Needs to be Public noticed and accepted.

Seabrook/Sun Valley Beach Long-Term Management Plan

Prepared For:
Beach Management Committee/
Seabrook Conservation Commission
Seabrook, New Hampshire

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TABLE OF CONTENTS

TABLE OF CONTENTS

Appendices

Introduction

Background

Seabrook Beach, located along the Gulf of Maine, is the most eastward extent of the Towns of Seabrook and Hampton, New Hampshire. The beach and associated dune system is an important component in the town's natural and recreational character and its economic base. The beach provides a high quality scenic and aesthetic environment for both beach and town residents. Each town has responsibility for all management and maintenance activities to ensure the long-term environmental integrity and recreational value of this important resource and to protect public safety, particularly for adjacent private property owners.

Over the years the Town of Seabrook has conducted a number of studies and undertaken various programs to enhance the beach/dune environment and to protect private property subject to ocean storms. In 1988 the Town of Seabrook contracted with IEP, Inc. to provide an Environmental Assessment for the Seabrook Dune Improvement Project for the South Beach area. The Dune Restoration Project was completed in 1994 at a cost of $200,000 shared equally by the town and matching funds from a federal Coastal Zone Management Program grant. In 1995, the town contracted with Appledore Engineering, Inc. (AEI) to perform a Coastal Beach Study of the conditions of the North Beach area. In 2002, the town established a Beach Management Committee, comprised of interested residents and town officials from both towns, for the purpose of creating and implementing a Long-Term Beach Management Plan. This Committee, acting on behalf of the Town of Seabrook, prepared a grant application for a long-term beach management plan in January of 2003 under New Hampshire Coastal Program local grants program. In July the NH Coastal Program awarded Seabrook grant funds to undertake the plan. Subsequently, the Committee selected AEI to prepare a Long-Term Beach Management Plan for North and South Beaches.

Additional study area background and historical information can be found in a previous report conducted for the Town of Seabrook in April 2002, "The Town of Seabrook, Coastal Beach Study".

Purpose of the Plan

Almost all maintenance and capital projects at Seabrook Beach require a permit from the New Hampshire Department of Environmental Services (DES), Wetlands Bureau. In the past, the Town of Seabrook has applied for and received permits for specific activities. In 2001 the DES Wetlands Bureau issued a permit (#2000-00949) to allow for beach re-grading in the North Beach area as the initial step in a long-term beach management plan. In 2002 the Wetlands Bureau issued a permit (#2002-00130) to allow for 1500 linear feet of beach replenishment as the second step in the development of a long-term dune restoration and beach management plan. **See Appendix A for copies of these permits.**

The purpose of this Beach Management Plan is to provide the next step in the development of a "comprehensive long-term restoration and management plan for the entire town-owned area of Seabrook Beach" (as recommended by NH DES Permit #2000-00949) in coordination with the Wetlands Bureau. With the acceptance of this plan by the Towns of Seabrook and Hampton and the New Hampshire DES Wetlands Bureau, the towns will be able to manage the beach and dune environment in a responsible manner for the long-term with the approval of the DES Wetlands Bureau and associated regulatory agencies.

The Planning Process

Staff of Appledore Engineering, Inc. worked closely with an appointed Beach Management Committee to prepare the Long-Term Beach Management Plan, for purposes of this study the Committee decided to divide Seabrook Beach into two segments—North Beach and South Beach—because each has a distinctive set of characteristics each requiring specific management strategies. North Beach contains a beach area that has adjacent residential structures and only minimal isolated vegetated dunes. By contrast the South Beach not only has an extensive beach, it also has a significant vegetated dune system. Initially, an inventory and analysis of beach and dune conditions was conducted, that documented the natural, physical and economic resources of the overall beach area as well as beach and dune issues including encroachment of the dunes and dune grass on to private property and structures. The Committee then established a long-term vision for the beach including a set of goals for the whole beach as well as specific goals for the North and South Beaches. The Committee also considered a wide range of beach management techniques to address the issues raised in the inventory and the need to maintain a healthy and safe beach and dune environment. Based on the needs identified in the inventory and the goals that the Committee wished to achieve, an assessment of the most appropriate beach management techniques were prepared by the Committee. These techniques were then formulated into an action plan and implementation program for long-term beach management.

The Plan

This Long-Term Beach Management Plan consists of:

- *Introduction*
- *Inventory*—an assessment of the natural, economic and physical condition of the beach and dune environment, regulatory jurisdictions, recent management activities, and a review of possible management methods.
- *Vision and Goals*—goals for the beach and dune area
- *Management Strategies*—recommended strategies and implementation program to achieve the long term goals and vision for Seabrook Beach.

The Appendix contains more detailed information on the inventory of beach and dune conditions.

Inventory

Study Area Description

Seabrook Beach, the second largest contiguous beach in New Hampshire, forms part of the barrier beach system, which extends from Plum Island in northern Massachusetts to Great Boars Head in the Town of Hampton, New Hampshire. The barrier beach in New Hampshire is backed by an extensive salt marsh system, the Blackwater River and portions of Hampton/Seabrook Harbor. The barrier beach has been heavily developed with primarily residential development on the ocean side and commercial/residential development on the landward side along the Route 1A corridor. US Route 1-A runs along the length of the barrier beach in New Hampshire. **See Figure 1 – Site Location Plan.**

The study area extends from the Hampton Harbor inlet, south to the state line and includes both North and South Beaches. **See Photograph 1 - Overall of Seabrook Beach.** For the purpose of this study, the North Beach area will include the section of beach from the Hampton Harbor inlet south to Ashland Street, which is referred to locally as Sun Valley. The North Beach portion of Seabrook Beach extends approximately 2200 feet from the White Rock south to Hooksett Street. There it merges into South Beach, which extends approximately 5,150 feet south to the New Hampshire/ Massachusetts state line at the Town of Salisbury, in the vicinity of east-west running NH Route 286. **See Figure 2 - Existing Conditions Plan and Photo 1.** The beach and dune area of Seabrook is owned and maintained by the Town of Seabrook.

Residential development in the North Beach area occurs between 100 to 120 feet inshore of the High Tide Line as shown on **Figure 2 - Existing Conditions Plan.** No continuous dune system exists within this area, although several small dune areas and beach grass patches are evident, particularly in the vicinity of Hooksett and Suncook Streets.

By contrast, residential development in the South Beach area is set back approximately 250 to 500 feet from the high tide line with a significant continuous dune system between the beach and this development that extends to the state line. This system had been highly degraded by the middle 1980's through actions of individual owners, ocean storms and periodic high winds. This dune system was restored by the Town of Seabrook during the springs of 1993 and 1994 based on a restoration plan prepared by the town in cooperation with IEP, Inc. in 1988.

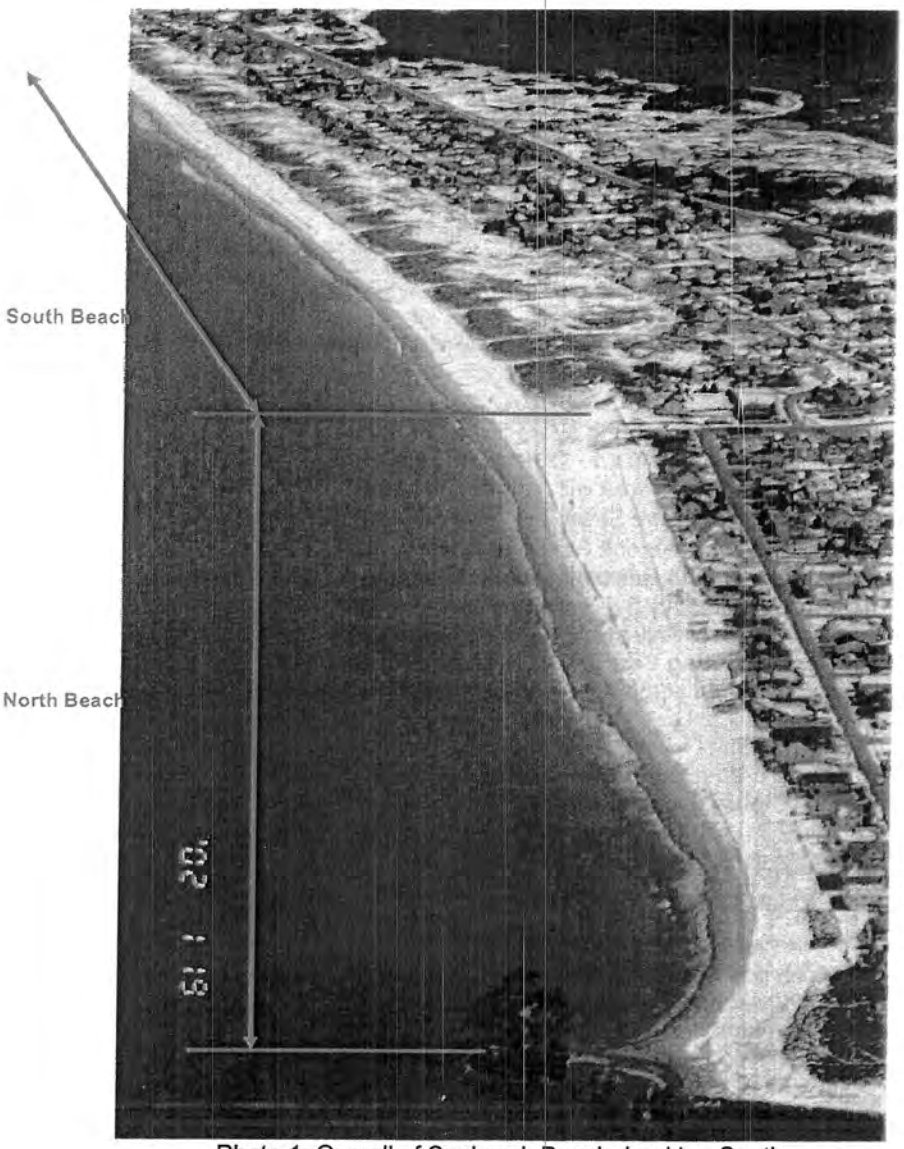


Photo 1: Overall of Seabrook Beach, Looking South

There are several physical landmarks that mark the study area. One is the exposed bedrock located near mean low water, between Concord and Franklin Streets. **See Figure 3, Photographic Inventory**. Both the US Geologic Survey (USGS) maps and National Oceanic and Atmospheric Administration (NOAA) charts for the area refer to this exposed rock as "Thomas Rock." Another is a rock outcropping a little further offshore from South Beach between Merrimac and Haverhill Streets known as "Round Rock". Finally, there is an Army Corps project at Hampton Harbor inlet that includes a dredged channel and stabilizing jetties on both the north and south shores. The south shore jetty extends eastward to a rock outcropping at the north end of North Beach known as White Rocks. The inlet provides boating access into and out of Hampton Harbor and is the primary inlet/outlet for tidal water exchange and local watershed discharge.

Existing Beach And Dune Conditions

The following section describes the existing conditions of the beach and dune environment of Seabrook Beach. The discussion is broken down into general conditions, and specific conditions for the North or South Beach, since each area has different characteristics that will affect the town's approach to long-term beach management.

General

The ocean conditions for the entire study area are quite similar, except for the area near the harbor entrance, which is influenced by the harbor tidal currents, the offshore rock shoals and a submerged sandbar extending a significant distance out from White Rocks. Since the Hampton Harbor inlet was stabilized with rock jetties (circa 1935 and 1963), the inlet location has remained at its present location and there have been no major changes to the Seabrook Beach shoreline, other than variations in beach width (see Northern Seabrook Beach Study, June 1995). Previous reports have indicated that there does not appear to be significant net long shore movement of beach sand and that such movement is primarily short term, based on the actual wind and wave direction relative to the beach.

The mean tidal range in the study area is just over 8 feet, with the 100 year storm still water level at about 14 feet above mean lower low water (MLLW) chart datum. This 100-year storm still water level (excluding water height and runup) is approximately the water level experienced during the winter storm of 1978, based on nearby tide station readings. Sea level is rising relative to the land in this area of New England at an average rate of about 0.6 feet per century (based on the 1912 to 1999 tidal records) and this sea level rise will increase the potential for storm flood damage on Seabrook Beach buildings over time.

At low tide there are several areas of the beach, which do exhibit observable outflow of groundwater from the beach, and this does tend to increase the mobility of the intertidal sand in these areas due to the decreased angle of repose in association with highly fluid sand conditions.

North Beach

North Beach is composed of a relatively long stretch of narrow beach and a series of shore protection structures for protection of waterfront properties. There is no significant dune system along North Beach, although there are areas of sand accumulation and beach grass in several locations particularly in the vicinity of Hooksett and Suncook Streets, near Ashland Street and further north in the Sun Valley area of Hampton where the beach tends to widen out near the jetty. **See Figure 2, Existing Conditions Plan.**

During the 1940's there was significant residential development in the North Beach area that occurs between 100 to 120 feet inshore of the High Tide Line as shown on both **Figures 2 and 3**. In order to protect these properties, individual property owners have constructed shore protection structures along North Beach. However, there is no continuous shore protection structure (either natural or man-made) in place. These private structures are primarily concrete seawalls. Although the elevation of the beach has varied over the years, at present, the level of sand at the sea walls is relatively high. In the beach area near the intersection of Suncook/Hooksett Streets and Manchester Street, there are shore protection structures including a timber wall and chain link fence that are either partially or completely buried. **See Photograph 2.**

Photo 2: Partially Buried Wall and Fence, December 2003.

The primary stands of beach grass in this study area occur just north of Suncook/Hooksett Streets. In this area, the stands of beach grass covered dunes are approximately 10+ feet high (Elevation 25± feet). **See Photograph 3, Figure 3 - Photo H and Figure 2, Existing Conditions Plan.** The remainder of this study area contains several small areas where stands of beach grass have developed or have been planted such as in front of homes between Ashland and Tilton Streets. **See Photograph 4, and Figure 3 - Photo E.** The dunes under these stands of beach grass are typically less than 5 feet high and are located adjacent to the backside (eastside) of the homeowners' properties. In some cases, these vegetated dunes have buried existing shore protection structures. **See Photograph 5.** Further north in the Sun Valley area there are small outcroppings of beach grass that appear to be stabilizing the beach and potentially establishing initial stages of dune development. **See Figure 4, Existing Beach and Dune Plan.** The remaining North Beach study area is void of any beach grass or dune system. The Town of Seabrook installs seasonal snow fences to prevent sand migration from occurring during the winter storm season. **See Photograph 6 and Figure 3 - Photos F & G.** These are usually installed in late October and removed in April/May. Since the houses and other shorefront structures can act to trap wind blown sand, the town periodically re-grades this area in order to prevent development of a significant sand/dune system that would eventually encroach on the existing waterfront structures and recreational beach space.

Photo 3: Vicinity of Suncook/Hooksett Streets, Looking Northwest

Photo 4: Vicinity of Tilton Street, Looking South

Photo 5: Vicinity of Ashland Street, Looking South

Photo 6: Vicinity of Suncook/ Hooksett, Streets, Looking North

The location of the residential development with respect to the high tide line provides limited usable recreational beach width. Due to the lack of dune system development and the proximity of houses to the high tide line, the North Beach area is more susceptible to damage and flooding during storm significant events than the South Beach area.

South Beach

The South Beach area contains a beach and dune system, with the highest dunes occurring just south of Suncook/Hooksett Streets. **See Photographs 7, 8 and 9**. In this area, the dunes are over 30 feet high, obstructing ocean views of several property owners. **See Figures 2 and 4**. The sand dunes in this area have migrated west, encroaching on the residences of several property owners. This condition is considered as a significant liability for the town with dune grass located so close to homes, creating the potential for grass fires to spread onto homes and for pedestrians to fall into the steep drop-off of the dune. **See Figure 3 – Photo I.**

Photo 7: Vicinity of Suncook/Hooksett Streets, Looking Southwest

Photo 8: Vicinity of Suncook/ Hooksett Streets, Looking Southwest

Photo 9: Vicinity of Suncook/ Hooksett Streets, Looking South

Immediately south of this area, residential development is set back approximately 250 to 500 feet from the approximate Mean High Water, allowing a relatively stable dune system to be retained between the beach and the nearest development. **See Figure 4**. The width of this dune system significantly reduces the accumulation of drifting sand in the residential area. This beach and dune area is owned by the Town of Seabrook.

Prior to 1990, much of this dune area was highly degraded from man-made intrusions, ocean storms and wind action. During the spring seasons of 1993 and 1994, the Town of Seabrook restored much of the system. Consequently, there are vegetated stands of beach grass that cover much of the dune system in the South Beach area.

There appears to be only one area of the South Beach dune system that has become eroded recently. There is a washout area of the dune near Atlantic Avenue at New Hampshire Street. This erosion may be due to a combination of pedestrian traffic, wave overtopping and wind due to the degradation of the dune. **See Figure 3 - Photos Q & R**.

The Town of Seabrook has installed and maintains eleven (11) public boardwalks in the South Beach area extending from each street end to the beach area except at Merrimac Street and New Hampshire Street. A public boardwalk is due to be built at Merrimac Street as part of the Merrimac Street subdivision plan.

Beach Natural Resources

The South Beach dune and beach system provides valuable natural resources that are typical of the New England Coastal Dune Community. The predominant vegetative species is beach grass (Ammophila breviligulata). In recent years there has been significant die-off in various areas of the back dune between Haverhill Street and Hudson Street and transitional vegetation is emerging. In some locations, particularly between Tyngsboro Street and Hudson Street the beach grass has been replaced with Sand-Golden Heather (Hairy hudsonia), a state threatened species according to the New Hampshire Natural Heritage Inventory[1]. **See Figure 5, Rare Species and Exemplary Natural Communities**. Other threatened species that have been observed include:

- Tall wormwood (Artemisia campestris)
- Sea Beach Needlegrass (Aristida tuberculosa)

There has also been a minor invasion of a non-native plant, Yucca filementosa.

[1] The New Hampshire Natural Heritage Bureau prepared an inventory of natural communities and rare, threatened and endangered species for the Seabrook Harbor area (including Seabrook beach and dunes) as part of the Major Impact Wetland Application for the dredging of Seabrook Harbor in August of 2003. A full description of the beach and dune resources is included in that document.

The South Beach area provides habitat for one federal/state listed threatened bird species, the Piping Plover. The species use the beach area for breeding and nesting from approximately April 1 through approximately August 31. Plovers forage on the intertidal portions of the sandy beach and tend to nest just below the crest or scarp of the dune. The New Hampshire Fish and Game Department is the agency legally charged with managing the plover population along New Hampshire's beaches including South Beach in Seabrook. According to federal guidelines this species is to be managed to avoid and minimize adverse effects to the species. There is an educational sign frame for the Piping Plovers Protection Program at the beach end of the boardwalk from Haverhill Street.

Public Beach Access

The Town of Seabrook has encouraged protection of this beach and dune system by installing fourteen (14) boardwalks, which extend from many of the street ends to the beach. Eleven (11) of these are on South Beach and three (3) are on North Beach. This system of boardwalks controls foot and vehicle traffic to and from the beach, thus minimizing impact to the dune vegetation and private property. The Town of Hampton has installed one (1) boardwalk at Woodstock Street. There are several locations where the boardwalks are wide enough and substantial enough to carry vehicles including at Hooksett, Haverhill and Ashland Streets. Typically these access points are used by fishermen and lobstermen to remove equipment and by the Seabrook DPW for beach maintenance.

The town has also worked with adjacent landowners to educate them about the need to use the boardwalks to get to the beach and stay off the remainder of the dunes. In spite of these efforts, a number of landowners have installed or maintained small private boardwalks across the dunes particularly just north of Haverhill Street. **See Figure 3 - Photo N**.

Assessment of Beach and Dune System

The width of the South Beach dune system varies, but is typically in excess of 150 feet, with average dune heights of 10 to 15 feet above the beach (crest elevation 25 to 30 feet**). See Photographs 10, 11, 12 and 13 and Figure 2**. Due to the width of the dune system, sand accumulation has not directly impacted residential property owners. Dune height has partially impeded first floor ocean views of a majority of property owners in this area.

Photo 10: Vicinity of Manchester Street, Looking South

Photo 11: Vicinity of Nashua Street, Looking East

Photo 12: Vicinity of Haverhill Street, Looking Northeast

Photo 13: Vicinity of Haverhill Street, Looking Northwest

The total width of the beach and dune system of the South Beach is generally wider than North Beach. At high tide there is limited recreational beach due to the extensively vegetated dune system. The increased setback distance of the shorefront property owners has allowed wind blown sand to accumulate and disperse over a larger area, resulting in dunes lower in elevation and minimizing the obstruction of ocean views. The height and width of this existing dune helps prevent significant storm damage or flooding from occurring.

The location of the vegetated dunes with respect to the high tide line provides relatively less usable recreational beach width near the intersection of Suncook/Hooksett Streets and Manchester Street. A significant dune system, which has been created by the houses and other shorefront structures in this area, has trapped wind blown sand. These dunes have reached elevations over 30 feet. Since windblown sand in this area is prevented from dispersing due to the proximity of the shorefront structures, the dune system continues to grow in height, rather than width, threatening to engulf the houses while obstructing ocean views. **See Figure 3 – Photo I and Figure 2.**

Impact of Coastal Process on the Beach and Dune System

In 1995, Appledore Engineering, Inc. prepared a report for the Town of Seabrook, *Northern Seabrook Beach, Coastal Beach Study*. This study undertook an in depth analysis of the historical development of the Seabrook Beach and Dune System with particular emphasis on North Beach. This study made the following observations regarding existing conditions on Seabrook Beach:

- The beach front residences along North Beach were built in an area that was, and is, subject to periodic attack from storm waves.
- The beach appears to have remained relatively stable following the 1934/1935 stabilization of Hampton Harbor Inlet.
- Seasonal and year-to-year changes in beach profile and volume occur. Depending on the season and year, varying usable beach and protection for the shorefront residences is provided.
- Long-term erosion or accretional trends, if present, are masked by the seasonal and year-to-year variations, including past beach nourishment, based on a relatively short time period (1932 to present).
- Sand build up between the homes and the beach dune is to be expected on a barrier beach system. The homes and shore protection structures contribute to sand build up by locally reducing wind speed (similar to a snow fence).
- Modeling of wave runup on the beach profile indicates that under some wave/storm conditions the build-up of sand in front of the existing seawalls does promote greater runup than with the seawalls exposed.

Conclusion

A long-term beach erosion problem has not been observed on Seabrook Beach. Seasonal and year-to-year beach erosion tends to reduce usable beach width. Beach front residences located in the North Beach area are subject to periodic storm water attack. Beach front residences, from Manchester Street north to Plymouth Street, are also located in an area prone to wind blown sand accumulation.

Consequently, any beach management program must be cognizant of these incremental erosion and accretional trends both from stormwater attack and wind blown sand.

Economic Assessment Of Beach Area

The economic value of the Seabrook/Sun Valley Beach area can be directly attributed to the beach environment.

The Seabrook and Sun Valley Beach area consists largely of private single family and duplex homes. There are also a number of businesses located on Route 286, Route 1A and River Street, which are considered to be part of the beach area.

When considering the economic value attributed to the beach environment, it is necessary to include the fact that the beaches along the Atlantic Ocean and Seabrook Harbor are attractive to year-round residents, seasonal residents and tourists throughout the year. The aesthetics and high quality of the water, beach, sand dunes and natural environment of the Seabrook area provide an attractive draw for public recreational use.

Seabrook Beach is the southern entrance to the Scenic Coastal By Ways established by the State of New Hampshire for the benefit of tourism. Recreational attractions in the area include: swimming, sunbathing, beach walking, bird watching, biking, boating, kayaking, fishing, whale watching, and day and evening party boat cruises. Businesses in the area that draw public interest include: several restaurants, convenient grocery stores, real estate offices, party boat fishing and whale watching, fish and bait markets, the Yankee Co-operative fishing industry, and a kayak sales and rental store.

Value of Business and Residential Properties

Business

There are 16 businesses in the Seabrook Beach area with total assessed values of $7,070,200. The business owners are mainly dependent upon the tourist trade to derive their income and contribution to the community. Maintaining an attractive safe beach environment provides an attraction for tourists and residents alike. As an indicator of the market strength in this beach community, the NH State Liquor Commission is planning to open a retail store in June 2004 at Preston Plaza on Route 1A.

The economic impact from these businesses can be further analyzed with the values of the room and meal taxes submitted to the state. The state does not make mean figures available on a town-by-town basis. However, an informal survey of business owners resulted in the fact that most businesses in the beach area are earning from a half a million to several million dollars in revenue, which contributes largely to the economic impact of the area, both directly and indirectly.

Residential

Assessed values of residential properties in the beach area have continued to rise dramatically over the past decade. At present, there are a total of 810 residential properties in the Seabrook/Sun Valley area with a total assessed value of $350,044,000. On average each property represents approximately $432,153. The property taxes generated to the Town of Seabrook based on these assessed values is substantial. Consequently, it is in the best interest of the town to maintain an aesthetic quality of the beach area as well as to provide the necessary measures to ensure the public safety and welfare of the beach residents.

The town assessed (non taxable) properties for both Seabrook and Sun Valley amount to $3,427,200. In total the assessed property value of the beach area is $360,541,000.

The demographics of the residential properties have changed substantially over the past decade. Due to the amount of property sales and conversions from seasonal to year-round homes, the number of rental properties has decreased. However, the rental incomes have been maintained at a high level due the fact that people are willing to pay more to rent at this residential beach environment.

Current Activities to Maintain Aesthetic Quality at Beach Area

With the aid of state grant funding, the Town of Seabrook built and maintains an attractive and much needed restroom facility located at the public parking lot for visitors. The Seabrook Beach Civic Association consisting of resident volunteers are participants in the Adopt-A-Highway program sponsored by the State of New Hampshire and conducts several trash pickups along Routes 1A and 286. The group also maintains several areas along the same route that have been beautified with plants and flowers. This effort contributes to keeping the area attractive and inviting for residents and visitors.

Two (2) additional activities also contribute to the health of the beach area. The Seabrook DPW and the NHDES are jointly sponsoring a program that retrofits stormwater catch basins to filter pollutants prior to discharging into the harbor. In addition, the Beach Association is working with the town and NHDES to stencil catch basins and drains to discourage dumping into these structures.

The economic value of the Seabrook/Sun Valley area relies heavily on the protection and maintenance of the beach environment.

Beach User Counts

In order to better assess the demand for use of the Seabrook/Sun Valley Beach, members of the Seabrook Beach Civic Association conducted a census of beach users during two (2) days in August of 2003, through the use of a mobile photographic unit. Below is a table that summarizes the results of this census by date, time of day, beach location and the number of individuals at each of these locations.

On Friday August 22nd, there were a total of 747 beach goers during the late morning and 649 during the mid-afternoon. Based on the break down of the counts during the late morning, it would appear that there was greater concentration of beach goers between Concord and Nashua Street than elsewhere on the beach. **See Figure 2 for the location of these areas.** This concentration may be due to the available access at Hooksett Street. Unfortunately, the same location categories were not used for the afternoon counts, but it is clear that there were fewer beach goers and there does not appear to be as clear a concentration of beach goers. There may also be a similar concentration on either side of the Hooksett Street access. There were no counts below Haverhill Street to the state line as there were in the Saturday counts.

Date	Time	Location	Head Count
08-22-03	11AM to noon	Harbor	23
		Sun Valley to Ashland Street	112
		Ashland to Concord	197
		Concord to Hooksett	214
		Hooksett to Nashua	126
		Nashua to Haverhill	98
		Total ocean front beach	**747**
	2PM – 3PM	Sun Valley to Ashland Street	190
		Ashland to Hooksett	175
		Hooksett to Haverhill	284
		Total ocean front beach	**649**
08-23-03	11:30 AM	Hampton River mouth to Haverhill Street	436
		Haverhill south to State line	245
		Total ocean front beach	**681**
	3:30 PM	Hampton River mouth to Haverhill	550
		Haverhill south to State line	350
		Total ocean front beach	**900**

The counts taken on Saturday the 23rd were aggregated into two (2) categories and the counts were extended to the Massachusetts state line. Consequently, direct comparisons to Friday's counts are limited. However, in general there appear to be fewer beach goers during both time periods for the area between the Hampton River (Sun Valley) and Haverhill Street. For example, on Friday morning in this area there were 743 beach goers whereas on Saturday morning there were only 436. In addition, the total numbers cannot be directly compared since the Saturday counts included additional beach area. For example, even though there were total of 900 people on the beach Saturday afternoon, 550 of these were north of Haverhill Street which compares to the Friday afternoon count of 649 for the same area.

Analysis of this information makes specific conclusions with regard to the total numbers of beach goers and any concentrations by specific locations some what problematic. However, it is clear that based on these counts, the area north of Haverhill Street and including North Beach tends to have more beach goers than the area south of Haverhill Street.

Based on personal observation, the most heavily used areas in South Beach are associated with the New Hampshire Street access area. The Haverhill Street access area is also heavily used. The level of beach use is likely tied directly to the availability of parking in these areas. (Personal Communication with Susan Foote, May 3, 2004).

The Beach Count Program also involved the use of walking volunteers who counted beach users during this same period. The results are as follows:

Date	Time	Location	Head Count
08-22-03	10:30 AM	North Beach, Hooksett Street to the Jetty at Sun Valley	635
	2:15 PM	South Beach, Chelmsford Street to State Line	398
08-24-03	10:30 AM	North Beach, Hooksett Street to the Jetty at Sun Valley	485
	3:40 PM	South Beach, Hooksett to State Line	340

The Beach Management Committee believes that these counts may be lower than most weekends in the summer. Typically, school starts before Labor Day thus reducing the number of beach goers and this observation took place on the last weekend of summer.

The counts in the previous section were obtained from a filming done on a mobile unit. The film was then slowed down and stopped to take a count of people. The difference in counting technique could account for variations in the data, since it would appear that the volunteers recorded more beach goers than the photographic census on Friday the 22nd.

Beach User Survey

In March 2002, the Beach Management Committee prepared and distributed a survey to all households in Seabrook to determine the nature of beach use on Seabrook Beach. The final results are tabulated in a report that is attached to this beach management plan in **Appendix B**. There was a 17% return rate. The results of the survey are summarized below.

Most of the survey respondents (48% or 84 individuals) indicated that they use South Beach for the most part with 31% preferring North Beach. A similar number (46%) indicated that they frequent the beach mostly in the summer with 21% preferring the spring and another 21% preferring the fall and most respondents use the beach at least once per week (90%). The most frequent activities for the beach users included walking (31%), sunbathing (27%) and swimming (22%). Other activities included sightseeing, bird watching and fishing.

The Committee was also interested in citizen reaction to dune management and protection. By an overwhelming majority (82%) the respondents felt that the dunes enhanced the beach environment. Although some respondents were concerned that the dunes were too large, most agreed that they were satisfactory as is or that they were not large enough. A majority (56%) indicated that there should be a designated wildlife resource area in the dunes.

Finally, the Committee wanted to determine the level of use at the town access areas (public boardwalks) to the beach and the level of support for beach maintenance by the town. Although all the access areas were used, the most frequently used were Hooksett Street (19%) and Haverhill Street (23%). And while most people do not tend to use the existing observation platforms (65% of the respondents did not), a similar number do use the benches that are located throughout the beach area. Almost all respondents were in favor of town financial support for annual beach maintenance with over 69% supporting an expenditure of $15,000 or more annually.

The survey also asked for written comments. For the most part respondents were interested in maintaining and protecting the beach dune environment as a pleasant area for low impact recreation. There were a number of comments with regard to banning personal watercraft in the ocean area near the beach for noise and safety reasons.

In summary, there appears to be frequent use of the beach for much of the year for a variety of activities, not just swimming and sunbathing. There seems to be a strong interest in maintaining the dune environment even as a "wildlife refuge". Although all of the access points to the beach are used, the most frequently used are Hooksett and Haverhill Streets. There is also strong support for the town to spend funds on beach maintenance.

Regulation Of Beach And Dune Activity

Numerous regulatory agencies have the authority to manage and control activities and uses in the Seabrook Beach and Dune area. These include federal, state and local entities. Below is a discussion of the various agencies, which may have legal or project jurisdiction in the Seabrook Beach area.

Federal

U. S. Army Corps of Engineers

The Corps regulates work in or affecting navigable waters under Section 10 of the Rivers and Harbors Act of 1899. The Corps may plan, design, and contract improvements including navigational channels, erosion control, flood protection and beach restoration. The Hampton Harbor Inlet is such a project. Under Section 404 of the Clean Water Act the Corps may also regulate dredging and filling in all waters of the U.S. In the beach area this would involve any dredging or filling below the Hide Tide line. Although the beach area may come under the jurisdiction of the Corp sand dunes would be excluded.

Federal Emergency Management Agency

FEMA prepares flood hazard area mapping through the national Flood Insurance Rate Program for purposes of property flood insurance rates and resource protection. This agency also provides flood insurance subsidies and administration as well as disaster relief. This agency has prepared *Flood Insurance Rate Maps* for Seabrook dated June 17, 1986. In order for communities to belong to this program it must adopt floodplain regulations. See Local Regulatory discussion below for more information about this program in Seabrook.

Fish and Wildlife Service

The US Fish and Wildlife Service is responsible for implementing the Endangered Species Act, Section 9 and its implementing regulations 50 CFR Part 17. All of Seabrook/Sun Valley Beach area is an identified breeding area for the Piping Plover. The service has prepared a guidance document for protection and management of this habitat in cooperation with the Army Corps of Engineers, FEMA and the New Hampshire Fish & Game Department. This document is entitled, *Guidelines for Managing Recreational Activities in Piping Plover Breeding Habitat on the U.S. Atlantic Coast to Avoid Take Under Section 9 of the Endangered Species Act*, April 15, 1994. Active management and protection of this habitat area typically occurs between April and August of each year. **See Appendix C for a copy of these guidelines.**

State of New Hampshire

New Hampshire Department of Environmental Services--Wetlands Bureau

The state of New Hampshire regulates activities in wetlands through the Wetlands bureau of NH DES under RSA 482- A. Wetlands are defined to include sand dunes under RSA 482-A:2 and A:4, which regulates dredge and fill in wetlands. The regulations define sand dunes as a hill or ridge of sand piled up by wind.

Under RSA 482-A:3 (Fill and Dredge in Wetlands), VII a:

> Permit required to alter or remove any sand or vegetation from any sand dune in the state; except "any person may remove sand which blows or drifts onto any lawn, driveway, walkway, parking or storage area, or boat ramp, or which blows or drifts in, on, or around buildings or other structures owned by the person".

Under Section VIII no person shall operate or ride any mechanized or off highway recreational vehicle on any sand dune in the State of New Hampshire. However, under Section IX there may be exemptions for driving vehicles on dunes; including maintenance vehicles, emergency vehicles and commercial fishermen.

As part of the Wetlands Bureau's regulatory jurisdiction, it has issued a set of administrative rules to clarify the requirements for an application to disturb sand dunes and stabilize shorelines. These include the following:

Wt 101.32 Lists dune vegetation in the definition section as species commonly found associated with sand dunes, e.g. American Beach Grass.

Wt 302.04 Requirements for Application Evaluation for a Dredge and Fill Permit.

- Rarity of sand dunes
- Exemplary natural communities
- Impact on public commerce, navigation and recreation
- Benefit of the project health, safety and well being of the general public
- Extent to which project impacts beach or tidal flat sediment replenishment and movement of sediment along the shore
- Impact on the tidal wetland's ability to dissipate wave energy and storm surge
- Alternatives

Wt 303.05 Projects in jurisdiction that do not require a permit

- Maintenance of public beaches in tidal waters for the purposes of removal of seaweed, algae or other debris: must be done at low tide, no work in the water, done by state or local agency (not private land owners), no removal of sand and/or re-grading or recontouring of the beach.
- The re-grading and recontouring of public beaches as necessary to maintain the integrity of seawalls and to insure the safety and protection of the public on beaches maintained by the state of New Hampshire department of resources and economic development.
- The administrative rules also define criteria for shoreline stabilization.

Wt 404.01 Least Intrusive Method

- Shoreline stabilization shall be by the least intrusive but practical method.

Wt 404.03 Vegetative Stabilization

- If space relative to the highest observable tide line, water turbulence, and soil conditions allow, vegetation of existing sand beach or dunes, or construction of vegetated sand dunes shall be required.

Wt 404.04 Rip-rap

- Rip-rap applications shall be considered only where the applicant demonstrates that anticipated turbulence, flows, restricted space, or similar factors render vegetative and diversion methods physically impractical.

<u>New Hampshire Department of Environmental Services--Shoreland Program</u>

The state also regulates activities in shoreland areas under the RSA 483-B:2 Comprehensive Shoreland Protection Act. Relevant purposes of this act include:

- Protection of buildings and lands from flooding and accelerated erosion.
- Conservation of shoreline cover and points of access to inland and coastal waters.

- Protection of public use of waters, including recreation.

Under this act the state has jurisdiction for managing certain activities within 250' from highest observable tide line (excluding storm events). Within this area the state has established standards for uses, vegetative cutting, building and septic system setbacks. In reality, since the state has only one shoreland regulator for the whole state, it relies on local regulators to inform the state of any violations or to implement this program informally through its local regulatory process.

New Hampshire Department of Environmental Services—Land Resources Management (Site Specific) Program

Under RSA 485-A:17 (Water Pollution and Waste Disposal) the state regulates disturbance of land for all activities if the disturbance of land is 100,000 sf or greater through the terrain alteration or site specific permit process. However, in the shoreland zone this threshold is reduced to 50,000 sf.

New Hampshire Fish & Game Department

This agency, in cooperation with the U.S. Fish and Wildlife Survey, is responsible for implementing the Endangered Species Act. This responsibility includes protection and management of the Piping Plover breeding habitat.

Towns of Seabrook and Hampton

Zoning Ordinance

The Towns of Seabrook and Hampton control the types of uses and activities within each community's jurisdiction through the designation of use districts as defined in the Zoning Ordinance. The Seabrook Beach area is within the 2R Residential Zone in Seabrook, which is primarily a zone that allows for single family residential units and accessory uses. The Seabrook Beach Village District administers the ordinance for individual lots and establishes dimensional requirements for lot dimensions, setbacks, height and open space. Any activity that includes more than one lot or is a commercial activity is regulated by the town Planning Board.

The Town of Hampton has designated the Sun Valley area as the RA or Residence A Zone which, like Seabrook, is primarily a zone for single-family residential units and accessory structures. The building inspector is responsible for implementing the requirements of the ordinance for single lots.

Floodplain Development Ordinance

The Towns of Seabrook and Hampton regulate activity in the floodplain through Flood Development Ordinances in an effort to protect public health, safety and welfare. Any new construction or substantial improvement to an existing structure in the defined flood hazard area must adhere to the standards and regulations of the appropriate town ordinance. In Seabrook these ordinances are administered through both the town Building Inspector and the Beach Village District Inspector. A portion of the Seabrook Beach area is within the Coastal High Hazard Area, which requires more stringent building standards.

Public Use Restrictions

Under Chapter 211, the town regulates public use and activities on the town-owned beach and dune area eastward from the boundaries of waterfront lots. The town prohibits any structures, filling or paving in this area as well as removal of natural vegetation from the dunes area. The "dunes area" shall not be used for picnicking, sunbathing or other beach activities. There shall be no commercial activity or use of motor vehicles except for the extensions of Hooksett Street, Haverhill Street and State Line Street, which may be used by commercial fisherman and licensed lobsterman as access to the beach front motor vehicles for purposes of retrieving their equipment. See **Appendix D**, Public Use Restrictions for the full text of this regulation.

Seabrook Beach Rules and Regulations

Under Article IV of the Seabrook code, the town has established rules and regulations that prohibit alcoholic beverages and motor vehicles on the beach as well as regulating hours of operation, use of fires and charcoal grills and dogs on the beach. See **Appendix D** for the full text of this regulation.

Domestic Pet Control

The Town of Seabrook under Chapter 152—Dogs—requires that all dogs be registered and licensed. Furthermore, under 152-2 it is unlawful to permit any dog to run at large at any time. Under Chapter 202 no dogs are allowed on the beach from June 1st to September 15th of each year. Dogs are allowed on the beach between September 15th and June 1st, but must be on a leash.

The Town of Seabrook also requires that all cats are registered and licensed under Chapter 146—Cats. It also provides that any cat that is unlicensed and is allowed to run at large may be declared a nuisance and can be impounded. (Seabrook has experienced a problem with unlicensed feral cats in the beach and dune area that have become a nuisance particularly with regard to impact on Piping Plover breeding.)

Recent Beach Management Activities

The Town of Seabrook Department of Public Works has been performing maintenance activities within the guidelines of the New Hampshire Department of Environmental Services. The activities include:

- Periodic machine raking of debris on the areas of the beach used by the public. This has been done without disturbing areas where there is presence of dune grass.
- Erecting storm fencing in the fall on North Beach areas in front of private residences and in front of public access walks on South Beach in an effort to contain wind blown sand. The storm fencing is removed in the spring.
- In 1996 a permit allowed the town to re-grade the North Beach by pushing the windblown sand away from beach walls toward the ocean. This procedure was repeated in 2001 in order to maintain a level of protection to private properties.
- Maintenance of the public access boardwalks. At times the boardwalks need to be raised and re-graded due to shifting sand. The walks are then reset in order to maintain safe walking conditions.
- Beach nourishment has been done either by transporting the harbor dredge material by pipes to the beach or most recently, transporting by truck and distributing the sand with earthmoving equipment. Beach nourishment was most recently completed in March of 2004 with a limited amount of sand from harbor maintenance dredging that was trucked onto the beach and placed as a berm above the high water line in a few isolated areas. **See Photo 14.**

Other organizations or private individuals have also contributed to beach management activities, and include the activities described below:

- Beach Management Committee members conducted a visual count of persons using the beach during the last weekend in August 2003 to aid in the assessment of public use analysis. Also, a policeman riding on the ATV filmed the beach on the same weekend for a population study.
- The local schools perform an annual Coastal Cleanup in the fall to collect and document man-made debris.
- The NH Fish & Game Department conducts a program annually to protect the nesting population of Piping Plovers in the South Beach Area from approximately April through July or August.
- The Seabrook Conservation Commission posted signs regarding the regulation of feral cats and their impact on protection of the Piping Plovers.

- Individual volunteers, who walk the beach periodically, carry a plastic bag and pick up trash to help enhance their environment.

- The Seabrook Beach Civic Association sponsored the placement of memorial benches located at public access ways for the enjoyment of all visitors.

Photo 14 – Beach Nourishment, March 2004

Beach Management Methods

Beaches in the local New Hampshire/Massachusetts barrier island system use a mixture of beach stabilization methods to attempt to retain sand or armor the shoreline from storm damage. The traditional methods include shoreline armoring with seawalls or rubble stone structures, such as the Hampton Beach seawall, the perched beach rock sill at Half Tide Jetty, or the stone groins on Plum Island. More recent "softer" methods involving dune creation have been used at Hampton Beach State Park, Seabrook South Beach and at Salisbury Beach. These methods are typical along the east coast and have had mixed success. The "hard" structures typically last longer than the "soft" structures/methods, however the "hard" structures, particularly when used without concurrent beach fills or nourishment, are typically thought to cause adverse changes to the dynamic beach/dune system from wave reflection and increased scour. The "soft" methods can be quite successful if there is sufficient beach width to allow the construction of dunes with proper setback from wave action so that they will be less prone to frequent storm damage. The Town of Salisbury has reported success with dune creation using snow fencing and some of these dunes have been planted with dune grass (based on discussion with the Salisbury Public Works Director in April 2004).

There are other methods and numerous variations on these methods that have been tried in this country and overseas, some of which might be categorized more as science experiments, rather than practical long-term cost effective methods for beach management. An expanded discussion and analysis of these methods is found in **Appendix E**. The following list summarizes possible beach management methods:

Sand Grading

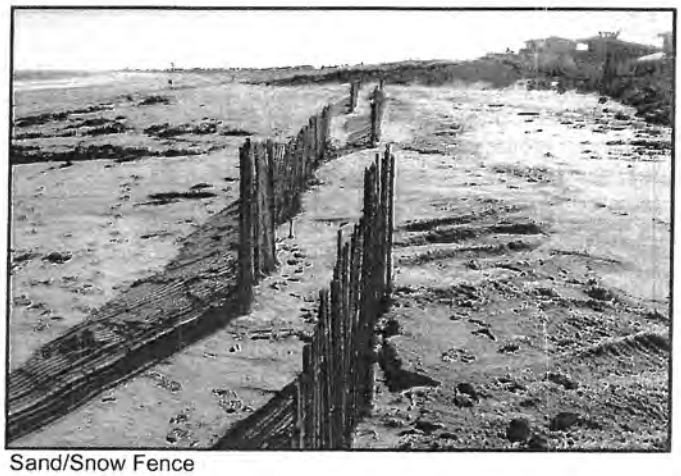
The moving of sand on the beach or dunes with mechanical earth moving equipment.

Beach Raking

Raking of the beach with tractor mounted rake to remove seaweed and trash.

Sand/Snow Fence

Trapping of wind blown sand with simple barriers, including sand or snow fencing.



Sand/Snow Fence

Sacrificial Dune Construction

Creation of a sand dune, typically a non-vegetated sand berm formed with earth moving equipment or possibly created with a sand-covered, sand-filled geotube (see photo). The sacrificial nature of this type of dune is based on its construction close to damaging wave action and high likelihood of partial or complete erosion during significant storm events.

Sacrificial Sand Berm- Hookset Street 2004

Sand filled geotube berm (Photo courtesy of Bradley Industrial Textiles, Inc.)

Planted Dune Construction

A vegetated sand berm, constructed farther inshore to lengthen life expectancy and a structure typically expected to survive most storm events due to the higher cost associated with developing a vegetation cover. Since the construction of vegetated dunes does remove sand from the beach system for all but the most severe storm events, the construction of vegetated dunes may require imported sand to minimize the adverse impacts on down-drift beaches. Wind blown sand will tend to accumulate on vegetated dunes, causing growth in dune height, which can affect wind patterns and block ocean views.

Planted Dune (Photo courtesy of the US Army Corps of Engineers)

Sand Adhesive

This is a non-toxic water based adhesive typically spray applied to the sand to help prevent wind blown sand drifting. Foot traffic reportedly breaks up the crust formed and at least some formulations may adversely impact plant growth. Only very limited use on beach and coastal dunes to date based on document research.

Seawalls and Revetments

These are traditional walls or slope armoring typically built along the inshore edge of the beach to protect upland areas from storm wave erosion and flooding. Typically a high capital cost method with long-term impacts.

Seawall with stone revetment toe protection

Elevating Shoreline Buildings

A technique applied to both new and existing buildings to elevate the habitable portions of the buildings on piles or columns, above the storm flood elevation. Typically requires high capital cost and has significant social/political and visual impacts.

House Elevated Above Flood Elevation (Photo courtesy of FEMA)

Beach Fill or Nourishment

The method involves the placement of sand onto the beach from an inland borrow area (beach fill) or from a dredging project (beach nourishment). This procedure does require that the imported sand grain size and shape be similar to the existing sand on the beach to minimize potential beach changes. There may be adverse environmental impacts at the submerged dredging site or at the terrestrial borrow area.

Beach Nourishment at North Beach

Sand By-Passing System

A hydraulic dredging system, where sand accumulating on one side of a barrier or inlet due too long-shore drift, is pumped beyond the barrier or inlet to nourish the down-drift area. Requires high capital and operating costs, and the system may be shut-down for significant portions of each year for beach use and environmental reasons.

Beach Dewatering

This is a mechanically pumped drainage system intended to reduce seaward sand particle movement in the wave runup zone by draining the face of the beach and absorbing wave backwash. Complex system prone to storm damage, which can be classed as more of a science experiment, rather than a practical beach management method.

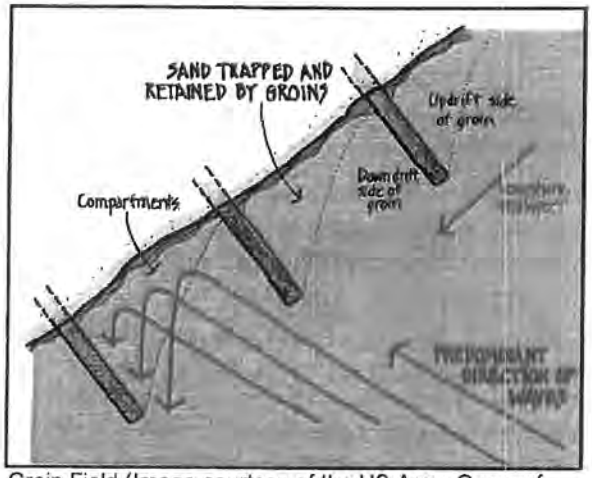
Offshore Breakwater

This is an artificial structure installed offshore of a beach to reduce wave energy and stimulate deposition of sand in the more sheltered zone. This typically would be a stone rubble breakwater, which may be partially submerged or segmental. In present day installations it is typically a permitting requirement to pre-fill the sheltered areas with sand to reduce the potential impacts of sand retention in the breakwater, otherwise these structures can affect down-drift beaches. Typically a high capital cost method with long term impacts.

Segmental Offshore Breakwater (Photo courtesy of Baird & Associates)

Groins

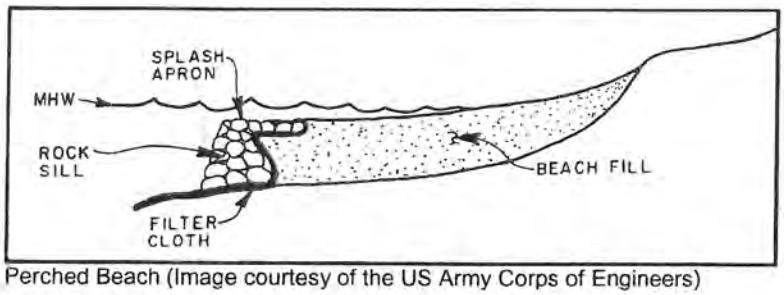
These are barriers typically built from concrete, steel or timber sheet piling, or stone rubble, and oriented perpendicular to the beach through the wave runup zone intended to trap sand moving down the littoral drift. In present day installation of groins it is typically a permitting requirement to pre-fill the groins with sand to reduce the potential impacts of sand retention in the groins, which can affect down-drift beaches.



Groin Field (Image courtesy of the US Army Corps of Engineers)

Perched Beach Sill

This technique involves an underwater retaining wall structure installed at the toe of a beach used to retain a larger volume of sand on the intertidal beach at a reduced slope, or with an increased crest width. The retaining wall structure may be comprised of traditional construction materials, or may be formed with sand filled geotubes. A potential hazard for bathers.



Perched Beach (Image courtesy of the US Army Corps of Engineers)

Artificial Seaweed

A manufactured product using synthetic fabric materials to simulate the function of seaweed to reduce water motion and encourage sand accretion. Trial installations in surf zones have indicated relatively short life expectancies, a possible beach debris source if storm damaged. A potential for adverse impacts to swimmers.

Vision and Goal Statement

The Towns of Seabrook and Hampton recognize their responsibility to preserve, protect and maintain the Atlantic beach and dune system that extends from the Hampton-Seabrook Harbor Inlet south to the state boundary line with Massachusetts and which forms a portion of the larger Hampton-Seabrook barrier beach system. This responsibility includes maintaining the integrity of the beach environment as well as protecting private and public property and providing quality public recreational use for town residents.

The Town of Seabrook is committed to this vision and has already established a procedure for annual municipal funding for beach maintenance. Furthermore, the Towns of Seabrook and Hampton are committed to establishing a long term beach management plan that will be implemented over a period of several years. This commitment includes implementation of beach and dune management practices and continuance of a planned monitoring program to assess proposed beach management activities.

The following summarizes the long-term goals for Seabrook Beach and Sun Valley Beach:

General for Whole Beach

- Provide for public access to Seabrook/Sun Valley Beach for both residents and visitors while ensuring the integrity of the beach residential area.
- Maintain Seabrook/Sun Valley Beach in a manner that allows public recreational use.
- Manage Seabrook/Sun Valley Beach in cooperation with adjacent property owners.
- Maintain and protect the quality of the beach and dune environment.
- Work cooperatively with appropriate state agencies to manage and regulate the beach and dune environment in a manner consistent with this Long Term Beach Management Plan.
- Preserve and protect the ecological habitat of the indigenous beach and dune plant and animal species.
- Minimize potential for dune grass fires in order to protect private homes and reduce town liability.
- Establish and maintain a beach and dune profile to minimize soil loads on existing private homes.

North Beach (Including Sun Valley)

- Maintain a beach profile best suited to minimize the potential for property damage during storm events.
- Minimize the impact of wind blown sand along the front of all private properties and public access ways.

South Beach

- Discourage private boardwalks in the vegetated dunes.
- Maintain the beach seaward of the existing dune vegetation for public use.
- Minimize the impact of wind blown sand along the front of all public access ways.
- Protect and manage the natural habitats and vegetation of the beach/dune environment.

Management Strategies

Assessment of Alternatives

The beach management methods previously summarized in the inventory section of this plan have been evaluated specifically for this site and for their ability to meet the goals and vision for future maintenance and protection of Seabrook Beach and the associated dune system. A detailed discussion and evaluation of many of these alternatives is documented in the 2002 Coastal Beach Study, prepared by Appledore Engineering, Inc. for the Town of Seabrook and an updated discussion/evaluation is located in the **Appendix E**. The following methods are generic in nature and are not intended to evaluate specific manufactured products. The matrix in Table 1 summarizes these assessments and provides guidance for selecting the best strategies for implementation in the near term and long term. The implementation schedule section presents a preferred schedule for implementation of the selected strategies in this plan, based on consensus of the Beach Management Committee. Actual implementation may be dependent on available funding and may be tied to the availability of state and federal grants.

General Recommendations

Based on recommendations from the Beach Committee and analysis of the beach management alternatives in Table 1, the following general recommendations are feasible and are consistent with the goals of this plan. **See Figure 6 for a Concept Plan that identifies the location of many of these activities.** It is anticipated that specific implementation of many of these general methods will involve some small scale trials to determine the most effective beach and dune management procedures, such as the best sand fence orientations and configurations relative to the prevailing winds, proximity to wave runup and public beach users. Funding and volunteers will be sought to document the specific details of the trial implementations, resulting in the development of a beach management procedures manual which will provide guidance for larger scale implementation of the most effective beach management strategies.

- Conduct a complete survey of the properties along the beachfront (Seabrook and Hampton) to establish property boundaries and control points for long term beach and dune management.
- Continue to provide a line item in the Town of Seabrook annual budget for beach maintenance issues.
- Encourage the Town of Hampton to provide consistent funding for long term beach management.

- Maintain all of Seabrook Beach for public recreational use, including raking to remove trash, removing washed-up fishing gear, and minimizing significant build up of seaweed.

- Develop beneficial uses for the material raked up in beach cleanup (primarily seaweed). Preference should be given to those uses, which benefit the beach environment and shoreline protection.

- Implement a seasonal sand fencing procedure to ensure the containment of wind blown sand along the front of all properties and public access ways on the North Beach and along the front of all public access ways on the South Beach.

- Establish/maintain public boardwalks at street ends that allow beach access. In the dune area, these boardwalks are intended to minimize pedestrian and vehicle disturbance of dune vegetation. Consider use of elevated non-vegetated sand berms to minimize wave overtopping, wash-through and flooding during storm events in the boardwalk locations.

- Accept clean sand on the beach from clean up of wind/wave deposited sand on private properties directly adjacent to the beach.

- Work with adjacent property owners during town-sponsored sand re-location projects to grade the beach/dune areas along adjacent property lines in a manner that is compatible with the abutting land contours and waterfront structures. This grading can be accomplished through the following:

    1. Nourishing the beach when sand is available from dredging at Hampton/Seabrook Harbor. Work cooperatively with appropriate state agencies, such as the Division of Ports and Harbors, to effect this program.

    2. Establishing and maintaining an appropriate dune profile of dune/beach grass areas close to private homes that are immediately adjacent to the beach/dune system to avoid damage to buildings. Such areas include properties at the head of Manchester and Hooksett Streets and properties just south of Ashland Street. This specific project would have an order of magnitude cost of approximately $18,000 - $23,000 including revegetation. The excess sand can either be used to re-grade the North Beach or used to restore the dune at New Hampshire Street.

    3. Re-grading North Beach as described in the North Beach Recommendation below.

- Develop an educational program for beach and community residents for residents (seasonal and year-round) highlighting beach management strategies and public land use restrictions. Such a program could include:

Recommendations - South Beach

At the South Beach the following additional beach management actions are feasible and should also be used:

- Restore dune and create public access boardwalk at New Hampshire Street in the existing washout area. It is recommended that the new boardwalk be on-grade, similar to the existing boardwalk designs, to allow future reconfiguration to match changes in dune height. The restored dune should have a similar profile and contours as the existing dune, but also provide for sufficient public access to, and use of, the beach. The dune restoration shall take place outside the Piping Plover breeding season. Sand could be imported for this restoration from the Manchester/Hooksett Street dune project. The order of magnitude cost to complete both projects would be approximately $18,000 - $23,000.

- Undertake a fencing program in cooperation with the New Hampshire Wetlands Bureau to provide preferable nesting habitat for Piping Plovers.

- Consider establishing a parallel boardwalk along the back dunes, in front of private properties between Haverhill Street and Nashua Street to allow residents easier access to the public beach boardwalks. Such a project could only be undertaken as funds allow.

- Maintain to the greatest extent practicable the natural, indigenous plant and animal community at the South Beach dune system. Maintenance of these communities can be accomplished through:

    1. Removal of invasive plant species and

    2. Continuing to implement the Piping Plover protection program in consultation with US Fish & Wildlife Service, NH Fish & Game and the NH Audubon Society. As part of the proposed educational program recommended previously, the Towns of Seabrook and Hampton could highlight the necessary cooperation with these agencies to protect Piping Plover habitat. Continuation of appropriate signage about the feral cat problem is an example.

Implementation Program

The following is the preferred implementation schedule for the recommended beach management strategies. Each action item is prioritized into one of the following categories:

- Immediate/Continual—immediate implementation or recurs on an annual or periodic basis
- Short Term—implement within 1-2 years
- Medium Term—implement within 3-5 years
- Long Term—implement after 5 years

Where a particular activity requires significant financial support, its implementation will be dependent on available funding and may be tied to the availability of state and federal grants. This program also identifies the entity(ies) with primary responsibility for implementation of a specific action item. The Beach Management Committee will be the primary party for coordinating this implementation program. Where the Committee is a key entity for implementation of a specific action, it has been identified as the responsible party.

Immediate/Continual

Action	Responsibility
1. Provide annual beach maintenance funds in the Seabrook and Hampton town budgets.	Budget Committees, Beach Management Committee
2. Undertake periodic beach raking and trash removal.	DPW
3. Develop beneficial uses for collected seaweed.	Conservation Commission, DPW
4. Install sand fencing on an annual basis.	DPW
5. Maintain and repair beach boardwalks annually.	DPW
6. Accept and place clean sand onto beach from adjacent beach property owners as part of residential cleanup.	DPW
7. Accept and place sand from harbor dredging projects, as available, for beach nourishment.	DPW, Beach Management Committee, State Agencies
8. Re-grade North Beach periodically in coordination with abutting property owners.	Beach Management Committee, DPW
9. Remove and re-grade the dunes encroaching on private property at Manchester and Hooksett Streets and between Ashland and Tilton Streets.	DPW, Beach Management Committee
10. Prepare Beach Management Guidelines that document Best Management Practices and Procedures.	Beach Management Committee
11. Apply for grants and technical assistance from non-profit, state and federal organizations.	Beach Management Committee
12. Remove invasive species in order to maintain indigenous plant habitat on South Beach dune system	Conservation Commission
13. Continue to implement annual piping plover protection program.	NH Fish & Game, Conservation Commission
14. Monitor beach management activities and implementation program annually.	Beach Management Committee

Short Term

Action	Responsibility
1. Complete beach and dune property line and topographic survey.	Town Manager
2. Construct New Hampshire Street public access boardwalk and restore washout area.	Town Manager/Beach Management Committee
3. Establish 30-foot wide firebreak.	Town Manager/Beach Management Committee
4. Develop an educational program for beach and community residents.	Conservation Commission

Medium Term

Action	Responsibility
1. Consider establishing a parallel boardwalk along back dunes (Haverhill to Nashua Streets) if and when are funds available.	Town Manager/Beach Management Committee
2. Establish fire break between dune grass and adjacent homes.	DPW

Long Term

Action	Responsibility
1. Evaluate this Long-Term Beach Management Plan.	Beach Management Committee