Seabrook Dune Walkway Evaluation
Final Report

July 2025

Photo Credit: Tom Morgan

Prepared by the Rockingham Planning Commission in partnership with the Town of Seabrook, the Seabrook Hamptons Estuary Alliance and University of New Hampshire Cooperative Extension & Sea Grant. This project was funded, in part, by NOAA's Office for Coastal Management Under the Coastal Zone Management Act in Conjunction with the NH Department of Environmental Services Coastal Program.

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Executive Summary

This project was undertaken to develop a clear, comprehensive understanding of Seabrook's existing network of beach walkways that traverse the town's critical sand dune system. These walkways provide public access to the beach while intersecting a dynamic natural system that protects Seabrook from coastal storms, erosion, and rising sea levels. By addressing both accessibility and environmental resilience, the project seeks to strike a thoughtful balance between ecological protection and equitable community use.

The primary goals of the project were to:

- Assess the physical condition, accessibility, and ecological impact of the existing dune walkways.
- Identify locations in need of repair or enhanced maintenance.
- Engage community members to gather insights, build local support, and improve understanding of the importance of dune health and long-term walkway management.

This effort serves as a baseline information-gathering initiative to support future planning, permitting, and capital improvement efforts. The findings detailed herein are intended to inform more detailed evaluations and the development of walkway design alternatives that are resilient, accessible, and environmentally sustainable.

Enclosed in this report is a set of practical, actionable recommendations to guide the Town of Seabrook in maintaining and adapting its dune walkways - enhancing public safety and access while protecting and restoring the integrity of the dunes. These recommendations consider both near-term improvements and longer-term strategies to build climate resilience and support ongoing stewardship of the coastal environment.

This work builds on and supports existing local efforts, particularly those outlined in the *Seabrook/Sun Valley Beach Long-Term Management Plan* developed by the Seabrook Beach Village District, the Beach Management Committee, and the Conservation Commission as well as the *Environmental Assessment for the Seabrook Dune Improvement Project* conducted by IEP, Inc. in 1988. The findings and recommendations offered here aim to complement and advance the town's commitment to sustainable beach and dune management.

Key Findings:

Boardwalk Conditions:

- While many of the boardwalks are in stable condition, several show signs of structural aging, including bowed or missing planks, shifting foundations, or tilted sections - especially where walkways traverse steeper dune slopes.
- It was observed that nearly all boardwalks experience sand buildup, particularly at their seaward ends.
- Most boardwalks could benefit from additional accessibility-compliant features such as handrails and non-slip surfacing on the dune incline and decline boardwalk segments, and accessible beach mats connecting the end of the boardwalks to the beach.

- Several boardwalks have uneven or warped walking surfaces that pose tripping hazards. In some cases, overgrown vegetation further compromises safe access.
- Most people who responded to the 2024 Dune Walkway Survey reported experiencing difficulty navigating the walkways, further emphasizing the need for additional accessibility improvements.
- Mobi mats are working well and helping improve walkability down to the beach, according to survey feedback.

Environmental Conditions

- At most walkways, wide vegetated dunes exist. Well-established dunes are not present at walkways to the north.
- Two plant community types were observed in the Seabrook dunes - beachgrass grassland and Hudsonia maritime shrubland.
- Human activities in the dunes (e.g., private paths, walking, sitting and playing areas, mowing beachgrass) were observed, which decreases dune stability and function.
- Invasive species are present at most walkways, outcompeting native vegetation, and in several instances, along the entrances, the invasive plants are becoming very dense and overgrown.
- Some walkways are substantially wider at the seaward end as a result of foot traffic and loss of vegetation, making these areas more vulnerable to erosion due to strong winds and storm waves.
- Evidence of beachgrass die-off exists at some sites.
- At some sites, it appears that degraded walkway conditions are prompting pedestrians to walk next to the walkway, which in turn widens the pathways, causing dune vegetation to be trampled and die-off.
- At some walkways, beachgrass extends onto the walkways, resulting in narrower walking paths.
- Survey results and project workshop discussions indicate that community members are interested in dune health and are looking for more opportunities to learn about dune threats and sustainability.

Next Steps

This baseline assessment lays the foundation for a second phase of the project, which will focus on evaluating alternative walkway designs and advancing necessary permitting to improve accessibility while safeguarding Seabrook's dune system. The Town of Seabrook and project partners are actively seeking additional funding and resources to support this next phase.

In the interim, this report outlines a series of practical, near-term actions the Town can pursue, including repairing or replacing the most deteriorated boardwalk segments, expanding the use of Mobi mats, adding handrails and non-slip surfaces to enhance safety and accessibility, revegetating dunes with native species, and coordinating an invasive plant removal event. Strengthening public education around dune ecology, improving outreach on responsible use, and enhancing enforcement of dune protection regulations are also key priorities. Collectively, these actions will

help ensure that Seabrook continues to provide safe, inclusive beach access while preserving the natural systems that protect the community from coastal hazards.

Introduction

Background

In 2023, the Rockingham Planning Commission, in partnership with the Seabrook-Hamptons Estuary Alliance (SHEA), UNH Cooperative Extension & NH Sea Grant (UNHCE/NHSG), and the Town of Seabrook, applied for and received a New Hampshire Department of Environmental Services (NHDES) Coastal Resilience Grant to conduct an evaluation of Seabrook's existing beach and dune walkways. This project idea arose from earlier conversations with Seabrook residents as part of the town's "coastal resilience team," a town group focused on topics related to climate and coastal resilience initiatives and capacity building. Residents shared the need for improved structural walkways and safer access to the town's beach.

Project Goals

Through robust community outreach, conversations, research and field observations, the project team strove to increase its understanding of Seabrook's current and future needs, and opportunities to improve its network of beach walkways that bisect the dune system to improve accessibility and strengthen the dune's ability to respond to rising sea levels and coastal storms. Safeguarding this natural resource helps maintain Seabrook's treasured beachfront and most valuable natural defense against the destructive impacts of coastal storms while investing in walkway improvements to strike a more harmonious balance between protecting the dune ecosystem services and providing safe and accessible beach access.

Evaluation Process

The primary objective of this evaluation was to collect and analyze all relevant information regarding Seabrook's existing dune walkways to gain a thorough understanding of current conditions and develop actionable recommendations for improvements. This work forms the foundation for a potential Phase II of the project, which will focus on implementing the strategies and recommendations identified during this initial evaluation. Phase I included four key components:

1. **Baseline Research** – To document the existing walkway network, including identifying town-designated access points, ownership and management responsibilities, and usage patterns.
2. **Structural Evaluation -** To evaluate the physical boardwalk structure with regard to navigability and opportunities for short and long-term accessibility improvements.
3. **Environmental Evaluation** – To assess ecological impacts and constraints, impacts, and opportunities for improved protection and resilience.
4. **Community Engagement** – To ensure that local perspectives, concerns, and priorities shaped the assessment.

Together, these elements provided a well-rounded understanding of the walkways and dune system and informed the development of targeted improvement strategies.

Baseline Research

The project team conducted research into historic town records to verify the terms governing public beach access, identify designated access points, and clarify ownership and maintenance responsibilities. Field observations and satellite imagery were used to document the current conditions of each Town-maintained dune walkway (18 total), along with assessing impacts of unauthorized pathways where possible. These data provided a clear picture of the existing infrastructure and usage patterns.

Structural Evaluation

The project team conducted a visual assessment of each dune walkway to better understand the physical condition, navigability, and accessibility of the boardwalks. The team visited all 18 walkways during the 2024 field season and documented structural features including boardwalk material, surface condition, slope, and alignment. Particular attention was paid to identifying areas with warped, bowed, or missing planks, loose planks, tilted or uneven sections, and instances of sand accumulation or vegetation overgrowth that could obstruct safe passage. Each boardwalk was also measured to determine its width and length across the dune system. Additional site visits were conducted in 2025 following the replacements of the walkways at Hudson and Lawrence Street.

Environmental Evaluation

The environmental evaluation included an analysis of the condition of the adjacent dune along an approximate 50-foot width (including the boardwalk) along beach access routes over the dune system. Using a combination of existing data, such as beach profiling transects and GIS tools, field surveys, input from Town staff and committees responsible for dune walkway maintenance, and conversations with residents and survey responses, the project team assessed the ecological condition of the dune surrounding the walkways.

Community Engagement

Furthermore, Phase I of the evaluation involved hosting a series of public outreach events, including designing and deploying a dune walkway usage survey to capture insight into the public's needs and desires for beach access and their understanding of the dune system. The project team conducted three public workshops to build awareness of dune ecosystem services, garner community feedback on the current condition of the walkways and discuss where there may be opportunities for improvement, and how the town can take action toward preserving and protecting the dunes while maintaining adequate public access.

Findings

Baseline Research

Seabrook Beach and Dune System

The Seabrook dune system is the largest contiguous dune area in New Hampshire and contains the state's only significant back dune system. Spanning approximately 1.6 miles from the Hampton town

line to the Massachusetts border in Salisbury, this dynamic coastal environment is part of a larger barrier beach system extending from Plum Island, Massachusetts, to Great Boar's Head in Hampton, New Hampshire.

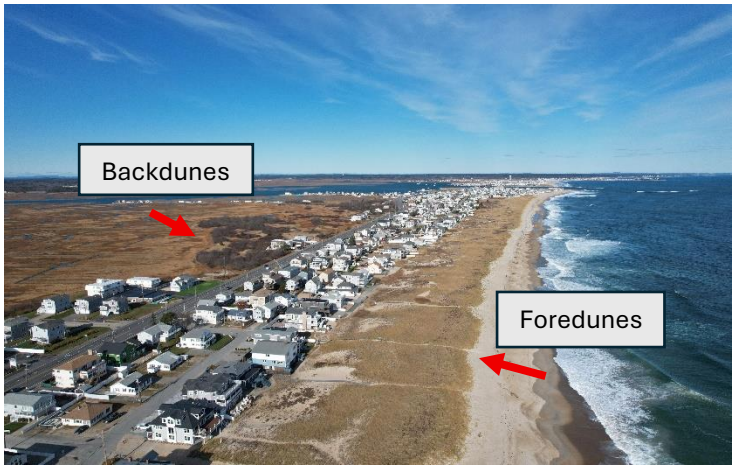


Figure 1: Seabrook Dunes and Beach; photo credit: Tom Morgan

The barrier beach in Seabrook is flanked by the Blackwater River and parts of the Hampton-Seabrook Harbor, with extensive salt marshes located behind the dunes. The dunes themselves, comprising approximately 109 acres, are constantly reshaped by wind and wave action and are considered one of New Hampshire's most at-risk natural habitats. Over 30 acres of the dune system lie west of Route 1A and are commonly referred to as the "back dunes." The Seabrook foredunes are located parallel to Route 1A between NH street and Hudson Street and were the primary study area for this evaluation.

Seabrook Beach is heavily developed, with residential properties dominating the oceanside of the dune system and mixed residential and commercial uses along the landward side, adjacent to Route 1A.

The dune system serves critical ecological functions by supporting beach and dune habitats used by migratory and nesting birds, including the federally protected Piping Plover. It also provides important flood protection and storm damage protection for inland properties by absorbing wave energy and mitigating erosion. However, the protective capacity of the dunes has been diminished by decades of degradation, largely due to pedestrian traffic, vegetation loss, and continued development.

Beach Access Ways

Public access to Seabrook Beach is provided via 18 boardwalks extending from the following public streets (listed from North to South):

- Ashland Street
- Tilton Street
- Hooksett Street
- Hudson Street
- Nashua Street
- Tyngsboro Street
- Chelmsford Street
- Lowell Street
- Dracut Street
- Andover Street
- Methuen Street
- Lawrence Street
- Haverhill Street
- Merrimack Street
- Groveland Street
- Newbury Street
- Amesbury Street
- New Hampshire Street

The boardwalks vary in length, ranging from under 100 feet at Ashland and Tilton Streets to over 500 feet at Nashua and Tyngsboro Streets. Most of the walkways are 4 feet wide, with the exception of Ashland, Tilton, Hooksett, and Haverhill Streets, which feature wider access ways.

It's important to note that the walkways at Ashland, Tilton and Hooksett streets do not currently support dunes. The remaining walkways, from Hudson Street south to New Hampshire Street, cross Seabrook's foredune system. These dune walkways range in length from approximately 102 feet (Newbury Street) to 520 feet (Nashua Street).

A detailed profile and evaluation were conducted for each walkway as part of this project. Additional information can be found in **Appendix II**.

Figure 2: Seabrook Beach and Public Access Streets

Ownership and Management

The Town of Seabrook owns and manages most of the dune system. The town's jurisdiction, as described in the town's property deed (Book 2408 Page 0326) encompasses "all land east of beachfront lots and extending to the Atlantic Ocean, as well as all land north of the Massachusetts/New Hampshire border and south of the Hampton/Seabrook town line." This area includes both coastal dunes and the adjacent beach.

The town acquired this land in 1982 from the Oceanside Community Association, which represented the interests of Seabrook Beachfront property owners. Under the terms of the property deed, as well as local and state regulations, this land is permanently protected from development. This protection prohibits the construction of any structures and restricts the removal of sand and vegetation, ensuring that the area remains undeveloped for conservation and public benefit. While owners of waterfront lots retain the right to access the Atlantic Ocean via their property, the land itself cannot be used for private or commercial purposes.

The deed strictly prohibits the construction of any structures, including fences, swimming pools, leach fields, boardwalks, and paved surfaces. Any structures that existed at the time of the land transfer may remain only for the duration of their useful life and cannot be repaired or replaced once they deteriorate. Additionally, removing or extracting sand and vegetation is banned to preserve the natural integrity of the dunes and beach ecosystem.

To further protect the area, certain activities are explicitly prohibited within the dunes. Recreational activities such as picnicking, sunbathing, and other beach-related uses are not permitted in the dunes. Motor vehicles cannot be parked or operated on the dunes, and trailers, mobile homes, camping trailers, motor homes, tents, or boats are also banned. Additionally, no animals may be kept on the dunes. These restrictions ensure that the dunes remain undisturbed and ecologically stable, preserving their role as a natural barrier and wildlife habitat while maintaining public access to the beach.

Town, State, and Federal Protections

Below is a brief summary of town, state, and federal regulations and guidelines to consider when planning any activities in or near the dune system. These regulations are designed to protect sensitive coastal habitats and the species that depend on them, and as a result, are subject to change over time. It is strongly recommended to consult with the appropriate regulatory agencies for the most current guidance and permitting requirements before starting any work in or around dune areas.

Town

- **Floodplain Ordinance**: Seabrook (Section 24) and Seabrook Beach Village District (Title IX)

  The Town of Seabrook and the Village District participate in FEMA's National Flood Insurance Program by enforcing a local floodplain ordinance. These ordinances cover new and

substantial construction in coastal high-risk flood areas and explicitly prohibit any man-made changes to sand dunes that would increase flood damage.

- **Beach and Parking Ordinance**
  The Town of Seabrook has adopted a set of rules to help preserve and protect the beach area. Fireworks displays are not allowed on either public or private property within the Seabrook Beach Village District. Dogs are only permitted on a leash and at set times between Memorial Day and Labor Day and owners are required to clean up after their animals. Visitors are expected to follow the "Carry In–Carry Out" policy, meaning all trash brought to the beach must be taken away. Open fires are not permitted on the beach, and motor vehicles are strictly prohibited both on the beach and in any areas where restrictions are posted.

- **Conservation Commission**
  The Seabrook Conservation Commission was established to support the Town in protecting its natural resources, open spaces, and the ecological communities that depend on local wetland systems. The Commission also serves in an advisory capacity to the Planning Board, Board of Selectmen, and other municipal departments. Additionally, it provides input to the NHDES Wetlands Bureau on projects requiring a wetlands permit within the Seabrook community.

- **Board of Selectmen**
  The Town owns various parcels of land acquired through different means, including purchases, donations, land gifts, and land dedicated through developments or conservation efforts. This land may include public parks, conservation areas, municipal buildings, and other community assets. The Town's Board of Selectmen is responsible for overseeing the management and use of these properties to ensure they serve the best interests of the community. Because the Town holds these lands in trust for its residents, any proposed work or activities on Town-owned property require prior approval from the Board of Selectmen.

State

The NHDES is the state agency responsible for overseeing maintenance, restoration, and construction projects near or within tidal waters, including beaches and dunes. Below are two programmatic areas that have jurisdiction over dune systems.

- **Fill and Dredge in Wetlands Act (**Statute: RSA 482-A and Administrative Rules Env-Wt 100-900)

  This law established a permitting process for reviewing activities that impact wetlands, surface waters, sand dunes, and the land 100 feet above the highest tide line (called the tidal buffer zone). Activities such as excavation, removal, filling, dredging, or the construction of structures in, adjacent to, or near waterbodies and sand dunes require an approved wetlands permit. There are only a few minor activities that are permissible without a permit within the dune system:
  - Sand removal from driveways, lawns, walkways, and buildings if no motorized equipment is used, no established vegetation is removed, and sand near buildings is only removed a safe distance from the dune slope (Env-Wt 611.02).
  - Vehicle usage for fire, police, and emergency situations, authorized maintenance, commercial fishing, and lobstering activities (Env-Wt 611.02).

- **Shoreland Water Quality Protection Act (SWQPA)** (Statute: RSA 483-B and Administrative Rules Env-Wq 1400)

  This statute and associated permitting process regulate activities within 250 feet of public waters, including 4th-order or higher, designated rivers under the Rivers Management and Protection Program (RSA 483), and tidal waters subject to tidal flow. SWQPA frequently applies to dune systems and governs activities such as vegetation removal, excavation, and development. Invasive species removal and the planting of native vegetation are permissible and do not require a permit as long as the work is performed using hand tools (Env-Wq 1406.04). It's worth noting that the application of herbicides to support invasive plant removal may require a permit from the NH Department of Agriculture's Division of Pesticide Control due to the presence of protected dune vegetation and proximity to tidal waters.

- **New Hampshire Fish & Game (NH F&G)**

  Since 1997, NH F&G, through its Nongame and Endangered Wildlife Program, has been monitoring and protecting the breeding population of Piping Plovers (Charadrius melodus) along the New Hampshire Seacoast. Each spring, NH F&G staff install protective fencing around nesting areas on Hampton and Seabrook beaches to safeguard the birds and their nests. A designated Piping Plover Monitor supports these efforts by tracking nesting activity, coordinating beach management practices—such as raking and cleaning—and promoting public awareness about the importance of protecting these federally threatened shorebirds and their habitat.

- **New Hampshire Heritage Bureau (NHB)**

  The NHB is the state's expert agency on identifying, tracking, and protecting biodiversity in NH through its three primary functions:

  - Inventory & Monitoring: NHB conducts ecological surveys and maintains a database of rare plants, exemplary natural communities, and critical habitats statewide.
  - Data & Analysis: The Bureau compiles and provides ecological data to support informed land-use decisions, conservation planning, and wetland assessments.
  - Conservation Guidance: NHB advises on conservation and management strategies for native plant species, animal populations, and natural community systems.

Federal

- **U.S Army Corp of Engineers (USACE)**
  The U.S. Army Corps of Engineers (USACE) regulates construction and modification activities affecting dunes and beaches under the authority of the Rivers and Harbors Act of 1899 and the Clean Water Act. The Rivers and Harbors Act prohibits unauthorized alterations or obstructions in navigable waters, while the Clean Water Act addresses the discharge of dredged or fill material into U.S. waters, including wetlands and coastal shorelines. There is coordination between the NHDES Wetlands Bureau and the USACE when a project requires permits from both entities.

- **U.S. Fish and Wildlife Service (USFW)**
  This agency has specific rules regarding dunes and dune-dwelling species, particularly those listed under the Endangered Species Act of 1973. Threatened or endangered species that can be found in the Northeast nesting near dunes include the Piping plover (Charadrius melodus) and the Roseate tern (Sterna dougallii dougallii).

Common Walkway Management Activities and Management Agencies

This table identifies several common walkway maintenance activities and recommends consulting with the following town, state, and federal entities.

Key:

- NHDES = NH Department of Environmental Services
- NHF&G = NH Fish and Game
- USFW = U.S. Fish and Wildlife Service
- NHB = Natural Heritage Bureau
- DPW = Department of Public Works
- BOS = Board of Selectmen
- CC = Conservation Commission

Activity	Town	State	Federal
Walkway repairs or replacement	Code Enforcement Officer to ensure changes will not increase flood risk, DPW, CC, BOS	• NHDES Wetlands Bureau if expanding the width or length. • Shoreland Program if work is within 250' of the Highest Observable Tide Line. • No permit is needed if work stays within the existing footprint and uses only non-motorized equipment.	• NH F&G or USFW to confirm breeding seasons of any known endangered species and schedule work outside sensitive periods. • NHB to confirm the presence of rare or endangered plant species.
Sand removal from walkway	DPW, BOS	• The NHDES Wetland or Shoreland Programs, if sand removal requires the use of motorized equipment or machinery.	• NH F&G or USFW to confirm breeding seasons of any known endangered species and schedule work outside sensitive periods. • NHB to confirm the presence of rare or endangered plant species.
Adding Mobi Mat to an Existing Walkway	DPW, BOS	• NHDES Wetlands Bureau if expanding the walkway width or length. • Shoreland Program if work is within 250' of the Highest Observable Tide Line.	None
Invasive Plant Species Removal	CC, BOS, DPW	• The NHDES Wetland or Shoreland Programs, if plant removal requires the use of motorized equipment or	NHB to confirm the presence of rare or endangered plant species.

		machinery (only hand tools are permissible without a permit). • NH Department of Agriculture's Division of Pesticide Control if	
Native Plant Species Installation	CC, BOS, DPW	The NHDES Wetland or Shoreland Programs, if plant removal requires the use of motorized equipment or machinery (only hand tools are permissible without a permit).	NHB to confirm the presence of rare or endangered plant species.

Table 1: Common Walkway Management Activities and Relevant Stakeholders

Structural Evaluation

The structural evaluation of Seabrook's dune walkways revealed a mix of conditions across the 18 boardwalks. While many boardwalks are generally stable and functional, several display clear signs of aging or wear that may impact both safety and accessibility. Common issues observed during field visits included bowed or warped planks, shifting or tilted foundations, particularly at locations where boardwalks traverse steep dune slopes, and sections where boards were missing or loose. These conditions create uneven walking surfaces that pose tripping hazards, especially for older adults, young children, and people with mobility challenges. It was also observed in certain locations, such as Nashua Street, that sections of boardwalks with uneven, missing or loose planks correspond with what appears to be evidence of pedestrian use directly alongside the walkway, suggesting that beachgoers are stepping off the boardwalk and walking through the sand and vegetation. This is resulting in large bare areas of sand directly adjacent to the boardwalk, which degrades over time and undermines the stability of the dune.

Figure 3: Shifting boardwalk foundation; bare areas of sand and footsteps observed alongside the walkway; Chelmsford Street

Sand accumulation was observed on almost every walkway. Most boardwalks experience moderate to heavy sand buildup at their seaward ends, limiting accessibility to the beach and requiring frequent maintenance to remain passable. In several locations, sand buildup was significant enough to partially bury the end of the walkway, contributing to pedestrian detours that can damage adjacent dune vegetation. Regular removal of excess sand and redistribution within the adjacent dune system is recommended as part of a town-wide maintenance program.

Figure 4: Sand accumulation on boardwalk, bare areas of sand and footsteps observed alongside the walkway; Andover Street

Many walkways would benefit from the installation of accessibility upgrades. Based on both field observations and survey responses, there is a need to improve navigation for individuals with mobility limitations. Some key, short-term upgrades could include non-slip surfacing on sloped or curved boardwalk segments, handrails along steeper sections, and expanded use of beach access mats (e.g., Mobi Mats) at the ends of walkways. The Groveland, and Lowell and Merrimack Street boardwalks in particular feature inclines and boardwalk curvature that would benefit from handrail installation and additional traction enhancements.

Vegetation overgrowth was also observed along the edges of several walkways, such as at Hudson and Lowell Streets, where dune grasses and shrubs have narrowed the passable width of the boardwalk. In these cases, periodic vegetation trimming and debris removal would improve both visibility and safe passage. This should be done in close consultation with town and state officials (See Table 1 above) to ensure the native plants are not destroyed.

During field visits, the project team also observed that bench placement and orientation may be contributing to dune disturbance in some locations. It appears that benches positioned perpendicular to the walkway may encourage users to step off the boardwalk and onto adjacent dune areas when sitting down or exiting the bench, leading to vegetation loss and widening of the pathway. In contrast, benches oriented diagonally or parallel to the walkway appeared to have less impact on surrounding dune vegetation. Repositioning benches to a diagonal orientation where space allows may help minimize off-path foot traffic in the dunes.

Figure 5: Observed difference in pedestrian impact with bench orientation.

Looking ahead, future phases of walkway improvements could incorporate enhanced design standards that consider storm resilience and long-term dune stability. One recommendation is to assess the orientation of the shorter, wider walkways, such as Ashland, Tilton, and Hooksett Streets, which currently run perpendicular to the shoreline. In major storm events, these straight corridors can act as conduits for storm surge and wave energy, channeling water directly into the roadways and adjacent neighborhoods. Repositioning these walkways at a more oblique angle to the shoreline, where feasible, could reduce direct water flow into inland areas while maintaining pedestrian access.

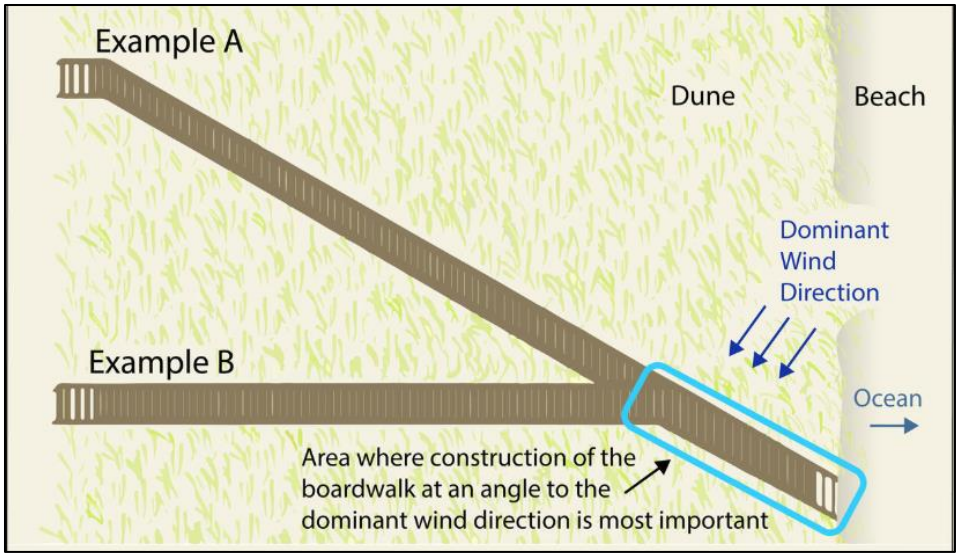


Figure 6: A recommended approach is to construct the walkway at an angle away from the dominant wind and wave direction. Retrieved from MA CZM Basics of Building Beach Access Structures that Protect Dunes and Banks

Additionally, elevating certain walkways using modular systems or engineered supports could allow wind and water to pass beneath the structure during high tides and storm events, reducing erosion and improving durability. Furthermore, elevating the walkways allows vegetation to grow underneath and prevents pedestrians from straying from the boardwalk. See Appendix I for more information on elevated boardwalks. These strategies should be explored further in a second phase to this project as part of future design and permitting efforts.

Environmental Assessment

Coastal sand dunes are coastal landforms characterized by mounds of wind-blown sand that exist landward of beaches. The plants that grow on sand dunes are well-adapted to growing in sand and exposure to wind, waves, and salt air. Dune vegetation plays a critical role in the stability of sand dune systems, both below and above ground. The roots of dune vegetation help anchor the sand in place. Many NH native dunes species (e.g. beachgrass, beach pea) also have underground stems, called rhizomes, that also play this dune anchoring role. The plant leaves and stems above ground help catch the sand as it blows up from the beach. This sand catching function is what helps build dunes in a process called accretion. Because bigger dunes (both taller and wider) provide more storm protection and sand storage capacity, the goal is to have dune systems that are densely colonized with native species. The plants also serve as important wildlife habitat. As such, the assessment focused on the presence/absence and composition of the plant community along the Seabrook dune walkways.

Field surveys were conducted within an approximate 50-foot width encompassing each walkway for one or more days in the growing season. Data were collected for the natural community types present, rare and native plant species of interest, and nonnative/invasive species. Unvegetated areas were noted, and when possible, the potential cause of de-vegetation was identified (human use, beachgrass die-off, etc.).

Natural Communities

Natural communities are defined by the NH Natural Heritage Bureau (NHB) as "recurring assemblages of plants and animals found in particular physical environments." Community types were identified according to the manual of *Natural Communities of New Hampshire* (Sperduto and Nichols 2011). Two natural communities were identified along Seabrook walkways: Beachgrass grassland and Hudsonia maritime shrubland. Beachgrass grassland is typical of the foredune, or the dune ridge that is closest to the ocean and can also be found in the interdune (the low dunes areas closer to homes). Beachgrass (*Ammophila breviligulata*) is the dominant plant species in beachgrass grasslands, as it is well adapted to the shifting sands and strong winds and salt exposure of the foredune (ocean side of the dune). Other species such as beach pea (*Lathyrus japonica*) and Seaside goldenrod (*Solidago sempervirens*) can also be found growing in the beachgrass grassland community. Hudsonia maritime shrubland is present in the interdune, or lower elevation areas behind the foredune, and is therefore more protected from wind and waves. The dominant species growing here is wooly beach heather or hairy hudsonia (*Hudsonia tomentosa*).

Figure 8: Beachgrass grassland

Figure 8: Hudsonia maritime shrubland

Rare and native plant species of interest

Rare species are native plants that are identified as having some level of risk (very high, high, or moderate) of elimination from NH due to a restricted range, few populations, steep declines, threats, or other factors. Rare plants were classified according to the NH Official Rare Plants List (Effective 01/01/2020) maintained by NHB as State Endangered (S1) or State Threatened (S2). These species are native taxon that have a very high (endangered) or high (threatened) risk of extirpation (disappearance) in the state due to restricted range, few populations, steep declines, severe threats, or other factors. Native plants of interest were also included based on feedback from residents asking for information about plants they are observing; these plants are not classified as rare and are typical of NH dune systems.

Species of Concern

A nonnative species is one that does not naturally occur in an area and is introduced as a result of deliberate or incidental human activities. Unlike an invasive species, a nonnative species does not do harm. An invasive species is a plant or animal that is not native to a particular ecosystem, whose introduction does or is likely to cause economic or environmental harm, or harm to human health. It is capable of moving aggressively into an area and monopolizing light, nutrients, water, and space to the detriment of native species (UNH Extension). Invasive species pose a threat to Seabrook's dune

systems by outcompeting and replacing the native species that typically exist there. Colonization by invasive species can reduce the diversity of the system, displace rare species, and reduce wildlife habitat. Invasive species were classified according to the NH Comprehensive Invasive Plant List (January 2023) as Prohibited or Watch. Prohibited species are regulated by rule Agr 3800 of the NH Invasive Species Act *"No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1, New Hampshire prohibited invasive species list." Species listed as Watch are not regulated but exhibit some invasive characteristics that over time could allow them to spread or become invasive*.

Community Engagement

The project team conducted three public workshops to raise awareness of dune ecosystem services, explore and discuss case studies related to best practices for traversing dunes, and gain preliminary input to gauge the community's readiness to investigate and use alternative dune walkover options. Summarized as follows:

Public Workshop #1: May 28, 2024, Seabrook Public Library

The first public workshop was held on May 28, 2024, at the Seabrook Public Library, which was attended by over 50 residents, town officials, and staff members. The primary goal of the workshop was to introduce the project, discuss its objectives, and engage with the community to gather feedback on the current condition of the dune boardwalks and potential improvements. The project team shared the goals of the initiative and listened to residents' concerns and suggestions.

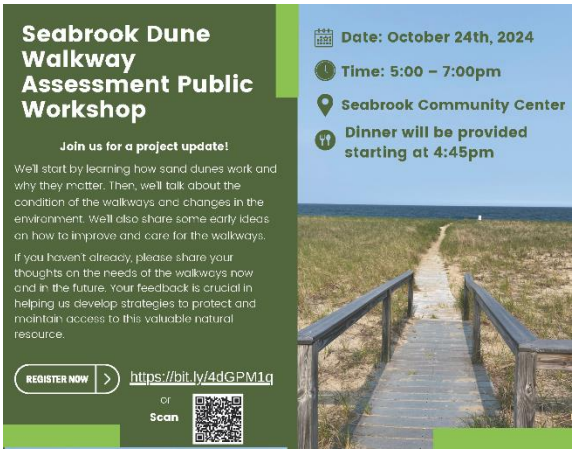
Figure 9: Select Board Member Ravi Ravikumar addresses residents at Public Workshop May 28, 2024, retrieved from WMUR

A key issue raised by participants was the condition of several walkways, particularly the challenges they posed for elderly residents and those with mobility issues, who often found access difficult. Many attendees expressed confusion about the rules governing dune access, such as which pathways were permissible, how often maintenance occurred, and whether town funding was allocated for ongoing walkway repairs. Town officials from the Board of Selectmen were present to address these concerns, providing clarification on maintenance schedules and funding sources while also hearing directly from residents.

In addition to accessibility concerns, many residents expressed a desire for greater education on dune ecology, including the types of vegetation present and whether invasive species were affecting the walkways. There was also positive feedback regarding the recently installed Mobi Mats at the ends of several walkways, which provide improved access to the beach for individuals with mobility challenges. Additionally, participants praised the recent replacement of a section of the Andover Street Walkway, noting its improved functionality and aesthetic appeal.

To gather more in-depth feedback, the project team launched a pre-workshop survey to capture initial thoughts on the dunes and walkways. Survey results revealed that residents highly value the dunes for their role in protecting the community from storm surge and coastal erosion. Many participants emphasized the need for increased public education about the ecological significance of the dunes and better, more frequent walkway improvements to prevent people from walking on or through the dunes. These insights are helping to shape the next steps of the project, ensuring that the improvements will address both environmental protection and public accessibility.

Public Workshop #2: October 24th, 2024



The second public workshop was held on October 24, 2024, at the Seabrook Community Center, with approximately 20 residents, town officials, and staff members in attendance. This workshop focused on presenting the preliminary results of the environmental assessments conducted on the dune walkways, as well as sharing insights from the larger resident survey that was launched over the summer.

After a summer of field investigations, the project team, led by Dr. Alyson Eberhardt, provided an overview of the environmental assessments. Dr. Eberhardt presented detailed findings on the types of plant species present in Seabrook's dune systems, including the identification of invasive species and rare or endangered plants. She emphasized the importance of restoring native dune plants, such as beachgrass (*Ammophila breviligulata*), which is essential for the health and stability of the dunes. Dr. Eberhardt also pointed out areas where human use/walking had caused significant damage, resulting in sparse or dying vegetation.

Residents were particularly interested in learning which plant species were considered invasive and should be removed to protect the dune ecosystem. Several attendees shared that they were already actively managing the vegetation along the walkways near their properties, expressing a strong community commitment to maintaining the health of the dunes. Additionally, there was considerable interest in understanding which types of walkway designs would best support dune health by minimizing damage to plant species. This conversation highlighted the community's eagerness to contribute to the preservation and restoration of Seabrook's dunes, as well as their desire for walkways that are both functional and ecologically sustainable.

The feedback gathered during this workshop is helping to refine the recommendations for future walkway designs and will be instrumental in identifying strategies to protect and restore Seabrook's vital dune ecosystem.

Public Workshop #3: June 24, 2025

The final public workshop for the Seabrook Dune Walkway Evaluation project was held on June 24, 2025, at the Seabrook Public Library and was attended by residents, town officials, and members of the project team. The primary goal of the workshop was to present the final draft of the report, share

key findings from the structural and environmental assessments, and discuss next steps for continuing the project. This workshop marked the conclusion of Phase I, which focused on evaluating current walkway conditions and identifying opportunities to improve both access and dune health.

The project team presented a summary of boardwalk condition observations, including opportunities for incorporating accessibility upgrades such as handrails and non-slip materials, as well as potential future design considerations, including elevating boardwalks and orienting them at angles to reduce flood risk. The project team reiterated the importance of maintaining healthy dune vegetation and minimizing new pathways that damage native plants. Residents engaged in a thoughtful dialogue about stewardship, funding, and the need for a more consistent town-wide approach to walkway maintenance and dune protection.

The project team emphasized that alternative funding pathways are actively being explored to support continued progress. The feedback from this final workshop reinforced strong community interest in seeing the work move forward and highlighted opportunities for public education, volunteer stewardship, and local investment to sustain momentum into the next phase.

Public Survey

From July to October 2024, the RPC, SHEA, UNHCE/NHSG conducted a public survey to gather feedback and understand local perspectives regarding Seabrook's dunes and walkways. The survey was designed to assess what residents value about these natural resources, the challenges they face when using the walkways, and their ideas for improving public access and preserving the resilience of the dune systems.

To encourage widespread participation, the survey was distributed through a combination of outreach methods, including postcard distribution, online promotions, and direct emails to residents. In total, 309 individuals responded to the survey, generating nearly 6,000 individual responses to specific questions and 262 additional open-ended comments.

Survey Feedback

Community feedback on the condition and management of Seabrook's dune walkways revealed a strong appreciation for recent improvements, alongside a clear call for enhanced maintenance, accessibility, safety, environmental stewardship and protection, and public engagement. Respondents expressed gratitude for ongoing beach upkeep efforts, the positive visual impact of civic beautification efforts such as flower planters and particularly praised the use of Mobi-Mats to improve accessibility. Many indicated they'd like to see more of these mats, especially wider and longer installations at all beach access points.

However, several recurring concerns emerged regarding the condition and safety of the dune walkways. Many described the wooden boardwalks as warped, slippery, or uneven, with reports of loose or broken boards and steep walkways that lack handrails. Specific walkways, such as Lawrence Street, were highlighted as particularly difficult to navigate. Residents strongly supported the development of a regular, proactive maintenance schedule to address these issues.

"There is no replacement plan for the current structures. There should be a deferred maintenance plan where there is continual renewal, replacement, and improvement for the walkways." – Seabrook resident

Accessibility emerged as another major theme, with participants calling for better support for individuals with mobility limitations. Respondents recommend expanding Mobi-Mats, adding handicapped parking spaces, and improving the quality and consistency of accessible pathways. ADA compliance was seen as a critical area for improvement.

"I am 78 years old and find it impossible to get to the beach anymore. I think if the path was widened and we had Mobi mats, the accessibility for everyone including the handicapped would be so improved." - Seabrook resident

"The Mobi mats are great! If they could extend longer, it would make the trek a bit easier for everyone." - Seabrook resident

There were repeated concerns about dune misuse, especially trampling of vegetation and the creation of unauthorized footpaths. Residents expressed frustration with both short-term renters' disregard or lack of awareness of beach rules and private property owners who have installed illegal structures, such as patios or concrete slabs, within the dunes. Many called for greater enforcement and education to reduce these impacts.

Calls for improved enforcement and education were frequent. Respondents noted persistent issues with littering, off-leash pets, and disregard for posted signage. There was widespread support for stronger regulation and enforcement, including the issuance of fines for violations and increased public education about the importance of dune ecosystems. Many emphasized the need to engage both residents and visitors in preservation efforts.

"I'd like to see more signage about people actually picking up their trash and bringing it out. Especially dog poop - not just bagging it and leaving it there." - Seabrook resident

Lastly, respondents advocated for better communication and regional collaboration. They expressed a desire for the town to more actively share information on ongoing and upcoming projects, grants, and studies related to dune and beach preservation. Some recommended regional cooperation with neighboring communities like Hampton to coordinate dune management strategies and share resources to enhance long-term coastal resilience.

"We have ongoing concerns about residents mowing and/or snowplowing the dune grass on either side of the town installed boardwalk. The town should devote resources to foster awareness around environmental impact of erosion including effectively disseminating information about any work completed by the town on the beaches(and this is ongoing to keep the beach clean and to dredge), grants obtained (if any), studies conducted by the State Of New Hampshire, Department of Environmental Services and UNH on rising sea levels, erosion and environmental impact. This builds awareness to strengthen community engagement and advocacy to preserve our beautiful beach for the generations to follow." - Seabrook Resident

See Appendix V for full survey results.

Conclusion

Seabrook's sand dune system is both a vital ecological resource and a defining feature of Seabrook's identity. The walkways that provide access to the beach must carefully balance the needs of public access with the long-term health and stability of the dunes.

The assessment provides a foundational understanding of current conditions, challenges, and opportunities, grounded in field observations, community input, and local knowledge. It offers a set of practical, near-term recommendations that the Town and community partners can begin implementing now - "low-hanging fruit" actions that address immediate safety concerns, improve accessibility, and support dune health and resilience.

At the same time, this report is intended to set the stage for a second phase of work focused on developing, analyzing, and advancing longer-term walkway design alternatives. These next steps will require feasibility assessments, cost estimates, engineering input, and potentially state and federal permitting processes. Building on the momentum of this baseline assessment, the project team looks forward to working with the town in exploring grant opportunities and other funding sources to support more comprehensive design and permitting activities. With proactive Town leadership, strong community support, growing awareness of dune conservation, and a solid foundation and understanding of the town's existing dune walkways, Seabrook is well-positioned to advance its goals of enhancing the town's dune walkways for current and future generations.

Potential Next Steps

The following recommendations are provided for the Town's consideration, informed by field observations, discussions with community members, and input from Town staff, to help guide future decisions related to the dunes and dune walkways. For the complete list of potential actions and recommendations per walkway, see Appendices II and III.

Near-Term (0-5 Years)

1. **Establish a Dune Walkway Maintenance Program:** Collaborate with the Department of Public Works (DPW), and Seabrook Beach Village Commissioners to create a regular walkway maintenance schedule that includes:
    - Routine sand removal from the walkway ends to maintain accessibility.
    - Trimming overgrown vegetation and clearing debris to preserve full walkway width and reduce trip hazards.
    - Inspecting for and addressing loose, warped, or damaged planks and other structural concerns.
    - Consider establishing an annual budget line dedicated to maintenance work and/or creating a reserve fund to support longer-term and more costly improvements.

2. **Repair and Replace Damaged boards:** Promptly address safety hazards by repairing or replacing missing, bowed, or unstable boards and stabilizing any tilted or shifted portions of the walkways.
3. **Improve Accessibility:** Explore options for purchasing and installing Mobi-Mats or similar ADA-compliant access mats at priority locations - particularly those with wider, more stable paths and higher pedestrian use.
4. **Enhance Safety Features:** Install non-slip surfacing and handrails in areas with steeper grades, sharp turns, or visibly uneven surfaces to improve safety for all users.
5. **Restore Native Vegetation:** Partner with NH Sea Grant/UNH Extension, DPW, and other local groups to plan and implement native plant restoration activities, such as revegetating bare areas, replanting after invasive species removal, and planting in areas showing signs of beachgrass die-off.
6. **Reconfigure Infrastructure to Promote Dune Building.** In areas where dunes do not currently exist or where the seaward end of walkways is wide, promote dune building activities by delineating areas with fencing. Fencing will promote vegetation growth by limiting foot traffic, and both fencing and vegetation promote the buildup of sand. Consider orienting the seaward end of walkways away from the dominant wind and wave direction.
7. **Limit Density of Walking Paths**. Where multiple paths cut through the dune in close proximity, identify the most important/used and abandon the others to allow revegetation and promote a more stable system. Where private paths connect to municipal walkways, consider rerouting them along the back side of the dune, perpendicular to the municipal path, to minimize dune impact.
8. **Manage Invasive Species:** Coordinate targeted removal of invasive plant species along key walkways using best practices. Confirm identification on nonnative pine trees and consider removal and revegetation with native species
9. **Evaluate Bench Position and/or Orientation:** Consider repositioning benches to a diagonal alignment rather than perpendicular to the walkway, as this configuration may reduce dune vegetation disturbance. Also, consider moving benches that are further into the dunes closer to the walkways to discourage walking through the dune vegetation.
10. **Strengthen Public Education and Outreach:** Collaborate with the Seabrook Beach Civic Association, Village District, Conservation Commission and other community groups to expand public education efforts focused on dune health and protection. Engagement should emphasize the importance of staying on designated walkways, avoiding dune trampling, dune ecology, and actions to promote dune sustainability.
    a. Establish a **community walkway stewardship program** to complement existing local efforts, promote community engagement, and ensure consistent maintenance and care of the boardwalk and surrounding environment. This could be implemented at the neighborhood level with facilitation support from RPC, SHEA and NHSG.

Long-term: (5+ years)

1. **Secure Funding for Implementation**
   Actively pursue state and federal funding opportunities to support the design, permitting, and construction of improved walkway configurations.

a. Work with RPC, SHEA and NHSG to apply for funding and obtain other resources to build on this assessment.

2. **Upgrade Walkways for Long-Term Resilience**
   Incorporate resilient design standards into future walkway improvements, such as elevated boardwalks, to protect the dune system while improving accessibility.

Appendix I: Alternative Walkway Designs

During community outreach and survey efforts, many residents expressed concerns about the physical boardwalk conditions along Seabrook Beach. Issues such as uneven surfaces, structural deterioration, and lack of accessible features were frequently cited. These conditions not only pose challenges for people with limited mobility, but also contribute to environmental degradation, as users often bypass the designated walkways and trample through the dunes, further harming sensitive habitat areas.

In response to these concerns, the project team reviewed best practices and alternative design options for beach access structures that balance accessibility needs with dune protection. The following section summarizes key design guidelines developed by the U.S. Access Board for accessible beach access and dune walkovers, as well as relevant examples and recommendations from Massachusetts.

It is important to note that a detailed, site-specific analysis of each existing walkway in Seabrook will be necessary to determine the feasibility of applying these guidelines. Not all design solutions will be appropriate or achievable at every location. Additional studies, resources, and funding will be required to support this future work. This work is intended for a future Phase II of the project.

The information that follows is intended to serve as a reference for the town as it considers improvements to beach access infrastructure. These guidelines can help inform future planning and decision-making efforts to ensure that any new or reconstructed walkways are both accessible and environmentally responsible.

Overview of the U.S. Access Board and Accessibility Standards for Beach Access

The U.S. Access Board, established in 1973, is an independent federal agency that works to ensure accessibility in the built environment and federally funded facilities. It plays a key role in developing and maintaining design standards under several federal laws, including the Americans with Disabilities Act (ADA) of 1990 and the Architectural Barriers Act (ABA) of 1968. These laws are intended to ensure that public spaces, including buildings, transportation systems, technology, and outdoor recreational areas, are usable by people with disabilities.

In outdoor settings, the Access Board provides specific accessibility guidelines for features such as trails, picnic and camping areas, viewing areas, and beach access routes. These guidelines help architects, designers, and land managers incorporate accessibility into their projects from the earliest stages of planning.

However, the Access Board recognizes that strict compliance with accessibility standards may not be feasible. For that reason, the ABA Standards include clearly defined exceptions, known as "conditions for exceptions." These allow flexibility when site-specific factors make full compliance impractical. Common conditions for exceptions include:

- **Challenging Terrain:** Steep slopes, sensitive landscapes, or areas requiring extensive excavation that could be difficult to construct, maintain, or would result in significant environmental impacts.
- **Construction Limitations:** Situations where standard construction methods cannot be used without impacting the surrounding environment e.g., blasting.
- **Impact on the Recreational Experience:** Some outdoor facilities, such as primitive trails, are meant to offer a natural and undeveloped experience. Using manufactured materials or highly engineered techniques in these areas could change the character of the setting or interfere with how people use and enjoy it.
- **Conflict with Other Laws:** Compliance with accessibility standards must not violate other federal, state, or local laws intended to protect environmental, historical, or cultural resources such as the Endangered Species Act, the National Historic Preservation Act, or similar regulations.

Given the natural features along Seabrook Beach, including sand dunes and the surrounding environmentally sensitive areas, it's possible that some locations may not be capable of meeting ABA accessibility standards. A more detailed site analysis will be necessary to determine where and how accessibility improvements can be made without compromising the integrity of the coastal environment.

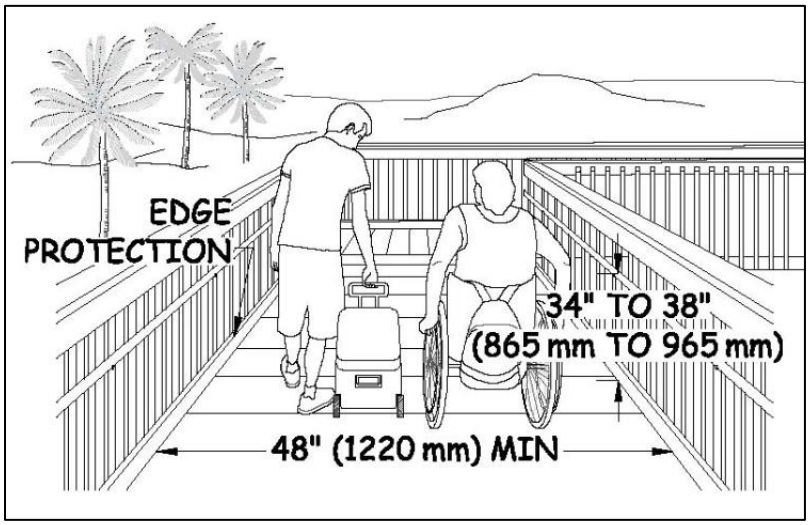
Beach Access Routes and Dune Crossings

The U.S. Access Board's guidelines for beach access routes. particularly where walkways cross over dunes. serve as a reference point for communities evaluating how to improve access for people with mobility challenges. While these guidelines are mandatory only for federally funded outdoor recreation areas, they can offer a useful framework for local projects as well.

Key provisions from the Access Board's guidelines for dune crossings include:

- **Handrails and Edge Protection:** If a dune crossing has a slope steeper than 1:20 (5%), it must include handrails on both sides. These should be continuous and mounted 34 to 38 inches above the walking surface. Edge protection, such as a curb or barrier, must prevent small objects (e.g., a 2-inch sphere) from rolling off the walkway.
- **Width:** The standard width for a beach access route is 60 inches, but for dune crossings, this can be reduced to 48 inches where necessary.
- **Resting Intervals:** When the running slope of a dune crossing is steeper than 1:20 (5 percent), the maximum length of the segment is 50 feet, and a resting interval must be provided at the top and bottom of each segment. Resting intervals are level areas that provide an opportunity for people to stop after a steep segment and recover before continuing on.

- **Removable vs. Permanent Structures:** Removable beach access routes, such as mats or temporary walkways, are exempt from certain technical requirements related to slope and resting areas.



Other Walkover Design Considerations

Designing safe, sustainable beach access structures is key to balancing public access with the protection of sensitive dune ecosystems. There are a number of walkover designs used in the United States. Elevated walkways and similar structures are generally preferred over ground-level paths because they help clearly define access routes while minimizing damage to the fragile vegetation that stabilizes dunes and coastal banks (Massachusetts Office of Coastal Zone Management, 2021).

Ground-level pathways can easily become obscured or widened by foot traffic, often leading visitors to stray from designated access points. This unintentional off-trail movement can trample dune vegetation such as beachgrass, which plays a critical role in stabilizing dunes and preventing erosion. Damage to these plants can result in bare patches, destabilization, or even blowouts - areas where wind erodes sand from the dune, forming a depression that can expand over time. Similar impacts are seen on coastal banks, where foot traffic can accelerate erosion and slope failure.

To reduce these impacts, elevated boardwalks, stairways, or walkovers are strongly recommended. These structures provide clearly visible, defined routes and enable natural dune processes to continue beneath them. They allow windblown sand and sediment to move freely and sunlight to reach the ground, which supports plant growth. Keep in mind, the construction or replacement of a boardwalk on or near a dune, bank, or beach will require local, state and potentially federal permits.

"The dunes are essential for protection. It seems like in Seabrook, the dunes grow annually with the wind and storms. An elevated walkway would allow for the additional sand build up and keep the walkways from being covered annually from the natural occurrence. However, this would take an enormous amount of money which the community cannot afford. Finding

federal and state funding would be the only way to obtain this true protection of the dunes and property." – Seabrook resident; comment from Dune Walkway Evaluation Survey

The following guidelines have been developed by the Massachusetts Coastal Zone Management Program:

Elevation of Structures

Elevated walkways should be constructed on posts or pilings without solid footings, raised at least two feet above the grade of the surrounding dune - not just the surface directly beneath the structure. This extra clearance accounts for natural dune regrowth and sand accumulation over time, ensuring that the structure remains effective and environmentally compatible. On coastal banks, a minimum clearance of two feet similarly supports vegetation and allows sediment to reach the beach, where it helps maintain shoreline stability.

Modular and Seasonal Design Options

Figure 10: Mobi Mat at Groveland Street, Seabrook

In some cases, using modular or removable structures may be appropriate - particularly in areas with high storm activity or where year-round access is not required. Sectional, roll-out walkways that lie at-grade can be installed during the summer season and removed in the off-season. This approach reduces the risk of storm damage and allows dunes to function naturally during times when foot traffic is minimal, and sediment transport is highest. Additionally, designing permanent structures with breakaway or adjustable segments can help limit long-term damage if portions are lost during extreme weather events.

The Seabrook Village District and Seabrook Beach Civic Association currently deploy Mobi Mats at 8 walkways during the summer months and are actively working to acquire more. These mats have received strong community support for significantly improving access to the beach, particularly for individuals with mobility challenges. As a short-term solution, they have proven effective in enhancing accessibility while long-term infrastructure improvements are being explored.

Case Studies:

The following case studies highlight approaches that may offer useful insights or inspiration as Seabrook explores design alternatives in future project phases.

Salisbury, Massachusetts: Beach Access Design and Elevated Walkways

The Town of Salisbury, located directly south of Seabrook, has developed comprehensive beach access design standards and resident education materials focused on barrier beach protection and

dune conservation. These resources were created in coordination with state agencies and the town's Conservation Commission to ensure public access is maintained while protecting fragile coastal resources.

Salisbury, in conjunction with the State of MA, has also constructed elevated dune walkways in several areas to allow beachgoers to cross over sensitive dune systems without causing damage. Their design guidance includes material specifications, siting recommendations, and strategies to integrate walkways with surrounding dune habitat.

Resources:

- Salisbury Beach Access Design Standards (PDF)
- Barrier Beach/Coastal Dune Information for Residents
- Salisbury Beach Boardwalk Overview

Plum Island, Massachusetts: Hellcat Boardwalk Trail

The Hellcat Interpretive Trail in the Parker River National Wildlife Refuge on Plum Island is a 1.4-mile boardwalk system that traverses both dune and marsh habitats and was designed with public access and environmental education in mind. Divided into two segments, the boardwalk includes interpretive signage, wildlife observation areas, and a fully accessible surface suitable for wheelchairs and strollers.

In 2020, the original wooden planks were replaced with durable, synthetic materials, and the trail was widened to improve accessibility. This investment reflects a long-term commitment to balancing public use with habitat protection and may offer design ideas relevant to Seabrook's future walkway improvements.

More information:
Hellcat Boardwalk Trail Overview

References and other Resources:

- Sperduto, D.D. and William F. Nichols. 2011. Natural Communities of New Hampshire. 2nd Ed. NH Natural Heritage Bureau, Concord, NH. Pub. UNH Cooperative Extension, Durham, NH. https://www.nhdfl.dncr.nh.gov/sites/g/files/ehbemt866/files/inline-documents/natural-communities-technical-manual.pdf
- NH Rare Plants List (January 2023) https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- NH Comprehensive Invasive Plant List: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf

Appendix II: Dune Walkway Profiles

Amesbury Street: Dune Walkway Profile

Site Assessments: March 26, 2024, July 29, 2024, and May 23, 2025

Structure Conditions and Observations	
Road to Beach	433 ft
Boardwalk Length	363 ft
End of boardwalk to beach	70 ft
Walkway Width	4 ft
Boardwalk Material	• Asphalt apron • pressure treated wood connected by galvanized cable
Attached pathways	1
Benches	4
Additional Features	• Railings & viewing platform • Fire hydrant at entrance
**Human-made pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
Beachgrass grassland	• Wooly beach heather (*Hudsonia tomentosa*)[S2] • Tall wormwood (*Artermesia campestrus*)[S1]	• Beachgrass (*Ammophila breviligulata*) • Seaside goldenrod (*Solidago sempervirens*) • Beach pea (*Lathyrus japonicus*) • Common Milkweed (*Asclepias syriaca*)	• Beach rose (Rosa rugosa)[W] • Cypress spurge (Euphorbia cyparissias)[W]
S1 = endangered in NH, S2 = threatened in NH, P = prohibited species in NH, W = NH invasive watch list)			

Walkway Entrance

Landward Side

Seaward Side

Walkway Observations

Landward Side of Dune

- The walkway is relatively straight and flat, with a gentle incline leading up to the dune crest.
- A small number of boards show signs of bowing or tilting.
- A railing is installed along the south side of the walkway on the incline section.
- Milk weed, a native species, was observed along the landward side of the walkway (Figure 1).
- A small patch of wooly beach heather, a rare species, is growing near the homes. The area around is sparsely vegetated (Figure 2).
- Areas of degraded habitat exist along landward side of the walkways, as evidenced by invasive species and species non-characteristic of dunes (Figure 3).
- A walking path runs perpendicular to the municipal walkway along the landward edge of the dunes (Figure 4).

Figure 1. Milkweed near entrance

Figure 2. Wooly beach heather near homes

Figure 3. Vegetation non-characteristic of dune

Figure 4. Perpendicular paths connect to

Dune Crest

- A viewing platform is located at the crest, with benches positioned on both the north and south sides, each oriented parallel to the walkway.

Figure 5. Well established grass and vegetated seaward end

Seaward Side of Dune

- The beachgrass grassland is well-established and the seaward end of the walkway is well vegetated (Figure 5).
- Two benches are located about halfway between the dune crest and the beach entrance—one on the north side, oriented perpendicular to the walkway, and one on the south side, oriented parallel to it (Figure 6).
- The end of the boardwalk is partially covered by sand.

Figure 6. Seaward side benches

Potential Action Items

- Conduct regular maintenance to prevent future sand buildup, especially after storms. Also inspect and replace any missing or damaged planks to ensure a safe walking surface
- Install a Mobi Mat or similar ADA-compliant beach access mat at the end of the walkway to improve accessibility.
- The walking path running perpendicular to the municipal walkway along the landward edge of the dunes is a nice example of landowner access paths to the beach that limit impacts to the dune. Consider this approach at other walkways.
- Relocate the seaward side bench currently located in the dune to minimize impacts to the dune vegetation. Benches placed at an angle (~45°) generally appear to have less impact on the surrounding dune than benches placed perpendicular to the walkway. Consider positioning benches at a 45° angle to the walkway when practicable and revegetating the areas around them, other than directly in front.
- Revegetate areas of bare sand and sparse vegetation with native sand dune species with a focus on the areas around benched and large disturbed areas.
- Remove invasive species. Consider replacing the vegetation along the landward side of the walkway, where habitat quality is low, with native dune species.
- Remove excess sand from the walkway surface to maintain accessibility. Redistribute the excess sand evenly within the adjacent dune system.

Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- NH Guide to Upland Invasive Species: https://www.agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf
- NH Comprehensive Invasive Plant list: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- Planting Guide for Tidal Shoreline Erosion Management in New Hampshire (beach and dune sections): https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- UNH Extension resources on invasive species: https://extension.unh.edu/natural-resources/forests-trees/invasive-species

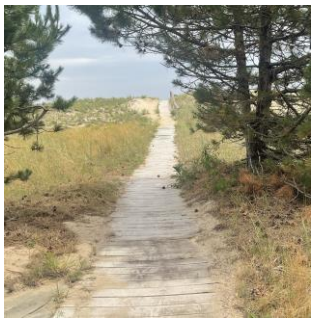
Andover Street: Dune Walkway Profile

Site Assessments: March 5, 2024 and July 25, 2024

Structure Conditions and Observations	
Road to Beach	537 ft
Boardwalk Length	467 ft
End of boardwalk to beach	70 ft
Walkway Width	4.0 ft
Boardwalk Material	• Asphalt apron • Pressure treated wood connected by galvanized cable
Attached pathways*	3
Benches	5
Additional Features	Railing on southern side of walkway along the landward side of dune crest incline.
**Human-made pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
• Beachgrass grassland • Hudsonia maritime shrubland	• Wooly beach heather (*Hudsonia tomentosa*)[S2] • Gray's sedge (*Cyperus grayi*)[S1] • Tall wormwood (*Artermesia campestrus*)[S1]	• Beachgrass (*Ammophila breviligulata*) • Seaside goldenrod (*Solidago sempervirens*) • Beach pea (*Lathyrus japonicus*) • Beach plum (*Prunus maritima*)	• Asiatic bittersweet (*Celastrus orbiculatus*)[P] • Shrub honeysuckle (Lonicera species)[P] • Autumn olive (*Elaeagnus umbellata)*[P] • Climbing nightshade (*Solanum dulcamara*)[W]
S1 = endangered in NH, S2 = threatened in NH, P = prohibited species in NH, W = NH invasive watch list)			

Walkway Entrance



Landward Side

Seaward Side

Walkway Observations

Landward Side of Dune

- The initial portion of the walkway was reconstructed in 2024 (see Additional Information section below).
- Multiple nonnative and/or invasive species are present at the entrance to the walkway near the road and along the fence
- Pine trees near the restoration area may be Austrian pine (*Pinus nigra*) or Japanese black pine (*Pinus thunbergia*) (Figure 1).
- The section beyond the newly replaced part before the incline to dune crest has many bowed planks posing tripping hazards *(Figure 2)*.
- An unvegetated area exists on the north side of the boardwalk where it is steep, slippery, and boards are missing (Figure 3).
- Areas of dense and intact *Hudsonia* maritime shrubland are intersected by walking paths through the dunes directly to homes resulting in areas of bare sand and sparse vegetation.
- There one bench along the side of the walkway about halfway between the entrance and dune crest oriented parallel to it.
- It appears a walkway from a home through the dunes has been abandoned and is revegetating with native dune species. By connecting to the municipal walkway (approximately 60 foot long path) rather than running directly from the house to the dune (approximately 390 foot long path), the new path avoids 330 feet of dune impact

Figure 1. Pine trees

Figure 2. Uneven boards

Dune Crest

- At the dune crest there are two benches on the south side of the walkway. Each are positioned at an approximate 45-degree angle to walkway.
- Areas of suspected dune die-off exist along the dune crest and landward side of the dune (Figure 4).

Figure 3. Unvegetated areas on northside of boardwalk

Seaward Side of Dune

- The seaward side of the boardwalk is steeper and partially covered in windblown sand (See Figure 2).
- On the seaward side, two benches are located along the walkway—one on the north side near the dune crest, angled about 45 degrees toward the path, and the other on the south side, about halfway to the beach, set back into the dune and positioned perpendicular to the walkway.
- The lower portion of the boardwalk is buried in sand near the beach access point.

Figure 4. Suspected dune die-off

- A well-established beachgrass grassland exists at the seaward end of the walkway. The walkway is narrow and the area is well vegetated. (Figure 5).

Figure 5. Beach opening

Potential Action Items

- Remove invasive species near the restoration area and replant with native species.
- Seek positive confirmation of pine tree species.
- Relocated or reposition benches at 45° angle along the walkway when practicable and revegetate with native dune species the areas around them, other than directly in front.
- Move bench at the seaward end of the walkway, on the south side, closer to the walkway to limit dune impacts.
- Delineate paths from homes to walkway to minimize dune impact.
- Revegetate bare areas with native sand dune plants.
- In areas of suspected dune die-off, consider planting a diversity of sand dune species and/or treating the area with a lime and fertilizer.
- Conduct regular maintenance to prevent future sand buildup, especially after storms.
- Install a Mobi Mat or similar ADA-compliant beach access mat at the end of the walkway to improve accessibility.
- Install non-slip surfacing along the seaward portion of the walkway, particularly on the steeper section, to improve traction and reduce the risk of slipping.
- Remove excess sand from the lower portion of the walkway to restore accessibility and reduce the risk of structural strain.
- Allow the beachgrass on the seaward side of the dune to continue to grow.

Additional Information

A sand dune restoration project occurred at the landward end of this walkway in 2024. A collaboration of the Town of Seabrook, Seabrook Beach Civic Association, Millenium Engineering, Wetland Scientist Sergio Bonilla, Seabrook residents, NH Sea Grant Extension, the University of New Hampshire Coastal Restoration Team, and volunteers with the Coastal Research Volunteer program worked together to restore the habitat along the landward end of the Andover St walkway. The project involved the removal of invasive species and planting with native beachgrass and the replacement of the boardwalk at the landward end of the walkway. In August 2024, three months after planting, an estimated 85-90% success rate of beachgrass planting was observed. Ragweed (*Ambrosia*) was observed growing throughout the area.

Figure 6. May 2024 Planting event

Figure 7. Restored area in Aug 2024

Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org/
- MA Office of Coastal Zone Management Tips: Basics of Building Beach Access Structures that Protect Dunes and Banks
- NH Guide to Upland Invasive Species: https://www.agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf
- Planting guide for tidal shoreline erosion management in NH: https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- NH Comprehensive Invasive Plant list: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- UNH Extension resources on invasive species: https://extension.unh.edu/natural-resources/forests-trees/invasive-species

Ashland Street: Dune Walkway Profile

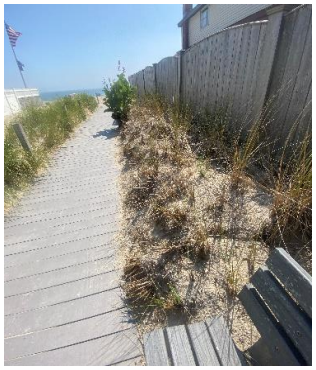
Site Assessments: March 26, 2024 and August 27, 2024

Walkway Conditions and Observations	
Road to Beach	152 ft
Boardwalk Length	82 ft
End of boardwalk to beach	70 ft
Walkway width	5.3 ft
Boardwalk Material	• Asphalt apron, • Pressure treated plywood connected by cable
Attached pathways*	None
Benches	4
Additional Features	• Emergency Access point • Wide enough for vehicular access. • Wooden posts and beachgrass separating walkway from adjacent vehicle access way. • Seasonal Mobi Mat installed to extend wooden walkway over sand to beach
**Human-made pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
Not applicable	None observed on assessment dates	• Beachgrass (*Ammophila breviligulata*) • Beach pea (*Lathyrus japonicus*) • Common Milkweed (*Asclepias syriaca*) • Sea rocket (*Cakile edentula*)	• Beach rose *(Rosa rugosa)*[W]
W = NH invasive watch list			

Entrance

Walkway Entrance



Landward Side

Walkway Observations

- This location features a flat, wide pathway that is not situated on a dune.
- The boardwalk is noticeably wider than others observed.
- There are four benches along the south side of the walkway, all positioned parallel to it. One bench is located at the point where the sand portion of the walkway meets the beach.
- The sand and vegetation are higher than the surface of the walkway along the north and south edges, leading to sand buildup and encroachment onto the walkway (observed March 26, 2024).
- No dunes are present adjacent to the walkways although small remnant dunes are present in front of homes to the south (figure 1).
- The beach entrance supports vehicle access to the beach to the north side of the walkway.
- The walkway is lined with beachgrass on either side (observed 8/27/24); the beachgrass to the north of the walkway is denser and healthier than that to the south.
- Planters with Canna lilies are present along the south side of the walkway.
- Mobi mat observed in August (Figure 2).

Figure 1: Small dune system in front of homes to the south.

Figure 2: Mobi mat observed in August

Potential Action Items

- Periodically remove excess sand from the walkway surface to maintain accessibility.
- Explore opportunities to use the removed sand beneath the walkway to raise its elevation and improve resilience.
- Allow the small, fragmented dunes to continue developing. Limit disturbance.
- Restore sand dune to create a narrow path on the seaward end of the walkway.
- Consider orienting the seaward end of the walkway away from the dominant wind and wave directions.

Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- MA Office of Coastal Zone Management Tips: Basics of Building Beach Access Structures that Protect Dunes and Banks
- Planting Guide for Tidal Shoreline Erosion Management in New Hampshire (beach and dune sections): https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf

Chelmsford Street: Dune Walkway Profile

Site Assessments: February 21, 2024, July 25, 2024, and May 23, 2025

Structure Conditions and Observations	
Road to Beach	570 ft
Boardwalk Length	520 ft
End of boardwalk to beach	50 ft
Walkway Width	4.0 ft
Boardwalk Material	• Asphalt apron • Pressure treated wood connected by cable
Connected pathways**	2
Benches	1
Additional Features	Railings and viewing platform at crest of dune
**Human-made pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
• Beachgrass grassland • Hudsonia maritime shrubland	• Wooly beach heather (*Hudsonia tomentosa*)[S2] • Tall wormwood (*Artermesia campestrus*)[S1]	• Beachgrass (*Ammophila breviligulata*) • Seaside goldenrod (*Solidago sempervirens*) • Northern Bayberry (*Myrica pennsylvanica*) • Beach plum (*Prunus maritima*)	• Asiatic bittersweet (*Celastrus orbiculatus*)[P] • Shrub honeysuckle (*Lonicera species*)[P] • Beach rose (*Rosa rugosa*)[W]
S1 = endangered in NH, S2 = threatened in NH, P = prohibited species in NH, W = NH invasive watch list			

Walkway Entrance

Landward Side

Seaward Side

Walkway Observations

Landward Side of Dune

- The initial portion of the walkway is flat and stable.
- A small section of the boardwalk near the dune crest appears to be shifting slightly to the right (Figure 1), resulting in an uneven and tilted walking surface.
- Dense vegetation is present at the walkway entrance, consisting primarily of crabgrass (*Digitaria* species) and other non-dune species, including invasive species (Figure 2).
- Some sparsely vegetated areas on the landward side of the dune.
- Nonnative pine trees are present on the site.

Figure 1: Boardwalk shifting near dune crest

Dune Crest

- There is a viewing platform that expands out from the walkway on the north and south sides. The walkway immediately leading up and just beyond the walk has railings on both sides of the walkway.
- The viewing platform contains one bench on the south side and two portable/temporary wicker chairs

Figure 2: Presence of invasive plant species

Seaward Side of Dune

- There are a few sections that have bowed or loose planks, which may pose a tripping hazard.
- Walkway buried by sand at the bottom toward the beach.
- There is one bench along the north side of the walkway, positioned parallel to it.
- The seaward side of the dune is well-vegetated (Figure 3).
- Earthstar mushrooms found at this site (likely *Astraeus hygrometricus)*.

Figure 3: Well vegetated seaward side of dune

Potential Action Items

- Reinforce or realign the boardwalk and stabilize to prevent further shifting.
- Install a Mobi Mat or similar ADA-compliant beach access mat at the end of the walkway to improve accessibility.

- Remove invasive species and revegetate the areas adjacent to the walkway near the road with native dune species.
- Seek positive confirmation of pine tree species.
- Revegetate and/or limit foot traffic in dune along the walkway to allow for reestablishment of sand dune vegetation.

Notes

The mushroom observed at this site is likely in the genus Astraeus – the false earthstars. They are often called the "Barometer Earthster" as the rays of the star open and close based on the humidity.

Figure 4: Earthstar mushrooms found at this site

Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- NH Comprehensive Invasive Plant list: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- NH Guide to Upland Invasive Species: https://www.agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf
- Planting Guide for Tidal Shoreline Erosion Management in New Hampshire (beach and dune sections): https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- UNH Extension resources on invasive species: https://extension.unh.edu/natural-resources/forests-trees/invasive-species

Dracut Street: Dune Walkway Profile

Site Assessments: March 5, 2024 and July 9, 2024

Structure Conditions and Observations:	
Road to Beach	498 ft
Boardwalk Length	410 ft
End of walkway to beach	88 ft
Walkway Width	4.0 ft
Walkway Material	• Asphalt apron • Pressure treated wood connected by cable
Attached pathways	2
Benches	4
Additional Features	NA
**Human-made pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
• Beachgrass grassland • Hudsonia maritime shrubland	Wooly beach heather (*Hudsonia tomentosa*)[S2]	• Beachgrass (*Ammophila breviligulata*) • Beach pea *(Lathyrus japonicus)* • Northern Bayberry *(Myrica pennsylvanica)* • Virginia creeper *(Parthenocissus quinquefolia)*	• Asiatic bittersweet (*Celastrus orbiculatus*)[P] • Beach rose (*Rosa rugosa*)[W] • Shrub honeysuckle (*Lonicera species*)[P] • Olive (*Elaeagnus* species) - *E. angustifolia*[W] and *E. umbellata*[P] • Scotch pine (*Pinus sylvestris*)[W] • Yucca species (likely *Yucca filamentosa*) • Hoary alyssum (*Berteroa incana)* • Scotch pine (*Pinus sylvestris*[W])
S2 = threatened in NH, P = prohibited species in NH, W = NH invasive watch list			

Walkway Entrance

Landward Side

Seaward Side

Walkway Observations

Landward Side of Dune

- The initial portion of the walkway is flat and stable.
- There are two benches at the beginning of the walkway positioned parallel to it.
- Areas of bare sand exist within the dune, including adjacent to the walkway, that appear to be a result of pedestrian traffic (Figure 1).
- Scotch pine (*Pinus sylvestris*, NH invasive species watch list) and possibly Japanese black pine (*Pinus thungergii*; nonnative) or jack pine are present on site (Figures 2 & 3).
- The landward end of the walkway is colonized by predominantly nonnative species including species considered invasive or potentially invasive in NH (Figure 4).
- This area has well-established, contiguous and dense beachgrass grassland.

Figure 1: Bare sand strip perpendicular to walkway

Figure 2: Possibly Japanese Black Pine (Pinus thungergii)

Figure 3: Scotch pine (Pinus sylvestris)

Figure 4: Virginia creeper (Parthenocissus quinquefolia) a native vine that turns red in fall and bares berries that are important for

Dune Crest

- The walkway is relatively straight and flat, with a moderate incline over the dune crest.
- *Hudsonia* maritime shrubland intact.

Seaward Side of Dune

- The lower portion of the walkway is buried in sand near the beach access point (Figure 5).
- There are two benches, one on the north and south sides of the walkway. Each are positioned at an approximate 45-degree angle to walkway.
- The seaward end of the walkway is narrow and there is evidence of new beachgrass growth (Figure 6.

Figure 5: Bottom of walkway buried

Figure 6: Seaward end of walkway with new beachgrass growth

Potential Action Items:

- Remove excess sand from the lower portion of the boardwalk to restore accessibility and reduce the risk of structural strain.
- Conduct regular maintenance to prevent future sand buildup, especially after storms.
- Install a Mobi Mat or similar ADA-compliant beach access mat at the end of the walkway to improve accessibility.
- Limit pedestrian traffic through the dune and revegetate the bare areas of dune near the walkway.
- Remove invasive species and revegetate the areas adjacent to the walkway near the road with native dune species.

Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- NH Comprehensive Invasive Plant list: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- NH Guide to Upland Invasive Species: https://www.agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf
- Planting Guide for Tidal Shoreline Erosion Management in New Hampshire (beach and dune sections): https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- UNH Extension resources on invasive species: https://extension.unh.edu/natural-resources/forests-trees/invasive-species

Groveland Street: Dune Walkway Profile

Site Assessments: March 5, 2024 and July 29, 2024

Structure Conditions and Observations	
Road to Beach	266 ft
Boardwalk Length	185 ft
End of boardwalk to beach	81 ft
Walkway Width	4 ft
Boardwalk Material	• Asphalt apron • Pressure treated wood connected by galvanized cable
Attached pathways	0
Benches	2
Additional Features	Seasonal Mobi Mat installed to extend wooden walkway over sand to beach
**Human-made pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
• Beachgrass grassland • Hudsonia maritime shrubland	• Wooly beach heather (*Hudsonia tomentosa*)[S2] • Tall wormwood (*Artermesia campestrus*)[S1]	• Beachgrass (Ammophila breviligulata) • Seaside goldenrod (*Solidago sempervirens*) • Beach pea (*Lathyrus japonicus*) • Seabeach pinweed (*Lechea maritima*) • Poison ivy (*Toxicodendron radicans*)	• Asiatic bittersweet (*Celastrus orbiculatus*)[P] • Beach rose (*Rosa rugosa*)[W]
S1 = endangered in NH, S2 = threatened in NH, P = prohibited species in NH, W = NH invasive watch list)			

Walkway Entrance & Landward side

Seaward Side

Walkway Observations

Landward Side of Dune

- The vegetation along the walkway appears to be cut (Figure 1).
- A bench on the south side near the entrance is oriented parallel to the walkway
- Noticed individual walkways from homes through the dunes, running parallel to the municipal walkway.
- Several sections of the walkway have bowed or loose planks.
- Poison ivy was observed along the north side of the dune walkway (Figure 2).
- The walkway becomes noticeably steep as it approaches the crest of the dune.

Figure 1. Cut vegetation along walkway edge

Figure 2. Poison Ivy along northside of walkway

Seaward Side of Dune

- The beachgrass grassland on the seaward end of the walkway is well-established (Figure 3).
- One bench located on the northside of walkway oriented at a 45-degree angle and set back into the dune.
- The lower portion of the boardwalk near the beach is partially buried by sand.
- Unvegetated areas were observed along the seaward side of the walkway near the homes. Adjacent to the walkway areas of disturbed habitat were observed (Figure 4). Sparse patches of wooly beach heather (a rare species) were also observed in this area.
- A bench is located at an approximately 45-degree angle to the walkway, facing the ocean (Figure 5). The impacts to dune vegetation are confined to the small area in front of the bench. This bench serves as an example of how to position a bench to maximize the view for bench users while limiting impacts to the dune.

Figure 3. Well-established beachgrass

Figure 4. Unvegetated areas on seaward side

Figure 5. Ocean side bench

Potential Action Items

- Conduct regular maintenance to prevent future sand buildup, especially after storms.
- Inspect and replace any missing or damaged planks to improve safety and stability.
- Remove the invasive species near the landward end of the walkway and revegetate the area with native dune species.
- Consider replacing the vegetation along the landward side of the walkway, where habitat quality is low, with native dune species.
- Add non-slip surfacing to the inclined portion of the boardwalk to improve traction and reduce the risk of slipping.
- Remove excess sand from the lower portion of the boardwalk to restore accessibility and reduce the risk of structural strain.
- Limit pathways and walking through the dunes
- Plant unvegetated areas with native dune species.
- Provide educational materials or programming to increase awareness about protected dune plant species and the best practices for controlling vegetation growth around walkways.

Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- NH Comprehensive Invasive Plant list: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- NH Guide to Upland Invasive Species: https://www.agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf
- Planting Guide for Tidal Shoreline Erosion Management in New Hampshire (beach and dune sections): https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- UNH Extension resources on invasive species: https://extension.unh.edu/natural-resources/forests-trees/invasive-species

Haverhill Street: Dune Walkway Profile

Site Assessments: March 5, 2024, July 8, 2024, and May 23, 2005

Structure Conditions and Observations	
Road to Beach	385 ft
Boardwalk Length	308 ft
End of boardwalk to beach	77 ft
Walkway Width	8 ft
Boardwalk Material	• Asphalt apron • Pressure treated wood connected by galvanized cable
Attached pathways	1
Benches	4
Additional Features	• Handicap parking spot nearby • Seasonal Mobi Mat installed to extend wooden walkway over sand to beach
**Human-made pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
• Beachgrass grassland	• Seaside goldenrod (*Solidago sempervirens*)	• Beachgrass (Ammophila breviligulata) • Goldenrod (*Solidago sempervirens*) • Beach pea (*Lathyrus japonicus*)	• Japanese knotweed (Renoutria japonica)[P] • Beach rose (Rosa rugosa)[W]
P = prohibited species in NH, W = NH invasive watch list			

Walkway Entrance

Landward Side

Seaward Side

Walkway Observations

Landward Side of Dune

- The landward area to the south of the walkway is unvegetated (Figure 1). The area to the north of the walkway has recently planted beachgrass (as of May 2025)
- A walking path to homes connects to the municipal path perpendicularly and along the back side of the dune.
- An unvegetated area was observed to the north of the walkway (Figure 2).
- The vegetation to the north of the walkway is more sparse than to the south (Figure 3).

Figure 1. south side of entrance is unvegetated

Figure 3. Vegetation to north of the walkway (right) is more sparse than south (left)

Figure 2. Unvegetated area to the north of walkway

- There is one bench close to the entrance on the northside oriented parallel to walkway.

Dune Crest

- Former dune die-off area suspected on the dune crest where beachgrass is sparse, and the primary species present are goldenrod and beach pea.
- Then a second one located close to the end of the wooden portion of the walkway on the northside and oriented perpendicular to it. The area around the bench is unvegetated. (Figure 4).

Seaward Side of Dune

- There are two benches located near the beach entrance on the north and south sides and each bench is oriented parallel to path.
- The seaward end of the walkway is less vegetated and widens, creating a weak point for flooding during storms (Figure 5).

Figure 4. Unvegetated area around bench

Figure 5. Wider less vegetated seaward end of walkway

Potential Action Items

- Restore sand dune vegetation to create a narrower path on the seaward end of the walkway. Consider orienting the seaward end of the walkway away from the dominant wind and wave directions.
- Revegetate the landward area to the south of the walkway near the road with native dune species as this area is currently vulnerable to colonization by invasive species.
- Benches placed at an angle (~45°) generally appear to have less impact on the surrounding dune than benches placed perpendicular to the walkway. Consider positioning benches at a 45° angle to the walkway when practicable and revegetating the areas around them, other than directly in front.
- Allow the suspected former dune die-off area to revegetate. Consider treating the area with a lime and fertilizer (see die-off area planting suggestions).
- The orientation of the walking path to homes perpendicular to the municipal path, and along the back side of the dunes, is a good example of how to structure paths to homes with minimal impact to the dunes.

Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- MA Office of Coastal Zone Management Tips: Basics of Building Beach Access Structures that Protect Dunes and Banks
- NH Comprehensive Invasive Plant list: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- NH Guide to Upland Invasive Species: https://www.agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf
- NH Sea Grant - Dune Die-Off Factsheet (See Appendix IV)
- Planting Guide for Tidal Shoreline Erosion Management in New Hampshire (beach and dune sections): https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- UNH Extension resources on invasive species: https://extension.unh.edu/natural-resources/forests-trees/invasive-species

Hooksett Street: Dune Walkway Profile

Site Assessments: March 5, 2024 and July 29, 2024

Structure Conditions and Observations	
Road to Beach	NA
Boardwalk Length	109 ft
End of boardwalk to beach	NA – walkway ends right at the beach
Walkway Width	8 ft
Boardwalk Material	• Asphalt apron • Pressure treated wood connected by cable
Attached pathways*	0
Benches	2
Additional Features	• Emergency Access point • Wide enough for vehicular access.
**Human-made pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of Interest**	**Species of Concern**
NA	None observed on assessment dates	• Beachgrass (*Ammophila breviligulata*) • Seaside goldenrod *(Solidago sempervirens)* • Beach pea *(Lathyrus japonicus)* • Northern Bayberry *(Myrica pennsylvanica)*	None observed on assessment dates

Right side of walkway – large adjacent pathway

Walkway entrance

Left side of walkway – adjacent dune

Observations:

Figure 1: Dunes present adjacent to the walkway

- This location features a flat, wide pathway that is not situated on a dune.
- The boardwalk is noticeably wider than others observed.
- The boardwalk runs parallel to a sand pathway that provides pedestrian and vehicle access to the beach, which is used by emergency response and maintenance vehicles.
- Portions of the boardwalk, particularly along the side closest to Ocean Dr, appear to be partially buried by sand and encroaching vegetation (observed March 2024).
- Beachgrass growing along the walkway on both sides of the beach entrance.
- Beachgrass to the north of the walkway is bordered by northern bayberry.
- Planters with annual species (e.g., marigold) are present among the beachgrass to the north.
- No dune present to the south. The dune present to the north angles steeply to the north.
- Two benches are set within the dune to the north (Figure 1).

Potential Action Items:

- Conduct regular maintenance to remove accumulated sand and vegetation from the boardwalk edges to preserve its full width and functionality.
- Any improvements or accessibility enhancements should be coordinated with the Department of Public Works and Emergency Management to maintain vehicle access for emergency and maintenance purposes.
- Restore sand dune to create a narrower path on the seaward end of the walkway.
- When dunes are restored, consider orienting the walkway away from the dominant wind and wave directions.
- Benches placed at an angle (~45°) generally appear to have less impact on the surrounding dune than benches placed perpendicular to the walkway. Consider positioning benches at a 45° angle to the walkway when practicable and revegetating the areas around them, other than directly in front.

Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- MA Office of Coastal Zone Management Tips: Basics of Building Beach Access Structures that Protect Dunes and Banks
- Planting Guide for Tidal Shoreline Erosion Management in New Hampshire (beach and dune sections): https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf

Hudson Street: Dune Walkway Profile

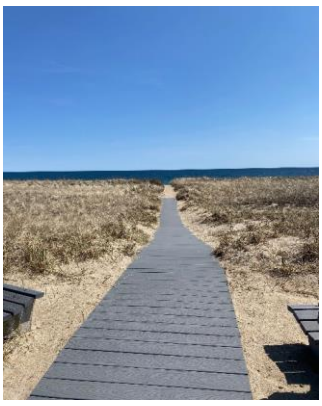
Site Assessments: February 14, 2024 and July 25, 2024

Structure Conditions and Observations	
Road to Beach	480 ft
Boardwalk Length	420 ft
End of boardwalk to beach	60 ft
Walkway Width	4.0 ft
Boardwalk Material	Asphalt apron; pressure treated wood connected by cable
Attached pathways*	3
Benches	3
Additional Features	• Birdhouses • Stone patio blocks alongside of path with handicap symbol
**human-made pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of Interest**	**Species of Concern***
• Beachgrass grassland • Hudsonia maritime shrubland	• Wooly beach heather (*Hudsonia tomentosa*)[S2]	• Beachgrass (*Ammophila breviligulata*) • Seaside goldenrod (*Solidago sempervirens*) • Beach pea (*Lathyrus japonicus*) • Northern Bayberry (*Myrica pennsylvanica*) • Common milkweed (*Asclepias syriaca*)	• Asiatic bittersweet[P] (*Celastrus orbiculatus*) • Beach rose[W] (*Rosa rugosa*) • Yucca species (likely *Yucca filamentosa*) • Shrub honeysuckle[P] (*Lonicera species*)
S2 = threatened in NH, P = prohibited species in NH, W = NH invasive watch list			

Walkway entrance (2025)

Landward side (2025)



Seaward side (2025)

Walkway Observations

Entrance:

- The boardwalk was replaced in December 2024.
- Invasive species at the entrance to the Hudson St walkway, including beach rose on the left side of the image, and Asiatic bittersweet climbing the tree in the background (Figure 1).

Figure 1: Invasive species at the entrance to the walkway

Landward Side of Dune:

- Areas of dune die-off are vegetated with seaside goldenrod.
- Areas of bare send adjacent to walkway near homes to the south (Figure 2).
- Piles of sand adjacent to the walkway suggest that sand is being shoveled from the walkway onto the dune.

Figure 2: Areas of bare send adjacent to walkway near homes to the south

Dune Crest:

- At the dune crest there are two benches on both sides of the walkway.
- The areas surrounding the benches vary in condition. Some have minimal impact to the dune, and lack of vegetation only in front of the bench while others have more unvegetated areas surrounding them (Figure 3).

Figure 3: Bench placed perpendicular to the boardwalk exhibits surrounding unvegetated areas. Consider repositioning the bench and revegetating.

Potential Action Items

- Install a Mobi Mat or similar ADA-compliant beach access mat at the end of the walkway to improve accessibility.
- Delineate paths from homes to walkway to minimize dune impact.
- Revegetate the bare areas of dune near homes with native sand dune plants.
- Consider removal of invasive species and revegetation with native species.
- Benches placed at an angle (~45°) generally appear to have less impact on the surrounding dune than benches placed perpendicular to the walkway. Consider positioning benches at a 45° angle to the walkway when practicable and revegetating the areas around them, other than directly in front.
- In areas of suspected dune die-off, consider planting a diversity of sand dune species and/or treating the area with a lime and fertilizer (see die-off area planting suggestions).

Additional Information

- This boardwalk was replaced by the town, with approval from the Selectboard, using ARPA funds in December 2024. According to Selectboard member Ravi Ravikumar, "The contractor is required to do the entire job manually, without disturbing the dune grass. Nonnative brush at the entrance of the Hudson boardwalk, the *Rosa rugosa*, will be cut back 1 ft back on either side of the boardwalk."
- Monitoring of beach erosion and accretion along NH's coast began in 2018 through the NH Volunteer Beach Profile Monitoring Program. A monitoring station (SB02) exists along Hudson Street. If you'd like to explore the NH Volunteer Beach Profile Monitoring data, you can access the interactive data portal and read a summary report specific to Seabrook Beach monitoring stations.

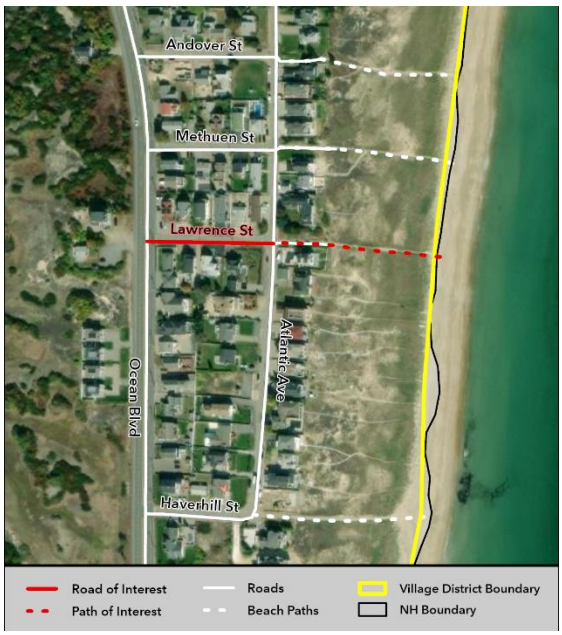
Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- MA Office of Coastal Zone Management Tips: Basics of Building Beach Access Structures that Protect Dunes and Banks
- NH Comprehensive Invasive Plant list: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- NH Guide to Upland Invasive Species: https://www.agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf
- Planting Guide for Tidal Shoreline Erosion Management in New Hampshire (beach and dune sections): https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- UNH Extension resources on invasive species: https://extension.unh.edu/natural-resources/forests-trees/invasive-species

Lawrence Street: Dune Walkway Profile

Site Assessments: March 5, 2024, July 9, 2024, and May 23, 2025

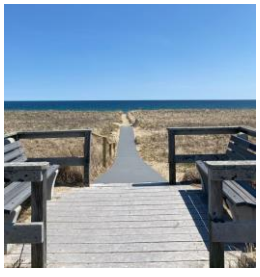
Structure Conditions and Observations	
Road to Beach	504 ft
Boardwalk Length	415 ft
End of boardwalk to beach	89 ft
Walkway Width	4.0 ft
Boardwalk Material	• Asphalt apron • Pressure treated wood connected by galvanized cable
Attached pathways	2
Benches	2
Additional Features	• Wooden viewing platform with benches at dune crest • Seasonal Mobi Mat installed to extend wooden walkway over sand to beach
**Human-made pathways connected to the municipal walkway*	



Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
• Beachgrass grassland	• Wooly beach heather (*Hudsonia tomentosa*)[S2] • Gray's sedge (*Cyperus grayi*)[S1] • Tall wormwood (*Artermesia campestrus*)[S1]	• Beachgrass (*Ammophila breviligulata*) • Seaside goldenrod (*Solidago sempervirens*) • Beach pea (*Lathyrus japonicus*) • Beach plum (*Prunus maritima*) • Seabeach pinweed (*Lechea maritima*) • Common Milkweed (*Asclepias syriaca*) • Chokecherry (Prunus virginiana)	• Asiatic bittersweet (*Celastrus orbiculatus*)[P] • Beach rose (Rosa rugosa)[W] • Shrub honeysuckle (Lonicera species) [P] • Burning bush (Euonymus alatus)[P]
S1 = endangered in NH, S2 = threatened in NH, P = prohibited species in NH, W = NH invasive watch list			

Walkway Entrance

Landward Side



Seaward Side

Walkway Observations

General

- Walkway was replaced in 2025.
- Walkway is relatively straight and flat with moderate incline over the crest of the dune.
- Dog waste was observed along the sides of the walkway.

Figure 1. Dense vegetation near entrance

Landward Side of Dune

- Dense vegetation containing invasives plant species in the initial portion of the southside section of walkway (Figure 1).
- Invasive species are abundant at the landward side of the walkway, particularly to the south of the walkway. Invasive species are also present in the dune near the benches along the walkway.
- There is one bench along the southside of the walkway, positioned at 45-degree angle to the walkway.

Figure 2. Dune die off area

Dune Crest

- Areas of less dense vegetation and an absence of beachgrass along the dune crest both to the north and south of the walkway suggest dune die-off has occurred in these areas (Figure 2).
- Viewing platform at crest with two benches on the north and south sides of the walkway, oriented parallel to it.

Figure 3. Dune vegetation loss adjacent to walkway

Seaward Side of Dune

- The beachgrass grassland at the seaward end of the walkway is well-established.
- In a section of the walkway where the slope is steeper, a railing is on the north side of the walkway. Loss of dune vegetation was observed adjacent to the walkway where there is no railing (Figure 3).
- There is one bench along the southside of the walkway at the transition from wooden walkway to sand, positioned at parallel to it.
- Prior to replacement, there was slip resistant tape added to walkway on the steepest section (Figure 3).

Figure 3. Previously installed slip resistant tape

Potential Action Items

- Conduct regular maintenance to prevent future sand buildup, especially after storms.
- Remove the invasive species near the landward entrance and near the benches and replant the area with native dune species.
- Revegetate areas of bare sand and sparse vegetation with native sand dune species.
- Add non-slip surfacing on either side of dune crest to improve traction and reduce the risk of slipping.
- In areas of suspected dune die-off, consider planting a diversity of sand dune species and/or treating the area with lime and fertilizer (see die off area planting suggestions).
- Investigate the feasibility of installing a handrail on the seaward side on the southern side where vegetation die-off has occurred this can help to limit foot traffic.

Additional Information

- This boardwalk was replaced by the town, with approval from the Selectboard, using ARPA funds. According to Selectboard member Ravi Ravikumar, "The contractor is required to do the entire job manually, without disturbing the dune grass.

- Monitoring of beach erosion and accretion along NH's coast began in 2018 through the NH Volunteer Beach Profile Monitoring Program. A monitoring station (SB04) exists to the south of Lawrence St – the two blue dots on the photo at the start of this report indicate the location of the station markers. If you'd like to explore the NH Volunteer Beach Profile Monitoring data, you can access the interactive data portal and read a summary report specific to Seabrook Beach monitoring stations.

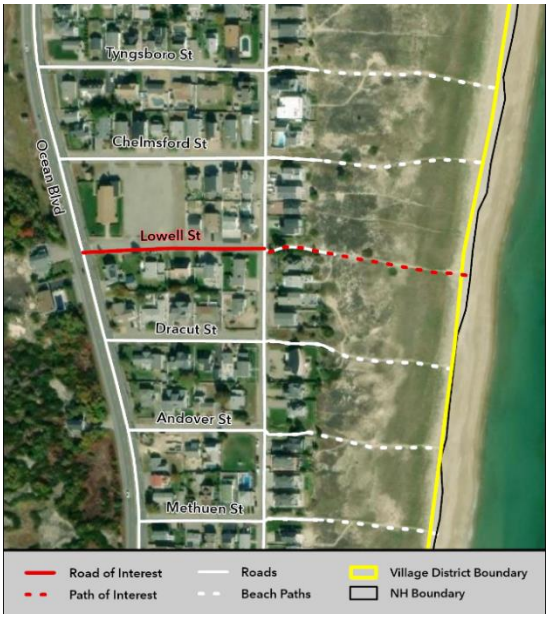
Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- MA Office of Coastal Zone Management Tips: Basics of Building Beach Access Structures that Protect Dunes and Banks
- NH Comprehensive Invasive Plant list: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- NH Guide to Upland Invasive Species: https://www.agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf
- NH Sea Grant - Dune Die-Off Factsheet (See Appendix IV)
- Planting guide for tidal shoreline erosion management in NH: https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- UNH Extension resources on invasive species: https://extension.unh.edu/natural-resources/forests-trees/invasive-species

Lowell Street: Dune Walkway Profile

Sie Assessments: March 5, 2024 and July 25, 2024

Structure Conditions and Observations:	
Road to Beach	500 ft
Boardwalk Length	430 ft
End of boardwalk to the beach	70 ft
Walkway Width	4.0 ft
Walkway Material	• Asphalt apron • Pressure treated wood connected by cable
Connected pathways**	2
Benches	3
Additional Features	viewing platform at crest of dune with benches
**Human-made pathways connected to the municipal walkway*	



Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
• Beachgrass grassland • Hudsonia maritime shrubland	• Wooly beach heather (*Hudsonia tomentosa*)[S2]	• Beachgrass (*Ammophila breviligulata*) • Northern Bayberry (*Myrica pennsylvanica*)	• Asiatic bittersweet (*Celastrus orbiculatus*)[P] • Beach rose (*Rosa rugosa*)[W] • Shrub honeysuckle (*Lonicera species*)[P] • Black locust (*Robinia pseudoacacia*)[W] • Privet (*Ligustrum vulgare*)[P] • Beach rose (*Rosa rugosa*)[W] • Scotch pine (*Pinus sylvestris*)[W] • Yucca species (likely *Yucca filamentosa*) • Hoary alyssum (*Berteroa incana)* • Scotch pine (*Pinus sylvestris*[W])
S2 = threatened in NH, P = prohibited species in NH, W = NH invasive watch list			

Walkway Entrance

Landward Side

Seaward Side

Observations

Landward Side of Dune

- The initial portion of the walkway appears flat and stable.
- High density and diversity of invasive plant species found at the entrance to the walkway.
- Hudsonia maritime shrubland is dense and intact, particularly to the north of the walkway.
- Both Scotch pine (*Pinus sylvestris*, NH invasive species watch list) and Austrian/black pine (*Pinus nigra*; nonnative) are suspected on site (Figure 1).
- There is one bench along the north side of the walkway, positioned parallel to it.
- As the slope increases to the dune crest some boards are bowing which could cause a tripping hazard.
- Walking paths to homes have created unvegetated areas in the Hudsonia maritime shrubland to the south (Figure 2).

Figure 1: Nonnative pine species observed at the entrance to the walkway

Dune Crest

- There is one bench along the south side of the walkway that is positioned perpendicular to it.
- There is some evidence of the boardwalk shifting slightly at the dune crest (Figure 3).

Figure 2: Unvegetated areas of Hudsonia maritime shrubland

Seaward Side of Dune

- There is a bench positioned further into the dune and away from the walkway.
- The lower portion of the walkway is buried in sand near the beach access point.
- The seaward end of walkway is narrow and there is evidence of new beachgrass growth.
- Earthstar mushrooms found at this site (likely *Astraeus hygrometricus*).

Figure 3: Some shifting of the boardwalk observed at the crest of the dune.

Potential Action Items

- Inspect and replace any damaged or loose planks to improve safety and durability.
- Install a Mobi Mat or similar ADA-compliant beach access mat at the end of the walkway to improve accessibility.
- Given the high condition of the dune and density of invasive species, remove invasive species and revegetate the areas adjacent to the walkway near the road with native dune species.

- Consider routing walking paths from homes perpendicular to the walkway along the edge of the dune close to the houses to limit dune impacts.
- Seek positive confirmation of pine tree species and remove if confirmed to be non-native.
- Remove excess sand from the lower portion of the walkway to restore accessibility and reduce the risk of structural strain.

Notes

The mushroom observed at this site is likely in the genus Astraeus – the false earthstars (Figure 3). They are often called the **"Barometer Earthster"** as the rays of the star open and close based on the humidity.

Figure 3: Earthstar mushroom found at this site

Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- NH Comprehensive Invasive Plant list: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- NH Guide to Upland Invasive Species: https://www.agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf
- Planting Guide for Tidal Shoreline Erosion Management in New Hampshire (beach and dune sections): https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- UNH Extension resources on invasive species: https://extension.unh.edu/natural-resources/forests-trees/invasive-species

Merrimack Street: Dune Walkway Profile

Site Assessments: March 5, 2024, July 29, 2024, and May 23, 2025

Structure Conditions and Observations	
Road to Beach	474 ft
Boardwalk Length	380 ft
End of boardwalk to beach	94 ft
Walkway Width	4.0 ft
Boardwalk Material	• Asphalt apron • Pressure treated wood connected by galvanized cable
Attached pathways	3 with others seen adjacent
Benches	1
Additional Features	• Fire hydrant at entrance • Seasonal Mobi Mat installed to extend wooden walkway over sand to beach
**Human-made pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
• Beachgrass grassland • Hudsonia maritime shrubland	• Wooly beach heather (*Hudsonia tomentosa*)[S2] • Gray's sedge (*Cyperus grayi*)[S1] • Tall wormwood (*Artermesia campestrus*)[S1]	• Beachgrass (Ammophila breviligulata) • Seaside goldenrod (*Solidago sempervirens*) • Beach pea (*Lathyrus japonicus*) • Northern Bayberry (*Myrica pennsylvanica*) • Seabeach pinweed (*Lechea maritima*)	• Shrub honeysuckle (Lonicera species)[P] • Asiatic bittersweet (*Celastrus orbiculatus*)[P] • Beach rose (Rosa rugosa)[W]
S1 = endangered in NH, S2 = threatened in NH, P = prohibited species in NH, W = NH invasive watch list			

Walkway Entrance

Landward Side

Seaward Side

Walkway Observations

Landward Side of Dune

- At the entrance the southern side of the walkway is unvegetated (Figure 1).
- Nonnative and/or invasive species are present at the entrance to the walkway near the road.
- The wooly beach heather is sparse throughout the back side of the dune with a large unvegetated area observed to the south of the walkway (Figure 2).
- Private walking paths from homes through the dunes and use of the dunes have contributed to many large unvegetated areas (Figure 3).

Figure 1. Unvegetated area near

Figure 2. Sparsely vegetated backside of dune

Figure 3. Large unvegetated areas in dune

Dune Crest

- The walkway remains relatively flat until it reaches a moderate incline leading up to the dune crest. At the crest, the walkway features a sharp S-curve (Figure 4).
- A bench on the southerly side of the dune crest is set back into the dune and oriented perpendicular to the walkway. There is side path that connects to it, a large unvegetated area around it, and sparse growth of rare species (Figure 5).

Figure 4. S-curve in walkway approaching dune crest

Seaward Side of Dune

- The beachgrass grassland is well established, though two invasive honeysuckle shrubs were observed on the seaward side of the dunes.
- Long path to bench set far into dune (Figure 6)
- Walking paths and use of the dunes have created many large unvegetated areas.
- The seasonal Mobi Mat extends the walkway closer to the beach but it does not make it all the way to the beach.
- Many small beach rose plants are growing to the south of walkway,
- The lower portion of the boardwalk is buried in sand near the beach access point.

Figure 5. Dune crest bench set into

Figure 6. Path to bench set far into dune

Potential Action Items

- Repair uneven or loose planks to ensure a safe walking surface.
- Assess feasibility of installing handrails along the curved section of the walkway to provide additional stability.
- Add non-slip surfacing to the inclined and curved sections to improve traction and reduce the risk of slipping.
- Limit individual paths through dunes and connect homes to the municipal path. Consider routing the paths perpendicular to the walkway, along the edge of the dune close to the houses to limit dune impacts.
- The locations of the bench on the dune crest and the bench in the dune to the north are resulting in impacts to dune vegetation, including rare species. Benches placed at an angle (~45°) generally appear to have less impact on the surrounding dune than benches placed perpendicular to the walkway. Consider positioning benches at a 45° angle to the walkway when practicable and revegetating the areas around them, other than directly in front.
- Remove excess sand from the lower portion of the boardwalk to restore accessibility and reduce the risk of structural strain.
- Remove the invasive shrubs in the beachgrass grassland and replant with native species.
- Revegetate areas of bare sand and sparse vegetation with native sand dune species with a focus on the large, disturbed areas.

Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- NH Comprehensive Invasive Plant list: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- NH Guide to Upland Invasive Species: https://www.agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf
- Planting Guide for Tidal Shoreline Erosion Management in New Hampshire (beach and dune sections): https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- UNH Extension resources on invasive species: https://extension.unh.edu/natural-resources/forests-trees/invasive-species

Methuen Street: Dune Walkway Profile

Site Assessments: March 5, 2024, July 9, 2024, and May 23, 2025

Structure Conditions and Observations	
Road to Beach	542 ft
Boardwalk Length	453 ft
End of boardwalk to beach	89 ft
Walkway Width	4.0 ft
Boardwalk Material	• Asphalt apron • Pressure treated wood connected by galvanized cable
Attached pathways	2
Benches	2
Additional Features	Railings on south landward side of dune incline
**Human-made pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
• Beachgrass grassland • Hudsonia maritime shrubland	• Wooly beach heather (*Hudsonia tomentosa*)[S2] • Gray's sedge (*Cyperus grayi*)[S1] • Tall wormwood (*Artermesia campestrus*)[S1]	• Beachgrass (*Ammophila breviligulata*) • Seaside goldenrod (*Solidago sempervirens*) • Beach pea (*Lathyrus japonicus*) • Beach plum (*Prunus maritima*) • Seabeach pinweed (*Lechea maritima*) • Bayberry (*Myrica pennsylvanica*)	• Asiatic bittersweet (*Celastrus orbiculatus*)[P]
S1 = endangered in NH, S2 = threatened in NH, P = prohibited species in NH, W = NH invasive watch list			

Walkway Entrance

Landward Side

Seaward Side

Walkway Observations

Landward Side of Dune

- The pine tree near the entrance appears to be a Japanese black pine (*Pinus thunbergii*).
- The walkway is relatively straight and flat, with a moderate incline over the dune crest.
- The vegetation along the walkway is close to the boardwalk suggesting pedestrians are staying on the walkway (Figure 1).
- The vegetated adjacent to the walkway appears to be mowed (Figure 1).
- Areas of dense and intact Hudsonia maritime shrubland and beachgrass grassland are fragmented by a wooden walking path through the dunes directly to homes contributing to areas of bare sand and sparse vegetation (Figure 2).
- A pile of grass clippings and rocks was observed in the dune.

Figure 1. Landward side leading to dune crest

Figure 2. Areas of intact Hudsonia between walkway and private path

Dune Crest

- Toward the dune crest, it appears some planks are coming loose (Figure 2).

Seaward Side of Dune

- A well-established beachgrass grassland exists at the seaward end to the south of the walkway.
- Large unvegetated areas were present to the north of the walkway.
- Two benches are located further into the dune requiring people to walk through the dunes to access them. Beach accessories may be stored here as evidence by the Adirondack chairs and beach chairs.
- An area of suspected dune die-off exists to the north of the walkway behind the bench area (Figure 3).

Figure 3. Dune die-off near benches

- A section of wooden planks at the end of the walkway is detached and made of a different material than the rest of the boardwalk (Figure 4).
- The lower portion of the walkway is buried in sand near the beach access point.
- Seaward end of walkway is narrow and the surrounding area is well vegetated.

Figure 4. Added wooden planks

Figure 5. Seaward end of walkway

- Inspect and replace any missing or damaged planks to improve safety and stability.
- Remove excess sand from the lower portion of the walkway to restore accessibility and reduce the risk of structural strain.
- Increase native plant diversity by removing the pine tree, bittersweet, and the lawn grasses near the landward entrance and revegetate with native dune species.
- Assess replacing the mismatched section with materials consistent with the rest of the walkway to improve durability and to restore a continuous, stable walking surface.
- Install a Mobi Mat or similar ADA-compliant beach access mat at the end of the walkway to improve accessibility.
- Conduct regular maintenance to prevent future sand buildup, especially after storms.
- Move benches closer to the primary walkway. Remove beach chairs and Adirondack chairs and revegetate the area with native dune species. Benches placed at an angle (~45°) generally appear to have less impact on the surrounding dune than benches placed perpendicular to the walkway. Consider positioning benches at a 45° angle to the walkway when practicable
- Remove invasive species and revegetate with native dune species
- In areas of suspected dune die-off, consider planting a diversity of sand dune species and/or treating the area with a lime and fertilizer (see die-off area planting suggestions).

Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- MA Office of Coastal Zone Management Tips: Basics of Building Beach Access Structures that Protect Dunes and Banks
- NH Comprehensive Invasive Plant list: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- NH Guide to Upland Invasive Species: https://www.agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf
- NH Sea Grant - Dune Die-Off Factsheet (See Appendix IV)
- Planting guide for tidal shoreline erosion management in NH: https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- UNH Extension resources on invasive species: https://extension.unh.edu/natural-resources/forests-trees/invasive-species

Nashua Street: Dune Walkway Profile

Site Assessments: February 14, 2024 and July 25, 2024

Structure Conditions and Observations	
Road to beach	591 ft
Boardwalk Length	520
End of boardwalk to beach	71 ft
Walkway Width	4 ft
Walkway Material	• Asphalt apron • Pressure treated plywood connected by cable
Attached pathways*	2
Benches	3
Additional Features	NA
*Human-made *pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
• Beachgrass grassland • Hudsonia maritime shrubland	• Wooly beach heather (*Hudsonia tomentosa*)[S2]	• Beachgrass (*Ammophila breviligulata*) • Seaside goldenrod (*Solidago sempervirens*) • Northern Bayberry (*Myrica pennsylvanica*)	• Autumn olive (*Elaeagnus umbellata*)[P] • Climbing nightshade (*Solanum dulcamara*)[W] • Beach rose *(Rosa rugosa)*[W]
S2 = threatened in NH, P = prohibited species in NH, W = NH invasive watch list			

Walkway Entrance

Landward Side

Seaward Side

Walkway Observations

Landward Side of Dune

- The initial portion of the walkway is flat and appears structurally stable.
- Nonnative and/or invasive species are present at the entrance to the walkway near the road.
- As the path begins to slope upward toward the dune crest, several boards show signs of bowing, and a few are missing (Figure 1).
- Near the dune crest, the walkway curves and exhibits noticeable tilting.
- Areas of bare sand and sparse vegetation were observed along the walkway.
- Bare sand areas appear to correspond with sections of walkway that has missing and unstable boards.
- Walking paths to homes have created large unvegetated areas (Figure 2).
- Vegetation adjacent to the path on either side appears to have been mowed (Figure 3).

Figure 1: Missing boards; noticeable tilting.

Figure 3: Large unvegetated areas adjacent to walkway

Figure 2: Vegetation appears to have been mowed

Seaward Side of Dune

- The walkway continues to tilt in certain sections as it descends, with dune elevation rising on both sides as it nears the beach access point.
- One bench is located on the north side of the walkway, oriented parallel to the path.
- Two additional benches are situated where the sand path transitions to the beach.
- Vegetation adjacent to the path on both the landward and seaward side of the walkway appears to have been mowed (Figure 3).
- Earthstar mushrooms found at this site (likely *Astraeus hygrometricus*) (Figure 4).

Potential Action Items

- Inspect and repair loose or uneven planks to maintain a safe, level surface.
- Add non-slip surfacing on curved and inclined sections to improve traction and reduce the risk of slipping.

- Assess feasibility of Installing handrails along the curved section of the walkway to provide additional stability.
- Install a Mobi Mat or similar ADA-compliant beach access mat at the end of the walkway to improve accessibility.
- Revegetate areas of bare sand and sparse vegetation with native sand dune species.
- Delineate walking paths from homes, consider routing the paths perpendicular to the walkway along the edge of the dune close to the houses to limit dune impacts.
- Revegetate abandoned walking paths.
- Remove invasive species and replant with native dune species.
- Increase education and awareness about state regulations regarding the cutting of dune vegetation

Notes

The mushroom observed at this site is likely in the genus Astraeus – the false earthstars. They are often called the **"Barometer Earthster"** as the rays of the star open and close based on the humidity.

Figure 4: Earthstar Mushroom

Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- NH Comprehensive Invasive Plant list: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- NH Guide to Upland Invasive Species: https://www.agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf
- Planting Guide for Tidal Shoreline Erosion Management in New Hampshire (beach and dune sections): https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- UNH Extension resources on invasive species: https://extension.unh.edu/natural-resources/forests-trees/invasive-species

New Hampshire Street: Dune Walkway Profile

Site Assessments: March 5, 2024 and July 25, 2024

Structure Conditions and Observations	
Road to Beach	239 ft
Boardwalk Length	NA
End of boardwalk to beach	NA
Walkway Width	10 ft
Boardwalk Material	NA – all sand
Attached pathways	3
Benches	2
Additional Features	• Emergency Access point • Wide enough for vehicular access. • A winter sacrificial dune is built on the beach side to provide storm surge and flood protection.
**Human-made pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
• Beachgrass grassland	None observed on assessment dates	• Beachgrass (*Ammophila breviligulata*) • Seaside goldenrod (*Solidago sempervirens*) • Beach pea (*Lathyrus japonicus*)	• Asiatic bittersweet (*Celastrus orbiculatus*)[P] • Beach Rose (*Rosa rugosa*)[W] • Shrub honeysuckle (*Lonicera species*)[P]
P = prohibited species in NH; W = NH invasive watch list			

Walkway Entrance

Landward Side

Seaward Side

Walkway Observations

- No constructed walkway is present; the pathway consists entirely of sand.
- Multiple nonnative and/or invasive species are present at the entrance to the walkway near the road (Figure 2).
- Unvegetated, or sparsely vegetated areas, were observed north of the walkway with dead stems of beachgrass remaining in the sand, suggesting that these are areas of dune die-off. (Figures 1 and 3).
- Two benches are located close to the walkway about one-third down. The positioned opposite each other and oriented parallel to the path.

Figure 1. Google aerial view of walkway

- A third benches are located close to beach but further into the dune requiring people to walk through the dunes to access them (Figure 4).
- Multiple walkways from the adjacent homes through the dunes have created additional unvegetated areas (Figures 5).
- Walkway is wider than most other access points and further widens on seaward end with a large unvegetated area. This area can serve as a weak point for flooding during storms (Figure 1).

Figure 2. Nonnative and invasives near entrance

Figure 3. Areas of dune die-off north of walkway

Figure 4. Bench located inside of dune

Figure 5. Private walkway connecting to main walkway

Potential Action Items

- Delineate walking paths from homes. Consider routing the paths perpendicular to the walkway, along the edge of the dune close to the houses to limit dune impacts.
- Remove invasive species and revegetate with native dune species
- Erect temporary fencing (post and rope) to delineate a narrower walkway and allow vegetation to re-establish along the length of the walkway.
- Consider orienting the seaward end of the walkway away from the dominant wind and wave directions.
- Move benches closer to the primary walkway. Consider positioning benches at a 45o angle to the walkway when practicable and revegetating the areas around them, other than directly in front.
- In areas of suspected dune die-off, consider planting a diversity of sand dune species and/or treating the area with lime and fertilizer (see die-off area planting suggestions).

- Install a Mobi Mat or similar ADA-compliant beach access mat at the end of the walkway to improve accessibility. However, any installation should be coordinated with the Department of Public Works and Emergency Management to ensure continued access for emergency and municipal vehicles, as this location serves as a vehicle access point.

Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- MA Office of Coastal Zone Management Tips: Basics of Building Beach Access Structures that Protect Dunes and Banks
- NH Guide to Upland Invasive Species: https://www.agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf
- NH Comprehensive Invasive Plant list: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- NH Sea Grant - Dune Die-Off Factsheet (See Appendix IV)
- Planting Guide for Tidal Shoreline Erosion Management in New Hampshire (beach and dune sections): https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- UNH Extension resources on invasive species: https://extension.unh.edu/natural-resources/forests-trees/invasive-species

Newbury Street: Dune Walkway Profile

Site Assessments: March 5, 2024 and July 25, 2024

Structure Conditions and Observations	
Road to Beach	238 ft
Boardwalk Length	102 ft
End of boardwalk to beach	136 ft
Walkway Width	4 ft
Boardwalk Material	• Asphalt apron • pressure treated wood connected by galvanized cable
Attached pathways	2
Benches	3
Additional Features	• Light fixtures installed on landward side of walkway • Seasonal Mobi Mat installed to extend wooden walkway over sand to beach
**Human-made pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
• Beachgrass grassland	• Tall wormwood (*Artermesia campestrus*)[S1]	• Beachgrass (Ammophila breviligulata) • Seaside goldenrod (*Solidago sempervirens*) • Beach pea (*Lathyrus japonicus*) • Seabeach pinweed (*Lechea maritima*)	• Asiatic bittersweet (*Celastrus orbiculatus*)[P] • Beach Rose (*Rosa rugosa*)[W]
S1 = endangered in NH, P = prohibited species in NH, W = NH invasive watch list			

Walkway Entrance

Landward Side

Seaward Side

Walkway Observations

Landward Side of Dune

- The walkway planks are oriented parallel to the direction of travel, which differs from the typical perpendicular installation observed on other walkways (Figure 1).
- The walkway appears to have been recently replaced, suggesting recent maintenance or improvement work.
- Unvegetated areas are present along the landward side of the dunes, with human footprints through the areas (Figure 1).
- Two benches are installed along this section - one near the beginning and one near the midpoint - both aligned parallel to the walkway (Figure 4).
- A large stand of beach rose (*Rosa rugosa*) is present to the north of the walkway, and along the road (Figure 2).
- Wooly beach heather (*Hudsonia tomentosa*) is not growing adjacent to the walkway thus is not listed above; a few sparse patches were observed further to the north.
- A paved road runs along the landward end of the dune. Tire tracks were present along the edge of the dune, as well as unvegetated areas and areas with vegetation more typical of roadsides than high functioning dunes systems.

Figure 1. Foot traffic along walkway edges impacting vegetation

Figure 2. Large stands of beach

Dune Crest

- One bench is located on the north side of the crest, oriented parallel to the walkway (Figure 4).

Seaward Side of Dune

- Two benches are positioned at the end of the walkway, each set at approximately a 45-degree angle relative to the path, providing a diagonal orientation for beach viewing (Figure 4).
- Wooly beach heather (*Hudsonia tomentosa*) is not growing adjacent to the walkway thus is not listed above; a few sparse patches were observed to the north.
- Unvegetated, or sparsely vegetated areas, were observed with dead roots of beachgrass remaining in the sand, suggesting that these are areas of dune die-off (Figure 3).

Figure 3. Unvegetated areas suggesting dune die-off

Figure 4. Three different bench orientations to the walkways, parallel, angled and offset (left to right)

Potential Action Items

- Limit people walking through the dune system
- Revegetate areas of bare sand and sparse vegetation with native sand dune species with a focus on the large, disturbed areas
- Consider the pros and cons of removing the large stand of beach rose and replanting the area with native dune species.
- Consider installing a barrier (e.g. fencing, shrubs_ between the landward edge of the dune and the road to limit vehicle impacts to the dune system. Ensure that snow is not plowed into the dune in winter.
- Benches placed at an angle (~45°) generally appear to have less impact on the surrounding dune than benches placed perpendicular to the walkway. Consider positioning benches at a 45° angle to the walkway when practicable and revegetating the areas around them, other than directly in front.
- Unvegetated areas at this site appear to be due to two primary causes: beachgrass die-off and human use. In areas where human use is the primary driver, redirect people to walkways and ensure vehicles stay on the pavement.
- Revegetate these areas with native species. Where die-off appears to be the cause, consider planting native dune species other than beachgrass and/or treating the area with lime and fertilizer (see die-off area planting suggestions).

Additional Information

Beach profiling: Monitoring of beach erosion and accretion along NH's coast began in 2018 through the NH Volunteer Beach Profile Monitoring Program. A monitoring station (SB05) exists to the south of the Newbury St walkway – the two blue dots on the photo at the start of this report indicate the location of the station markers. If you'd like to explore the NH Volunteer Beach Profile Monitoring data, you can access the interactive data portal and read a summary report specific to Seabrook Beach monitoring stations.

Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- NH Comprehensive Invasive Plant list: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- NH Guide to Upland Invasive Species: https://www.agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf
- NH Sea Grant - Dune Die-Off Factsheet (See Appendix IV)
- Planting Guide for Tidal Shoreline Erosion Management in New Hampshire (beach and dune sections): https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- UNH Extension resources on invasive species: https://extension.unh.edu/natural-resources/forests-trees/invasive-species

Tilton Street: Dune Walkway Profile

Site Assessments: March 26, 2024 and August 27, 2024

Structure Conditions and Observations	
Road to beach	163 ft
Boardwalk Length	83 ft
End of boardwalk to beach	80 ft
Walkway Width	8 ft
Walkway Material	• Asphalt apron • Pressure treated plywood connected by cable
Attached pathways*	None
Benches	3
Additional Features	• Seasonal Mobi Mat installed to extend wooden walkway over sand to beach • Large planter between walkway benches
**Human-made pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
Not applicable	None observed on assessment dates	• Beachgrass (*Ammophila breviligulata*) • Seaside goldenrod (*Solidago sempervirens*) • Beach pea (*Lathyrus japonicus*) • Common Milkweed (*Asclepias syriaca*)	None observed on assessment dates.

Walkway Entrance

Walkway Entrance

End of walkway looking east

Observations

- The surface of the walkway is flat and stable. The planks are oriented east/west unlike most which run north/south (Figure 1).
- There are two benches along the north side of the walkway, positioned parallel to it. One bench is located where the sand portion of the walkway meets the beach.
- Mobi Mat was observed during the summer months.
- Beachgrass along the southern side of the walkway is dense and healthy.
- Vegetated dunes are present adjacent to the walkway; the beachgrass along the southern side of the walkway is dense.
- Planters with Canna lilies are present along the north side of the walkway (Figure 1).
- The seaward end of the walkway is quite wide, creating a potential path for storm waves to travel (Figure 2).
- Upon observation in March, the end portion of the walkway was covered with sand.

Figure 1: Landward side of walkway

Figure 2: The wide opening at the seaward end of the walkway

Potential Action Items

- Periodically remove excess sand from the boardwalk surface to improve accessibility.
- Restore sand dune to create a narrower path on the seaward end of the walkway.
- Consider orienting the seaward end of the walkway away from the dominant wind and wave directions.

Resources

- GoBotany – Native Plant Trust https://gobotany.nativeplanttrust.org
- MA Office of Coastal Zone Management Tips Basics of Building Beach Access Structures that Protect Dunes and Banks
- Planting Guide for Tidal Shoreline Erosion Management in New Hampshire (beach and dune sections) https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf

Tyngsboro Street: Dune Walkway Profile

Site Assessments: February 14, 2024 and July 25, 2024

Structure Conditions and Observations:	
Road to beach	580 ft
Boardwalk Length	500 ft
End of boardwalk to beach	80 ft
Walkway Width	4 ft
Walkway Material	• Asphalt apron • Pressure treated wood connected by cable
Attached pathways*	2
Benches	3
Additional Features	NA
**Human-made pathways connected to the municipal walkway*	

Ecological Conditions and Observations			
Community Types Present	**Rare Species**	**Other Native Species of interest**	**Species of Concern**
• Beachgrass grassland • Hudsonia maritime shrubland	• Wooly beach heather (*Hudsonia tomentosa*)[S2]	• Beachgrass (*Ammophila breviligulata*) • Common Milkweed (*Asclepias syriaca*)	• Asiatic bittersweet (*Celastrus orbiculatus*)[P]
S2 = threatened in NH, P = prohibited species in NH			

Walkway Entrance

Landward side

Seaward Side

Walkway Observations

Landward Side of Dune

Figure 1: Apparent tilting approaching dune crest; moderate incline; footsteps observed in unvegetated areas.

- The initial portion of the walkway is flat and stable.
- There are two benches on the north side of the walkway positioned at an approximate 45 and 90-degree angle.
- The walkway becomes noticeably steep as it approaches the crest of the dune with several bowed and tilting planks (Figure 1).
- Unvegetated areas on landward side of dune crest (*Hudsonia maritime* shrubland) with footsteps in sand suggests this sensitive area is used by people (Figure 2).
- Unvegetated areas present adjacent to the walkway.
- Walking paths to homes have contributed to large unvegetated areas.
- Earthstar mushrooms found at this site (likely *Astraeus hygrometricus*) (figure 4).
- Nonnative and/or invasive species are present on site, including nonnative pine trees.

Figure 2: Unvegetated areas adjacent to walkway

Dune Crest

- The walkway at the dune crest appears to be shifting and tilting, with multiple planks showing signs of bowing (Figure 3).
- There is one bench on the north side of walkway positioned parallel to it.

Seaward Side of Dune

- The lower portion of the walkway near the beach is partially buried by sand.
- This portion of the walkway also contains several bowed planks.
- The seaward end of the walkway is narrow and well vegetated.

Figure 3: Observed tilting and bowing of some planks; apparent pedestrian use adjacent to the boardwalk.

Potential Action Items

- Install non-slip surfacing on the steeper portion of the walkway to improve traction.
- Evaluate the potential for installing handrails on the steeper portions of the walkway to improve accessibility.
- Inspect and secure any loose or warped planks to restore an even walking surface.
- Install a Mobi Mat or similar ADA-compliant beach access mat at the end of the walkway to improve accessibility.
- Delineate walking paths from homes, consider routing the paths perpendicular to the walk along the edge of the dune close to the houses to limit dune impacts. Limit walking through dunes to designated walkways.
- Revegetate areas of bare sand and sparse vegetation with native species.
- Remove invasive species and revegetate with native species.

Notes

The mushroom observed at this site is likely in the genus Astraeus – the false earthstars. They are often called the **"Barometer Earthster"** as the rays of the star open and close based on the humidity.

Figure 4: Earthstar Mushroom

Resources

- GoBotany – Native Plant Trust: https://gobotany.nativeplanttrust.org
- NH Comprehensive Invasive Plant list: https://www.agriculture.nh.gov/publications-forms/documents/nh-invasive-plant-list.pdf
- NH Guide to Upland Invasive Species: https://www.agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf
- Planting Guide for Tidal Shoreline Erosion Management in New Hampshire (beach and dune sections): https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- UNH Extension resources on invasive species: https://extension.unh.edu/natural-resources/forests-trees/invasive-species

Appendix III: Dune Walkway Matrix

The Dune Walkway Matrix serves as a practical tool to help identify, prioritize, and plan improvements for the dune walkways based on observed physical and environmental conditions. The following information is included in the matrix:

- Observed issues and challenges (e.g., accessibility gaps, vegetation loss, structural instability).
- The impacted walkways for each observed issue.
- Recommendations for potential short-term and long-term actions to address each issue, including maintenance, design changes, community stewardship and restoration opportunities.

The matrix is designed to support informed decision-making by the Town of Seabrook and its partners by helping prioritize which walkways to address. While the final prioritization will ultimately depend on the Town's specific goals, funding, and capacity, the matrix offers a practical starting point. To guide this process, the following section provides examples of how the town might prioritize walkway improvements based on common conditions and challenges identified during the assessment.

Example 1: Prioritizing Walkways with Multiple Overlapping Issues

One approach to prioritization is to focus on walkways that exhibit multiple overlapping issues, as addressing these concerns may yield the most comprehensive benefits.

The walkways at Methuen Street, Nashua Street, and Tyngsboro Street appear across the widest range of "observed issue" categories in the matrix, each flagged for issues such as:

  - Slippery dune slopes
  - Missing/warped boards
  - Overgrown vegetation limiting walkway width
  - Sparse vegetation
  - Invasive species
  - Foot traffic impacts
  - Bench-related dune damage
  - Additional pathways through dunes

The combination of structural and ecological challenges at these locations indicates they are strong candidates for near-term improvements to improve public safety, enhance accessibility, and support dune health.

Example 2: Prioritizing Walkways with Accessibility Issues

Another strategy is to prioritize walkways with known accessibility challenges that limit safe and equitable beach access. If accessibility is the primary focus for prioritization, consider addressing walkways that exhibit the following:

- Boardwalks that end before the beach creating a difficult-to-navigate sandy gap (11 walkways)

- Accumulation of excess sand on walking surface (13 walkways)
- Encroaching sand and vegetation, reducing safe passage (3 walkways)
- Slippery slopes and lack of handrails (6 and 4 walkways, respectively)

These combined conditions indicate that the walkways at ***Andover, Groveland, Merrimack, Methuen, and Nashua Street*** may be strong candidates for near-term accessibility improvements.

Example 3: Prioritizing Walkways with Ecological Restoration Needs

If ecological restoration is the primary focus and priority, consider addressing walkways that exhibit the following:

- Sparse dune vegetation from foot traffic or dune vegetation die-off (18 walkways)
- Invasive species (14 walkways)
- Foot traffic to benches is degrading dune systems (9 walkways)

The Amesbury, Andover, Hudson, Merrimack, Methuen, New Hampshire Street and Newbury Street walkways appear in each of the three above categories, suggesting the need for targeted restoration actions such as native plantings, invasive species management, and pathway stabilization to protect dune health at these locations.

Example 4: Prioritizing Walkways with Safety Hazards

If the priority is to address walkways presenting safety concerns, consider addressing walkways that exhibit the following:

- Missing, loose, or warped boards (8 walkways)
- Tilting/unstable walkways (3 walkways)
- Slippery slopes (6 walkways)

The Lowell, Merrimack, and Tyngsboro Street walkways appear across each of these categories, potentially making them good candidates for near-term repairs to enhance pedestrian safety.

SEABROOK DUNE WALKWAY MATRIX

Observed Issue	Impacted Walkways	Potential Actions	
		Near term (0-5 years)	Long-Term (5+ years)
Sparsely vegetated dune areas adjacent to walkways, either created by foot traffic or dune vegetation die-off	**18 out of 18 walkways** Amesbury, Andover, Ashland, Chelmsford, Dracut, Groveland, Haverhill, Hooksett, Hudson, Lawrence, Lowell, Merrimack, Methuen, Nashua, New Hampshire, Newbury, Tilton, Tyngsboro	Revegetate areas of bare sand and sparse vegetation with native sand dune species, with a focus on the large, disturbed areas. This is a prime activity for a walkway stewardship program or could be led by interested residents in coordination with partners such as UNH Extension and the Coastal Conservation Coordinator. **Note**: Consult guidance for replanting dune die-off areas where it is suspected (Appendix IV)	If a stewardship program is established, consider expanding it to include routine monitoring of dune vegetation. It is also recommended to connect with other entities, such as UNH Cooperative Extension, to learn about other potential dune monitoring efforts.
Invasive plant species on the landward side of the walkway, most often near the entrance.	**14 out of 18 walkways** Amesbury, Andover, Chelmsford, Dracut, Groveland, Hudson, Lawrence, Lowell, Merrimack, Methuen, Nashua, New Hampshire, Newbury, Tyngsboro	Collaborate with partners, such as UNH Extension, SHEA, and Coastal Conservation Coordinator, to develop virtual or in-person training sessions on invasive species identification and best practices for removal.	Establish a walkway stewardship program to support ongoing efforts to control invasive species. Consider recruiting additional volunteers through platforms like Nature Groupie to assist with removal work sessions. Follow up removal activities by planting native species to help restore the area and prevent the reestablishment of invasive plants.
An accumulation of excess sand is encroaching onto the lower section of the walkway, impacting accessibility.	**13 out of 18 walkways** Amesbury, Andover, Andover, Ashland, Chelmsford, Dracut, Groveland, Hooksett, Lawrence, Lowell, Merrimack, Methuen, Tilton	● Remove excess sand from the walkway surface and redistribute it within the dune system. Perform at the beginning of each summer season. ● Remove Mobi Mats from the seaward end each winter to allow natural sand movement. Reinstall them in early summer on top of the accumulated sand	Establish a walkway stewardship program to complement existing local efforts, promote community engagement, and ensure consistent maintenance and care of the pathway.

Observed Issue	Impacted Walkways	Potential Actions	
		Near term (0-5 years)	Long-Term (5+ years)
The existing boardwalk terminates before reaching the sandy beach area, leaving a gap. This sandy portion is more challenging to traverse and may impact accessibility.	**11 out of 18 walkways** Amesbury, Andover, Chelmsford, Dracut, Hudson, Lowell, Methuen, Nashua, New Hampshire, Tilton, Tyngsboro	Install a Mobi Mat or similar ADA-compliant beach access mat at the end of the walkway to improve accessibility.	Evaluate and consider alternative walkway designs that allow for the natural dune dynamics (i.e., accumulation and erosion of sand).
Foot traffic to the benches is damaging or impeding the growth of the surrounding dune vegetation.	**9 out of 18 walkways** Amesbury, Andover, Haverhill, Hooksett, Hudson, Merrimack, Methuen, New Hampshire, Newbury	• Relocate benches within the dune system (>3' away from the walkway) to be adjacent to the walkway • On the seaward side, consider placing benches at a 45-degree angle facing the ocean. This orientation allows dune grass to grow undisturbed behind the benches, minimizing the impact on vegetation while preserving the ocean views.	Develop new bench installation guidelines that outline desired materials and placement (i.e., angle and distance from the walkway).
The creation of additional pathways across the dunes weakens the integrity of the dune system.	**9 out of 18 walkways** Groveland, Hudson, Lawrence, Lowell, Merrimack, Methuen, Nashua, New Hampshire, Tyngsboro	• Abandon additional pathways and allow to revegetate. • Create perpendicular paths along the eastern edges of properties to connect to municipal walkways.	If a stewardship program is established, consider expanding to offer property owners support with creating perpendicular pathways and revegetating previous paths across the dune (**Subject to permitting**)
Missing, loose, or warped boards posing tripping hazards	**8 out of 18 walkways** Amesbury, Andover, Groveland, Lowell, Merrimack, Methuen, Nashua, Tyngsboro	Inspect and repair or replace loose or warped planks to maintain a safe, even walking surface.	• Develop a proactive boardwalk inspection and replacement program using more durable, warp-resistant materials.

Observed Issue	Impacted Walkways	Potential Actions	
		Near term (0-5 years)	Long-Term (5+ years)
The slope on both sides of the dune crest can become slippery, especially in wet or sandy conditions.	**6 out of 18 walkways** Andover, Groveland, Lawrence, Merrimack, Nashua, Tyngsboro	On either side of the dune crest (steepest sections), apply anti-slip tape or similar material to planks to improve traction.	• When boards are replaced, consider a new board material with built-in anti-slip properties • Evaluate and consider alternative walkway designs that reduce walkway incline/decline over the dune (**Subject to permitting**)
The seaward end of the walkway is much wider than the walkway, resulting in less vegetation and increased susceptibility to flooding from strong waves and storm surge	**5 out of 18 walkways** Ashland, Haverhill, Hooksett, New Hampshire, Tilton	Fence off areas to delineate the path and vegetate with native dune species	Orient the seaward end of the pathway away from the wind and wave influence
Additional support features are needed to improve pedestrian stability	**4 out of 18 walkways** Lawrence, Merrimack, Nashua, Tyngsboro	Evaluate the potential for installing handrails along the curved section of the walkway to provide additional stability.	Integrate handrails into future boardwalk redesigns or upgrades, especially in high-traffic or exposed areas.
Overgrown vegetation is encroaching onto the walkway, significantly narrowing the path and hindering the passage for pedestrians.	**3 out of 18 walkways** Groveland, Methuen, Nashua	Conduct regular maintenance to remove accumulated sand and vegetation from the boardwalk edges to preserve its full width and functionality.	• Establish a walkway stewardship program to complement existing local efforts, promote community engagement, and ensure consistent maintenance and care of the walkway. • Evaluate and consider alternative walkway designs that allow for the vegetation to grow underneath the walkway
Sections of the walkway are tilting or curving, resulting in an uneven and/or unstable walking surface	**3 out of 18 walkways** Chelmsford, Lowell, Tyngsboro	• Conduct a structural inspection to determine the cause of the boardwalk shift. • Reinforce or realign the boardwalk to stabilize the boardwalk and prevent further movement.	Consider complete section realignment or redesign to ensure long-term stability, especially in areas with persistent shifting. (**Subject to permitting**)

Observed Issue	Impacted Walkways	Potential Actions	
		Near term (0-5 years)	Long-Term (5+ years)
Small Dune system that needs support to grow and expand	**3 out of 18 walkways** Hooksett, Tilton, Ashland	Restore sand dune to create a narrower path on the seaward end of the walkway.	When dunes are restored, consider orienting the walkway away from the dominant wind and wave directions
Inconsistent walkway materials	**1 out of 18 walkways** Methuen	Assess replacing the mismatched section with materials consistent with the rest of the walkway to improve durability and to restore a continuous, stable walking surface.	Create design standards for material use during upgrades to improve aesthetics, safety, and durability.
Survey results and project workshop discussions indicate that community members are interested in dune health and are looking for more opportunities to learn about dune threats and sustainability.		Local groups, such as the Civic Association, with support from UNH Extension, SHEA, or RPC, could host community talks and guided site walks to engage residents and raise awareness.	Consider a community stewardship program that expands beyond the local neighborhoods closest to the walkways to include more community-wide involvement and participation.

Appendix IV: Dune Die-off Fact Sheet

Dune Die-Off

In New England, **beachgrass (*Ammophila breviligulata*)** is the most common plant found in sand dunes. Beachgrass and other native plant species play important roles in providing habitat, trapping sand to build dunes and nourish beaches, and stabilizing dunes to provide storm protection.

A phenomenon known as **die-off** can occur where large areas of vegetation loss are observed that do not appear to have other causes. Die-off largely affects beachgrass, but can affect other dune species too. Given the critical role these plants play in sustaining dune systems, researchers have been exploring the causes of die-off and solutions for mitigating it.

Suspected Causes of Die-Off

Research in the 1990s out of Delaware indicated that parasitic nematodes were the likely cause of beachgrass die-off.[1] Nematodes are unsegmented worms, most of which are microscopic, that are an important part of soil food webs. Nematodes generally play beneficial roles, such as in nutrient cycling, although some of them are harmful. In Delaware die-off areas, researchers found high densities of nematodes that were known to cause root damage and limit growth in other grassland habitats. They concluded that parasitic nematodes were the likely cause of dune vegetation die-off. Recent research out of the University of New Hampshire used genetic tools to examine die-off in New England dunes.[2] Results suggested that die-off is due to a combination of infections by both **nematodes and fungi**.

How to Spot Die-Off

The aboveground growth of beachgrass and other dune species dies each year and this is a typical and expected process. Die-off events can often be distinguished by **rapid vegetation loss** without any other obvious cause. The vegetation loss tends to spread out in a circular pattern and it is typically, although not exclusively, found on the dune crest or back side of the seaward dune. A quick test is to tug the plants and if they come out of the ground very easily because they have no root system, it may be a clue of die-off.

Replanting Die-Off Areas

Recent research out of the **University of New Hampshire** suggests that applying lime and slow-release fertilizer when planting may help restore die-off areas.[3] Soil in die-off areas can be acidic, so the addition of lime can raise the pH of the soil, resulting in more favorable growing conditions. The addition of fertilizer can increase the productivity and vigor of plants, stimulate growth, and make them more resistant to infection. UNH researchers found that the addition of pulverized dolomitic limestone (21.6% Calcium and 10% Magnesium) at a rate of 2.35 pounds per 100 square feet and slow release fertilizer (N14:P14:K14) at a rate of 1 pound per 100 square feet replanted in die-off areas resulted in more live plants, greater relative abundance of beachgrass, and higher plant cover than areas that did not receive the combined **lime-fertilizer treatment**. The combination of lime and fertilizer treatment when planting dune vegetation may help in the restoration of dune die-off areas. If you are considering using this approach, please consult state and municipal wetlands rules to determine if these amendments are allowed prior to implementation.

For quesitons about dune die-off, contact:

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Sea Grant NEW HAMPSHIRE

NOAA National Oceanic and Atmospheric Administration U.S. Department of Commerce

University of New Hampshire

Appendix V. Public Survey Results

Seabrook Dune Walkway Survey Summary

October 2024

Prepared by the Rockingham Planning Commission in partnership with the Town of Seabrook, the Seabrook Hamptons Estuary Alliance and University of New Hampshire Sea Grant. This project was funded, in part, by NOAA's Office for Coastal Management Under the Coastal Zone Management Act in Conjunction with the NH Department of Environmental Services Coastal Program

SEABROOK-HAMPTONS ESTUARY ALLIANCE

ROCKINGHAM PLANNING COMMISSION
theRPC.org

NEW HAMPSHIRE COASTAL PROGRAM

NHDES

NOAA

Acknowledgements

The Rockingham Planning Commission (RPC), Seabrook Hamptons Estuary Alliance (SHEA), and UNH Sea Grant (UNHSG) extend their sincere gratitude to all those who contributed to the success of this survey and report. The active participation of Seabrook residents—who attended public meetings, provided valuable input, and completed the survey—was essential to strengthening and localizing the findings. This community engagement has significantly enhanced the relevance and accuracy of the outcomes presented in this summary.

Executive Summary

Project Background

The Rockingham Planning Commission (RPC), Seabrook Hamptons Estuary Alliance (SHEA) and UNH Sea Grant, with the help of Seabrook town staff, board and committee members and interested stakeholders, have been working together since early 2023 to assess the condition of Seabrook's municipal dune walkways, which connect Ocean Drive to the town's beaches, crossing over critical dune systems. These walkways, particularly in the northern part of Seabrook Beach, serve as the only public access points from the streets to the beach.

Over time, concerns have been raised by residents and visitors regarding the deteriorating state of some walkways, which may pose safety risks. There has also been increasing awareness about the potential negative effects of walkway design and usage on the health and integrity of the dunes. This assessment aims to address these concerns while preserving the ecological value of Seabrook’s dunes and ensuring public safety and accessibility.

Coastal Resilience Grant

In response to these concerns, the Town of Seabrook, in partnership with RPC, SHEA and UNH Sea Grant, applied for and was awarded a Coastal Resilience Grant from the New Hampshire Department of Environmental Services’ Coastal Program. This grant provides the resources necessary to evaluate Seabrook’s existing dune walkways, identifying opportunities to improve public safety and accessibility while ensuring that the ecological integrity of the dunes is maintained. The evaluation process focuses on balancing the need for public access with the protection and preservation of these vital coastal systems.

Public Survey

From July to October 2024, the RPC, SHEA, NHSG (here forward referred to as the Project Team) conducted a public survey to gather feedback and understand local perspectives regarding Seabrook’s dunes and walkways. The survey was designed to assess what residents value about these natural resources, the challenges they face when using the walkways, and their ideas for improving public access and preserving the resilience of the dune systems.

To encourage widespread participation, the survey was distributed through a combination of outreach methods, including postcard distribution, online promotions, and direct emails to residents. In total, 309 individuals responded to the survey, generating nearly 6,000 individual responses to specific questions and 262 additional open-ended comments.

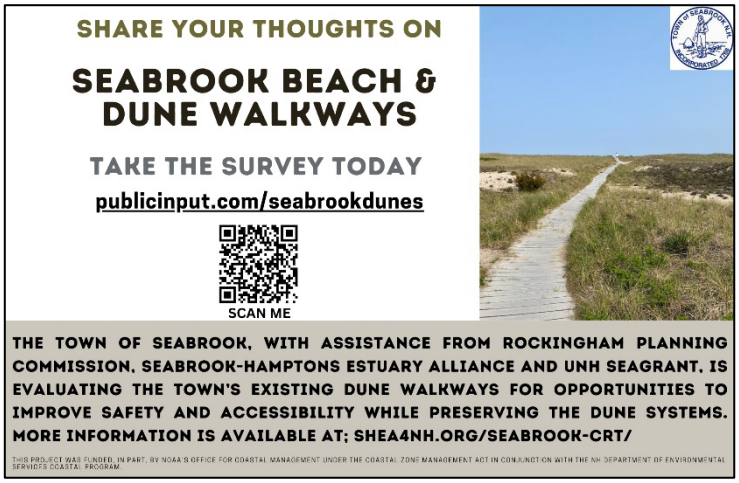
Survey Purpose

The primary purpose of this survey was to capture public input to inform the ongoing evaluation of the dune walkways. By surveying residents and visitors, the project team was able to identify key themes around what people value most about the dunes, what challenges they face when using the walkways, and what improvements they hope to see. Survey responses also helped highlight broader concerns regarding the preservation of the Seabrook Dune system and its resilience to coastal erosion and storm surges.

Respondents were encouraged to share their concerns and priorities through both multiple-choice and open-ended questions. The responses collected from this survey will help guide recommendations for improving the walkways and ensuring the continued health of the dunes.

Survey Distribution Process

The survey development process began in early 2024, with collaborative efforts from Seabrook staff, board and committee members and interested residents to ensure clarity and accessibility in the design of the survey. Questions were refined to make sure they were clear and understandable for the target audience. The Rockingham Planning Commission played a key role in testing the survey software to ensure it was user-friendly and accessible to all participants.



The survey was officially launched in early July, and outreach efforts were made to engage as many Seabrook residents as possible. The survey link was distributed through the town's website, the Seabrook Beach Civic Association, Facebook, and email lists. Postcards with the survey link were also distributed at various public locations around town, including town offices, ensuring that the survey reached a wide audience.

Through these combined efforts, the Project Team was able to gather meaningful feedback that will play a crucial role in shaping future recommendations for improving the dune walkways and preserving the ecological integrity of Seabrook's coastal environments.

Survey Results

A total of 309 individuals participated in the survey, providing 5,990 responses across all questions and contributing 262 written comments. As all survey questions were optional, not every respondent answered every question. Therefore, the percentages presented are based solely on the individuals who responded to each specific question. All survey responses were submitted anonymously. Additionally, 182 respondents voluntarily provided their contact information to receive updates on the survey results and future developments related to the Dune Public Walkways project.

PARTICIPANTS
309

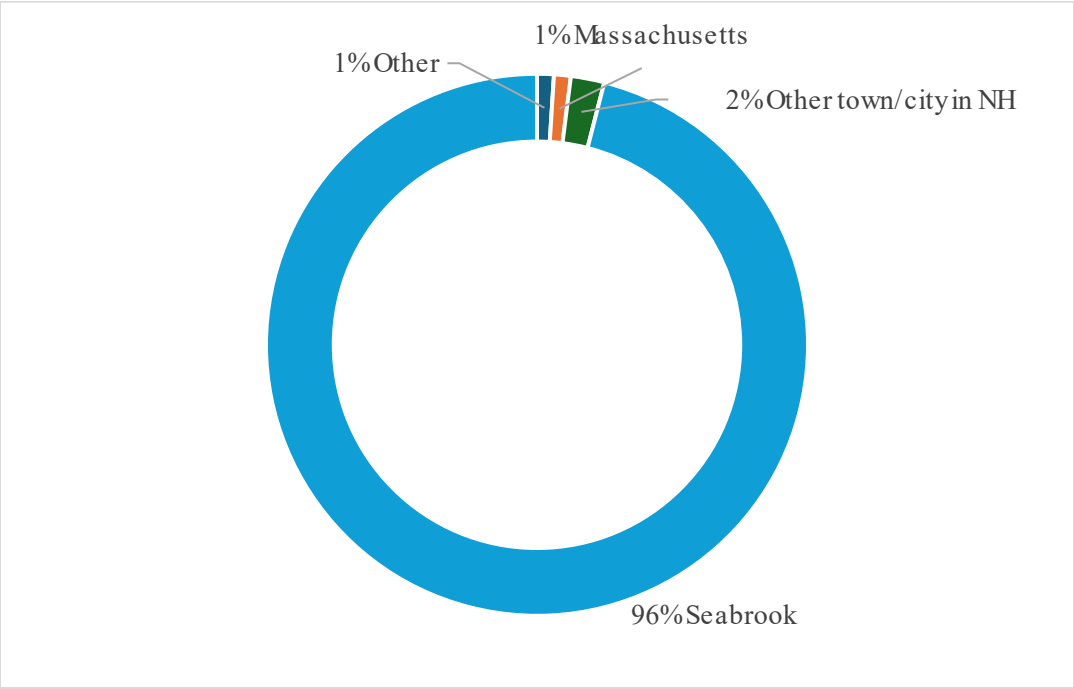
RESPONSES
5,990

COMMENTS
262

SUBSCRIBERS
182

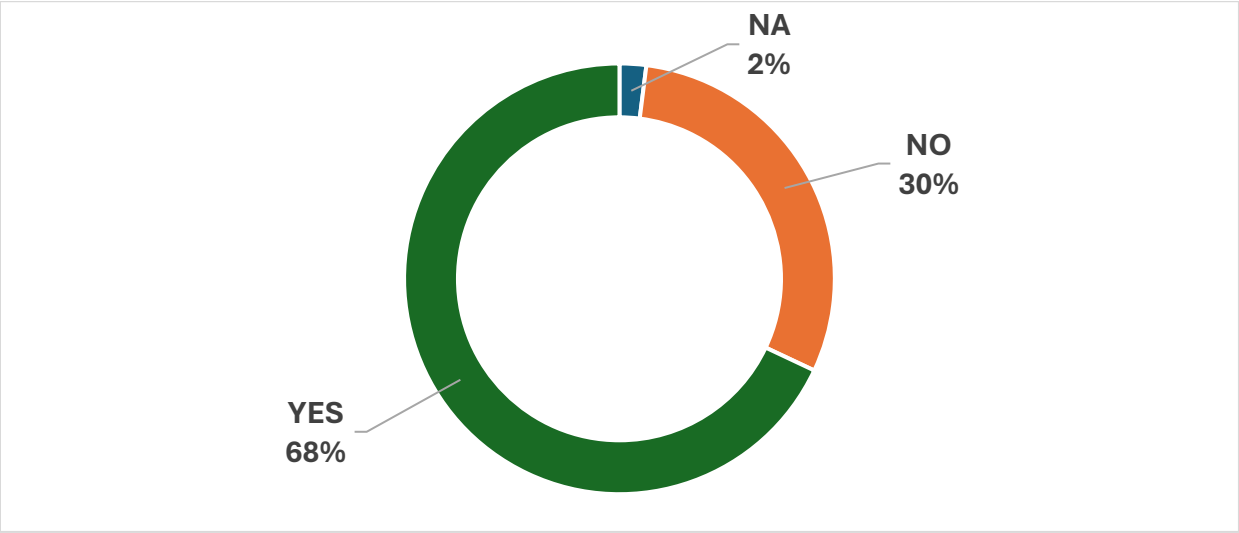
Question 1: Where do you live? (Total Responses: 305)

Of the 305 respondents who chose to answer this question, 292 respondents (96%) indicated they live in Seabrook.



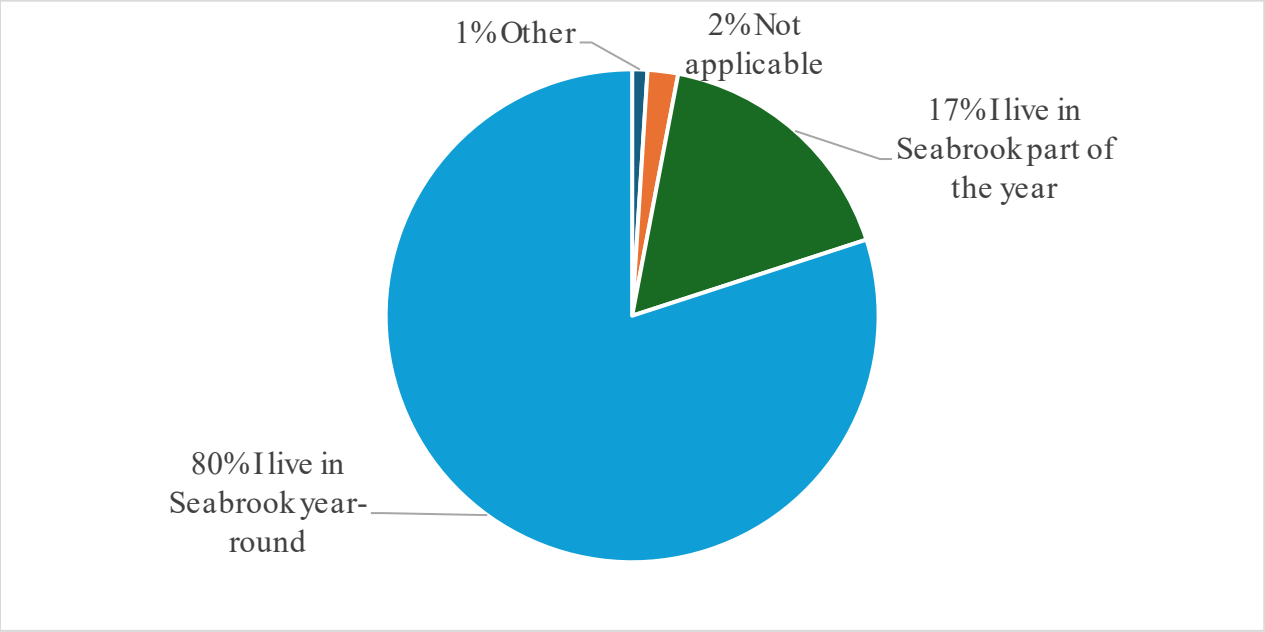
Question 2. If you live in Seabrook, do you live at Seabrook Beach? (Total responses: 303)

Of the 303 respondents who answered this question, 205 respondents (63%) indicated that they live at Seabrook Beach. 92 respondents (30%) indicated that they live in Seabrook, but not within the beach district.



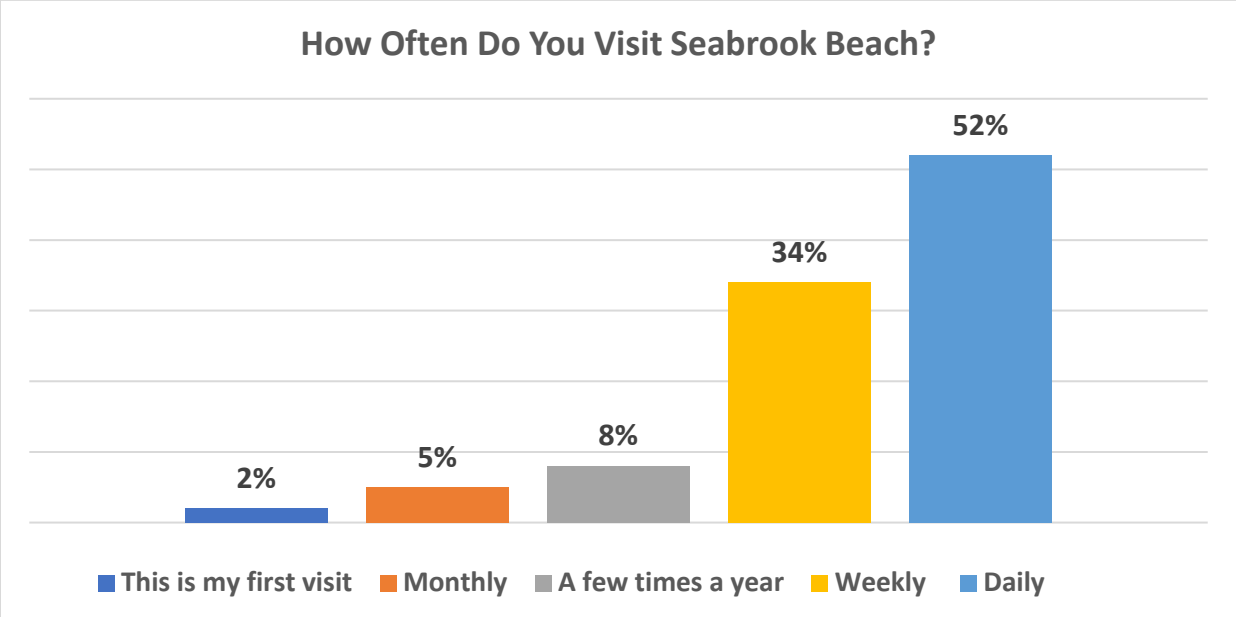
Question 3. If you are a Seabrook resident, which of the following best describes you? (Total Responses: 277)

Of the 277 respondents who answered this question, 222 (80%) indicated that they live in Seabrook year-round. 48 respondents (17%) indicated that they live in Seabrook for part of the year.



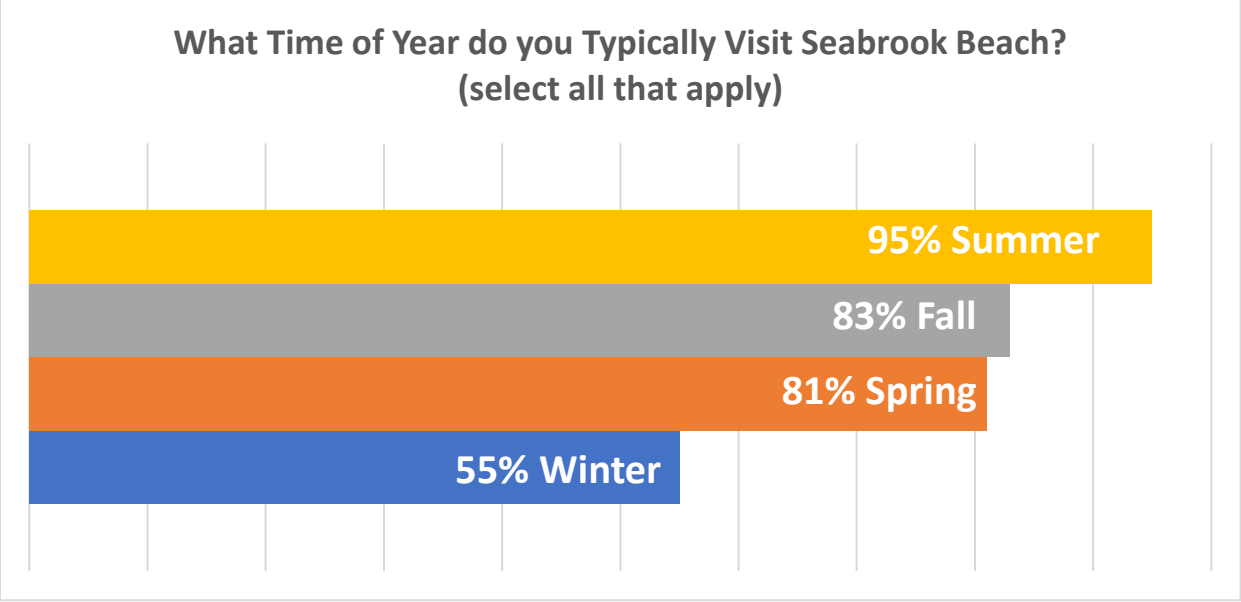
Question 4: How often do you visit Seabrook Beach? (Total responses: 289)

Out of the 289 respondents who answered this question, 52% (150 individuals) reported visiting Seabrook Beach daily, while 34% (97 individuals) indicated they visit weekly. Additionally, 8% (23 respondents) visit a few times a year, 5% (14 respondents) visit monthly, and 2% (5 respondents) took the survey after their first visit to Seabrook Beach.



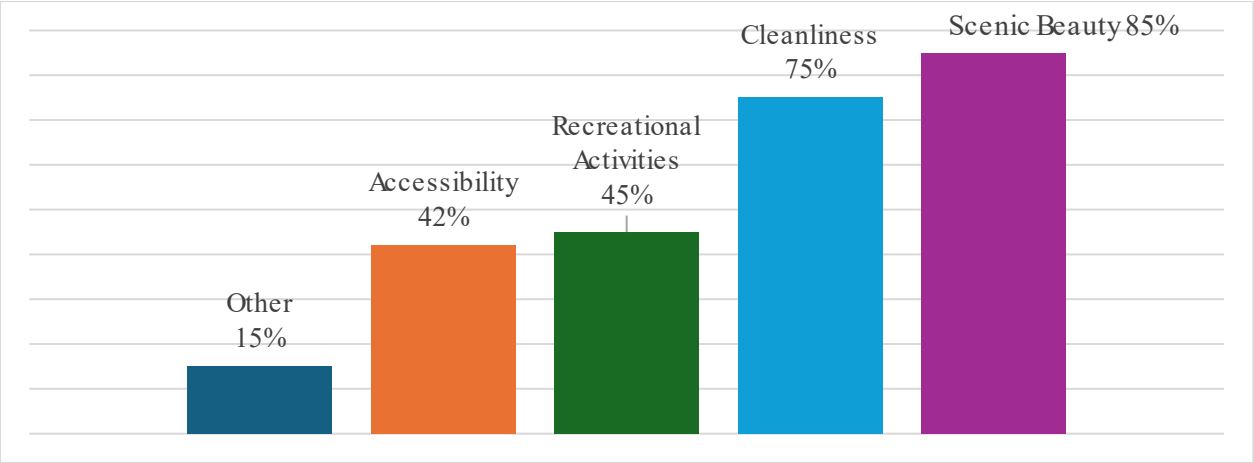
Question 5: What time of year do you typically visit Seabrook Beach? Select all that apply. (Total responses: 257)

Of the 271 respondents who answered this question, 257 respondents (95%) chose Summer, 225 respondents (83%) chose Fall, 219 respondents (81%) chose Spring, and 148 respondents (55%) chose Winter.



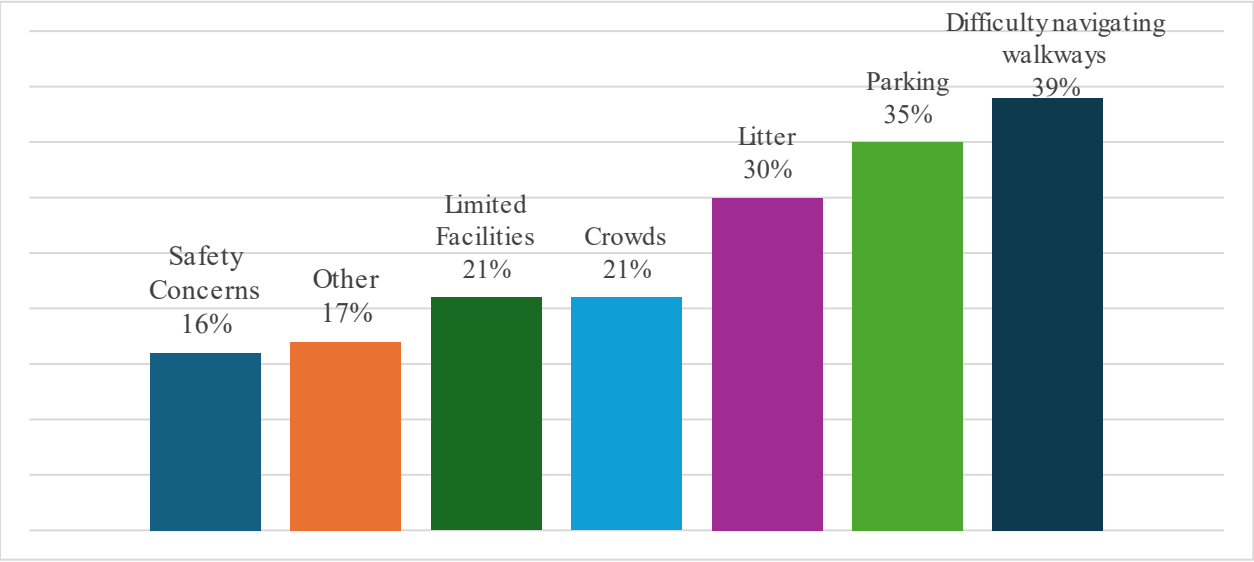
Question 6: What do you like most about Seabrook Beach? Select all that apply. (Total Responses: 274).

Most respondents (85%) identified Seabrook Beach's scenic beauty as the aspect they enjoy most, followed by its cleanliness (75%), recreational activities (45%), accessibility (42%), and other factors (40%). Among the 40 respondents (15%) who selected "other," many highlighted the perceived benefits of property ownership, such as private access, as what they value most about the beach.



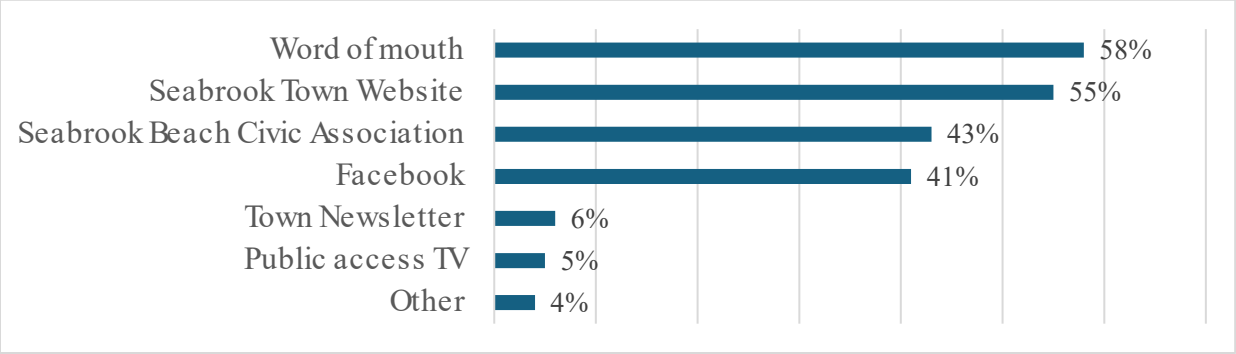
Question 7: Have you experienced any of the following issues or challenges at Seabrook Beach? Select all that apply. (Total Responses: 255)

Among the 255 respondents who answered this question, the most commonly reported challenges at Seabrook Beach were difficulty navigating the walkways (39%), parking issues (36%), and litter (31%). Other concerns included crowds (23%), limited facilities such as bathrooms and changing rooms (22%), and safety concerns (15%). Additionally, 18% of respondents identified other issues, including violations of dog leash and waste rules, lack of lifeguards, fireworks disturbances, and a general lack of public education and awareness about dune protection.

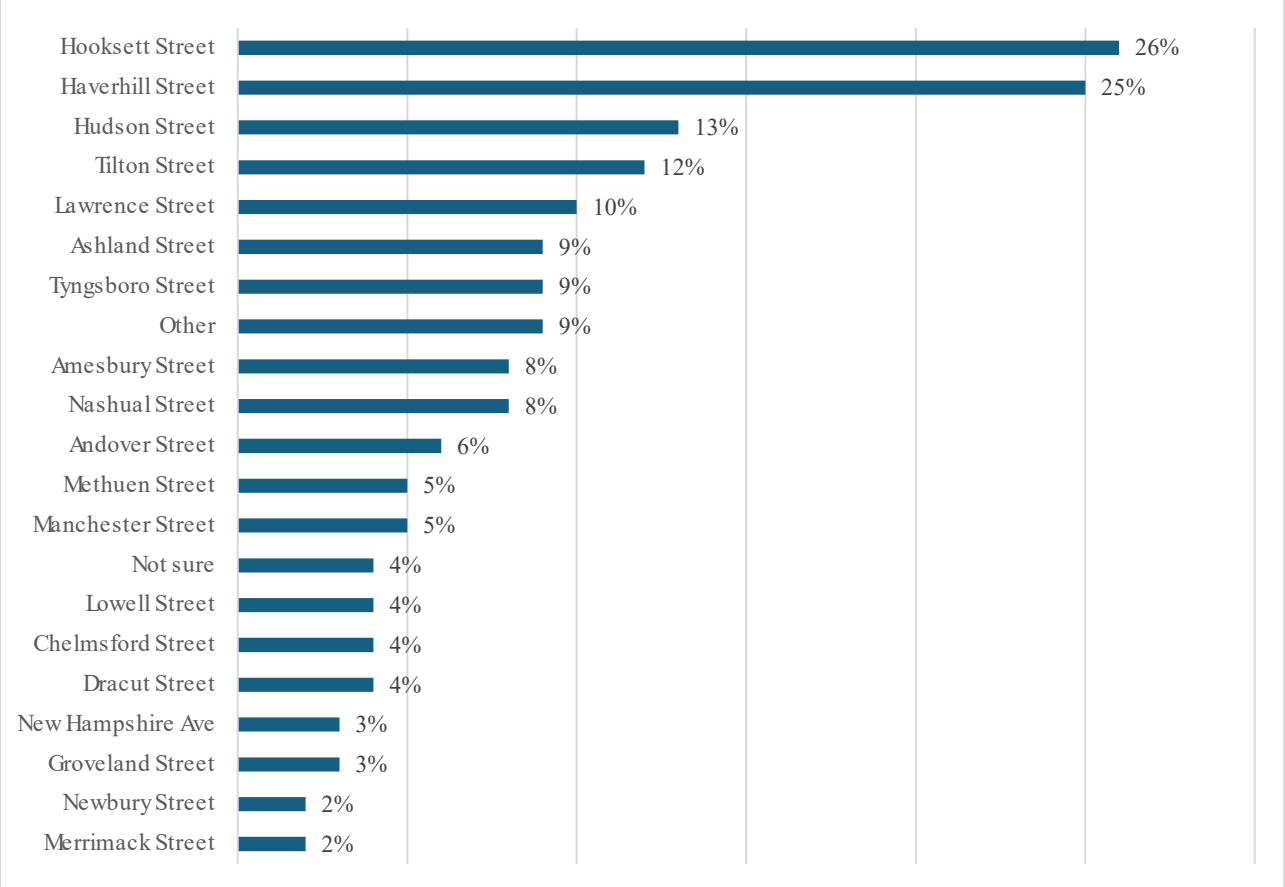


Question 8: Where do you find information on Seabrook Beach? Select all that apply. (Total Responses: 265)

Of the 265 respondents who answered this question, the majority (58%) indicated they primarily get their information about Seabrook Beach through word of mouth. Other common sources included the Seabrook Town website (55%), the Seabrook Beach Civic Association (43%), and Facebook (41%). Fewer respondents relied on the town newsletter (6%) or public access TV (5%). Additionally, 4% of respondents mentioned other communication methods, such as Town Hall meetings and the digital platform NextDoor.

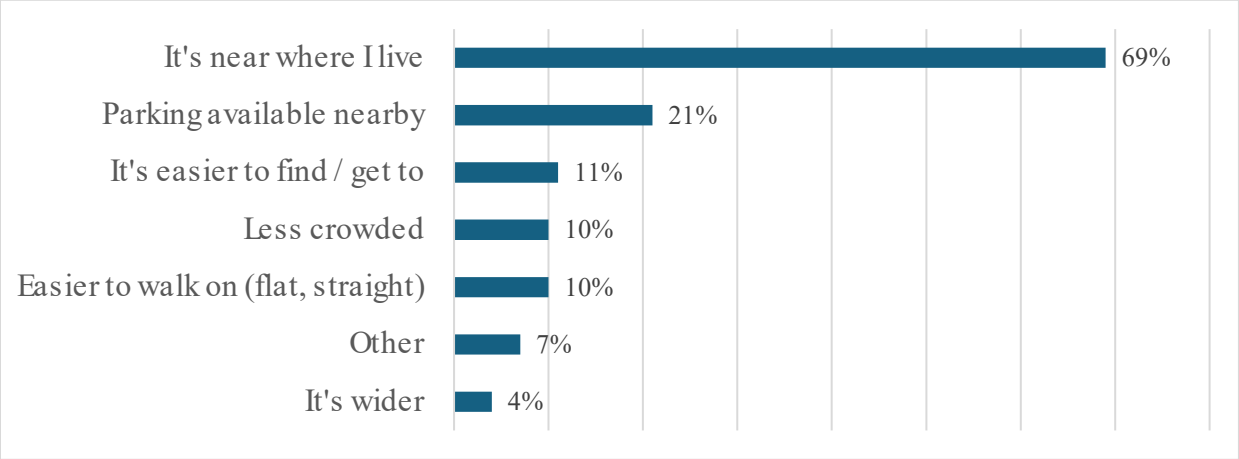


Question 9: From which street(s) or walkway(s) do you normally access Seabrook Beach? Select all that apply. (Total Responses: 272)



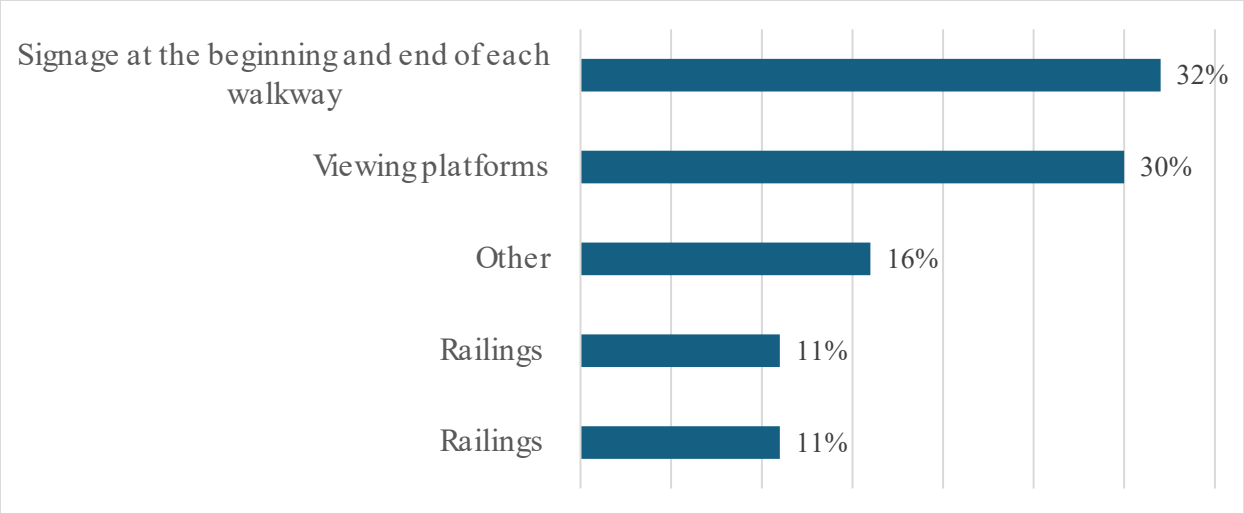
Question 10: Why do you use these Streets or Walkways? Select all that apply. (Total Responses: 274)

Of the 274 respondents who answered this question, the majority (69%) indicated they use the streets or walkways near where they live to access Seabrook Beach. A smaller group (21%) chose their route based on the availability of nearby parking. Ease of navigation, less crowding, and easier walking surfaces were factors for around 10-11% of respondents. These results suggest that proximity to residence and parking availability are the primary factors influencing the streets and walkways chosen by respondents to access Seabrook Beach.



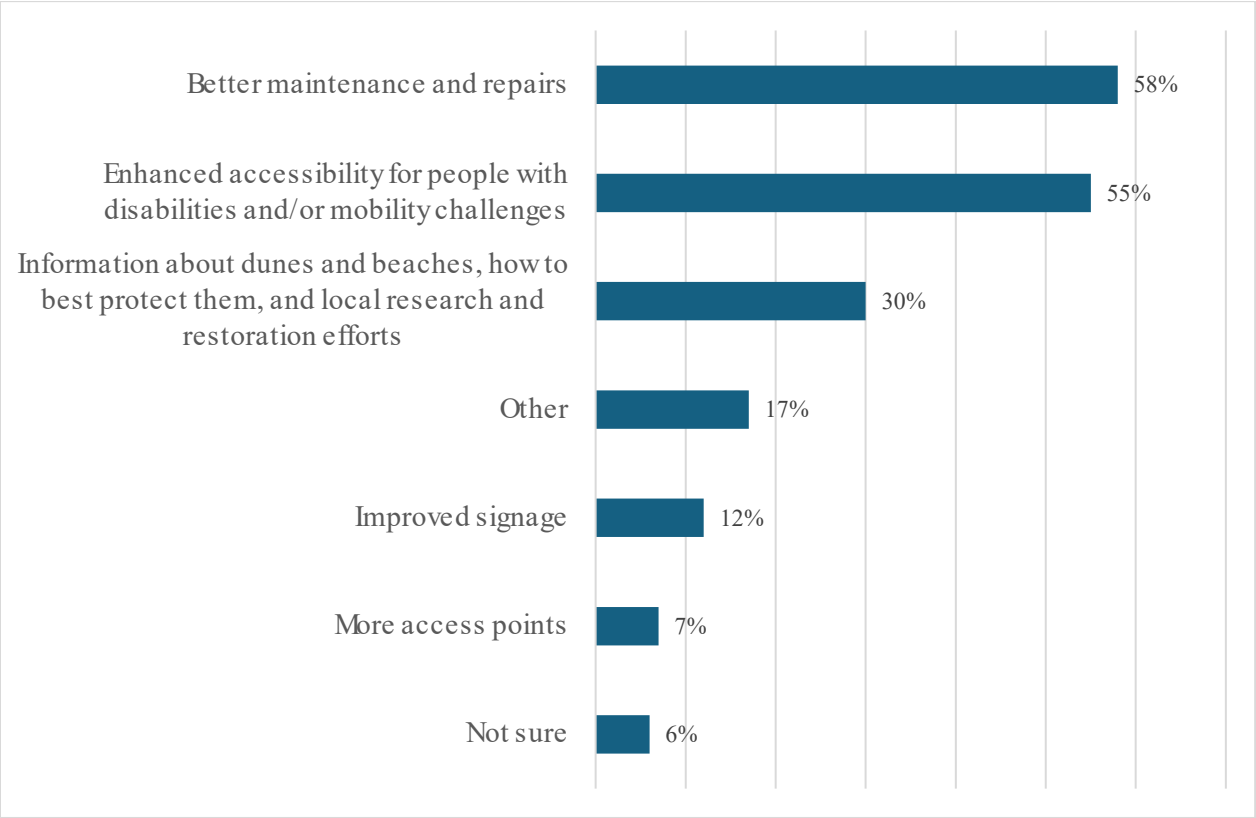
Question 11: Which of the following features do you like most about the municipal walkways? Select all that apply. (Not all the walkways have these features.) (Total Responses: 244)

Of the 244 respondents who answered this question, the most popular feature of the municipal walkways was benches, with 74% of respondents indicating they liked them. Viewing platforms followed, with 30% of respondents mentioning them, while 11% preferred railings. Signage at the beginning and end of each walkway was noted by 32% of respondents. Additionally, 16% of respondents appreciated other accessibility features such as Mobi Mats and provided recommendations for improvements, including making signage more visible at night and reinstalling benches, especially those for handicap and disabled access.



Question 12: What improvements would you like to see for the municipal dune walkways? Select all that apply. (Total Responses: 260)

Of the 260 individuals who answered this question, most (58%) indicated they'd like to see better maintenance and repairs of the municipal walkways followed by enhanced accessibility for people with disabilities and/or mobility challenges (55%), information on sand dunes and beaches, how best to protect them and local research and restoration efforts (30%), other (17%), improved signage (12%), more access points (7%) and not sure (6%).



Question 13: Do you have any other questions or concerns about the municipal dune walkways?

The following synthesizes the comments received in question 12 as well as the 100 comments received in response to this question, #13. All comments can be found in Appendix A.

1. **Positive Feedback:**
   - **Mobi Mats:** Highly appreciated for improving accessibility; requests for extended wider mats at all access points.
   - **General Maintenance:** Many residents express gratitude for the beauty and upkeep of the beach.
   - **Beach Civic Association:** Commendation for the association's efforts, including flower planters.

2. **Concerns and Recommendations:**

A. Walkway Conditions and Safety:
   a. Walkways are warped, uneven, and slippery, causing tripping hazards.
   b. Boards are reported as loose, broken, and improperly installed.
   c. Some walkways, like Lawrence Street, are too steep, lack handrails, and fail to meet ADA requirements.
   d. Deferred maintenance plans for ongoing repairs and improvements are urgently requested.

B. Accessibility:
   a. Expanded use of Mobi Mats is critical to support people with mobility issues.
   b. ADA compliance is lacking at many access points, with calls for additional handicapped parking and better pathways.

C. Parking Issues:
   a. Beachfront homeowners are increasing driveway widths, reducing public parking availability.
   b. Residents report illegal parking, misuse of placards, and lack of enforcement.
   c. Suggestions include alternating parking sides annually and clearer markings for legal parking.

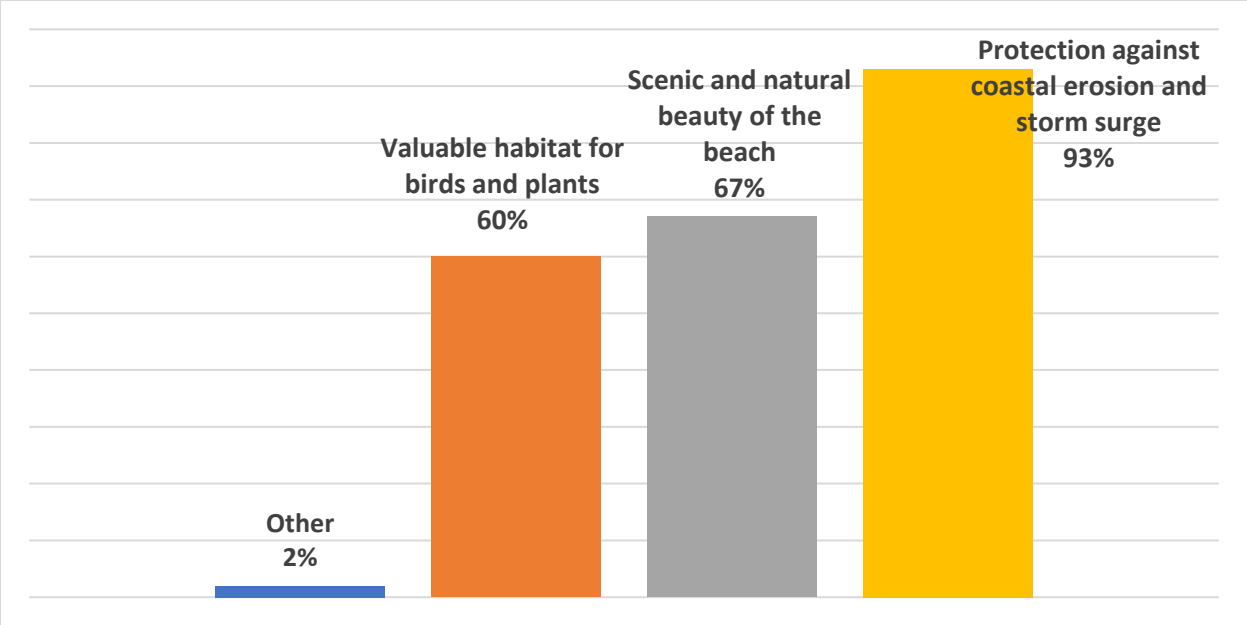
D. Environmental Concerns:
   a. Overgrowth of dune grass is narrowing walkways and extending toward the water, raising concerns about beach access and erosion.
   b. Unauthorized paths and activities in the dunes (e.g., private walkways, mowing dune grass) are seen as threats to their viability and protective function.
   c. Recommendations include educational outreach on erosion, dune preservation, and the environmental impact of misuse.

E. General Beach Management:
   a. Residents desire more trash pickup, dog waste stations, and enforcement of leash laws.
   b. Concerns about excessive signage clutter and lack of rule enforcement.
   c. Desire for better communication about town projects, grants, and studies related to beach preservation.

F. Specific Issues:
   a. Residents point out specific walkways needing attention, such as Amesbury, Tilton, and Dracut streets.
   b. Requests for more patrolling and ticketing to curb unauthorized vehicle use and illegal parking.

Question 14: Sand dunes provide many environmental and community benefits. Which of the following benefits do you think are most important? Select all that apply.

Of the 236 respondents who answered this question, the most commonly cited benefit was protection against coastal erosion and storm surge, with 92% of respondents emphasizing its importance. A majority of 66% of respondents also valued the scenic and natural beauty of the beach. Additionally, 59% of respondents recognized the dunes as a valuable habitat for birds and plants, highlighting their ecological significance.



Question 15: Do you have any other questions or concerns about the sand dunes in Seabrook?

The following synthesizes the comments received in Question 14 as well as the 52 comments received with this question #15.

1. **Invasive Species and Non-Native Vegetation**
    - **Invasive Plants:** Participants noted the spread of invasive plants like shrubs and non-native trees, which threaten the natural ecosystem of the dunes.
    - **Desire for Native Plant Restoration:** There is strong support for increasing biodiversity by planting native species and removing non-native vegetation.
2. **Dune Protection and Misuse**
    - **Trampling and Pathways:** Repeated concerns about people walking through and damaging the dunes, often creating unauthorized pathways. Residents and renters are called out for these actions.
    - **Private Pathways:** Many highlighted issues with oceanfront property owners building walkways, patios, or cement slabs within the dunes, contributing to erosion and environmental damage.
3. **Environmental Impacts and Flood Protection**
    - **Erosion and Sea Grass:** Comments reflect a concern that while dune grasses protect against flooding, they are encroaching on the beach, reducing usable space. Some participants want controlled maintenance to prevent further beach shrinkage.
    - **Flooding Concerns:** The dunes are seen as critical barriers against flooding, with calls for increased protection and restoration to mitigate risks to properties and ecosystems.

4. **Behavior and Enforcement Issues**
    - **Trash and Misuse:** Littering in the dunes (e.g., beer cans, water bottles) and behaviors like letting pets run loose or people climbing over the dunes are common frustrations.
    - **Calls for Regulation:** Suggestions to fine violators, enforce rules more strictly, and educate the public about the importance of dunes.
5. **Collaboration and Education**
    - **Public Awareness:** Multiple respondents suggested education initiatives to promote awareness about protecting dunes and maintaining a healthy coastal environment.
    - **Regional Collaboration:** Some proposed sharing dune management strategies between Seabrook, Hampton, and other nearby communities to improve resilience collectively.
6. **Balancing Preservation and Use**
    - **Beach Access vs. Dune Growth:** Several comments point to a perceived conflict between protecting the dunes and preserving public beach access. Concerns about overgrown dunes reducing beach size were prominent.
    - **Public vs. Private Use:** Strong opinions were voiced on prioritizing public access and limiting private modifications that harm the shared environment.
7. **Miscellaneous**
    - **Wildlife Concerns:** Issues like skunk infestations in the dunes and frustration over beach closures for piping plovers were noted.
    - **General Observations:** Some commenters recognized the town's efforts in other areas, such as emergency services and trash removal, but emphasized neglected beach-related responsibilities.

Conclusion & Next Steps

The survey provided valuable insights into the preferences, challenges, and concerns of those who visit Seabrook Beach and utilize its public walkways. With a strong response rate of 309 participants, the results reflect a diverse range of perspectives on the beach's accessibility, environmental health, and the quality of the municipal walkways.

The feedback revealed that visitors appreciate the natural beauty and cleanliness of Seabrook Beach, but they also face several challenges, including crowding, parking issues, and the condition of walkways. Many respondents emphasized the need for better maintenance and improvements to walkways, as well as increased protection for the dunes, which play a crucial role in coastal erosion prevention. Additionally, there was strong support for continued efforts to educate the public on respecting the dunes and preserving the beach's natural habitat.

Furthermore, respondents highlighted the importance of the dunes not only for environmental protection but also for their role in supporting wildlife and enhancing the beach's overall aesthetic

appeal. There was a significant demand for better signage, benches, and other accessibility features on the walkways to improve user experience and ensure that Seabrook Beach remains an inclusive and enjoyable destination for all visitors.

The results of this survey will play a crucial role in informing the ongoing evaluation of the dune walkways, currently being conducted by the Rockingham Planning Commission (RPC), SHEA, and NH Sea Grant. By providing valuable insights into community concerns, preferences, and priorities, these findings will help shape and refine the strategies, recommendations, and proposed solutions that emerge from the assessment process. The survey data will be integrated into a comprehensive analysis that considers both environmental factors and public input, ensuring that the final recommendations align with the needs of the community and the goals of coastal preservation. This collaborative effort will contribute to the development of actionable, sustainable solutions aimed at improving access and protecting the dunes.

The Seabrook Dune Walkway Evaluation is expected to be completed by June 2025. In May, a public workshop will be held to present the findings of the evaluation and discuss the next steps for the town in terms of protecting and enhancing the dunes and dune walkways. This workshop will provide an opportunity for the community to engage with the project team, ask questions, and provide feedback on the proposed recommendations.

To stay updated on the progress of the Seabrook Dune Walkway Evaluation, upcoming events, and other important developments, please visit the project website at: https://shea4nh.org/seabrook-crt/.