

PATROL SUMMARY
OBSERVATIONS AND REPORTS OF HUMAN ACTIVITY
ON THE ATLANTIC BARRIER ISLANDS ON THE
EASTERN SHORE OF VIRGINIA

2006 REPORT



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PROJECT FUNDING:

Seaside human impact monitoring is funded by the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA05NOS4191180 of the National Oceanic and Atmospheric Administration, Office of Ocean and Coastal Resource Management, under the Coastal Zone Management Act of 1972, as amended.



Virginia Coastal Zone
MANAGEMENT PROGRAM



The views expressed herein are those of the Virginia Eastern Shorekeeper, inc. and do not necessarily reflect the views of NOAA or any of its subagencies or the Virginia Department of Environmental Quality.

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Cover photo: Virginia Commonwealth University (VCU) students and instructor on Wreck Island NAP with trash collected as part of the 2005 International Coastal Cleanup, October 2005, R.Ayers

Photo enhancements: Where noted some digital photos shown as figures were enhanced using Adobe Photoshop 6.0 to highlight a portion of the photo. Contrast and brightness level were adjusted to make images of the photos more recognizable. In some pictures, all or some of the color was removed to highlight areas and to reduce overall image/pixel size. Except where cited, all photos were by R. Ayers, Virginia Eastern SHOREKEEPER®, 2004-2006

Introduction

Land managers responsible for the protection of the Atlantic barrier islands on the Eastern Shore of Virginia remain concerned about the effects human activity may have on the sensitive natural resources of the islands. The Virginia Eastern SHOREKEEPER® received a FY-05 grant from the Virginia Coastal Zone Management Program (VCZMP) to conduct on-the-water monitoring of human activity along the Atlantic seaside of the Virginia Eastern Shore.

GRANT OBJECTIVE: Document human impacts to sensitive marine resources.

Task: On-site monitoring of sensitive natural resources.

Description: *“The Shorekeeper will conduct year round on-the-water monitoring to provide protection for oyster reef sanctuaries, planted and restored eelgrass beds, nesting shorebirds and colonial bird colonies. The Shorekeeper will maintain a close working relationship with the Virginia Marine Resources Commission and all the other Seaside Heritage Program partners. Trained Volunteer Creek Watchers will provide periodic monitoring of their assigned area. When observations indicate an imminent impact to the coastal resources, the Creek Watchers will report the activity to the appropriate federal, state or local agency. Potential impacts reported by the Creek Watchers, individual citizens or the Shorekeeper would be investigated and documented by the Shorekeeper. Activities resulting in infractions of existing laws will be referred to the appropriate agency, with follow-up monitoring by the Shorekeeper. In FY-05 (2006), the Shorekeeper will revisit human impact strategies developed in FY-03 and FY-04 with Virginia Coastal Zone Management partners. A report documenting specific human impacts, including scale of impacts and suggested strategies to offset any documented impacts will be provided.”*

PATROL REPORT OBJECTIVE: To provide a general qualitative assessment of type of human activity on the Barrier Islands and select natural resource protection areas on the seaside of the Eastern Shore of Virginia.

The intent is that information contained herein can aid public land and resource managers in accessing impacts to their individual lands or projects. Patrol efforts attempted to build from lessons learned in previous years, track earlier recommendations and provide better on-the-water patrol observation. This report is an assemblage of actual observations by the Shorekeeper and Creekwatcher volunteers, reports from Virginia CZM Program partners, law enforcement personnel and anecdotal and third party information from commercial and recreational users of the seaside waters. Some activities that were conducted by private land managers or private land owners on there land were omitted or intentionally generalized at the land managers request.

AUTHORS GENERAL COMMENTS: The barrier islands flanking the seaside of the Eastern Shore of Virginia comprise one of the best protected and least impacted barrier island chains on the entire Atlantic coast. Protection is largely due to conservation minded private and public ownership and the relatively limited access to the islands. This is an amazingly pristine natural system.

Observations, conclusions and recommendations are that of the Virginia Eastern Shorekeeper and should, in no case, be construed as guidance or policy for public or private lands.

HUMAN HISTORY: Historically, the Virginia barrier islands have had modest spikes of human settlement. Since the first arrivals of European settlers, the islands have been primarily used for animal grazing, waterfowl hunting and to support the once abundant seafood industry on the Eastern Shore. Most notable was the town of Broadwater, located on the southern end of Hog Island. Settled shortly after the Revolutionary War, the population of the town grew to over 100. In the early 1900s, severe storms and coastal erosion began to force the residents to move inland. Hunting lodges, U.S. Lifesaving Stations and lighthouses were also scattered throughout the islands. Small caretaker houses, used to maintain seasonal lodges and oversee livestock herds, and watch houses, primarily used by waterman to watch over their oyster and scallop grounds, were abundant. A series of storms in the 1930s, as well as changes in the coastal fisheries combined with improved powerboats, caused most remaining island inhabitants to leave the islands permanently. The only remaining inhabited structures were U.S. Coast Guard Stations, watch houses and a few hunting lodges. In the early 1950s,

developers produced plans to develop several of the islands. The plans included elaborate bridges, airports and marinas. Before these projects could be implemented, however, The Nature Conservancy (TNC), and state and federal agencies were able to purchase and protect most of the barrier islands. The exception was Cedar Island, which was platted for several hundred residential lots. Although in the late 1980s the island supported nearly forty seasonal cottages, the project never fully succeeded due to erosion and natural island migration processes.

OWNERSHIP: Within the survey area of Gargathy Inlet south to the mouth of the Chesapeake Bay, the islands are primarily in protective ownership (Figure 1). The Nature Conservancy owns all of Parramore Island, Revel Island, Little Cobb Island, Ship Shoal Island, Myrtle Island and Smith Island. The Nature Conservancy also owns



Figure 1. Virginia Barrier Island ownership. (Graphic provided by Virginia Coastal Zone Management Program, 2005)

most of Metompkin Island, Hog Island and Cobb's Island. The U.S. Fish & Wildlife Service (USF&WS) owns the northern tip of Metompkin Island and manages it through the Chincoteague National Wildlife Refuge (NWR). Fisherman Island National Wildlife Refuge is owned by USF&WS, but has a significant road right-of-way for a four-lane highway connection from the Eastern Shore to the Chesapeake Bay Bridge Tunnel. Wreck Island Natural Area Preserve (NAP) is owned by the Virginia Department of Conservation on Recreation, Division of National Heritage (DCR/DNH). Large private in-holdings still remain on Cedar Island. Some parcels on Cedar Island have been purchased by or donated to the USF&WS and TNC. Other smaller in-holdings remain on Hog Island and Cobb's Island. In addition, several interior marsh islands are in protective ownership and the most of the tidal salt marsh is owned by the Commonwealth of Virginia.

METHODS

Random patrols were conducted from 1 October 2005 through 30 September 2006 in conjunction with the broader Shorekeeper and VCMP goals for FY-05. With approximately 50 miles of Atlantic coastal beaches along the barrier islands, over 500 miles of tidal shoreline along the mainland and thousands of acres of island upland and tidal marsh, plus the variability of weather and tides, systematic patrolling was not considered. Conditions of the grant limited all monitoring activities to on-the-water or on public land. No privately owned land was accessed and persons on privately owned land were not approached. This limited determining the specifics of most human activities beyond what was visible from the water. It also greatly limited opportunities for public education and outreach.

A patrol area from Gargathy Inlet at the north end of Metompkin Island south to the Chesapeake Bay was selected. The area

from Gargathy Inlet north is primarily managed and patrolled by USF&WS personnel from the Chincoteague Island NWR. Because Assateague, Wallops and Assawoman Islands are all accessible by vehicle and patrolled by the USF&WS, boat surveys were deemed unnecessary. Fisherman Island NWR was included in the survey area.

The primary method of observation was frequent and random on-the-water patrols. The Virginia Eastern Shorekeeper operates a 22-foot *BayRider*® skiff with an outboard motor. (Figure 2) This flat bottom boat can operate comfortably in 18 inches of water and in the near-shore waters of the Atlantic Ocean. In addition, the Shorekeeper took advantage of other Seaside Heritage Program partners, local waterman and private boaters to access broad areas along the seaside. For remote access, kayaks were transported in the Shorekeeper boat and launched to access even more remote island areas.

Patrols were primarily scheduled around weather, tide and season. Weather was the predominant variable influencing the observation of recreational use of the barrier islands. Only 12 patrols were conducted during the cold months (Dec-Mar) primarily for safety reasons. Tide was a limiting variable for safe boat operation and access to some remote locations. Restored eelgrass beds and VCMP's, Virginia Oyster Heritage Program (VOHP) oyster reefs were primarily patrolled during low tide to allow for physical observation of growth and turbidity monitoring. Although generally random, more patrols were conducted on Friday and Saturday than during the remainder of the week, to better observe impacts from recreational use. Once shorebird nesting activity was observed in the spring, targeted patrols were increased near nesting areas.



Figure 2. The Virginia Eastern Shorekeeper boat anchored near Wreck Island NAP. Note posted bird sign in foreground.

RESULTS

For the third year, casual entry by recreational beachcombers into colonial and solitary bird nesting sites was the most often observed activity, though there is an apparent decline when compared to observations from 2004-05. A significant increase in postings and the increased presence by land managers and DGIF appears to be getting the word out. This year bird colonies were well posted and people were generally observed complying with the signage.

New for 2006, similar observed human activities were grouped in results section. Activity groups include a general summary and Shorekeeper comments and often include specific observed or reported examples and action that land managers have reported taking to address impacts. Each activity has a small corresponding table that lists the primary barrier islands. A check mark next to the island indicates that the listed activity was observed or reported on that island. Since naturally occurring changes affect each island and ultimately its use policies and sensitivities to human usage exact locations are not necessarily important in evaluating overall general trends.

Walking through posted areas.

There continue to be people who ignore the signage, mostly recreational users: beach walking, shell collecting, artifact hunting, bird watching, picnicking and using the island as a rest room. These encroachments are largely in areas where clear beach access is available or where ownership is unclear to the public. The north end of Cobb's Island, Cedar Island, Dawson Shoal in Wachapreague Inlet and the eastern sand spit on Wreck Island NAP had the most apparent incidences of people ignoring the signage.

- The northern end of **Cobb's Island** has formed a thin sandy hook; boaters can easily access the back of the island and are a short walk to the ocean beach. The area was well posted by TNC. Three encroachments were observed (Figure 3) and others were reported by land managers. Ironically, just to the north of the cove behind the island is a sandy beach that provides a better boat landing and puts people closer to the inlet beach.

Table 2: People walking through posted areas.

✓	Metomkin Island
✓	Cedar Island
✓	Dawson Shoal
	Parramore Island
	Revel's Island
	Hog Island
✓	Cobb's Island
✓	Little Cobb Island
✓	Wreck Island
✓	Ship Shoal Island
	Myrtle Island
	Smith Island



Figure 3: Recreational boat anchored near Cobb's Island. "Nesting Bird" signs clearly visible. Persons from boat walked through nesting area to pick shells from beach. 2006

- **Dawson Shoal** has been a fairly accessible small island that continues to persist between Cedar and Parramore Island. Good access and lack of vegetation makes this a frequented spot for boaters out of the town of Wachapreague. The bird colonies this year were away from the common boat landing areas, yet the land manager reported a number of entries into the well posted areas. Dog tracks were also fairly common. The Shorekeeper observed 6 unleashed dogs, none in the posted bird areas.
- The eastern sand spit on **Wreck Island** NAP has been one of the preferred surf fishing spots since its formation over the past few years. The sand spit provided excellent weather protection, once boaters transit the Inlet, with access to good surf fishing near the boat. Over the past two years there have been numerous observations of surf fishermen on the island. The Virginia DRC/DNH closes the island from

April 15 through September 1 each year, but has not actively posted or enforced the closure for surf fishermen who have generally been away from any nesting bird colonies. This year, DCR/DNH clearly marked the area with nesting area signs. Most fair days in late April and May saw, at least, one boat with several surf fisherman near the posted area. Three encroachments were observed and four more were reported. In one case, the state Natural Area Steward made contact with the fisherman and explained the areas closure policy. There were also numerous foot tracks and surf cart prints through the posted area. By the end of May, most surf fishing had stopped and only one additional encroachment was reported.

- **Cedar Island** probably poses the most difficult scenario for nesting bird protection. Large portions of Cedar Island are not in protective ownership. The island has had two significant land divisions. In the 1950's the northern end of the island was divided into small four sided lots with roads and right-of-ways platted. By the late 1970's, many of the platted lots had completely eroded away as the island migrated westward. The remaining land was re-platted in the mid 1980's. Many of the new lots only had northern and southern property boundaries; thereby ensuring that regardless of how much the island migrated west there would always be a lot. USF&WS owns a vast majority of the backside marsh (estimated 1221 acres) and USF&WS and TNC have a number of narrow lots on the island. The remainder of the island is largely in private ownership. The northern tip of Cedar Island, often referred to as Cedar Sandbar, is largely the result on island movement. In the early 1990's the inlet shown on most modern maps of the area closed and a new inlet formed to the north. This movement, in effect, cut off the lower portion of Metompink Island and attached it to Cedar Island. While dynamics of these islands is somewhat unpredictable and seldom permanent it does pose a problem for resource managers working on private land not in conservation ownership.

Dogs



Figure 4: Unleashed dog running on Metompkin Island. 2006

Any unleashed domestic dog that was on a barrier island, except for dogs that were used while hunting, was considered notable. If nothing else, it is not consistent with any of the island land use policies and is prohibited by Virginia Code.

Table 3: Unleashed dogs observed in 2006

✓	Metomkin Island
✓	Cedar Island
✓	Dawson Shoal
✓	Parramore Island
✓	Revel's Island
✓	Hog Island
✓	Cobb's Island
	Little Cobb Island
✓	Wreck Island
	Ship Shoal Island
	Myrtle Island
✓	Smith Island

Eleven unleashed dogs were observed (Figure 4) and many more were reported or tracks were seen that were likely from unleashed dogs. Metompkin Island, Cedar Island and Dawson Shoal were where dogs or dog tracks were most often reported. Dogs were observed on leads on Wreck Island and Dawson Shoals.

Off-Road Vehicles (ORV) usage.

USF&WS patrols Fisherman Island NWR and Assawoman Island (part of Wallops Island NWR) routinely with government owned vehicles. In addition, USDA, Wildlife Services uses a vehicle on Wallops and Assawoman Island to support their work. This is an authorized activity approved or conducted by federal land managers and no harmful effects were noted. Other ORV activity is limited to Hog and Cedar Island. The harsh environment quickly deteriorates any vehicle, so the number of vehicles should remain low. Of specific concern, in 2006, are two trucks on Cedar Island North that continue to threaten solitary nesting bird areas and a Least Tern Colony on the south end of the island. Although these vehicles are owned by island landowners they have been seen operating and have left tracks through posted areas where Piping Plover were nesting. One island land owner, Folley Creek Corporation, has voluntarily agreed to a driving ban on Cedar sandbar during breeding season. Cedar Island poses a unique challenge to nesting birds because of numerous property owners and unclear reference points to determine where property boundaries are.

Table 4: ORV usage observed.

	Metomkin Island
✓	Cedar Island
	Dawson Shoal
	Parramore Island
	Revel's Island
	Hog Island
	Cobb's Island
	Little Cobb Island
	Wreck Island
	Ship Shoal Island
	Myrtle Island
	Smith Island

Historically, there have been one or two ORVs used on Hog Island to surf fish, but usage of these vehicles was not observed in 2006. These vehicles are usually barged out to the island in the spring and returned to the mainland in the fall. The two ORVs involved seem to operate within the tidal zone and have not been of particular concern to TNC, which manages the largest portion of the island.

All-Terrain-Vehicles (ATV) usage.



Figure 5: ATV on Wreck Island NAP during the 2005 International Coastal Cleanup hauling trash.

No ATV activity was observed or reported in posted nesting areas. A few privately owned ATVs have been used by land owners on Cedar Island to provide basic transportation on the island for 15 years (personal observation). The ATVs are routinely transported from the mainland to the island and back as they are needed. Currently there are no ATVs on Cedar Island.

Table 5: ATV usage observed.

✓	Metomkin Island
✓	Cedar Island
	Dawson Shoal
✓	Parramore Island
	Revel's Island
✓	Hog Island
	Cobb's Island
	Little Cobb Island
✓	Wreck Island
	Ship Shoal Island
	Myrtle Island
✓	Smith Island

While no ATV activity authorized by the land managers was viewed as harmful, it is notable. TNC, DCR/DNH and USDA Wildlife Services all have boats capable of routinely transporting ATVs to the islands. ATVs provide land managers quick, affordable logistical access to inaccessible areas of the islands to conduct stewardship and research activities (Figure 5).

Surf fishing:

This year there was a reoccurring conflict between surf fisherman and a Least Tern colony on Wreck Island NAP. DCR/DNH staff posted the area to clearly define the nesting bird area. However, DCR/DNH lists Wreck Island NAP as “Closed to the Public” from April 15 through September 1 annually. Historically DCR/DNH has not posted the entire island as closed or enforced the closure. Rather they have just posted individual colonies. In this case, the Least Tern colony established on a sand-spit between a preferred surf fishing location and the closest anchorage. Least Terns are small birds and were not present at a density that allowed them to be easily noticed from outside the colony. Surf fishermen were observed on eight separate days; in all cases there was no evidence of passage through the colony. Evidence of encroachment was observed two times and reported three additional times by DGIF and TNC personnel. This type of disturbance has occurred on other islands in the past, but it is largely a random pairing of accessible surf fishing areas and the nesting locations. Because both surf fishing locations and bird nesting locations are highly dynamic on the barrier islands, locating nesting sites and posting them early is probably the best defense. The general consensus among land managers is that surf fishermen provided minimal disturbance to sensitive natural resources. For the most part, fishing activities are limited to the surf zone of the beach. Most fishermen to the islands are seasoned anglers who seem to demonstrate care and respect towards the sensitive natural resources. Although surf fishing is not new to the barrier islands, there has been a notable increase in the size of the groups fishing and the equipment used. In the mid-1990s, a typical surf fishing party was two to three persons, with two fishing rods each and a five-gallon bucket used to carry all supplies. Continuing this year was the use of non-motorized carts and individual fishermen fishing as many as 5 rods at once. Surf fishing parties of ten or more fishermen were noted on Wreck Island NAP 8 times. In most cases, their boat was within the sight of the fishermen. On Cedar Island, Cobb’s Island, Smith Island and Ship Shoal Island surf fishermen were observed fishing from the beach during the spring and autumn. DGIF personnel observed fishermen on Cedar Island were walking through nesting sites. The accompanying boats were anchored behind tidal sandbars on the seaside of the island.

Table 6: Surf fishing observed.

	Metomkin Island
	Cedar Island
✓	Dawson Shoal
✓	Parramore Island
	Revel's Island
	Hog Island
✓	Cobb's Island
	Little Cobb Island
✓	Wreck Island
✓	Ship Shoal Island
	Myrtle Island
✓	Smith Island

Researcher Activity:

Researchers, both academic and institutional accounted for much of the human activity observed on the islands. Many of the sightings were the same researchers on different days. Although difficult to quantify, researchers accounted for the most hours on the islands (personal opinion).

Table 7: Researchers observed in 2006

✓	Metomkin Island
✓	Cedar Island
✓	Dawson Shoal
✓	Parramore Island
✓	Revel's Island
✓	Hog Island
✓	Cobb's Island
✓	Little Cobb Island
✓	Wreck Island
✓	Ship Shoal Island
✓	Myrtle Island
✓	Smith Island



Figure 6: Researcher walking through colonel bird nests. At least 30 nests shown in picture. 2006. R. Ayers

Some land managers have voiced their concern about the cumulative impact of researchers on nesting birds (Figure 6). At the annual VCZMP partners meetings, there was both an opportunity for land managers to review their management goals and researchers to provide a coarse overview on their projects. All managers generally agree that ongoing and new research is needed, both to further science and to aid in land management decisions. Some land managers voiced concern over the particular scale or scope of individual studies. Of note were concerns over single species studies conducted in or near multiple-species colonies. Discussions among land managers seem to be addressing these concerns. Some land managers have reported modifying, limiting or not approving research permits that were inconsistent with their management goals.

Cottages:



Figure 7: From the same location off Cedar Island. Top photo shows cottage in October 2004. Lower photo taken July 2006 showing only the pilings remaining after cottage was removed.

Cottages exist on a number of the islands and are mentioned since they directly facilitate human usage. As previously mentioned, the vast majority of cottages on Cedar Island have been damaged or destroyed since the peak of development in the late 1980s (Figure 7). There are privately owned cottages on Cedar Island (6), Hog Island (2) Cobb's Island (1) Parramore Island (2), and Smith Island (1) and seven more within the lagoon system. The privately owned former Coast Guard Stations on north Cedar Island and Hog Island probably have less than 30 overnight uses per year with the remaining cottages having very low usage, generally a few days per year. Beyond the foot-print of the structure, related support activities such as maintaining access right-of-ways, storing diesel fuel, propane, trash, fresh water and waste water disposal should be considered when assessing site specific impacts.

Table 8: Cottages on barrier islands in 2006

	Metomkin Island
6	Cedar Island
	Dawson Shoal
2	Parramore Island
	Revel's Island
2	Hog Island
1	Cobb's Island
	Little Cobb Island
	Wreck Island
	Ship Shoal Island
	Myrtle Island
1	Smith Island

There were six barges (monitors) fitted with cabins and house boats present near or on the barrier islands or within the lagoon system in 2006 (Figure 8). These seem largely to be used as hunting cabins during the winter. Some floating cabins, such as one on Parramore Island, have been in place for over fifteen years. Two similar barges are present near the south end of Hog Island. They remain in place, secured to permanent pilings, and are only moved for occasional maintenance. The remainder are towed to island locations in the winter and anchored near the island. Other than the initial impact of the barge to the salt marsh below the barge, which is destroyed within a few weeks, impact is minimal. Uses of the monitors are limited. It is unclear how human waste is managed.



Figure 8: Barge (monitor) fitted with cabin anchored behind Hog Island. 2006

Camping:

Camping includes any activity beyond a simple picnic, including setting up tents, cooking equipment, tables, volleyball nets, temporary generators and building campfires. One camping incident was reported to have an impact in 2006. On the north end of Cedar Island North DGIF personnel reported a group of boy scouts camping on the island in an unposted area that supported several pairs of Piping Plovers, Wilson's Plovers and American Oystercatchers. Fortunately, the birds finished nesting prior to this year's arrival of the boy scouts. The troop leader claimed to be a Cedar island property owner and used his lot as the camp site. An agreement was reached between DGIF personnel and the Boy Scouts camped on the island whereby in the future, the Boy Scouts will contact DGIF staff to make sure that all birds in the area finished nesting before coming out to the island.

Table 9: Cottages on barrier islands in 2006

	Metomkin Island
✓	Cedar Island
	Dawson Shoal
	Parramore Island
	Revel's Island
	Hog Island
	Cobb's Island
	Little Cobb Island
	Wreck Island
	Ship Shoal Island
	Myrtle Island
	Smith Island

Camping was observed on two occasions on the south end of Cedar Island and reported once on Metomkin, no harmful impact was noted. No other camping was observed in 2006.

Hunting:

No illegal or disruptive hunting was observed in 2006 on public land. Hunting activities included island upland, waterfowl and marsh hunting, building and accessing blinds. Hunting on private land was not monitored.

Boating and kayaking:

Boating and kayaking are the only means to gain access to the barrier islands and not generally an impact in themselves. The only evidence of boat damage was on the southern tip on Cedar Island where a boat used by a barge operator moving heavy equipment on and off Cedar Island scoured a small area of beach away while apparently maneuvering close to the breach. Within a week the damaged area was unnoticeable although wood pilings remained. While kayaks concern resource managers with their ability to access remote portions of the islands not normally monitored or posted, observations in 2006 continue to show that the vast majority of kayaks that access the barrier island use the same sandy beaches that the larger boats use.

DISCUSSION

The general assumption by land managers along the Virginia barrier islands is that the wholesale loss of coastal habitat to the north and south along the East Coast places even more importance on the conservation value of the remaining natural communities on these islands. Although that point is not in question, it does pertain to the relevance of human activity on the Virginia barrier islands. By scale, human usage on all of the islands within the survey area is substantially less than, for example Fenwick Island, Ocean City, Maryland, with its millions of annual visitors (Maryland Coastal Bays Program, 2004).

Feedback from numerous VCZMP partners suggested that the conclusions in the 2004 human impact study overstated the overall human impacts to sensitive natural resources. Originally, general activities that disturbed nesting birds to the point they took flight were viewed as disruptive. This report makes no attempt to quantify what level of human disturbance was necessary to disrupt otherwise undisturbed natural processes.

Following a third year of observations, except for some research and studies conducted with land managers approval, most observed human disturbances were short in duration and thus are no longer considered an impact. While any human activity is worth monitoring, the barrier islands are a disturbance driven system with frequent disruption by storm and tide. The flora and fauna that use these islands are adapted to these disturbances. Human activities near or over restored eelgrass restoration beds do not appear to be having a negative effect on restoration efforts.

Overall human usage, within the Seaside Heritage area surveyed, is not increasing. Based on historical and anecdotal information (Badger and Kellam, 1989; Barnes and Truitt, 1997; Personal observation) human usage on the barrier islands appears to have decreased between the peaks of activity in the early 1900s through 1994. Since 1994, there has been a steady decline of hunting lodges, watch houses, U.S. Coast Guard Stations and seasonal cottage construction (personal observation). Currently, all the Coast Guard Stations are closed. Only a few small cabins, used primarily by small groups of hunters or fisherman, are present on Cedar, Hog and Cobb's Islands, and only a few watch houses are located behind the islands in the lagoon system. In addition, these watch houses are used only sporadically and primarily by watermen awaiting a rising tide. The number of cottages, on Cedar Island, has been reduced dramatically; those remaining are continually threatened by adverse weather.

By stark contrast, a majority of the Atlantic coast has seen dramatic increases in human impacts in the past one hundred years. Areas north and south of the Virginia barrier islands involved in this report have been subject to residential and commercial development, impacted by shoreline hardening, modification and replenishment and now support year-round human populations (Figure 8). In 2002, the Pew Ocean Commission report; *Coastal Sprawl, The effects of Urban Design on Aquatic Ecosystems in the United States* (Beach, D, 2002) describes an ever increasing coastal population. The report projects that between 2002 and 2017; 27 million additional people will populate the coastal zone of the United States. By multiple accounts increases in coastal populations and coastal land urbanization is creating irreversible degradation in a number of coastal aquatic systems nationwide.

Ease of access to the islands appears to be the strongest variable determining which and where the islands are impacted. As expected, the relationship to the mainland public boat ramps to the closest landing point on the islands clearly affects the number of recreational visitors. Virtually all island access was onto sandy beaches either near an inlet or at an over-wash area. It was thought that the increased use of kayaks would begin to provide access to areas not normally accessed by larger boats. The kayaks that were observed on the islands were accessing the islands in the same locations as the boats. The more remote island landings were by island researchers, surf fisherman and hunters who used local knowledge to access small creeks and guts. The preferred island landing points were sandy beaches on the inlets or backside of the islands. Current and tide did not seem to affect the decision to land, though it often affected how long visitors remained there. Under ideal weather and tide conditions, local boaters would beach their boat and anchor the stern into deeper water. Out of town boats would anchor out in deeper water and wade or swim in or simply beach the boat for short periods of time. Kayaks, canoes and small aluminum boats would always be pulled up on the beach away from wave activity. In speaking with boaters launching at public ramps in Wachapreague, Folly Creek, Gargathy Creek and Oyster, it was noted that these were the launching points for most boaters accessing the islands. While ramps in Quinby, Willis Wharf and Red Bank were frequently used, they anecdotally seemed to have had a lower number of boats that accessed the islands. The bayside ramp at Kiptopeake State Park is worth mentioning because a number of boats used that ramp to access Fisherman Island NWR and the southern end of Smith Island.



Figure 9: Visitors enjoying a barrier island. Note: man in background (in circle) has a dog on a leash.

The more remote island landings were by island researchers, surf fisherman and hunters who used local knowledge to access small creeks and guts. The preferred island landing points were sandy beaches on the inlets or backside of the islands. Current and tide did not seem to affect the decision to land, though it often affected how long visitors remained there. Under ideal weather and tide conditions, local boaters would beach their boat and anchor the stern into deeper water. Out of town boats would anchor out in deeper water and wade or swim in or simply beach the boat for short periods of time. Kayaks, canoes and small aluminum boats would always be pulled up on the beach away from wave activity. In speaking with boaters launching at public ramps in Wachapreague, Folly Creek, Gargathy Creek and Oyster, it was noted that these were the launching points for most boaters accessing the islands. While ramps in Quinby, Willis Wharf and Red Bank were frequently used, they anecdotally seemed to have had a lower number of boats that accessed the islands. The bayside ramp at Kiptopeake State Park is worth mentioning because a number of boats used that ramp to access Fisherman Island NWR and the southern end of Smith Island.

Human activities near or over Virginia Oyster Heritage Program (VOHP) oyster restoration beds are having a negative effect. VOHP restoration efforts are funded by VCZMP. TNC and VMRC have supplemented viable oyster reef, with additional substrate, increasing viable growing areas on the seaside. TNC and VMRC reef restoration activities are supported by NOAA's Community Restoration Program and the Aquatic Resources Trust Fund. Unfortunately, both TNC and VMRC reports indicate that illegal harvests have greatly hampered VOHP restoration efforts in some areas. The greatest thefts report are in the same general geographic area in the southern portion of the lagoon system suggesting that illegal harvests may likely be linked to a small number of people (personal opinion).

Included in this report are some of the state laws that affect a number of human activities on the barrier island and seaside waters. This information is provided solely as background. Readers should consult competent legal sources for complete and up-to-date laws and applicable regulations. Definitions and legal terms used are referenced are in Appendix 1.

- In October 1990 Virginia Administrative Code, 4VAC20-440-10, *Barrier island policy*. (Appendix 4) went into affect. The law primarily addresses construction on the barrier islands, access across primary dunes and certain authorized activities, including vehicle usage, on the islands. The law is largely not enforced and little regulation has been developed to enable enforcement. The law was generally used by VMRC when reviewing construction request on Cedar Island, but little construction has occurred since the law took affect. Permitting or restrictions for vehicle use on the barrier islands associated with private property has gone un-enforced.
- In March 1999 Virginia Administrative Code, 4VAC20-1030-20; *Description of ungranted state lands* (Appendix 5) went into effect. This is the section of law that identifies 27,722 acres of "common" land on seaside marshes, meadowlands and shores of the sea. Largely this law was developed to help clarify certain lands where title or ownership was unclear. A court case in the early 90's had questioned deeded ownership to areas of one barrier island whose beaches and marshes where viewed as commons by the court. The decision in this case was narrow and only applied to one island, however, there has been little other litigation or challenges since to "test" that decision. This lack of clear riparian use, in certain unclear deeded lands, particularly on backside marshes creates a theoretical "gray area" for land managers.

While there may be unclear guidance for private property owners, VMRC Habitat Division generally view the lands below the high tide line as commons.

While there is vague guidance for some lands in the intra-tidal zone (the land below high tide), the upland portions of the islands have clearer ownership. Generally the islands wholly owned by TNC, USF&WS and the Commonwealth have clear ownership. Where it becomes unclear is on Cedar Island and the few remaining islands that still have private in-holdings. The dynamic nature of the islands causes the islands to literally move. Property lines and reference points from older surveys become very difficult to discern over time. In the case of Cedar Island lots platted in the 50's were largely eroded away and the northern portion of the island was re-platted in the 80's. From a land owner and management perspective, it can be difficult to determine whose property you may be on.

CONCLUSIONS

Human activities on the Virginia Barrier Islands are very low when compared to any other Atlantic coastal area. However, with the global significance of the barrier island chain, particularly in relation to nesting and migratory birds and the favorable habitat that supports these birds, any human activity demands a raised level of concern.

Results from 2006 continue to show minimal change in the type, scale or scope of human activity. While 2004 and 2005 seemed to show a slight increase in research and recreational sport fishing on the barrier islands, that trend did not continue through 2006. Most notable this year was the increase in landowner presence on the barrier islands. TNC, USF&WS and Virginia DCR/DNH all had an increased personnel presence on the islands and lagoon system. DGIF has an additional full-time permanent assistant to support their non-game biologist and summer technicians in several monitoring projects. In addition, several other extensive avian monitoring, SAV restoration and oyster shell planting projects brought hundreds of additional man-hours "patrolling" the islands. The Shorekeeper and volunteer Creekwatchers (a Shorekeeper program) dramatically increased monitoring on the seaside. The Shorekeeper conducted 230 hours of direct patrols of the seaside and 135 hours of indirect patrols while supporting other VCZMP partners. The Creekwatchers network was expanded primarily through networking with the clam aquaculture industry, volunteers and three very active Shorekeeper board members.

Generally, there was widely distributed light recreational usage throughout the survey area with human activity observed on a barrier island or near a sensitive restoration area on most dates. On most patrol days, humans were observed on at least one of the islands. Fortunately, those observed fell into two general groups. The largest observed group was land managers and researchers conducting appropriate activities. Second were casual recreational users that, for the most part, were complying with island use policies (Figure 9.) Recreational boating numbers on the seaside were down in 2006. The general consensus of boaters polled indicated gas/fuel prices were likely the cause. Although windy weekend spring weather seemed to limit recreational flounder fisherman, with seasonable weather and light winds during the summer resulted in favorable weather for recreational activities. One significant storm, Tropical Storm Ernesto on September 1, brought a significant wind and wave event to the seaside followed by a series of very high storm tides. Most of the seaside damage was from the high tides. All the seaside towns suffered damage including the closing of the Chincoteague causeway for a three hour period around high tide. The barrier islands showed typical storm response; with increased areas of over-wash and some island retreat.

Accessing harmful activity on restored natural resource areas, particularly oyster restoration areas continues to be difficult. As has been the case in previous years, the Shorekeeper was only able to document two illegal harvestings of oysters from any restoration, protected or set-aside area in 2006. This year, TNC supplemented their staff with a summer intern who assisted staff in dramatically increasing their posting efforts around managed shellfish grounds. The Nature Conservancy's postings are primarily possible because most of their grounds are riparian lands adjacent to property owned by TNC. Virginia law does not restrict postings of these areas to the Mean Low Water mark (MLW). This enables TNC to erect "No Trespassing" signs in these riparian areas. Although the signs have no legal power to keep boats from being in the water over the restoration areas, they do provide a clear message to boaters. Lands that do not become exposed at low tide and are not contiguous to owned land can not be posted with any exclusive language. Additional comments are included in 2005 recommendation follow-up.

PAST RECOMMENDATIONS; FOLLOW-UP:

2004 Recommendation 1 summary: *Land managers, large property owners and resource managers should meet to discuss the issue of human impacts on the barrier islands, and;*

2004 Recommendation 2 summary: *Use policies need to be clarified and made available to the public.*

The brochure titled “*LIFE ON THE BEACH ISN’T ALWAYS EASY*” (Figure 10) has been well received by land managers and island users. The brochure was funded in part by the VCZMP and in part by the Virginia DGIF through a grant from the USFWS, Federal Aid to Wildlife Restoration Project. Brochures were printed and VCZMP distributed them to Eastern Shore vendors and public contact centers as well as to land managers for local distribution. The Shorekeeper distributed brochures to public contact points and local eco-tour business owners. The land managers and the Shorekeeper also use the brochure when conducting outreach to educate the public on barrier island protection and public use policy. Commercial tour and kayak operators have provided positive feedback on the content and quality of the brochure. A query in August 2006 indicated that all of the land managers and partners that received brochures in 2005 want to continue stocking and using the brochures. VCZMP is working on funding for a reprint for 2007.



Figure 10: “LIFE ON THE BEACH ISN’T ALWAYS EASY” brochures. Background is opened brochure showing ownership.

2004 Recommendation 3 summary: *Colonial nesting bird areas need to be more clearly defined and posted.*

2004 Recommendation 4 summary: *Islands that are closed to the public should be posted as such.*

2004 Recommendation 5 summary: *Temporary barriers need to be considered.*

2006 continued to be an improvement the posting of nesting bird areas on the barrier island. The additional staff and interns hired by TNC have done an excellent job posting their lands. Posting in 2006 was well placed and covered a majority of the areas where nesting occurred. The Virginia Department of Conservation and Recreation, Division of Natural Heritage (DCR/DNH) has had a full time regional steward on the Eastern Shore for the past six years. Posting on DCR/DNH land has been effective. DGIF and TNC staffs have partnered to monitor Piping Plover and other birds on public and private lands. Their increased presence on the islands has located



Figure 11: Ownership and usage sign posted on Ship Shoal Island by The Nature Conservancy. 2006.

and posted many solitary nest sites, primarily on Metompkin and Cedar Islands, which have traditionally gone un-posted. Their increased presence may also be deterring human impacts from recreational users on solitary nesting sites. USF&WS, Eastern Shore/Fisherman Island NWR was assigned a full-time law enforcement officer in 2005. The availability of an officer and the additional presence will assist in monitoring and deterring any unwanted human impacts. USF&WS properties that are closed to the public are well marked. This year TNC developed a standard sign using international symbols to show ownership (figure 11) and received a \$13,500 grant for additional signs and posting material. Though it is widely agreed that maintaining large year-round signs on the islands is difficult due to the dynamic nature of the land, it is a clear and concise way to show ownership.

2005 Recommendation 05-1 summary: *Barrier Island landowners and land managers need to meet to evaluate the human impacts of certain types of research.*

The VCZMP does provide a forum for grant funded partners to meet annually to update and discuss projects. While these meetings primarily focus on the current VCZMP projects, it is one of the few opportunities to hear from the broad research community. Avian projects that cover multiple islands and multiple lands are the possible exception. Various single avian species projects appear to be receiving more scrutiny in regards to conflicts with other avian species. This year, following concerns over bird injury, DCR-DNH placed additional limits on a long term Royal Tern projects after significant discussion with the Royal Tern Working Group, other partners and within its own agency. DGIF & TNC field personnel have collectively developed a number of agreed upon practices for, marking nests, spotlighting birds and trapping birds. TNC has limited herbicide control of the invasive plant *Phragmites australis* during the Seaside Sparrow nesting season.

2005 Recommendation 05-2 summary: *Recent increased emphasis on nature-based or eco-tourism by the local government need to be considered.*

The idea of nature-based or ecotourism is not a new idea on the Eastern Shore. Over the past two years changes in the Eastern Shore Tourism Commission and changes in Accomack and Northampton County's leadership have placed an increased emphasis on nature-based or eco-tourism. At a joint Northampton/Accomack County Board of Supervisors meeting in September 2005, Northampton County Supervisor Andrew Barbour presented a draft proposal that outlined the value of the seaside and barrier islands as a marketable resource to draw visitors to the Eastern Shore. This summer, the Eastern Shore Tourism Commission began using language focused more on branding the "Eastern Shore" name and less on barrier island access. Public Island managers can expect this issue to reemerge from time-to-time as localities try to leverage access to the islands. Federal and state land managers have legally mandated public use policies that are incorporated into their management plans (or master plans). There may already be commercial access opportunities on Mockhorn Island WMA and many of VMRC's marsh land through current special use permitting. Additional opportunities will be explored in 2007 through a VCZMP grant to evaluate camping platforms on the seaside. This may serve to provide controlled access to the seaside waters for campers and kayakers while limiting the need to access the barrier island.

2005 Recommendation 05-3 summary: *Seaside Water Trail signage should be carefully worded.*

No signs have been developed. The installation of the floating docks is proceeding with the fifth floating dock being installed in Willis Wharf by October 2006. There have been delays in permitting and contracting. Once the floating docks are installed land and resource managers should be contacted to provide input on signage located at the kiosks. There should be ample time to vet though the various land managers to balance their barrier island protection concerns while encouraging responsible public access to the Seaside. While no specific language is suggested, these kiosks will be one of the few public information points to educate visitors.

2005 Recommendation 05-4 summary: *The Eastern Shore Avian Partnership needs to update their Conservation Action Plan.*

A report titled, *Progress on Goals of the 1996 Conservation Action Plan for the Avian Communities in the Virginia Barrier Islands System* was prepared by Terwilliger Consulting Inc. under a subcontract with Virginia Eastern Shorekeeper.

The summary progress report documents and describes the progress made to date on identified goals over the Plan's 10 year implementation. Information was gathered from lead partners and co-partners to document the status of progress for each of the 8 Management Actions, 12 Research and Monitoring Actions and 5 Conservation Education Actions. Interviews were conducted and websites, publications, annual reports and other relevant documents were reviewed to capture the progress made to date, over the Plan's 10 year implementation. The report also begins to describe current status and identify new opportunities, challenges and potential partners that have developed since this plan was first implemented. The report includes hyperlinks to online supporting documents. Also, a CD was created with .pdf versions of several of the supporting documents that were not available online and a list of acronyms used in the Progress Report.

The Progress on Goals of the 1996 Conservation Action Plan for the Avian Communities in the Virginia Barrier Islands System report will serve as the foundation for the next phase, guiding assessment of what remains to be done of the original goals. It will also facilitate identification of new goals and priorities for the next 10 years to guide respective and cooperative management, research and monitoring, and education actions by the Virginia Coastal Avian Partnership. This is the first step in updating the Plan to be incorporated as the avian portion into the broader Seaside Management Plan.

2005 Recommendation 05-5 summary: *Oyster restoration areas need to be clearly marked with compliant signage.*

This year, oyster reefs and oyster restoration areas were better marked. Signage, which was often damaged by storm and tide stayed in place throughout the summer. TNC dramatically increased their oyster ground markings. Good markings aid with monitoring and enforcement. TNC has begun to map reefs using GPS in 2005. TNC has provided law enforcement personnel exact reef locations.



Figure 12: Collage of signage marking oyster grounds on the seaside. Photo assembled from three different signs from three different locations.

Land Managers using signage containing the words “No Trespassing” or “Keep Out” (figure 12) need to ensure that they are on their riparian land at or above the low water mark. All other postings should be in compliance with VMRC regulations. In Virginia, shellfish leases not adjoining riparian lands only cover 12 inches from the bottom. In effect, the water that covers these leases is still open for public use. Even in designated Oyster Management Areas it is not illegal to be in the area provided you are not in possession of shellfish or shellfish harvesting equipment. Some areas are still marked with metal posts and are not in compliance with Virginia code. Two sections of Virginia Code, 4 VAC 20-290-20 and 4 VAC 20-290-30(B)1 apply. (Appendix 3)

The SAV protection areas in Chincoteague Bay are well marked with permanent wooden pilings and large clearly visible signs.

2005 Recommendation 05-6 summary: *Increased monitoring and enforcement is needed in oyster restoration areas.*

TNC and VMRC both reported thefts in 2004, 2005 and 2006 that greatly reduced the oyster stocks in critical restoration and set-aside areas. The Shorekeeper increased patrols in the greater Oyster harbor/South Bay/Cobb Island Bays area where the highest theft was reported.

Unfortunately, no illegal harvest of shellfish was observed in restoration areas. The remote location of these sites makes undetected monitoring difficult. Boats in this part of the lagoon system can be seen for miles. TNC has indicated that, provided available funding, they intend to add an additional seasonal staff to work on their oyster restoration projects and mark and monitor their sites.



Figure 13: Two boats harvesting oysters from a state riparian land on Wreck Island Natural Area Preserve. 2006

The Shorekeeper and DCR/DNH staff observed two different groups harvesting oysters' from riparian lands adjacent to Wreck Island NAP (Figure 13). Since the taking of shellfish was on riparian land VMRC has no jurisdiction over the harvest. The case has been referred to DCR/DNH Operations (law enforcement) and is pending.

VMRC has increased their on-the-water patrols on the seaside. VMRC has had a good presence at boat landings and commercial on-shore facilities but seemed to have reduced its on-the-water patrol hours in 2004 and 2005. As an example of their increased patrol efforts, in August, while assisting DCR/DNH staff on Wreck Island NAP a VMRC officer approached the island by boat, landed and signaled us over to the boat to check us.

RECOMMENDATIONS:

Recommendations for 2006 include, as noted, actions planned by other VCZMP partners that are viewed as positive management actions in addressing human impacts on the barrier islands.

Recommendation 06-01: Cedar Island private property access

A vast majority of visitors to Cedar Island view the beaches and overwash areas as common areas, particularly where the island has accreted or expanded northward. There are also significant private property holdings in that area of the island that is not owned and maintained (at least from a legal/tax perspective) by conservation agencies or organizations.

In 2003, Accomac County re-assessed the remaining lots and updated the tax records. On 30 January 2003 tax records indicated there were 629 listed parcels recorded for Cedar Island. Of those, only 165 showed a listed value (other than the \$100.00 minimum fee of as USF&WS holdings) suggesting that, at the time of that survey, there were only 165 parcels that were likely actual lots at high tide. Of those 165 parcels, 17 were listed as USF&WS and 10 were listed as TNC. Many of the remaining private lot owners have continued to pay property taxes and maintain a legal claim to their property. With few physical land marks on the island, locating lot boundaries can be difficult. Resource managers have not made a concerted effort to identify these owners and to seek permission to post and monitor the nest sites on these lands. Over the years, nesting colonies on the north end of Cedar Island (Cedar Sandbar) have been posted. In 2005, a mainland developer marketed a link between his mainland development, Seaview Farm, and a "private" beach on property owned on Cedar Island. While DGIF personnel maintain contact with the current manager of the Seaview Farm, this still gives property access to dozens on non-island property owners.

While the intent of resource managers is to protect nesting bird colonies on the northern end of Cedar Island, they may need to be cautious when posting on private property or if considering recommending private citizens leave property they otherwise believe they have a legal right to be on. Virginia law allows certain state and federal resource personnel legal access to private property to locate and access endangered and threatened species. Encroachment upon the nesting sites of threatened and endangered species identified by the Virginia Department of Game and Inland Fisheries or Department of Conservation and Recreation are protected by 4VAC20-440-10.C.11 (Appendix 4). It should be noted that DGIF reported all the property owners on South Cedar were notified prior to the start of the terrapin study and had given their consent.

To address these private property issues it is recommended that;

1. Posting of nesting areas of non-threatened or non-endangered species should be discontinued on island lands where the property ownership is not known or permission has not been received.
2. State and federal officials, who in the course of their official work, access private property should ensure they are acting within the legal scope of their employ. In some cases, state and federal resource personnel can access private property to monitor for certain endangered animals or to investigate and control harmful activities. It may be unrealistic to assume that all private property owners are aware of all monitoring and research activities occurring on their land and are thereby providing consent.
3. Island resource managers and researchers who intend to work on private island property need to make a reasonable attempt to identify the private property and contact the owners to seek permission for activities not covered by existing statutory authority. This would be consistent with the

requirements that resource managers who wish to work on most of the islands where private, state and federal land owners already require some type of research or special use permit.

Recommendation 06-02: *Get creative on Oyster theft.*

Law enforcement and increased patrols alone are not curbing the illegal harvest of oysters from restored areas. While increased patrols by TNC, VMRC and Shorekeeper may be deterring some illegal activity, it is not reducing it enough. Recommend that the VCZMP partners involved in oyster restoration get together to devise innovative ways to monitor oyster reefs. TNC has already increased postings and may hire additional staff to ensure the success of their restoration efforts. But there may never be enough manpower to successfully monitor these remote sites. Use of remote sensing and photo monitoring may provide an additional layer of protection and should be discussed.

Recommendation 06-03: *Better Shorekeeper patrol tracking.*

Innovations in boat tracking through Global Positioning Systems (GPS) will allow for detailed record keeping while on patrol. Tested this year, the Shorekeeper boat tracking will allow for detailed review of patrol areas. This should aide in identify gaps in areas patrolled. (Figure 14 & 15)



Figure 14: Detail of Shorekeeper boat tracks from 17 July to 30 September 2006 near Ship Shoal Island. 2006, Garmin MapSource® software image



Figure 15: General overview of Shorekeeper boat tracks from 17 July to 30 September 2006, Garmin MapSource® software image

Recommendation 06-04: *Vehicles and ATV usage needs to be addressed.*

The Shorekeeper will meet with DGIF and VMRC law enforcement officials to discuss enforcement options to address the vehicles that are operating on islands. The hope is that the vehicles can be made operate to in a responsible manner without otherwise limiting other research and land manager needs.

Recommendation 06-05: *Expand the visibility of the Virginia Seaside Water Trail.*

The VCZMP officially launched Virginia's Eastern Shore Seaside Water Trail this summer. The intranet-based trail guide and map of the 100 mile long trail should begin to introduce more responsible recreational kayakers to the seaside of the Eastern Shore. This provides an excellent opportunity for the Shorekeeper and other resource managers to engage people who are likely to become advocates for the protection of the barrier islands. In addition, as kiosks and floating docks are installed, these structures need to be maintained. Additional and creative uses can be explored while still protecting the islands.



Figure 16: New Virginia Seaside water Trail floating dock in Wachapreague, VA. 2006

Specifically the Shorekeeper will:

1. Monitor the use and physical condition of all the installed floating docks. Kayakers using the floating docks will be contacted and provided "An Intranet Guide" or island bird brochure if not familiar with the program. Input will be solicited on improvements.
2. The general condition of the floating docks (Figure 16) and kiosks (when installed) will be monitored. Minor maintenance and clean-up will be performed and damage will be reported.
3. Subcontract with Southeast Expeditions to evaluate camping platforms and other alternative observation or stopover sites that could enhance the Seaside Water Trail.

Report acronyms used:

Commonwealth	Commonwealth of Virginia
DCR/DNH	Virginia Department of Conservation & Recreation, Division of Natural Heritage
DGIF	Virginia Department of Game and Inland Fisheries
NAP	State Natural Area Preserve managed by DCR/DNH
NWR	National Wildlife Refuge managed by USF&WS
TNC	The Nature Conservancy
USA	United States of America
USDA	U.S. Department of Agriculture
USF&WS	U.S. Department of the Interior, U.S. Fish & Wildlife Service
VCZMP	Virginia Coastal Zone Management Program
VIMS	Virginia Institute of Marine Science
VMRC	Virginia Marine Resources Commission
WMA	State Wildlife Management Area managed by DGIF

REFERENCES

Virginia Eastern Shorekeeper, 2004, *Human Impacts to Sensitive Natural Resources on the Atlantic Barrier Islands on the Eastern Shore of Virginia, 2004 Report*

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Barnes, B.M., Truitt, B.T., 1997, *Seashore Chronicles, Three Centuries of the Virginia Barrier Islands*

Maryland Coastal Bays Program, *State of the Maryland Coastal Bays, 2004*

Human Impact definitions:

Human Impacts and harmful activities are largely objective terms. No defined terms are widely agreed upon by land managers and researchers. For purposes of this report, the terms;

- “**Human impact**” generally refers to the potential of any human activity that may serve to disrupt the natural balance.
- “**Harmful activity**” is a specific activity that is likely to disrupt or damage the natural processes.
- “**Land Managers**” are employees of the land owner, private or public, who by the nature of their jobs have specific responsibilities to provide conservation stewardship over a given area of land.
- “**Resource Managers**” are employees of a private, public or governmental organization who have the responsibility in making research or management recommendations to better a particular natural resource.

Title 28.2 of the Code of Virginia, Chapter 14 et seq., provides the following definitions.

"Beach"

means the shoreline zone comprised of unconsolidated sandy material upon which there is a mutual interaction of the forces of erosion, sediment transport and deposition that extends from the low water line landward to where there is a marked change in either material composition or physiographic form such as a dune, bluff, or marsh, or where no such change can be identified, to the line of woody vegetation (usually the effective limit of stormwaves), or the nearest impermeable manmade structure, such as a bulkhead, revetment, or paved road. (§28.2-1400)

"Coastal primary sand dune" or "dune"

means a mound of unconsolidated sandy soil which is contiguous to mean high water, whose landward and lateral limits are marked by a change in grade from ten percent or greater to less than ten percent, and upon which is growing any of the following species (§28.2-1400):

American beach grass	<i>Ammophilla breviligulata</i>
Beach heather	<i>Hudsonia tometosa</i>
Dune bean	<i>Strophostylis spp.</i>
Dusty miller	<i>Artemisia stelleriana</i>
Saltmeadow hay	<i>Spartina patens</i>
Seabeach sandwort	<i>Arenaria peploides</i>
Sea oats	<i>Uniola paniculata</i>
Sea rocket	<i>Cakile edentula</i>
Seaside goldenrod	<i>Solidago sempervirens</i>
Short dune grass	<i>Panicum ararum.</i>

"Marsh" or "meadowland"

shall have the same meaning ascribed to vegetated wetlands in § 28.2-1300.

"Ownership of ungranted shores of the sea, marsh and meadowlands"

All ungranted shores of the sea, marsh and meadowlands shall remain the property of the Commonwealth. Such ungranted marsh and meadowlands which have been used as a commons by the people of the Commonwealth shall continue as a commons for the purpose of fishing, fowling, hunting, and the taking and catching of oysters and other shellfish. All ungranted shores of the sea may be used as a commons for the purpose of fishing, fowling, hunting, and the taking and catching of oysters and other shellfish. The Commission shall manage all ungranted shores of the sea, marsh and meadowlands as provided in Article 2 (§ 28.2-1503 et seq.) of this chapter. (§ 28.2-1502)

"Shores of the sea"

means a beach or any unvegetated lands lying contiguous to mean low water and between mean low water and mean high water. (§ 28.2-1500)

This regulation establishes the required manner and method for marking leased oyster planting ground. §28.2-607 of the Code of Virginia requires that a lessee of oyster planting ground mark such ground in accordance with regulations established by the Marine Resources Commission. While all leased oyster planting grounds are not required to be marked at all times, it is the intent of this regulation to ensure that when the ground is marked, the boundary lines are properly and accurately delineated and safe navigation is maintained.

4 VAC 20-290-10. Purpose.

The purpose of this chapter is to describe the proper manner and method of marking leased oyster planting ground during such times when the ground is required to be marked or for such other instances when a lessee may desire to mark the ground.

4 VAC 20-290-20. General.

Leased oyster planting ground shall be marked by the lessee if the oyster planting ground is being worked. No harvesting or planting of leased oyster planting ground shall occur unless the lessee first has properly designated and marked the lease in accordance with the provisions of this chapter.

4 VAC 20-290-30. Method and manner of marking.

A. Marking requirements. When leased oyster planting ground is marked, it shall be marked with stakes or buoys so as to delineate accurately the boundary lines of the lease and prevent any unnecessary restriction to navigation.

1. Corner markers. The corners of leased oyster planting ground shall be marked and multiple markers may be used in these corners.
2. Boundary line markers. Under normal circumstances markers shall be placed at intervals no smaller than 150 feet.

B. Description of markers.

1. Stakes shall be no longer than two inches in diameter at the mean low water line and shall extend at least four feet above the mean high water line. The stake shall be of such materials not so rigid as to harm a boat if accidentally struck. Bamboo, white oak, cedar, or gum saplings are commonly used, but not required. If polyvinyl chloride (PVC) pipe is used, and driven into the bottom, the diameter of the PVC pipe shall be two inches or less. Metal pipe markers are prohibited.
2. Buoys shall be constructed of wood, PVC, or other suitable material, shall be no larger than six inches in diameter, and shall be anchored with sufficient weight to prevent their moving during adverse weather conditions. Buoys shall be constructed and anchored so as to extend at least four feet above the water line at all times.

4 VAC 20-290-40. Maintenance.

When oyster planting ground is marked, suitable stakes or markers shall be kept by the lessee in their proper places at all times so as to conform accurately to the survey. Should such stakes or markers be removed, knocked down, or be carried away, the lessee shall replace them in their proper location.

4 VAC 20-290-50. Exception.

The Marine Resources Commission may require its chief engineer to describe a plan for the proper marking of any designated oyster planting ground when it finds exceptional circumstances exist. In such a case the chief engineer shall direct the leaseholder where to place the appropriate markers.

4 VAC 20-290-60. Penalty.

As set forth in § 28.2-903 of the Code of Virginia, any person violating any provision of this chapter shall be guilty of a Class 3 misdemeanor, and a second or subsequent violation of any provision of this chapter committed by the same person within 12 months of a prior violation is a Class 1 misdemeanor.

4VAC20-440-10. Barrier island policy.

A. Introduction.

1. Definitions. For the purpose of this chapter, the definitions contained within §62.1-13.22 of the Code of Virginia apply. In addition, the following words and terms when used in this chapter shall have the following meanings unless the context clearly indicates otherwise: "Barrier islands" means elongated narrow landforms consisting largely of unconsolidated and shifting sand, fronted on one side by the ocean and on the other by a bay or marshland which separates them from the mainland. "Dune crest" means the highest elevation of the coastal primary sand dune on the lot as determined in consultation with the Virginia Institute of Marine Science. "Local 100-year long-term recession rate" means calculating the average shoreline recession over fixed one-mile intervals averaged over the period between surveys of 100 years or more.
2. Background. Barrier islands are transient landforms. Their dynamic and unstable nature poses significant risk to life and property located there. Scientific evidence placed before the Marine Resources Commission supports a finding that some of Virginia's barrier islands, including Cedar Island, are more fragile, more unstable and pose even greater risk to life and property than many other coastal barriers, due to their sand-deficient character. In addition, barrier islands are themselves significant natural resources that contain a number of specific features (coastal primary sand dunes, wetlands, and vast stretches of state-owned sandy beaches) including natural heritage resources and threatened or endangered species that are recognized by the General Assembly for their natural value and are protected by law. This policy applies to the barrier island systems on the seaside of the Virginia portion of the southern Delmarva peninsula, and is not intended to cover military activities essential to national security, or the construction, operation, maintenance or rehabilitation of coast guard facilities or access to them. This exclusion does not obviate compliance with other applicable provisions of the Coastal Primary Sand Dune Protection Act. Survival of these barrier islands often depends on the ability of sand to wash across the island naturally in concert with the local wind and wave climate. The sand is then protected from loss offshore and provides a means of perpetuating the island, albeit in a more landward location. Activities which adversely affect this interaction can have an extremely detrimental impact on the island as well as the structure, form and function of its dune system. The artificial accumulation of sand along the oceanside of an island can make it more susceptible to loss offshore during a storm. Once such a loss occurs, the sand then becomes unavailable for washover and for the continued landward migration of the island. Houses, sand fences and similar structures can also alter wind patterns; this alteration impedes the wind transport of sand across the island. Accumulations adjacent to these impediments can be lost offshore as the shoreline continues to recede, leading to an increased rate of recession and a narrowing of the island. In addition, many of the Commonwealth's rarest species depend on the continuation of natural processes that currently exist on barrier islands. Consequently they are threatened by any interference with those processes. The implementation of the policies and guidelines set forth in this chapter will support a fuller achievement of the purposes of the Virginia Natural Area Preserves Act (§10.1-209 et seq. of the Code of Virginia), the Virginia Endangered Species Act (§29.1-563 et seq. of the Code of Virginia) and the Virginia Endangered Plant and Insect Species Act (§3.1-1020 et seq. of the Code of Virginia). Two of the main natural features of barrier islands are natural dunes and washover areas, both of which are included in the statutory definition of a coastal primary sand dune as a "mound of unconsolidated sandy soil which is contiguous to mean high water, whose landward and lateral limits are marked by a change in grade from 10% or greater to less than 10% and upon any part of which is growing" certain designated plants as listed in §62.1-13.22 of the Code of Virginia. Given the particular combination of risks to both natural values and life and property posed by development on barrier islands, the commission finds it necessary and appropriate to establish a policy and supplemental guidelines to assist landowners and decision makers alike in shaping barrier island uses in a manner that preserves and protects the values of coastal primary sand dunes as set forth by the General Assembly.

B. Permits required.

1. Applications for new development.
 - a. No construction or any other activity which has the potential for encroaching on or otherwise damaging coastal primary sand dunes or state-owned beaches shall occur without review and approval by the Marine Resources Commission (commission) or a local wetland board, or both. Consequently, a permit application shall be submitted for any such construction or other activity. Each application shall include:
 - (1) A certified survey of the site which is representative of current conditions showing: (i) one foot contours relative to local mean high water, commencing at the line and proceeding through the site to the first wetlands vegetation, (ii) specific location for all proposed structures including septic system and drainfields, (iii) size, configuration and design of access points, (iv) location of any other activity which may affect coastal primary sand dunes or state-owned shore, and (v) a dune crest, determined in consultation with the Virginia Institute of Marine Science, which identifies the highest elevation of the coastal primary sand dune on the lot.
 - (2) A copy of both a valid building permit and septic or other wastewater handling or disposal system permit.
 - b. All lot pins and proposed construction locations, drainfield sites and access points shall be staked and tied to suitable reference points.

- c. In its review of the application, the commission (or a local wetlands board) will determine the correctness of the dune crest and will establish a minimum setback necessary to prevent encroachment in or damage to the dune or interference with the natural processes of dune growth.
2. Loss of structures and applications for redevelopment. When a structure is destroyed or damaged by natural events such that the structure is condemned by health officials or local building officials, reconstruction in that location may not be authorized. Submission of a new application and evaluation as if no structure were present will be required. In the event a structure is damaged beyond repair and no longer habitable or damaged and not restored to a usable state within one year, the owner of record shall be responsible for the complete removal of all vestiges of the structure and materials resulting from them, including the septic tank, distribution box and drainfields in their entirety, or as directed by the state or local Department of Health. The owner of the lot shall restore the area to as natural a state as possible.

C. Supplemental guidelines.

1. Structures.

- a. No permanent structure, other than those already specifically allowed by law or provided in subdivision C 2 b below for purposes of permanent access, will be permitted seaward of the crest of the coastal primary sand dune. No permanent alteration of the coastal primary sand dune will be permitted, except in accordance with the standards set forth in the Coastal Primary Sand Dunes Act.
- b. Since it is well established that the coastal primary sand dunes and the islands themselves recede continually westward at a reasonably predictable rate, and that excessive vehicular and pedestrian use will increase the fragility of coastal primary sand dunes or impact upon significant natural resources, development must be limited to no more than low density single family use on each platted parcel. Uses other than single family dwellings can clearly be characterized as "unnecessary and inconsistent with the public interest considering all material factors."
- c. The density of structures and the percentage of the shoreline frontage occupied by those structures are critical to minimizing the impact they have on sand migration across the island. Data concerning the development on barrier islands indicates that adverse impacts may be minimized when no more than 25% of the islands' linear shoreline is occupied by structures. This factor shall be considered in evaluating the individual and cumulative impacts of each permit application. In considering permit applications, the following guidelines shall be followed:
 - (1) There shall be adequate area within the lot that is neither sand dune, including beach and overwash areas, nor wetlands to accommodate the proposed dwelling and any appurtenant structures, including attendant sanitary facilities.
 - (2) Minimum frontage for a lot on the ocean capable of supporting a single-family vacation cottage shall be 100 feet.
 - (3) Minimum side yard requirements shall be 30 feet.
 - (4) The setback from the dune crest for all structures including septic systems shall be 20 times the local 100-year long-term annual shoreline recession rate. The dune crest shall be defined as the location of the highest elevation of the coastal primary sand dune, beach or washover located on the lot.
 - (5) The maximum allowable square footage for the first floor of a single family dwelling on a 100-foot lot shall be 900 square feet and for a 200-foot lot, 1800 square feet, including porches, decks, and other appurtenances. Houses with first floors larger than these will not be considered necessary economic development.
 - (6) The maximum height of a dwelling shall be 25 feet measured from the base of the first floor to the peak of the roof.
 - (7) All dwellings shall be constructed on elevated open pilings a minimum of 10 feet above grade. No enclosures will be permitted below the first floor.
 - (8) An appropriate identification number shall be affixed to all septic tanks made of nonbiodegradable plastic materials to aid in their identification.
 - (9) Exceptions to these requirements may be authorized in individual cases. No such exception shall be authorized unless the commission finds (i) that the strict application of the requirement would produce undue hardship, and (ii) that the authorization of such exception will not result in significant detriment to barrier islands, their natural resources, or adjacent property.
- d. Evidence of cumulative environmental impacts of existing and proposed structures, as well as the secondary impacts resulting from their use, shall be considered in passing upon any application for a permit.

2. Access.

- a. No cuts through the dune will be permitted. Temporary vehicular access for purposes of construction will be permitted only by open-pile or "corduroy" ramps. Permits for temporary vehicular access will be limited as necessary to protect significant natural resources. At expiration of the authorized term all structures, except as noted in subdivision b below, shall be removed and the dune restored to its preconstruction contours and revegetated. All plans for temporary construction access must be specified in the application of any construction permit.
- b. Permanent vehicular access across the dune will be permitted only by "corduroy" or open-pile vehicular ramps which allow the natural process of dune growth and migration to occur. An open-pile or "corduroy" ramp developed for purposes of construction access may remain in place for permanent access if it meets the above criteria and is specifically approved. All plans for permanent access must be specified in the application for any construction permit.

- c. Each dwelling will be limited to a maximum of one vehicle for access to and from the island's landings. All vehicles shall be subject to the following conditions:
 - (1) Each vehicle shall have a no-cost annually renewable permit to travel on the beach. The owner shall attest at the time of renewal the vehicle's status and condition.
 - (2) The permit number for each vehicle shall be displayed in two-foot high letters on the roof and sides of the vehicle.
 - (3) When a vehicle for a particular dwelling is no longer functional, it must be removed from the island. Evidence of its removal must be provided prior to the issuance of a permit for a new vehicle.
 - (4) All driving will be limited to the intertidal zone and between there and approved dune crossovers. Vehicular use of the beach at periods greater than four hours either side of low water shall be considered a violation of this section.
 - (5) All bird nesting areas posted by the Virginia Department of Game and Inland Fisheries, U.S. Fish and Wildlife Service, or Department of Conservation and Recreation shall be off limits to all vehicles.
 - (6) No all terrain vehicles (ATVs) will be permitted on barrier islands.
 - (7) Evidence of vehicular use in areas other than those authorized shall be cause for revocation of the permit and a requirement that the vehicle be removed from the island. Any person having his permit revoked shall be precluded from reapplication for a one-year period.
3. Roads. No roads or trails will be permitted on or across any coastal primary sand dune or in any wetland.
4. Sand movement. No artificial relocation of sand will be permitted.
5. Shore hardening. Structures normally associated with or used for shoreline protection or erosion control, including but not limited to bulkheads, riprap, revetments, gabion baskets, sand bags, groins and jetties, or any other hardening of the shoreline will not be permitted under any circumstances.
6. Point source discharges. No point source discharge pipe, structures or other devices will be permitted.
7. Bond requirement. A reasonable bond or letter of credit will be required prior to granting any permit to assure restoration of any temporary alteration of the coastal primary sand dune including, but not limited to, regrading to the original elevation, resprigging with appropriate vegetation and removal of any and all construction debris.
8. Sand fence. The use of sand fencing or other artificial barriers is discouraged because of its interference with the natural sand transport and migration on barrier islands.
9. Solid waste. All solid waste generated on barrier islands must be removed and disposed of appropriately on the mainland.
10. Pets. In order to prevent unrestricted roaming which may result in the disturbance of, or depredation to wildlife, domestic pets must (i) be restrained or under control of their owner at all times, (ii) shall not be allowed off of the owner's property except under leash, and (iii) shall not be abandoned on a barrier island.
11. Endangered species. Encroachment upon the nesting sites of threatened and endangered species identified by the Virginia Department of Game and Inland Fisheries or Department of Conservation and Recreation is prohibited. Evidence of impact or potential impact on threatened and endangered species shall be considered in passing upon any application for a permit.
12. Landscaping. The planting of exotic species or introduction of non-native fauna are impermissible. Broadcast spraying of pesticides or herbicides is impermissible except when necessary to protect the public health or safety as decreed by the appropriate public health official.

D. Public hearings. The public hearing required by §6 of the model ordinance may be held in Newport News, Virginia. Such hearing will not be scheduled until the commission staff has determined that it is in receipt of a complete application.

E. Comments/advisory notes.

1. Risks. While future events and their impacts on human activity cannot be forecast with any degree of precision, experience in other coastal areas suggests a proclivity to seek public assistance when catastrophic events occur or when services are needed beyond the ability of private resources to provide. The commission believes that any development on barrier islands should be undertaken only with the full acceptance by the owners of the risks involved.
 - a. No public protection of private property. Authorization of structures should in no way serve as justification for the future expenditure of public resources to protect such structures.
 - b. Services. Any services which may be provided by local government to promote public health, safety and general welfare must be installed, maintained and operated in a manner consistent with the policy, standards and guidelines of both the Wetlands and Dunes Protection Acts.
 - c. Relocation of structures. Once local mean high water approaches a structure to within 10 times the average recession rate, a plan for its movement/relocation must be submitted for review. No movement or relocation will be permitted without the written permission of the commission.
2. Interference with natural processes. The serious sand deficiency which currently exists on Virginia's barrier islands is exacerbated by any artificial manipulation, including sand fences, which might render the supply more vulnerable to export offshore or interfere with the natural movement onshore in washover areas during storm events. Private property owners have even more at stake than the public-at-large in assuring that natural processes are not interfered with to any discernible degree.
3. Value of dune preservation. Special emphasis is placed on the legislative declaration of public policy that coastal primary sand dunes "in their natural state serve as protective barriers from the effects of flooding and erosion caused by coastal storms, thereby protecting life and property."

- a. Accordingly, every reasonable precaution to avoid permanent alteration is expected to be exercised by all users in gaining temporary access to private property for construction or for continued access to authorized structures.
 - b. All construction, including septic systems, shall be set-back from mean high water a distance at the site to assure reasonable survival duration. Setbacks from the dune crest were specified in subdivision C 1 c (4) of this chapter.
4. Water quality. While the commission believes that properly functioning septic systems in the limited density anticipated will have no measurable effect, failing systems of greater numbers than now forecast could impact important public shellfish growing areas. Therefore, staff will request at least biannually from the Department of Health an assessment of the cumulative impact or catastrophic failure of septic systems they have authorized.

F. Policy with regard to private restrictive agreements. In addition to the above guidelines and advisory comments and as an additional means to reasonably "preserve and protect coastal primary sand dunes and reaches and to prevent their despoliation and destruction," and to help achieve the other purposes set forth by the General Assembly in the Coastal Primary Sand Dune Protection Act, the commission endorses and looks favorably upon restrictive private covenants which "accommodate necessary economic development in a manner consistent with the protection of coastal primary sand dunes." For example, the Commission encourages restrictive private covenants which:

1. Protect the "natural habitat for coastal fauna," "wildlife habitat," and "vegetation which stabilizes coastal primary sand dunes."
2. Prohibit special exemptions or attempt to obtain such exemptions from the application of controlling statutes.
3. Enhance the "scenic and recreational attractiveness of Virginia's coastal area," protect the "important natural habitat for coastal fauna," and protect the "vegetation which stabilizes such features."
4. Require cooperation with the state and federal conservation agencies to protect the ecologically significant natural resources including granting permission to post critical bird nesting sites.

Statutory Authority §28.2-103 and Chapter 14 (§28.2-1400 et seq.) of Title 28.2 of the Code of Virginia.

Historical Notes

Derived from VR450-01-0058, eff. October 24, 1990.

4VAC20-1030-20. Description of ungranted state lands.

A. Location and boundaries. This management plan covers 28,507 acres of ungranted state lands on Virginia's Eastern Shore. 27,722 acres are located on the seaside between the barrier islands and the mainland. 785 acres are located on the bayside. Although most of these lands are marsh, there are some uplands and fringe marsh included in the acreage identified as being state owned. The state lands covered by this plan have been surveyed by the Virginia Marine Resources Commission (VMRC) which produced a series of maps depicting the state lands. The maps have been recorded in the clerks' offices of Accomack and Northampton Counties and can be found at the Accomack County Courthouse in Accomac and at the Northampton County Courthouse in Eastville.

B. Surrounding demographic features.

1. **Northampton County.** Northampton County is located on the southern half of the Delmarva Peninsula in Virginia, known as Virginia's Eastern Shore. The southern tip of the Eastern Shore is connected to the Virginia mainland by the Chesapeake Bay Bridge-Tunnel. Northampton County is approximately 35 miles in length with an average width of six miles. The county extends from the Accomack County line in the north to Fisherman Island at the southern tip of the peninsula. The county encompasses about 360 square miles or 229,947 acres of land, tidal marshes, bayside creeks and barrier islands. More than half of the total acres in Northampton County are marshes, bayside creeks, and barrier islands. Twenty-five percent of the land is in agricultural and forest use. Only 3.0% of the land is developed for residential and commercial use. The remaining portion is undeveloped. Northampton County is governed by a Board of Supervisors. The county seat is in Eastville. According to statistics published in the 1990 census, the population of Northampton County is 13,061. The county is predominantly rural with occasional small residential centers. The basis of the economy is agriculture and seafood. The main occupations are in retail trade; the agriculture, forestry and fishing industries; manufacturing; construction; tourism; and health/education services.
2. **Accomack County.** Accomack County is located on the northern half of Virginia's Eastern Shore. Accomack County is approximately 45 miles long with an average width of 15 miles. The county stretches from the Northampton County line at the south to the Maryland state line at the north, and out to Tangier and Smith Islands in the Chesapeake Bay. Accomack County encompasses approximately 476 square miles, or 300,649 acres of mainland, marsh and barrier islands. Sixty-six percent of the mainland is in agricultural and forest use. Twenty-three percent of the land is tidal marshes and barrier islands, and the remaining 11% is developed for residential and commercial use. Accomack County is governed by a Board of Supervisors. The county seat is in Accomac. According to statistics published in the 1990 census, the population of Accomack County is 31,703. The main occupations are in retail trade; manufacturing; health/education; tourism; and the agriculture, farming and fishing industries.

C. Climate. The climate of the Eastern Shore is coastal with mild winters and warm, humid summers.

D. Land use.

1. Historic uses. The ungranted state lands covered by this management plan have historically been open to the public for traditional subsistence and recreational uses. Open access to beaches, marshes and meadowlands has been allowed in the past for recreational activities such as hunting, fishing, fowling, trapping, camping, salvaging, and eggng. In addition, commercial harvest of fowl, furbearers, finfish, shellfish, and terrapin has been allowed historically subject to state and federal regulations and, for personal and family use, by local citizens for centuries. These rights are intrinsic to the commons concept recognized in Virginia statutes and such uses are supported by historical precedent and general usage.
2. Current uses. Ungranted state lands are currently used for recreational and commercial activities, subject to state and federal regulations. It should be noted that certain historical uses, such as eggng, are no longer permissible under current legislation. This plan does not change existing laws and regulations concerning recreational and commercial activities or other traditional uses of the ungranted state lands. If it is, however, found that these activities threaten the natural integrity of these lands, it may be necessary to revise existing laws and regulations or to establish new guidelines or policies. Such changes would be in accordance with established procedures.
3. Surrounding land holdings.
 - a. Accomack County. The land surrounding the ungranted state lands in Accomack County fall into two categories of the Accomack zoning ordinance: (i) the agriculture district which covers portions of the county occupied by various open uses such as marsh lands, beaches, forests, parks and farms; and (ii) the Barrier Island District. In addition, Accomack County has a wetlands ordinance and a Chesapeake Bay preservation ordinance which overlay the zoning ordinance. Any development in these zoning districts is subject to the restrictions and regulations of the Accomack zoning ordinance. The county's future land use plans are detailed in the Accomack Comprehensive Plan, Section 5.
 - b. Northampton County. The land surrounding the ungranted state lands in Northampton County is currently zoned as an agriculture/residential district. There are, however, several ordinances that overlay the agriculture district. These are the Chesapeake Bay/Atlantic Ocean Preservation Area, the wetlands ordinance, and the primary sand dune ordinance. The future land use plan for Northampton County is detailed in Part II of the Northampton Comprehensive Plan.

4. The Nature Conservancy land holdings. The Nature Conservancy, a private, nonprofit conservation organization, owns and manages 14 islands, saltmarsh tracts, and adjacent mainland sites totaling 40,000 acres on Virginia's Eastern Shore. This area is called the Virginia Coast Reserve, and it has been designated a Biosphere Reserve by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) in its Man and the Biosphere Programme, recognizing it as one of the world's most important ecosystems. The Nature Conservancy is working to protect significant ecological values on Virginia's Eastern Shore.
5. Federal land holdings. The federal government has extensive holdings on Virginia's Eastern Shore. The U.S. Fish and Wildlife Service administers the National Wildlife Refuge System for the protection and conservation of fish and wildlife including those threatened with extinction. The U.S. Fish and Wildlife Service have two offices, the Chincoteague National Wildlife Refuge and the Eastern Shore National Wildlife Refuge, that manage the federal holdings on Virginia's Eastern Shore. The federal holdings are:

Chincoteague National Wildlife Refuge:	
Assateague	9,459 acres
Chincoteague	550 acres
Morris Island	427 acres
Assawoman Island	1,434 acres
Metomkin Island	174 acres
Cedar Island	1,250 acres
Eastern Shore National Wildlife Refuge	752 acres
Fisherman Island National Wildlife Refuge	1,825 acres
Wallops Island National Wildlife Refuge	3,376 acres (3,000 acres owned by NASA)
6. State land holdings. In addition to the ungranted state lands covered by this management plan, the Commonwealth of Virginia owns lands designated as natural areas and state parks on the Eastern Shore. These are:

Department of Conservation and Recreation	
Wreck and Bone Island NAP	1,380 acres
Parker's Marsh NAP	750 acres
Kiptopeke State Park	375 acres
Department of Game and Inland Fisheries	
Mockhorn Island WMA	7,642 acres
Saxis Marsh WMA	5,574.34 acres
7. Local land holdings.

Raccoon Park, in Northampton County	60 acres
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Statutory Authority §§28.2-103 and 28.2-1504 of the Code of Virginia.