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SECTION 1 PLAN SUMMARY

This 1999 Open Space and Recreation Plan update is a complete revision of Sandwich's earlier plan (1986) and is designed to give it meaning for today's town, as well as to meet the state's 1990 Open Space and Recreation Plan Requirements. The update builds on the earlier plan, incorporating goals of protecting natural resources, conserving open space and providing a varied recreation program. The plan seeks to address these goals simultaneously where possible by encouraging preservation of open space, while allowing opportunities for its enjoyment through modest improvements which provide access for passive recreation.¹

This update presents some new ideas for recreation, such as participation in the Cape Cod Pathways trail network, and incorporates new goals for accessibility for both recreation and open space facilities. There is an emphasis on open space preservation by means other than direct acquisition, for instance, through conservation restrictions, donation, cluster zoning, etc., in response to current town fiscal conditions. Oftentimes, however, land must be acquired outright for full public enjoyment. (In 1998, Sandwich joined other Cape Cod towns in adopting the land bank to set aside dedicated revenues to purchase open space.)

Public participation was an important part of the plan. A survey was used to obtain a real sense of public opinion on the town's approach to open space and recreation, and public meetings and hearings were held throughout the planning process.

This updated plan is also intended to supplement the Open Space and Recreation Element of the Sandwich Local Comprehensive Plan (LCP), now in progress. The LCP, once approved by the Cape Cod Commission and Town Meeting, will serve as the town's response to the Cape Cod Regional Policy Plan (1991, amended 1996) and guide planning and growth decisions overall for the town.

Approval of this plan by the state Division of Conservation Services will enable the Town to be eligible for land acquisition and recreation facility reimbursement funding through programs, such as Self Help, Urban Self Help and the Federal Land & Water Conservation Fund. Between 1967 and 1987, the Town of Sandwich received over \$2 million from these state and federal reimbursement programs. (See Table 7.1.)

It is hoped that this Plan will also guide decisionmaking by the Town in implementing the land bank legislation approved in November 1998, which will

¹ (According to the Massachusetts Division of Conservation Services, "passive recreation" means "any activity that can be casually performed with minimum disturbance of an area's natural condition." Examples of passive recreation include hiking, picnicking, canoeing, photography, nature study, cross country skiing, limited horseback riding, informal swimming, hunting, recreational finfishing, and recreational shellfishing.)

provide Sandwich with over \$700,000 each year for 20 years to purchase open space lands or interests in such lands. (See Section 5.)

SECTION 2 INTRODUCTION

A. Statement of Purpose

Sandwich's Open Space and Recreation Plan is intended to provide a framework for decision-making by its residents. The purpose of the plan is to serve as a guide to responsible action to conserve Sandwich's natural resources including wildlife habitat, preserve its open space and provide ample opportunities for recreation for its citizens.

B. Previous Efforts

This plan represents the current culmination of over 25 years of open space and recreation planning in the Town of Sandwich. Among the first principal efforts was the Town of Sandwich Natural Resources Report prepared in 1974. In 1977, the town prepared a report entitled Land Use and Population Study. Principles and goals for recreation in 1989 study, Planning for Play. Growth and fiscal impact of development studies were also prepared in 1989.

In 1986, a comprehensive document, Conservation and Recreation Plan, was prepared by the Town's Environmental Task Force, (a volunteer committee) and provided a framework to advance the town's ambitious land acquisition program at 1986 Town Meeting. This plan was the town's first to receive state approval by the Division of Conservation Services and made the town eligible for state open space funding through 1991, when plan approval expired. From 1991 through 1998, the town was out of compliance with state open space planning requirements. During this period, the Conservation Officer attempted to fund a new plan, but other budgeting concerns and a lack of funding for land acquisition caused this to be a lower priority for many years.

In 1992 the town began its preparation of a Local Comprehensive Plan (LCP) in compliance with the Cape Cod Regional Policy Plan (1991, amended 1996). This comprehensive plan will involve a full build-out and capacity analysis and guide development for the next 20 years. This 1998 Open Space and Recreation Plan will be incorporated by reference into the LCP.

C. Planning Process and Public Participation

The Executive Office of Environmental Affairs' Open Space Planner's Workbook: A Companion to the 1990 Open Space and Recreation Plan Requirements was used as a guide to preparing the plan. The Selectmen appointed a Local Planning Committee in 1992. In 1996 the LPC released Phase I of the Local Comprehensive Plan, including Elements on Open Space and Recreation, approved by Town Meeting in 1996. In 1997 the Committee distributed a survey (362 respondents), which included conservation and recreation questions. Appendix B contains sample surveys and tabulated results and Section 7 analyzes the responses. The survey was used in conjunction with interviews of town officials to develop the Goals and Objectives for this plan. In accordance with the state Uniform Procurement Act (MGL c.30B), the town hired The Compact of Cape Cod Conservation Trusts, Inc. to provide technical assistance to the Planning Department in preparing the final plan.

The Conservation Commission sponsored an initial public meeting on February 17, 1998 to elicit citizen comments on goals and objectives. The Recreation Committee held a similar forum on March 23, 1998. A public hearing on the draft plan was held on November 1, 1999. Comments from that hearing were incorporated in the plan. A public hearing on the final plan was held before the Planning Board in December 1999. All hearings were publicized in the local media as well as by town hall posting. Town, regional and state officials reviewed the plan in 1999 and their comments were also used to revise the final plan. Final state approval was granted on February 11, 2000. (See page ii.)

SECTION 3 COMMUNITY SETTING

A. Regional Context

Located in the mainland-side or "shoulder" of Thoreau's "bare and bended arm" of Cape Cod, Sandwich is located 57 (road travel) miles from Boston and 238 miles from New York City. The town covers ten miles north to south and ranges about six miles in width. In area, the third largest town (of 15) on Cape Cod,^{1a} Sandwich encompasses 44.51 square miles, or 28,484 acres, and is bounded on the north by Cape Cod Bay, on the east by the Town of Barnstable, on the south by the Towns of Mashpee and Falmouth, and on the west by the Town of Bourne. (See Map 3. A. 1.) The portion of the Massachusetts Military Reservation within the confines of Sandwich total approximately 14.95 square miles, or 9,568 acres,² so the effective part of the town not under federal jurisdiction is 29.56 square miles, or 18,914 acres. (See Map 3. A. 2. and Map 3. A. 3.)

Sandwich is engaged in the natural resource and planning issues of Cape Cod through participation in the Assembly of Delegates, Cape Cod Commission, Barnstable County Health Department, Shellfish Task Force, Cape Cod Pathways, Regional Transit Authority, Coastal Zone Management, Massachusetts Bays Program, and other regional programs, and with Massachusetts Division of Marine Fisheries, MassWildlife, Massachusetts Department of Environmental Management, Sandwich Water District and the U.S. Army Corps of Engineers. Cooperative ventures in protecting and managing the Scorton Creek and Sandy Neck ecosystem (an Area of Critical Environmental Concern) require a partnership with the Town of Barnstable. As with the entire Cape area, Sandwich is served by a sole source aquifer, in this case the Sagamore Lens. Public wellfields in Barnstable and Bourne draw ground water from Sandwich, and the town participates in the Groundwater Protection Project with its municipal neighbors through the Cape Cod Commission.

With Bourne, Sandwich hosts the Cape Cod Canal and its attendant regional bike path facility, and is cooperating with Bourne and state and federal officials in the restoration of a portion of the Scusset River to tidal marsh.^{2a} Sandwich and Mashpee have collaborated on a Cross Cape walking trail feasibility study. (See Map 5. D. 1.) Sandwich is also represented on various regional task forces related to the cleanup and future use of the Massachusetts Military Reservation, shared by the Towns of Bourne, Sandwich, Mashpee and Falmouth.

^{1a} (Even when 14.95 square miles are subtracted from the 44.51 total to exclude military lands under federal control, the remaining 29.56 square miles of Sandwich qualifies it as the third largest town on Cape Cod, trailing only Barnstable and Falmouth in land area.)

² Sandwich Local Comprehensive Plan, April 1996, Land Use and Growth Management Element, p. LU-2.

^{2a} "The project involves enhancement of tidal flushing throughout an extensive [50-60 acres] salt marsh [*sic*] behind the popular Scusset [*sic*] Beach at the eastern end of the Cape Cod Canal in Bourne and Sandwich...At present, DEM and the [Army] Corps are working to put the project out to bid in early 1999 and begin construction..next spring." Massachusetts Executive Office of Environmental Affairs *Newsletter*, January 1999, p. 10. (The Army Corps are accepting bids for the project in 1999 and expect to have construction begin in 2000.)

Potential regional and neighboring threats to the quality of resources and open space in Sandwich include continued regional development, particularly given Sandwich's proximity to Hyannis, Cape Cod's commercial core and transportation hub, and the community's relatively short distance to Boston. (Indeed, there is evidence of Sandwich becoming a far-flung bedroom suburb of Boston, given the number of commuters into the city from the town.) This growth could impact regional resources, such as groundwater quality, coastal resources and wildlife migration, which exist in Sandwich. Sandwich's planning areas, loosely called villages are Sandwich Center (the historic Village), East Sandwich, South Sandwich, the Ridge District, Forestdale and Sagamore Beach. (See Map 3. B. 1.)

B. History of the Community

Archaeological studies in Sandwich have uncovered finds rich in American Indian artifacts. Major Indian trails followed the an east-west route through town along what is now Route 6A and Old County Road, and and north-south route along Cotuit Road and the north end of Route 130.³ Sandwich was colonized by Europeans in 1637 as part of Plymouth Colony. Incorporated as its own Town in 1639, Sandwich was named for a town in Kent, England. Sandwich was settled by English families seeking an escape from religious intolerance typical of seventeenth-century England.

"Settlement was usually strung out around the harbor and along the roads that led to it with only a moderate commercial and institutional core at the center."⁴ This statement pertaining to Cape Cod in general certainly applied to colonial Sandwich. In Sandwich's case, the harbor was actually the tidal creek landings along the Northside (Shawme River, Old Harbor, Scorton River, etc.), the road was the King's Highway (now, Route 6A) and a core arose in Sandwich Center and East Sandwich. Sandwich's core is actually less linear than any other Northside Cape town's, as the cluster around town hall added width and breadth. As more settlers arrived, they had to be granted some upland to build and farm on, as well as salt marsh for haying. But serious complaints abound in the history of the resolution of the equitable use of these lands.

As its motto states, Sandwich is "Cape Cod's oldest town." The Old Kings Highway Regional Historic District was the first one approved on the Cape in the 1970s, indicating the affection Sandwich citizens have for their gloried past.

Like much of the rest of early Cape Codders (except the inveterate fishermen of the Provincelands), Sandwich settlers were farmers first and fishermen on the side. Sandwich had its share of famous sea captains, but it remained more agricultural than most Cape towns, and, eventually, by the early 1800s, a nascent industrial activity began to take hold. Sandwich's relative location closest to Boston meant that it was the first Cape town to enjoy the commercial advantages of rail transport in the 1840s. The famed Sandwich Glass factory was sited here, ironically not for the access to sand (which was imported, in a sort of "bringing coals to Newcastle" twist), but owing to the still extensive forests of the southern part of town, needed in huge quantities to fuel the factory furnaces. The glass industries and related works spawned a number of supportive businesses, which continued through the end of the nineteenth century. Tourism and vacation-home building dominated the economy of the twentieth century and agriculture, fishing and factory work have all declined to relatively insignificant amounts.

For 50 years after the Civil War, Cape Cod experienced an economic collapse. Fishing and whaling continued their decline, midwestern farms dominated the national

³ Massachusetts Historical Commission, town map files, Contact Period overlay.

⁴ Massachusetts Historical Commission, Historic and Archaeological Resources of Cape Cod and the Islands, 1987, p. 90.

markets and net migration of the population was off-Cape. The permanent population of Cape Cod dropped 20 percent between 1885 and 1895.⁵

The advent of the automobile brought about subtle, but inevitable change. By 1920, Sandwich's population began its rebound from nineteenth century decline, as the idea of Cape Cod as a summer resort, which was only a germ of a vision to that point, took firm hold:

Fifty years ago only a comparatively small number of persons seeking rest and recreation had discovered the attractiveness of Cape Cod for summer residence...It is only within a score of years, as a result of the introduction of the automobile, the summer population has become so great as to render "the entertainment of summer visitors" an important industry of the Cape.⁶

Men found jobs building homes in developments along the southern coastal areas, and the foundation of the tourist economy took shape. By the 1950s, spurred by the post-World War II boom, Sandwich's character as a seaside resort was entrenched, less so than the Nantucket Sound shore towns of the Cape, but meaningful nevertheless. Over the past 50 years, many of the former summer tourists have purchased homes and retired to Sandwich; retirees represent the largest user group of the Cape's service economy.⁷ This large and still growing retirement community has produced a greater awareness about "quality of life" issues in Sandwich and on the Cape.

C. Population Characteristics

Sandwich hosts eight percent of the county's population on eleven percent of the land in the county. Growth in Sandwich, as on the rest of Cape Cod, has been dramatic in the past 40 years. At the turn of the century, Sandwich was home to 1,500 souls, a number essentially static in the first half of the 1900s as an off-Cape migration, associated with diminished Cape economic opportunities, continued. Though the town's year-round population exploded between 1960 and 1995 (2,082 to 18,479),⁸ most of that growth was during the '70s and '80s; the population tripled in the 1970s and then almost doubled again in the 1980s. To some degree, Sandwich was "discovered" by Boston commuters during the 1980s, accounting for a large part of the influx.⁹ Sandwich had the second highest growth rate on the Cape (behind only Mashpee)

⁵ Massachusetts Department of Natural Resources, The Outdoor Recreational Resources of Barnstable County, Massachusetts, 1963, p. 15.

⁶ Massachusetts Department of Natural Resources, The Outdoor Recreational Resources of Barnstable County, Massachusetts, 1963, p. 15.

⁷ Cape Cod Commission, "CapeTrends: Demographic and Economic Characteristics and Trends, Barnstable County - Cape Cod, 4th Ed.," 1997, p. 8.

⁸ (The 1999 Town Census found 20,577 year-round residents of Sandwich, an increase of 470 persons over 1998.)

⁹ In the mid-1980s, an off-Cape developer purchased a vast tract of the Ridge District with plans for a large condominium complex, retail and commercial development. He told the press that he wanted Sandwich to "become the next suburb of Boston." Most Sandwich residents saw his dramatic vision as a threat more than a promise. In 1999 the Town purchased the 525-acre tract from the developer's estate for open space.

between 1980 and 1994.¹⁰ "Mashpee and Sandwich led Cape towns with post-1990 housing growth rates of 22 and 21 percent, respectively, twice the Capewide 11 percent rate."¹¹ Diminishing open space and a simultaneous increased demand for year-round outdoor recreation continues to challenge Sandwich.

In absolute numbers, Sandwich's summer population swells less than most other Cape towns, reflecting the year-round aspect of population growth. The seasonal increase is less than twice its the year-round population (16,120 to an estimated 29,000).¹² The town of Dennis, for example, grows in summer four and a half times its winter size. Meeting the recreation needs of the year-round population is perhaps even more important in Sandwich, then, than elsewhere on the Cape.

Sandwich's year-round population (from which the remaining comparisons are drawn)¹³ is predominantly middle-aged, its median age growing only slightly between 1980 and 1990 (rising from 33.7 to 35.40 years old). This median age is still younger relative to the rest of the Cape's median (39.5 years). Its citizens over 55 years of age comprise 22 per cent of the town's population, far below the county median of 33 per cent (and the same as the state median of 22 percent.) The birth rate has been relatively steady for the past 12 years, but the school enrollment has exploded from 1,992 in 1980 to 2,808 in 1990 to 4,286 in 1999, reflecting the in-migration of families rather than solely a resident baby boom. The implications of this youthful population factor for open space and recreational services are that, all else being equal, the town should perhaps emphasize more leisure activities oriented towards younger citizens, such as nature trails, playing fields, and team sports, as well as indoor recreational pursuits.

In addition to having a younger population than other Cape towns, Sandwich is also wealthier. Household income in 1989 was \$43,500 for Sandwich, far and away the highest of the 15 towns on Cape Cod, and the only Cape town which exceeds the statewide median of \$36,952.¹⁴ This anomaly can be explained primarily by Sandwich's attraction for commuters to metro-Boston jobs, which are generally higher-paying than any on the Cape. These commuter, suburban families are also more used to the town providing a varied array of municipal services, including recreational facilities and programs, beyond the basic health, school and safety ones typically provided by Cape towns.

¹⁰ Cape Cod Commission, "CapeTrends: Demographic and Economic Characteristics and Trends, Barnstable County - Cape Cod, 4th Ed.," 1997, p. 17.

¹¹ Cape Cod Commission, April 14, 1999. Sandwich had the eighth highest population gain in Mass. from '90-'98.

¹² Cape Cod Commission, "CapeTrends: Demographic and Economic Characteristics and Trends, Barnstable County - Cape Cod, 4th Ed.," 1997, p. 18.

¹³ Cape Cod Commission, "CapeTrends: Demographic and Economic Characteristics and Trends, Barnstable County - Cape Cod, 4th Ed.," 1997, p. 18.

¹⁴ Cape Cod Commission, "CapeTrends: Demographic and Economic Characteristics and Trends, Barnstable County - Cape Cod, 4th Ed.," 1997, p. 61.

Though fluctuating (7% to 3% in 1996) between winter and summer, owing to influences of its tourist economy, average annual unemployment rates are lower (3.9 % in 1996) than the rest of the Cape's (5.8%). Fewer Sandwich residents live in poverty as well; only 4.8% are reported below federal poverty limits.¹⁵ Census breakout figures confirm anecdotal evidence that Northside residents are generally better off financially than those who live south of Route 6; only 3.7 percent of East Sandwich dwellers live below the poverty rate, compared with eight percent for Forestdale, for example.¹⁶ Implications of these demographics include the need to provide recreational opportunities that are affordable for most people, particularly facilities that are proximate to South Sandwich and Forestdale dwellers.

These characteristics of the population seem to indicate that while recreational facilities of most types should expand to serve all residents and visitors, opportunities which are conveniently located and free or inexpensive to use, such as playing fields, should be evenly distributed throughout town. Walking trails, scenic lookouts and sidewalks may be appropriate supplements to active recreation facilities (such as tennis or basketball) or private health clubs. In general, then, passive recreation should be emphasized along with active recreation to serve the needs of Sandwich.

Planning for the outdoor needs of elders (who comprise about a quarter of the population) need not be complicated or expensive. Items as simple as a bench to stop and catch one's breath along a hiking trail would be useful. While the town is obligated to provide some safe and convenient outdoor enjoyment for disabled people, many of whom may be elderly, the majority of senior citizens' only infirmity may be a tendency to tire easily. Benches, firm footing, safe parking access should be easy, yet important, design considerations. Outdoor facilities should be conveniently located for those living in elderly housing. For instance, the new sidewalk on Cotuit Road will link new elder housing to the shopping area there, but perhaps walking trails could be provided on nearby public land to enable seniors to exercise there safely.

The economy of Sandwich is less dependent upon the tourist trade and in servicing retirees than other Cape towns, because of the commuter families. Still, In 1992 the largest employment sectors were in the retail trade, particularly at eating and drinking places, services, and government, together accounting for 82 percent of jobs in town. The single largest employers in 1993 were the Town, Canal Electric, Purity [now, Stop & Shop] Supermarket, Daniel Webster Inn, and the Coca Cola bottling plant. The diversity of jobs available to town residents is wider than most of the smaller Cape towns, where retail and construction workers are typically most common.¹⁷

People are attracted to Sandwich because of its proximity to the city (Boston) and the beach (Cape Cod Bay). There is an old-time quaintness still extant in the village

¹⁵ Cape Cod Commission, "CapeTrends," 1997, p. 65.

¹⁶ Cape Cod Commission, "CapeTrends," 1997, p. 65.

¹⁷ Massachusetts Executive Office of Communities and Development, "Sandwich, Barnstable County: A Community Profile," 1993.

center and along the Old King's Highway, yet there are modern, suburban-style neighborhoods where off-Cape families can feel comfortable. Recreational opportunities should be incorporated by the town into the scheme of natural resources and man-made facilities.

D. Growth and Development Patterns

"We cannot point to any remarkable growth in wealth or population. The attractions of the cities and the fertile praries of the West, offering such fair promise of bettering fortune, have proved stronger, than the attachment to native soil or ties of kindred."

*- - The Honorable Charles Dillingham,
on the event of the 250th Anniversary Celebration
of Sandwich and Bourne, September 3, 1888*

Sandwich colonists originally divided their settlement into common property and private farming lands. Town Neck and the salt marshes were originally commons used for grazing cattle. Private land typically ran in north-south strips (called "long lots") from the beach back to the moraine ridges. This pattern enabled each colonist to have a slice of different habitat for various land uses: meadows for English hay in the richer soil near the shore, homes and yard gardens along the King's Highway, then pastures and woodlots in the poorer soils and rugged terrain south of the highway.¹⁹ This north-south strip pattern is still found today in some areas along the Northside and the Ridge District. (See Figure 3. D. 1). Its significance lies in its frequent ability to frustrate land assemblage for some large-scale developments (or, ironically, for large conservation blocks and east-west running trails).

On paper, Sandwich seems like one of Cape Cod's less densely developed towns, with 360 permanent residents per square mile. But the Census Bureau fails to subtract for the 14.95 square miles of the Massachusetts Military Reservation.²⁰ (See Map 3. D. 2.) So, Sandwich's population is effectively settled by 552 persons per square mile, above the county mean of 472 persons. Yet, owing to state and municipal foresight, there are large areas of protected undeveloped land. About one-quarter of the town's land mass has been set aside as protected open space for wellfields, conservation land and parks.²¹ In the past, the town vigorously pursued opportunities to purchase open land, most recently in 1985-86, when an acquisition package totalling 264 acres was approved by town voters. Until recently, however, the town did not make the same commitment to open space acquisition, a fact likely to change with the 1998 passage of the land bank.

¹⁹ Samuel D. Hannah, The Proprietary Lands of Plymouth Colony and Cape Cod, (Hyannis MA, 1980), p. 64.

²⁰ Cape Cod Commission, "CapeTrends: Demographic and Economic Characteristics and Trends, Barnstable County - Cape Cod, 4th Ed.," 1997, p. 41. (Yarmouth ranks first at 871 persons per square mile, Barnstable is second at 681.)

²¹ Analysis for this report by The Compact of Cape Cod Conservation Trusts, Inc.; see Section 5 for inventory.

The ability of the town's infrastructure to absorb more long-term growth is questionable at best, creating a potential loss of Sandwich's small town atmosphere, threatening a chokehold on traffic, and a strain on natural resources. It is unlikely that open space set-asides will grow apace with development despite the cluster zoning concept gaining favor with developers, residents, and town officials. Otherwise, significant new acquisitions of open space must be made, through purchase or other protective means. The preservation of some of the remaining open space may be an important way to manage growth, in addition to preserving resources and providing recreation. Despite its density, Sandwich still has a "small town" atmosphere appreciated by its citizens. The rural seaside charm is still extant in views of historic homes and glimpses of ponds, bogs and marshes.

In terms of existing infrastructure, there is no sewer service in Sandwich nor is there likely to be in the five-year scope of this plan. All septage is pumped and transported to various treatment facilities, including the plant built on the MMR. The Sandwich town landfill now operates as a solid waste transfer station, sending trash to the SEMASS waste-to-energy plant in Rochester, Mass. Re-use of the closed landfill is still undetermined, but the process is underway.²²

Historically, a lack of complete road access has been a hindrance to complete build-out throughout the town. Now, however, town roads connect most areas and their pattern leaves few areas of Sandwich far from public roadways. Yet there are still "landlocked" parcels in the Ridge District that have been "preserved" to date only because of legal or topographical impediments to road access. Sandwich supports a long-term policy of channeling future traffic flows along existing arterials rather than opening new roads,²³ yet the community cannot rely on inadequate roads to prevent growth. The roads will only suffer more traffic.

Town water service extends throughout much of the town, but 25 percent of homes are not served by public water lines, primarily in the eastern portion of town.²⁴ Since Sandwich relies on ground water for all of its drinking water supply, there is well-founded anxiety about this issue in the town. Already one public supply well has been closed due to contamination from the Massachusetts Military Reservation. Expanding the quantity of the water supply is not as much a problem in Sandwich as is assuring the continued high quality of the water.

Most (85%) of the town is zoned for residential use with a minimum lot size of 60,000 square feet except for 80,000 square feet in water resource protection districts and in long-settled areas, such as in Sandwich Center, where many smaller lots are still buildable owing to the zoning protection known as "grandfathering." (See Map 3. D. 2.)

²² Part of the delay revolves around ownership issues of the landfill, which is leased from the state Dept. of Environmental Management.

²³ Sandwich Local Comprehensive Plan, Introduction, April 1996, p. I-2.

²⁴ Sandwich Local Comprehensive Plan, Water Resources Element, April 1996, p. WR-2.

In 1996, the town found that there were 7,884 housing units in Sandwich; if fully built-out by zoning standards, Sandwich could have 10,000 units.²⁵

Available commercial space in Sandwich is limited to about 60,000 square feet in existing buildings. Commercially-zoned land still to be developed amounts to 275 acres. Industrial zones exist along the Canal and Route 130 and include Canal Electric, town landfill, Jan Sebastian Drive (Sandwich Industrial Park) and the gravel pits near Peters Pond. All of this industrial land and much of the commercial acreage lies within the water resource protection district to public wellfields and so new uses are limited. (See Map 3. D. 2 & Map 4. C. 4.)

There are few places immune to development in Sandwich, except wetlands. The town must assume, therefore, that development will continue to consume open spaces throughout town. Since physical impediments are not stopping development, legal and political will must be used if growth is to be managed. The Local Comprehensive Plan being designed will address this issue in greater depth.

The town should recognize the need for neighborhood open space. A conservation/ recreation area within walking distance of every home in Sandwich would be a fine objective, particularly since there is a general aversion to more traffic and parking lots in town. Opportunities to add natural areas, through linkages or inholdings, should be examined.

In addition to town-wide growth patterns, it is useful to analyze village development trends because Sandwich is a large town in area and outdoor facilities that may serve the needs of one village may simply be too distant to be readily available to use by residents of other villagers. Sandwich Center and Sagamore Beach have few tracts remaining for development and can be considered essentially "built-out" relative to the rest of town. (See Map 3. A. 3.) East Sandwich has been heavily subdivided, but more vacant lot remain here than in its western village neighbors.²⁶ Heavily developed along its eastern perimeter, South Sandwich and the Ridge District contain the greatest potential for more large subdivisions, as soon as access problems are clarified to the interior woodlands in the Ridge, or if the summer camps are developed. (See Table 3.1.) Forestdale has vast new suburban-style residential developments.

The Northside villages (Sandwich and East Sandwich) exhibit both some of the most rural patterns of development (large old farmsteads) and some of the most suburban patterns (acre-lot, grid subdivisions popular in the 1970s, such as Carleton Shores.) The fate of the Northside depends on the retention of enough larger estates and small farms to retain the rural character of the area.

Beyond the spatial considerations of development in Sandwich, there is also a temporal component. Less so than in most Cape towns, Sandwich still has about 28% of its homes occupied only seasonally. More and more of these summer homes can be

²⁵ Sandwich Local Comprehensive Plan, Land Use and Growth Management Element, April 1996, p. LU-5.

²⁶ In fact, East Sandwich could accommodate almost 1,000 new houses, according to a build-out study in, Sandwich Local Comprehensive Plan, Land Use and Growth Management Element, April 1996, p. LU-4.

expected to be converted to year-round use as not only commuting, but also "tele-commuting" become more acceptable, and as baby boomers begin to retire in 15 years, converting their summer homes to retirement homes.

Whatever the cause(s), crucial impacts on water demand, water quality, open space demand, traffic and other issues are as likely to come from seasonal to year-round conversion of existing housing stock as from more development in general. Since many of these "cottages" are on Town Neck or near the Bay shore, the impacts on the marine environment can be expected to be greater than on interior groundwater supplies.

SECTION 4 ENVIRONMENTAL INVENTORY and ANALYSIS

Sandwich's natural resources, physical development, and social structure create unique problems and opportunities for open space/conservation and recreation planning. This section examines how these features influence policy.

A. Geology, Soils, and Topography

"Knowing the fines for meeting in private homes, they [the Quakers] met in a deep glen ever since known as Christopher's Hollow."

- Sandwich: A Cape Cod Town, by Russell Lovell, Jr., 1996.

"Natives call the Sandwich Moraine, the east-west moraine of the Upper Cape, the backbone of the Cape."

- These Fragile Outposts, by B.B. Chamberlain, 1964.

1. Geology and Topography

Sandwich's three distinct physiographic regions and its major landscape features were formed during the retreat of the Wisconsin Glacier about 15,000 years ago. Wind, wave and storm action have shaped dunes, beaches and other shoreline features, but Sandwich is primarily characterized by its glacial past. (See Map 4. A. 1.)

During the retreat, or recession, of the last glacier, two lobes of the ice front occupied what is now Buzzards Bay and Cape Cod Bay. The lobes retreated at varying rates, sometimes re-advancing over older stratified drift, owing to short term periods of lower temperatures and increased precipitation. These series of advances and retreats plowed up the glacial materials into a series of irregular ridges known as moraines. Perhaps not surprisingly, the highest hills on Cape Cod occur near the intersection of the two moraines left by the two Bay lobes, near the northwest corner of what is now Camp Edwards (Massachusetts Military Reservation).

While Bourne may claim the distinction of the highest point on Cape Cod (Pine Hill, 306 feet above mean sea level), most of Bourne's moraine lies within Camp Edwards. Sandwich can claim the distinction of having the second highest hill on Cape Cod (Telegraph Hill, 295 feet) and the largest area of high moraine (above 200 feet) under municipal jurisdiction (for planning purposes) of any Cape Cod town. (See Map 4. A. 1.) This characteristic is memorialized in the name Ridge District given to the

town's large-lot zoning district stretching east-west along the moraine south of the Mid-Cape Highway. This Ridge District has been traditionally difficult to develop, given the steep topography and poor access. Even though the land surface plunges into deep kettle holes, very few ponds (only Boiling Springs and Nye's Ponds) are found in the moraine (and that at the toe), given the great depth to groundwater. In the 1930s this rugged hinterland hosted Sandwich's portion of the "Berkshires to the Capes Trail," a public bridle path laid out by the Civilian Conservation Corps. In the 1950s it was chosen to host the layout for the Mid-Cape Highway since the roadway would traverse an unpopulated area.

The Ridge (actually a series of ridges) still represents much of the "wilds" left in Sandwich and has been the focus of open space acquisition for the past 20 years, including the \$11 million, 525-acre purchase by the Town of the Striar property in 1999. In the 1980s and 1990s, The Ridge has been eyed by trail enthusiasts as the logical connection for Cape Cod Pathways, a regional walking trail network, given its large expanse internally and its proximity to the 1,200-acre West Barnstable Conservation Area.²⁷ (See Map 5. D. 1.)

²⁷ Indeed, with the addition of the Striar property, the Town of Sandwich now boasts a municipally-owned open space area equivalent in size to the West Barnstable one, heretofore the largest on the Cape.

TABLE 4.0 SIGNIFICANT ELEVATIONS, TOWN OF SANDWICH²⁸

Named Hills	Height in feet above sea level	Location	Use / Comments
Telegraph (Bournes) Hill	292	off Rt. 130	DEM fire tower
Discovery Hill	280	off Kiahs Way	town conservation land
Townline Hill	277	Spruce Swamp Road	Camp Edwards
Great Hill	240	off Chase Road	powerline great public overlook
Sam Nyes Mountain	210	off Mill Road	town conservation land
Faunces Mountain	160	east end of DEM	Shawme Crowell campground
Round Hill	150	off Cedarville Road	north of Route 6
Elephantback Hill	130	off Charles Street	south end Crows Farm
Spring Hill	80	Spring Hill Road	private residences
Sextant Hill	80	Moody Drive, S. Center	private residences
Sagamore Hill	74	off Scusset Beach Road	DEM Scusset State Beach
Town Neck Hill	60	Town Neck	private residences

Also of significance in the moraine are some of its depressions, known locally as "kettleholes" or "hollows," formed when stagnant ice blocks of the glacier finally melted. The largest is known as Great Hollow, now within Camp Edwards, and can be seen to the west from Route 130 at the powerline crossing. This massive gulf descends steeply from 250 feet high on Route 130 to about 80 feet high in the gulf just 1000 feet west of the road. A traveller in 1892 reported:

There is a piece of remarkably interesting scenery near the wood from Sandwich to Mashpee. It is a vast wooded hollow, or deep valley, which happens to have just the right proportions to be impressive. It ought to be defended from forest fires, and its sylvan beauty perpetuated and made a public possession.²⁹

With support of the recent proposal to create a wildlife refuge out of the northern 15,000 acres of Camp Edwards, perhaps this prescient hope will be realized.

Christopher's Hollow, now within the homeowners' association open space for the subdivision off Crowell Road, was historically significant as the secret meeting place for Sandwich's persecuted Quakers in the 1700s:

Charles Street continued on into the woods called Cut-Hill or Poorhouse Road, and passed between two deep glacial hollows with steep sides. The eastern one was the famous Christopher's Hollow, originally a beautiful area with a spring, large trees and rocks. In the later farm-world the rocks were taken away for walls and the hollow was used as a burial place for farm animals. The other hollow, to the west, is now nearly full as the town's sanitary landfill and will probably become a waste transfer station.³⁰

²⁸ Original research, The Compact of Cape Cod Conservation Trusts, Inc., 1999, using USGS topographic quadrangles.

²⁹ J.B. Harrison, "A Report upon the Public Holdings of the Shore Towns of Massachusetts," in First Annual Report of The Trustees of Public Reservations, 1891, (Boston MA, 1892), p. 41.

³⁰ R.A. Lovell, Jr., Sandwich: A Cape Cod Town, Sandwich Archives and Historical Center, 1984, 1996, p. 366.

Lands generally north of Route 6A comprise the second physiographic region: glacial lake and lake bottom deposits found inside the Cape Cod Bay shoreline. (See Map 4. A. 1.) The high moraine acted as a giant earth dam, causing a temporary lake to form, with silts and clays settling out as well as sands and gravel. The richest soils are found in this north part of town. Extensive salt marshes and broad tidal flats fringe these glacial lake delta deposits. There are a few small, shallow ponds, the most significant one being Hoxie Pond. Most of the town's remaining cranberry bogs are found in the "lake deposits" zone. Marine erosion and deposition has smoothed the shoreline of Sandwich, building sand spits and barrier beaches across the ragged glacial lake shoreline. Storm damage due to hurricanes can be drastic along this low-lying shoreline. This area is particularly vulnerable to waves running developing across the long fetch of Cape Cod Bay during winter Northeasters. Scorton Neck, which rises 90 feet high directly abutting the sea, and the smaller Spring Hill and Town Neck Hill share a geological bond as delta deposits, formed as the glacier retreated.

The southern half of Sandwich is composed of outwash plain deposits, sands and gravels sorted by meltwater running south off the glacier. The generally flat surface is pitted in places where blocks of ice became separated from the main mass of the glacier, were buried in the drift and later melted, leaving steep sided depressions, known locally as kettle holes. The deeper depressions extend below the water table and now contain most of the town's many ponds. The land surface is very uniform throughout this third physiographic unit: no land above 150 feet high exists south of the Ridge District and most of the area averages about 100 feet high. Though a 1795 town map labelled it as "Waste Land,"³¹ this flat surface, combined with its underlying coarse sands, makes Forestdale and South Sandwich a subdivision developer's dream and, in fact, this is where most of the town's population growth is now centered.

2. Soils

"On the northwest slope of Bourne's [now, Telegraph] Hill in Sandwich, in the roadside there was exposed in 1916 some 6 feet of clay beneath glacial gravel and the surface till."

-- "Geology of Cape Cod," J. B. Woodworth, 1937

a) Description

Different soils result from complex interactions among surficial geological forces, topography, climate, and plant and animal decomposition. The type, wetness and slope of soils often determine the suitability of land use development in a community. Soils affect drainage, erosion, sedimentation, agriculture, vegetation, wildlife habitat, sewage disposal, and suitability of concrete foundations. In Sandwich, particular concern should be given to uses of soil that are easily eroded, excessively or poorly drained, unstable or ecologically-important. The US Soil Conservation Service (now, the USDA Natural Resources Conservation Service) classifies soils by type and five general associations are found in Sandwich. *Carver - Windsor Association*: These sands

³¹ R.A. Lovell, Jr., Sandwich: A Cape Cod Town, Sandwich Archives and Historical Center, 1984, 1996, p. 250.

comprise about 33 percent of the town's area, typically, within the outwash plain south of the Mid-Cape Highway to Farmersville Road. These droughty, nutrient-poor soils are usually found on level or gently sloping land. Most of Sandwich's freshwater ponds are found here. These soils have few limitations for development, but, ironically, the ready permeability of the soils allow potential contaminants to reach the water table. A common complaint of Cape Cod health officials is that sandy soils are unsuitable for development of septic systems because they percolate *too quickly* rather than too slowly. Viruses and nitrogenous compounds from wastewater, then, can easily reach the aquifer before soil adsorption can occur. Lawns and athletic fields may also be difficult to establish and maintain owing to the droughty nature of the soils.

The *Enfield Association* covers 19 percent of the town, south of Farmersville Road. Formed in outwash, they are generally coarse sands overlain with a one to three feet thick silt mantle that Carver - Windsor typically does not have. Its permeability is similar to Carver - Windsor.

An upland soil which comprises only four percent of the town's area, but which are important agricultural soils is the *Paxton- Belgrade - Scituate Association* found on the Northside, north of Route 6A. Perhaps not surprisingly, the Northside locale coincides with the first colonial settlements in Sandwich, where small farmsteads benefited from the relatively rich loamy sand. The usefulness of this soil is seen today in the town's public "U-pick" blueberry patch and Crow Farm, but commercial agriculture has essentially vanished from Sandwich. The land is just too valuable for growing houses rather than crops.

Wetland soils include tidal beach, dune sand and beach sand (three per cent of town) and the peat, muck and sanded muck association of freshwater swamps, bogs and marshes (three percent) found scattered throughout the town.³²

Even though most of Sandwich was originally stabilized by vegetation, and a thin veneer of topsoil began to accumulate over it, supporting upland forests, the colonists soon stripped the timber from the woods and the topsoil blew away, leaving loose sand in many areas. In 1822 historian Timothy Dwight recorded that "the road from Sandwich to Barnstable was hilly and in a great degree bare, bleak and desolate."³³ Despite recovery in the visual sense, neither soils nor topography, with the exception of wetlands, has since proven to be an effective impediment to development. Retaining open space by relying on natural development constraints is not a realistic approach in Sandwich.

b) Agricultural Resources

The farming community that was Sandwich in the 18th and 19th centuries is long gone. Even remnants of that heritage are hard to find in town: a stone wall here and there marking on old pasture; a few gnarled apple trees of an abandoned orchard, and

³² Soil information combined from: Town of Sandwich Conservation and Recreation Plan, Appendix B, 1986; and, US Soil Conservation Service, "Barnstable County Massachusetts, Interim Soil Survey Report," June 1987.

³³ Timothy Dwight, Travels in New England and New York, 1822.

livestock barns that now shelter only automobiles. Nevertheless, there are still a few small working farms in Sandwich, where the public can experience the rich tradition of Cape agriculture. Perhaps the most visible and well-known is the Crow Farm on Route 6A near Charles Street. With an attractive farmstand by the roadside, and with ever-changing products and offerings timed to the season, the Crow Farm is at once a destination and an anchor for the Northside's historical rural character.

The largest farm on Cape Cod, Windstar Farm in South Sandwich, suffered a blow in 1998 when the Britt family, which owned and operated it for 21 years, lost it to private foreclosure. Previously advertised as the largest pumpkin farm in Massachusetts, Windstar Farm also is unique in being the only significant Cape Cod farm protected under the state's Agricultural Preservation Restriction program. In 1983, the Britts sold the state the development rights on the farm for \$990,000. Its fate remains undetermined, but one thing is clear: it will not become a 228-acre residential subdivision.

The Town of Sandwich is a leader in the municipal trend in sponsoring public gardening on the Cape. Eight towns on the Cape have town-operated community gardens,³⁴ but Sandwich hosts not one but three. A quarter-acre lot next to the railroad tracks on Liberty Street, established on tax title land in 1998. For the past 30 years, the town has run a very popular public blueberry picking patch on Route 6A in East Sandwich. A third community garden has been cleared out of pine woodlands at the Community Recreation Center in South Sandwich.

B. Landscape Character

The human eye delights in scenes where land meets water, and it does so in Sandwich with dramatic frequency and variety. In addition to its multitude of ponds, Sandwich has 1,128 acres of salt marsh and the broad sweep of these "meadows," as the colonists knew them, is breathtaking from the Boardwalk and the Scorton Creek Bridge on Route 6A. The scene along Cape Cod Bay is dazzling, with sparkling waters lapping the continuous white sandy beach. The large (ten-foot) tidal range assures different perspectives even at the same location during various times of day. The more intimate shoreline scenes are prized as well, such as the bridge crossings along Route 6A. Occasional fields, such as the Crow Farm orchard and the abandoned Roberti dairy farm (recently donated to the Town), provide upland vistas in the absence of the large farms found elsewhere in Massachusetts. The primary pond views along well-traveled roadways are of Snake Pond, Hoxie Pond, Twin Ponds and, of course, Sandwich's signature site, Shame Ponds in the Village Center. In addition, long-distance water views across Cape Cod Bay are available from Route 6A from Sextant Hill, Telegraph Hill on Route 130, and Quaker Meeting House Road at the Mid-Cape crossing.

More than in any other Cape Cod town, however, it is the rugged terrain of Sandwich which makes its mark in the public consciousness. For hundreds of years, The Ridge district was virtually uninhabited, a place to for Sandwich residents to haul

³⁴ Cape & Islands Self-Reliance Corp., "The Self Reliance Commentator," September 1997, p. 6.

wood out of and then retreat to lowland life along the shore. Now it is traversed daily by thousands traveling the Mid-Cape Highway east-west along its backbone, and by many more local commuters driving north-south across the moraine on Route 130 and Quaker Meetinghouse Road. You "feel" like you are up high, relative to the rest of Cape Cod, and you are. Again, The Boardwalk across Mill Creek is a great vantage point to see just how The Ridge looms over the old part of town.

Culturally, the main streets of Sandwich Village and East Sandwich are a visually distinctive part of Massachusetts. In fact, the Old Kings Highway was chosen as one of the ten Most Outstanding Scenic Byways in America in 1993.³⁵ When the Cape Cod Commission classified the Old Kings Highway for scenic resources in 1995, the Spring Hill segment of Route 6A route was considered to have a High Concentration of Scenic Elements.³⁶ There are 42 roads designated as town Scenic Roads under M.G.L. c. 40, s. 15C.^{36a} The mix of historical architecture and natural splendor is what attracts many tourists and residents to Sandwich. Sandwich wears its colors proudly: the gold of its marshes, the silver of its beaches, the blue of its ponds, the green of its woods, and the red of its bogs.

(For more information, see "Sandwich Local Comprehensive Plan," Element 7.0, Historic Preservation and Community Character, 1996.)

³⁵ Scenic America, Inc., Washington D.C., 1993.

³⁶ Cape Cod Commission, Old King's Highway / Route 6A Corridor Management Plan, April 1995, map after p. 56.

^{36a} Sandwich Local Comprehensive Plan, Transportation Element, April 1996, p. TC-6.

C. Water Based Resources

1. Salt Water Bodies

As previously discussed, the town's landscape character and 27 miles of salt water shorefront are a primary focus of informal outdoor activities and form the background for the town's tourist-based economy, including swimming, fishing, hunting, and boating. (See Map 4. C. 1.) Unlike most Cape Cod towns, which usually have many small public bathing beaches punctuating its Bay shoreline, Sandwich beachgoers are concentrated at Town Neck Beach and Scusset Beach State Park, which combined accounts for only 1.5 miles of Sandwich's 7.5-mile long Bay shore. The Town of Sandwich pays a \$20,000 annual subsidy to the Town of Barnstable, so that Sandwich residents can purchase, at Barnstable residents' prices, beach use and off-road vehicle permits to visit Barnstable's popular Sandy Neck Beach.³⁷ Most of the remaining shoreline is private development on small lots or private association beaches. Surfcasting for bluefish and striped bass is a popular pastime along the beaches. The Massachusetts Division of Marine Fisheries purchased a 1.5-acre beach property (Ladenburg) on the west side of the mouth of Scorton Creek in 1999 to provide better public fishing access. Flyfishing for sea-run brown trout, hickory shad and striped bass, conducted along Scorton Creek, is considered among the best on Cape Cod,³⁸ and coho salmon were stocked there in the 1980s.

(For more information, see "Sandwich Local Comprehensive Plan," Element 2.2, Coastal Resources, 1996.)

³⁷ Personal communication, Mark Galkowski, Conservation Officer3, April 1998.

³⁸ Personal communication, Andy Goode, Director of Conservation, Orvis, Inc., February 1999.

2. Fresh Water Bodies

"Jany. 14th, 1790: yesterday...a young indian was Crossing Lawrence hole pond upon ice he fell in and was Drowned in about 6 feet of water the ice had only one nights frost and was not hard enough to bear a man to go to his assistance yesterday they got him up and Carried him to his mothers he was son to Gideon Natumpon about 17 years of age his Father is upon a whale voyage."

-- The Diary of Benjamin Percival, Sandwich, 1777-1817

"...local tradition often accredits them [the ponds] as bottomless. The writer was once informed that Peters Pond was six hundred feet deep in parts. On making many soundings, with a ship's lead and line, the extreme depth was found to be fifty feet."

--S.W. Abbott, 1902.³⁹

The town's primary freshwater resources are its 22 ponds, totalling over 677 acres of surface area. These ponds are scattered throughout the town, primarily in the geologic areas of outwash plain and glacial lake deposit. (See Map 3. D. 2.) Eleven of the ponds are greater than ten acres in size, which classifies them as Great Ponds of the Commonwealth. The public owns Great Ponds and is entitled to access, while other ponds can be owned privately by surrounding landowners and public access can be prohibited. Only six of Sandwich's Great Ponds have been officially surveyed as being greater than ten acres in area by state engineers,⁴⁰ but probably six others meet the test. Five ponds are private by size, but have public access through publicly-owned land, such as the wellfields of the Sandwich Water District around their shores. Several ponds were created by impoundment, including Shawme Lake and the Twin Ponds on Route 6A. Most, however, are classic kettlehole ponds, continually recharged by groundwater and without surface inlet or outlet.

Recreationally, the most important swimming ponds are Wakeby Pond and Snake Pond, both of which have important town conservation/recreation land abutting them. Though it is not 600 feet deep, it is a respectable 54 feet deep, making Peter's Pond perhaps the crown jewel for the sportfisher. It is regularly stocked not only with trout, but was one of only three Cape ponds to receive Atlantic salmon broodstock in 1996. Peter's Pond is also considered by state fisheries officials as one of the seven best Cape ponds for small mouth bass fishing.⁴¹ Peter's Pond also has the distinction of

³⁹ S.W. Abbott, "The Lakes of Cape Cod," in *New England Magazine*, Vol. XXVI No. 3, May 1902, p. 340.

⁴⁰ Massachusetts Water Resources Commission, Massachusetts Water Laws, 1970, p. 212.

⁴¹ The Massachusetts Division of Fisheries and Wildlife inventoried Peters Pond in 1993 and filed this report:
"This 127 acre natural kettlehole pond has an average depth of 25 feet and a maximum depth of 54 feet. Transparency is excellent, extending to 22 feet. The shoreline is well developed with summer camps, residential homes and a gravel pit. The bottom is primarily sand and aquatic vegetation is scarce.

This pond was reclaimed for trout management in 1955. While the pond was dominated by white suckers and white perch at that time, the ten brown trout recovered weighed a total of 68 pounds! The lake was reclaimed again in 1968. Adult smallmouth bass brood stock were stocked in 1978 and 1979.

The most recent fisheries survey, conducted in 1990, recorded nine species present: largemouth bass, smallmouth bass, brown trout, rainbow trout, pumpkinseed sunfish, banded killifish, golden shiner bluegill and American eel. Stocked brook trout are also likely to be present at any given time. The pond was stocked with excess Atlantic salmon brood stock from 3 to 12

having the highest elevation (height of surface water 67 feet above sea level) of any pond on Cape Cod. Peter's Pond is classified as a "very sensitive" pond in terms of acidification, but its recent trend has been positive.

Peter's Pond and Wakeby Lake are available for trailered boats, but most pond boating is limited to canoes, rowboats and other small craft. An anadromous fish run for blueback herring and alewife species extends into Lower Shawme Lake^{41a} and Wakeby Pond. Coldwater stratified ponds, those whose depth to surface area ratio prevents seasonal mixing of waters, are preferred by trout and only five in Sandwich claim that distinction: Peters, Spectacle, Lower Shawme, Mashpee-Wakeby and Hoxie Ponds.

In 1986, the Town of Sandwich Environmental Task Force reported that, despite an abundance of freshwater ponds, "the Town possesses little pondfront property, severely limiting access by residents to these 'public' waters... Consequently, a very high priority for the Town is acquisition of pond frontage suitable for some recreational uses."⁴² Since that time 12 years ago, no new town boat ramps or beaches have been created on ponds. For example, Lawrence Pond, the town's largest pond, currently has no suitable public access along its 2.3-mile shoreline. A marginal dirt boat access is all that is legally-accessible. Pond recreational access must be balanced with the need to protect sensitive environmental resources along these ponds, an issue to be addressed in the DCPC discussions.

Most of the ponds in Sandwich are classic kettlehole ponds, formed on the Cape as deep depressions in the glacial outwash left by stagnant ice blocks. Most are isolated; that is, they do not drain to the sea. These ponds, dependent solely on the fluctuation in the water table for their own surface level, often expose a wide shore during the summer when the water table is low. These exposed shorelines comprise the unique habitat called "coastal plain pondshores," which harbor rare and endangered plants, such as Maryland meadow beauty and redroot, and rare animals, such as the comet darter and New England bluet (damselflies).⁴⁴ (See, Section 4.E on Vegetation and Appendix C.)

Part of the significance of Sandwich's ponds lies not in their importance for boating, as is the case in other Cape Cod towns, but rather the fact that they are the town's primary sites for rare plant and animal species and should be protected as sensitive habitat. Specifically, Hoxie, Hog, Weeks, Upper Shawme, Snake, Triangle,

pounds in size in the spring of 1992 and 1993, and these fish will continue to be stocked every spring as long as they are available.

...The pond's excellent coldwater habitat regularly produces some nice holdover trout. ..During the summer months, the pond is very heavily used by boaters and other recreational users..."

^{41a} A fish ladder,³ extending from Lower Shawme to Upper Shawme Pond, was abandoned in 1972. The Town, led by its Conservation Department, has been working to acquire land to fix the Upper Shawme Pond dam and restore the extended run.

⁴² Town of Sandwich, Environmental Task Force, Conservation and Recreation Plan for Town of Sandwich, January 1986, p. 29.

⁴⁴ Association for the Preservation of Cape Cod, Cape Cod Critical Habitats Atlas, 1990.

Spectacle and Lawrence Ponds harbor this rare habitat niche. (See "Rare Plant Communities" below in Section 4.D.2.)

TABLE 4.1 POND CHARACTERISTICS, TOWN OF SANDWICH⁴³

Pond Name	Surface Acreage	Max. Depth (ft.)	Shore Length (miles)	Activities	Public Access	Comments
OFFICIAL GREAT PONDS: (public; surveyed by state engineers)						
Wakeby Pond Area	30	15	0.30	trout-stocked fishing; swimming	Mashpee state ramp; Sandwich town beach	Ryder Cons.
Lawrence Pond	138	27	2.3	boating	poor town ramp, Great Hill Rd.	rare plants
Peter's Pond	127	54	2.9	trout-stocked	state ramp, John Ewer Rd.	Boyden Farm Cons. Area
Spectacle Pond 91	43	2.6	trout-stocked	town ramp off Pinkham Rd. swimming; Y camp	1973 liming;	rare plants
Triangle Pond	84	30	2.0	YMCA camp	informal; off Stowe Rd.	rare plants
Snake Pond	83	33	1.6	swimming	town beach & ramp	1991 liming; rare plants
PRESUMED GREAT PONDS: (public; surface area greater than 10 acres)						
Shawme Lake	24	16	1.50	historic scene	town land on Grove & Water St.	
Upper Shawme Lake	20	24	0.80	town to get dam	none; Union Braiding Rd.	rare plants
Weeks Pond	15	15	0.76		none; through wellfield	rare plants
Pimlico Pond	14	23	0.57	trout-stocked	town dirt ramp	
Goodspeed Cemtry. Pd.	11	?	0.76	loop trail	town land	Ryder Cons. Area
Hog Pond	10	20	0.57		none; through wellfield	rare plants
PRIVATE PONDS with Public Access: (less than 10 acres, but publicly-owned frontage or access)						
Hoxie Pond	8.5	35	0.42	trout-stocked	none; state game farm	rare plants
Twin Ponds	6.4	5	0.57	cranberry bogs	Route 6A, state highway	impoundment
Nye Pond	6.0	18	0.38	historic scene	Old County Rd; wellfield	
Boiling Springs Pond	5.0	?	0.68	historic scene	through wellfield	Briar Patch
Doughnut Pond	1.3	?	0.06		state land; off Rt. 130	Shawme-Crowell
PRIVATE PONDS: (less than 10 acres; no public access; surrounded by private property)						
Little Hog Pond	8.0	26	0.38	Holly Ridge GC	none; off Percival Lane	
Lily Pond	5.3	?	0.30	bog pond	none; off Old County Rd.	RR tracks
Bog Pond	2.0	?	0.23	bog pond	none; off Old County Rd.	
impoundment						
Bog Pond	1.5	?	0.19	bog pond	none; off Old County Rd.	
impoundment						
Dead Swamp Pond	1.4	?	0.23	bog pond	none; Solomon Pond Rd.	house lots
Spring Hill Pond	0.5	?	0.10		none; off Juniper Hill Lane	house lot
Small Mill Pond	0.4	?	0.19		none; off Nye Road	impoundment
Round Hill Pond	0.3	?	0.10	golf course	none; through Round Hill GC	

⁴³ Original research, The Compact of Cape Cod Conservation Trusts, Inc., 1997, using town assessing records, land surveys, personal communication from Dennis Dept. of Natural Resources, and, University of Massachusetts, "An Inventory of the Ponds, Lakes and Reservoirs of Massachusetts: Barnstable County," 1969.

HISTORICAL PONDS: (ponds no longer in existence)

Game Farm Pond - 5.8 reversion to salt marsh state game farm impoundment
breached

Totals 676.6 acres 18.17 miles (does not include filled ponds; most of Wakeby Pond is in Mashpee, only Sandwich portions included in table)

3. Surface Water Quality

All of Sandwich's waters are generally of high quality, though problem spots exist. The Massachusetts Department of Environmental Protection⁴⁵ lists all of the marine (salt) waters of Sandwich as Class SA, the top salt water ranking, meaning they are an "outstanding resource" whose purity should be suitable for all types of water recreation, including swimming and shellfishing. Nevertheless, Old Harbor Estuary and Scorton Creek do not presently meet this goal, owing to bacterial contamination resulting in shellfish bed closures. All freshwater ponds are included in Class B, the top freshwater ranking for ponds not used as a source of a public drinking water supply. These ponds must be maintained at a high level of purity and is not supposed to be degraded by point source discharges, such as sewage outfalls. In fact, it is non-point sources of pollution (road runoff, septic systems, lawn maintenance, etc.) that are the more potent threat to water quality of ponds and bays in Sandwich.

Recharge areas are land areas that contribute ground water flow to surface water bodies, such as ponds, streams and bays. (See Map 4. C. 2.) Recharge areas are much more relevant on Cape Cod, where sandy soils readily transmit groundwater, than land surface watersheds that contribute the most water to ponds and bays off-Cape. Land uses within recharge areas significantly influence surface water quality. The Town of Sandwich has been cooperating regionally, through the Cape Cod Commission, in the Cape Cod Coastal Embayment Project to examine, among other things, the recharge areas and nutrient loading capacity of saltwater bodies in the county.⁴⁶ Because it hosts the apex of the Sagamore lens of the Cape Cod aquifer, almost all of Sandwich's land area contributes via groundwater discharge to coastal embayments, salt ponds or estuaries, including not only Scorton Creek and Sandwich Harbor, but also Bourne's Back River and Red Brook Harbor, Falmouth's salt ponds and Waquoit Bay, Mashpee's Popponessett Bay, and Barnstable's Harbor and Cotuit/Osterville bays. Hence, land use throughout much of town can affect the quality of saltwater bodies as well as ponds.

Eutrophication is the process by which a pond experiences algal blooms, oxygen depletion, fish kills, noxious odors and visual deterioration as a result of excessive nutrient inputs (usually from runoff and septic systems). Some of Sandwich's smaller ponds are (anecdotally) presumed to suffer from eutrophication, but the only study done so far has been for Upper and Lower Shawme Ponds in 1997 for the Selectmen and Conservation Department. It found that there was "almost 12 feet of highly organic

⁴⁵ Massachusetts Department of Environmental Protection, Massachusetts Surface Water Quality Standards, 1990, p. 101. (314 CMR 4.00)

⁴⁶ Cape Cod Commission, "The Cape Cod Coastal Embayment Project," (final draft: April 1997).

muck in the middle of [Upper Shawme] pond"...and that "Lower Shawme is basically filling in with organic plant matter." A grassroots residents group called Sandwich Pond Watch was formed in 1998 to further study remediation of eutrophying ponds.

Freshwater ponds on the Cape tend to be naturally acidic due to a lack of alkaline materials in the soils, and accelerated acidification seems apparent in several ponds. Between 1983-85 the Acid Rain Monitoring Project, coordinated by the University of Massachusetts at Amherst, sampled 3370 surface waters throughout the state and found that 5.5 percent were acidified, 16.8 percent were critical, 20 percent were endangered and 21.7 percent were highly sensitive (in descending order of degradation.) Sandwich and the other Upper Cape towns were considered to be "endangered" (middle of range) in terms of mean alkalinity and buffering capacity.⁴⁸ Nevertheless, five of 18 ponds sampled in Sandwich were considered to be already "acidified" or "critical."⁴⁹ Ironically, the high acidity keeps the pond waters attractive for swimming because the water looks very clear and feels "soft". A private contractor, Living Lakes, Inc., monitored water quality, surveyed fish populations and treated Lawrence and Snake Ponds with limestone during the period May 1986 through December 1991 to improve the water quality.

TABLE 4.2 POND SENSITIVITY TO ACIDITY, TOWN OF SANDWICH⁵⁰

Sensitivity Category	Pond Name	Sampling Date	Sample pH	Acid Neutralizing Capacity (acidified =<0)
Acidified	Goodspeed Cemetery Pond	4/15/85	4.54	-0.90
Critical	Lower Hog Pond	1/12/86	5.74	0.30
Critical	Upper Hog Pond	4/15/85	6.21	0.90
Critical	Triangle Pond	4/15/84	6.20	0.50
Critical	Weeks Pond	4/15/84	6.00	1.00
Endangered	Snake Pond	7/24/88	6.87	2.70
Endangered	Hoxie Pond	7/24/88	6.68	4.70
Endangered	Twin Pond, South	4/15/84	6.30	5.00
Very Sensitive	Spectacle Pond	1/12/86	6.88	4.10
Very Sensitive	Pimlico Pond	4/15/84	6.68	4.40
Very Sensitive	Lawrence Pond	7/24/88	6.88	5.80
Very Sensitive	Peters Pond	4/10/88	6.99	6.60
Very Sensitive	Boiling Springs Pond	4/15/84	6.40	8.00
Very Sensitive	Upper Shawme Lake	4/15/84	6.65	8.00
Very Sensitive	Mashpee & Wakeby Pond	7/24/88	6.91	8.40
Very Sensitive	Lower Shawme Lake	4/15/84	6.70	9.00
Sensitive	Nye Pond	4/15/84	6.80	13.00

⁴⁸ Massachusetts Executive Office of Environmental Affairs, An Environment at Risk: The First Annual Report on the State of the Massachusetts Environment, April 1990, pp. 84-87.

⁴⁹ University of Massachusetts-Amherst, Water Resources Research Center, Sensitivity of Surface Waters in Massachusetts: A Listing of Sensitivity of All Surface Waters Sampled by the Acid Rain Monitoring Project, August 1988 (p. 6).

⁵⁰ University of Massachusetts-Amherst, Water Resources Research Center, Sensitivity of Surface Waters in Massachusetts: A Listing of Sensitivity of All Surface Waters Sampled by the Acid Rain Monitoring Project, August 1988 (p. 6).

In recognition of the importance of groundwater to the quality of ponds, a surface water protection district has been adopted under the town's zoning to regulate development within 300 feet of ponds and associated wetlands. (See Map 3. D. 2.) In 1999 the Town submitted a nomination to the Cape Cod Commission for the Three Ponds area of South Sandwich to be declared a District of Critical Planning Concern in recognition of the need to further protect these tremendous freshwater resources. [Ed. note: DCPC approved in February 2000.]

(For more information, see "Sandwich Local Comprehensive Plan," Element 2.1, Water Resources, 1996.)

4. Floodplains and Shoreline Change

Sandwich participates in the Federal Flood Insurance Program, which requires that new shorefront development meet engineering standards for floodproofing, but does not prohibit development. Flood velocity zones, or V-zones, are land areas where storm surge or direct wave action occurs. (See Map 4. C. 1.) A 1988 analysis by the Massachusetts Coastal Zone Management Office found that in the 1970s, Sandwich had more structures built in the velocity zone than any other Cape Cod town except Bourne, Falmouth and Dennis. About 52 buildings are clearly located in the V-zone, primarily near Sagamore Beach and Spring Hill Beach.⁵¹ The 1991 Halloween Storm damaged some houses along the Bay. State and local wetlands protection legislation should control future development in this high hazard area. In addition, little additional construction would be envisioned since 90 per cent of the barrier beach area in Sandwich was developed previously.⁵²

Landward of the velocity zones are other flood-prone areas (A-Zones) in which standing waters can be expected during 100-year storm events. These areas consist mostly of salt marshes and shorefront uplands up to about the 12-foot contour. Both commercial and residential developed areas, including portions of Route 6A near Sandwich Center and the south side of Scorton Neck, occur in the A-Zone. At the May 1999 Town Meeting, voters failed to adopt (lacked 2/3rds majority) stringent new changes in the town's floodplain bylaw, prohibiting new homes, enlargement of existing homes and soil relocation.

In coming decades, flooding and erosion will be increasingly exacerbated due to relative sea level rise. This phenomenon, the result of land submergence and ocean expansion from global warming, could result in the loss of between 54 and 188 acres of upland in Sandwich between the years 1980 and 2025.⁵³ These areas will basically fall

⁵¹ Mass. Coastal Zone Management Office, Memo (unpublished), "Cape Cod Coastal Areas with Habitable Structures within the Designated Flood Velocity Zone," May 10, 1988.

⁵² Town of Sandwich, "Sandwich Local Comprehensive Plan," Element 2.2, Coastal Resources, 1996, p. CR-5.

⁵³ Massachusetts Coastal Zone Management, "Coastal Submergence Program: Executive Summary," no date, p.9. (Based on a relative sea rise of 0.45 to 1.57 feet between 1980 and 2025. Recently, the USEPA has suggested using a figure of 1.0 feet, suggesting a typical loss of 280 acres might most likely be expected).

within the 100 year floodplain. Sea level rise will also mean an increase in the severity of storm damage. Owing to its low-lying coastline that intrudes far inland, Sandwich can expect to experience a shoreline retreat (as a percentage of its land mass) as significant as any other Cape Cod town.⁵⁴ The town must consider this issue when examining long-term public investment in shoreline facilities, such as in siting new parking lots.

The Massachusetts Coastal Zone Management Office has found that Sandwich is actually one of only four Cape towns which has experienced "long-term community-wide accretion of its shoreline."⁵⁵ Despite irregular short-term fluctuations of the beach width in specific locations, Sandwich as a whole, therefore, has had a net gain of sand, not a loss, :

"For example, a transect along Springhill Beach, which is downdrift from a jetty, shows a long-term annual erosion rate of 3.58 feet per year. From 1860-1952, the average rate of erosion was 3.94 feet per year. From 1952-1978, however, the annual erosion rate was only 1.7 feet per year. This shows that following jetty construction, there was an accelerated short-term level of erosion. Once the shoreline readjusted to the presence of the jetty, the erosion rate leveled off. If the jetty was properly engineered and is properly maintained, the short-term erosion rate of 1.7 feet per year should be considered for planning purposes, rather than the long-term rate of 3.9 feet per year."⁵⁶

Information from such studies should be evaluated in planning improvements to beaches for recreation. For instance, the Town has contracted with Woods Hole Group to study restoration of Old Harbor entrance, beach re-nourishment and to develop a beach management plan for Town Neck Beach and the Spring Hill Conservation Lands. In 1986, the Town used similar information to adopt a health regulation prohibiting the installation of septic systems for new construction in "shifting sands," effectively preventing further barrier beach development.⁵⁷

(For more information, see "Sandwich Local Comprehensive Plan," Element 2.2, Coastal Resources 1996.)

5. Wetlands

Wetlands, both fresh and salt water types, are the food factory and habitat for most of Sandwich's wild animals. Fortunately, Sandwich is blessed with a diversity of wetland, in type and size, though distribution is not scattered evenly throughout the Town. (See Map 4. C. 3).

⁵⁴ Massachusetts Coastal Zone Management, "Coastal Submergence Program".

⁵⁵ Massachusetts Coastal Zone Management, "Shorelines," Spring 1998, p. 3.

⁵⁶ Massachusetts Coastal Zone Management, "Shorelines," Spring 1998, p. 3.

⁵⁷ Personal communication, Mark Galkowski, Conservation Officer, April 1998.

A 1990 University of Massachusetts study⁵⁸ found that Sandwich had 358 acres of freshwater wetlands, 147 acres of cranberry bogs and 984 acres of saltwater wetlands. A 1985 Massachusetts Coastal Zone Management report identified 1,128 acres of salt marsh in Sandwich.⁵⁹ (This difference in salt marsh acreage figures is due to differences in methodology, not loss of habitat.) A salt marsh's high biomass makes it excellent habitat for birds, shellfish, and finfish nurseries. About two-thirds of commercially-important finfish spend some of their life cycle feeding or spawning in or near salt marshes.⁶⁰ Cranberry bogs are becoming increasingly recognized as suitable habitat for a number of species, particularly ducks and spotted turtles.⁶¹

As with Sandwich's ponds, most freshwater wetlands are dependent on water table fluctuations, rather than surface runoff, to ensure the soil saturation necessary for wetland plants. Most wetlands are at low elevations, close to the water table and the sand and gravel soils readily transmit groundwater through wetlands. Wetlands play an important role in filtering out contaminants from freshwater and reducing flooding during major storms.

In addition to town administration of the Massachusetts Wetlands Protection Act, the Town simultaneously administers a local wetlands protection bylaw (upgraded 1992) that strengthens minimum state performance standards, such as tightening regulations for building on dunes and asserting town jurisdiction over small wetlands, such as vernal pools of any size. Septic system leaching fields must be located over 100 feet from wetlands, rather than the 50-foot state Title 5-standard. (See Map 3. D. 2.)

(For more information, see "Sandwich Local Comprehensive Plan," Element 2.3, Wetlands/Wildlife and Plant Habitat, 1996.)

6. Streams and Water Courses

"Life is by watercourses," - - Emerson

Though its tidal creeks are much more important recreational resources, Sandwich has a number of small freshwater streams, serving as tributaries to estuaries, serving as anadromous fish runs or as wildlife corridors. Each courses through the bottom of old glacial lake channels, providing the major freshwater inputs to the estuaries along the Bay. Historically, the most important stream was Scusset River, whose headwaters nearly touched the headwaters of Monument River flowing west

⁵⁸ MacConnell, William P. et al., University of Massachusetts, Amherst, Department of Forestry and Wildlife, "Land Use Update for Cape Cod and the Islands with Area Statistics for 1971, 1984 and 1990." (See also, 1984 edition for 1951 statistics.)

⁵⁹ Massachusetts Coastal Zone Management Office, Barrier Beaches, Salt Marshes & Tidal Flats: An Inventory of the Coastal Resources of the Commonwealth of Massachusetts, 1985, p. 6.

⁶⁰ Sterling, Dorothy, Association for the Preservation of Cape Cod, Our Cape Cod Salt Marshes, (Orleans MA, 1976), p. 21.

⁶¹ S. Ellsworth & D. Schall, IEP, Inc., "Wildlife Utilization on Commercial Cranberry Wetland Systems," in Massachusetts Cranberry Production: An Information Guide, University of Massachusetts-Amherst, 1992.

into Buzzards Bay. The Pilgrims used this connection to conduct trade with the Rhode Island and New Amsterdam colonies to the south and west. They realized early on the commercial potential in creating a through-route by joining the two streams. After many false starts, the Cape Cod Canal was finally created in the early 1900s, the world's widest sea-level canal.

These remaining streams pose as "Cape Cod rivers." Though frequently capable of being waded without boots or jumped without splashing, and suffering such indignities as being herded into concrete culverts to cross roadways, they are nevertheless important. Many have been artificially manipulated over the years by ditching, for cranberry irrigation or mosquito control. A program which identified these sometimes obscure resources to the public might educate the citizenry as to their vital role in ensuring water quality in ponds, tidal rivers and bays.

Table 4.3			
Sandwich's Water Courses			
<u>Name of Stream</u>	<u>Headwaters</u>	<u>Receiving Body</u>	<u>Approx. Length (in miles)</u>
Scusset Mill/Bass Creek	Wilson Rd. Pond	Cape Cod Bay	1.0
Cow House River	Twin Ponds	Long Creek/Scorton Harbor	1.5
Mill Pond Creek	Lily Pond, ES	Scorton Creek	0.3
Ford Creek	Fish Hatchery	Old Harbor	0.5
Parsonage Creek	Chipman Pond	Old Harbor	1.5
Ox Pasture Creek	unnamed pond	Old Harbor	0.5
Mill River	Shawme Ponds	Old Harbor	2.0
Springhill Creek	Boiling Springs Pond	Old Harbor	1.5
Springhill Creek	Juniper Hill Pond	Old Harbor	0.3
Old Harbor Creek	Van Buskirk Bog	Old Harbor	0.1
Shove Creek	Lawrence Hole	Scorton Harbor Creek	0.5
Jeremy's Dam River	Bog Ponds/Old Co. Rd.	Scorton Harbor Creek	0.5
Mill Creek (E. Sand.)	Nye Pond	Scorton Harbor Creek	1.0
Dead SwAmp Pond Creek	Solomon Pond	Cape Cod Bay	0.3

7. Groundwater Resources

"The [Town Square] well was most likely used in pre-colonial times as a source of fresh, cool water...[The water] rises from a 47-foot deep capped artesian well that taps into the Cape's vast sole source aquifer...It is considered a self-feeding well. No pumps are involved...Beer brewers have said that due to its pH level the water is very good for brewing."

- - The Sandwich Enterprise, December 24, 1998

In addition to the famous Town Square well, visited daily by hundreds of people with water jugs, Sandwich hosts many other important "springs" or groundwater discharge points, more than other Cape towns. Lawrence Hole, mentioned in deeds from the 1680s, is a spring feeding into Scorton Creek east of Talbot's Point Conservation Area. A wooden cask captures the pure flow of a spring along the walking trail at Talbot's Point. Other visited springs are found behind the Wing Family Homestead at Spring Hill and the Town Hall Annex. The Meadow Spring on the north side of Route 6A near the corner of Meadow Spring Drive was a significant "rest stop" for horseback riders in early days. The Great Spring on Ploughed Neck is by the presumed homesite of colonist Thomas Burgess.⁶² An artesian spring is located near the former office at the East Sandwich Game Farm. The Town might consider these natural attractions as part of a historical tour, as well as a fascinating and tangible way to educate citizens and visitors about the aquifer. (In addition, one freshwater seep is the niche habitat of Sandwich's most rare species of native flower, the leafy white orchis.)

In 1982 the U.S. Environmental Protection Agency designated all of Barnstable County as a Sole Source Aquifer in recognition of the region's complete reliance on groundwater as its potable water supply. Sandwich is served by the Sagamore Lens, the largest of six discrete components of the aquifer. This lens provides water for all of the Cape towns from Bourne to Yarmouth; Bass River serves as its easterly discharge point. Acknowledging that inter-town cooperation is needed to manage the quantity and quality of this aquifer, Sandwich has participated with these towns and county agencies on groundwater plans, such as the 1987 *State of the Aquifer Report* by the Cape Cod Planning and Economic Development Commission. While Sandwich's ten public supply wells draw groundwater from within its own municipal borders, all of Sandwich's neighboring towns rely on Sandwich groundwater to supply some of their wells. (See Map 4. C. 4.) Cooperative regional management of ground water quality is therefore essential. Sandwich's ground water protection overlay zoning district, for instance, helps to protect the zone of contribution to the Centerville-Osterville-Marstons Mills Water District's wellfields off Race Lane.

Of the 46 inches of precipitation that falls on the Cape in a typical year, about 16 inches reaches the water table underground to replenish or "recharge" the aquifer. The freshwater lens in Sandwich is "thick" (more than 60 feet in water table depth through most of the town) relative to Lower Cape towns, which means it can provide greater yield and has more volume to dilute potential contamination. Unfortunately,

⁶² R.A. Lovell, Jr., Sandwich: A Cape Cod Town, Sandwich Archives and Historical Center, 1984, 1996, p. 51.

Sandwich's proximity to the contamination associated with Camp Edwards military base makes it more vulnerable, not less, to ground water pollution issues. Most of Sandwich's public supply wells have long, linear zones of contribution, meaning that spills or contamination in the far south end of town can still affect supply wells at the far north of town. (See Map 4. C. 4.) Thus, aquifer protection must be considered on a townwide basis, not limited to discrete sections of certain villages.

A 1994 study by the US Geological Survey⁶³ found that only about 5.8 percent of the Sagamore Lens land area (Bourne through Yarmouth) was useful for siting new public supply wells, not including land within Camp Edwards or within the moraine, where great depths to water table and variable soils make for difficult wellfields. (See Map 4. C. 4.) A recent follow-up study^{63a}, determined that only about 6,100 acres have any potential for future water supply development in Sandwich outside of Camp Edwards. These areas are limited to portions of the Ridge District, the YMCA camps at the South Sandwich ponds, Hewlett-Packard camp, Ryder Conservation Area and within some of the existing wellfields as the most suitable spots for further exploration. There are no "frontiers" left in town for new public water supply exploration. Nevertheless, the Sandwich Water District expects to see demand increase by almost one million gallons per day over the next twenty years.⁶⁴ Recent proposals by the legislature and Governor to protect 15,000 acres of Camp Edwards as a regional water supply area and wildlife refuge may help to address the future of Sandwich's water supply. Meanwhile, open space acquisition, in addition to regulatory protection of the aquifer, should be a top priority by the Town and Water District.

The Sandwich Water District, created as an authority by the state legislature in 1947, is responsible for providing service to about three-quarters of of the town's land area. About 2,200 households rely on private domestic wells, primarily in East Sandwich. Through health regulations, the Town has enhanced the state Title 5 septic system-to-well separation of 100 feet to 150 feet for lots subdivided in the past 16 years.

(For more information, see "Sandwich Local Comprehensive Plan," Element 2.1, Water Resources, 1996.)

⁶³ Sandra L. Harris and Peter A. Steeves, US Geological Survey, "Identification of Potential Public Water-Supply Areas of the Cape Cod Aquifer, Using a Geographic Information System," Report No. 94-4156, Marlborough, Massachusetts, 1994.

^{63a} Cape Cod Commission, "Priority Land Acquisition Assessment Project: A Guide to Identifying and Evaluating the Suitability of Land for Future Water Supply Sites," April 1999 (Draft).

⁶⁴ Massachusetts Department of Environmental Management, "Water Resources of Cape Cod: Water Use, Hydrology, and Potential Changes in Ground Water Levels," October 1994, p. 42.

D. Vegetation

"...the wild, unbroken forest crowning the hill ridges which create and back the amphitheatre in which our town is set, a forest then [1620] so stately that for generations after, men on horseback shall ride through it unhindered..."

*--The Reverend N. H. Chamberlain,
on the event of the 250th Anniversary
Celebration of Sandwich and Bourne,
September 3, 1888*

May 7th, 1789: "...soon after I Came out of meeting I saw a smoak rise I imediately sat out home as I feard the fire Proceeded from where I had been burning...burnt up 20 or 30 rods of that when by the Exertions of my Neighbors it was Stopd it took to the woods it has killd a great Deal of young wood and burnt a great Deal of split wood."

*-- The Diary of Benjamin Percival,
Sandwich, 1777-1817*

1. Forest Significance

In 1620 the *Mayflower* Pilgrims described Cape Cod's lofty forests of "oaks, pines, sassafras, juniper, birch and holly."⁶⁵ Subsequent research into the pre-colonial state of the forest on Cape Cod reveals a stratified habitat.⁶⁶ At high elevations (above 100 feet) as in Sandwich, pitch pine and oaks dominated, as they do today. Oaks, beech, red maple and white pines were prevalent, in taller and better form, since they were in moister soils and in hollows and hence not as vulnerable to the intense prescribed burns set by native Americans.

By 1706 the Town of Sandwich began allotting the 20,000 acres of common woodlands of the moraine and outwash plains to the 100 resident families as private property. Many of these lots were long, narrow parcels, "since these lots ran over the moraine, they were hilly, and for fairness they were laid out in long strips so that the terrain was better shared, giving rise to the term Long Lots."⁶⁷ (See Figure 3. D. 1.) As the population developed, residents decimated the woods to build wharves, ships, houses, salt vats, fences, windmills and for the prodigious amount, by far, of firewood

⁶⁵ "Mourt's Relation", cited in Leona Rust Egan, Provincetown as a stage: Provincetown, The Provincetown Players and the Discovery of Eugene O'Neill, p. 45.

⁶⁶ L. Stanford Altpeter, "A History of the Forests of Cape Cod," [unpublished], 1939, p. 10. (On file at the Cape Cod National Seashore.)

⁶⁷ R.A. Lovell, Jr., Sandwich: A Cape Cod Town, Sandwich Archives and Historical Center, 1984, 1996, cited in Town of Sandwich, Conservation and recreation Plan, 1986, p. 39.

consumed by the colonists' open fireplaces.⁶⁸ Unchecked forest fires claimed some of the Cape's forest stands.⁶⁹

But the forests of Sandwich were so vast that even these uses and threats could not make much of a dent in the interior. That intervention was reserved for the establishment of the Sandwich Glass Works at Jarvesville in 1825. If Sandwich became renowned as "The Town that Glass Built," it could have had the side effect of producing "The Forest that Glass Clear-cut." Manufacturer Deming Jarves was attracted to Sandwich as a glass-making site, not because of its sand (which actually was inferior for glass-blowing), but because of its expansive forest so close to town. He bought 1300 acres of woodland to provide fuel for the furnaces. Though the furnaces were converted to coal in 1836, the Company continued to cut the woodlots, when coal prices were high, until the plant closed around 1900. Sheep pasturing also decimated the forests, until that was abandoned too around the turn of the last century. Finally, the forest began to regrow, punctuated by often severe wildfires throughout this century. The founding of 8300-acre Shawme-Crowell State Forest in Bourne/Sandwich in 1923 had more to do with the encouragement of a forest renaissance there than with the preservation of an existing one.

Because the opportunistic species of pitch pine and oak in the 20th century are not of millable quality, (and pitch pine is essentially ignored now as a fuelwood) the new forest of Sandwich does not face the same commercial threat that the original one did. Today, the threat to forestland is primarily from displacement by residential development. If Sandwich can be said now to be exhibiting a suburban pattern of development, perhaps the pivot point will come in the next ten years, when urbanized acreage (land used for residential, commercial, industrial, transportation and waste purposes) finally outstrips forest land. In the past 50 years, Sandwich has lost more than a third of its forested acreage, as shown in Table 4.3A.

Table 4.3A Forestland vs. Residential Acreage, Town of Sandwich⁷⁰

YEAR	FORESTED ACRES	URBANIZED ACRES
1951	15,940	2,100
1971	13,725	2,252
1980	12,459	5,922
1984	11,597	6,359

⁶⁸ "A typical New England household probably consumed as much as thirty or forty cords of firewood per year, which can best be visualized as a stack of wood four feet wide, four feet high, and three hundred feet long; obtaining such a woodpile meant cutting more than an acre of forest each year," William Cronon, Changes in the Land: Indians, Colonists, and the Ecology of New England, (Hill and Wang, NY) 1983, p. 120.

⁶⁹ Simeon L. Deyo, History of Barnstable County, Massachusetts, 1890, p. 469-70.

⁷⁰ Analysis based on statistics from William MacConnell *et al*, University of Massachusetts, Land Use Update for Cape Cod and the Islands with Area Statistics for 1951, 1971, 1980, 1984 and 1990. (For the purpose of this table 5,000 acres of forest land within the Mass. Military Reservation in Sandwich were deducted from each of the reported figures, so that the part of Sandwich under municipal administration could be analyzed.)

1990

9,175

7,973

Despite its lack of rich and varied soils, Sandwich still supports some interesting plant communities in addition to the typical pitch pine and oak (red, black, scrub, scarlet oaks) association found throughout Cape Cod. There are areas where white pine (*Pinus strobus*) predominates, such as in the Ridge District. Large red maple (*Acer rubrum*) swamps are found along Route 6A, such as east of the Fish Hatchery. Other tree species found scattered throughout town include black cherry (*Prunus serotina*), sassafras (*Sassafras albidum*), gray birch (*Betula populifolia*), and tupelo (*Nyssa sylvatica*). Stands of American beech (*Fagus grandiflora*) are magnificent at the Ryder Conservation Lands and the Lowell Holly Reservation and along pond shorelines, such as Shawme Ponds. An emerging white cedar swamp is located at the Three Town Kettleholes area on Asa Meigs Road; a relict white cedar swamp borders the railroad and cranberry bog at the intersection of Old County Road and Route 6A. A large and dense Eastern spruce plantation is found at the southwest end of Windstar Farm.

At present, the benefits of the forest to the community of Sandwich as open space, wildlife preserve, and small cordwood production remains. Because of their proximity to some of the largest residential subdivisions, these woodlands can and do play a major role in passive recreation. More than any other town on Cape Cod, Sandwich still has the opportunity to create meaningful linkages of large forest tracts. (See Map 4. E. 1.) Such tracts are critical to creating and maintaining the type of quiet "forest interior" habitat needed by our shy, breeding songbirds, such as the scarlet tanager and pine warbler of the neotropical migrants, a declining bird community in New England.⁷¹

The habitat significance of the woodlands of Sandwich primarily lies in its ability to provide migratory corridors and refuge for wildlife from the heat and openness of the beaches, marshes and the built-up environment. The recreational value of these wooded areas for humans is remarkably similar. For much of the off-season, the great recreation areas of the beaches are not as popular as one might expect because of the exacerbated cold there. Woodlands offer important shelter and relief from the bitter winds off the Bay.

A 1995 study of the eight miles of Route 6A in Sandwich found that black locust was the dominant species in the shade canopy, some of more than six feet in diameter. Sandwich's portion of Route 6A has more shade canopy than other Route 6A towns.⁷² The same study recommended vista pruning along Route 6A near Mill Creek, Scorton Creek and the Twin Ponds. Another black locust stand filters sunlight onto Route 6 near Exit 2.

⁷¹ The Compact of Cape Cod Conservation Trusts, Inc., "Cape Cod Wildlife Conservation Project," Narrative Report, 1998.

⁷² Cape Cod Commission, "Route 6A Vegetation Management Plan," August 1995, p. 17.

2. Rare Plant Communities

Sandwich's main contribution to global biodiversity, particularly in relation to plants, are its coastal plain pondshores (primarily at the Hog Ponds, but also Spectacle/Lawrence and Triangle Ponds, Snake Pond and Hoxie Pond), its pine/scrub oak barrens (northern Camp Edwards) and its sandplain grasslands (Camp Edwards and powerlines). Rare plants in Sandwich protected under the 1991 Massachusetts Endangered Species Act include those listed as Endangered, Threatened and Species of Special Concern, in descending order of rarity. State regulations prohibit the taking or habit alteration of these species without a state permit. (See Map 4. E. 1.)

Pondshore species comprise the primary rarities in Sandwich, including Plymouth gentian (*Sabatia kennedyana*), redroot (*Lachnanthes caroliana*), and thread-leaved sundew (*Drosera filiformis*).⁷³ Sandplain flax (*Linum intercursum*) and Nuttall's Milkwort (*Polygala nuttallii*) are rare plants represented in the barrens and sandplains of Sandwich. Most curiously, the only known Eastern Massachusetts site of the leafy white orchid (*Platanthera dilatata*), a Threatened orchid associated with wet seeps in alkaline soils, is in Sandwich, perhaps associated with Sandwich's prevalence of artesian springs, despite the acidic soils here. The regionally-rare bluebead lily (*Clintonia borealis*) is found at Talbot's Point Conservation Area.^{73a}

In fact, several of Sandwich's coastal plain pondshores are among the top priorities in the state for rare species habitat. (See Appendix C.) Of the seven top-ranked (B2) pond sites on Cape Cod, one small complex is in Sandwich: Upper and Lower Hog Ponds. These ponds are rated most highly in need of protection. Unfortunately, almost all of the shoreline of these two ponds is owned privately and, therefore, not protected from development. Only a thin set-aside buffer protects the ponds' eastern shorelines from the fairways of the Ridge Club golf course. Further, unfortunately, the artificial groundwater withdrawal associated with the golf course irrigation and pumping public supply wells by the Sandwich Water District near these ponds may affect the narrow niche habitat along the water's edge:

If the average water level of a pond decreases [due to pumping], the area of shore line habitat also will decrease. Therefore, careful attention should be given to the potential impacts of ground water pumping in the vicinity of these ponds, particularly those priority ponds [such as at Hog Ponds].⁷⁴

The recent acceptance of the vicinity of South Sandwich Ponds (Spectacle, Triangle and Lawrence Ponds) as a District of Critical Planning Concern (DCPC) by the Cape Cod Commission should help to protect the rare plant pondshores on these water bodies, though the Hog Ponds were not included. Among the most significant plants

⁷³ Massachusetts Natural Heritage and Endangered Species Program, 1997.

^{73a} Botanical Club of Cape Cod, Newsletter, Vol 2, No. 1, March 2000, p.3

⁷⁴ Massachusetts Department of Environmental Management, Water Resources Office, Water Resources of Cape Cod: Water Use, Hydrology, and Potential Changes in Ground Water Levels, October 1994, p. 8.

found here is New England boneset (*Eupatorium leucolepis* var.), an Endangered Species under state law.

E. Fisheries and Wildlife

January 19, 1790: "...there is an animal that infests the woods among us and kills a great many sheep at town and spring hill kills and wounds 16 or 17 in one night some think it to be a Wolfe but they Cant hunt him for want of snow."

-- The Diary of Benjamin Percival, Sandwich, 1777-1817

Barnstable County is located at the juncture of two major wildlife zones: the Virginian and the Acadian biogeographic regions. Cape Cod separates the warm Gulf Stream waters of Nantucket Sound (northern edge of the Virginian zone) from the cold Labrador Current coursing down through the Gulf of Maine into Cape Cod Bay (southern edge of the Acadian zone.) Marine species composition, from seaweed to squid to marine mammals, is different between these two sides of Sandwich. In many ways, it is the marine life of Sandwich which is more diverse and interesting than its terrestrial fauna. The Cape Cod Bay shoreline is the innermost area proposed by the National Marine Fisheries Service as critical habitat for the federally-endangered North American right whale.

The waters of Sandwich also support a wide array of pelagic birds, such as fulmars, gannets, shearwaters and alcids (guillemot, murre, razorbill) all attracted to the abundant baitfish. The Great Marshes/Scorton Creek complex is part of one of only five Cape embayments identified as important wintering areas for black ducks, a National Species of Special Emphasis.⁷⁵ Shore birds include terns (common, least and an occasional roseate) and piping plovers, all listed as protected rare species in Massachusetts. (See Table 4.4.) The Massachusetts Audubon Society's Coastal Waterbird Program notes that five of its 30 monitored nesting sites are in Sandwich. Unrestrained dogs on the beach during nesting season, unpermitted nighttime parties and a high level of predation have been problems in terms of fledgling mortality.^{75a}

While a complete inventory of birds is not available for Sandwich, other important or interesting breeding birds include osprey, northern parula warbler, pine warbler, orchard oriole, eastern bluebird, savannah sparrow, sharp-tailed sparrow, eastern meadowlark, red-tailed hawk, killdeer, woodcock, horned lark, ruby-throated hummingbird, eastern phoebe, great horned owl, willet, and mute swan.⁷⁶ Rare upland bird species include barn owl, grasshopper sparrow and upland sandpiper, the latter two species associated with the extensive grasslands at the south end of Camp Edwards. The first wild turkeys to be located on Cape Cod since the 1600s were reintroduced on the Massachusetts Military Reservation near the Coast Guard antenna

⁷⁵ U.S. Fish and Wildlife Service, Concept Plan for Preservation of Black Duck," cited in U.S. Environmental Protection Agency, "Priority Wetlands in New England," September 1987, p. 55.

^{75a} Personal communication, Mark Galkowski, Conservation Officer.

⁷⁶ Richard Veit & Wayne Petersen, Birds of Massachusetts, Massachusetts Audubon Society, 1993.

farm in Sandwich on March 7, 1989. MassWildlife released twelve hens and six tom turkeys.

An interesting sight is the regular congregation of herons (great blue, green, black-crowned night herons) roosting above the Fish Hatchery, eager to dine. Osprey, which nest on platforms erected in the Old Harbor Marsh, are also regular visitors feeding at the fish hatchery.

Table 4.4 Nesting Shorebirds, Town of Sandwich⁷⁷

Rare species found in Sandwich include the Eastern box turtle, which prefers woodlands with access to water, spotted turtles (known to inhabit cranberry bogs as well as ponds), and threatened and rare invertebrates, such as dragonflies (comet darter) and moths (water willow stem borer, barren dagger moth).⁷⁸ (See Appendix C). The Massachusetts Audubon Society is presently preparing a herpetological atlas for Massachusetts, which should be consulted for additional information.

Mammals in Sandwich include the common assemblage of adaptive species: red and gray squirrel, white-tailed deer, raccoon, red fox, rabbit, skunk, otter, opossum, shrew, muskrat, bat, weasel, woodchuck, mice and voles. In recent years, a top-of-the-food-chain predator, the eastern coyote, has extended its range throughout all of Cape Cod and is seen throughout Sandwich, particularly along salt marsh edges, where they stalk mice and voles. A documented coyote attack on a South Sandwich child in 1998 is the only one known on the Cape and perhaps one of the few in the nation; reports indicate the neighbors may have been feeding the animal.

Wildlife corridors enable animals, particularly upland mammals, to migrate to new territories in search of food or breeding grounds. Biologists estimate that undisturbed linear areas of 300 feet in width are necessary for many species to feel comfortable moving undetected through an area. Owing to the dispersal of residential development throughout the town and its continuing saturation, wildlife corridors are fewer and more narrow than perhaps they should be, except along the Ridge District. Important wildlife corridors in Sandwich run east-west along the hilly moraine and north-south in Camp Edwards. (See Map 4. E. 1.)

Sandwich has one of the most limited shellfisheries of any town on the Cape, with only eight acres of productive shellfish beds in 1979.⁷⁹ Species harvested recreationally included soft-shell clams, quahogs, sea clams, blue mussels and razor clams. In the mid-1980s, the shellfishery was closed, owing to high levels of coliform bacteria. Stormwater runoff remediation is underway to correct the non-point pollution problems along Route 6A. Cumulative stormwater discharge from the Town Neck neighborhood is another obstacle to re-opening the beds.⁸⁰ The Massachusetts Coastal Zone Management Office approved a grant in 1999 to the Town to remediate stormwater problems at Town Neck. There is some hope that parts of Scorton Creek might be opened on a seasonal basis in 1999.^{80a}

⁷⁷ Massachusetts Audubon Society (1991-1994); Division of Fisheries & Wildlife, Massachusetts Tern Recovery Project (1994)

⁷⁸ Massachusetts Natural Heritage and Endangered Species Program, Westborough MA.

⁷⁹ Marine Research, Inc., "Shellfish Management Proposals for Barnstable County, Massachusetts," 1981, p. 14.

⁸⁰ Personal communication, Mark Galkowski, Conservation Officer, February 1998.

^{80a} Town of Sandwich, Annual Report, 1998, p. 91.

(See Map 9. A. 1.)

Anadromous fish runs (species, such as alewives and blueback herring, which live in saltwater but spawn in freshwater) are a part of Sandwich's history. Through the Revolution Period, "the sale of five to seven hundred barrels of herring each year at public auction was an important part of the Town's income."⁸¹ Profits were used to pay the local militia. Household limits for personal consumption were imposed by the mid-1770s, perhaps as a result of overfishing or the rise of mills obstructing fish passage to spawning grounds, though the town was usually careful to accommodate the fish when new mills were planned. For example, the Town created a new run into Nye's Pond on Old County Road in 1769.⁸² While limited runs may still persist there and up Dock Creek into the Fish Hatchery, today the major "herring run" exists up Mill Creek to Shawme Ponds.⁸³ About 4,000 fish successfully migrated into Lower Shawme Pond in 1998.^{83a} Herring and alewives are significant as the primary forage fish for other important sport and commercial species, such as striped bass and bluefish, which enter nearshore waters. White perch and sea-run brook trout are other anadromous fish found in Sandwich streams. Catadromous fish, such as eels and elvers (juveniles) migrate from Sandwich's ponds to spawn in the Sargasso Sea and return.

F. Scenic Resources and Unique Features

Though environmental educators and activists are trying to increase public appreciation of the complex ecological relationships among soils, water, plants and animals, many people still approach the environment primarily from an aesthetic viewpoint. If it is an attractive landscape, it is valuable, according to this perspective. Fortunately, Sandwich abounds in beautiful natural scenes which are also environmentally-sensitive areas, such as pondshores, salt marshes, barrier beaches, cranberry bogs and wooded moraines.

A 1963 state survey⁸⁴ identified four areas of Sandwich as meriting priority consideration as open space: Dock and Mill Creeks (near the Boardwalk); Hoxie Pond; Scorton Creek ("one of the most outstanding scenic views in the county"); and, Spectacle Pond ("most of the attractive shoreline is undeveloped"). A more analytical 1981 state survey⁸⁵ included a small portion of the Sandy Neck dunes in Sandwich as rating a "Noteworthy" classification on a statewide basis.

⁸¹ R.A. Lovell, Jr., Sandwich: A Cape Cod Town, Sandwich Archives and Historical Center, 1984, 1996, p. 209.

⁸² R.A. Lovell, Jr., Sandwich: A Cape Cod Town, Sandwich Archives and Historical Center, 1984, 1996, p. 209.

⁸³ Personal communication, Mark Galkowski, Conservation Officer, February 1998.

^{83a} Town of Sandwich, Annual Report, 1998, p. 91.

⁸⁴ Massachusetts Department of Natural Resources, The Outdoor Recreational Resources of Barnstable County, Massachusetts: Cape Cod Planning Program, A Sector of the Massachusetts State Plan, Boston MA, 1963, p. 86.

⁸⁵ Massachusetts Department of Environmental Management, "The Massachusetts Landscape Survey," 1981, p. 114. (Only 10% of the state's land mass rated either Distinctive or the lesser Noteworthy; most towns had no land included in these rankings.)

From a regional standpoint, several areas or features of Sandwich's natural environment are still significant or outright unique. The 1986 Open Space Plan noted the archetypal importance of the moraine: "Often cited as the classic example of this type of glacial terrain, the moraine gives Sandwich more topographic relief than can be found anywhere else on Cape Cod...While awareness of the fragility and value of wetlands and coastal marshes has led to preservation of these areas, upland forests are being sacrificed to development at an alarming rate."⁸⁶ Indeed, mindful of this, all three of the Town's open space purchases in 1998 and 1999 (Cashman, Inismore, Striar) were in the morainal Ridge District, including the 525-acre Striar purchase, which staved off 75 approved house lots from reaching the market. (See Map 4. F. 1.)

Another significant ecological feature is the coastal area generally bounded by Route 6 and Cape Cod Bay. While Sandwich lacks one large central salt marsh, as found in Barnstable's Great Marsh or Yarmouth/Dennis' Chase Garden Marsh, only Wellfleet rivals it as a Cape Cod town having so many salt creeks interwoven with residentially developed areas on "necks" of upland (Town, Ploughed and Scorton Neck, Spring Hill), often surrounded on three sides by marsh. Sandwich is unique as being the only town with significant salt marsh on the *south* side of Route 6A (Mill Creek, Scorton Creek). (See Map 4. C. 1.) The point is that there is a lot of upland/coastal wetland edge in Sandwich, which fosters environmental diversity and sensitivity; that it is part of the residents' daily consciousness unlike in most towns; and that there are still large, unfragmented estates on these necks whose fates will largely determine the integrity of these low-lying historic areas. One pending subdivision proposal would manufacture 40 new house lots along this dynamic interface. In 1978 most of the Scorton Creek Marshes was designated as an Area of Critical Environmental Concern by the Massachusetts Secretary of Environmental Affairs, but this act has no bearing on local permitting of development.

Regionally significant as well is the Three Ponds area of South Sandwich. Nominated in 1999 as a District of Critical Planning Concern under the Cape Cod Commission Act, this 692-acre area encompasses the shorelines of Lawrence, Spectacle and Triangle Ponds and the three YMCA summer camps along their shores.⁸⁷ (See Map 4. F. 2.) To stand on the southwest edge of Spectacle Pond and look across the water is to summon up images of backwoods New Hampshire...or, alternatively, Cape Cod as it used to be. Nowhere else on Cape Cod is there an assemblage of large, clean, recreational ponds like this that have not either been set aside for public protection (such as at Nickerson State Park in Brewster) or fully developed with residential lots (such as Indian Lakes in Marstons Mills). The large extent of undivided woodland on the outwash plain around these ponds, protected so far by the camps, is due to come under the same pressure for development that the rest of South Sandwich has in the

⁸⁶ Sandwich Environmental Task Force, Town of Sandwich Conservation and Recreation Plan, 1986, p. 36.

⁸⁷ [deleted]

past ten years. None of the camps in Sandwich is under any kind of legal protection as open space, and Cape Cod has witnessed the demise of summer camps elsewhere as land values escalate. The juxtaposition of the 692-acre Three Ponds area along the south edge of the town-owned 1000-acre Round Hill Golf Course/Maple Swamp Conservation Area and the greater Ridge District provides the opportunity to preserve the integrity of an extensive, unfragmented moraine/outwash interface. (See Map 4. F. 3.) The potential for wildlife habitat and public recreation here has not been calculated, perhaps cannot be.

As the northern entrance or gateway to Cape Cod, Sandwich is also proud yet protective of its cultural heritage, the first glimpse many visitors have of what Cape Cod is all about. The business community heralds Sandwich Center's colonial beauty, erecting the first sign on Route 6 to invite tourists to visit the village historic district. "By strict adherence to the mandated regulations of the [Old Kings Highway Historic] District, and in large part by voluntary action, Sandwich has effectively preserved much of its historical heritage."⁸⁸

Almost half of the Massachusetts Military Reservation (MMR or, generically, Camp Edwards) is situated within the corporate limits of the Town of Sandwich, but municipal jurisdiction does not apply there. (See Map 3. A. 3.) What is unique about the MMR, is not only the size, but also the type of forest there. Pine barrens habitat--pitch pine with a scrub (not tree) oak understory--cover more than 5000 acres on the northern portion of the base, much of it in Sandwich. This is the largest intact area of barrens on the Cape and one of the largest in New England.⁸⁹ It is the last stronghold for box turtles, northern harriers, whip-poor-wills and a suite of rare moths adapted to live exclusively in barrens habitat.⁹⁰ Sandwich Selectmen support a proposal to have the northern portion of the MMR managed for wildlife and water supply protection.^{89a} (See Map 9. A. 1.)

Cranberry bogs are another important feature of the town's scenery. Solomon Hoxie planted one of the first bogs on the Cape in 1846, probably located at the east end of what is now Solomon Pond (or Dead Swamp Pond) off Cranberry Trail in East Sandwich. The 1850s and 1860s were a time of "Cranberry Fever" in Massachusetts and Sandwich's five acres of planted bogs in 1855 grew rapidly to as many as 135 acres planted by 1889.⁹¹ The still-operating Cape Cod Cranberry Growers Association was

⁸⁸ Sandwich Environmental Task Force, Town of Sandwich Conservation and Recreation Plan, 1986, p. 36.

⁸⁹ For more information about pine barrens, see The Compact of Cape Cod Conservation Trusts, Inc., "Cape Cod Wildlife Conservation Project: Narrative Report," September 28, 1998, p. 33.

⁹⁰ Citizens United for MMR Watershed & Wildlife Refuge, "A Refuge for Watershed & Wildlife Protection at the Massachusetts Military Reservation," 1999, citing the 1998 MMR Master Plan Final Report.

^{89a} Most of the northern tier of the MMR was taken from the predecessor agency to the Department of Environmental Management, which had operated it as a part of Shawme-Crowell State Forest.

⁹¹ Joseph D. Thomas, Editor, Cranberry Harvest: A History of Cranberry Growing in Massachusetts, (Spinner Publications, New Bedford MA, 1990); and, Simeon L. Deyo, History of Barnstable County, Massachusetts, 1890, p. 152.

founded in Sandwich in 1888. Throughout the nineteenth century, Sandwich consistently placed within the top six of Cape towns in cranberry acreage and/or production. "Every known variety [of cranberry] is indigenous to the soil of the Cape, from which the fruit receives an excellence so peculiarly marked as to render the Cape Cod berries the most valuable in market," said an 1890 historian.⁹²

Cranberrying altered the environment in many ways: cedar swamps and other wetlands were displaced to make working bogs, dikes were used to impound streams, adjacent banks were mined for sand, and isolated ponds were given artificial outlets and their water levels manipulated with flumes. Large cranberry bogs do not remain in Sandwich today; the largest is about 18 acres compared with 75-acre bogs still found in Falmouth or Yarmouth. Yet bogs are well-known in Sandwich because of their visibility along major roads, such as Route 6A and Spring Hill Road and the dramatic view across the Ryder Bog on Cotuit Road to Wakeby Lake, which graced the cover of the New England Telephone book in the 1980s, as an archetypal Cape Cod scene.

Today, over 100 acres are in production in Sandwich, about one-tenth of Cape Cod's total bog acreage.^{92A} (See Table 4.5). (See Map 4. E. 1.) Though official statistics are not available by town,⁹³ reliable estimates suggest that 150 barrels per acre is an average yield Capewide and wholesale (farm gate) prices, in recent years, ranged from \$22 to \$80 (an average of \$65) per barrel.⁹⁴ This indicates that the Sandwich cranberry crop can be valued at close to \$1 million wholesale in recent years. The profitability of cranberries in the 1990s, however, led to a big increase in bog creation (nationally and internationally) and renovation (including the bog next to Hoxie Pond in 1998), causing prices to plummet this year owing to oversupply. Average prices may bottom out at \$30-\$40 per barrel, cutting local bog revenues almost in half.⁹⁵ While the price situation may stabilize or improve, and the state Rivers Protection Act passed in 1996 provides a streamlined permitting process on the state and local level for renovating abandoned bog acreage back into production, it is unlikely to have much effect in Sandwich where most of the surrounding upland needed to support a bog operation has either already been developed or derives its value as potential for housing. (Federal wetlands regulations remain unchanged and stricter than state or local laws related to redevelopment of abandoned bogs.)⁹⁶

⁹² Simeon L. Deyo, History of Barnstable County, Massachusetts, 1890, p. 149.

^{92A} The Cape Cod Cranberry Growers' Association, cited in *The Cape Codder*, October 15, 1999 p. 16, reports 96 acres of cranberry production in Sandwich, 1,209 acres Capewide and 14,400 acres statewide.

⁹³ Personal communication, David Farimond, Cranberry Marketing Comm., Wareham MA, 1997.

⁹⁴ Personal communication, William Clarke, Barnstable County Extension Agent. (Resource economists use a factor of four for the multiplier effect for cranberry harvests.) Also, Cape Cod Cranberry Growers' Association says Ocean Spray growers receive an average of \$65 per barrel, while other growers receive an average of \$80 per barrel.

⁹⁵ "Red berries, red ink: The bottom drops out of the cranberry barrel," *The Cape Codder*, April 2, 1999, p. 1. (Ocean Spray paid an average of \$55 per barrel in 1998, but only \$42 in 1999. *Cape Cod Times*, September 22, 1999, P. A6.)

⁹⁶ Cape Cod Times, "Bogged Down: Federal rules stymie reclamation of abandoned bogs," January 4, 1997, p. E-4.

G. Environmental Problems

Many of the environmental challenges which Sandwich faces are a direct result of its development pace and pattern over past three hundred years. As described in earlier chapters, the biggest, persistent problems are environmental and public health issues related to wastewater disposal. Despite its high density, which typically is a favorable factor for installing sewers, Sandwich continues to rely solely on on-site septic systems. Though most of the town's soils are highly permeable, there are still failed systems due to overloading, particularly during the summer. *Because* the soils are highly permeable, nitrates and viruses are readily transmitted off-site to surface waters, particularly ponds and streams, and ground water. There is insufficient depth to ground water on many lots, leading to the design of "mounded" systems, which can be aesthetically displeasing to many people as well as enabling development to go where it otherwise should not. Though the town has made great strides in protecting ground water through regulation, the potential for continued degradation of the town's most important natural assets, its waters, will remain.

As one of the nation's "poster children" for ground water contamination associated with military base operations, Sandwich residents do not have to be reminded about the connection between leachate plumes and ground water quality (the Weeks Pond wellfield has already been closed). What is new in recent years is the possibility that plumes emanating from the base (and the J. Braden Thompson Farm) may also affect pond waters and fish health as well, particularly in Mashpee-Wakeby Pond.⁹⁷ Over the past ten years, about \$200 million have been spent studying the base contamination and clean-up efforts have begun, but have a long way to go.

The use of the navigable waterways is another problem. Space conflicts, lack of adequate shorefront access, inadequate dockage/mooring supply, and commercial versus recreational disputes all need to be addressed in addition to water quality problems. An adopted speed limit for motorboats is largely unenforceable, owing to lack of available patrol.⁹⁸ A stormwater improvement committee has secured remediation for road runoff problems along Route 6A, but there has been no implementation. Shellfish beds may continued to remain closed for the foreseeable future.

Another issue relates to the impact of continued development on biodiversity and open space availability in general, since there is no local mechanism for requiring dedication or set-aside of open space to match the amount of lots being developed. Relative to other Cape towns, there are more (25) parcels capable of holding subdivisions, which would fall under the purview of the Cape Cod Commission as Developments of Regional Impact (DRIs). (See Table 3.1.) Residential DRIs must typically dedicate 60 percent of the parcel to open space use; commercial DRIs, 40

⁹⁷ Sandwich Local Comprehensive Plan, Water Resources Element, April 1996, p. WR-11.

⁹⁸ Personal communication, Mark Galkowski, Sandwich Conservation Officer, 1998.

percent. Perhaps with the approval of the town Local Comprehensive Plan, development agreements for subdivisions of any size can be instituted.

Resource management problems include illegal trash dumping in conservation areas; unauthorized off-road vehicle use in conservation areas; vandalism of open space facilities, particularly gates, signs and structures; lack of staff and volunteer supervision; and, providing better access and parking facilities to coastal recreation areas, particularly Scorton Neck.

SECTION 5 INVENTORY OF CONSERVATION AND RECREATION LANDS

A. Introduction

In 1991 the Cape Cod Commission proposed a regional open space greenbelt system throughout Barnstable County, whose purposes is to "link existing protected open space and sensitive resources including wildlife habitat, wetlands, and zones of contribution to public wells to establish a regional network of connected open space."⁹⁹ Towns were asked to refine this greenbelt as it falls within their borders, as they develop local comprehensive plans. In Sandwich, the Commission proposed including the Bay marshes, the Ridge District, the Three Ponds area of South Sandwich, Scusset Beach and marshes, and the north end of the MMR in the greenbelt

Though Sandwich was active in the 1970s and mid-1980s acquiring large tracts of town conservation lands, from 1987 until 1998 (the period of time, perhaps coincidentally, elapsed since the preparation of the last town open space plan) this activity was essentially dormant. Almost 80% respondents to the Town's 1997 opinion survey said that the Town had failed to implement the 1986 open space plan. Why? The late 1980s recession undoubtedly stalled the progress the Town was making in acquiring new lands; and the early 1990s was a time for the Town to play "catch-up" in providing the expensive infrastructure associated with rampant development of the '80s boom. There was no money left over for perceived non-necessities, such as open space acquisition. What the 1998 referendum vote on the land bank (adopted in every Cape Cod town) proved, however, was that, when asked, people are willing to pay for such perceived non-necessities. In fact, perhaps, Sandwich failed in the last decade to protect more open space because the question was not posed to financially exhausted taxpayers coming out of the last recession. But now the debate is over: large majorities agree that more open space is urgently needed and the townspeople are willing to pay for it.

During the period of this plan preparation (1998-99), a new "open space golden age" may indeed be forming. Several opportunities were grasped almost simultaneously. In 1998 the Town received a \$50,000 grant from Barnstable County's Cape Cod Pathways program to acquire the 1.5-acre Inismore subdivision lot near the entrance to the Maple Swamp Conservation Area, in order to preserve the existing trail there. The Town also negotiated a successful bargain purchase of the 5-acre Cashman parcel, an inholding in the Ridge District. The Sandwich Adventure Playground opened at the Oak Ridge School. And, most dramatically, in April 1999, Town Meeting voted to acquire the 525-acre Striar properties (accounting for fully 2% of the town's land mass!) in the Ridge, including the Round Hill Golf Club, as town conservation and recreation land. (See Map 4. F. 1.) The Town's approval of the Cape Cod Land Bank legislation in 1998 may help to ensure that this renewed open space momentum is sustained. In May 1999 the Town Meeting acquired its second land bank property, 5.4 acres at the Murkwood trailhead for \$183,000. And the redevelopment of Stop & Shop may result in the donation of much of the historic Roberti dairy farm to the Town; the

⁹⁹ Cape Cod Commission, Regional Policy Plan Atlas, 1991.

farm was named one of the ten "most endangered historic resources" in Massachusetts in 1999, by Historic Massachusetts, Inc.

B. Public Lands and Facilities (See Map 5.1)

"Sandwich has no town holding of any kind for a place of public resort. The Sandwich Glass Company had a small common near the glass-works, with large trees and seats for the operatives. It was a pleasant and valuable resting place for them, but the company has gone out of business and the common is uncared for.

--J.B. Harrison, 1892¹⁰⁰

With almost 3,000 acres under its control, the Town of Sandwich is the largest landowner in Sandwich. (See Table 5.1.) A large percentage of these lands is devoted to conservation (over 2,000 acres), though a significant portion of this acreage is unbuildable wetland. Another major portion of protected open space (395 acres) consists of large blocks of woodland held by the quasi-public Sandwich Water District for public water supply wells and wellfield protection. As a community, then, Sandwich has made a strong commitment to the setting aside of lands for public use and natural resource protection. By comparison, however, Yarmouth, its more urbanized neighbor, has protected a greater proportion of its township. Of Yarmouth's 15,443 acres, 17 percent is devoted to town conservation and wellfield lands. In Sandwich, 14 percent of its 18,914 acres is set aside for town conservation and water district lands. (See Table 5.1.)

A combination of factors --historical, geographical and political-- has resulted, however, in a less than perfect distribution of these lands. Wellfields, for example, were purchased outside of the morainal Ridge District, owing to hydrogeological necessity. Conservation areas were assembled where land was unquestionably unique (Ryder; Talbot's Point; Briar Patch) or was probably unbuildable, primarily due to wetland soils (Murkwood; Spring Hill) or where there was a lack of access for development (The Ridge). This opportunistic pattern, repeated through many Cape Cod towns, reveals the *ad hoc* decisionmaking by local officials in the past (which has left Forestdale without significant accessible conservation land, for example), which an open space and recreation action plan and professional guidance, by the town's planning department, can perhaps remedy for the future. The studies that led to the 1986 Sandwich *Open Space and Recreation Plan*, for instance, laid the framework for the municipal land purchases of the 1980s, that were scattered throughout town to benefit each village. Between the years 1985-88, the Town purchased 264 acres for assorted open space uses, including additions to the Maple Swamp and Boyden Farm.¹⁰¹

The most popular town conservation areas, in terms of frequent use, are the Ryder Conservation Lands, particularly the western portion along Wakeby Pond; the Maple Swamp; the Briar Patch, the Blueberry Patch (in picking season!) and the marshes

¹⁰⁰ J.B. Harrison, "A Report upon the Public Holdings of the Shore Towns of Massachusetts," in First Annual Report of The Trustees of Public Reservations, 1891, (Boston MA, 1892), p. 41.

¹⁰¹ The Compact of Cape Cod Conservation Trusts, Inc., unpublished data, 1990.

along the Boardwalk over Mill Creek (see Map 5.1.) The Conservation Commission is responsible for (and budgeted for) day-to-day management of all town conservation areas. Uses of conservation lands include passive recreation, such as walking, nature study, picnicking and photography.

The Commonwealth of Massachusetts as a landowner is represented in Sandwich in many ways. It owns the 9500 acres in Sandwich that is part of the Massachusetts Military Reservation, managed by the Military Reservations Commission. (See Map 3. A. 3.) The northern third of the base was appropriated out of Shawme-Crowell State Forest in the 1930s, to which it might revert if the current proposal to convert the northern part of the base to a water supply and wildlife refuge becomes a reality.^{101a} Shawme-Crowell State Forest presently comprises 406 acres in Sandwich, plus some in Bourne) primarily along the north side of Route 6 and is a very popular public camping grounds for three seasons of the year (though it is open year round). The State Forest was further truncated when a state highway barn was built on Route 130 in the 1950s and the Town was granted a lease to create a landfill across the street. The Department of Environmental Management (DEM), which operates Shawme-Crowell, also runs the 388-acre Scusset State Beach, another popular trailer camping and fishing site, at the north end of the Cape Cod Canal. DEM also owns a 21-acre reforestation plot abutting the former State Game Farm.

Sandwich has been an important host to several wildlife farming programs of state Division of Fisheries and Wildlife (DFW) in this century. The 135-acre Game Farm along Scorton Creek was closed in 1987, but previously provided pheasant and quail stocking for southeastern Massachusetts. Today it is leased and is being renovated by volunteers under the direction of the Thornton Burgess Society (TBS), for use as a nature classroom and passive recreation site. TBS will produce a comprehensive management plan for the site in 1999, including a proposal for a walking/canoe trail from Talbot's Point to Murkwood Conservation Areas. (See Map 9.A. 1.)

Abutting the Game Farm is a 20-acre site on Old County Road, formerly used as a supplemental trout hatchery, closed in the 1990s, which also provided coho salmon stock. But DFW's gem in Sandwich is still the main Trout Hatchery on 35 acres on Route 6A near the Center. One of only four state hatcheries in Massachusetts, it is the only one that provides a brood stock of trout: brown trout, sea-run brown and sea-run brook trout. Over 70,000 pounds of trout were produced in recent years here, for stocking all over the state.¹⁰² A public picnic grounds is provided at the hatchery.

DFW also owns scattered sites in the south part of town, most importantly 95 acres at the southwestern side of the South Sandwich Business District. Sporadic attempts to persuade DFW officials to consider swapping its land here for town land

^{101a} Governor Paul Celluci announced his intention to transfer the management of the 15,000 acres to environmental agencies under his Administration in August 1999.

¹⁰² Boating Magazine, "Breeding Program is Sandwich Hatchery's Mark of Distinction," Spring 1998, p. 3.

elsewhere, which undoubtedly would have more wildlife value at this point, have failed, owing to the state's reluctance to part with title to hard-won conservation sites.

MassHighways (formerly the Massachusetts Highway Department) is primarily represented by its Route 6 right of way, running through town as a double-barrelled, limited access highway from Bourne to the Barnstable line, along some of the highest points of the moraine. A highway rest area is located at the north side of Telegraph Hill on Route 6 westbound, undoubtedly situated to benefit from the sweeping vista across the Bay from here when the highway was built in the 1950s. Unfortunately, the intervening trees have matured in the past 50 years, obscuring the view.¹⁰³ The Town might encourage MassHighways to restore the view with judicious tree-trimming. (See Map 9. A. 1.) The Route 6 right of way varies in width, but averages 300 feet, though the actual road bed rarely exceeds 100 feet wide. The wide shoulders, therefore, otherwise provide a natural greenbelt to the highway.

The federal government is represented in Sandwich's outdoor recreation by the Cape Cod Canal, perhaps the most popular year-round outing site in town. The bike path along both banks of the Canal are regularly used by bikers, fishermen, walkers, baby-strollers, rollerbladers, joggers, and even remote-controlled toy vehicles! Formally known as the Sandcatcher Recreational Area, this 29-acre linear park, controlled by the Army Corps, ends at the south jetty of the Canal, abutting the 32-acre beach and maritime forest owned by Southern Energy.

The town owns other properties for general municipal purposes which are used *de facto* for conservation and recreation. Some of these "undesignated use" parcels, under the control of the Selectmen, could be formally transferred to the Conservation Commission for increased statutory protection and augmentation of existing conservation areas. For instance, the town highway barn on Route 130 occupies a small part of a 16-acre parcel, the northern half of which is a wooded slope declining to a vernal pool, a significant habitat.

See Appendix A for complete lists of town-owned open space lands by assessors' map, by village, by facility and by manager.

C. **Private Open Space Lands and Facilities** (See Map 5.1.)

Augmenting the 4,493 acres of publicly-owned (town state, federal, water district) open space lands are approximately 1,424 acres of land with varying degrees of legal protection against development. (See Tables 5.3, 5.3A.) Several non-profit organizations own grounds in Sandwich, often enhancing the value of abutting public lands, such as the 75 acres of the Lowell Holly Reservation owned by The Trustees of Reservations alongside the Town's Ryder Conservation lands. (Most visitors, in fact, probably assume it is all of a piece anyway, since the trails often merge.) The Massachusetts Audubon Society owns 81 acres along the southeast side of Triangle Pond, preserving water quality in the pond and also in the nearby Water District

¹⁰³ Similarly, a great view of Sandy Neck and Lake Wequaquet from Shoot Flying Hill on Route 6 has been obscured in Barnstable.

wellfields. (See Map 4. F. 2.) The Thornton Burgess Society's property abuts the Town's Briar Patch and provides the public with parking and environmental education and property monitoring. The 94 acres of Heritage Plantation, which includes at least 36 acres of still vacant woodland, augments the adjacent Shawme-Crowell State Forest.

The Sandwich Conservation Trust (DCT) was founded in 1985 to provide a private, non-profit vehicle to dedicate natural lands to conservation in town. In its first 14 years, SCT has protected 15 parcels of land totalling 102 acres (all but 24 acres are upland). All were donated in fee (outright gifts of land title) with the exception of three conservation restriction properties. The most significant acquisition was donated by Gifford Foster in 1994 to forestall the development of a proposed Costco retail warehouse in the industrial zone. Public access is allowed on lands held in fee by SCT, though it is not actively promoted. (See Table 5.3A).

There are 11 acres of private cemeteries at five sites in town, in addition to the 73 acres of town cemeteries. The public is allowed to walk at all cemeteries and the old ones help visitors to gain a sense of Sandwich's long history. (See Table 5.3.)

Institutional lands (particularly summer camps) in Sandwich are of conservation interest because of their size, strategic location alongside several Great Ponds and vulnerability to development. There are 635 acres of summer youth camps and 207 acres of commercial campgrounds in Sandwich, more than in any other Cape Cod town. These camps control almost half of the 11.4 miles of total shoreline of the following Forestdale / South Sandwich ponds: Snake, Peters, Lawrence, Triangle, and Spectacle Ponds. (See Table 4.4A.) The fate of summer camps in the past 20 years on Cape Cod has not been benign; insurance costs and the high value of their real estate puts enormous pressures on them to close and be sold for residential development.¹⁰⁴ The Town has acted to try to steer the ultimate destiny of the the South Sandwich ponds by proposing a District of Critical Planning Concern around their shores in 1999. (See Map 4. F. 2.)

There are a variety of unprotected commercial open space facilities in town. Most private cranberry bogs and several small farms are presently enrolled under the MGL chapter 61A current use assessment programs, which defer property taxes while the land is not developed.⁹⁹ (See Table 7.2A). Two private golf courses, Ridge Club and Holly Ridge, comprise 233 acres, are not enrolled in chapter 61B. (See Table 5.4.)

There are more than a dozen open space or "cluster" subdivisions in Sandwich, in which a common area of at least 30 percent of the parcel's area is provided for neighborhood use.¹⁰⁵ These open areas may be comprised of either undeveloped land or active recreational sites, with some as large as 40 acres (Torrey beach), though most are smaller. (See Table 5.4.) Most of these cluster subdivisions are located in the parts

¹⁰⁴ (The private Ridge Club has had interest in developing an additional 18 holes on 400 acres leased from the Y camps)

⁹⁹ Mass. c. 61 allows town to lower the assessment on 10-acre+ parcels of managed timberland; no parcels in Sandwich are enrolled in this tax deferral program.

¹⁰⁵ Sandwich Cluster Development Special Permit Bylaw, 1975, revised 1997.

of town (East Sandwich and South Sandwich) where larger, more recent subdivisions were built. There are also smaller park lots reserved for subdivision use. None are open to the general public unless specifically allowed by the owners. The provision of neighborhood open space / play lots was frequently mentioned as a desire at public hearings associated with this plan, though concerns over who would or should pay to provide them and maintain them (town or neighbors?) lingered.

Listed on Table 3.1 are the 28 largest parcels of contiguous, developable, unprotected land remaining in Sandwich, totaling about 1,950 acres. The fate of these parcels represents the last opportunity for Sandwich to preserve significant blocks of open space. Many of them are strategically located to expand existing conservation areas or serve as the only remaining undeveloped land, or breathing space near densely-built neighborhoods. Most of them are large enough to trigger the permitting authority of the Cape Cod Commission, since they exceed the Commission's 30-acre minimum threshold for review as Developments of Regional Impact, such as the pending 40-lot Norse Pines subdivision on Route 6A. Despite its accelerated growth in the past 20 years, Sandwich still has more large unsubdivided parcels than probably any other Cape Cod town. The advantage of this phenomenon is that there is more regulatory power and opportunity to see that they are developed according to better land use design principles than smaller parcels are often subject to. The problem is that it also means that Sandwich's ultimate build-out future is hostage to the fate of these large potential developments.

D. Recreational Facilities

1) Public Recreation Facilities

The primary active recreational facilities are on school grounds and controlled by the School Department, but frequently "shared" with the Recreation Department. Since the 1986 *Conservation and Recreation Plan* was prepared, the Town has developed several new play areas to accommodate the town's growing population. Two new elementary schools (Oak Ridge and Forestdale) were built in the late 1980s, so now school fields are adequately dispersed around town, where previously only school fields were available north of the Mid-Cape Highway. Three new play fields were also constructed on Water District land in South Sandwich in 1997, so every village except Sagamore Beach has a proximate play field. The boathouse and bathhouse at Ryder Beach were reopened for use in 1990.

Also notable was the set-aside of 10+ acres by the Selectmen in 1999 for direct control by the Recreation Committee at the former Quirk property in the South Sandwich Business District. For the first time, the Recreation Department has its own facilities, rather than sharing space with the schools. Volunteers completed a Pop Warner football field there in 1997 and a small Recreation Community Center building was made out of an old building for classes and programs. A fitness trail, horseshoe pits, volleyball court and community gardens have been installed outside; a skateboard park is being planned. (See Map 9. A. 1.) In 1998 volunteers helped to build the newest tot lot, the Sandwich Adventure Playground (still unfinished) on Quaker

Meetinghouse Road, which has become very popular as a meeting place for parents of small children, as well as for the children themselves. The Recreation Department also controls four tennis courts and one outdoor basketball court on the Wing School grounds.¹⁰⁶

Water-based recreation includes swimming lessons and sailing lessons at Wakeby Pond. The primary saltwater beach, operated by the town, is the 20-acre Town Neck / Boardwalk Beach. A small boat basin inside the Canal is heavily used by recreational small craft in summer.

Other town facilities used for recreation include the Human Services Building and school gyms. Sandwich is unique on Cape Cod in having a year-round indoor swimming pool in its high school, which is open to not only students, but also to the general public on a fee basis.

In 1999 the Town purchased the 18-hole Round Hill Country Club (now, renamed Sandwich Hollow) as a town facility. (See Map 4. F. 1.) Besides offering golf in season, it is the most challenging cross-country ski site on Cape Cod, with very long, steep slopes down the moraine. The purchase of this existing course precludes the need for further discussion of the town building its own course, as had been bruited about previously, at least until population growth and demand requires it.

2) Private Recreation Facilities

Augmenting town recreation lands and facilities are a few private, commercial enterprises. There are private camping facilities at the Hewlett-Packard Recreational Facility, Peters Pond Park and the Dun-Roamin' Trailer Park. Sandwich Center hosts a small, seasonal mini-golf. Holly Ridge in South Sandwich is the golf course open to the public besides the town-owned Sandwich Hollow club; both have public driving ranges. The Sportsite Health and Racquet Club was established in 1988 in South Sandwich as an indoor fitness center open to the public. Cape Cod Bike Rental is located near the Bourne line on Route 6A. In general, for a town its size, however, Sandwich is clearly lacking in active recreational opportunities more than most other communities on the Cape. It is beginning to catch up, but is still far behind. Some things it cannot change; it cannot create significant new public saltwater beaches. Some things it can change: it could provide a freshwater swim beach at a South Sandwich pond.

3) Special Recreational Features

a) Cape Cod Pathways

Sandwich's Board of Selectmen has endorsed the concept of Cape Cod Pathways, a countywide effort to create a Cape network of linked walking trails, primarily using existing trails and public open space. The Sandwich Planning Department cooperated with the Mashpee Planning Department and the Cape Cod Commission in 1995 to design a suggested north-south linked route through South and East Sandwich.¹⁰⁷ (See

¹⁰⁶ Personal communication, Robin Jenkins, Recreation Director, 1999.

¹⁰⁷ Abellire, Inc. "Feasibility Report for the Cross Cape Trail Connecting Sandy Neck to South Cape Beach Across Upper Cape Cod, Massachusetts," 1995.

Map 5. D. 1.) Cooperation among various town departments, primarily Conservation and Selectmen, Sandwich Water District and some private landowners, (particularly the summer camps), all of which have jurisdiction over key components of a Pathway system, will be needed. In December 1997 the Barnstable County Assembly of Delegates appropriated \$500,000 to assist towns in 1998 wishing to purchase land interests for Pathways use.¹⁰⁸ The Town of Sandwich successfully secured a \$50,000 county grant from this source to acquire the Inismore lot at the Maple Swamp trailhead. In 1999 the Cape Cod Commission is seeking towns' interest in conducting more trail planning with county funds.

In terms of internal loop trails on public land, Sandwich has done better than most towns, having about 17 miles of authorized walking/hiking trails within its existing conservation lands. (See Table 5.6) The almost unanimous affirmative response (92 percent) to the 1997 survey question "Do you know where some of the existing conservation areas are in town?" (Q.9) suggests that the walking trails popularity must be either the cause or effect of this response. A 1991 trails map published by the Sandwich Environmental Task Force and Conservation Department has helped people find the trails. Still, more hiking trails were a high priority for the 1997 survey respondents (Q.14).

Table 5.6 Authorized Hiking/Nature Trails, Town of Sandwich, 1999¹⁰⁹

<u>Site</u>	<u>Village</u>	<u>Miles</u>
Brady's Island	SC	0.18
Briar Patch	SC	2.03
Talbot's Point	ES	1.72
Murkwood	ES	0.87
Boyden Farm	SS	1.01
Ryder Lands: Pond	SS	3.66 (not including extension into Lowell Holly)
Ryder Lands: East	SS	2.46
Maple Swamp	RD	<u>4-5</u> (approximate)
		TOTAL 17 ±

b) Bike Trails

"A bikeway for Sandwich has been a long standing issue for the community. Most people biking through the community prefer to travel along Route 6A. The scenic nature of this route, as well as the easy access that it offers to the many conservation and marshland areas in East Sandwich and the Village, makes it very appealing. However, a direct user conflict occurs between the narrow shoulders and winding nature of Route 6A and the high auto traffic levels that occur on this road."¹¹⁰ A 1995 report on Route 6A by the Cape Cod Commission found that, "A bicycle path running

¹⁰⁸ Barnstable County Commissioners, "Request for Proposals - Cape Cod Pathways," February 6, 1998.

¹⁰⁹ Sandwich Conservation Department, and original research, The Compact of Cape Cod Conservation Trusts, Inc., 1998. (The Sandwich Conservation Department reports that there are 26 miles of trails, roads and parking lots under its management.)

¹¹⁰ Sandwich Local Comprehensive Plan, April 1996, Open Space and Recreation Element, p. OSR-9.

parallel to the roadway [Route 6A] is not recommended due to the high number of residential curb cuts and, in certain areas, constraints and impacts on existing [natural and cultural] resources."¹¹¹ Nevertheless, Route 6A is still used by long-distance riders and for several sanctioned bicycle races, such as the Boston to Provincetown Challenge.

An idea for a bike path along the railroad bed through town was abandoned since the bed is still in active, though less frequent, use. The recent repaving of the Service Road, which parallels the Mid-Cape Highway, would enable the town to promote it as a safer alternative through-route, but the Selectmen have informed MassHighway of their opposition, owing to resident complaints. The Service Road is currently listed, as are Main Street and Water Street through the historic Center, as part of a recommended long-distance bike trail on regional bike maps.¹¹²

The only separate, dedicated bike paths in Sandwich are 1.8 miles (total) of paved paths along either side of the Canal. These very popular public paths, on federal land, are continuous with an additional seven miles on each side through Bourne.

E. Recreational Programs

The philosophy of the Sandwich Recreation Department, established in 1973, is to provide recreational activities to the residents of Sandwich for the least possible cost and provide leadership in promoting a sense of town spirit and unity."¹¹³ The town Recreation Department, a full-time Director and seasonal staff overseen by an appointed committee of volunteers, provides offerings for residents and visitors throughout the year. The most popular youth programs, in terms of number of participants, are soccer, baseball, and boys' and girls' basketball. Other youth offerings include sailing and swimming lessons at Wakeby Pond, skating lessons at Gallo Arena in nearby Bourne, holiday events, playground programs, softball, tennis, and cheerleading. Adult activities include basketball, softball, and volleyball. Senior citizens are active in walking, exercise and tennis, as well as a men's group.

The Recreation Department (and, overwhelmingly, survey respondents) feel that the lack of a large, centralized indoor facilities, i.e. gymnasium, such as those found in Falmouth's Canty Recreation Center, severely hampers the continued growth of offerings and size of programs.

¹¹¹ Cape Cod Commission, "Old Kings Highway/Route 6A: Corridor Management Plan," April 1995, p. 115.

¹¹² Rubel Bike Maps, "Cape Cod & Islands & North Shore Bicycle and Road Map," 1998.

¹¹³ Sandwich Local Comprehensive Plan, April 1996, Open Space and Recreation Element, p. OSR-10.

SECTION 6. COMMUNITY GOALS

A. Description of Process

In order to determine what the people of Sandwich want with respect to conservation, recreation and open space in their town, the Town of Sandwich conducted a survey in 1997 which asked residents how they felt about acquiring additional open space and what improvements they felt were needed at open space and recreation lands and in programs. Questions were asked about what residents liked and disliked most about the town to get information about how residents perceive Sandwich now and what the focus of long range planning should be.

The sample surveys and the tabulation of the responses is found in Appendix B.

In general, the surveys found that the respondents seemed generally unsatisfied with the town's progress on open space and recreation issues between 1986 and 1997. Almost 80 percent of 250 survey respondents said the town had not adequately addressed these problems (Question 18.) Interestingly, the survey was completed prior to many of the conservation and recreation achievements of the past two years: playfields construction, land bank passage, Ridge acquisitions. Clearly, there is feeling in 1999 that things are looking up.

B. Statement of Open Space and Recreation Goals

The uniqueness of Sandwich lies in its large areas of protected open space, used passively and actively, despite being, overall, one of Cape Cod's most rapidly developing towns. One could argue that it was because of Sandwich's intensely felt development pressures over the years that led to the strong citizen support to set aside parcels against that development, from 1967 to 1986. One need only wander in the maze of small-lot residential streets of Lakewood Hills or Town Neck to appreciate how important "breathing space" can be to a Sandwich resident. It can still be found at the major beaches, but also in the preserved woodlands of the interior.

Sandwich's challenge is to preserve the natural and recreational qualities which make it unique, while promoting these features appropriately to attract tourism and bolster the economy. It is very clear that providing recreational opportunities for its citizens and visitors is more than a matter of placing saltwater beach maps in the hands of all. The ability to provide pocket parks of open space in dense subdivisions is important; after all, this is where most of the people are. East Sandwich still needs some active facilities placed in its domain. There are opportunities to bring open space to the people, by way of Pathways and bike trails, instead of sending people off to find the open space. Sandwich must also seize the day and integrate its assemblage of open spaces into a community vision, such as envisioned by the Pathways project, while tending to individual village needs.

SECTION 7 ANALYSIS OF NEEDS

A. Resource Lands Protection Needs

The 1997 town survey found that there was broad support for acquiring more open space for conservation (82 percent support). While the fate of large blocks of undeveloped land in Sandwich will continue to be important, the town's focus, might be to seize opportunities in the margins; that is, to enhance the value and utility of existing landholdings by acquiring or otherwise protecting smaller adjacent parcels, linkage or trailhead/access properties. Opportunities to acquire additional beachfront, now largely developed, may present themselves after the next vicious hurricane when landowners might be paid not to rebuild, as Falmouth did on its Surf Drive in 1992 after Hurricane Bob, and Dennis did after the 1944 hurricane flattened the Southside beaches.¹¹⁴ Additional access to water bodies, particularly inland ponds, should be pursued. The town should also stay alert to changes proposed in lands which are quasi-protected now by temporary restrictions, such as current use assessment lands, term conservation restrictions and camp lands.

The focus of land acquisition for conservation purposes will continue to be the set aside of land in order to preserve water quality (surface and ground waters), provide unfragmented wildlife habitat, and protect rural character.¹¹⁵ The continued integrity of regionally-unique land areas, mentioned in Section 4.F above (MMR, Ridge District, South Sandwich Ponds, salt marsh/upland necks, and farms), will provide the resource base to protect these qualities.

The fiscal constraints of the 1990s may require more innovative approaches to preserving open space and natural resources. Some of these techniques have been applied in Sandwich, but perhaps not emphasized. Better education of town officials, landowners, and citizenry about these alternatives may lead to improved implementation.

As part of the implementation of the Cape Cod Land Bank program, approved by Sandwich voters in 1998, the Selectmen have appointed a land bank committee to recommend parcels for acquisition by town meeting. Sandwich will raise over \$726,000 each year for 20 years through its 3% land bank surcharge tax. For the years 2000 - 2003, the state will automatically supply Sandwich with a 50 percent matching grant for the locally-raised amount, until a \$15 million regional appropriation for the region is exhausted. Over four years, then, Sandwich should realize \$1.37 million from this state matching grant.¹¹⁶ Sandwich will also be eligible for state Self Help reimbursement grants, as much as \$500,000 for an eligible property, which will further leverage local dollars for open space buys. Still, with land values so expensive, these dollars will not

¹¹⁴ Nancy Thacher Reid, Dennis, Cape Cod: From Firstcomers to Newcomers 1639-1993, Dennis Historical Society, 1996, p. 688.

¹¹⁵ Consensus of Sandwich attendees at public meeting on Cape Cod Regional Open Space Plan, February 11, 1999, Forestdale School.

¹¹⁶ Analysis by The Compact of Cape Cod Conservation Trusts, Inc.

do the job alone. Townspeople must manage their expectations of just how much the land bank monies can do. It will take over five years, for instance, for the Town to pay off its first land bank purchase, the 75-lot Striar subdivision for \$5.5 million, including the use of the state's 50% match.

Land is the resource base for many natural features, including water quality. Land can be preserved through regulatory or non-regulatory means. Regulatory means include mandatory cluster subdivisions, open space set-asides, and minimum lot size increases. Non-regulatory methods to preserve crucial resource lands in Sandwich include the following approaches:

Fee acquisition (conveying full title to land)

- *Donation: immediate or installment: to Town or Sandwich Conservation Trust
- *Purchase: friendly sale, eminent domain, bargain sale, installment sale
- *Bequest
- *Tax title transfer

Less-than fee protection (conveying partial rights to property)

- * Access easement
- * Conservation restrictions
- * Lease
- * Remainder interest/reserved life estate
- * Option/rights of first refusal
- * Tax-deferral programs: MGL 61, 61A, 61B
- * Differential assessment program: Special Act 797 of 1979

To determine which protection technique is best suited to each target parcel, the following set of circumstances should be evaluated:

1) Needs of the community

- * Is the parcel desirable for access and active use, or resource protection and passive use?
- * Are acquisition funds available (cash donations, town appropriation, outside grants?)
- * Is the parcel needed immediately or in the future?

2) Needs of the landowner

- * Are income tax or property tax advantages, or cash most important for landowner's financial situation?
- * Is continued privacy an issue?
- * Is the landowner sympathetic to public protection?

3) Size and value of parcel

- * Is the parcel large enough to protect what needs protection or serve as a linkage?
- * Is the entire parcel needed or only a portion?

4) Development pressures

- * Will the parcel likely be available later if not acquired now?
- * Is the real estate market likely to push prices beyond reach or is market declining for the foreseeable future?
- * Can the Town relieve land development pressure through advantageous tax policy?

5) Maintenance

- * Can the community manage the property better than current landowner, given expected levels and types of use?
- * Does the Town have the money and expertise to manage the parcel?

In general, it is recommended that parcels proposed for active use, such as parks, swimming beaches or boating facilities, be publicly owned for liability reasons. Resource protection uses, such as aquifer protection or trail easements, may not require public ownership.

B. Catalogue of Non-Regulatory Methods of Open Space Preservation**1) Fee Acquisition****a) Donation (outright gift of land)**

The landowner gives the entire interest in a property (fee simple title) to the Town or charitable conservation organization, such as the Sandwich Conservation Trust. The donor is relieved of future property taxes because ownership is relinquished. The donor may receive income tax deductions amounting to the appraised fair market value of the land.

The landowner may impose use restrictions on the deed, such as prohibiting motor vehicles, though these limitations may reduce the value of the gift. The landowner may also donate parts of the property in different years or donate undivided interests in the entire property over successive years, in order to maximize income tax benefits.

Land donations are the easiest, quickest and, obviously, cheapest land acquisition methods for the community. A title exam and hazardous waste survey should be conducted prior to conveyance. Deeds specifying conservation use should read, "to be managed under the authority of MGL Chapter 40, section 8C," to ensure the land cannot be devoted to other municipal use. Land donations are subject to Town Meeting approval, or Selectmen approval if accepted by the Conservation Commission. Gifts of land to the Sandwich Conservation Trust do not require municipal approval. Significant lands have been given to the Town in recent years include the 23-acre Cummings subdivision at Forestdale.

b) Purchase

If funds are available, and the landowner cannot or will not donate the parcel, the Town may wish to purchase the fee simple title to the land. The length of time necessary to complete the transaction depends on negotiations, title research, appraisals and Town Meeting scheduling. If bonds are to be issued, the Town Meeting must approve the purchase by a two-thirds majority and a simple majority of a town-wide election is needed to exempt the bonds from the tax levy limit (Proposition 2 1/2.) (Borrowing to buy land with previously-approved land bank proceeds will not require a 2 1/2 election vote.) Direct purchase was used by the Town in acquiring 264 acres in the mid-1980s and the 525-acre Striar purchase in 1999.

The Town has the right to take a key property for public use by eminent domain, if a negotiated price cannot be reached. Even if the Town bases compensation on an accurate appraisal, landowners often feel aggrieved and sue for additional damage awards. Juries typically side with the landowner.¹¹⁷ Because takings automatically clear away title defects, friendly negotiated sales are often written as eminent domain takings in the Town Meeting article.

Land purchases can also be structured in installments or at bargain prices to satisfy a landowner's tax needs. A bargain sale is one at a price below fair market value by at least 20 per cent. The difference between appraised value and the sale price qualifies as a tax-deductible gift, which can offset the landowner's capital gains tax on the sale.

Open space purchases by the town can receive approximately 52% in reimbursement from the state Self Help reimbursement program (M.G.L. c. 132A, s. 11).¹¹⁸ Towns across the state annually compete for what has amounted to a total of (in recent years) \$8 - 10 million. Sandwich has been the recipient of about \$2.07 million over the past 30 years under this program. (See Table 7.1). (Only Brewster, Falmouth and Mashpee have received more, among Cape Cod towns). Property acquired with assistance from these state programs must be kept and used at all times for open space purposes. Self Help lands cannot be disposed of or converted to other uses without approval of town meeting, the state legislature and the governor. Even then, converted property must be replaced by the town with land of at least equal fair market value and of reasonably equivalent usefulness.¹¹⁹

c) Bequests (Gifts by Devise)

Property can be given for public use after the landowner's death if his or her will specifies such a disposition. This technique allows the landowner full use and enjoyment of the land during his or her lifetime, while removing the asset from estate

¹¹⁷ In at least two Martha's Vineyard cases in the past decade, the court found in favor of the town, *reducing* the damage award.

¹¹⁸ A companion program, Urban Self Help, provides even greater reimbursement for park and recreation facilities construction. In 1999, however, no new Urban Self Help applications were being accepted.

¹¹⁹ 301 Code of Massachusetts Regulations 5.09(1).

tax obligations at the time of death. There are no income tax or property tax savings using this approach and the community gets no immediate use of the property. There is also no assurance that the will won't be altered before decease.

d) Tax Title Transfers

Tax title properties are parcels acquired by a municipality through foreclosure owing to non-payment of property taxes (M.G.L. c. 60.) People may neglect to pay the minor amount of taxes due on their "worthless" wetland parcels and lose their land through foreclosure by the Town. Land values today are generally high enough to dissuade owners from risking the loss of their land through tax default. In the past, though, many properties were acquired by towns through this method, including parcels in the Ridge, salt marsh and the quarter-acre lot next to the railroad which has been transformed into the town's newest community garden.

Once acquired by the community, tax title lands are general purpose municipal lands, usually under the control of the Selectmen. They can be kept, sold by Town Meeting, or transferred to another town agency for a specific use. The Conservation Commission, for example, could request wetlands and parcels with special resource value. Barnstable and Wellfleet are two Cape towns which have regularly transferred these types of parcels to their Conservation Commissions in the past. Examples of undesignated-use parcels which could be transferred to the Conservation Commission, due to their location abutting existing conservation land, are found abutting the Discovery Hill Conservation Area and in the Ridge.

e) Reverter clause

Lands can be transferred to one entity with the stipulation that if the grantee fails to honor the grantor's intent, the title will automatically transfer to a third party who will uphold the grantor's intent.¹²⁰ Some reverter clauses, though, only last for 30 years.

2) Less-than-Fee Acquisition

a) Trail Access Easements

Many landowners are familiar with positive easements, such as for drainage, driveways or utilities. Easements may also be constructed to link open space parcels or to create viewsheds. Unfortunately, most landowners fear the loss of privacy and liability concerns sometimes associated with public use. If privacy loss is significant and fair market value is reduced, the Town should lower the tax assessment on the affected parcel accordingly. Massachusetts General Law (c. 21, s. 17C) protects landowners from liability if they allow public access without charging admission, so liability fears are probably exaggerated. In 1998 the Smith/Thayer granted a public walking trail easement to the Sandwich Conservation Trust through its land along the

¹²⁰ (An example of this technique was used in the 1960s when the Thacher/Perera family transferred over 200 acres for use by the Boy Scouts' Camp Greenough in Yarmouthport. The deed requires that title transfer to the Yarmouth Conservation Commission if the Scouts discontinue use of the land for scouting/camping.)

Ridge abutting the West Barnstable Conservation Area, as part of a Development of Regional Impact decision by the Cape Cod Commission.¹²¹

The Cape Cod Pathways Project, sponsored by Barnstable County, encourages landowners to participate in the creation of a linked system of walking trails throughout the Cape. This network would rely on land donations, easements, licenses and purchases.¹²² In June 1995 and June 1997 a CapeWalk was organized which led walkers from Provincetown to Buzzards Bay in eight days. The CapeWalk took a route west and south through Sandwich.

The Department of Environmental Management's (DEM) Sea Path program, which would grant public strolling rights below the high tide line (currently, public trust rights in this intertidal zone are limited to fishing, fowling and navigation), is probably less relevant on Sandwich's Northside, where development into tiny shorefront lots has made multiple party negotiations too complex. The Sea Path concept does not address Sandwich's primary objective, which is providing additional "blanket space" on the beaches, adequate parking and more access to the beach, not along it.

The state awarded a coastal access grant to the Town in 1999 to research public rights of way to the sea in the Town Neck area. Results are intended to improve citizen access to the beach there.

¹²¹ Recorded in Barnstable County Registry of Deeds in Book 11217 Page 116.

¹²² Partners for Cape Cod Pathways, "Connecting the Cape: Tax Benefits for Landowners," (Barnstable, 1996.)

b) Conservation Restrictions (G.L. 184 s. 31-33)

Conservation restrictions, also called conservation easements, are voluntary, yet binding legal agreements between a landowner and the Town or conservation organization, such as the Sandwich Conservation Trust. The landowner is offered powerful incentives through estate tax and federal income tax deductions and property tax relief, to keep parcels in an undeveloped state. The owner keeps control over the land, while the holder of the restriction promises to enforce the terms of protection. The state Secretary of Environmental Affairs and the Selectmen must approve each restriction based on the land's environmental significance or other public benefit.

In 1987 the Sandwich Selectmen endorsed a policy encouraging the use of restrictions as a means of preserving natural areas without the town having to purchase them. Both permanent and temporary restrictions are considered. There is a two-acre minimum size requirement. Property valuation will be reduced by as much as 95% for lands under permanent restriction.¹²³ Between 1977 and 1999, 17 restrictions covering about 505 acres were approved in Sandwich. Unfortunately, all but five of those 17 restrictions were temporary easements and none of the temporary easements has been renewed. (See Table 7.2). Open space leaders must reinvigorate the success of this program by landowner outreach and follow-up. Most of the recent restrictions were exacted by the Cape Cod Commission as part of Development of Regional Impact decisions.

c) Lease

The Town could lease private land for open space needs, neighborhood park. Leases are effective in their flexibility and "trial-run" aspects. A landowner who is reassured by the community's responsible management of the leased land may be more willing to cooperate later on a more permanent arrangement, such as a donation in fee or conservation restriction.

Leases are recorded in the Registry of Deeds and remain in force until their expiration date, even if the land's title is conveyed. Land leased for public use is typically relieved of property tax obligation. No income or estate tax deduction can be claimed due to the temporary nature of the lease.

d) Remainder Interest/Reserved Life Estate

A landowner can give or sell land to a town while retaining the right to live on or use the property for the rest of his or her life. The landowner keeps a "reserved life estate," while transferring the remainder interest to the Town. The landowner receives a charitable deduction for the value of the land minus the value of the life estate (based on IRS actuarial tables) and minus any depreciation. The landowner typically must still pay property taxes and maintenance costs.

Reserved life estates are typically used by elderly landowners who still need their home, but not their land. Benefits to the community include immediate access to the property and knowledge that, eventually, full control will result. Landowners can also defer property taxes until after death by qualifying under M.G.L. c. 41A.

¹²³ Town of Sandwich, Conservation Restriction Formula, July 1987.

e) Options/Rights of First Refusal

An option is a right, but not an obligation, to purchase a property at an agreed upon price at a specific time. Options allow a town or land trust the time needed to raise funds for a parcel it knows it wants to acquire. Options are particularly useful in times of development pressure and rising realty markets because they lock in a price and take the land off the market. (Unfortunately, it is often the case that in a "hot" market, sellers are less likely to tie up their property under an option.) The Town pays a nominal price for the option itself to indicate genuine intent, and records the option. Landowners derive no tax incentives from this technique, but many landowners would prefer to sell their property for conservation than for development.

Rights of first refusal similarly can buy time for the town to assemble acquisition funds, but are less certain than options. These agreements set neither a purchase price nor an execution date. The town cannot determine when the owner will decide to sell the land - now, later or never - but it gives the public the right to determine the land's fate if and when that time comes. No tax incentives accrue to the landowner from these agreements; civic cooperation may be the only motivation.

f) Current Use Assessment Programs

Working forests, farms and private recreation lands often receive preferential tax treatment under the current use assessment programs (respectively, under MGL c.61, 61A, 61B.) (See Table 7.2A.) These programs enable local assessors to value open lands in their current state rather than at their "highest and best use," which in Sandwich generally means as a housing development or commercial establishment. It is similar to a conservation restriction program, in that it is employed strictly at the owner's request. Differences include: no benefit as income tax or estate tax deductions; annual application is necessary; and, the town has automatic right of first refusal in the event of a conversion to another use. A major advantage is that eligibility criteria and property tax reductions are simple and standard throughout the state:

- c.61- Ten acres of woodland with a state-approved forest management plan; 95% tax reduction plus stumpage fee,
- c.61A- Five acres in agricultural production grossing \$500 annually; reduction based on crop type,
- c.61B- Five acres used for public recreation or resource protection; 75% reduction.

The disadvantage is that property owners can withdraw from the program at any time. About 500 acres in Sandwich are enrolled in the farmland assessment program, primarily Windstar Farm and cranberry bogs. An additional three farms acres might be eligible but are not enrolled.

No large, managed woodlands exist in Sandwich, so ch. 61 is not applicable. There are currently three enrollments under ch. 61B for private recreation lands or open spaces. This latter program could be easily expanded since neither public access nor active recreation have to be engaged in on the qualifying 5-acre parcels. Holly Ridge Golf Club in South Sandwich, for instance, could be enrolled under ch. 61B, giving the town the right of first refusal to purchase it, should it ever be sold or discontinued, in

order to keep this important outdoor recreation asset in a part of town where there is a dearth of outdoor recreation opportunities.

g) Differential Assessment Programs

Private retention of open land could be stimulated by Special Act 797 of 1979, which provides the Selectmen with an option to tax open or vacant land at a rate up to 15 percent less than residentially-developed land. It is based on the premise that developed land requires more municipal services and should generate more taxes than open land. The advantage to this program is that it applies indiscriminately throughout the town; everyone gets a tax break for keeping land undeveloped whether they want it or not. The drawback is that the open space rate reduction of 15 percent is much smaller than the discount offered by other techniques, such as conservation restrictions.

In 1990, five Massachusetts communities (Bedford, Concord, Norton, Nantucket and Somerset) used this classification program. It is an equitable conservation option that need not cost the Town a penny. The Town's total tax revenue remains the same; more of the burden is simply shifted onto developed properties. Sandwich has not utilized a differential in tax rates to date.

3) Private Conservation Organizations (See Tables 5.3 and 5.3A.)

The local land conservation trust is playing an important role in shaping open space protection in Sandwich. As a private organization, the Sandwich Conservation Trust (SCT) can work separately from town government, while pursuing shared goals. As a charitable group recognized by the IRS since 1985, it can offer similar tax advantages as the town to a landowner for gifts of land. Land trusts are directly involved in acquiring and managing land for its natural, recreational, scenic or historical qualities. SCT is supported by public memberships and directed by a board of volunteer citizens.

What can non-profit groups do that town agencies cannot? First, they can work quietly and confidentially with landowners, forging relationships patiently (sometimes hard to do in government circles) that may result in open space protection, such as a land donation. Second, these groups are an attractive alternative for landowners skeptical about working with "government." Non-profits are not susceptible to the same type of political pressure to which a town agency may be subjected, such as converting town conservation land to another use. Finally, these groups can be instrumental in performing much of the pre-acquisition work needed for a town to purchase land, including surveys, title exams, appraisals and options.

SCT is a member of The Compact of Cape Cod Conservation Trusts, which provides technical assistance and professional expertise on matters relating to planning, land acquisition and management, and non-profit administration in addition to linking them to their counterparts across Barnstable County. These groups should supplement, not supplant, the Town's role in implementing the Open Space and Recreation Plan.

The Massachusetts Audubon Society is a statewide land trust, dating to 1895, which has a strong presence on Cape Cod (primarily in Wellfleet, Falmouth, Centerville and Sandwich.) Its presence in Sandwich centers around the shore of Triangle Pond, where it is a major landowner, and anchor of the proposed District of Critical Planning Concern. (See Map 4. F. 2.) The Trustees of Reservations, Thornton Burgess Society, and Heritage Plantation are other non-profits which have major landholdings in town. (See Section 5.)

C. Summary of Recreation Needs

Sandwich is a small town, with great natural and historic beauty, and large numbers of its residents would like it to stay that way. The town's wonderful views and environment of native plants and wildlife are aspects which residents and visitors wholeheartedly enjoy. Many of its important natural resources, including its beaches, woods, and fish, are also recreational resources. These have an economic aspect as well, as Sandwich has many businesses that serve the tourist attracted by its unique charm and beauty. The purpose of this plan is to identify means by which to protect these valuable resources which are vital to the town's environment, while promoting appropriate use of these resources to enhance the town's communal well-being.

The 1988 Massachusetts Statewide Comprehensive Outdoors Recreation Plan (SCORP) found that the Cape Cod and the Islands region was deficient in facilities for

golf, tennis and ice-skating. (Of these three priorities, Sandwich is probably self-sufficient in golf--three courses-- and ice skating, given its proximity to Gallo Arena in Bourne.) Critical planning needs were also listed as expanding coastal access and water recreation (swimming, fishing and boating), developing trail corridors, and conserving wildlife habitats and water supply areas.¹²⁴ The 1997 Sandwich survey found that residents agreed overwhelmingly that additional walking trails and bike paths should be created. (See Appendix B.)

Judged against some objective standards,¹²⁵ Sandwich's supply of recreational facilities not only generally fails to meet the demand generated by its winter population of 20,577 (in 1999), but grossly falls short when the summer population's (30,000 estimate in 1995) demand is taken into account. (See Table 7.3.) The greatest lack appears to be in playground space, bike paths and basketball courts, and ballfields, particularly during the summer season, when use of these facilities is obviously at its peak. Sandwich also has less protected open space per person than other Cape towns. (See Table 7.3A.) Some of the recreational facility needs identified by village in the 1986 town *Conservation and Recreation Plan* have been satisfied by either town or quasi-public installations:¹²⁶

"acquire parcels of land for sponsored recreational programs...In the vicinity of Quaker Meetinghouse Road, prefer one large tract, maintenance would be simplified"

-- The Selectmen are dedicating about 10 acres in the Golden Triangle to Recreation Committee jurisdiction. In 1998 a Pop Warner football field was created and a small Community Recreation Center opened there. No other ballfields or courts have been completed to date there, as originally desired.

-- The Sandwich Water District allowed three new play fields to be constructed on part of its Farmersville Road Wellfield property in 1998.

-- The Human Services Building, opened since the 1986 Plan, provides good indoor space (5,500 square feet) for meetings and activities by many segments of the population, particularly the elderly.

-- The Sandwich Adventure Playground, constructed by volunteers and donated to the Town, opened in 1998 for public use.

-- Two new schools have opened since the 1986 Plan, providing large new play fields and courts in underserved parts of town (Forestdale and the Ridge District).

The recreational needs of Sandwich's aging population can perhaps best be met by incorporating sensitive design features into open space and recreation areas, such as handicapped access, resting benches and sidewalks. Simple items like safe crosswalks across busy streets, beach boardwalks and surf chairs are other examples.

¹²⁴ Massachusetts Department of Environmental Management, Massachusetts Outdoors! For Our Common Good, 1988 - 1992, Vol. 1, p. 104.

¹²⁵ National Park Service Standards and National Recreation and Park Association Standards, cited in Orleans, Mass. Open Space and Recreation Plan, 1994, p. 84.

¹²⁶ Town of Sandwich, "Conservation and Recreation Plan," 1986 update, p. 82.

C. 1 Special Needs: Access by the Disabled (See Appendix F.)

The federal Americans with Disabilities Act (ADA) of 1991 states that public facilities, including town lands, should meet federal guidelines for accessibility for handicapped persons. The Town's goal is to implement this law by having an example of each type of outdoor facility accessible to handicapped persons, and eventually to have every open space area accessible, wherever feasible. For example, Wakeby Pond has a very shallow grade from a nearby parking area to water's edge for swimming, making it a more practical site to offer handicapped access than at Boyden Farm. On its open space and recreation properties, the Town remains committed to providing full experiential access, wherever environmentally and financially feasible.

In 1998, the Conservation, Recreation and Parks Departments conducted the town's first-ever disabled access inventory of lands under their control which experience the most usage. The results of this survey are provided in Appendix F of this report. They indicate proposed upgrades of facilities, contingent upon available staff and funding. The Town is committed, however, to ensuring that any new recreational facility development will be designed to meet ADA codes.

D. **Land Management / Facility Maintenance Needs**

Management of conservation areas falls to the town Conservation Officer, with policy guidance from the Conservation Commission. Part of the land management problem stems from a lack of available staff to act as steward for the large number of town properties. The Park/Grounds crew of the Highway Department does what it can to help, but is not budgeted for conservation area work. Prior to FY 1992, \$3500 was appropriated for conservation lands management in the Conservation Department's budget. In FY 1992 serious cuts were made, eliminating all land maintenance funds. In FY 1998 the Finance Committee restored the land management budget and \$500 was appropriated. The maintenance budget increased to \$1500 in FY 2000. In addition \$11,500 was appropriated to be combined with grant funds to purchase a small tractor for trail maintenance. The Conservation Officer awaits a response to the grant request.

Town meeting may want to deputize other town officials, such as health agents, in addition to police to bolster enforcement of M.G.L c. 270 s. 16, which designates fines and vehicle seizure for illegal dumping on public land, which continues to be a problem. Other towns have addressed the situation by enlisting volunteer stewards to adopt specific parcels. Without staff, it is difficult for the Conservation Officer to coordinate volunteer help. Making people aware of Sandwich's fine holdings was helped by the publication of trail maps by the Sandwich Environmental Task Force. Cape Cod Pathways can also be a unifying force in rallying practical support.

SECTION 8 GOALS AND OBJECTIVES

The goals described in this section are the long-range aspirations of the Town of Sandwich for the protection of natural resources and the provision of recreational opportunities for its citizens and visitors. The objectives are conceptual steps to be undertaken to achieve these goals. Specific, tangible actions to implement the objectives are found in Section 9.

These goals and objectives were developed by the Local Comprehensive Planning Committee with input from the community through public opinion surveys and public hearings. Previous town studies, particularly the 1986 Sandwich Open Space and Recreation Plan, were consulted for current applicability and compatibility. The goals and policies of the 1996 Cape Cod Commission Regional Policy Plan (RPP), the 1988 Massachusetts Statewide Comprehensive Outdoor Recreation Plan, and other elements of the town's current local comprehensive plan were also referenced for compatibility, where appropriate. RPP goals, policies and standards are included *verbatim*, or modified to fit Sandwich's needs.

A. GOALS:

I. Conservation: Protect and enhance Sandwich's fragile environmental resources, including water quality, scenic beauty and unique habitats.

II. Open Space: Preserve and manage sufficient areas to maintain a healthy natural environment, provide habitat for wildlife, encourage outdoor recreation and retain community character. In order to preserve and enhance the availability of open space on Cape Cod and provide wildlife habitat, recreation opportunities, and protect the natural resources, scenery, ground water quality, air quality and character of Cape Cod, Sandwich shall strive to protect at least 50% of its remaining developable land as open space (modified RPP Goal 2.5.1)

III. Recreation: Meet all residents' and visitors' recreational needs by providing a diversified selection of year-round recreational programs for all ages, with adequate indoor and outdoor facilities distributed to each village, while protecting sensitive natural resources and keeping costs within a limited municipal budget.

B. OBJECTIVES

I. Conservation Goal: Protect and enhance Sandwich's fragile environmental resources, including water quality, scenic beauty and unique habitats.

A. Protect and Enhance Coastal/Saltwater Resources: Preserve coastal water quality that will enable fishing, shellfishing, swimming and boating to continue for residents to enjoy and as a mainstay of the town's tourist economy and support native industries of commercial fishing and shellfishing. (For more information, see "Sandwich Local Comprehensive Plan," Element 2.2, Coastal Resources Element, 1996.)

B. Protect Freshwater and Wetland Resources: Preserve the quantity and quality of groundwater, ponds and freshwater wetlands which provide wildlife habitat.

Provide effective implementation of local wetlands regulations. (For more information, see "Sandwich Local Comprehensive Plan," Element 2.3, Wetlands/Wildlife and Plant Habitat, 1996.)

C. Preserve Unique Natural Features: Protect and preserve the value of identified lands for wildlife habitat, rare plants and animals, unfragmented woodlands and historic resources, farms and bogs, and scenic areas through regulatory and non-regulatory means. Development or redevelopment within Significant Natural Resource Areas, as illustrated on the Cape Cod Significant Natural Resource Area Map dated September 5, 1996, as amended, shall be clustered away from sensitive resources and maintain a continuous corridor to preserve interior wildlife habitat. Where a property straddles the boundary of an area shown on this map, development shall be clustered outside the boundary. The primary function of these areas is the provision of ground water recharge, wildlife habitat, open space, scenic roadways, appropriate recreational opportunities, and protection of the Cape's natural character (RPP 2.5.1.1).

D. Mitigate Natural Hazards of Storm Flooding and Sea Level Rise:

Promote sound land use principles to prevent acute storm damage and chronic sea level rise from causing undue threats to public safety and natural resources. Respond to heavy public use of certain town properties by designing appropriate erosion control measures. (For more information, see "Sandwich Local Comprehensive Plan," Element 2.2, Coastal Resources Element, 1996.)

E. Manage Town's Open Space Properties to Protect Natural Resources while Encouraging Appropriate Public Use:

Evaluate town-owned undesignated-use open space to dedicate portions to conservation use and develop management plans which ensure maximum natural resource protection, while enhancing wildlife habitat in selected areas, and allowing for recreational access for walking, fishing, hunting, and small-craft boating.

Acquire and develop trailheads or public access points to existing conservation areas.

(For more information, see "Sandwich Local Comprehensive Plan," Element 6.0, Open Space and Recreation Element, 1996.)

F. Prevent Degradation and Abuse of Open Space Areas.

Provide cost-effective means of patrol and maintenance for town-owned open space to prevent overuse, dumping and resource degradation.

G. Coordinate Protection of Natural Resource Areas with Multiple Jurisdictions:

Cooperate with nearby jurisdictions, such as the neighboring towns and water districts, to design compatible and integrated management of coastal and freshwater resource areas, migratory wildlife and other natural resources.

II. Open Space: Preserve and manage sufficient areas to maintain a healthy natural environment, provide habitat for wildlife, encourage outdoor recreation and retain community character.

A. Protect Environmentally Sensitive Lands:

Acquire or protect, through regulatory and non-regulatory mechanisms, lands in or near sensitive natural or unique areas and open space lands identified in this plan.

Residential, commercial and industrial development which qualifies as a Development of Regional Impact shall provide permanently-restricted upland open space in accordance with one of the two methods prescribed in the RPP. Where appropriate, credit may be obtained for set aside of off-site open space or a contribution of funds may be made to the town, state or a land trust for open space acquisition. Open space shall be designed to protect those portions of the site with the highest natural resource values as identified by a natural resources inventory. Within open space areas the maximum amount of natural vegetation shall be maintained. No credit may be obtained for land that is dedicated on a residential lot on which a dwelling exists or may be built, unless the lot is at least 3 acres in size. Where development consists of more than one type or is located in more than one area, open space totals shall be determined for each area and added together. No credit may be obtained for areas that have been dedicated as open space prior to the date of application. Where new development is proposed within Significant Natural Resources Areas, open space shall be provided within these Areas. The requirements for Significant Natural Resource Areas shall apply to any certified growth centers that are located within a Significant Natural Resource Area (modified RPP 2.5.1.3).

Residential, commercial and industrial redevelopment which qualifies as a Development of Regional Impact shall maintain the existing percentage of open space on the lot (up to an amount that would otherwise be required by the point system above) or shall provide off-site open space or make a cash contribution toward open space which offsets, by an equal amount, any reduction in open space resulting from redevelopment. In addition, redevelopment in Significant Natural Resource Areas shall provide a minimum of 30% of the upland area of the lot as open space or an equivalent cash or off-site contribution (RPP 2.5.1.4). Wherever possible, off-site open space should be located within or contiguous to Cape Cod Significant Natural Resource Areas or in the areas identified below (RPP 2.5.1.7)

In the design of developments, significant natural and fragile areas including critical wildlife and plant habitat, water resources such as lakes, rivers, aquifers, shorelands and wetlands, historic, cultural and archaeological areas, significant scenic roads and views, unfragmented forest (as mapped by the Cape Cod Commission) and significant landforms shall be protected (RPP 2.5.1.5).

B. Protect and Retain Lands of Recreational Value:

Dedicate appropriate areas of town-owned open space to recreational use and encourage retention of existing private recreational facilities, particularly camp grounds and summer camps.

Pursue the implementation of the Cape Cod Pathways project as it relates to Sandwich.

C. Protect the Town's Scenic Resources:

Preserve the natural features, cranberry bogs and woodlands of Sandwich, in particular the Ridge and Scorton Creek and South Sandwich ponds, and ensure that

views of these features are available to residents and tourists alike. (For more information, see "Sandwich Local Comprehensive Plan," Element 7.0, Historic Resources and Community Character Element, 1996.)

D. Protect Significant Historical Sites or Areas:

Acquire or protect lands and structures, particularly along, but not limited to Route 6A, Spring Hill, the Ryder Bog/Wakeby Pond viewshed, which contribute to the unique Cape Cod character of the Town, provide historical, prehistoric or educational perspectives, and/or meet the criteria of the National Register of Historic Places or the Massachusetts Historic Commission. (For more information, see "Sandwich Local Comprehensive Plan," Element 7.0, Historic Resources and Community Character Element, 1996.)

E. Promote an Integrated, Cost-Effective Open Space Acquisition Program:

Except when development threat is imminent and/or public ownership necessary to accomplish an intended public purpose, use cost-effective land protection tools, with tax-incentives, such as donations, conservation restrictions and current use assessment, to retain open space in the community, working in alliance with non-profit organizations, such as the Sandwich Conservation Trust.

F. Coordinate Open Space Protection with Regional Jurisdictions:

Cooperate with nearby jurisdictions to promote protection of regional open space resources, such as the Cape Cod Commission regional greenbelt system, Sagamore Lens Protection Project, and Cape Cod Pathways.

Preserved open space within proposed developments shall be designed to be contiguous and interconnecting with adjacent open space, and shall be subject to permanent conservation restrictions. Sandwich may develop bonus provisions through their local bylaws to allow increased density for preservation of additional high quality open space (RPP 2.5.1.2).

Where development is proposed adjacent to land held for conservation and preservation purposes, the development shall be configured so as to prevent adverse impacts to these lands and in a manner that maximizes contiguous open space (RPP 2.5.1.6).

III. Recreation: Meet all residents' and visitors' recreational needs by providing a diversified selection of year-round recreational programs with adequate indoor and outdoor facilities distributed evenly in each village, while protecting sensitive natural resources and keeping costs within a limited municipal budget (modified RPP Goal 2.5.2).

A. Meet Local Recreation Needs through Balanced Offering of Programs:

Develop and/or expand recreational programs which address the needs of citizens and tourists, including those of different age (youth, adults and seniors), incomes and abilities, subject to availability of funds.

B. Upgrade Active Recreation Facilities to Provide Better Service:

Develop, relocate and/or expand recreation facilities to meet local recreation needs, subject to availability of funds.

Recreational needs as identified in the 1989 Statewide Comprehensive Outdoor Recreation Plan should be addressed in the development of projects in Sandwich. Such needs include opportunities for wildlife study, expansion of trail corridors, protection of scenic roadways, development and expansion of access for the disabled, additional public beaches and water-based recreational opportunities with associated parking facilities to the extent these minimize alteration of natural shorelines and do not harm wildlife habitat (RPP 2.5.2.1).

New development should provide suitable recreation and play areas to meet the needs of the residents of that development, such as ballfields, playgrounds, basketball courts or bicycle and walking paths (RPP 2.5.2.2).

(For more information, see "Sandwich Local Comprehensive Plan," Element 4.2, Capital Facilities and Services Element, 1996.)

C. Enhance Fresh and Salt Water Bathing and Boating Facilities:

Design creative, efficient means to expand sandy beach areas and ancillary support land. (For more information, see "Sandwich Local Comprehensive Plan," Element 2.2, Coastal Resources Element, 1996.)

D. Encourage Alternative Transportation on Safe Routes to Reduce Congestion, Conserve Energy and Improve Air Quality:

Promote walking and bicycle paths throughout town (except where safety precludes it, such as along Route 6A) and connecting to long-distance trail systems.

Encourage the use of the Service Road as a safe, though not particularly scenic, bikeway alternative.

(For more information, see "Sandwich Local Comprehensive Plan," Element 4.1, Transportation and Circulation Element, and Element 6.0, Open Space and Recreation Element, 1996.)

E. Provide Access to Open Space and Outdoor Recreational Facilities for Persons with Varying Physical and Other Abilities:

Ensure that experiences available at selected conservation areas, trails, parks, and playgrounds are accessible to people with a variety of levels of mobility, sense awareness and mental capacity, mindful of site characteristics and financial considerations.

F. Cooperate with Other Town Departments to Develop Municipal Land for Multiple Use:

Identify areas of conservation land and wellfields, where passive recreation can be enhanced, such as installing trails, and picnic areas, as appropriate, as was done at Farmersville wellfield.

G. Provide Public Education and Promotion of Community Recreation Programs:

Ensure that programs and facilities are well known in the community, to residents and visitors.

H. Coordinate Management of Recreation Resources Which Cross Town Boundaries:

Cooperate with nearby jurisdictions to promote protection of regional recreational resources, such as the Cape Cod Pathways regional trail network.

I. Enhance a Balanced Local Economy by Strengthening Outdoor Opportunities:

Maintain, promote and improve economically productive recreational resources, such as beaches, woodlands and fishing areas. These areas should be maintained specifically for those uses and expanded where possible.

Promote Sandwich as a retirement location by focusing on its attractive historical character, opportunities for recreation. (See Action 10 of LCP 3.0.)

SECTION 9 ACTION PLAN

The following actions are designed to implement the Goals and Objectives outlined in Section 8 and to address the needs identified in Section 7 above. They are also intended to conform, to the maximum extent practical, given Sandwich's distinctiveness, with the "Recommended Town Actions" of the Cape Cod Commission Regional Policy Plan (RPP) of 1996. Each specific action is subject to additional directed town approval and/or appropriation. (See Map 9. A. 1.) The recommended agent with responsibility for implementing the action is identified at the end of each action as is the year in which the action is presumed to occur.

A. CONSERVATION ACTIONS

I.A. Coastal Resources/Saltwater Quality

1. Prohibit direct discharge of untreated stormwater and wastewater into coastal waterways (complies with Policy 2.1.1.5 of RPP). Mitigate untreated stormwater discharges through the use of vegetated swales, leaching catch basins and other best management practices (2.1.1.8 of RPP), particularly along Scorton Creek. Conservation Department & Board of Health. 2000.

2. Support nomination of portions of waterways as federal EPA No Discharge areas for boats (2.2.Town.A of RPP). Coordinate with regional health officials on marine head pumping options (2.2.Town.G of RPP). Board of Health & Conservation Department. 1999.

3. Continue water monitoring to enable safe re-opening of Scorton Creek for shellfishing. Conservation Department. 1999.

4. Cooperate in efforts to restore the Sagamore Marsh to a tidally-flushed ecosystem. Conservation Department. Ongoing.

I.B. Freshwater/Wetland Resources

1. Nominate and implement regulations for District of Critical Planning Concern around Three Ponds area in South Sandwich. All Town boards. 1999 - 2000.
2. Evaluate and, if necessary, mitigate stormwater drainage patterns into ponds and streams. (2.3.Town.D of RPP). Conservation Department & Board of Health. Ongoing.
3. Acquire rights to repair and maintain Upper Shawme Pond Dam, for flood control and anadromous fish passage. Conservation Department. Ongoing.

I.C. Unique Areas

1. Identify and certify all vernal pools (2.4.Town.A of RPP). Conservation Department. Ongoing.
2. Pursue protection of properties on or near The Ridge and Three Ponds Area for conservation/recreation use. Planning Board, Land Bank Committee & Conservation Department. Ongoing.

I.D. Flooding/Sea Level Rise

1. Amend zoning bylaw to prohibit new non-water dependent construction in the Federal Emergency Management Area (FEMA) V-flood zones, except where the height of the first floor elevation meets or exceeds the 100-year storm wave height (2.2.2.1 & 2.2.2.2 of RPP). Planning Board & Town Meeting. 1999.
2. Amend local wetlands protection bylaw to accommodate inland migration of saltwater wetlands, where feasible, based on a 2-foot sea level rise. (2.3.Comm.E of RPP). Conservation Department. 2002.
3. Augment erosion control measures with beach nourishment at town beaches, particularly Old Harbor Inlet. Conservation Department. 1999-2003.

I.E. Natural Resource Management

1. Develop natural resource inventory and management plan for major conservation areas, particularly Maple Swamp and Ryder Lands, identifying appropriate types and levels of recreational use. Conservation Department & Recreation Department. by 2004.
2. Evaluate conservation significance of town-owned parcels, acquired through tax-title foreclosure. If significant, dedicate to conservation land under MGL c. 40, s. 8C. Conservation Department & Selectmen. 2000.
3. Prepare and distribute public information about hurricane preparation, wetland protection, septic upgrades, floodproofing, boating safety. Various departments. Ongoing.
4. Negotiate with Sandwich Water District to exchange conservation restrictions on town and district lands that abut or are near each other, such as at Boiling Springs Pond, to assure water quality and permanent open space protection. Conservation Department, Board of Selectmen and Sandwich Water District. 2001.

I.F. Patrol/Land Maintenance

1. Deputize appropriate town officials, including health agents, in addition to police, to bolster enforcement of MGL c. 270, s. 16, preventing illegal dumping on public land. Conservation Department & Town Meeting. 2000.
2. Encourage non-profit groups, such as the Sandwich Conservation Trust, to organize land clean-ups of public and private open space. Conservation Department. Ongoing.
3. Evaluate landfill/transfer station fees and collection policies to discourage residents from disposing of bulk items in unauthorized areas. Explore alternative means of legal disposal. Board of Health & Selectmen. 1999.
4. Regulate motorized and non-motorized bicycle use on identified nature trails. Conservation Department. Ongoing.

I.G. Regional Coordination

1. Continue to work with the neighboring towns to protect aquifer quality. All boards. Ongoing.
2. Support efforts to designate a water supply area and wildlife refuge in the northern part of the Massachusetts Military Reservation. Selectmen. 1999.

B. OPEN SPACE ACTIONS

II.A. Protection/ Sensitive Lands

1. Establish a Land Bank Committee of the town to update, refine and examine new opportunities for the town to acquire lands for conservation passive and active recreation. Selectmen. 1999.

2. By means of regulatory or non-regulatory methods (see Section 7.A), protect lands which meet one or more of the following criteria:

a. Lands within or adjacent to designated protected open space or potential open space areas (Map 7.A.1 and Map 9.A);

b. Lands within or adjacent to fresh and saltwater bodies, beaches, (salt and fresh water), wetlands, (marshes, swamps, bogs, meadows, ponds, and creeks), and floodplains;

c. Lands containing contiguous wildlife habitat, vernal pools or which provide refuge to federally or state listed endangered, or threatened species or species listed as of special concern;

d. Lands providing wildlife corridors which allow movement and migration of wildlife indigenous to Sandwich;

e. Lands useful for multiple public purposes or enhancement of Cape Cod Pathways;

f. Lands providing access or parking for existing conservation areas. Conservation Department, Land Bank Committee & Town Meeting. Ongoing.

3. The Town should actively seek to protect high priority areas which have been identified by the Cape Cod Commission and town boards as Significant Natural Resource Areas. Local bylaws and regulations including mandatory cluster, increased lot sizes and overlay districts are encouraged to preserve the sensitive resources within the greenbelt (RPP Rec. Action A).

4. Work with local land conservation organizations to identify, acquire and manage open space to meet projected community needs. Priority should be given to the protection of significant natural and fragile areas (RPP Rec. Action B). Ongoing.

II.B. Protection/Recreational Lands

1. By means of regulatory or non-regulatory methods (see Section 7.A), protect lands which meet one or more of the following criteria:

a. Lands which abut existing public and private recreation and open space lands (6.2.Town.D of RPP);

c. Lands which could be designed to promote hiking or bicycle trails;

d. Lands which could allow for expanded recreational facilities in parts of Town presently under-supplied, particularly Forestdale, and including lands within existing densely developed subdivisions.

Recreation Commission & Town Meeting. Ongoing.

e. Lands providing public access for recreation to both freshwater and saltwater bodies (RPP Rec. Action C).

f. Lands suitable for active recreation where activities such as ballfields, playgrounds and public swimming areas would not adversely affect sensitive resources, as well as lands for passive or restricted access conservation uses (RPP Rec. Action D).

2. Encourage eligible private recreation facilities to apply for property tax reduction via MGL c. 61B application for current use assessment. Recreation Director and Assessors. 1996.

II.C. Protection/Scenic Resources

1. Encourage use of construction and design standards contained in "Designing the Future to Honor the Past: Design Guidelines for Cape Cod," Cape Cod Commission, 1994. Planning Board & Historical Commission. Ongoing.
2. Where feasible, require placement of new utility lines underground. (7.2.Town.J of RPP) Planning Board. Ongoing.
3. Implement local recommendations of Route 6A Corridor Management Plan. Planning Board & Historical Commission. Ongoing.
4. Where appropriate, the Town should encourage land owners to restore blighted or abandoned areas to open space, whether it be to landscaped parks or natural areas (RPP Rec. Action F).
5. Encourage MassHighways to open a viewshed to the Bay from the Route 6 westbound rest area on Telegraph Hill. Selectmen. 1999.

II.D. Protection/Historic Resources

1. Continue to preserve land along Route 6A, particularly parcels in East Sandwich. Conservation Department & Land Bank Committee. Ongoing.
2. Install proper signage and covenants to protect public usage of ancient ways, such as Kiah's Way. Planning Board & Selectmen. Ongoing.

II.E. Cost-Effective Program

1. Conduct mailings and hold workshops for large landowners describing tax benefits (income tax, property tax, estate tax) associated with land preservation options, such as the town conservation restriction program. Conservation Department, Selectmen, Assessors, & Conservation Trust. 2000.
2. The Town should aggressively seek to acquire tax title lands and hold them for community purposes, such as open space, affordable housing or municipal services. Properties of environmental significance such as wetlands and rare species habitat should be placed under the jurisdiction of the Conservation Department or nonprofit organization (modified RPP Rec. Action E). Adopt a policy to acquire tax title lands and evaluate for conservation, open space or recreation significance before deciding to dispose of them. Selectmen. 1999.
3. The Town should periodically review its procedures for approval and assessment of conservation restrictions (modified RPP Rec. Action H). Selectmen, Conservation Department & Assessors. 2002.

II.F. Regional Coordination

1. Identify and map strategic parcels needed to implement open space greenbelt system, particularly parcels providing connections to the Cape Cod Pathways (6.2.Town.A of RPP). Conservation Department. 1999.
2. Encourage cluster subdivision design to protect significant linkages in the greenbelt system (6.2.Town.A of RPP). Planning Board. Ongoing.

3. Cooperate with the Thornton Burgess Society and Division of Fisheries and Wildlife to create a linked walking/canoe trail from Talbot's Point to Murkwood. Conservation Department. 2002.

C. RECREATION ACTIONS

III.A. Recreation Programs

1. Develop additional adult and senior recreation programs, using town funds and fees. 1999.

2. Work cooperatively to develop bike paths, particularly south of the Mid-Cape Highway, and walking trails linking various outdoor and recreation facilities. Recreation Department & Dept. of Public Works. Ongoing.

3. Review and update recreation program offerings as community needs dictate, based on citizen/user surveys. Recreation Department. 2001.

III.B. Active Recreation Facilities

1. Continue to pursue alternative means of funding to design and construct an indoor community/recreation center, probably located at Golden Triangle. Seek state Urban Self-Help reimbursement and other sources to augment town funds. Recreation Commission. 2003.

2. Develop additional facilities, distributed evenly through town, particularly for baseball, basketball and tennis. Recreation Department. 1998 - 2003.

3. Develop a dialogue with local homeowners' associations to determine the feasibility of creating small "pocket parks" in densely developed neighborhoods, whether at town or private expense or in partnership. Planning Board & Recreation Department. 2000.

III.C. Beach/Boating Facilities

1. Instruct the land bank committee to focus on identifying opportunities for increased pond and saltwater access lands. Selectmen. 1999.

III.D. Alternative Transportation

1. Develop the Service Road as a recreational corridor. Selectmen & Dept. of Public Works. by 2003.

2. The Town should continue to work with the Cape Cod Commission to identify and designate suitable locations for bicycling facilities to further the Cape Cod Bikeways program (RPP Rec. Action I). Install additional bicycle racks at beaches, parks and in commercial areas. Recreation Commission & Dept. of Public Works. by 2001.

4. The Town should continue its work with the Cape Cod Pathways Partners and the Commission to further identify, designate and acquire, through purchase or easement, suitable locations for walking paths that comprise the Cape Cod Pathways network (modified RPP Rec. Action G). Promote Cape Cod Pathways as an off-season tourist attraction as well as year-round recreational network. Conservation Department & Recreation Commission. Ongoing.

III.E. Handicapped Accessibility

1. Ensure that any new recreational facilities include design specifications that incorporate accessibility codes. Ongoing. Recreation Department.
2. Prioritize list of accessibility upgrades and determine costs needed for existing facilities, based on inventory in Appendix F of this Plan. Recreation and Conservation Departments with assistance from Town Engineer. 2000.

III.F. Regional Coordination

1. Appoint a local coordinator and/or committee to participate in and advise on the Cape Cod Pathways program of the County Commissioners. Selectmen. 1999.
2. Conduct Cape Cod Pathways trail planning, with county funds, for proposed inter-town routes and dedicate specific public lands to that effort. Conservation Department & Water District & Selectmen. 1999-2000.
3. Update Open Space and Recreation Plan for continued state eligibility. Planning Department. 2004.

SECTION 10 PUBLIC COMMENTS

*[insert here letters of review and comment
from town boards and CCC]*

SECTION 11 SELECTED REFERENCES (see also, footnotes for each Section)

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APPENDIX A.TOWN OWNED LANDS
OF
CONSERVATION
AND RECREATION
INTEREST

1999

Appendix A.1

Sorted by Tax Map & Lot Numbers

Appendix A.2

Sorted by Land Manager

Appendix A.3

Sorted by Facility Name

Appendix A. 4

Sorted by Village / Planning District

APPENDIX B.

PUBLIC OPINION SURVEY FOR 1999
OPEN SPACE AND RECREATION PLAN
1997

APPENDIX C.

RARE and ENDANGERED SPECIES INVENTORY
and
COASTAL PLAIN POND SITES IN BARNSTABLE COUNTY

Source: Massachusetts Natural Heritage and Endangered Species Program, 1997

APPENDIX D.

SELECTED NEWSCLIPPINGS

Source: Local and Reginal Newspapers

APPENDIX E.**AMERICANS WITH DISABILITIES ACT (ADA)
COMPLIANCE DOCUMENTS**

1. ADA Coordinator Appointment
2. Grievance Procedures
3. Commission on Disabilities Charge and Powers
4. Compliance Report: Transition Plan
5. Employment Practices

APPENDIX F.**FACILITIES ACCESS SURVEY
and ADA Section 504 Compliance Inventory**

Source: Recreation Commission and Conservation Department, Town of
Sandwich, 1998

Table 7.3A Protected Open Space: Sandwich versus other Cape Cod Towns, 1997

While Sandwich has an average amount of acres protected relative to other Cape Cod towns, when measured against community population (acres per capita), Sandwich is less than average. For instance, Mashpee and Sandwich have preserved about the same number of acres, but Mashpee is a town half the size in population as Sandwich.

Source: Cape Cod Commission, 1998.