

City of Newburyport
Plum Island
Beach Management Plan

Submitted to:

Newburyport Conservation Commission
60 Pleasant Street
Newburyport, MA 01950

Submitted by:

City of Newburyport
60 Pleasant Street
Newburyport, MA 01950

In association with:



190 Old Derby Street
Suite 311
Hingham, MA 02043

JULY 2009

Table of Contents

I. PURPOSE OF THE PLAN	1
II. ENVIRONMENTAL REGULATIONS.....	3
A. MA WETLANDS PROTECTION ACT (WPA) (MGL c. 131. s. 40).....	3
B. ADDITIONAL REGULATIONS.....	3
1. Local	3
2. State.....	4
3. Federal.....	4
III. PUBLIC USE, ACCESS AND SAFETY	5
A. PUBLIC USE	5
1. Public Facilities.....	5
2. Public Recreation	5
B. PUBLIC ACCESS	8
1. General.....	8
2. Pedestrian Access	9
3. Vehicular Access.....	10
4. Maintenance of Public Facilities and Access Ways	11
C. PUBLIC SAFETY	11
1. Lifeguards	11
2. Emergency Response.....	12
3. Beach Patrols	12
4. Water Quality Testing	12
D. SUMMARY OF PUBLIC USE, ACCESS WAYS AND SAFETY RECOMMENDATIONS	12
IV. RESOURCE AREA MANAGEMENT AND PROTECTION	15
A. GENERAL DESCRIPTION.....	15
B. BARRIER BEACH (310 CMR 10.29)	15
1. Definition.....	15
2. Functions.....	16
3. Critical Characteristics.....	16
4. Performance Standards	16
5. Additional Performance Standards per the Newburyport Wetlands Ordinance	16
C. COASTAL BEACH (310 CMR 10.27)	18
1. Definition.....	18
2. Functions.....	18
3. Critical Characteristics.....	18
4. Performance Standards	18
5. Existing Conditions of Coastal Beach.....	19
6. Coastal Beach Management and Protection	19
D. COASTAL DUNES (310 CMR 10.28 AND THE NEWBURYPORT WETLANDS ORDINANCE, C. 6.5, A. II, S. 6.5-28)	21
1. Definition.....	21
2. Functions	21
3. Critical Characteristics.....	21
4. Performance Standards	21
5. Existing Conditions of Coastal Dune	22
6. Coastal Dune Management and Protection.....	22
E. LAND SUBJECT TO COASTAL STORM FLOWAGE (310 CMR 10.04)	25
1. Definition.....	25

2. Functions.....	26
3. Critical Characteristics.....	26
4. Performance Standards	26
5. Existing Conditions of LSCSF.....	26
6. LSCSF Management and Protection	26
F. RIVERFRONT AREA (310 CMR 10.58).....	27
1. Definition.....	27
2. Functions.....	27
3. Critical Characteristics.....	27
4. Presumption.....	27
5. Performance Standards	28
6. Existing Conditions of Riverfront.....	28
G. RESOURCE AREA MANAGEMENT RECOMMENDATIONS.....	29
V. RARE SPECIES AND WILDLIFE MANAGEMENT.....	31
A. RARE SPECIES PROTECTION AND HABITAT MANAGEMENT.....	31
B. WILDLIFE MANAGEMENT	32
C. RARE SPECIES AND WILDLIFE MANAGEMENT RECOMMENDATIONS	32
VI. STORM-RELATED MAINTENANCE AND DAMAGE PROTECTION.....	33
A. GENERAL	33
B. DEBRIS REMOVAL	33
C. ACCESS WAY REPAIR	33
D. STORM-RELATED BEACH AND DUNE MAINTENANCE.....	34
E. STORM-RELATED MAINTENANCE AND DAMAGE PROTECTION RECOMMENDATIONS.....	34
VII. PUBLIC OUTREACH AND EDUCATION	35
A. EDUCATION.....	35
B. LITTER	35
C. SIGNAGE	36
D. PUBLIC OUTREACH AND EDUCATION RECOMMENDATIONS	36
VIII. SUMMARY OF RECOMMENDATIONS	
A. PUBLIC USE, ACCESS WAYS AND SAFETY RECOMMENDATIONS	39
B. RESOURCE AREA MANAGEMENT RECOMMENDATIONS.....	42
C. RARE SPECIES AND WILDLIFE MANAGEMENT RECOMMENDATIONS.....	44
D. STORM-RELATED MAINTENANCE AND DAMAGE PROTECTION RECOMMENDATIONS.....	45
E. PUBLIC OUTREACH AND EDUCATION RECOMMENDATIONS	46

TABLES

Table 1 Authorized Vehicles for Beach Access

FIGURES

Figure 1	Locus Map
Figure 2	Limits of Beach Management Plan
Figure 3	Public Facilities
Figure 4	Public Access
Figure 5	Coastal Resource Areas
Figure 6	Federal Dredging Nearshore Disposal Sites
Figure 7a	FEMA Flood Insurance Rate Map
Figure 7b	FEMA Primary Frontal Dune Delineation
Figure 8	Riverfront Area
Figure 9A	NHESP 2008 Priority Habitat of Rare Species
Figure 9B	NHESP 2008 Estimated Habitat of Rare Wildlife
Figure 10	Plover Nesting Areas

APPENDICES

A	State & City Land Management Agreement – Memorandum of Understanding
B	Executive Order No. 181
C	City of Newburyport Wetlands Ordinance
D	Guidelines For Plum Island Applications
E	Applicable Laws and Regulations
F	2006 DCR Plum Island Access Plan
G	City of Newburyport Standards for Boardwalk and Walkover Construction
H	DCR Guidelines to Dune Stabilization
I	Memorandum of Agreement between Newburyport and USFWS-PRNWR (DRAFT)
J	NHESP & USFWS Guidelines for Managing Recreational Use of Beaches to Protect Piping Plovers, Terns and Their Habitats in Massachusetts
K	Resource Protection Partners
L	FEMA Letter 07-01-0522P
M	Beach Management Plan - Order of Conditions

City of Newburyport PLUM ISLAND BEACH MANAGEMENT PLAN

I. PURPOSE OF THE PLAN

The public beaches in the City of Newburyport, Massachusetts are located on Plum Island, stretching from the city line with Newbury to the northern areas of the island (Figures 1 and 2). The primary public beach is located along the ocean shoreline and the southern shore of the Merrimack River. The city beaches provide a number of recreational opportunities to the public, including swimming, fishing, walking and boating.

Most of the property that is the subject of this plan is owned by the Commonwealth of Massachusetts but is managed by the City of Newburyport. In 1978, the City of Newburyport entered into a land management agreement with Massachusetts Department of Environmental Management (now the Department of Conservation and Recreation). A copy of the original agreement is presented in Appendix A. Executive Order 181 (issued in 1980) dictates that management plans for State-owned beach property shall be prepared and be consistent with state wetland policy (see Appendix B).

Plum Island is a barrier beach which also contains areas of coastal dunes and salt marsh located behind the beach. These coastal resource areas are all located within a complex barrier beach system. Because the city beach is within a highly dynamic and sensitive ecosystem and there is such a great demand for public use, the City of Newburyport is tasked with finding and maintaining a balance between providing safe and enjoyable recreational opportunities to its visitors, while protecting the barrier beach system, which includes fragile coastal dunes, coastal beach, rare species and wildlife habitat.

In Massachusetts, a barrier beach is a resource area provided protection under the Massachusetts Wetlands Protection Act (WPA), Massachusetts General Law (MGL) c. 131 s. 40 and its implementing regulations, 310 Code of Massachusetts Regulations (CMR) 10.00. By definition, a barrier beach consists of two additional protected resource areas, Coastal Dune and Coastal Beach. As such, all activities that occur on a barrier beach fall under jurisdiction of the WPA. In addition, the barrier beach is protected under a local city ordinance—the City of Newburyport Wetlands Ordinance, adopted in 2001 and revised in 2005 (see Appendix C).

The purpose of the Newburyport Beach Management Plan presented herein is to identify issues pertaining to existing resource areas and to establish guidelines for coastal resource protection through appropriate management practices, in order to establish a framework in which the City of Newburyport can conduct sustainable recreation planning, facility improvements and maintenance activities. The primary goal for developing a beach management plan is to allow for the public to pursue recreational opportunities and environmental education in a safe and enjoyable environment, while instituting protection of the existing dune and beach system, wildlife habitat and other important ecological features which are an integral part of these

coastal resources located within the City of Newburyport. The plan includes recommendations for achieving these goals; however, all recommendations within the plan are subject to the City obtaining funding and/or assistance from various volunteer groups.

A. Implementation of Plan Recommendations

This plan outlines current conditions and practices and sets forth recommendations to improve protection of the barrier beach. In order to implement these recommendations, the City of Newburyport will take steps to ensure that this plan becomes a working document with staff appointed to oversee its success.

The City is in the process of forming a Beach Management Committee, made up of representatives from several City departments. The committee's charter will be to implement the Beach Management Plan. City departments that are being asked to participate are the Department of Public Services (DPS), the Harbormaster, Public Safety (Police or Fire), the Planning Office, the Conservation Administrator and the Mayor's Office. In addition, a representative from the Massachusetts Department of Conservation and Recreation (DCR) and a Newburyport resident who belongs to the Plum Island Tax Payer's Association (PITA), a volunteer group on Plum Island, will also be invited to participate.

The Beach Management Committee will undertake the implementation of this plan through the prioritization of recommendations; the creation of project plans for priority projects with timelines; and the pursuit of funding for projects. Ideally, the City will employ someone on a part-time basis to coordinate the activities of this group and help manage projects resulting from this plan; however, this is dependent on funding or securing grant money, as are some of the recommendations put forth in this document.

II. ENVIRONMENTAL REGULATIONS

Numerous local, state and federal statutes and regulations exist to protect barrier beaches and regulate activities within these areas. The following is a listing of the most significant environmental statutes and regulations that apply to activities at Plum Island Beach in the City of Newburyport, presented in accordance with the regulatory agency that oversees them.

A. MA Wetlands Protection Act (WPA) (MGL c. 131. s. 40)

The WPA and its implementing regulations (310 CMR 10.00), are the most significant laws and regulations in terms of use and applicability for the protection of important natural resource areas found on barrier beaches and the activities which occur in these areas.

The WPA also outlines performance standards for the alteration of rare wetland wildlife habitat. Any project under jurisdiction of the WPA and within “Estimated Habitat of Rare Species” is required to submit a copy of a Notice of Intent to the Natural Heritage and Endangered Species Program (NHESP).

Plum Island in the City of Newburyport consists of coastal wetland environments that are subject to the jurisdiction of the WPA and its implementing regulations. The City of Newburyport Conservation Commission (NCC) is the regulatory body responsible for the implementation of the WPA in the City of Newburyport. Their jurisdiction encompasses any activity proposed or undertaken within a wetland resource area or within 100 feet of a wetland resource that will remove, fill, dredge or alter a resource area. The NCC consists of a seven member board appointed by the Mayor. The City of Newburyport Conservation Administrator serves as staff to the NCC and provides the day-to-day administration of the wetland regulations. Guidelines specific to Plum Island have been developed to assist applicants who wish to file with the NCC (see Appendix D).

B. Additional Regulations

Other local, state and federal laws and regulations may also apply to proposed work within the barrier beach. These are listed below and further described in Appendix E:

1. Local

City of Newburyport

- City of Newburyport Wetlands Protection Ordinance (overview and appeal authority of Conservation Commission decisions); administered by and with an initial filing with the NCC.
- Newburyport City Zoning Ordinance:
 - *Plum Island Overlay District*. Governs the lot size and setbacks for single-family dwellings on Plum Island.
 - *Agricultural/Conservation District*. Waterfront areas on Plum Island are designated as Ag/Con zoning district. The zoning regulations govern use, minimum lot size, house size and frontage.

2. State

Department of Environmental Protection (MassDEP), Wetlands and Waterways Program

- Massachusetts Wetlands Protection Act (overview and appeal authority of Conservation Commission decisions); administered by and with an initial filing with the NCC.
- State Building Code (780 CMR, including Section 5323 and Appendix 120.G)

MA Division of Fisheries and Wildlife, Natural Heritage & Endangered Species Program

- Massachusetts Endangered Species Act (MESA) (MGL c.131A) and regulations (321 CMR 10.00): contains prohibitions against “taking” of a state-listed species; MESA review process required for projects within Priority Habitat for State-Protected Species. The review guidelines explain which projects require MESA filings and also include specific exemptions for certain activities. All projects within Priority Habitat for State-Protected Species should consult the MESA review process guidelines.

Executive Office of Energy and Environmental Affairs

- Massachusetts Environmental Policy Act (MEPA) (MGL c. 30 s.61-62H) and regulations (301 CMR 11.00)
- Coastal Zone Management Act (MGL c.21As.4A) and regulations (301 CMR 20.00)

3. Federal

U.S. Fish & Wildlife Service (USFWS)

- Federal Endangered Species Act (16 U.S.C. 1451, et. seq.)

U.S. Army Corps of Engineers (USACE)

- Clean Water Act, Section 404 (33 U.S.C. 1251, et. seq.)
- Rivers and Harbors Act of 1899 (33 U.S.C. 401, et. seq.)

Others

- Coastal Barrier Resources Act (16 U.S.C. 1451, et. seq.)
- National Flood Insurance Act (42 U.S.C. 4001, et. seq.)
- Americans with Disabilities Act (42 U.S.C. 12101, et. seq.)

III. PUBLIC USE, ACCESS AND SAFETY

Public use of Newburyport public beaches occur throughout the entire beach area. The current activities associated with public use, access and safety are described in detail below.

A. Public Use

1. Public Facilities

Pursuant to wetlands protection regulations, as well as coastal zone regulations which encourage public beach access in identifiable Rights of Way (ROW), public facilities will ensure proper use of the public beach environment and also will maintain the vital balance of protection of the primary dunes and dune grass from being adversely impacted by pedestrian access.

The primary location of public facilities is at the northern tip of Plum Island, locally known as “The Point.” The Point consists of a public parking lot, restrooms, a ticket booth and the Jason Sawyer Playground (see Figure 3). Construction of new public restrooms at the Point has been recently completed. The facilities are in compliance with federal, state and local regulations to ensure protection of coastal wetlands. In addition to the new public restrooms, the existing ticket booth was replaced in Spring 2009. The new booth is an 8 foot by 8 foot, pre-constructed, portable shed that can be moved and protected from storm damage during the winter months.

Any proposed construction projects on the barrier beach must comply with the requirements of the Massachusetts WPA and its implementing regulations and the City of Newburyport Wetlands Ordinance and will be required to file of a Notice of Intent or a Request for Determination of Applicability. These projects may also require MESA review.

In addition, any new structure or rebuilding of existing structures in any Flood Hazard Areas (including A-Zones), Coastal High-Hazard Areas (including Velocity Zones (V-Zones)), and Coastal Dunes shall comply with the State Building Code (780 CMR, including Section 5323 and Appendix 120.G), which imposes special restrictions on the placement and construction of structures within these areas. These restrictions include that structures in Coastal High Hazard Areas be elevated on adequately anchored pilings or columns, so that the lowest portion of the structure is elevated at least 2 feet above the base flood elevation. The newly revised State Building Code (effective January 1, 2008) also regulates “Windborne Debris Protection” (780 CMR 5301). Flood zones are further discussed in Section IV.E.5 (Resource Area Management and Protection, Land Subject to Coastal Storm Flowage).

The WPA, the Newburyport Wetlands Ordinance and State Building Code will help insure that buildings are constructed adequately above surrounding dune elevations to limit collateral storm damage by minimizing storm debris, allow dune migration, minimize erosion of dunes during storms and other beneficial functions described above.

2. Public Recreation

Public recreation on a barrier beach includes a variety of activities, including swimming, beach walking, wildlife observation and bird watching, kite flying, and fishing.

If left unmanaged, large numbers of pedestrians can significantly impact barrier beach resources. Destruction of dune vegetation can lead to blow-outs and destruction of dunes, and impact wildlife habitat. Wetlands can

become compacted, and upper wrack line of the beach can be affected by the destruction of sand-binding plants there. Wildlife can be disturbed by human presence or adversely affected by visitor-generated garbage. Kites may be seen by nesting birds as potential predators, causing them to abandon nests temporarily and put vulnerable young birds at risk. Wildlife and birds can become entangled in discarded kite string, and be seriously injured or die as a result. Vegetation as well as dune form and function can be adversely affected by all of the pedestrian recreation activities noted above.

Other, more specific recreational activities are discussed in the following sections.

a. Hunting and Fishing

Hunting, while acceptable on some portions of Plum Island under existing regulations established by the Mass. Division of Fishing and Wildlife, would nevertheless pose major safety problems on populated beaches on the Newburyport portion of Plum Island and is not permitted there.

Fishing on a populated beach could also pose a safety problem if not separated from recreational swimming areas during hours of active beach use. At present, Newburyport does not restrict fishing to a specific time or location on the beach; however, fishing (and other sporting activities) can be discontinued at the demand of a lifeguard or police officer (City Ordinance: c. 4, a. III, s. 4-101(d)) for public safety purposes.

In addition, discarded fishing gear poses a threat to wildlife. Wildlife (fish, birds, mammals and reptiles) can become entangled in fishing line which can result in injury or death. Waterfowl may ingest discarded fishing sinkers, which are especially harmful if they contain lead. Birds or other untargeted species may become hooked by fishing gear. Providing special units to recycle or dispose of fishing gear and erecting public signage to educate the public on these hazards can be employed – especially at the Point where fishing is a popular activity.

b. Camping and Fires

Camping or making fires on the beach can cause degradation of the beach environment. Tenting and fires may impact vegetation or landforms. They can destroy vegetated cover as well as alter dune form and function; they can impact rare species and their habitat, and can disturb activities of migratory shorebirds. Fires can impact dune fencing and signage through using them as combustion material. Fires can also create a public safety threat and debris problem through improper or careless disposal.

The City of Newburyport prohibits starting or maintaining any fire except those that are for the purpose of cooking by a person 18 years of age or older, provided state regulations are followed (527 CMR 10.22(3)). Cooking fires must be located upon sandy or gravelly land, free from living or dead vegetation or upon sandy or rocky beaches bordering tidewater. (The Newburyport Fire Department does not issue specific permits for fires.)

In addition, the City prohibits any person from camping, tenting, or sleeping on any part of the beach and prohibits the use of trailers for camping, tenting or living quarters (City Ordinance: c. 4, a. III, s. 4-101(b)).

c. Fireworks

Landing of fireworks on the barrier beach can result in quick-moving fires, which can destroy vegetation holding dunes in place. Fireworks can also cause serious disturbance to rare species and wildlife habitat. Launching and large-scale viewing of fireworks should be prohibited on coastal dunes and salt marshes, and especially near wildlife habitat, particularly that of nesting rare species.

Fireworks are prohibited by Massachusetts law except for large public displays permitted and regulated by municipal authorities.

d. Off-Road Vehicles and Horseback Riding

The use of vehicles and horseback riding on barrier beaches may destroy beach vegetation and destabilize the dunes. Coastal beaches may be affected by the churning of tires; tidal flats may be compacted. Use of vehicles and horseback riding can contribute to erosion of dune form and function. They can also degrade habitat of rare species.

While horseback riding is not prohibited on the beach per the City Ordinance, it is generally not done. It is recommended, however that if horseback riding on the beach occurs in the future, that it be limited to non-dune areas and away from designated Piping Plover nesting sites and that these restrictions be publicly posted.

With regard to off-road vehicles, the City Ordinance (c. 4, a. III, s. 4-101(c)) states that no person shall operate or use any motor vehicle or motorized bicycle on any part of the beach, except for authorized emergency vehicles or for the placement of docking and boating equipment for the safety of passengers embarking or disembarking boats commercially operated for fishing parties.

e. Pets

Pedestrians engage in a wide variety of activities on a barrier beach, including walking with pets on the beach. However, large, concentrated volumes of pedestrians with pets can have impacts on dune vegetation, wetlands, upper wrack line, wildlife and public health. Garbage and animal waste can have an adverse affect on beaches, water quality and tidal flats. Uncontrolled pets can harass wildlife and may cause a disturbance to other beach goers.

Dogs are *not* allowed at all on the public beach from May 15 through September 15 of each year per the City Ordinance (c.4, a. III, s. 4-101(e)). They are allowed at other times provided they are leashed. However, in reality, dogs are often allowed to run unleashed which can result in adverse impacts as noted above.

The existing land management agreement between DCR and the City of Newburyport states that the City must follow DCR park rules and regulations. DCR will be changing these rules in the near future which could affect the time period in which dogs are allowed on the beach, in order to more closely adhere to piping plover management guidelines. The Natural Heritage & Endangered Species Program under the Division of Fisheries & Wildlife recommends that the start date for banning dogs from beach be changed from May 15 to April 1. Any signage which will be created for the beach will reflect these changes.

Although pet owners may be fined for bringing their dogs on the beach from May 15 through September 15 or letting them run unleashed at other times, it is rarely enforced and is unlikely to deter these activities. It is recommended that the City engage in public outreach and education that would explain why certain restrictions are in place (e.g., public health, the preservation of wildlife habitat). Outreach could be in the form of signage, mailings, or other methods (see Section VII, Public Outreach and Education). In addition, it is recommended that the City amend the City Ordinance to ban dogs from the public beach from April 1 to September 15 of any year in order to avoid disturbance of nesting Piping Plovers and increase the fines for violation of this regulation from \$25 to at least \$50.

f. Watercraft

Barrier beach resources impacted by watercraft include: beaches, salt marsh, land containing shellfish, and land under the ocean. Coastal dunes may be impacted by pedestrians associated with vessel use. Vessel access at barrier beaches may conflict with recreational swimming. It may also conflict with rare species and wildlife habitat protection, especially at remote ends of barrier spits. Changes in bottom topography, alteration of substrate vegetation, and increased sedimentation due to prop wash and hull impacts may also occur. Motorized watercraft can create boat wakes which erode the shoreline. Increased access on barrier beaches or barrier spits can create a large human disturbance factor to areas otherwise inaccessible to most people but commonly used as nesting, feeding, resting and migration habitat for rare species and other wildlife.

The impacts of watercraft can also directly or indirectly impact the beach. Impacts are not likely to occur from minimal or occasional use of watercraft. It is the continued impact that needs to be evaluated and subsequently regulated. Often it is the impact of humans associated with watercraft activities that can have the largest negative impact on the barrier beach environment.

In order to properly manage vessel access to barrier beach and islands, beach managers (presently the Newburyport Harbormaster and his staff) are encouraged to work closely with other municipal harbormasters, the Massachusetts Harbormasters Association, the boating public, yacht clubs, the U.S. Coast Guard Auxiliary and the U.S. Power Squadron.

In addition, the Harbormaster is responsible for pump-out facilities (one at Cashman Park and one boat pump-out) for boaters. Although these facilities are not located directly on Plum Island, the use of pump-out facilities is important to preserving water quality in the vicinity of the island.

At present there are no public boat launches on the Newburyport section of Plum Island. There is, however, a private boat charter company (*Captain's Fishing Parties*) located the Point that offers fishing expeditions, sightseeing and whale watching cruises (all vessels are licensed by the Coast Guard). Another charter fishing company, *Obsessed Charters*, operates out of the same location as *Captain's*.

All management steps should be implemented to be consistent with the City of Newburyport Harbormaster. Watercraft use should be balanced with other uses through designation of special use areas. To accommodate migratory patterns of shorebirds such as terns and plovers, temporary restrictions on the launching and beaching of small craft should be implemented.

B. Public Access

1. General

Public beach access should, and needs to, be provided. However, both foot and vehicle traffic can result in degradation of the barrier dune and damage to the beach vegetation. Access ways need to be provided which will not only assure safe access to pedestrians and authorized vehicles, but also reduce or minimize impacts to the beaches, dunes and wildlife.

In 2006, a plan was prepared for DCR on public access at Plum Island entitled "*Plum Island Public Access Plan*." This document catalogs all existing Rights of Way (ROWs) and points of access (authorized and unauthorized) along Plum Island and offers recommendations as to how to best preserve the dunes and beach vegetation, while allowing public access to the beach. Although the City was not involved in the creation, review or approval of this plan, it will serve as a useful tool for planning future improvements of public

access to the beach. It is recommended that the City revisit the portion of this plan that applies to the City, revise it as necessary and then create an action plan to improve public access. Though many of the access ways described by the DCR document are outside of the physical limits of the Newburyport Beach Management Plan, the goals and objectives for minimizing impact to beach resources and providing improved public access to the water are consistent with the Newburyport Beach Management Plan. A copy of the 2006 DCR plan is presented in Appendix F.

An aspect of planning and managing public access ways that needs to be addressed (and was not included in the 2006 DCR plan) is the potential effect on rare and endangered plants and wildlife. For example, when assessing a public access way, the surrounding dune areas should be surveyed for rare plants by a qualified botanist. Potential effects on wildlife, especially on rare or endangered species as designated by the Natural Heritage and Endangered Species Program (NHESP) under the Massachusetts Department of Fish and Game, should be considered as well.

Many of the existing public ROWs and access ways to the beach are unmarked and have not been maintained. Consequently, some of these points of access have been encroached upon by abutters. Figure 4 shows the locations and provides a description of the use and types of public access ways/ROWs that exist within the limit of the Beach Management Plan. The following sections presented below describe pedestrian and vehicular access that is currently utilized at Plum Island along with a description of the current maintenance practices implemented by the City for these established ROWs and other points of public access.

2. Pedestrian Access

Currently, pedestrian access exists through a number of ROWs located at the ends of streets-running perpendicular to the beach, a number of footpaths located off of Grant Street, along Reservation Terrace and at the Point, and the elevated boardwalk at the Point. Many of the existing footpaths run through vegetated areas are not maintained by the City, but are likely to continue to exist due to pedestrian foot traffic. On-grade “Mobi-Mats” have been placed over the dunes at the ends of 53rd, 55th and 57th streets by volunteers from the Plum Island Taxpayers Association (PITA). The mats do not belong to the City and are on loan from PITA. Presently they remain in place all-year round, with the exception of the end sections, which are rolled up in the winter and then rolled out again in the spring (see Figure 4).

All existing ROWs and access points must be assessed for possible adverse effects on dunes, vegetation and wildlife habitat and to determine how to best remedy these impacts. As part of this assessment, the City will consider the installation of elevation boardwalks, on-grade mats and the use of snow fencing to delineate footpaths as described below.

a. Boardwalks and Walkover Design

In regard to boardwalks or wooden walkovers, these will be designed according to the standards presented in Appendix G: “Standards for Boardwalk and Walkover Construction” in order to have the least impact on the coastal dune and lessen any impact from storm damage. For example, a raised boardwalk must allow for the free movement of sediment and water through the dune. It must also allow for native vegetation, especially beach grass, to grow up to and under the boardwalk.

Access to a boardwalk should begin as far back as possible from the beach and dune. Snow fencing, symbolic fencing, a railing, or a vegetative barrier must funnel beach goers to the boardwalk and restrict pedestrian traffic to the boardwalk. In addition, any modified walkways are required to be ADA compliant.

b. On-Grade Mats

On-grade walkways, consisting of a plastic “Mobi-Mat” or wooden slat roll-out mats, are intended to be seasonal and temporary and can readily conform to existing dune topography, thus accommodating natural changes within the dune system. They can be utilized for pedestrian foot traffic as well as to provide a stable travel surface for vehicles that need to access to/from the beach. Placement of on-grade mats will be on designated locations, especially where emergency and public safety vehicles must pass to minimize degradation. Mats will be required to be inspected periodically and raised at the appropriate times to allow for the accretion of sediment and the growth of vegetation. The mats must be removed and stored during the winter months and reinstalled each spring. The City or PITA does not currently remove the mats during the winter months. As part of this Plan, the City or PITA will be required to remove the mats at the end of the summer beach season. A storage location will be identified for mat storage.

Placement of any new on-grade mats may require some grading to achieve a smooth, even surface. Any grading shall be performed with hand-rakes – no machinery shall be used. No sand shall be removed from the dune system as part of the grading process. If winter storms result in overwash or scarping of dunes where mats are to be placed, then pathways will be re-graded by hand and, if necessary, sand (i.e., sediment of an appropriate grain size) will be added before replacing the mats in the spring. If machinery is required for grading, a separate Notice of Intent will be filed for the proposed work.

c. Snow Fencing and Other Barriers

Snow (or sand) fencing is often installed to help build dunes since they trap windblown, and it can also be utilized to delineate the boundaries of sand pathways and prevent straying of pedestrian traffic into sensitive dune areas. At present, the Newburyport Department of Public Services (DPS) does not maintain any snow fencing on Plum Island.

Symbolic fencing, consisting of stakes and some type of tape or roping, is generally used to designate areas that are off limits to the public (e.g., sensitive dune areas or wildlife nesting sites). Newburyport DPS does not presently install or maintain symbolic fencing. The US Fish & Wildlife Service at the Parker River National Wildlife Refuge (PRNWR) has installed symbolic fencing in the past to cordon off Piping Plover nesting sites (see Section V, Rare Species and Wildlife Management).

3. Vehicular Access

Vehicular access to the beach is allowed throughout the beach by authorized vehicle only. Vehicles authorized to use existing access ways include those used for emergency response, lifeguards and beach maintenance by the Newburyport DPS. Access by beach maintenance and lifeguard vehicles occur only at the north end of the island through the existing parking lot and then via a wide sand pathway (see Figure 4). Authorized vehicles which access the beach are listed in Table 1 below.

Table 1: Authorized Vehicles for Beach Access

<i>Purpose</i>	<i>Vehicles</i>
Lifeguard equipment	1 ATV with trailer
Beach Cleaning	1 Ford tractor with rake*
Police	1 ATV for patrolling beaches 1 Van (for emergency use)

*City may share equipment with the Town of Newbury or use their rake, based on availability and condition of equipment, etc.

The police keep one vehicle (a van) at the Point for emergency use but it is not intended for use directly on the beach. In addition, Newburyport DPS uses one-ton dump trucks to empty the twelve (12) trash barrels that are located in the parking lot at the Point during summer months, 7 days a week. No trash barrels are located on the beach.

4. Maintenance of Public Facilities and Access Ways

The primary public access way to the beach is at the northern tip of Plum Island (the Point). A public parking lot (parking fees are collected in summer), public restrooms and a small playground are located here. Newburyport DPS sweeps and plows within the parking lot area and maintains the pavement but performs no other maintenance at this location. Sweepings are taken off the island to the Fulton Pit in Newburyport. The playground is maintained by the Newburyport Parks Commission.

Newburyport DPS is responsible for maintenance of the elevated boardwalk that was constructed in 2005-2006; however, no repair/maintenance has been required to-date. Newburyport DPS does not currently maintain any of the existing pathways or established ROWs shown in Figure 4. Existing footpaths remain unvegetated due to heavy pedestrian traffic that occurs both during the summer season and throughout the winter.

Maintenance plans/schedules will be developed for each type of public access way (i.e., elevated boardwalk, on-grade mat, sand path, etc.). As part of the effort to assess all access ways, maintenance plans will be identified for each type.

C. Public Safety

The Newburyport Code of Ordinances (c. 4, a. III, s. 4-101) includes rules and regulations regarding the use of the beach on Plum Island. Restricted or prohibited activities related to public safety include a ban on open fires; prohibition of any motorized vehicles on the beach with the exception of emergency vehicles; and restrictions on sporting activities (surfing, fishing, etc.) which must be discontinued if instructed by a lifeguard or police officer for the purpose of public safety.

1. Lifeguards

Newburyport employs several lifeguards at three separate stations during the summer season. All lifeguarding activities are managed by the Newburyport Harbormaster.

Typically, lifeguards are on duty from mid-June through Labor Day. Lifeguards work from 10:00 a.m. to 5:00 p.m. during the beach season. On weekends, two lifeguards are assigned to each station with one “floating” lifeguard who is available to relieve others on duty as necessary. The lifeguard stations are located at 55th Street (Station #1), near the south jetty (Station #2), and at Plum Island Point (Station #4). It is noted that Station #3 no longer exists. Equipment is brought in daily through the access path adjacent to the boardwalk on an ATV and is then driven down the beach to station #2 for convenient access to the other two stations.

Although the primary responsibility of the lifeguards is to respond to emergency events, they also take measures to prevent accidents, such as enforcing the ban of flotation devices in the water or interrupting unsafe behavior on the beach. Lifeguards do not, however, have the authority to issue a citation to beach visitors who break city ordinances.

2. Emergency Response

The number of emergency responses at Newburyport's beaches on Plum Island is driven by surf conditions and rip tides. If the water becomes too treacherous for swimming, signs are posted indicating that the beach is closed. In the case of an emergency, lifeguards are equipped with rescue boards, back boards and first aid kits. They also use radios which are on the same frequency as the Newburyport Fire Department, and in the case of an emergency, the Fire Department is immediately notified as well as the Harbor Patrol. The Fire Department decides how to proceed based on the type of emergency, although the Harbor Patrol is often the first to respond via boat because they are often in the vicinity. In addition, lifeguards check in with the Fire Department via radio each morning when they start duty and log in and out when they depart/return to their post.

3. Beach Patrols

Police patrol the beach during the summer months (Memorial Day through Labor Day) in an ATV. The purpose for this patrolling is for additional public safety and to deter activities on the beach such as illegal consumption of alcoholic beverages. Rescue equipment is kept on the ATV for emergencies. Police also patrol the public areas at the Point at night, mostly to deter vandalism. Police access the beach through an unpaved sand path from the parking lot (see Figure 4, public access way #5).

In addition, the police keep a van at the Point for emergency use. The vehicle is not intended for use on the beach, but to transport people from the beach parking lot in case of an emergency.

4. Water Quality Testing

The Newburyport Board of Health department is responsible for performing water quality testing during the summer months if it receives funding from the State Department of Public Health. Water samples are collected at four locations (two on the Merrimack River and two on the Ocean) on a bi-weekly basis and are tested for Enterococci. Test results can be found on the Massachusetts Department of Public Health website at: <http://mass.digitalhealthdepartment.com>. All samples from the 2008 season were at or under the bacterial standard level for Enterococcus.

D. Summary of Public Use, Access Ways and Safety Recommendations

Access ways to the beach are not presently maintained by the City, with the exception of the elevated boardwalk located at Plum Island Point. The City will assess current pathways, especially those that cross steeper dunes (e.g., at 55th Street) to determine appropriate maintenance/improvement needs or if the access should be closed to prevent further erosion of the dunes and impacts to vegetation and wildlife.

In addition, all City employees using ATVs (lifeguards, police), or any staff performing spring cleanup activities, will attend annual training provided by the Parker River National Wildlife Refuge (PRNWR) to avoid disturbance of nesting birds. (See Appendix I)

The management recommendations presented below are for the entire public beach area on Plum Island in Newburyport, unless otherwise specifically noted. As stated earlier, the City will implement these recommendations based on the prioritization set by the Newburyport Beach Management Committee.

Public Access Ways

1. Verify existing public Rights of Ways (ROWs) to the beach, using the 2006 "Plum Island Access Plan" as a guide using deed records or available plan information.

2. Assess existing public ROWs and other points of established public access to determine if their current use is having an adverse effect on the dune system or on wildlife habitat. Establish a plan for closure, as applicable. For those ROWs and public access ways that the City determines should remain open, evaluate the most appropriate base for each access way (e.g., on-grade walkway, elevated boardwalk, sand pathway with snow fencing, etc.) and create an implementation plan.*
3. Create maintenance plans/schedules for each type of path implemented under Task 2 above (i.e., elevated boardwalk, on-grade mat, sand path, etc.) to include sweeping, inspections after major storms and removal of on-grade mats during winter months.*
4. Designate a location to store on-grade mats during winter months.*
5. Identify and clearly mark each ROW/access way with appropriate signage.
6. Designate a City department (or departments) to oversee and maintain the public ROWs/access ways.
7. Clearly demarcate (by signage) the access ways that are used by lifeguard and police vehicles.
8. Perform periodic inspections of access ways used by authorized vehicles (seasonally and after major storms) to determine if maintenance is required (raking, or additional nourishment in the way of additional beach-grade sediments). Any nourishment needed for the access ways shall come from stockpiled sand or a clean, compatible, off-site source.*
9. Conduct periodic inspections of all access ways to ensure that safe passage to/from the beach area is maintained. If safe access is compromised at any designated public access way locations, the City will take action (such as roping off unsafe areas) to divert pedestrian/vehicular access until it can be restored.*
10. The City may temporarily block off existing public access ways during/after storm events as a matter of public safety.
11. The City will clear sand from designated public access ways, where appropriate and as necessary, to maintain their function, and keep sand within the immediate area, either in the dune or on the beach, wherever it is most beneficial. Maintenance of these access ways will be primarily conducted by sweeping. Sand will be swept, by manual methods, to the sides or towards the entryway where pedestrian traffic is the greatest using manual methods.*
12. Elevated boardwalks that become buried will remain buried. The City will not remove sand, but rather, will smooth it out (by hand) within the designated boundaries of the access way, matching existing surrounding grades. New elevated boardwalk structures will be built over the buried structures as funds become available. Any components of the existing boardwalk that are partially buried, damaged or broken will be removed to ensure public safety. All new elevated boardwalk structures will be constructed at an appropriate elevation to minimize/avoid impacts to naturally migrating sand and in accordance with the "City of Newburyport Standards for Boardwalk and Walkover Construction (see Appendix G). Written notification will be submitted to the Conservation Commission a minimum of 2 weeks prior to the installation of replacement boardwalks.
13. Should the City wish to install any new vehicular access ways for the purpose of emergency response or maintenance, an NOI will be required. Any new access ways for vehicles shall at least be minimized in width and length to the extent practical. Access will be designed to be maintained over existing dune elevations, rather than creating/maintaining access at a lower grade than adjacent dunes to minimize impacts from erosion over time.
14. Engage public volunteer groups (e.g., the Plum Island Taxpayers Association) to help the City monitor and maintain ROWs/access ways.

**Minimum required activities or practices by the City of Newburyport.*

Other Recommendations:

15. Continue current maintenance practices for the parking lot and public buildings (restrooms and ticket booth) located at Plum Island Point.
16. Continue the ban on hunting on the beach.
17. Continue the ban on the use of any motor vehicle or motorized vehicles on the beach, with the exception of authorized emergency vehicles and motorized equipment located at Plum Island Point for the placement of docking and boating equipment (City Ordinance, c. 4, a. III, s. 4-101(c)).
18. Change time period in the City Ordinance during which dogs are banned from the beach (from May 15 to April 1) in order to protect nesting Piping Plovers. Also increase fines for violation of this regulation from \$25.00 to at least \$50.00.
19. Erect signage and notify the public of the requirements regarding dogs on the beach. Include rules (per City Ordinance) to pick up and carry out animal waste generated by their pets and the ban against dogs on the Beach, clearly stating the penalties (fines) for failure to comply.
Signage should include educational messages as to why it is important to pick up animal waste—for both health and water quality reasons. Also state the leash requirements for dogs for off-season times and why it is important (protection of wildlife habitat, prevention of dune and vegetation destruction, etc.) See City Ordinances c. 3, a. I, s. 3-2; c. 4, a. II, s. 4-101(e) and c. 3, a. II, s. 3-26.
20. Provide biodegradable bags at beach access points for owners to collect and transport animal waste. Provide waste receptacles at beach in off-season with weekly pickup. Recommend participation of dog-owners in Plum Island to provide bags and trash receptacles.
21. Provide units for recycling fishing gear (fishing line, etc.).
22. Erect signage educating the public as to the potential danger of fishing gear to wildlife.
23. As part of public education signage, include a message that everything that is carried onto the beach must be carried out.
24. Construction activities associated with major city facilities improvements will continue to require a separate application (Notice of Intent or Request for Determination) to be filed with the Conservation Commission and MassDEP.
25. Continue to implement all watercraft management steps in cooperation with the City of Newburyport Harbormaster.
26. Determine if special use areas for swimming, surfing, and fishing should be adopted (for safety purposes). If so, this could be managed by educational signage, emphasizing the rules of beach etiquette between swimmers, surfers, anglers, etc.
27. Monitor and manage, if necessary, the impact of human activities to minimize the impact to the dunes, beach and salt marsh areas and resident wildlife.
28. Designate and mark areas of special conditions with buoys and signage, as appropriate.
29. Install symbolic and/or snow fencing and signage for onshore areas where human activities affect wildlife or fragile resource areas (dunes, beach grass, salt marsh, Piping Plover habitat, etc).

IV. RESOURCE AREA MANAGEMENT AND PROTECTION

A. General Description

As discussed previously, resource areas that exist at Plum Island Beach in the City of Newburyport, as defined under the WPA and its implementing regulations (310 CMR 10.00), include Barrier Beach, Coastal Beach, Coastal Dune, Riverfront Area and Land Subject to Coastal Storm Flowage (see Figures 5 and 8). The City's management of the beach strives to balance protection of the island's sensitive natural resources with the need to provide safe and enjoyable public recreational opportunities.

This section identifies and describes the resource areas on Newburyport's section of Plum Island that are under the jurisdiction of the WPA, the Newburyport Wetlands Ordinance and the most significant resource protection issues. This includes a description of the existing conditions of the Newburyport beach-dune system, as well as stabilization and protection measures which are utilized within resource areas.

These issues will also be an integral component of the City's environmental education and outreach programs. Much of this information presented herein is also provided in the report "*Guidelines for Barrier Beach Management in Massachusetts* (MA Barrier Beach Task Force (MBBTF) 1994).

Within each of the Resource Areas discussed below, the WPA provides protection for "Estimated Habitats of Rare Wildlife" which may fall within these areas, requiring review of applications by NHESP. The issuing authority (typically the Conservation Commission) determines if the project could adversely affect any rare or endangered species, based on comments issued from NHESP. 310 CMR 10.37 states:

"Notwithstanding 310 CMR 10.24(7) and 10.25 and 310 CMR 10.27 through 10.35, if a proposed project is found by the issuing authority to alter a resource area which is part of the habitat of a state-listed species, such project shall not be permitted to have any short or long term adverse effects on the habitat of the local population of that species. A determination of whether or not a proposed project will have such an adverse effect shall be made by the issuing authority. However, a written opinion of the Program on whether or not a proposed project will have such an adverse effect shall be presumed by the issuing authority to be correct. This presumption is rebuttable and may be overcome upon a clear showing to the contrary."

Since there are designated Estimated Habitats on Plum Island, preservation of rare and endangered species (e.g., the Piping Plover) and their habitat is an important consideration in the management of the barrier beach.

B. Barrier Beach (310 CMR 10.29)

1. Definition

Barrier Beach means a narrow low-lying strip of land generally consisting of coastal beaches and coastal dunes extending roughly parallel to the trend of the coast. It is separated from the mainland by a narrow body of fresh, brackish or saline water or a marsh system. A barrier beach may be joined to the mainland at one or both ends. (310 CMR 10.29(2))

Plum Island is a barrier beach. This site has been assigned the unit code “Sb-1” as part of the Massachusetts Barrier Beach Inventory Project (MBBTF, 1994).

2. Functions

Barrier beaches, including all of their coastal dunes, are significant to the public interests of storm damage prevention, flood control, and protection of marine fisheries, wildlife habitat, and, where there are shellfish, land containing shellfish. “Significant” means that they play a role in protecting these public interests of the WPA.

3. Critical Characteristics

Since barrier beaches are composed of coastal beach and coastal dunes, the characteristics of a barrier beach that are critical to the protection of the public interests listed above are described below under the coastal beach and coastal dune subsections.

4. Performance Standards

When a barrier beach is significant to storm damage prevention, flood control, marine fisheries, or the protection of wildlife habitat, the following performance standards apply:

- All performance standards for coastal beach and coastal dunes.
- No project may be permitted which will have an adverse effect on state-listed rare vertebrate or invertebrate species (see subsection entitled Rare Species Habitat Protection later in this chapter for more information).

5. Additional Performance Standards per the Newburyport Wetlands Ordinance

The Newburyport Wetlands Ordinance offers additional protection to the barrier beach (Plum Island). In regard to building construction, the State Building Code was modified in January 2008 to address the issues of coastal storms and flooding. (See Appendix G of the 7th Edition of The Massachusetts Basic Building Code 780 CMR 120.G: Flood-Resistant Construction and Construction in Coastal Dunes to address structural damage.) In cases where the state building code is more stringent than the Newburyport Wetlands Ordinance, the building code will take precedence and vice-versa.

The performance standards from the Newburyport Wetlands Ordinance are, as follows:

- No development or redevelopment shall be permitted within a FEMA V-Zone or AO-Zone. Notwithstanding the foregoing, structures damaged or destroyed from fire, storm, or similar disaster may be redeveloped/repared only in accordance with current local, state and federal regulatory standards when damage to or loss of the structure is equal to or greater than 50% of the market value of the building. When damage to or loss of the structure is less than 50% of the market value of the building, redevelopment/repairs may be allowed to return the structure to pre-damaged conditions. In all instances, reconstruction, renovation or repairs to damaged structures may be authorized as stated herein, provided that there is no increase in floor area.
- All new buildings or substantial improvements to existing buildings shall be built on open pilings and comply with FEMA National Flood Insurance Regulations and State Building Code Regulations for elevation and flood proofing. All development and redevelopment shall comply with G.L. c. 131, sec. 40,

310 CMR 10.00 and Section 744 of the Massachusetts State Building Code Design Requirements for Floodplain and Coastal High Hazard Areas.

- For the purposes of this Ordinance, the term “substantial improvement” shall mean an improvement that increases the market value of the building by an amount equal to or greater than 50% or an improvement that increases the square footage by an amount equal to or greater than 25%.
- All new buildings, replacements, substantial improvements or expanded footprints less than 25% in square footage shall have their first floor built at least two feet above base flood elevation or the highest existing ground elevation whichever is higher.
- Electrical, heating, ventilation, plumbing and air conditioning and other service facilities shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.
- Development or redevelopment on or within 200 feet landward of the top of a coastal bank or dune shall have no adverse impact on the height, stability or function of the bank or dune to fulfill the purposes set forth in Section IB.
- In areas where there are coastal banks or primary or frontal dunes, all new buildings and structures shall be set back from the beach dune interface at a distance equal to thirty times the average yearly historical erosion as shown by the most current CZM shoreline change map.
- No activity shall increase the elevation or velocity of flows in a floodplain.
- Within the FEMA V Zone, A Zone, or AO Zone or their equivalent, new or reconstructed structures or development on the barrier beach that alters vegetation, interrupts sediment supply and/or changes the form or volume of a dune or beach must comply with the specific performance standards in this Ordinance and in the regulations promulgated pursuant hereto.
- In all other areas of the Plum Island Barrier Beach outside of the V-Zone and AO-Zone, all new Buildings shall be built on open pilings and shall comply with FEMA National Flood Insurance Regulations and State Building Code Regulations for elevation and flood proofing. All existing Buildings with Substantial Improvements, and all horizontal expansions of the existing footprint, shall be built on open pilings and shall comply with FEMA National Flood Insurance Regulations and State Building Code Regulations for elevation and flood proofing. If a Licensed Engineer certifies that an existing portion of the solid foundation will not require modifications to support the proposed building (other than new pilings exterior to the existing footprint), the existing portion of the solid foundation may remain.

Notwithstanding the previous sentence, the existing solid foundation of a *Building* shall be replaced with pilings, if, 50% or more of the exterior walls have been removed, or are proposed to be removed, and a new roof will be construction, or is proposed to be constructed.

C. Coastal Beach (310 CMR 10.27)

1. Definition

Coastal Beach *means unconsolidated sediment subject to wave, tidal and coastal storm action which forms the gently sloping shore of a body of salt water and includes tidal flats. Coastal beaches extend from the mean low water line landward to the dune line, coastal bankline or the seaward edge of existing manmade structures, when these structures replace one of the above lines, whichever is closest to the ocean.* (310 CMR 10.27(2))

Tidal flats are the nearly level part of a coastal beach, usually extending from the low water line landward to the more steeply sloping portion of the coastal beach. On the bayshore they may end at the salt marsh line.

The coastal beach resource area at Plum Island in City of Newburyport is located along the Atlantic Ocean and along the Merrimack River.

2. Functions

Coastal beaches, including their tidal flats, are significant to the public interests of storm damage prevention, flood control, and the protection of wildlife habitat. Where tidal flats are present, they are presumed significant to the protection of marine fisheries and, where there are shellfish, to land containing shellfish.

3. Critical Characteristics

The characteristics of a coastal beach that are critical to storm damage prevention and flood control are: the ability of the coastal beach to respond to wave action and the volume and form of the beach.

The characteristics critical to the protection of marine fisheries or wildlife habitat are: distribution of sediment grain size; water circulation; water quality; and relief and elevation.

4. Performance Standards

When a coastal beach is significant to storm damage prevention, flood control, marine fisheries or the protection of wildlife habitat, the following performance standards apply:

- Any project on a coastal beach (with a few exceptions described in the Wetlands Protection regulations) must not have an adverse effect by increasing erosion, decreasing the volume, or changing the form of any coastal beach or an adjacent or downdrift coastal beach.
- Any groin, jetty, solid pier, or other solid fill structure which will interfere with littoral drift, in addition to complying with the above must also be constructed as follows:
 - It shall be the minimum length and height demonstrated to be necessary to maintain beach form and volume. In evaluating necessity, coastal engineering, physical oceanographic and/or coastal geologic information shall be considered.
 - Immediately after construction any groin shall be filled to entrapment capacity in height and length with sediment of grain size compatible with that of the adjacent beach.
 - Jetties trapping littoral drift material shall contain a sand by-pass system to transfer sediments to the downdrift side of the inlet or shall be periodically re-dredged to provide beach nourishment to ensure that downdrift or adjacent beaches are not starved of sediments.

- Beach nourishment with clean sediment of a grain size compatible with that on the existing beach may be permitted.

When a tidal flat is significant to marine fisheries or the protection of wildlife habitat, the following performance standards apply:

- Water-dependent projects must be designed and constructed using the best available measures to minimize adverse effects.
- Non-water-dependent projects must have no adverse effect on marine fisheries or wildlife habitat caused by: alterations in water circulation; alterations in the distribution of sediment grain size; and changes in water quality, including, but not limited to, other than natural fluctuations in the levels of dissolved oxygen, temperature, or turbidity, or the addition of pollutants.
- No project may be permitted which will have an adverse effect on specified habitat sites of state-listed rare vertebrate or invertebrate species.

5. Existing Conditions of Coastal Beach

The beach extends approximately 4,200 linear feet from the Newburyport/Newbury city/town line at 51st Street), to the northern tip of Plum Island. The width of the beach from mean low water to the toe of the dune generally ranges from approximately 90 to 1,000 feet. Severe erosion has taken place along many parts of the Plum Island Coastal Beach.

6. Coastal Beach Management and Protection

The City conducts routine beach operation and management practices, which include:

- Trash removal
- Annual beach raking

a. Debris and Trash Removal

According to many sources, over 7 billion tons of waste impacts the oceans of the world annually. It is, therefore, not surprising to note that Plum Island Beach is one of those areas that can be seriously impacted by this problem. While our barrier beach is not normally subjected to many of the municipal and commercial abuses, litter can be a major issue. The discarding of litter, in particular cigarette butts, beverage containers, pet wastes, plastics, and other detritus by human visitors, can cause significant harm to our beach and its inhabitants (human and wildlife). A brief item description would include cigarettes and filters (most common), food wrappers and containers, balloons, glass bottles, cups, plates, forks, knives, spoons, caps, lids, aluminum cans, plastic bottles, straws, clothing, discarded food, bags, and many other items cast aside by those who visit and use Plum Island beaches. There is also a fair amount of debris and litter that washes in from “off-shore” sources. Fortunately, the state of Massachusetts has less beverage container litter than many other coastal states because of the bottle deposit laws.

Residual litter, even after the most successful of preventative programs, is a fact of life. Co-operative action in partnership with local conservation groups is still necessary to keep our beaches clean. Such organizations as Surfriders, Adopt-A-Beach, Massachusetts Coastal Zone Management and many others are useful not only as information sources, but they also conduct organized periodic beach clean-up events.

There are many opportunities to minimize littering, and to mitigate the impact of littering as well as clean up after the fact. Much of this can be accomplished through public outreach and education and will be discussed in further detail in Section VII. *Outreach and Education*.

b. Beach Cleaning

The purpose of raking the beach is to gather and dispose of wrack interspersed with debris that has accumulated during the winter months, along the entire length of the public beach. The Newburyport DPS cleans the beach using a 10-foot rake attached to a tractor. Newburyport DPS also manually collects large pieces of debris that have washed up on the beach during the winter. Collected debris will be placed into tractor bucket by hand-rake and pitchfork, whenever feasible.

At present, beach raking is performed once a year, typically in mid-May after the large debris has been removed. Currently, the raking takes place from the shoreline up to the vegetated areas of the dune but does not go beyond that point. All wrack is collected and disposed of and is not reused elsewhere on the beach. The large debris and wrack are taken off the island and disposed of at the Fulton Pit in the City. Should the City perform raking by mechanical means in the future, it will be done so with a set back at least 10-15 feet seaward from the toe of the dune.

c. Beach Maintenance

The only beach maintenance performed by the City, through its DPS division, is annual beach raking and manual removal of large debris as discussed in the above section.

d. Beach Nourishment

"Nourishment" refers to the placement of sand (and appropriately sized sediment) on a beach or barrier beach to increase its volume. The feasibility of nourishment should be evaluated in combination with modification to any existing erosion control structures. Beach nourishment using dredged and other off-site materials is a preferred alternative to hard structures and a positive step for storm damage prevention on barrier beaches.

Beach compatible sediment for nourishment may be obtained from several different sources and by different methods including, but not limited to: an offsite borrow source (i.e. clean, compatible material trucked in from off-island), surplus sediment from construction projects performed along the beach, sand swept from the parking lot and roads, or dredged sediment from navigation channels or other acceptable dredged sand material. Beach nourishment will likely need to be performed on a periodic basis, particularly if a source of natural sand no longer exists for a given beach area. Development of a beach nourishment program will require an understanding of erosion rates to identify the most critical beach areas, identification of suitable sand source(s) and the frequency and volume of sand necessary to maintain the beach. Storm frequency and magnitude can greatly affect how much and how often beach nourishment will be required.

Any sediment that is used for beach nourishment should be similar in size and color to that of the natural beach and should be appropriate for whatever purpose it is intended to serve (e.g., shore protection). DCR, in participation with CZM and the U.S. Army Corps of Engineers (USACE), will be moving ahead with a study of the Plum Island-Salisbury region in an effort to address the on-going beach and dune erosion on a long-term basis. As part of this study, the physical characteristics of beach sediments will be determined and provide a baseline for future beach nourishment projects. In addition, guidelines set forth in Mass DEP's "*Beach Nourishment: MA DEP's Guide to Best Management Practices for Projects in Massachusetts*" will be consulted for beach nourishment projects on Plum Island.

Since 1990, the USACE has been performing the maintenance dredging of the existing federal entrance channel located at the entrance of the Merrimack River and disposing of the sediments at nearshore sites located immediately offshore at Plum Island and Salisbury Beach (see Figure 6). Dredging and disposal of sediments at the Plum Island nearshore site occurred in 1990, 1991, 1993 and 1999, with the Salisbury Beach nearshore site being utilized in 1996. The nearshore disposal of dredge sediments provides an indirect beach nourishment source by natural means.

The USACE, DCR, the City of Newburyport and the Towns of Newbury and Salisbury are currently pursuing the use of dredge sediments from the upcoming Merrimack River Entrance Channel maintenance project for beach/dune nourishment. Approximately 160,000 cubic yards of dredge sediments are anticipated to be available to directly pump to Plum Island and Salisbury Beach. Pending funding and the permitting of this work, the nourishment is scheduled for the Fall of 2009. The Merrimack River Beach Alliance was established for local municipalities, Federal and State Agencies, and State and Federal Representatives to communicate and help coordinate this major undertaking.

The City of Newburyport will most likely not receive any of the dredge materials for beach/dune nourishment from the 2009 federal dredging project; however, the City may have an opportunity to receive dredge sediments from subsequent dredging efforts. All future dredging and beach/dune nourishment activities will require approval by local, state and federal regulatory agencies. The City's primary focus for future beach nourishment efforts will be concentrated on critical dune areas and those at the beach-dune interface.

D. Coastal Dunes (310 CMR 10.28 and the Newburyport Wetlands Ordinance, c. 6.5, a. II, s. 6.5-28)

1. Definition

Coastal Dune means any natural hill, mound or ridge of sediment landward of a coastal beach deposited by wind action or storm overwash. Coastal dune also means sediment deposited by artificial means and serving the purpose of storm damage prevention and flood control. (310 CMR 10.28 (2))

The coastal dune resource area at Plum Island is present along the entire length of the barrier beach. Under Newburyport's Wetland Ordinance, the whole of Plum Island is considered coastal dune.

2. Functions

Coastal dunes are significant to the public interests of storm damage prevention, flood control, and the protection of wildlife habitat. On barrier beaches, all coastal dunes are deemed significant to these public interests.

3. Critical Characteristics

The characteristics of coastal dunes that are critical to the protection of storm damage prevention, flood control, and wildlife habitat are: ability of the dunes to erode in response to the beach conditions; volume and form of the dunes; vegetative cover; ability of the dune to move landward or laterally; ability of the dune to continue serving as bird nesting habitat.

4. Performance Standards

When a coastal dune is significant to storm damage prevention, flood control, marine fisheries, or the protection of wildlife habitat, the following performance standards apply:

- Any alteration of, or structure on, a coastal dune or within 100 feet of a coastal dune shall not have an adverse effect on the coastal dune by: affecting the ability of waves to remove sand from the dune; disturbing the vegetative cover so as to destabilize the dune; causing any modification of the dune form that would increase the potential for storm or flood damage; interfering with the landward or lateral movement of the dune; causing removal of sand from the dune artificially; or interfering with mapped or otherwise identified bird nesting habitat.
- When a building already exists upon a coastal dune, a project accessory to the existing building such as a small shed or small parking area for residents may be permitted, provided that such work, using the best commercially available measures, minimizes the adverse effect on the coastal dune caused by the impacts listed above.
- The following projects may be permitted provided that they have no adverse effect on the coastal dune caused by the impacts listed above: pedestrian walkways, designed to minimize the disturbance to the vegetative cover and traditional bird nesting habitat; fencing and other devices designed to increase dune development, and to direct vehicular and pedestrian traffic; and plantings compatible with the natural vegetative cover.
- No project may be permitted which will have any adverse effect on the habitat of state-listed rare vertebrate or invertebrate species (see section later in this report entitled Rare Species and Wildlife Management for more information).

5. Existing Conditions of Coastal Dune

Severe erosion has taken place along many parts of the Coastal Dune, mostly on the southern portions of Plum Island in the Town of Newbury. The rate of dunal erosion varies along the length of Plum Island, with many areas experiencing 50 to 100 feet of dune retreat over the last 5 to 10 years.

Newburyport has experienced accretion of sand on the northern portion of Plum Island. There is, however, an area of the beach between 51st and 57th Streets (#30 55th Street) that is experiencing erosion which has prompted a private homeowner to place sandbags in front of this house. This sandbagging project is presently being monitored to determine the effectiveness of the bags as well as to evaluate any potential adverse end effects resulting from the sandbags. In April 2009, sand was added to the sandbagging followed by the planting of beach grass in order to stabilize the area. The Order of Conditions for this project requires that the following documentation be provided before the issuance of a Certificate of Compliance:

- A written post-construction report including observations made during the monitoring and inspection of the coir bags (after their installation). The report shall also detail any problems that occurred, if any, and any actions that occurred in order to remediate these problems.
- Post-construction photographs that include the staked or predetermined reference points (see Condition # 40) demonstrating compliance with this Order of Conditions.

6. Coastal Dune Management and Protection

Many of the City's natural resource management and protection measures at the beach focus on the dune area. Dunes are **the** key natural component in a barrier beach system, since these sandy formations are the major element of the barrier, which in most cases prevent damage to natural or developed areas behind the dunes.

Dune vegetation traps windblown sand, stabilizing the dunes and preventing the sand and other debris from covering developed portions of the property.

The primary functions of a barrier beach are storm damage protection, flood control and protection of wildlife habitat. Managing a barrier beach in order to preserve these important natural functions becomes increasingly necessary as development along the coast continues to increase and relative sea level continues to rise. The Plum Island Beach has experienced significant erosion which affects the ability of the beach to provide storm damage protection, flood control and protection of wildlife habitat. Beach management actions shall give priority to storm damage prevention, flood control, and wildlife habitat preservation.

a. Control of Pedestrian Access

Pedestrian access will be focused at the public access ways in order to keep pedestrian traffic off the fragile dune system. This is addressed in detail in Section III B.

b. Dune Maintenance

Currently, the City of Newburyport is not actively employing measures to maintain the existing dune system or encourage its growth by use of snow fencing and beach grass planting. Snow (or sand) fencing provides an appropriate means of building dunes for storm damage protection and flood control or maintaining a barrier beach system to manage blowing sand in and around built facilities and structures. Snow fences may be placed along foredunes or beach berms to trap and accrete sand. While snow fence installation allows sand to collect and help rebuild the dune, the dune can only be fully stabilized through the planting of vegetation. Dunes will not stay in place without vegetation and its associated root system. Beach grass or other native vegetation is, therefore, often planted in conjunction with snow fence to further facilitate the trapping of sand and stabilization of the dunes.

Snow fencing typically should consist of wood fencing with wood fence posts. The fencing should be about 50% open with open and closed areas no smaller than 5 centimeters wide. Sets of snow fence with posts are typically spaced at 10 to 15 foot intervals and be installed parallel to the beach and dune face and supplemented with additional installation of fencing to quickly build a dune.

Beach grass and other vegetative plantings should be made in designated areas for storm damage restoration and erosion control, especially in overwash areas in front of sections of developed barrier beach. Plantings should be American Beach Grass (*Ammophila breviligulata*) planted two to three culms to a depth of 8 inches, spaced 12-18 inches apart. Planting may be fertilized with slow-release fertilizer. Ideally, a natural seaweed or fish fertilizer or the addition of natural wrack will be used. These plantings should be made in conjunction with snow fence installation. Additional guidance on snow fence installation and beach grass planting is provided in Appendix H.

In some instances, the planting of beach grass or the installation of snow fencing can adversely affect Piping Plovers (especially nesting areas); therefore, proposed plans for installing either will be submitted to NHESP for review, pursuant to MESA and the rare species habitat provisions of the WPA.

In planning such restoration activities, care must be taken not to destroy rare species habitat by improperly planting in overwash fans and low relief foredune areas that may be utilized by sensitive species, such as Piping Plovers.

Whenever and wherever possible, the natural processes of beach and dune accretion and erosion should be allowed to occur. Beach and dune stabilization projects should not be undertaken that will alter and degrade wildlife habitat, particularly for rare species such as terns and plovers.

Signs, in addition to snow fencing and native vegetation plantings, should be placed at dune restoration sites to control pedestrian and vehicle traffic. Residents of Plum Island should be encouraged to engage in dune restoration activities through activities designed to increase awareness of the fragile nature of the barrier beach and by enforcement of the Wetland Regulations.

c. Dune Nourishment

Dune nourishment can be performed with the addition of outside material to the dunes. Several techniques for dune nourishment are recommended for the City. These techniques are described below.

1. Stockpiling Sand/Sediments for Nourishment

Stockpiled material would be used to fill voids within the beach dune system, on an emergency basis, or for non-emergency in the spring/summer season for the preparation of the dune prior to planting and fencing. Nourishment compatible sands and sediments could be placed within the sand stockpile areas (SSA) at the Plum Island Point parking lot or other approved areas to have in reserve for immediate placement for stabilizing eroded areas along the beach.

Beach and dune-quality sand to be placed at the SSA can be obtained from offsite borrow, surplus sand from construction projects performed along the beach, sand swept from the beach parking lot and roadways and from dredging projects. Sand sweepings will be sifted to remove debris. Sand for nourishment shall not be excavated from surrounding beaches or dunes for the purpose of filling the SSA. Stockpiled sand for nourishment should meet the physical characteristics of existing dune sediments as determined as part of the future DCR study that will be conducted (See Section IV.C.6.d).

Prior to stockpiling any material within the SSA, grain size analyses should be performed on a representative sample of the material and submitted to the City for approval. Sand for nourishment should be clean, granular, free from roots or other organic material, trash and frozen material and shall be capable of meeting the size requirements as specified. Sand material should also match the color of existing sediments as closely as possible, as approved by the City. If necessary, all stockpiled sand should be sifted to meet sand quality requirements for beach nourishment as needed. Inspection of the quality of the sand deposited should be made on an on-going basis in accordance with an appropriate permit.

Equipment to be used for placing the beach/dune nourishment sands will be in good condition with no leaks or spilling that could occur while the equipment is on the beach. Equipment anticipated for this activity include a, front-end loader, backhoe, and tracked excavator, tracked trucks and trucks with reduced pressure in the tires.

Most likely, the SSA will be managed by the Newburyport DPS, although it may be overseen through a joint effort by the proposed Newburyport Beach Committee. It is recommended that there be a plan for the SSA that outlines details, including:

- The minimum and maximum storage capacity of the SSA;
- How the use of the SSA will be regulated (including the filing of a Notice of Intent);

- How sand/sediments will be replenished, in order to maintain a stable supply; and
- Identification of sources of sediments (i.e., dredge materials, purchased from 3rd party, etc.).

2. Placement of dredged material from the Merrimack River

Dune nourishment can also be performed utilizing dredge sediments from the Merrimack River Federal Entrance Channel (See Section C.6.d. - Coastal Beach Management and Protection, Beach Nourishment).

E. Land Subject to Coastal Storm Flowage (310 CMR 10.04)

1. Definition

Land Subject to Coastal Storm Flowage (LSCSF) *means land subject to any inundation caused by coastal storms up to and including that caused by the 100-year storm, surge of record or storm of record, whichever is greater* (310 CMR 10.04). The areas mapped by the Federal Emergency Management Agency (FEMA) on community Flood Insurance Rate Maps (FIRM) as the 100-year flood plain within the coastal zone are included within LSCSF.

On Plum Island, these areas include (but may not be limited to) velocity zones (V-zones), overwash zones, and areas of still water flooding during the 100-year statistical storm (A-zones). LSCSF is an overlay resource area that includes other coastal wetland resource areas – Coastal Beach, Coastal Dune, and Salt Marsh. LSCSF does not have a buffer zone, nor does it have any performance standards.

The area between the primary frontal dune on Plum Island and offshore is considered a “Coastal High Hazard Area” and a V-zone since any structures located here are likely to incur damage during storms.

FEMA defines “Coastal High Hazard Area” as:

“an area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. The coastal high hazard area is identified as Zone V on Flood Insurance Rate Maps (FIRMs). Special floodplain management requirements apply in V Zones including the requirement that all buildings be elevated on piles or columns.”

The Newburyport Wetlands Ordinance prohibits development or redevelopment in a FEMA V or AO Zone except under special circumstances:

No development or redevelopment shall be permitted within a FEMA V-Zone or AO-Zone. Notwithstanding the foregoing, structures damaged or destroyed by fire, storm, or similar disaster may be redeveloped/repared only in accordance with the current local, state and federal regulatory standards when damage to or loss of the structure is equal to or greater than 50% of the market value of the building.

For all other FEMA flood zones, the ordinance requires that all new structures (or substantially improved structures) shall be raised on pilings. (See Appendix C)

2. Functions

Land Subject to Coastal Storm Flowage may be significant to the interests of storm damage prevention, flood control, pollution prevention and wildlife habitat.

3. Critical Characteristics

LSCSF contains other important resource areas, including Coastal Beach, Coastal Dune and Salt Marsh, which are important for storm damage prevention and flood control. The critical characteristics of each of these resource areas have been described in previous sections.

4. Performance Standards

There are currently no performance standards for work in LSCSF. However, Plum Island is defined as a Barrier Beach, consisting of Coastal Beach and Coastal Dune. LSCSF at Plum Island will fall within one of these two resource areas and is subject to all of its particular performance standards.

5. Existing Conditions of LSCSF

LSCSF on Plum Island extends to the edge of the 100-year flood plain. Some areas are in V-zones, which are those areas that FEMA has mapped as being likely to have at least a three-foot wave with velocity moving across the beach or dune surface during the 100-year storm. This includes the beach, much of the coastal dune and salt marsh, as well as parts of several developed areas.

The current FEMA maps for Newburyport were created in 1985 and are inaccurate with regard to flood zones on the barrier beach (see Figure 7a). As noted in the *Newburyport Plum Island Filing Guidelines* (last revised in 7/5/2004), the Conservation Commission has used what are known as the “CDM” maps, developed by Camp Dresser & McKee in 2002 and reviewed by the Massachusetts Department of Environmental Protection (Mass DEP). These maps include a delineation of LSCSF (A and AO Zones), the limit of Barrier Beach, Coastal High Hazard & Limit of Coastal Dune (V Zone), the Riverfront Boundary and the Primary Frontal Dune.

In 2007, FEMA supplied the City with maps of the barrier beach showing a new delineation of the primary frontal dune and a more accurate representation of the flood zones. These are now being used in place of the CDM maps to determine the extent of LSCSF for Conservation permits. Figure 7B displays one of these maps showing the primary front dune (red line).

New FEMA maps are in the process of being developed for Newburyport (and all of Essex County). The City will receive draft maps at the end of May 2009 with the first introductory meeting (hosted by FEMA and DEP) scheduled for June 16 in Newburyport. Final maps are expected to be approved and implemented in 2010. These will replace all previous maps for determining flood zones and the Primary Frontal Dune. (see Appendix L for FEMA Letter 07-01-0522P regarding the LIDAR mapping for primary dunes).

6. LSCSF Management and Protection

As stated previously above, LSCSF at Plum Island falls within either Coastal Beach or Coastal Dune. The performance standards for these resource areas would apply to any activity proposed within LSCSF in this area, as appropriate. Work may not increase coastal flooding by redirecting floodwaters or by decreasing the ability of resource areas to provide their natural storm damage protection functions. In addition, work on

structures within LSCSF must also comply with the recently revised regulations (January 2008) of the State Building Code (780 CMR 5323 and Appendix 120.G), as discussed in Section III, Environmental Regulations.

F. Riverfront Area (310 CMR 10.58)

1. Definition

A Riverfront Area is the area of land between a river's mean annual high water line and a parallel line measured horizontally outward from the river and a parallel line located 200 feet away. The riverfront area may include or overlap other resource areas or their buffer zones. The riverfront area does not have a buffer zone.

The northern portion of the Plum Island is considered Riverfront as shown in Figure 8 and includes the public parking lot and facilities at Plum Island Point down to the South Jetty. This area overlaps with all the other resource areas discussed above. Any project that falls within Riverfront must adhere to its performance standards as well as any others that are present.

An exception for meeting Riverfront performance standards applies to any project requiring a Chapter 91 license. These are projects that fall below Mean High Water such as piers or dredging activities.

- Structures and activities subject to a M.G.L. c. 91 waterways license or permit, or authorized prior to 1973 by a special act, are exempt, provided the structure or activity is subject to jurisdiction and obtains a license, permit, or authorization under 310 CMR 9.00. (310 CMR 10.58 (6)(i))

2. Functions

Riverfront Areas are likely to be significant to protect the private or public water supply; to protect groundwater; to provide flood control; to prevent storm damage; to prevent pollution; to protect land containing shellfish; to protect wildlife habitat; and to protect fisheries.

3. Critical Characteristics

Land adjacent to rivers and streams can protect the natural integrity of these water bodies. The presence of natural vegetation within Riverfront Areas is critical to sustaining rivers as ecosystems and providing these public values. The Riverfront Area can prevent degradation of water quality by filtering sediments, toxic substances (such as heavy metals), and nutrients (such as phosphorus and nitrogen) from stormwater, nonpoint pollution sources, and the river itself. Sediments are trapped by vegetation before reaching the river. Nutrients and toxic substances may be detained in plant root systems or broken down by soil bacteria. Riverfront Areas can trap and remove disease-causing bacteria that otherwise would reach rivers and coastal estuaries where they can contaminate shellfish beds and prohibit safe human consumption.

4. Presumption

Where a proposed activity involves work within the riverfront area, the issuing authority shall presume that the area is significant to protect the private or public water supply; to protect the groundwater; to provide flood control; to prevent storm damage; to prevent pollution; to protect land containing shellfish; to protect wildlife habitat; and to protect fisheries.

The presumption is rebuttable and may be overcome by a clear showing that the riverfront area does not play a role in the protection of one or more of these interests. In the event that the presumption is deemed to have been overcome as to the protection of all the interests, the issuing authority shall make a written determination to this effect, setting forth its grounds on Form 6. Where the applicant provides information that the riverfront area at the site of the activity does not play a role in the protection of an interest, the issuing authority may determine that the presumption for that interest has been rebutted and the presumption of significance is partially overcome.

5. Performance Standards

Where the presumption set forth in 310 CMR 10.58(3) is not overcome, the applicant shall prove by a preponderance of the evidence that there are no practicable and substantially equivalent economic alternatives to the proposed project with less adverse effects on the interests identified in M.G.L. c.131 § 40 and that the work, including proposed mitigation, will have no significant adverse impact on the riverfront area to protect the interests identified in M.G.L. c. 131 § 40. In the event that the presumption is partially overcome, the issuing authority shall make a written determination setting forth its grounds in the Order of Conditions and the partial rebuttal shall be taken into account in the application of 310 CMR 10.58 (4)(d)1.a. and c.; the issuing authority shall impose conditions in the Order that contribute to the protection of interests for which the Riverfront Area is significant.

- Protection of Other Resource Areas. The work shall meet the performance standards for all other resource areas within the Riverfront Area, as identified in 310 CMR 10.30 (coastal bank), 10.32 (salt marsh), 10.55 (Bordering Vegetated Wetland), and 10.57 (Land Subject to Flooding). When work in the Riverfront Area is also within the buffer zone to another resource area, the performance standards for the Riverfront Area shall contribute to the protection of the interests of M.G.L. c. 131, § 40 in lieu of any additional requirements that might otherwise be imposed on work in the buffer zone within the Riverfront Area.
- Protection of Rare Species. No project may be permitted within the Riverfront Area which will have any adverse effect on specified habitat sites of rare wetland or upland, vertebrate or invertebrate species, as identified by the procedures established under 310 CMR 10.59 or 10.37, or which will have any adverse effect on vernal pool habitat certified prior to the filing of the Notice of Intent.
- Practicable and Substantially Equivalent Economic Alternatives. There must be no practicable and substantially equivalent economic alternative to the proposed project with less adverse effects on the interests identified in M.G.L. c. 131 § 40.
- No Significant Adverse Impact. The work, including proposed mitigation measures, must have no significant adverse impact on the Riverfront Area to protect the interests identified in M.G.L. c. 131, § 40.

6. Existing Conditions of Riverfront

The Riverfront Area on Plum Island consists of sandy beach and coastal dune. The northern tip of Plum Island is on the Merrimack River and the Riverfront area runs southward to the “South Jetty.”

The condition of the Riverfront is good in terms of recreational purposes. It also has a large dune area that provides nesting habitat for Piping Plovers.

G. Resource Area Management Recommendations

The management recommendations presented below are for the entire beach area, unless otherwise specifically noted. The implementation of these recommendations is contingent upon the City authorizing funds and enlisting volunteer efforts.

1. Identify beach property owned or managed by the state and/or the City of Newburyport appropriate for Beach Management activities, including public ROWs/public access ways.
2. Review records including deeds and surveys, combined with physical inspection to identify specific parcels of land appropriate for management activities.
3. Review the existing land management agreement that is in place with DCR and the City that authorizes Newburyport to manage the state-owned portion of the beach. Assess whether this needs to be updated/revised.
4. Compare the Newburyport Wetlands Ordinance to the latest state building code in regard to Coastal Construction (7th Edition of The Massachusetts Basic Building Code 780 CMR 120.G , Appendix G: Flood-Resistant Construction and Construction in Coastal Dunes). Revise the Ordinance in areas where it is not as strict (or detailed) as the building code.
5. Continue to remove litter from the beach. The City will also educate visitors regarding the importance of trash removal.
6. Establish a program for beach and dune nourishment.
7. Implement dune nourishment techniques, as necessary, in appropriate locations through the use of snow fencing. Erect snow fences in appropriate locations in order to build dunes. Monitor condition of snow fence and replace, reinforce and repair as needed. The extent of snow fencing will be contingent upon available funding.
8. Plant Beach Grass and other vegetative plantings to stabilize dunes in conjunction with snow fence installation. Inspect beach grass plantings periodically. Replace and supplement plantings as needed, in conjunction with snow fence repair and other management measures. Monitor the status of the accumulation of sand and the condition of plantings to determine the scope of maintenance and restorative measures. The extent of beach grass planting would be contingent upon available funding. NOTE: plans for beach grass planting and installation of snow fencing must be submitted to NHESP for review in order to determine possible adverse effects on wildlife.
9. Place signs at dune restoration locations identifying the location as beach grass planting areas and dune restoration sites to minimize damage to beach grass and dune.
10. Notify residents and owners of private property of benefits of erecting snow fences and beach grass plantings through the newspaper; informational literature, talks, lectures and public meetings on the topic.
11. Shoreline birds, including the federally and state-listed threatened species, the Piping Plover, forage in the wrack. In addition, the Plover nesting period begins in mid-April. It is therefore recommended that the Newburyport DPS implement a program that includes:
 - a. Re-scheduling beach raking and debris removal to March
 - b. Preserve the wrack that is collected (removing the interspersed trash) and place it at the toes of the dune.
 - c. Arrange to have a qualified wildlife monitor on site if beach cleaning is to take place when rare or endangered nesting birds are present.
12. Newburyport DPS will follow the recommendation by CZM that raking by mechanical means should be performed no closer than 10-15 feet from the toe of the dune.

13. Videotaping beach/dunes during the spring and fall to visually document resource area conditions.
14. Create and maintain a Sand Stockpile Area (SSA) within the parking lot area at the Point or other area approved by the City and DCR. Sand from the SSA will be used for the purposes of emergency storm response, sand nourishment/restoration at critical areas, and repairing/maintaining public access ways and other access structures located along/throughout the public beach.
15. Continue to prohibit structures that act as barriers against the lateral movement of sand for dune building.
16. Coordinate with U.S. Fish & Wildlife (USFWS) and the Massachusetts Division of Fisheries & Wildlife, Natural Heritage Endangered Species Program (NHESP) for guidance on wrack management.

V. RARE SPECIES AND WILDLIFE MANAGEMENT

A. Rare Species Protection and Habitat Management

The section of Plum Island within the City of Newburyport is within a Priority Habitat of Rare Species (PH 1321) and Estimated Habitat of Rare Wildlife (EH 65) as designated by the Natural Heritage and Endangered Species Program (see Figures 9A and 9B, respectively). All projects within Priority Habitat fall under the jurisdiction of the MA Endangered Species Act (MESA), as implemented by the MA Natural Heritage and Endangered Species Program (NHESP). MESA contains prohibitions against “taking” of a state-listed species and a review process with NHESP is required for projects within Priority Habitat of Rare Species. The review guidelines explain which projects require MESA filings and also include specific exemptions for certain activities. All projects within Priority Habitat of Rare Species should consult the MESA review process guidelines. All projects within Estimated Habitat of Rare Wildlife requiring a Notice of Intent (NOI) must submit a copy of the NOI to NHESP for review.

The primary species of concern in this area is the Piping Plover (*Charadrius melodus*), which is listed as both a Federal and State Threatened Species. Piping Plovers nest on coastal beaches above the high tide line, on sand flats at the end of sand spits, on gently sloping fore-dunes, and in blowouts or overwash areas between or behind coastal dunes. Plover nesting typically occurs between the end of April through early June. Chicks typically hatch anytime from early June through mid to late July, but can be later if nesting has been interrupted by weather conditions. Its nest is a simple scrape in the sand or mixtures of sand, gravel and shells. The nest is typically placed on open sand or in patches of sparse to moderately dense beach grass and other dune vegetation. The management of the beach for threatened and endangered species habitat is an intense challenge, given the potential conflicts with recreational users of the beach.

Least Terns (*Sternula antillarum*), which are a State-listed species of Special Concern, are not known to nest on the Newburyport section of beach, but they do occur at the Parker River National Wildlife Refuge (PRNWR) to the south. The nesting periods of the Least Tern are similar to those of the Piping Plover. However, terns nest in colonies while plovers nest in isolated pairs.

The City of Newburyport is working with the PRNWR to establish a Memorandum of Understanding (MOU) which will establish protocols for the monitoring and protection of Piping Plovers on Plum Island (see Appendix I). The MOU has also been reviewed by the USFWS New England Field Office and should be finalized before Fall 2009. USFWS and NHESP guidelines for the managing recreational use of beaches to protect Piping Plover, Terns, and their habitats are provided in Appendix J. These documents will also provide assistance to the City in monitoring and protecting Piping Plover habitat.

Under the MOU, personnel from the PRNWR will identify and monitor piping plover nests and fledglings along City property throughout the piping plover nesting and fledging season (April through August). They will also install and monitor symbolic fencing and signage to deter people from entering nesting plover territory and monitor beach raking activities. The PRNWR has provided the City with maps of past nesting locations as shown in Figure 10. PRNWR will also provide the City with maps of current and future nesting locations. The PRNWR will work with the City to determine if further management strategies are required, including possible adjustments to trash bin locations and beach cleaning. The City will provide funding for the necessary equipment.

The MOU also states that PRNWR will provide annual training of any City staff that work on the beach as to how to best avoid plovers and terns that may be nesting or foraging. The training will include guidance in the use of ATVs, beach raking equipment, trucks or other equipment on the beach.

In addition to protecting rare and endangered wildlife, care must be taken to avoid damaging rare plant species. A list of rare plant species can be found on the NHESP website at http://www.mass.gov/dfwele/dfw/nhesp/species_info/ mesa_list/ mesa_list.htm.

B. Wildlife Management

Dead or injured marine animals are occasionally discovered along the beach and should be reported to the appropriate agency. In the case of injured or dead marine mammals or reptiles (sea turtles), the New England Aquarium should be notified immediately.

Other dead animals and fish will either be buried in a remote location within the study area or removed by staff from the Newburyport Health Department

Other wildlife species, including skunks, foxes and coyotes, can be attracted to homes because of trash, food waste, pet food and bird food. The City will work with homeowners to remind and educate them how to deter unwanted or nuisance wildlife species.

C. Rare Species and Wildlife Management Recommendations

1. The City will adhere to the MOU established between the City and the PRNWR.
2. Avoid vehicle use in the vicinity of nesting Piping Plovers, except in the case of an emergency.
3. Portions of the primary dune system that may be over washed by natural storm events will be left untouched to enhance nesting habitat for plovers and least terns, and provide travel corridors for plover chicks.
4. Beach raking and debris removal performed by Newburyport DPS should take place before the Piping Plover nesting period (before April).
5. Wrack that is raked from the beach by Newburyport DPS should be cleaned of debris and deposited on the upper portions of the beach, close to the toe of the dunes to provide food for foraging birds.
6. Post signs at the Point that instruct the public as to what to do (and not do) in the case of a stranded marine animal (e.g., call the New England Aquarium if the animal is injured, don't touch or attempt to move the animal).
7. The City should work with homeowners/residents to minimize the attraction of wildlife species onto their property or in public areas.
8. Obtain maps and lists of rare plant species (from NHESP and/or MESA) that may reside in the study area. Consult these for any construction activities in the study area or adoption of maintenance plans.

VI. STORM-RELATED MAINTENANCE AND DAMAGE PROTECTION

A. General

Barrier beaches are dynamic landforms that are constantly moving and shifting in response to coastal processes. In storm events, the beach and dune form and location shift as storm energy is dispersed and dissipated, allowing the barrier beach system to keep up with sea-level rise and changing sediment supply. The natural storm damage prevention function of the beaches and dunes on a barrier beach is dependent on the ability of the system to respond in this way. An important aspect of the beach and dune system's natural protection is to shift sand from the beach and dunes into near shore bars, which in turn "trip" incoming waves and cause wave energy to be diminished before it reaches the shoreline. Over time after a storm event, the sediment shifts back onshore, and vegetation becomes re-established in the newly formed profile. In addition, dune erosion and overwash actually create endangered species habitat. Protection of these critical storm response characteristics of barrier beaches is essential to appropriate barrier beach management.

Erosion and flooding from coastal storms, such as Nor'easters and hurricanes, often result in significant damage or loss of property. However, even smaller, more frequently occurring storms may pose potentially greater risks to coastal areas. The Newburyport section of Plum Island, as part of the barrier beach system, plays an intrinsic role in protecting the mainland against storm damage. The primary dune (the dune that is closest to the ocean), is the first line of defense against storms. Vegetated dunes absorb the force of waves created by on-shore storms and shield buildings and inland areas from storm damage and flooding. The height and volume of the dune determine how much protection it can provide from specific storm events. The dune volume can be significantly eroded during multiple small storms, reducing its ability to provide protection during subsequent storms. The height of the dune is not the only factor in providing storm damage protection – the volume is also very important.

The Massachusetts Coastal Hazards Commission (CHC) recently cited decreased sediment supplies, and sea level rise as contributing factors to the decrease of the ability of dunes and beaches to perform their storm-protective functions. The City is committed to working towards maintaining a balance between resource protection and human use of the barrier beach to ensure storm buffering and flood protection.

B. Debris Removal

The City will continue to remove storm debris as described in Section IV. "Resource Area Management and Protection."

C. Access Way Repair

The City will continue to make repairs to access ways as described in Section III. B. "Public Access."

D. Storm-Related Beach and Dune Maintenance

Stockpiled sand from the SSA will be used to fill voids within the beach and dunes, on an emergency basis and prior to planting beach grass and installing snow fence. Equipment to be used will be in good condition with no leaks or spilling that could occur while the equipment is on the beach. The equipment used to conduct these activities is those discussed in Section IV Resource Area Management and Protection.

E. Storm-related Maintenance and Damage Protection Recommendations

The following actions may be taken as emergency measures, with the approval of the Conservation Commission, depending on the seriousness of the damage to the dunes (as detailed in the City of Newburyport's "Storm Emergency Certification Conditions"):

1. Temporary repair of coastal engineering structures, including a groin, jetty, breakwater, seawall, revetment, or bulkhead, may be undertaken provided such a structure was previously licensed.
2. Sediment may be replaced in areas where the storm has caused erosion, in order to provide temporary stabilization of the area. Sand to be used may not be removed from any existing coastal dune, as defined in the Wetlands Protection Act and Regulations. Documentation must be provided to the Conservation Commission identifying the source of all sediment used, and these must be of compatible grain size and color to existing sediment on the beach. Specifications for location and volume of sand to be brought in must be approved by the Conservation Commission before work can commence. The method to be used for sand delivery and placement must be included in the specifications provided.
3. Public structures, buildings, or foundations may be stabilized and shored up, but only to the extent that such work is necessary in order to prevent imminent harm to the structure. More complete restoration requires the filing of a Notice of Intent, as put forth in 310 CMR 10.05(4).

VII. PUBLIC OUTREACH AND EDUCATION

A. Education

An informed and educated visitor to the Plum Island Beach is important to maintaining the barrier beach. A clear and understandable public education program will contribute to the visitor abiding by the rules and regulations established and the actions needed to maintain the barrier beach.

It is recommended that the City encourage the formation of a Beach Advisory Committee under the Newburyport Conservation Commission. The Committee would be made up of volunteer residents of the Newburyport section of Plum Island. Their charter would be to promote stewardship of the island through education, outreach and special projects.

The Committee would employ environmental education programs and projects to inform residents and non-residents of vital issues affecting the barrier beach. Specific projects which could provide for public participation and education include the planting of dune grass, erecting snow fences to assure public access along rights of way, providing signage, offering lectures on environmental issues and communicating items of interest to local newspapers.

B. Litter

As discussed earlier, litter is a large problem on Plum Island. However, there are many opportunities to minimize littering, and to mitigate the impact of littering as well as clean up after the fact. Much of this can be accomplished through public outreach and education. Perhaps most important are beach residents' actions taken to prevent littering from occurring in the first place. The support of island residents is critical in providing year-round awareness in the drive against litter.

On-going litter abatement and awareness campaigns can be effective. Teaming with local merchants to limit the amount of take-out food wrappings and containers can also serve to reduce the potential for litter in the first place.

School outreach can include talks on various aspects of litter reduction. Publicizing "no litter zones", and clearly delineating litter enforcement statutes and fines, will assist in raising the awareness of not only the local population, but of visitors as well. Assuming that visitors will bring articles that will not "go home", the strategic placement of convenient, highly-visible, attractive disposal barrels or receptacles is mandatory. In addition, recycling containers should be placed along with trash barrels.

The actions listed above apply not only to residents but also filter onto the general populace. For example, dog owners from anywhere are allowed free range of the beach area from mid-September thru mid-May. An effective aid in reducing dog feces problems is to provide disposable pet waste bag dispensers at access areas located near parking spaces.

C. Signage

Posting of signs is one method of informing the beach-going public regarding matters of importance to preservation of the barrier beach. Posting and informing the public in this fashion will lead to a greater degree of compliance with rules and regulations.

To be effective, signs should be quickly readable, with a short, pointed message. They must fit into the landscape without being so inconspicuous that they are ignored. The shape, size, color and placement must avoid visual pollution (garish colors, overpowering designs), but attract attention with appropriate use of color and careful attention to sign placement for high visibility, accessibility, and readability.

The content of the signs could include a number of topics or themes including: natural history of the barrier beach; wildlife of the island; stewardship of natural resources along with those that present rules and regulations. If the signage is asking for a particular behavior, it is important that it include *the reason* that it is important (e.g., the importance of keep your dog leashed, particularly at certain times of the year for the protection of nesting plovers). Any new signage will be submitted to DCR for review.

Maintenance is extremely important, as is rapid replacement of lost, stolen, or damaged signs. If possible standardized, generic signage should be coordinated with other agencies such as the Massachusetts Department of Conservation and Recreation, Massachusetts Coastal Zone Management, or the Massachusetts Division of Fisheries. Signs should be placed not only for information purposes, but also to aid in controlling pedestrian traffic. Posting of the ordinances and penalties for violations must be clearly done in order to foster compliance.

D. Public Outreach and Education Recommendations

1. Allocate time, funding and personnel resources to establishing and maintaining an educational program.
2. Prepare educational materials and make available to the general public. The materials can include:
 - i. Lectures
 - ii. Brochures
 - iii. Curriculum materials
 - iv. Signs and Exhibits
 - v. Videos/slide shows
 - vi. Books, pamphlets, maps etc.
 - vii. Bulletin board
3. Develop a public awareness program, including school outreach, to help reduce the amount of litter on the beach.
4. Place trash receptacles at strategic, easily-seen and convenient locations.
5. Determine appropriate locations and standard templates for each combination of rules and regulations at Rights of Way (ROW) and Plum Island Point.
6. Place standard-sized signs specific to rights of way (ROWs), beach access, lifeguards (or lack thereof), dogs, dune protection/restoration and alcohol prohibition
7. Erect a bulletin board, placed at Plum Island Point for the purpose of educating and informing the public about City of Newburyport Beach Management actions, conservation information, projects, with schedules of planned activities, and educational data.

8. Establish a maintenance program whereby routine, scheduled inspections would monitor the condition of signage and lead to actions which would prolong the visibility and effectiveness of the signage in place.
9. Maintain vigilance regarding any changes (location and/or information) necessary to retain or upgrade effectiveness.
10. Partner with merchants to limit the amount of take-out food wrappers and containers.

VIII. SUMMARY OF RECOMMENDATIONS

This section summarizes the recommendations that have been presented in this plan with respect to the following management classifications.

A. Public Use, Access Ways and Safety Recommendations

Public Access Ways

1. Verify existing public Rights of Ways (ROWs) to the beach, using the 2006 “Plum Island Access Plan” as a guide using deed records or available plan information.
2. Assess existing public ROWs and other points of established public access to determine if their current use is having an adverse effect on the dune system or on wildlife habitat. Establish a plan for closure, as applicable. For those ROWs and public access ways that the City determines should remain open, evaluate the most appropriate base for each access way (e.g., on-grade walkway, elevated boardwalk, sand pathway with snow fencing, etc.) and create an implementation plan.
3. Create maintenance plans/schedules for each type of path implemented under Task 2 above (i.e., elevated boardwalk, on-grade mat, sand path, etc.) to include sweeping, inspections after major storms and removal of on-grade mats during winter months
4. Designate a location to store on-grade mats during winter months.
5. Identify and clearly mark each ROW/access way with appropriate signage.
6. Designate a City department (or departments) to oversee and maintain the public ROWs/access ways.
7. Clearly demarcate (by signage) the access ways that are used by lifeguard and police vehicles.
8. Perform periodic inspections of access ways used by authorized vehicles (seasonally and after major storms) to determine if maintenance is required (raking, or additional nourishment in the way of additional beach-grade sediments). Any nourishment needed for the access ways shall come from stockpiled sand or a clean, compatible, off-site source.
9. Conduct periodic inspections of all access ways to ensure that safe passage to/from the beach area is maintained. If safe access is compromised at any designated public access way locations, the City will take action (such as roping off unsafe areas) to divert pedestrian/vehicular access until it can be restored.
10. The City may temporarily block off existing public access ways during/after storm events as a matter of public safety.
11. All on-grade boardwalk structures installed at access way locations will be placed directly on top of the existing sand at the beginning of each recreational season and then removed at the end of the season to prevent them from being destroyed by high running tides and storms. Written notification will be submitted to the Conservation Commission a minimum of 2 weeks prior to the installation of any new on-grade walkways. On-grade boardwalks will be maintained by manually sweeping, lifting and/or shaking methods. Care will be taken not to modify existing grade elevations so as not to create a pathway that will encourage high velocity waves to travel up and cause erosion of the beach/dunes during storm events or exceptional high tides.
12. The City will clear sand from designated public access ways, where appropriate and as necessary, to maintain their function, and keep sand within the immediate area, either in the dune or on the beach, wherever it is most beneficial. Maintenance of these access ways will be primarily conducted by sweeping. Sand will be swept, by manual methods, to the sides or towards the entryway where

pedestrian traffic is the greatest using manual methods.

13. Whenever on-grade boardwalks are replaced, elevated boardwalks will be installed where feasible.
14. Elevated boardwalks that become buried will remain buried. The City will not remove sand, but rather, will smooth it out (by hand) within the designated boundaries of the access way, matching existing surrounding grades. New elevated boardwalk structures will be built over the buried structures as funds become available. Any components of the existing boardwalk that are partially buried, damaged or broken will be removed to ensure public safety. All new elevated boardwalk structures will be constructed at an appropriate elevation to minimize/avoid impacts to naturally migrating sand and in accordance with the "City of Newburyport Standards for Boardwalk and Walkover Construction (see Appendix G). Written notification will be submitted to the Conservation Commission a minimum of 2 weeks prior to the installation of replacement boardwalks.
15. Should the City wish to install any new vehicular access ways for the purpose of emergency response or maintenance, they will be minimized in width and length to the most feasible extent without losing any important vehicular functions. Access will be designed to be maintained over existing dune elevations, rather than creating/maintaining access at a lower grade than adjacent dunes to minimize impacts from erosion over time.
16. Engage public volunteer groups (e.g., the Plum Island Taxpayers Association) to help the City monitor and maintain ROWs/access ways.

Other Recommendations:

17. Continue current maintenance practices for the parking lot and public buildings (restrooms and ticket booth) located at Plum Island Point.
18. Continue the ban on hunting on the beach.
19. Continue the ban on the use of any motor vehicle or motorized vehicles on the beach, with the exception of authorized emergency vehicles and motorized equipment located at Plum Island Point for the placement of docking and boating equipment (City Ordinance, c. 4, a. III, s. 4-101(c)).
20. Change time period in the City Ordinance during which dogs are banned from the beach (from May 15 to April 1) in order to protect nesting Piping Plovers. Also increase fines for violation of this regulation from \$25.00 to at least \$50.00.
21. Erect signage and notify the public of the requirements regarding dogs on the beach. Include rules (per City Ordinance) to pick up and carry out animal waste generated by their pets and the ban against dogs on the Beach, clearly stating the penalties (fines) for failure to comply.
Signage should include educational messages as to why it is important to pick up animal waste—for both health and water quality reasons. Also state the leash requirements for dogs for off-season times and why it is important (protection of wildlife habitat, prevention of dune and vegetation destruction, etc.) See City Ordinances c. 3, a. I, s. 3-2; c. 4, a. II, s. 4-101(e) and c. 3, a. II, s. 3-26.
22. Provide biodegradable bags at beach access points for owners to collect and transport animal waste. Provide waste receptacles at beach in off-season with weekly pickup. Recommend participation of dog-owners in Plum Island to provide bags and trash receptacles.
23. Provide units for recycling fishing gear (fishing line, etc.)
24. Erect signage educating the public as to the potential danger of fishing gear to wildlife.
25. As part of public education signage, include a message that everything that is carried onto the beach must be carried out.
26. Construction activities associated with major city facilities improvements will continue to require a separate application (Notice of Intent or Request for Determination) to be filed with the Conservation Commission and MassDEP.

27. Continue to implement all watercraft management steps in cooperation with the City of Newburyport Harbormaster.
28. Determine if special use areas for swimming, surfing, and fishing should be adopted (for safety purposes). If so, this could be managed by educational signage, emphasizing the rules of beach etiquette between swimmers, surfers, anglers, etc.
29. Monitor and manage, if necessary, the impact of human activities to minimize the impact to the dunes, beach and salt marsh areas and resident wildlife.
30. Designate and mark areas of special conditions with buoys and signage, as appropriate.
31. Install symbolic and/or snow fencing and signage for onshore areas where human activities affect wildlife or fragile resource areas (dunes, beach grass, salt marsh, Piping Plover habitat, etc).

B. Resource Area Management Recommendations

1. Identify beach property owned or managed by the state and/or the City of Newburyport appropriate for Beach Management activities, including public ROWs/public access ways.
2. Review records including deeds and surveys, combined with physical inspection to identify specific parcels of land appropriate for management activities.
3. Review the existing land management agreement that is in place with DCR and the City that authorizes Newburyport to manage the state-owned portion of the beach. Assess whether this needs to be updated/revised.
4. Compare the Newburyport Wetlands Ordinance to the latest state building code in regard to Coastal Construction (7th Edition of The Massachusetts Basic Building Code 780 CMR 120.G , Appendix G: Flood-Resistant Construction and Construction in Coastal Dunes). Revise the Ordinance in areas where it is not as strict (or detailed) as the building code.
5. Continue to remove litter from the beach. The City will also educate visitors regarding the importance of trash removal.
6. Establish a program for beach and dune nourishment.
7. Implement dune nourishment techniques, as necessary, in appropriate locations through the use of snow fencing. Erect snow fences in appropriate locations in order to build dunes. Monitor condition of snow fence and replace, reinforce and repair as needed. The extent of snow fencing will be contingent upon available funding.
8. Plant Beach Grass and other vegetative plantings to stabilize dunes in conjunction with snow fence installation. Inspect beach grass plantings periodically. Replace and supplement plantings as needed, in conjunction with snow fence repair and other management measures. Monitor the status of the accumulation of sand and the condition of plantings to determine the scope of maintenance and restorative measures. The extent of beach grass planting would be contingent upon available funding. NOTE: plans for beach grass planting and installation of snow fencing must be submitted to NHESP for review in order to determine possible adverse effects on wildlife.
9. Place signs at dune restoration locations identifying the location as beach grass planting areas and dune restoration sites to minimize damage to beach grass and dune.
10. Notify residents and owners of private property of benefits of erecting snow fences and beach grass plantings through the newspaper; informational literature, talks, lectures and public meetings on the topic.
11. Shoreline birds, including the federally and state-listed threatened species, the Piping Plover, forage in the wrack. In addition, the Plover nesting period begins in mid-April. It is therefore recommended that the Newburyport DPS implement a program that includes:
 - a. Re-scheduling beach raking and debris removal to March
 - b. Preserve the wrack that is collected (removing the interspersed trash) and place it at the toes of the dune.
 - c. Arrange to have a qualified wildlife monitor on site if beach cleaning is to take place when rare or endangered nesting birds are present.
12. Newburyport DPS will follow the recommendation by CZM that raking by mechanical means should be performed no closer than 10-15 feet from the toe of the dune.
13. Videotaping beach/dunes during the spring and fall to visually document resource area conditions.
14. Create and maintain a Sand Stockpile Area (SSA) within the parking lot area at the Point or other area approved by the City and DCR. Sand from the SSA will be used for the purposes of emergency storm

response, sand nourishment/restoration at critical areas, and repairing/maintaining public access ways and other access structures located along/throughout the public beach.

15. Continue to prohibit structures such as privacy fencing and latticework around decks and foundation pilings that act as barriers against the lateral movement of sand for dune building.
16. Coordinate with U.S. Fish & Wildlife (USFWS) and the Massachusetts Division of Fisheries & Wildlife, Natural Heritage Endangered Species Program (NHESP) for guidance on wrack management.

C. Rare Species and Wildlife Management Recommendations

1. The City will adhere to the MOU established between the City and the PRNWR.
2. Avoid vehicle use in the vicinity of nesting Piping Plovers, except in the case of an emergency.
3. Portions of the primary dune system that may be over washed by natural storm events will be left untouched to enhance nesting habitat for plovers and least terns, and provide travel corridors for plover chicks.
4. Beach raking and debris removal performed by Newburyport DPS should take place before the Piping Plover nesting period (before April).
5. Wrack that is raked from the beach by Newburyport DPS should be cleaned of debris and deposited on the upper portions of the beach, close to the toe of the dunes to provide food for foraging birds.
6. Post signs at the Point that instruct the public as to what to do (and not do) in the case of a stranded marine animal (e.g., call the New England Aquarium if the animal is injured, don't touch or attempt to move the animal).
7. The City should work with homeowners/residents to minimize the attraction of wildlife species onto their property or in public areas.
8. Obtain maps and lists of rare plant species (from NHESP and/or MESA) that may reside in the study area. Consult these for any construction activities in the study area or adoption of maintenance plans.

D. Storm-related Maintenance and Damage Protection Recommendations

1. Temporary repair of coastal engineering structures, including a groin, jetty, breakwater, seawall, revetment, or bulkhead, may be undertaken provided such a structure was previously licensed.
2. Sediment may be replaced in areas where the storm has caused erosion, in order to provide temporary stabilization of the area. Sand to be used may not be removed from any existing coastal dune, as defined in the Wetlands Protection Act and Regulations. Documentation must be provided to the Conservation Commission identifying the source of all sediment used, and these must be of compatible grain size and color to existing sediment on the beach. Specifications for location and volume of sand to be brought in must be approved by the Conservation Commission before work can commence. The method to be used for sand delivery and placement must be included in the specifications provided.
3. Public structures, buildings, or foundations may be stabilized and shored up, but only to the extent that such work is necessary in order to prevent imminent harm to the structure. More complete restoration requires the filing of a Notice of Intent, as put forth in 310 CMR 10.05(4).

E. Public Outreach and Education Recommendations

1. Allocate time, funding and personnel resources to establishing and maintaining an educational program.
2. Prepare educational materials and make available to the general public. The materials can include:
 - i. Lectures
 - ii. Brochures
 - iii. Curriculum materials
 - iv. Signs and Exhibits
 - v. Videos/slide shows
 - vi. Books, pamphlets, maps etc.
 - vii. Bulletin board
3. Develop a public awareness program, including school outreach, to help reduce the amount of litter on the beach.
4. Place trash receptacles at strategic, easily-seen and convenient locations.
5. Determine appropriate locations and standard templates for each combination of rules and regulations at Rights of Way (ROW) and Plum Island Point.
6. Place standard-sized signs specific to rights of way (ROWs), beach access, lifeguards (or lack thereof), dogs, dune protection/restoration and alcohol prohibition
7. Erect a bulletin board, placed at Plum Island Point for the purpose of educating and informing the public about City of Newburyport Beach Management actions, conservation information, projects, with schedules of planned activities, and educational data.
8. Establish a maintenance program whereby routine, scheduled inspections would monitor the condition of signage and lead to actions which would prolong the visibility and effectiveness of the signage in place.
9. Maintain vigilance regarding any changes (location and/or information) necessary to retain or upgrade effectiveness.
10. Partner with merchants to limit the amount of take-out food wrappers and containers.

FIGURES

APPENDIX A

State-City Land Management Agreement Memorandum of Understanding

APPENDIX B

Executive Order No. 181 Re: Barrier Beaches

APPENDIX C

City of Newburyport Wetlands Ordinance

APPENDIX D

Guidelines for Plum Island Applications

APPENDIX E

Applicable Laws & Regulations

APPENDIX F

2006 DCR Plum Island Public Access Plan

APPENDIX G

**City of Newburyport
Standards for Boardwalk & Walkover Construction**

APPENDIX H

DCR Guide to Dune Stabilization

APPENDIX I

**Memorandum of Understanding (draft)
City of Newburyport & USFW PRNWR**

APPENDIX J

**NHESP & USFWS Guidelines for Managing Recreational Use
Of Beaches to Protect Piping Plovers, Terns
and Their Habitats In Massachusetts**

APPENDIX K

Resource Protection Partners

APPENDIX L

FEMA Letter 07-01-0522P

APPENDIX M

**Beach Management Plan
Order of Conditions**