

HABITAT PROFILE

Dunes

Associated Species: Piping Plover (*Charadrius melodus*), semi-palmated plover (*Charadrius semipalmatus*), Semipalmated Sandpiper (*Calidris pusilla*), Least Tern (*Sterna antillarum*), Horned Lark (*Eremophila alpestris*), “Ipswich” Savannah sparrow (*P. s. princeps*)

Global Rank: Not ranked

State Rank: Beach grass grassland (S1),

Bayberry – beach plum maritime shrubland (S1)

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ELEMENT 1: DISTRIBUTION AND HABITAT

1.1 Habitat Description

Coastal sand dunes are areas of sand and gravel that are deposited by wave and wind action within a marine beach system. Dunal formations include beach berms, frontal dunes, dune ridges, back dunes, and other sand and gravel areas. The coastal sand dune system is characterized primarily by American beach grass (*Ammophila breviligulata*) in the frontal dunes and by beach plum (*Prunus maritima*) in the back dunes (Maine Department of Environmental Protection (MDEP) 2004, Spurduto and Nichols 2004).

Coastal sand dunes are typically transverse dunes that form at right angles to prevailing winds (Lutgens and Tarbuck 2000). Waves bring sand to the shore where it is transported by onshore winds. Sand is considered any loose, granular material with grains 0.05 to 2.0 millimeters in diameter. Sand comes from igneous, metamorphic, and sedimentary rock.

Obstacles—such as driftwood, fencing, or vegetation—reduce wind speed and cause sand to accrete. As sand accumulates, plants adapted to the beach environment emerge, stabilizing the surface and promoting further dune formation (Broome

2004). Dune plants are subject to fluctuating environmental conditions that affect their growth, survival, and community structure. The most important factors include temperature, desiccation, low moisture retention, soil erosion, sand accretion, soil salinity, salt spray, changes in organic matter and pH (Maun 1994).

Other types of vegetation that occur in the shifting sands of the frontal dunes and dune ridges include seaside goldenrod (*Solidago sempervirens*), hair hudsonia (*Hudsonia tomentosa* var. *tomentosa*), poverty oat grass (*Danthonia spicata*), little bluestem (*Schizachyrium scoparium*), beach pea (*Lathyrus japonicus*), seabeach pinweed (*Lechea maritima*), jointweed (*Polygonella articulata*), perennial umbrella-sedge (*Cyperus lupulinus*), sea-beach needlegrass (*Aristida tuberculosa*) and Gray’s umbrella-sedge (*Cyperus grayi*) (Dunlop and Crow 1985, Dunlop et al. 1983).

Sandy soils are typically more stable in the back dunes, allowing other types of vegetation to grow, including climbing poison ivy (*Toxicodendron radicans*), Virginia rose (*Rosa virginiana*), small sundrops (*Oenothera perennis*), yarrow (*Achillea millefolium*) and large climbing false buckwheat (*Polygonum scandens*) (Dunlop and Crow 1985, Dunlop et al. 1983).

1.2 Justification

Many avian species depend on coastal sand dunes. The state endangered and federally threatened piping plover (*Charadrius melodus*), horned lark (*Eremophila alpestris*), and least tern (*Sterna antillarum*) use coastal sand dunes for breeding while the semi-palmated plover (*Charadrius semipalmatus*), semi-palmated sandpiper (*Calidris pusilla*), sanderling (*Calidris alba*), short-eared owl (*Asio flammeus*), horned lark and Ipswich/Savannah sparrow (*P. s. princeps*) use

coastal sand dunes for migration. The sanderling, short-eared owl, horned lark, and Ipswich/Savannah sparrow use coastal sand dunes for wintering (Hunt 2004).

Coastal sand dune systems include sand deposits within a marine beach system that have been artificially covered by structures, lawns, roads, and fill (MDEP 2004). Prior to World War II, more than 90% of the nation's coastal barrier real estate existed as natural areas, largely inaccessible to the public (United States Fish and Wildlife Service (USFWS) 1996). Today coastal sand dunes have been lost to construction of homes, roads, parking lots, jetties, seawalls, and other structures in New Hampshire and along the entire Atlantic coast.

In Maine, historic dune nesting habitat has been reduced over 70% due to development (USFWS 1996). Significant development has also occurred along the New Hampshire coast in recent decades. However, no data are available to quantify the severity of dune habitat loss in the state. Protection of coastal development against strong ocean storms is important because damage from storms can result in billions of dollars of damage. Because they are both natural and economical, coastal sand dune systems provide coastal development with the best protection against storms, wind, waves, erosion, and sea level rise (MDEP 2004).

1.3 Protection and Regulatory Status

Coastal sand dune systems are protected under the Federal Coastal Zone Management Act of 1972 as well as New Hampshire RSA 482-A pertaining to Fill and Dredge in Wetlands. The New Hampshire Department of Environmental Services (NHDES), Watershed Management Bureau, Coastal Program has regulatory authority regarding RSA 482-A and associated administrative rules pertaining to coastal sand dune systems.

Coastal sand dune systems that serve as breeding grounds for federal and state listed species are protected through the Federal Endangered Species Act (1973), and New Hampshire RSA 212-A:6 IV(a) Endangered Species Conservation Act (1979). Coastal sand dune systems that occur in the Hampton Harbor Wildlife Management Area, Hampton Beach State Park and Odiorne State Park are state owned lands open to the public for recreation and protected

from development. Local town ordinances and New Hampshire State Parks rules help protect dune habitats by prohibiting such activities as the use of fireworks and campfires and restricting motorized vehicle use on dunes and beaches.

1.4 Population and Habitat Distribution

New Hampshire has 18.57 miles of coastline along the Atlantic Ocean (NHDES 2004), most of which is rocky shore. According to the Coastal Sand Dune Systems map that was created for this process, coastal sand dune systems comprise approximately 1.78 miles of the immediate coastline and occur primarily in Hampton and Seabrook.

1.5 Town Distribution Map

See attached.

1.6 Habitat Map

Polygons representing any of the diagnostic natural communities, as defined by New Hampshire Natural Heritage Bureau (NHNHB), within the coastal sand dune system were selected for this habitat. These communities are beach grass grassland, bayberry–beach plum maritime shrubland, coastal interdunal marsh/swale, and maritime wooded dune. Communities with overlapping polygons were dissolved to form one polygon with the dominant community name. The result was a shape-file of four small polygons along the coast of New Hampshire.

These polygons were then reviewed by New Hampshire Fish and Game (NHFG) personnel and modified to include known and potential occurrence of coastal sand dune systems from survey efforts conducted along the coast. The result was 13 polygons comprised of 7 known coastal dunes locations and 6 potential dune locations.

1.7 Sources of Information

Sources regarding habitat and distribution include NHNHB Natural Communities of New Hampshire, NHFG Nongame and Endangered Wildlife Program, piping plover monitoring data, and personal knowledge

1.8 Extent and Quality of Data

Dune occurrence is well documented by NHFG surveys. The Nongame and Endangered Wildlife Program monitors breeding piping plovers along the seacoast and conducts a census of the entire coast annually. NHNHBB has conducted extensive field surveys documenting the occurrence of American beach grass (Sperduto and Nichols 2004).

1.9 Distribution Research

The current distribution of coastal dunes is well documented. Further research should include determining the historic distribution and abundance of coastal sand dunes and the magnitude of habitat lost in recent history (50 years). In addition, areas of potential dune habitat restoration should be identified.

Element 2: Species/Habitat Condition

2.1 Scale

Polygons representing coastal sand dune systems were grouped by geographic location. Those polygons that comprised more than one jurisdiction were split by land ownership. Grouping in this manner resulted in 13 conservation-planning units.

2.2 Relative Health of Populations

The majority of coastal sand dune systems that remain occur along the Atlantic coast in the towns of Hampton and Seabrook (33.0 acres and 117.7 acres respectively). Two smaller areas occupy 9.1 acres in Hampton/Seabrook Harbor and 7.4 acres at Odiorne State Park in Rye.

2.3 Population Management Status

Not addressed for this habitat.

2.4 Relative Quality of Habitat Patches

Seabrook Town Beach hosts the most extensive coastal sand dune systems that remain in the state. Smaller remnants of dunes occur at various locations along the coast including state owned lands in Hampton/Seabrook harbor, at Hampton Beach State Park and

Odiorne State Park. All coastal sand dune systems are under severe pressure from human recreation and development.

2.5 Habitat Patch Protection Status

See element 1.3 above.

2.6 Habitat Management Status

In areas where piping plovers are known to occur, habitat is managed to protect nesting areas during the breeding season. Management activities include fencing suitable habitat areas, restricting motorized vehicle use, and coordinating beach management activities such as beach raking and boardwalk maintenance. Habitat management for piping plovers is conducted by NHFG according to USFWS Atlantic Coast Piping Plover Population Revised Recovery Plan guidelines and in cooperation with town officials.

NHFG owns the Hampton Harbor Wildlife Management Area (WMA), which is comprised of 9.13 acres of dunes. No habitat management plan is in place for this WMA, and no active management has occurred at this site.

Dredging of Hampton/Seabrook harbor and the inlet typically takes place annually between November and March. Dredge spoil is dumped on the dunes in Hampton and Seabrook to stabilize dunes and replenish beaches. Mechanical maintenance of coastal sand dune systems is carried out by local towns and New Hampshire State Parks and includes, but is not limited to, bulldozing of dunes, planting vegetation, installation and maintenance of boardwalks and pathways, and mechanical cleaning of the beach.

The town of Seabrook established the Seabrook/Sun Valley Beach Management Committee, a volunteer committee, in 2001. The purpose of the committee is to establish a long-term management plan for the Seabrook town-maintained beach and Sun Valley beach, which falls under the town of Hampton's jurisdiction. This committee has worked with NHDES to obtain funding and has worked with an engineering consultant to develop a management plan for the town beach. The final version of the management plan was completed in June 2004 and includes primary objectives such as, "maintaining control of dune heights and protection of private properties abutting the beach" (Seabrook 2004).

2.7 Sources of Information

Information on management and regulations was obtained from the USFWS Atlantic Coast Piping Plover Population Revised Recovery Plan and from local communities. Geographic Information Systems data-layers were used to identify key habitat areas and determine quality of habitat patches.

2.8 Extent and Quality of Data

Dune occurrence is well documented by NHFG surveys. The Nongame and Endangered Wildlife Program monitors breeding piping plovers along the seacoast and conducts a census of the entire coast annually. The Marine Fisheries Division conducts MRFFS at over 40 recreational fishing sites along the seacoast annually. NHNHBB has conducted extensive field surveys documenting the occurrence of American beach grass (Spencer and Nichols 2004).

2.9 Condition Assessment Research

A coastal geological survey of the New Hampshire coast is important. The survey should determine the current health and condition of existing dunes, project likely changes to current dunes in future decades, and determine protocol for managing, protecting and improving the health of existing dunes.

ELEMENT 3: SPECIES AND HABITAT THREAT ASSESSMENT

3.1.1 Recreation (General Disturbance), 4.00, Critical

(A) Exposure Pathway

Sunbathing, swimming, jogging, dog walking, kite flying, volleyball, jet skiing, surfing and fishing are all popular recreational activities in or nearby dune habitats, and the effects of human presence on the dunes are long lasting. Unrestricted access has led to many unofficial pathways, which have allowed trampling, loss of vegetation, and erosion on the dunes. Increased human presence also deters native species from nesting and/or feeding, can result in trampling of nests and chicks, and can lead to nest abandonment. Additionally, human refuse attracts predators

High recreational use is supported in turn by

intensive management including installation and maintenance of boardwalks for human access, mechanical raking to clean beaches, removal of wrack and debris, and public safety operations such as patrol by local police on horseback and in vehicles.

(B) Evidence

During summer 2003, Hampton Beach State Park reported 122,890 visitors (J. Lyones, New Hampshire Department of Resource and Economic Development, personal communication). These numbers are in keeping with the fact that beach visits are the second most popular recreational activity, and visits are likely to rise as population increases (National Survey on Recreation and the Environment 1994, New Hampshire Office of State Planning 2003).

Recreational management activities affect the dune ecosystem by altering the natural processes of dune formation, increasing erosion, trampling and killing native plant and animal species, and altering species' natural behaviors.

The piping plover, which breeds among sandy dunes and beaches along the Atlantic coast, is a state endangered and federally threatened species. The decline of piping plovers beginning in the 1940s has been attributed primarily to habitat loss and disturbance by humans and their pets (USFWS 1996).

3.1.2 Development (Habitat Loss and Conversion)

(A) Exposure Pathway

The natural shifting of sand from wind and wave action can have negative impacts on property value and industry along the coast. Hampton/Seabrook harbor and the inlet are dredged annually for navigation. Dredge spoil is dumped on the dunes in both Hampton and Seabrook to stabilize dunes and replenish beaches.

Increased shoreline development raised property owner concern regarding beach and dune stabilization. Dune stabilization efforts include planting American beach grass, bulldozing, and snow fencing. Shoreline modification efforts include seawall and jetty construction. Stabilization and modification interrupt natural dune succession, disturb native natural communities, and limit reestablishment.

(B) Evidence

Man-made structures along the shoreline, or manipulation of natural inlets, disrupt the natural forces necessary for beach and dune creation and renewal and can result in habitat loss or degradation (Melvin et al. 1991). Artificial barriers block the natural flow of sand and sediment, preventing the formation and maintenance of dunes. In addition, beach ecosystems are threatened by the removal of wrack, which provides nutrients and beach stability (Gulf of Maine Council Habitat Restoration Subcommittee 2004). Dredging of inlets can affect spit formation adjacent to inlets, and jetties can cause widening of islands as well as growth of vegetation on inlet shores (USFWS 1996).

3.2 Sources of Information

Information regarding dune threats was compiled from expert review and consultation, literature review, fact sheets and the Internet.

3.3 Extent and Quality of Data

Recreational uses and their impacts on coastal sand dune systems as well as the effects of shoreline stabilization on coastlines are well documented.

3.4 Threat Assessment Research

Additional research is needed to determine the impact of shoreline stabilization efforts, including dredging, beach replenishment, jetties, seawalls, mechanical manipulation of dunes, and the establishment and removal of vegetation on New Hampshire coastal dunes.

ELEMENT 4: CONSERVATION ACTIONS

4.1.1 Create and maintain official, designated pathways for access to and from beaches

(A) Direct threats include: human disturbance, recreational management and shoreline/dune modification.

(B) Justification

- Directing foot traffic along designated pathways for

access to and from beaches will reduce the number of paths over dunes and will reduce trampling and loss of vegetation.

- Official paths should be installed and maintained at all main beach access points as well as at designated areas along the length of the beach.
- Some official paths and boardwalks are in place and maintained. Spacing of these walkways should be evaluated to determine where additional paths and boardwalks are needed and will be most effective.
- Placement of new walkways should be a decision made by representatives from the local communities as well as by town, state, and federal officials.

(C) Conservation Performance Objective

The objective of creating and maintaining official designated walkways is to direct all human access to and from beaches along designated paths to reduce trampling and loss of vegetation on dunes and prevent erosion.

(D) Performance Monitoring

Monitoring should be performed daily during the summer months when recreational use of beaches is at its peak. Monitoring should include observing the number of people using official walkways, observing other locations where people are using the beach, recording the number of people using these other areas, and noting the distance from these areas to official designated access points.

(E) Ecological Response Objective

The goal of installing and maintaining designated official walkways is to reduce human foot traffic over dunes and to allow natural dune formation and growth as well as succession of dune vegetation. Successful protection of existing dunes will be indicated by the natural succession of distinct natural communities in the frontal dune and back dune areas.

(F) Response Monitoring

Response monitoring should include vegetation sampling and monitoring at predetermined areas throughout the dunes. Response monitoring should note the types and density of vegetation occurring. Over time, a reduction in the amount of open space and an increase in the amount of vegetation should be observed. In addition, long term response monitoring should show a change in vegetative structure,

especially in the back dunes where a variety of shrub species should become established.

(G) Implementation

A cooperative agreement should be established between NHFG, United States Fish and Wildlife Service (USFWS), the NHDES, and local town officials to determine the most appropriate locations, maintenance techniques, and monitoring protocol for official pathways.

(H) Feasibility

Local town public works departments and DRED have the expertise to install and maintain paths and boardwalks. NHFG and the NHDES have the expertise to carry out monitoring.

4.1.2 Improve enforcement of existing laws and regulations, Regulation and Policy.

(A) Direct threats include: human disturbance, recreational management, and shoreline/dune modification.

(B) Justification

- Improving enforcement of existing laws and regulations will help to reduce the number of unofficial paths leading from private residences over the dunes and thus reduce trampling and loss of vegetation and erosion. It will also help promote natural dune succession. Improving existing laws and regulations will help to ensure that dredgers follow permit requirements.
- Improving enforcement of existing laws and regulations will promote natural dune formation and growth as well as the establishment and succession of natural dune vegetative communities.
- Improving enforcement of existing laws and regulations should be targeted to all existing dune areas and any restored areas.
- Improving enforcement of existing laws and regulations is needed immediately and should be a continuous year-round effort. Enforcement efforts should be increased during the summer months when recreational use of beaches and dunes is most intense.
- Enforcement efforts can be adjusted depending on public response and the results of performance and

response monitoring efforts.

(C) Conservation Performance Objective

The objective of improving enforcement of existing laws and regulations is to reduce the number of unofficial paths leading from private residences over the dunes, reduce trampling and loss of vegetation, reduce erosion, and promote natural dune growth and formation and vegetative succession. Improving existing laws and regulations will also help to ensure that dredgers follow permit requirements.

(D) Performance Monitoring

Performance monitoring will be entailed by the increased efforts of town, state and federal officials to identify strategies to improve enforcement of existing laws and regulations and to ensure dredgers follow permit requirements.

(E) Ecological Response Objective

The desired ecological response to improving enforcement of existing laws and regulations is natural dune growth and formation and the succession of dune vegetative communities.

(F) Response Monitoring

Response monitoring will be entailed by the cooperation of town officials and state agencies to identify and implement strategies for increased enforcement of existing laws and regulations.

(G) Implementation

NHFG and NHDES should work with towns to identify strategies for increasing enforcement of existing laws and regulations. Funding sources need to be identified to support additional law enforcement staff at both the town and state levels.

(H) Feasibility

Local towns and NHFG have the expertise to carry out enforcement of existing laws and regulations. However, both town and state law enforcement are constrained by limited staff and funding.

4.1.3 Create and implement a comprehensive education and outreach plan for residents, day visitors, community and town officials, Education and Outreach.

(A) Direct threats include human disturbance, recreational management, and shoreline/dune modification

(B) Justification

- Implementing a comprehensive education and outreach plan will help to raise awareness and garner support for protecting and maintaining New Hampshire's remaining dunes.
- Raising public awareness will help to protect dunes from human disturbance and thus allow for natural dune formation and growth as well as vegetative succession.
- Education and outreach should be targeted both at beach users and local decision makers as well as at local conservation commissions and public schools.
- An education and outreach plan should be created to raise awareness and garner local support for protecting and reducing further losses and degradation of dunes. Education and outreach efforts should increase during the summer months when recreational use is at its peak.
- Education and outreach efforts can be conducted in a variety of ways depending on the audience, the time of year, and can be adjusted based on feedback received from outreach efforts.

(C) Conservation Performance Objective

The objective of creating a comprehensive education and outreach plan is to increase community support and involvement in the protection and management of this unique habitat. Such a plan would raise awareness by providing information about dune ecosystems, as well as by emphasizing the benefits of healthy dunes to humans and their property.

(D) Performance Monitoring

The performance of education and outreach efforts will be determined by the number of people interested in participating in presentations and other outreach efforts.

(E) Ecological Response Objective

The desired ecological response to creating an education and outreach plan is natural dune

formation and growth, which will natural vegetative succession of existing dunes and potential dune restoration areas.

(F) Response Monitoring

Response monitoring will be done by observing increased involvement in the protection and management of dune habitats as well as by observing a decrease in human uses that harm dune habitats.

(G) Implementation

- Create and install educational displays at all main beach entrances
- Give informative presentations to town officials, local conservation commissions, community groups involved in beach management, local police departments and state parks personnel
- Give mini-presentations to day visitors at beaches that include guided walks and information about dune ecosystems
- Create and distribute an informational mailing to all residents who live along beaches/dunes
- Create an educational program to be used in local schools and encourage student involvement in beach management

(H) Feasibility

NHFG has limited funding and staff. Funding sources should be identified, and additional staff should be acquired to develop an education and outreach plan for dune habitats and the piping plover.

4.1.4 Identify and carry out habitat restoration in most suitable areas, Restoration and Management, Habitat Protection.

(A) Direct threats affected include: shoreline/dune modification

(B) Justification:

- Dune restoration along the coast will help to stabilize the New Hampshire shoreline and protect property in a natural and cost effective manner
- Development pressure along the coast is severe and continues rapidly. Work should

begin immediately to identify potential dune restoration sites and to determine the appropriate interventions.

- Dune restoration efforts will take place at those sites determined by a feasibility study to be most suitable.

Conservation Performance Objective

The objective of dune habitat restoration is to restore areas of historical dune occurrence and to increase the amount of dune habitat in the state.

(D) Performance Monitoring

Performance will be measured by the success of restoration efforts in protecting and repairing dune ecosystems

(E) Ecological Response Objective

The desired ecological response to dune habitat restoration is an increase in the amount of healthy dune habitat in the state.

(F) Response Monitoring

Successful dune restoration will be indicated by an increase in the amount of dune habitat in the state.

(G) Implementation

A feasibility study needs to be conducted to determine historical occurrences of dune habitats, ascertain which areas are most suitable for habitat restoration and identify steps necessary to begin restoration.

(H) Feasibility

Funding for a feasibility study and restoration efforts should be pursued by NHFG, NHDES, DRED, and the Parks Division

4.1.5 Require dredge applicants to consult with NHFG Nongame and Endangered Wildlife Program, regarding disposal and placement of dredge material, Regulation and Policy.

(A) Direct threats include: recreational management and shoreline/dune modification.

(B) Justification

- Requiring dredge and fill applicants to consult with NHFG Nongame and

Endangered Wildlife Program will help to ensure that existing dune habitat is not degraded and may potentially help to restore dune habitat in historical areas.

- Reviewing dredge and fill permits will help to determine where dredge material should be placed and will promote natural shoreline stabilization and reduce the risk of destroying dune habitat. Only dredge and fill permits pertaining to Hampton/Seabrook harbor and the immediate coast should be reviewed. Dredge and fill permits should be reviewed year round, as necessary. Dredge operations should continue to be conducted only between November and March.
- Reviewing dredge applications and advising on the placement of dredge material may help to maintain existing dune habitat and restore historical dunes.

(C) Conservation Performance Objective

Reviewing dredge applications will provide input on the disposal and placement of dredge material in an effort to promote natural shoreline stabilization, minimize degradation of existing dunes, and conduct habitat restoration.

(D) Performance Monitoring

Performance will be evident by the inclusion of NHFG Nongame and Endangered Wildlife Program in all dredge applications pertaining to Hampton/Seabrook harbor and the adjacent coast.

(E) Ecological Response Objective

The objective is to promote natural shoreline stabilization, minimize degradation of existing dunes and conduct habitat restoration.

(F) Response Monitoring

Success of dredge application review will be evident in the success of natural shoreline stabilization, natural dune formation and growth, and the successful restoration of dunes in identified areas.

(G) Implementation

NHFG, Nongame and Endangered Wildlife Program has the authority to review dredge applications and provide advisement on the disposal and placement of dredge material. The USFWS has the authority

to change wording in dredge applications to require applicants to consult with NHFG Nongame and Endangered Wildlife Program during planning.

(H) Feasibility

Given the authority of the NHFG and USFWS, it is highly feasible to revise the wording on dredge permit applications.

4.1.6 Coordinate recreational management activities on beaches and dunes, including boardwalk installation and maintenance, beach raking and motorized vehicle use, Habitat Protection.

(A) Direct threats include: recreational management and shoreline/dune modification.

(B) Justification (some justifications sound like recommendations)

Coordinating recreational management activities and managing motorized vehicle use will help to minimize degradation and erosion of dunes. Recreational management activities and motorized vehicle use should be coordinated in areas where dune habitat occurs. Recreational management activities and motorized vehicle use should be coordinated year round to protect dune habitats. Efforts should be increased during the summer months when use of beaches and dunes is at a peak. Coordination of recreational management can be flexible so that town, state and federal groups can work in successful partnerships.

(C) Conservation Performance Objective

The objective of coordinating recreational management activities on beaches and dunes, including boardwalk installation and maintenance, beach raking and motorized vehicle use is to protect dune habitats, promote dune formation, promote natural succession of dune vegetative communities.

(D) Performance Monitoring

Performance monitoring should include monitoring beach management activities and motorized vehicle use on dunes and beaches.

(E) Ecological Response Objective

The desired ecological response of coordinating recreational management activities on beaches and dunes is to promote natural dune growth, promote

natural succession of dune vegetative communities, reduce erosion, and minimize harm to dunes from human activities.

(F) Response Monitoring

Successful coordination of recreational management activities on beaches and dunes including boardwalk installation/maintenance, beach raking and motorized vehicle use will be evident in the minimum use of motorized vehicles on beaches/dunes and the effectiveness recreational management activities with minimal impact to dunes.

(G) Implementation

Collaborative between members from the following groups should be established: NHFG, NHDES, DRED, local town officials, local police and emergency respondents and local conservation commissions. This coalition should meet regularly to discuss recreational management activities and motorized vehicle use on beaches and dunes and should work to effectively carry out efforts with minimum impact to dunes.

(H) Feasibility

NHFG Nongame and Endangered Wildlife Program has experience in coordinating recreational management activities and managing motorized vehicle use on beaches and dunes where the state endangered and federally threatened piping plover occurs. However, NHFG is limited in its ability to fund and staff these efforts year round. Funding is needed to support additional personnel who can adequately coordinate recreational management activities and motorized vehicle use on New Hampshire beaches and dunes.

4.2 Conservation Action Research

Significant habitat loss due to development has already occurred along the New Hampshire seacoast, and development pressure continues. All potential sites for dune habitat restoration should be studied for restoration feasibility.

ELEMENT 5: REFERENCES

5.1 Literature

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Distribution of Sand Dune Habitat in New Hampshire

Distribution
■ Known
■ Potential



0 10 20 40 Miles

