction; or,

Criteria D: Yielding, or likely to yield, information important in prehistory or history.

(National Register Bulletin 16 1986:1; See also Technical Appendix V.A5.0)

Properties listed in the National Register must meet at least one of the four criteria and retain integrity of location, design, setting, materials, workmanship, feeling and association.

Before any federally-funded, licensed, or regulated action can occur at or near a property listed on the National Register, the action must be reviewed by the State Historic Preservation Office (SHPO) in order to minimize and/or to mitigate any impact it will have on the historic site.

Figure 19
 Distribution of Historic Architectural Resources in South Kingstown
 (from the 1984 Preliminary Survey by RIHPC)

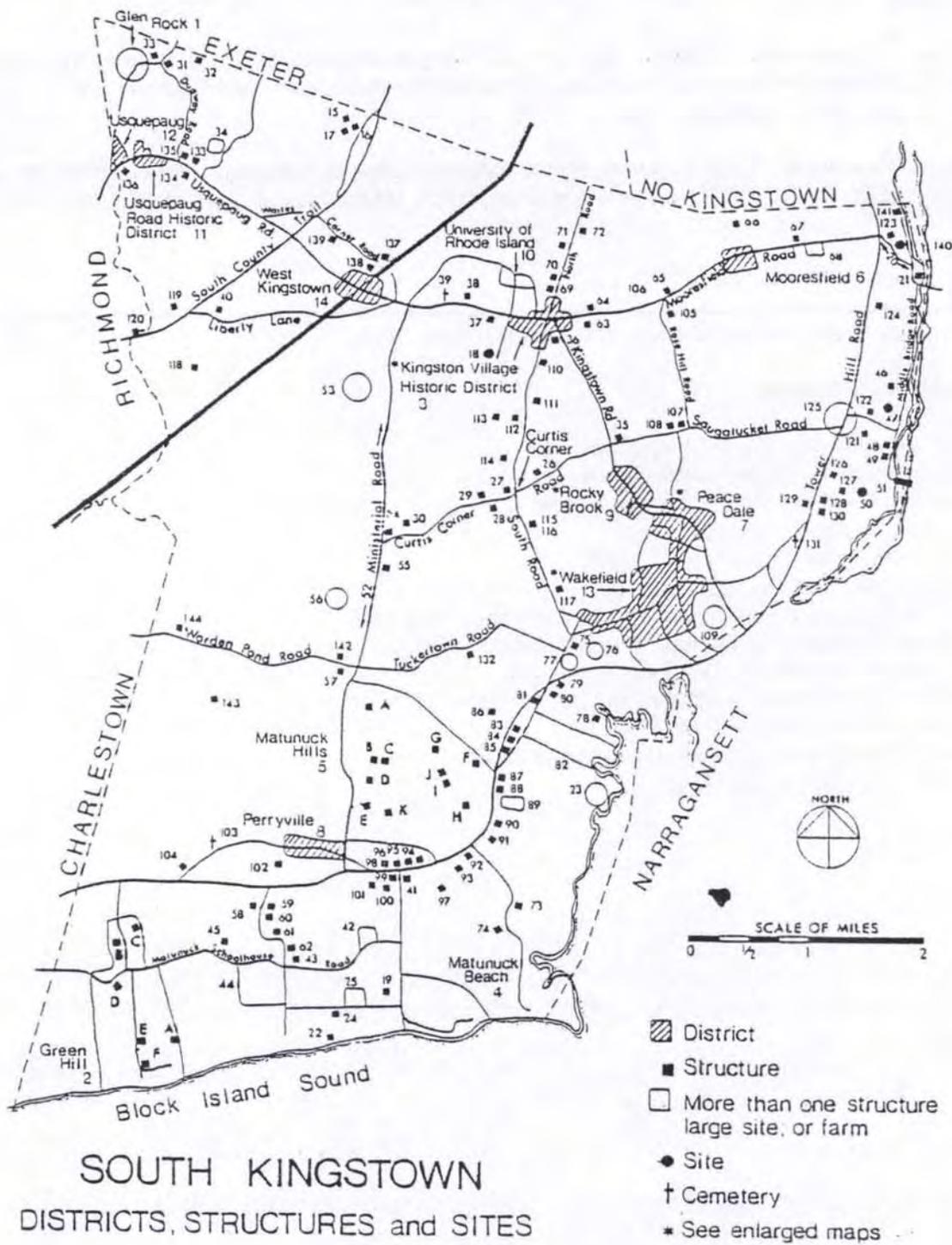


Table 2
**Properties Listed in the National Register of Historic Places
and the Rhode Island State Register**

(Numbers following each entry refer to the properties
identification number on Figure 18)

Districts:

Kingston Village Historic District: both sides of Kingstown Road and Mooresfield Road between Little Rest Road on the west and Kingstown Road on the east; also, section of adjacent South and North Roads and Potter Lane. (3)

Peace Dale Historic District: Amos, Branch, Brown, Church, Columbia, Green, Kimball, Larkin, Railroad, School and Spring Streets and Broad Rock, Indian Run, Kersey, Kingstown, and North Roads. (7)

Potter Pond Archaeological District

Usquepaug Road Historic District: Usquepaug Road (11)

Individual Properties:

Theatre-by-the-Sea, Card's Pond Road (24)
Femwood Cemetery, Kingstown Road
Kingston Railroad Station, Kingstown Road (14-A)
Lambda Chi Site, Kingstown Road
Shadow Farm, Kingstown Road (109)
William Davis Miller House, 130 Main Street (13-U)
Jireh Bull Blockhouse Historic Site, Middlebridge Road (50)
Ministerial Road Archaeological Site, Ministerial Road
Commodore Perry Farm, 184 Post Road (86)
Henry Marchant Farm, South County Trail (119)
Bouchard Site, Usquepaug Road
Fayerweather Blacksmith Site, Usquepaug Road
Tappan Site, Usquepaug Road

NHPA also mandated the SHPO's in each state across the country to oversee the protection of historic resources in their jurisdiction. This included the compilation of a state survey and inventory of all historic and prehistoric cultural resources. The state surveys contain many properties either not eligible for or not yet nominated to the National Register. A complete state survey will list all of the historic properties within that state. The Rhode Island Historical Preservation Commission (RIHPC) completed the survey of South Kingstown's historic buildings in 1984 and published the findings in Historic and Architectural Resources of South Kingstown, Rhode Island: A Preliminary Report.

A total of 71 South Kingstown properties are listed on the National Register. These include seven individual properties, one cemetery, 2 historic archaeological sites and 5 prehistoric archaeological sites. The majority of the properties are located in two districts (refer to Table 2). A third district, in the neighborhood of Woodruff Avenue in Wakefield, currently is being considered for admission to the Register, as well. Forty-two additional sites and structures, mostly individual properties, have been determined eligible for the Register, but have not yet been listed (Table 3).

Twenty historic designed landscapes in South Kingstown, dating from the early eighteenth century to the early twentieth century, have been inventoried and found eligible for Register listing by the RIHPC, as well (Table 4). These landscapes include estate lands designed by professional firms (including the Olmsted firms) and private gardens created by property owners. Among the inventoried landscapes are the University of Rhode Island campus, originally designed by the Olmsted Brothers, the Marchant Farm, the most intact property from the Narragansett Planters, and Shephard's Run, the only extant Beatrix Farrand landscape design in Rhode Island.

The locations of all National Register listed sites and structures, as well as the locations of eligible, historic designed landscapes can be found on the RIGIS cultural resource maps for South Kingstown.

b. Projects Receiving Investment Tax Credits - Federal Investment Tax Credits are available to owners of commercial or industrial, income-producing, National Register listed or eligible properties; properties contributing to National Register Historic Districts; or properties located in Certified Local Districts. Owners completing a restoration according to the Secretary of the Interior's Standards for Rehabilitation are eligible for a tax credit equal to twenty percent (20 percent) of the cost of the rehabilitation (See Technical Appendix V.A4.0).

The State of Rhode Island also offers a tax credit equal to ten percent (10 percent) of the cost of rehabilitation or maintenance work on owner-occupied, non-income producing residences. The work must be approved by the Rhode Island Historical Preservation Commission, and the eligible property must be listed on the Rhode Island Register of Historic Places or be included in an area subject to local historic district zoning controls.

Table 3
**Properties Which May Be Eligible for Listing in the
National Register of Historic Places and the Rhode Island State Register**

(Numbers following each entry refer to the properties
identification number on Figure 18)

Matunuck Point Summer Colony, Peninsula Road (4-F)
University of Rhode Island Quadrangle (12-C)
Wakefield Historic District (13)
Hazard Holland House, Antique Road, off Matunuck Beach Road
R.R. Gardener Estate, Curtis Corner Road (28)
Dockray House, 2 Dockray Road (13-E)
Dry Stone Walls, Edgewater Road
Kenyon Corn Meal Company, Glen Rock Road (12-A)
Wakefield Mill, 10 High Street (13-F)
Washington County Courthouse, Kingstown Road (14-L)
Isaac Peace Rodman House, 961 Kingstown Road (35)
The Wells Place, Littlefield Lane
Watson House, 141 Main Street, Wakefield (13-V)
Admiral Dewey Inn, Matunuck Beach Road (4-D)
Green Farm/Windy Meadows, Matunuck Schoolhouse Road (44)
Samuel Perry House, 844 Matunuck Schoolhouse Road (43)
Browning Homestead Farm, off Matunuck Schoolhouse Road (42)
Pettaquamscutt Rock, off Middlebridge Road (46)
Tucker-Albro House, 155 Ministerial Road (55)
Perry/Carpenter Gristmill, Moonstone Beach Road (59)
Palmer Gardner House, Mooresfield Road (67)
Henry Palmer House, 557 Old Succotash Road (74)
John Potter House/"Great House," Post Road, south of Succotash Road (92)
Jeremiah P. Robinson House, 145 Post Road (77)
William Congdon House/Brookfield, 159 Post Road (79)
The Watson Tract, Post Road (82)
House, 166 Post Road (80)
Rocky Meadows Farm, 205 Post Road (87)
Weeden Farm/"Willow Dell," Post Road (100)
George E. Rose, Jr. House, Rose Hill Road (105)
Watson House, Saugatucket Road (108)
Solomon Carpenter House, 144 South Road (111)
Mileage Marker, South Road (115)
Town Pound, South Road (116)
Great Swamp Fight Site, off South County Trail (118)
Kymbolde, Torry Road (122)
Hannah Robinson's Rock, Tower Hill Road (123)
Shadblow Farm, Tower Hill Road (126)
Dr. Nathan Knight Farmhouse, Usquepaug Road (12-C)
Larchwood Inn, Main Street

T a b l e 4

Historic Designed Landscapes Which May Be Eligible for Listing in the National Register of Historic Places and the Rhode Island State Register

(Numbers following each entry refer to the properties identification number on Figure 18)

"The Glebe," Walmsley Lane off Bridgetown Road (140)
Henry Marchant House, South County Trail (119)
Shadow Farm (109)
Hazard Farm, Columbia Street
Hazard Homestead, East Street (7-M)
Potter Residence, North Road (72)
Shadblow Farm, Tower Hill Road (126)
"Little Rest," 1276 Kingston Road (3-E)
Larchwood Inn, 176 Main Street (13-W)
Isaac Peace Rodman House, 961 Kingstown Road (35)
George E. Rose Jr. House, Rose Hill Road (105)
University of Rhode Island (10)
Dr. R.R. Robinson Estate/Edgewood Farm/J.P. Robinson House, 99 Main Street and 145 Post Road (13-S, 76, 77)
Watson Tract, Post Road (82, 82A-1)
Welsh House, Torry Road (121)
"Kymbolde," Torry Road (122)
Hazard Memorial, Kingstown Road (7-K)
Saugatucket Park/Wakefield Grammar School, Main and High Streets
Tootell House, Mooresfield Road (64)
"Shephard's Run," Tower Hill Road (127)
Robinson Spring and Spring House, off Tuckertown Road across from Stewart Nursery
ENDALAR, Post Road, built by Stanford White (c. 1880's)
Old Mill (stone ruins) about 100 yards beyond the spring
Oliver Watson Home (#274)
Cottrell Homestead
John Richmond House (formerly store and livery stable) (#344)
Boisclair House (#381 A)
Waites Corner itself (site of old church)
Baptist Church, Wakefield
Church of Ascension, Wakefield

Four properties in South Kingstown listed on the National Register have received Federal tax credits for completed renovations. Three of these properties are located in Wakefield and one is in Kingston (refer to Table 4). No restoration projects in South Kingstown have received State tax credits.

c. Buildings Granting Facade Easements - A historic preservation easement involves a formal agreement between the owner of a historic property and a government agency or preservation organization under which the latter receives the right to review and approve any alterations to the facades of the designated building before they are made. In exchange, the building owner receives a tax credit, grant, or some other form of economic benefit. Owners can donate easements for a building's exterior or interior or both. Typically, easements on a building's interior are granted for public buildings, while easements on privately owned structures generally affect only the building's exterior. The majority of easements are long term or in perpetuity depending on the specific terms of each agreement. Owners who donate easements in perpetuity are eligible for Federal Tax Credits.

Three buildings in South Kingstown have donated facade easements to the RIHPC in exchange for grants for restoration projects. Included were the Kingston Free Library and Reading Room, the Kingston Congregational Church, and the Elisha Reynolds House (Table 5). An easement also was donated on the Old County Jail, which has since expired.

d. Projects Receiving Grants - A 1980 amendment to NHPA allows local governments to participate in the National Register and Section 106 processes. Through the State Historic Preservation Office, communities can join the Certified Local Government (CLG) program. This program allows towns to designate local historic districts and develop design review procedures to be overseen by a local historic district commission. As a CLG, communities are also eligible to apply for grants from RIHPC to fund historic preservation survey and planning projects.

As a participant in the RIHPC Certified Local Government Program, South Kingstown has received grants from the RIHPC over the past five years (Table 6). In 1985, the National Register nomination for the Peace Dale Village Historic District was funded by the Certified Local Government (CLG) program. In 1988, the South Kingstown Historic District Zoning Brochure was developed using funds from RIHPC. Currently, an archaeological survey of the Near Interior Archaeological Region is being funded by a 1990 CLG grant. A 1991 CLG grant application was awarded to fund the preparation of two National Register Nominations. A 1992 CLG award was made for an archeological study at the Great Swamp.

e. Buildings Included in the Local Historic District - In 1959, a local historic district was created in Kingston in accordance with the enabling legislation of the State of Rhode Island (Title 45, Chapter 24.1 of Rhode Island General Laws). Incorporated in the Town's zoning, the Historic District Ordinance includes provisions to "safeguard the heritage of the town" through the preservation of the buildings included within the boundaries of the

Table 5
Properties Donating Facade Easements

Kingston Free Library & Reading Room, Kingstown Road (Exterior) - expires 11/10/2005
Kingston Congregational Church, 1328 Kingstown Road (interior & Exterior) - expires 11/22/97
Elisha Reynolds House, 1 South Road (Exterior) - expires 5/14/2007

Table 6
Projects Receiving Investment Tax Credits

Aldrich House, 36 North Road
Hale Mill Boiler House, Main & High Streets
Shadow Farm Carriage House/Barn Complex, Wakefield
Shadow Farm Manor House, Wakefield

Table 7
Projects Receiving RIHPC Grants

1985 - Peace Dale Village Historic District National Register Nomination
1989 - South Kingstown Historic District Zoning Brochure
1990 - Archaeology Survey of the Near Interior Region
1991 - Preparation of Two National Register Nominations (Kenyon's Department Store and South County Center for the Arts, formerly the Washington County Courthouse)
1992 - Archeological Survey of the Great Swamp Area

district (South Kingstown Code of Ordinances, Article II, Section 14-16). A commission of local residents is charged with ruling on applications for altering, repairing, moving or demolishing existing structures, as well as applications for new construction within the established boundaries of the district.

Thirty-nine buildings in Kingston are included in the Historic District. While the stated aim of the Historic District is not to limit new construction, alteration or repairs to any one (1) period of architectural style, the creation of the district and design review maintains the cohesive appearance of the area within the district boundaries (Town of South Kingstown 1989: Article II, Section 14-39).

I. Needs Analysis - Cultural Resources

1. Condition of Cultural Resource Stock

The historic building stock in South Kingstown appears to be well maintained. Alterations and additions are noticeable on some buildings. While the majority of changes have been sympathetic to the historic character of the buildings and district, some minor changes (replacement windows or new porch elements) have been made which, over time collectively could erode the historic character of the building and its surroundings.

Because they are protected by design review, buildings in the local historic district suffer fewer losses of the features that contribute to both their individual historic character and that of the district as a whole. Overall, the existence of design review has enabled the Kingston Historic District to change without losing the sense of place fostered by the community's historic buildings.

2. Existing Cultural Resource Surveys

While the preliminary survey published by RIHPC provides a thorough inventory of South Kingstown's historic building stock, the inventory of historic buildings needs to be maintained and continually updated to include buildings that may have been overlooked earlier, as well as buildings "coming of age" in later years.

A 1991 report by Dr. E. Pierre Morenon, Rhode Island College, entitled "Archaeological Planning: Establishing a Context for the Near-Interior and a Discussion of the Archaeological Record in South Kingstown, Rhode Island" concluded that a site in Green Hill (the South Shore Park) is significant and eligible for National Register nomination. Within the study area, a total of sixteen features were identified and studied. Of these, nine were found to be the result of Native American activity and were undisturbed by rodent activity. The information uncovered has been found to be important to our understandings of Native American life in the past. The site also warrants future study.

J. Strategies for Preserving South Kingstown's Cultural Resources

Preservation efforts in South Kingstown became formalized when the Kingston Historic District was created in 1959. Local residents are concerned about protecting the archaeological sites and historic buildings of the Town. This interest should be captured and transferred into action to ensure the protection of the Town's cultural resources.

1. Expansion of Local Cultural Resource Protection

A key element to any successful, local preservation activity is a strong local body with jurisdiction over the town's cultural resources. South Kingstown has been a leader in Rhode Island's local preservation movement since 1959. The effectiveness of the South Kingstown Historic District Commission and the Historic District Ordinance clearly are visible in the sense of place maintained on the streetscape of the Kingston district. Changes made to the buildings within the district are sympathetic to the historic nature of the specific structure and to the overall character of the district.

However, since the last revision of the South Kingstown Historic District Ordinance, the State of Rhode Island has passed new enabling legislation which expands the powers available to historic district commissions. The new legislation allows for the designation of a single building as a district as well as for the protection of historic landscapes. As a Certified Local Government, the Town of South Kingstown is mandated to adopt an updated version of the historic district ordinance in order to offer the fullest protection possible to the town's cultural resources.

The jurisdiction of the Historic District Commission should also be expanded by the adoption of additional local historic districts, including such areas as Peace Dale, Usquepaug Road, and Wakefield. Adoption of the new ordinance would empower the South Kingstown Historic District Commission to expand its protection to include all National and State Register listed and eligible buildings in town.

2. Control of Development Activities

The effect of development on cultural resources in South Kingstown is a situation requiring immediate attention. Zoning regulations are allowing the historic identities of the villages to be submerged and their boundaries obscured by the construction of new housing developments and shopping centers. In the rural areas, such landscape features as historic cemeteries and stone walls, also are being threatened as the historic landscape is obscured by new housing units, shopping centers, and widened roadways. Care must be taken that these features, which foster the setting and context for the structures, as well as the buildings themselves, are not lost and that present agricultural activities are encouraged to continue.

While all growth has not been traditionally contained within the villages, an effort to focus development around the village nodes and settlement clusters would preserve not only the villages as entities within the Town of South Kingstown but the historic landscape patterns, including agricultural fields and pastures.

With the high rate of ground disturbance that occurs during development, there is great potential for damage to archaeological sites. Projects located in the state-designated Coastal Zone are subject to review, including cultural resource review, by the Coastal Resource Management Council (CRMC). Projects involving state or federal funding, licensing or regulation are subject to review through the RIHPC Project Review process. However, the bulk of development is private, and as such the activity is not subject to formal, cultural resource review. While this applies to both standing structures and buried sites, archaeological sites, because their exact locations cannot be predetermined, face a greater threat of destruction by unmonitored activities.

The preparation of a planning map, identifying the locations of known cultural resources as well as areas of potential archaeological sensitivity, would assist the Town in directing new growth in a manner minimizing the harm to its irreplaceable cultural resources. The Rhode Island Geographic Information System (RIGIS) has produced a map indicating the locations of all National and State Register sites in South Kingstown, as well as the locations of all known archaeological sites and cemeteries. The map is an invaluable aid to South Kingstown's preservation efforts.

3. Revitalization of Main Street

Main Street has been the traditional center of American communities, serving as the commercial, and often social, focus of town. In recent years, development has shifted this focus to malls and shopping centers built in outlying areas. As a result, the economic vitality of Main Street and the sense of community have suffered. As consumers abandon Main Street for the malls, the vitality of downtown businesses and the community identity they fostered fades.

This situation has been occurring in South Kingstown. Strong development in the area is shifting the commercial focus of the town away from the Main Street area of Wakefield, the traditional commercial center of South Kingstown. The National Main Street Center (NMSC), run by the National Trust for Historic Preservation, offers a wide variety of services and programs to assist individual communities in revitalizing downtown districts. The Main Street approach integrates the physical improvement of existing historic buildings with economic development. The four elements of the process (promoting a positive image to attract businesses as well as customers; using buildings, signs, landscaping, and public spaces to improve the visual appearance of the district; rebuilding of the economy of the business district to make it competitive in the local market; and developing of means by which various groups, including merchants, property owners, and town officials, can work together) are tailored to meet the specific needs and character of each place. Put to the test by hundreds of communities across the country, NMSC's four-point approach has proven very successful.

Action must be taken to preserve the Main Street area of Wakefield as the traditional, commercial center of South Kingstown. Involvement with NMSC will show South Kingstown how to draw on existing resources, including historic buildings, to revitalize its downtown. This plan is discussed further in Section 4.0 of the Economic Development Element of the Comprehensive Plan.

4. Adaptive Reuse of Existing Structures

A primary element of the Main Street revitalization concept is the adaptive reuse of existing structures. Each building in town relates a chapter in the history of the community's development. Eighteenth century farmhouses stand in contrast with early 19th century mills and late 19th century commercial blocks. A building remains a vital element in the landscape, even if it no longer serves its original purpose.

Adaptive reuse not only saves a piece of town history by utilizing existing structures, but it is economically prudent as well. Even if interior alterations are required for conversion of the building to a new use, the structure, already is built which eliminates the cost of erecting a new structure. Restoration of a National Register-listed or eligible building according to a set of prescribed standards also can reward building owners with a twenty percent (20 percent) federal tax credit. Concern has been raised among South Kingstown's residents that many old buildings, especially former mill buildings, are falling into disuse. While these buildings may no longer serve their original function, they are important elements of the communities. Members of CPAC have expressed concern that zoning regulations will inhibit the reuse of existing structures for new purposes. It is possible to zone to allow for mixed-use development of existing commercial and industrial buildings in order to maintain historic structures as contributing elements to the town.

5. Education

Education is a key factor in creating an understanding and awareness of cultural resources and their value to a community. Educational programs aimed at both adults and children will facilitate citizen awareness about South Kingstown's cultural resources. Such simple, fun activities as lectures about local history or walking tours of different neighborhoods, can reach large segments of the population. Local organizations, including historical societies and libraries, can be helpful in disseminating information. The Museum of Primitive Art and Culture, located in Peace Dale, has developed educational programs on the prehistory and history of South Kingstown that reach approximately 2000 school children per year. The museum also sponsors volunteer participation on local archaeological digs and publishes pamphlets for self-guided walking and driving tours. These activities increase awareness of all who participate, and thereby stimulate concern for the protection of cultural resources.

While the Historic District Commission has been very effective in protecting the resources of the Kingston Historic District, only a small portion of the Town's resources are included in this district. The creation of a Town Historic District Commission would facilitate resource protection and educational activities for the entire town. Such a body would work with such existing local organizations as the Museum of Primitive Art and Culture, to maximize the preservation of South Kingstown's historic and prehistoric resources. A South Kingstown Historic District Commission could facilitate public awareness, programs and information distribution. Examples are: a) a booklet of do-it-yourself guidelines for historic home owners interested in making repairs to their property; b) guided tours and self-guided pamphlets to educated residents and visitors about the history of South Kingstown; and, c) forums geared to business owners and realtors, on the value and importance of preserving historic resources.

K. Goals, Policies, and Implementation

1. Consistency with State Guide Plan

This plan expands upon the Historic Land Use subsection of the Land Use Element of the Comprehensive Plan of the Town of South Kingstown (1986), creating a separate element devoted to the issues of cultural resources.

The Cultural Resource Element incorporates the guidelines enumerated in Land Use 2010: State Land Use Policies and Plan, State of Rhode Island and Providence Plantations (1989) and the revised Rhode Island State Enabling Acts Relating to Land Use Planning (1988). It also takes into account the parameters established by the South Kingstown Historic District Ordinance (1989). Based on these guides and the changing needs and desires of the community, three objectives have been defined which will ensure the preservation and protection of the historic and prehistoric cultural resources of South Kingstown. They are as follows:

- protect the historic and prehistoric cultural resources that define the history and development of South Kingstown so that present and future generations can understand what makes South Kingstown unique;
- direct development patterns based on previous patterns of residential, commercial, and industrial development in South Kingstown in order to preserve the heritage of the individual villages, while simultaneously identifying and preserving those elements that unify the villages into a town;
- preserve the living history of the town by protecting representative structures, such as those associated with agriculture and fishing.

2. Goals

Overall Goal of the Cultural Resource Element

To preserve, protect and enhance the Town's historic and cultural resources and to integrate these into planning for the future.

Overall Goal of the Cultural Resource Element

To preserve, protect and enhance the Town's historic and cultural resources and to integrate these into planning for the future.

Policy 1.1 - The Town will continue to expand its inventory of: a) historic buildings and structures; and, b) historic and prehistoric archaeological sites, making sure that all aspects and periods of South Kingstown's history are identified and represented.

Implementation

- The Town shall continue to encourage nominations to the National Register of individual historic buildings and districts and archaeological sites and districts. The Town shall consider keeping a copy of this inventory on file with a local cultural repository (i.e., the Museum of Primitive Art and Culture) to be available to the general public for research and reference needs.

Responsible Party: Planning Department, Historic District Commission

Policy 1.2 - The Town will expand the measures available for protecting cultural resources to provide maximum protection to South Kingstown's historic and prehistoric resources.

Implementation

- The Town shall amend the Historic District Ordinance to include the elements of the current enabling legislation.
Responsible Party: Town Council, Planning Board, Planning Department, Historic District Commission
- The Town shall consider establishing additional historic districts in locations including, but not limited to, Usquepaug, Peace Dale, and Wakefield.
Responsible Party: Town Council, Planning Board, Planning Department, Historic District Commission
- The Town should develop a town-wide Historic District Commission to handle issues that effect any and all of South Kingstown's cultural resources.
- The Historic District Commission should have the authority to comment on alterations to all buildings designated as historic, making recommendations for preferred treatments.

Policy 1.3 - The Town will protect the integrity of cultural resources, including historic buildings, structures, and landscape features and archeological sites, from adverse impacts of development activities.

Implementation

- When cultural resources will be impacted, town-wide development decisions shall be reviewed in consultation with a professional archaeologist or historic preservation specialist to develop an alternative plan or appropriate mitigative action.
Responsible Party: Planning Department
- The Town shall use easements to protect open land, including agricultural land and areas along the shoreline that contribute to the historic context of the Town.
Responsible Party: Planning Department, Conservation Commission
- The Town shall consider developing, within the limits of state enabling legislation, appropriate ordinances and regulations to help protect features, including field patterns, coast line, stone walls, cemeteries, and signage.
Responsible Party: Town Council, Planning Department, Planning Board

Policy 1.4 - The Town will preserve the unique identity of the villages that comprise South Kingstown, as well as those cultural features that identify the Town as a whole.

Implementation

- Zoning shall be used to direct development according to the traditional characters and patterns of the villages. Development shall be focused in and around the villages, in an effort to maintain the rural nature of outlying areas.
Responsible Party: Town Council, Planning Board, Planning Department

Policy 1.5 - The Town supports the development and the promotion of the economic benefits of preservation.

Implementation

- The Town shall participate in programs and utilize resources from the National Trust's Main Street Center.

Responsible Party: Town Council, Planning Department, Town Manager's Office

- The Town shall encourage residents to qualify for state and federal investment tax credits by restoring historic buildings on the National Register of Historic Places.

Responsible Party: Planning Department

Policy 1.6 - The Town will encourage the continued use and adaptive reuse of historic buildings.

Implementation

- The Town shall review the Zoning Ordinance to ensure the inclusion of measures that allow for mixed-use of existing industrial and commercial buildings in historic districts.

Responsible Party: Town Council, Planning Department, Planning Board

Policy 1.7 - The Town supports educating residents, as well as visitors, to the importance of preserving cultural resources and of the intrinsic value of historic buildings and sites in South Kingstown.

Implementation

- The Town shall develop a Town-wide Historic District Commission to handle issues that affect any and all of South Kingstown's cultural resources.

Responsible Party: Town Council, Planning Department

- The Historic District Commission shall continue to develop and make available to historic home owners a how-to booklet of do-it-yourself guidelines for restoration.

Responsible Party: Planning Department, Historic District Commission

- The Town shall encourage the development of programs that integrate study of South Kingstown's historic resources into school curricula. An example of this would be the Museum of Primitive Art and Culture's school program established in 1978 to dovetail school curricula.

Responsible Party: Historic District Commission

- The Town shall encourage the development of guided and self-guided walking and driving tours, as well as pamphlets that highlight the cultural resources of South Kingstown. The Museum of Primitive Art and Culture and the South County Museum could sponsor or co-sponsor such programs.

Responsible Party: Planning Department, Historic District Commission

- The Town shall work with local organizations (e.g. the Museum of Primitive Art and Culture and the South County Museum) to sponsor forums on subjects related to South Kingstown's history and historic resources in order to increase awareness among the Town's citizens. In addition to general programs, symposia shall be held on issues of importance to specific groups, such as small business owners, bankers, and realtors who may not be familiar with the benefits of preservation.

Responsible Party: Planning Department, Historic District Commission

Policy 1.8 - The Town shall require access to all historic cemeteries registered with the Town Hall for all future development projects. The Town also will require that a reasonable buffer be provided around the cemeteries.

Implementation

- The Town shall amend the Zoning Ordinance to require that access be maintained in any new development in proximity to a registered historic cemetery.

Responsible Party: Town Council, Planning Board, Planning Department

- The Town shall amend the Zoning Ordinance to require that a reasonable, undisturbed buffer be maintained around all registered historic cemeteries.

Responsible Party: Town Council, Planning Board, Planning Department

Policy 1.9 - The Town will encourage the preservation of traditional ways of life, such as agriculture and fishing, and their associated structures and landscapes in order to maintain continuity in the landscape of South Kingstown.

Implementation

- The Town shall continue to promote participation in the Farm Land Preservation Act as a measure to encourage the continued maintenance of the historic landscape of South Kingstown.

Responsible Party: Planning Department

- The Town should support efforts to protect South Kingstown's coastal zone through a variety of land use strategies cited in the Natural Resources and Land Use elements of the Comprehensive Plan.

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COMPREHENSIVE PLAN

PREPARED FOR THE
TOWN OF SOUTH KINGSTOWN

WETLANDS

WETLAND- CODE DESCRIPTION

Inland:

- ROW - Riverine nontidal open water
- LOW - Lacustrine open water
- POW - Palustrine open water
- EMA - Emergent wetland: marsh/ wet meadow
- EMB - Emergent wetland: emergent fen or bog
- SSA - Scrub- shrub wetland: shrub swamp
- SSB - Scrub- shrub wetland: shrub fen or bog
- FOA - Forested wetland: coniferous
- FOB - Forested wetland: deciduous
- FOD - Forested wetland: dead

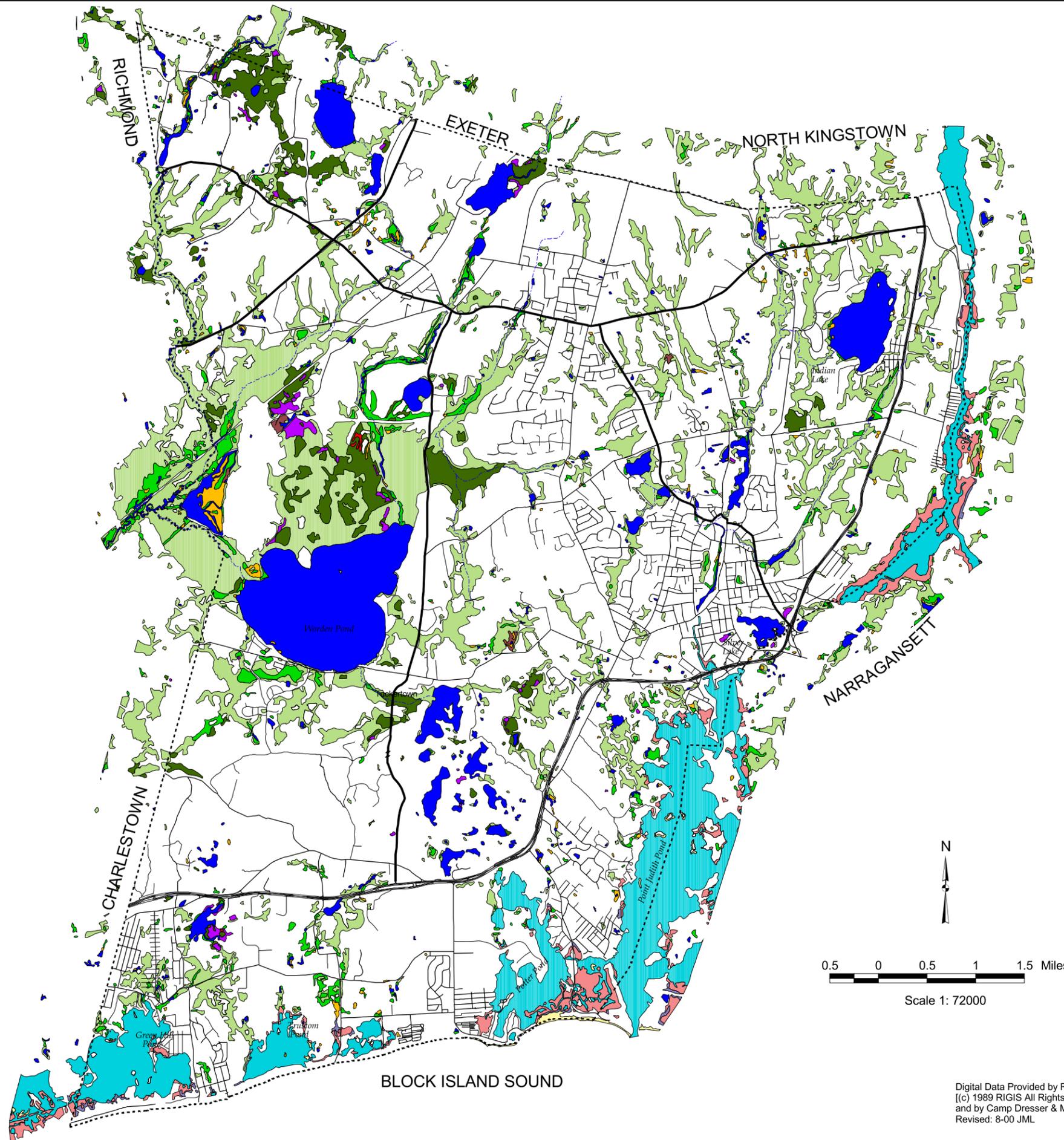
Coastal:

- EOW - Estuarine open water
- ERS - Marine/ estuarine rocky shore
- EUS - Marine/ estuarine unconsolidated shore
- EEM - Estuarine emergent wetland
- ESS - Estuarine scrub- shrub wetland

UPL - Upland

ROADS

- Federal Highway
- State Highway
- Local Road
- Privately Owned
- Railroad
- Municipal Border
- Streams

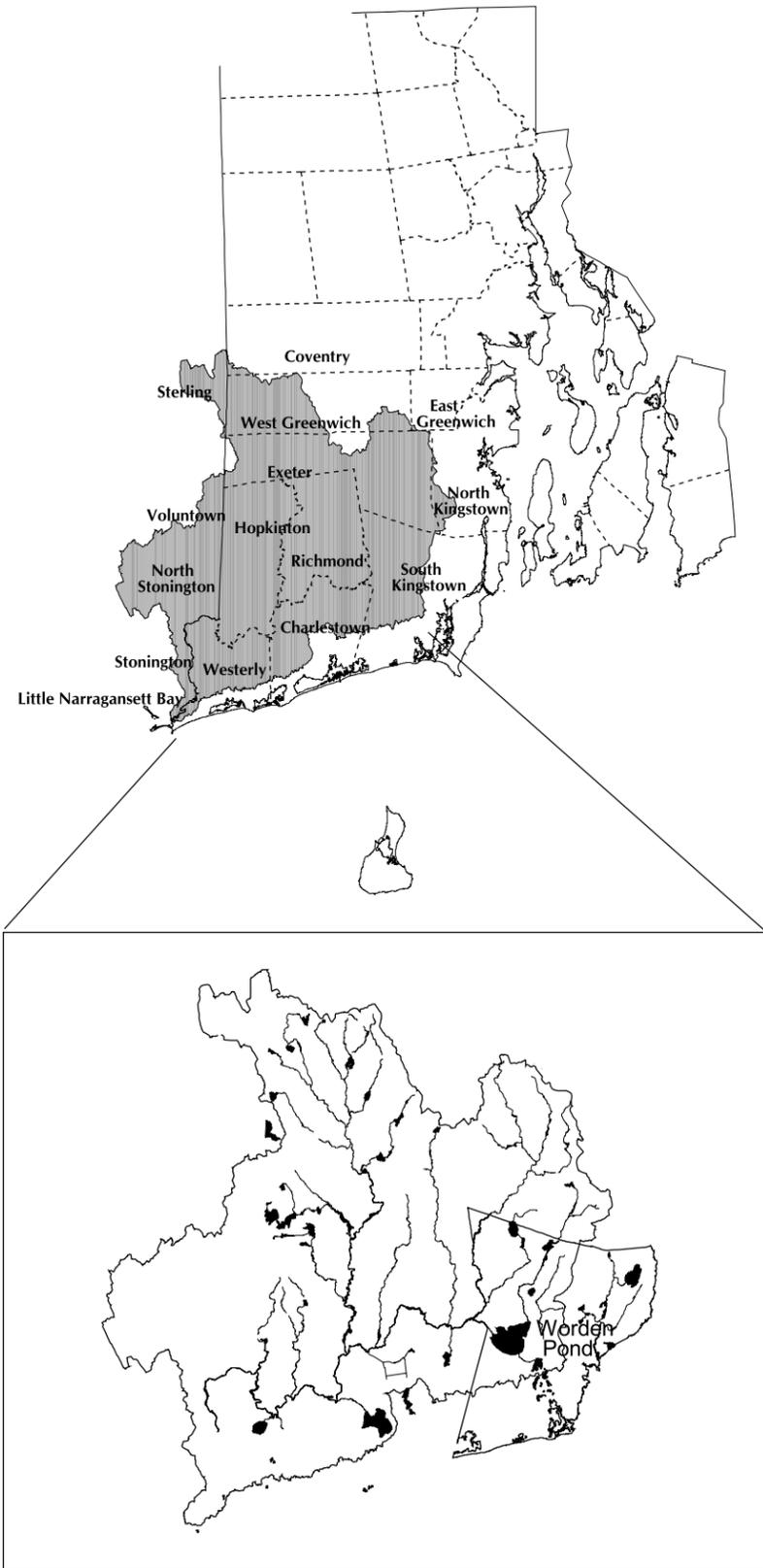


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Louis Berger & Associates, Inc.
Date: 1991, Revised: 8-00, JML

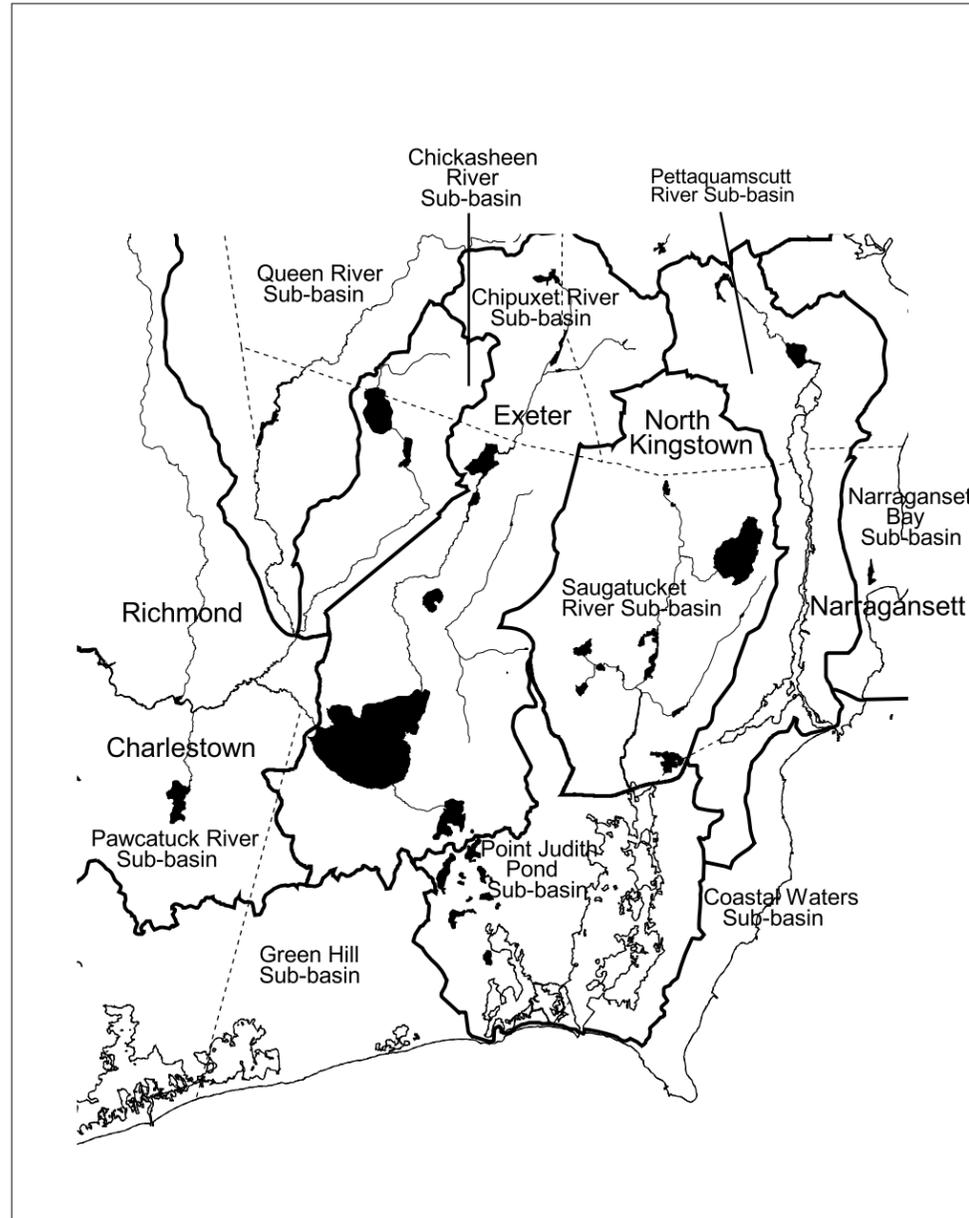
Map
5.1

The Pawcatuck Watershed Basin



Major Hydrography of the Pawcatuck Watershed Basin

Sub-basins Town of South Kingstown, Rhode Island



Not to Scale

**COMPREHENSIVE PLAN
PREPARED FOR THE
TOWN OF SOUTH KINGSTOWN**

WATERSHEDS AND SUBWATERSHEDS

LEGEND

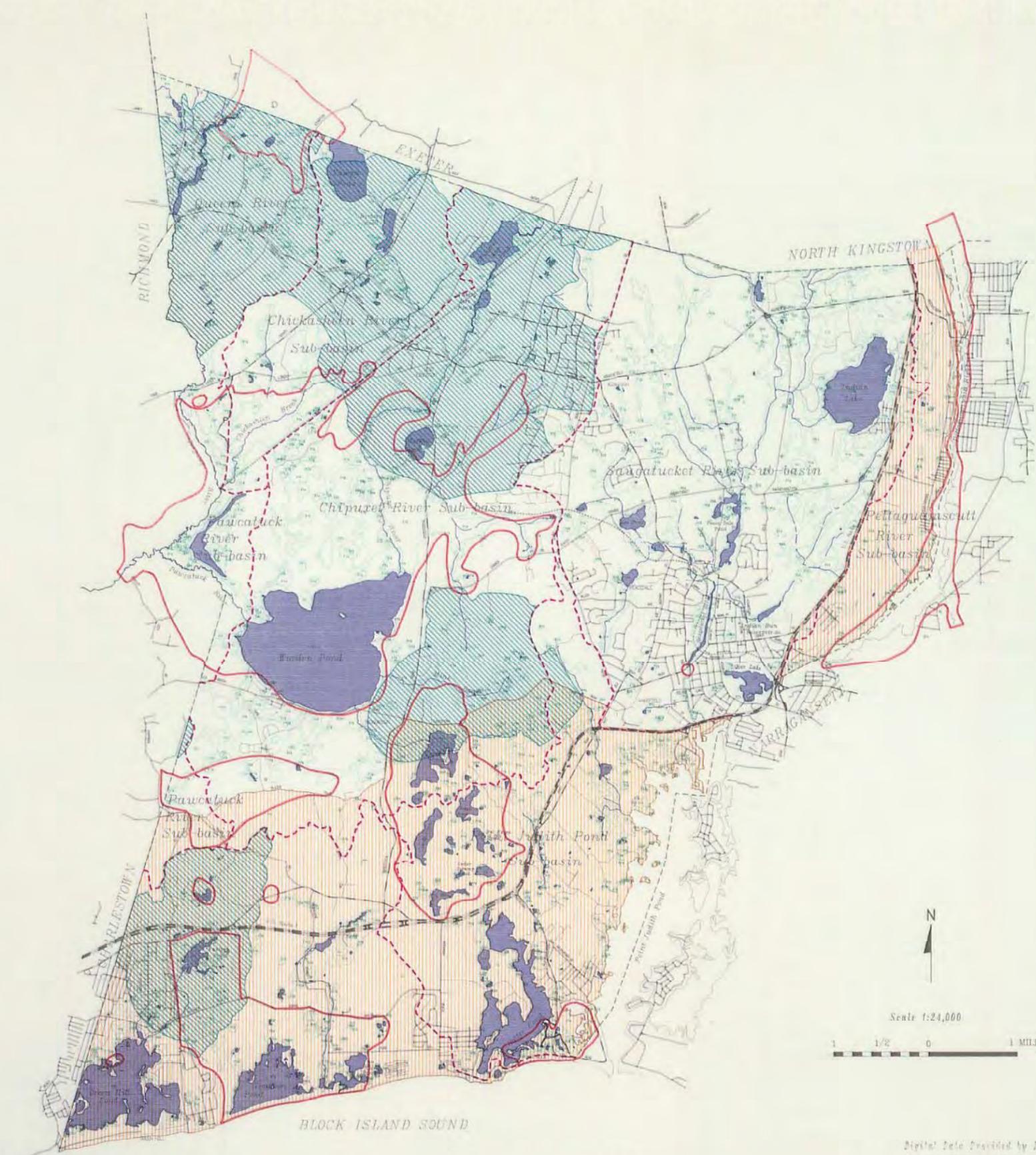
-  Sub-basin boundaries
-  Ponds and Lakes
-  Streams
-  Municipal Border

These data are provided by the Rhode Island Geographic Information System. This work is part of the U.S. Dept. of Agriculture Pawcatuck Hydrologic Unit Project with support from the University of Rhode Island Cooperative Extension. Revised: 8-16-00, JML

**Figure
5.2**

COMPREHENSIVE PLAN
 PREPARED FOR THE
 TOWN OF SOUTH KINGSTOWN, RI.

CRITICAL AND ENVIRONMENTALLY
 SENSITIVE AREAS



LEGEND

- Special Area Management Plan (SAM) Boundary
- Groundwater Protection Overlay District
- Natural Heritage Areas
- Wetlands
- Sub-basins
- Municipal Border
- ROADS
 - Federal Highway
 - State Owned & Maintained
 - Town Owned & Maintained
 - Privately Owned
 - Railroad
- SURFACE WATER
 - Streams
 - Ponds and Lakes



Digital Data Provided by NGS Database
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Louis Berger & Associates, Inc.
 Date: 1991

Figure
5.3

COMPREHENSIVE PLAN
 PREPARED FOR THE
 TOWN OF SOUTH KINGSTOWN, RI.

CULTURAL
 RESOURCES



LEGEND

▣ HISTORIC DISTRICTS (PEACEDALE, KINGSTON)

▨ SCENIC LANDSCAPES

- D= DISTINCTIVE
- D068 YAWAGOO POND AREA
- D095 TRUSTOM POND/MATUNUCK
- D101 PETTAQUAMSCUTT COVE/NARROW RIVER
- N= NOTEWORTHY
- N074 PETTAQUAMSCUTT RIVER
- N091 SOUTH COUNTY TRAIL
- N093 WORDEN POND
- N094 PERRYVILLE
- N095 MATUNUCK
- N096 SNUG HARBOR/JERUSALEM
- N098 TUCKERTOWN
- N099 SUGARLOAF HILL
- N100 CURTIS CORNER

ROADS AND SURFACE WATER

▭ TOWN BOUNDARY

▭ ROADS

▭ STREAMS AND PONDS

▭ RAILROADS

▣ HISTORIC CEMETERIES

This map was produced by Nathan J. Reis and the digital data was obtained from the RIGIS database July 1992.

MAP

5.4

COMPREHENSIVE PLAN
 PREPARED FOR THE
 TOWN OF SOUTH KINGSTOWN, RI.

AGRICULTURAL
 RESOURCES



LEGEND

▨ FARM, FOREST, AND OPEN SPACE PROGRAM

▤ STATE PRESERVED LAND

- 001 COTTREL FARM
- 002 CARUOLO FARM
- 003 BURKE FARM
- 004 GAVITT-CARTER
- 005 SSMA-CHEESMAN/FORD

▭ LAND CURRENTLY IN AGRICULTURAL USE
 ROADS AND SURFACE WATER

▮ TOWN BOUNDARY

▯ ROADS

▧ STREAMS AND PONDS

▩ RAILROADS

This map was produced by Nathan J. Reis and the digital data was obtained from the RIGIS database July 1992.

MAP

5.5