



Assateague Island National Seashore Natural Resource Condition Assessment

Maryland, Virginia

Natural Resource Report NPS/ASIS/NRR—2011/405



Assateague Island National Seashore Natural Resource Condition Assessment

Maryland, Virginia

Natural Resource Report NPS/ASIS/NRR—2011/405

Tim Carruthers, Kris Beckert, Bill Dennison, Jane Thomas, Tracey Saxby, Mike Williams
Integration & Application Network
University of Maryland Center for Environmental Science
PO Box 775
Cambridge, MD 21613

Tom Fisher
Horn Point Laboratory
University of Maryland Center for Environmental Science
PO Box 775
Cambridge, MD 21613

Jack Kumer, Courtney Schupp, Brian Sturgis, Carl Zimmerman
Assateague Island National Seashore
National Park Service
7206 National Seashore Lane
Berlin, MD 21811

This document has adapted the Executive Summary of Natural Resource Condition Assessment report that the University of Maryland Center for Environmental Science produced in collaboration with Assateague Island National Seashore staff.

The full 182 pp. report can be accessed via www.ian.umces.edu/press.

ACKNOWLEDGEMENTS

We acknowledge input and comments from many people, and particularly, Jonathan Chase, Debbie Morlock, Tami Pearl, Arty Rodriguez, Eric Sherry, Helen Violi, and Neil Winn from Assateague Island National Seashore, Penelope Pooler, Dennis Skidds, and Sara Stevens from the Northeast Coastal Barrier Network, Inventory and Monitoring Program, John Karish, Peter Sharpe, and Charley Roman from the National Park Service North East Region, and Greg Radcliffe from the University of Maryland Center for Environmental Science.

ON THE COVER

Dune and grassland habitat on Assateague Island.
Photo: NPS ASIS

June 2011

U.S. Department of the Interior
National Park Service
Natural Resource Program Center
Fort Collins, Colorado

BACKGROUND AND CONTEXT

Assateague Island National Seashore, established in 1965, includes 11,571 ha (28,584 acres) of lands and waters in Maryland and 4,813 ha (11,902 acres) of lands and waters in Virginia. Assateague Island also contains protected lands under the jurisdiction of the Maryland Park Service (Assateague State park) and U.S. Fish and Wildlife Service (Chincoteague National Wildlife Refuge). The Seashore receives some two million visitors per year, most of whom are beach day visitors from mid-Atlantic states, but other activities include back country camping, and permitted hunting of deer, upland game, and waterfowl, within season.

An important context for this resource condition assessment, is that barrier islands are naturally dynamic ecosystems, potentially migrating meters on an annual basis, with longshore drift resulting in a continual sand erosion and deposition cycle. Barrier islands are also subject to major changes from storms that cause island overwash, and by major storms, and hurricanes, that can cause island breaching or form new inlets. These dynamic processes create the unique habitats, flora and fauna that are the key features of Assateague Island (including overwash areas, piping plover and seabeach amaranth); however, they also have the potential to dramatically change fundamental aspects of the island.

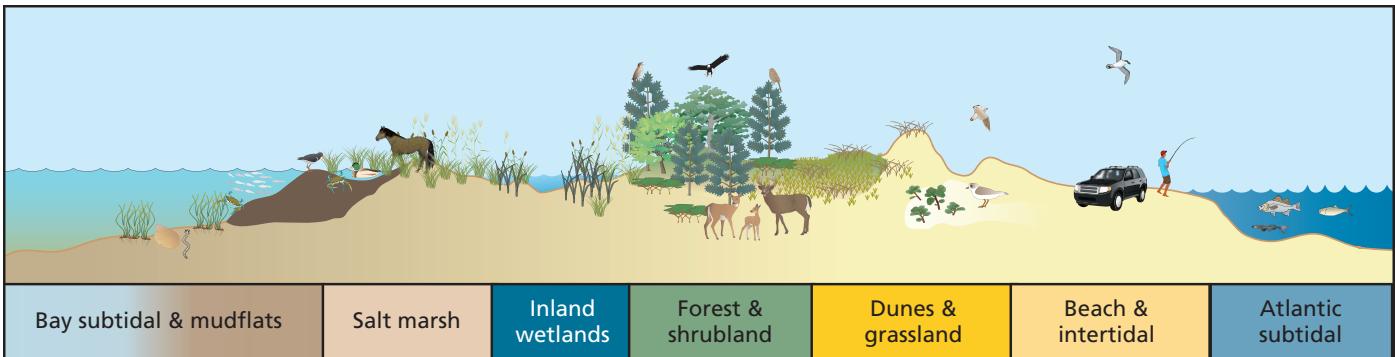
The unique history of Assateague Island, preceding the establishment of the National Park, also provides important context to an assessment of natural resource condition. In terms of the geomorphology of the island, significant impacts include the hard stabilization of Ocean City inlet, which was opened by the 1933 storm, the strengthening of a protective dune along much of the island following the 'Ash Wednesday Storm' in 1962, and the creation of an emergency storm berm at the north end of the island after two extra-tropical cyclones in 1998 threatened to breach the island. Two significant biological introductions, horses and sika deer, while non-native species to the area, have become significant park resources in their own right. Accordingly, this assessment includes these metrics in the context of stressors when they are extreme, but in recognition that maintaining a naturally dynamic system with sustainable populations of horses and deer is also the desired condition.



Assateague Island horses are both a feature and a stressor.

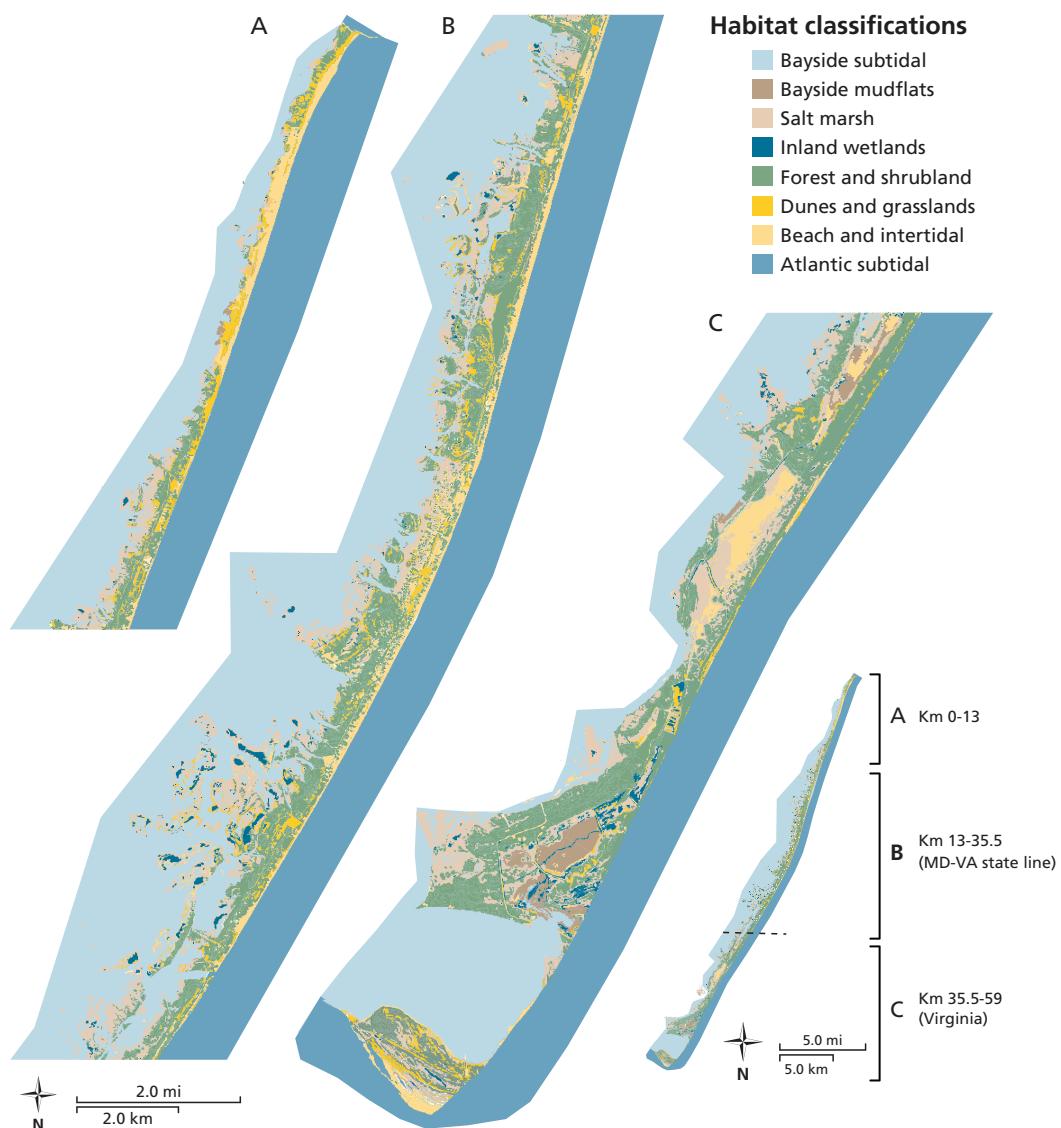
Photo: NPS ASIS

Habitat Framework



APPROACH

A habitat framework was used to assess natural resource condition within the Seashore. After determining key habitats on Assateague Island, potential indicators to inform the current condition of these habitats were identified and data sourced. Reference conditions were determined based on published scientific literature, federal guidelines, and historic data as appropriate. Attainment of reference condition was assessed for each metric and summarized by habitat and ultimately for the whole park. Based on these key findings, management recommendations were developed.



FEATURES OF ASSATEAGUE ISLAND NATIONAL SEASHORE

The abundant resources of Assateague Island National Seashore include physical features of the Island, ecosystem features and human use features. Assateague Island is a naturally dynamic coastal barrier island, structured by storm activity. These storms cause island overwash by large waves resulting in sand erosion and accretion, including inlet formation and closure. Assateague Island has an independent groundwater system, with a fresh lens 6-7 m (20-23 ft) deep in the center of the island and less than 1 m (3 ft) near both shores. Globally rare sand overwash habitat provides nesting sites for the threatened shorebird, *Charadrius melanotos* (piping plover). The dune annual, *Amaranthus pumilus* (sea-beach amaranth) is only found in these habitats between the high tide line and the base of the primary dune. The Seashore is an important site for many migratory bird species, and supports populations of the native white tail deer (*Odocoileus virginianus*) as well as the historically introduced sika deer (*Cervus nippon*) and horses (*Equus caballus*). The aesthetic appeal, beach, and unique fauna (including the feral horses) are key reasons for visiting the Seashore, and therefore important human use features. The National Park Service is committed to monitoring and preserving natural night sky conditions, and the Seashore is one of the longest sections of undeveloped coastline on the mid-Atlantic US coast, providing a rare dark sky experience.



Photo: iStockphoto.com

More than two million people visit the seashore every year including these bay side salt marshes.

THREATS TO ASSATEAGUE ISLAND NATIONAL SEASHORE

Threats and stressors to the natural resources of Assateague Island National Seashore occur at three main scales, within the Seashore itself, within the surrounding watersheds and within the mid Atlantic region. Changes to vegetation structure and dune erosion have been observed as a result of the Seashore's feral horse, white tail and sika deer populations. Many invasive plant species, including the highly invasive strain of *Phragmites australis*, occur within the Seashore. Over-sand vehicles impact the beaches, and have historically impacted dunes areas. Historic mosquito ditches remain, potentially impacting wading and shorebirds as well as estuarine water quality. The coastal bays within and adjacent to the Seashore are impacted by development, agriculture, and concentrated animal feeding operations throughout the adjoining watersheds, and are showing evidence of degrading water quality and loss of seagrass meadows. The mid-Atlantic region includes some of the highest population densities in north America, resulting in regional scale stressors, such as poor air quality. The mid-Atlantic region of the US has experienced almost twice the global mean rate of relative sea level rise over the past century (3-4 mm yr⁻¹), which is predicted to increase a further 19 cm by 2030, resulting in increased coastal flooding and changes to coastal geomorphological processes.

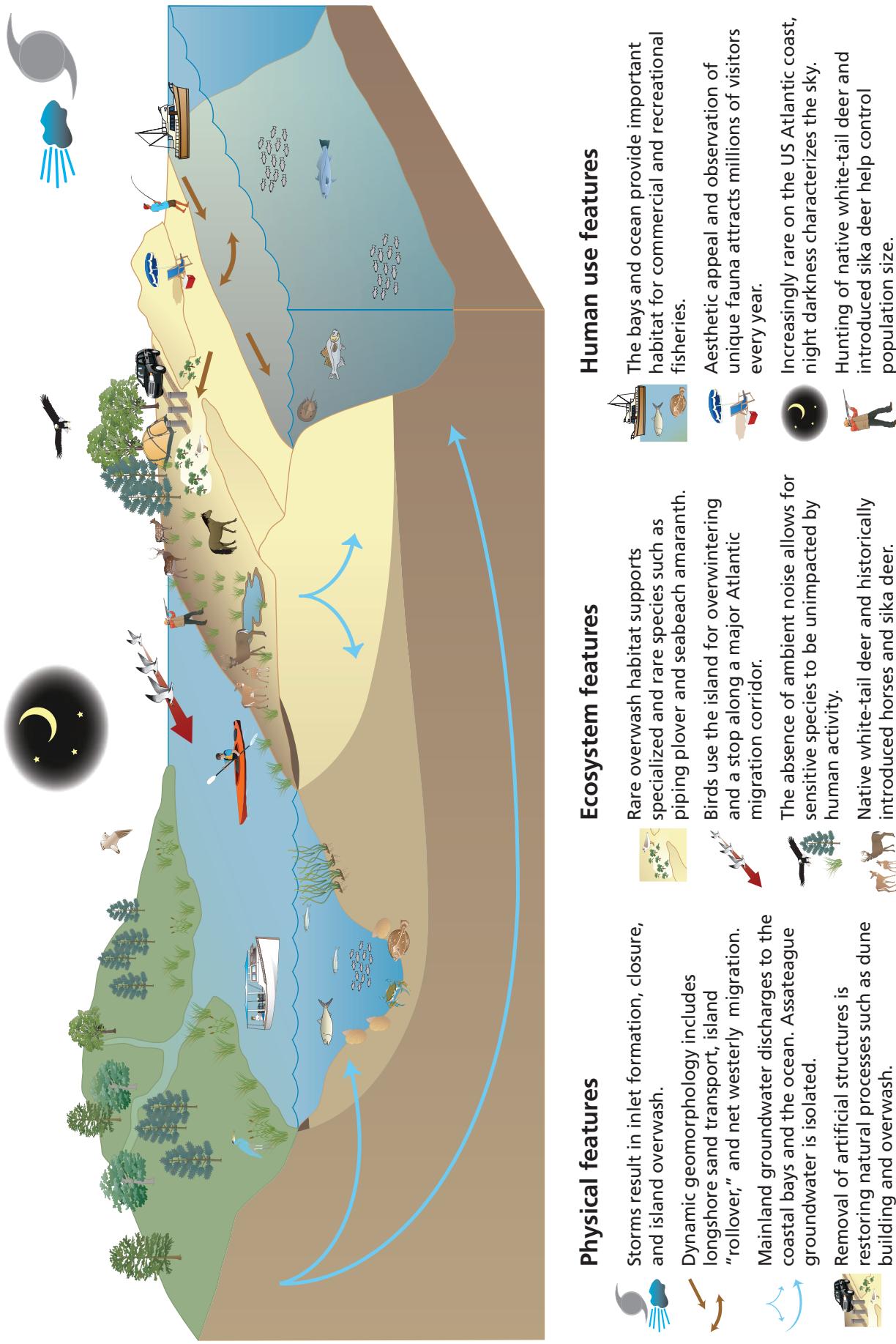


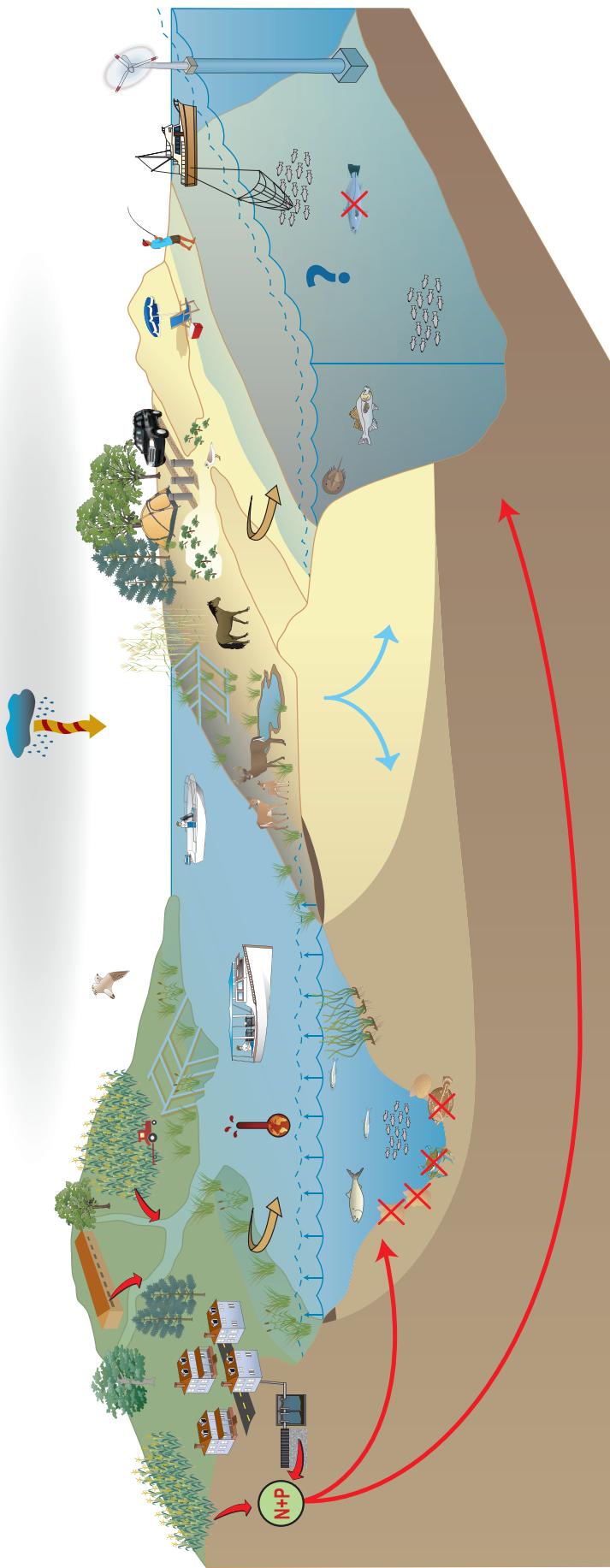
Photo: Jane Thomas, IAN Image Library

Aerial view of Assateague Island, showing proximity to Ocean City Inlet and development.

Key Features

Conceptual diagram showing the key features of Assateague Island.





Conceptual diagram showing the key threats to Assateague Island.

Current Conditions

CURRENT CONDITION OF NATURAL RESOURCES IN ASSATEAUGUE ISLAND NATIONAL SEASHORE



Present in several habitats, invasive *Phragmites* is actively being reduced and abundant mosquito ditches are actively being filled. Rare, storm overwash habitat supports sustainable populations of the threatened beach annual, seabeach amaranth and the shorebird, piping plover. Increasingly rare, populations of tiger beetles are supported. Historically established to protect the island, artificial impediments are being removed to allow natural overwash processes. Low amounts of light pollution result in a dark night sky. Shoreline rate of change is equivalent to historic rates, as a result of active sand bypass across the ocean city inlet. Degraded air quality impacts vegetation and aquatic habitats. Coastal Bays water quality is currently good, but declining. Feral horse as well as native white tail, and introduced sika deer populations overgraze vegetation and trample fragile habitats.

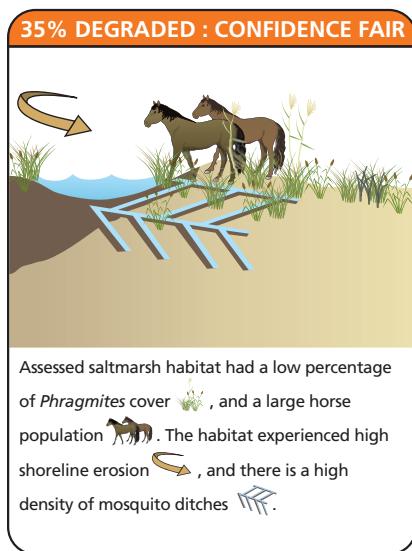
Percent Attainment:	0-20 %	20-40 %	40-60 %	60-80 %	80-100%
Habitat Condition:	Very Degraded	Degraded	Fair	Good	Very Good

Habitat	Reference condition attainment	Current condition	Confidence in assessment
Bay subtidal and mudflats	67%	Good	High
Salt marsh	35%	Degraded	Fair
Forest and shrubland	23%	Degraded	Fair
Inland wetlands	42%	Fair	Limited
Dunes and grassland	53%	Fair	High
Beach and intertidal	73%	Good	High
Atlantic subtidal	99%	Very good	Very limited
Assateague Island National Seashore	56%	Fair	Fair/high

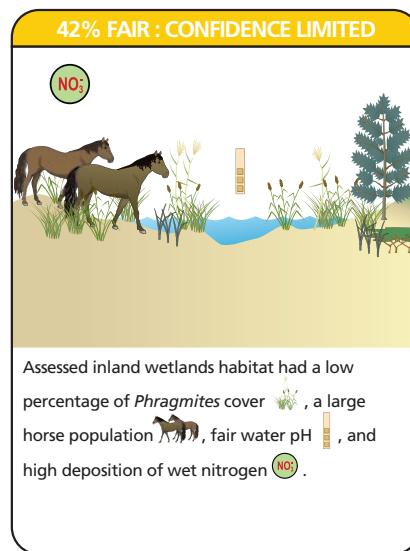
CURRENT CONDITION OF ASSATEAGUE ISLAND HABITATS

Overall, the natural resources of Assateague Island National Seashore were assessed to be in fair condition, with a fair to high confidence in this assessment. While salt marsh, forest and shrubland habitats were assessed to be in degraded condition, inland wetlands, dunes and grasslands were assessed as fair, bay subtidal and mudflats, beach and intertidal to be in good condition and Atlantic subtidal to be in very good condition. Confidence in the assessment of the different habitats varied, largely due to differences in data availability.

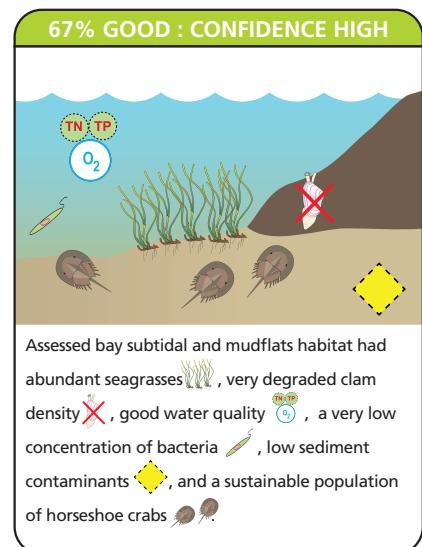
SALT MARSH



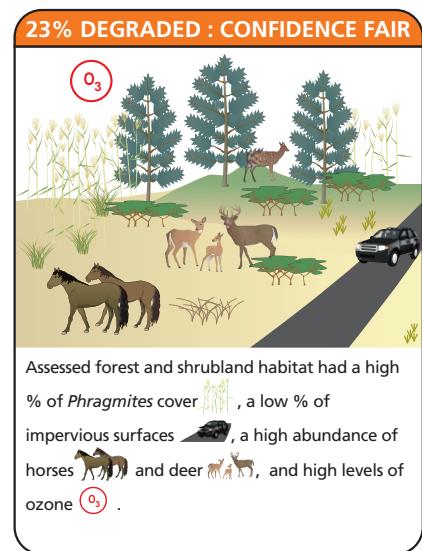
INLAND WETLANDS



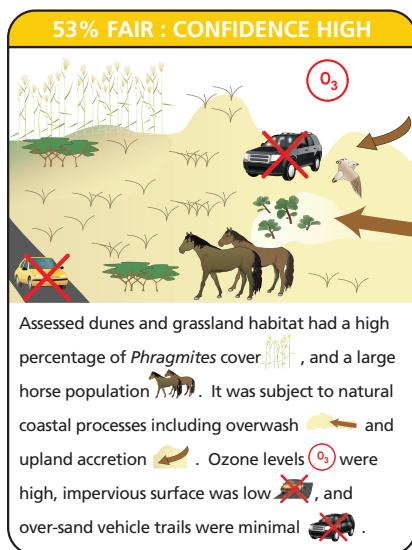
BAY SUBTIDAL AND MUDFLATS



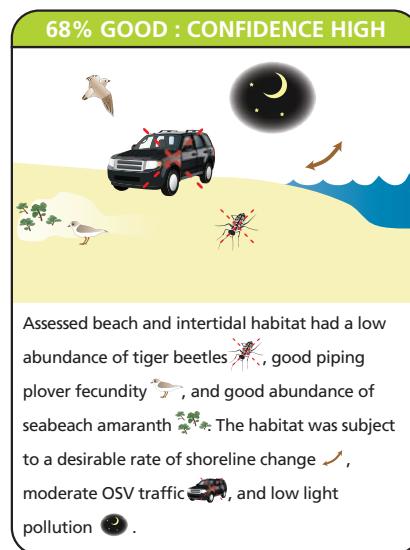
FOREST AND SHRUBLAND



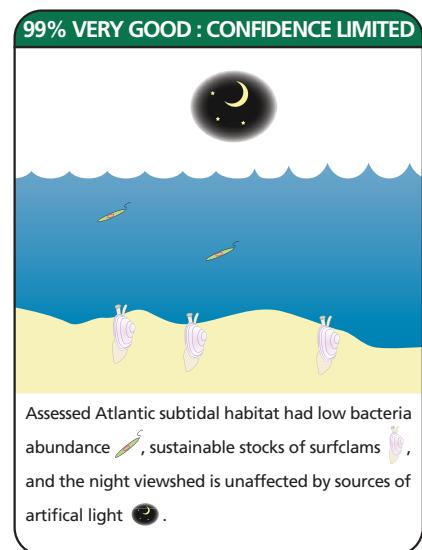
DUNES AND GRASSLAND



BEACH AND INTERTIDAL



ATLANTIC SUBTIDAL



Key Findings and Recommendations

Bay subtidal and mudflat habitat

Key findings	Recommendations
• Water quality good but degrading	<ul style="list-style-type: none"> Continue to monitor conditions and work collaboratively with federal, state and local partners to identify and reduce sources. Investigate septic sources from Town of Chincoteague and Captains Cove community.
• Seagrass has recent declines and low genetic diversity	<ul style="list-style-type: none"> Focus on maintaining water quality. Continue NPS Vital Signs monitoring to assist in understanding processes to maintain resource.
• Low but stable clam populations	<ul style="list-style-type: none"> Support, and monitor effects of, dredging ban.
• Status of horseshoe crabs uncertain	<ul style="list-style-type: none"> Standardize and expand population monitoring.
• Difficulty in assessing fin-fisheries status	<ul style="list-style-type: none"> Encourage development of status and trends data.

Saltmarsh habitat

Key findings	Recommendations
• Storm overwash is critical to balance shoreline erosion	<ul style="list-style-type: none"> Minimize artificial impediments to natural island overwash processes.
• Salt marsh is susceptible to the effects of accelerating sea level rise	<ul style="list-style-type: none"> Continue SET monitoring of marsh sedimentation/subsidence processes
• Mosquito ditches are abundant	<ul style="list-style-type: none"> Continue infilling ditches on experimental basis, monitoring ecosystem effects.
• Horses overgraze and trample the marsh	<ul style="list-style-type: none"> Manage to minimum self-sustaining population size.
• Invasive <i>Phragmites</i> currently controlled in this habitat	<ul style="list-style-type: none"> Continue <i>Phragmites</i> control efforts.
• Lack of knowledge on secretive marsh birds	<ul style="list-style-type: none"> Monitor to inform management decision making.

Forest and shrubland habitat

Key findings	Recommendations
• Invasive <i>Phragmites</i> abundant	<ul style="list-style-type: none"> Continue active <i>Phragmites</i> control, and monitor ecosystem impacts of treatment.
• Horses overgraze vegetation	<ul style="list-style-type: none"> Manage to minimum self-sustaining population size.
• Deer overgraze vegetation	<ul style="list-style-type: none"> Develop indices of deer herbivory on vegetation in conjunction with deer density index, to inform decision making.
• Invasive plant species influence native communities	<ul style="list-style-type: none"> Continue to monitor, track, and eradicate invasive plant species.
• Limited knowledge of bird resource	<ul style="list-style-type: none"> Inventory and monitor forest bird species.

Inland wetlands habitat

Key findings	Recommendations
• Poor air quality can impact these fragile habitats	• Initiate pond nutrient monitoring, and support regional air quality initiatives.
• Horses overgraze and trample limited freshwater pond resources	• Manage to minimum self-sustaining population size.
• Biotic resources inventoried, limited condition and trend information	• Develop indicators and techniques for assessing and monitoring biological integrity.
• Invasive plant species influence native communities	• Continue to monitor, track, and eradicate invasive plant species.
• These habitats are poorly characterized	• Study interrelationships with groundwater and storm overwash/flooding events, to inform management.

Dune and grassland habitat

Key findings	Recommendations
• Key biota impacted by poor air quality	• Support regional air quality initiatives, and monitor for specific impacts.
• Invasive <i>Phragmites</i> abundant	• Continue active <i>Phragmites</i> control, and monitor ecosystem impacts of treatment.
• Horses overgraze vegetation	• Manage to minimum self-sustaining population size.
• Dunes rely on natural shoreline processes	• Continue to minimize over-sand vehicle trails and minimize artificial impediments to natural island overwash processes.
• Invasive plant species influence native communities	• Continue to monitor, track, and eradicate invasive plant species.

Beach and intertidal habitat

Key findings	Recommendations
• Tiger beetle populations stable but low and limited in extent	• Minimize length of beach accessed by over-sand vehicles.
• Seabeach amaranth and piping plover require overwash habitat	• Minimize artificial impediments to natural island overwash processes.
• Shoreline rate of change is occurring at historical rates	• Maintain sand bypass to northern end of Assateague Island.
• Lack of current data on migratory shorebirds and intertidal biota	• Monitor to inform management decisions.

Atlantic subtidal habitat

Key findings	Recommendations
• Critical lack of knowledge	• Baseline surveys of benthic habitats. • Identify sensitive areas and key resources.
• Regional development threatens night sky conditions	• Collaborate with other agencies to initiate monitoring of water quality, fisheries and benthic habitats. • Collaborate with regional partners to reduce existing and prevent new impacts to night sky darkness.

