

3.13 The Chesapeake Bay Shoreline of Northern Neck

*Authors: Ann Shellenbarger Jones, Industrial Economics Inc.,
Christina Bosch, Industrial Economics Inc.*

Overview

The Northern Neck's Chesapeake Bay shoreline comprises Lancaster and Northumberland counties. The Northern Neck has marsh and beach shoreline, with heavily armored areas along developed shores of the Potomac.

This brief literature review discusses species that could be at risk because of further habitat loss resulting from sea level rise and shoreline protection. Existing literature and knowledge of coastal scientists in the area appears to be sufficient in many cases to make qualitative statements about the possible impact if sea level rise causes a total loss of habitat, which might be expected if shores are protected with hard structures and the wetlands are unable to keep pace with sea level rise. Our ability is more limited, however, to say what the impact might be if only a portion of the habitat is lost. The overall environmental impact of sea level rise in this multicounty region is likely to include the following:

- The tidal marshes may be lost with rising sea levels, including the marsh-fringed Mosquito Island. The many rare birds that nest in the Northern Neck marshes, including least bitterns, king rails, and black rails, will lose habitat. In addition, the crustaceans, mollusks, and other invertebrates that live in close association with the wetland vegetation will be lost. Ecological impacts will be similar to those expected for other marsh areas that will be lost. That is, habitat for fish that depend on marshes for nurseries and spawning will be lost, as will nesting habitat for marsh obligate birds. The ecosystem functions of flood control, erosion buffering, and nutrient and contaminant filtering will be lost as wetlands are submerged.⁵⁷⁰

- In Northumberland County, shoreline protections will preserve inland areas, but beach erosion will be likely in unnourished areas. Absent site-specific information for areas other than Hughlett Point, presumably, if beaches are lost to sea level rise, the few plants that are well adapted to the harsh beach environment will be lost, and invertebrates, including the northeastern tiger beetle, sand diggers, sand fleas, and crab species, will be lost. Shorebirds that rely on beaches for forage and nesting (e.g., turnstones, sanderlings, and plovers) will face more limited resources.⁵⁷¹

Lancaster County

Apart from the peninsular area of North Point (CBIM location 18) in Lancaster County, planners indicate that the county's bay shoreline will almost certainly be protected against rising sea levels. They also indicate that shore protection is unlikely on the county's Rappahannock shore (a primarily agricultural area near the border with Richmond County) and on Mosquito Island (CBIM location 17 in the Rappahannock River). Scrub-shrub, forest, grass and agricultural land cover dominate the shorelines. Although inland migration will not be blocked by protections, the land area is small and as such has limited space in which migrating marshes and forests may establish themselves.⁵⁷² Further reducing the likelihood of the area's ability to adapt to rising sea levels, planners anticipate that with a 2 mm per year increase in

⁵⁷¹Lippson and Lippson, 2006, pp. 26–42 (see note 2).

⁵⁷²Berman, M.R., Berquist, H., Dewing, S., Glover, J., Hershner, C.H., Rudnicki, T., Schatt, D.E., and Skunda, K., 2001, Lancaster County Shoreline Situation Report, Special Report in Applied Marine Science and Ocean Engineering No. 371, Comprehensive Coastal Inventory Program, Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, VA.

⁵⁷⁰Lippson and Lippson, 2006, pp. 201–239 (see note 2).

the rate of sea level rise, marshes will marginally be able to retain current area (Section 2.1).

Lancaster County's bay and river shoreline has interspersed marsh and beach areas, with beaches typically occurring at points, and marshes in coves. Shorelines of Fleet's Bay and Dymer, Tabbs, and Antipoison creeks are covered by marshes with minimal erosion rates. Groinfields stretch from either side of Tabbs Creek in Fleet's Bay, around Clark Point in Little Bay, and west of Rones Bay in Dymer Creek. Similar protections are found at the mouth of Mosquito Creek and at the end of Mosquito Point on the Rappahannock River. Riprap is also present along many discrete portions of the county shoreline.⁵⁷³ Shoreline marshes will possibly be maintained through accretion with a 2 mm per year acceleration in sea level rise, but most areas will be lost under a 7 mm per year acceleration scenario (Section 2.1). The Virginia brackish marshes are home to a large number of rare birds, including the least bittern, the king rail, and the black rail. The rails eat insects, crustaceans, and seeds, and the least bittern feeds on fish or other small animals.⁵⁷⁴ Marsh submersion will lead to loss of these food sources for these rare birds, and for more common marsh birds such as the herons and egrets. Habitat for forage and game fish that spend portions of their lives in wetlands will be lost, as will nesting habitat for marsh obligate birds.⁵⁷⁵

Northumberland County

Northumberland County is densely developed along the Potomac River and on the Chesapeake Bay shoreline. Of 558 miles of Northumberland County shoreline surveyed, approximately 80 percent had marsh coverage, and the remaining 20 had beach.⁵⁷⁶ Planners indicate that most of

the county will be protected, leading to likely loss of unnourished beaches and marsh areas through erosion and inundation as a result of the inability to retreat inland and lack of sufficient sediment inputs. Hughlett Point Natural Area Preserve, at the midpoint along the Northern Neck's Chesapeake Bay shoreline, has forest areas fronted by estuarine marshes and sandy beaches line most of its shore (CBIM location 19). The preserve hosts a population of northeastern beach tiger beetles and nesting diamondback terrapins and provides a resting point for migratory birds. In addition, gray foxes (*Urocyon cinereoargenteus*) and river otters (*Lontra canadensis*) are present.⁵⁷⁷ Presumably, if beaches are lost to sea level rise, the few plants that are well adapted to the harsh beach environment will be lost. Habitat for insects and other invertebrates such as sand diggers, sand fleas, and beach tiger beetles will be lost. Shorebirds that rely on beaches for forage and nesting (e.g., turnstones, sanderlings, and plovers) will face more limited resources.⁵⁷⁸ Loss of the marsh areas will lead to ecological effects as described for Lancaster County.

Wrapup

The Northern Neck marshes of Lancaster County will be marginal with an increase of 2 mm per year over current rates of sea level rise and will most likely be lost with an increase of 7 mm, eliminating habitat for rare marsh birds. The beaches of Northumberland County are likely to be eroded in front of the expected shore protections, and lost without nourishment. Hughlett Point Natural Area Preserve may be inundated with an increase of 7 mm in sea level rise rates, eliminating habitat for a variety of species, including the federally listed threatened northeastern beach tiger beetle and migratory birds.

⁵⁷³Berman et al., 2001 (see note 572).

⁵⁷⁴Rare Marsh-Nesting Birds of Virginia's Coastal Plan. Natural Heritage Resources Fact Sheet. Accessed online at <http://www.state.va.us/dcr/dnh/mrshfact.htm> on June 13, 2006.

⁵⁷⁵Lippson and Lippson, 2006, pp. 201-239 (see note 2).

⁵⁷⁶Berman, M.R., Berquist, H., Killeen, S., Hershner, C.H., Rudnicky, T., Schatt, D.E., Weiss, D., and H. Woods, 2002, Northumberland County Shoreline Situation Report, Special Report in Applied Marine Science and Ocean Engineering No. 379, Comprehensive Coastal Inventory

Program, Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, VA.

⁵⁷⁷Virginia Department of Game and Inland Fisheries, n.d., Hughlett Point Natural Area Preserve, accessed on August 3, 2006, at: <http://www.dgif.virginia.gov/wildlife/vbwt/site.asp?trail=1&site=CNN12&loop=CNN>.

⁵⁷⁸Lippson and Lippson, 2006, pp. 26-42 (see note 2).