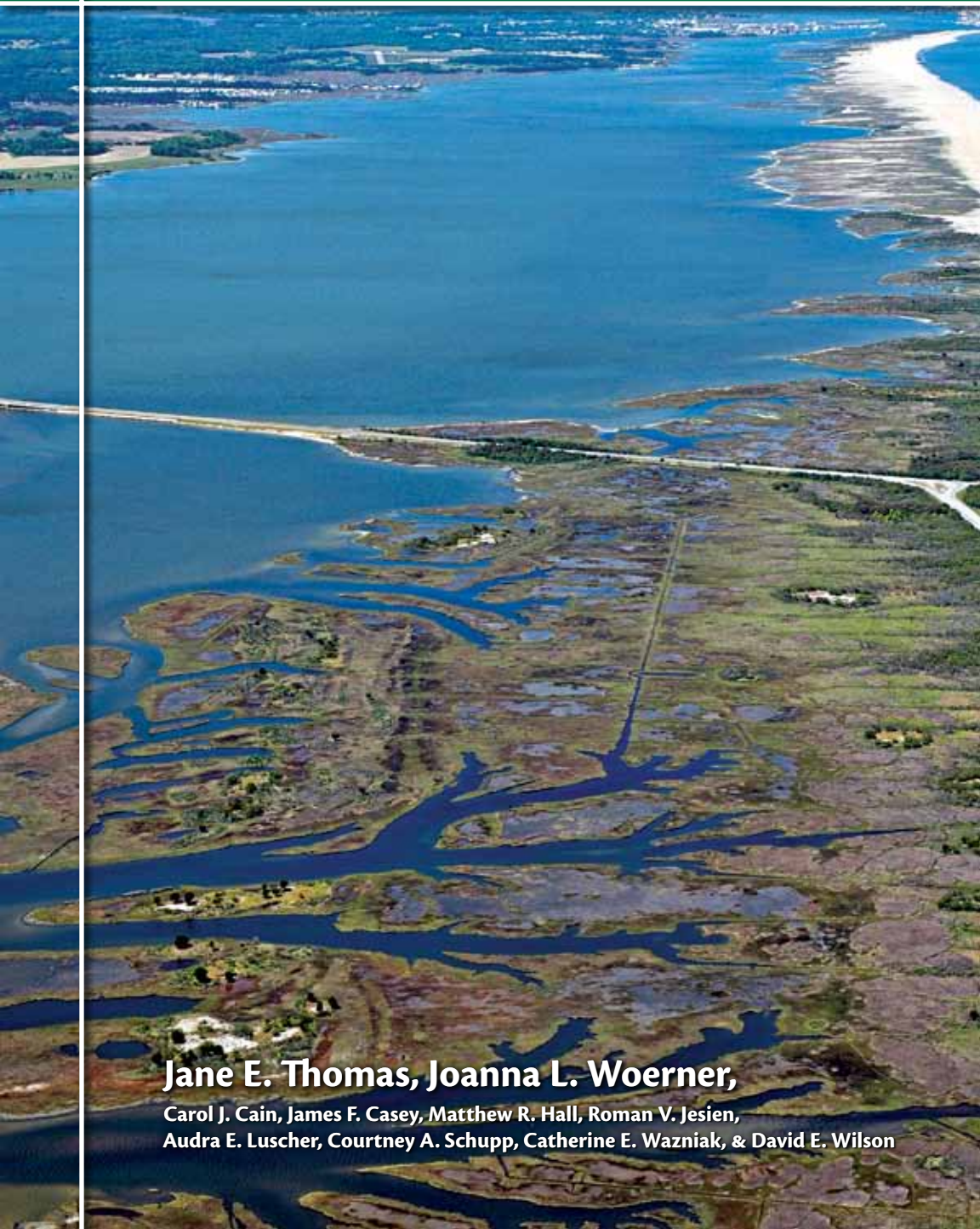


## *7. Sinepuxent Bay*



**Jane E. Thomas, Joanna L. Woerner,**

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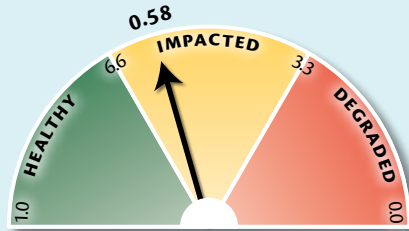
Audra E. Luscher, Courtney A. Schupp, Catherine E. Wazniak, & David E. Wilson

## CONCLUSIONS

### The ecosystem health of Sinepuxent Bay is the best of all the subwatersheds

Sinepuxent Bay ranked first in the Coastal Bays for estuarine health and second for watershed health, with the best water quality, highest density of hard clams, and greatest seagrass coverage—likely due to its small, relatively undeveloped watershed and good oceanic flushing through the Ocean City Inlet. This resulted in Sinepuxent Bay's overall ecosystem health ranking as the best of the Coastal Bays. Despite this relatively high ranking, the ecosystem health of Sinepuxent Bay is still impacted. For more information, see Chapter 2—*Ecosystem Health Assessment*.

#### How healthy is Sinepuxent Bay?



## SINEPUXENT BAY ISSUES

Although the following issues are presented as pertaining to Sinepuxent Bay, they also apply to other Coastal Bays subwatersheds.

### Docks & piers can impact habitat

Information compiled by the National Oceanographic and Atmospheric

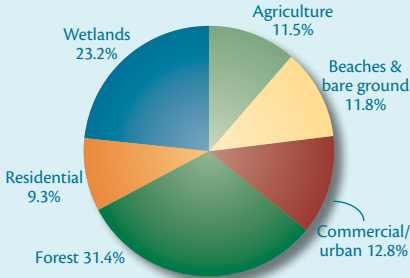


Aerial view looking north along Sinepuxent Bay, with the Route 611 bridge to Assateague Island in the background and the old ferry landing in the middle.

### Sinepuxent Bay & watershed facts

Watershed area (km <sup>2</sup> )	26.7
Average bay depth (m)	0.67
Surface area of bay (km <sup>2</sup> )	24.1
Watershed area: surface area	1.1
Bay water volume (m <sup>3</sup> × 10 <sup>6</sup> )	16.5
Watershed area: water volume	1.62
Flushing rate (days)	unknown
Population	4,420

### Land use in Sinepuxent Bay subwatershed



### Sinepuxent Bay & watershed



Conceptual diagram depicting general land use and features of Sinepuxent Bay and its watershed.

Administration indicates that researchers and coastal managers consistently note environmental, navigational, and aesthetic concerns regarding the cumulative impacts of docks, piers, and wetland walkways. In particular, overly large structures increase the likelihood of navigational problems, increase pollution to sediments and surface waters, and increase shading of wetland vegetation and submerged aquatic vegetation.

While one large structure individually may have a small adverse impact, the cumulative effects of these structures become more significant as they become more numerous. Preliminary results of surveys conducted in Worcester County indicate that marsh-dependent birds are negatively impacted by long piers.

In an effort to minimize cumulative

impacts, Worcester County prohibits private piers longer than 30 m (100 ft) over marsh and community piers longer than 90 m (300 ft). For more information, see Chapter 3—*Management of the Coastal Bays & Watershed*.

### Research recommendations

- Assess impacts of docks and piers.
- Research the effects of docks and piers over riparian/terrestrial habitats.

### Management recommendations

- Consider the use of combined piers (i.e., community piers), rather than the 'porcupine effect' of multiple private piers.

### Monitoring recommendation

- Monitor marsh functionality around docks and piers, fragmentation, and habitat disturbance.

## Coastal hazards affect the Coastal Bays

Coastal hazards include both natural and man-made events that threaten the health and safety of coastal ecosystems and communities. This definition includes, but is not limited to hurricanes, nor'easters, sea level rise, erosion, oil spills, harmful algal blooms, and pollution. Coastal areas have long been subject to environmental, social, and economic impacts from coastal hazards and it has become increasingly evident that increased decision-support capabilities for coastal managers and emergency responders must be better coordinated. Coordinated efforts are imperative because coastal communities can suffer human, environmental, and economic impacts from both man-made and natural hazards. In addition, a coordinated effort means that the hazard-risk and vulnerability data, information, and application needs can be developed and shared. A coordinated effort would also mean that coastal managers, emergency responders, and local officials gain the knowledge and skills to develop and implement hazard mitigation policies and practices. For more information, see Chapter 3—*Management of the Coastal Bays & Watershed*.

### Management recommendations<sup>1</sup>

- Implement Worcester County's Comprehensive Plan.<sup>3</sup>
- Consider developing a regional council of county and town emergency managers and planners. Encourage this council to participate in the Delmarva Emergency Management Task Force.
- Engage emergency managers with local planning commissions to better link emergency response activities

- with local hazard mitigation and comprehensive planning activities.
- Improve public and local access to data and information by communicating coastal hazard vulnerability and risk through multiple media outlets. Provide the results of technical analyses (modeling, floodplain mapping, etc.) through public workshops, brochures and websites.
- Promote Shorelines Online ([www.shorelines.dnr.state.md.us](http://www.shorelines.dnr.state.md.us)) as an internet mapping application to allow the public to view data and determine risks.
- Develop a registration system for vulnerable individuals (handicapped, elderly, etc.) who need assistance during emergency and evacuation activities.
- Refer to the Federal Emergency Management Agency (FEMA; [www.fema.gov](http://www.fema.gov)) for resources and information.

## Assateague Island is moving landward

Since 1850 (when the first accurate coastal charts were made), the bay shoreline of northern Assateague Island has migrated westward into Sinepuxent Bay while the mainland shoreline has lost very little land (less than 100 m [330 ft]) to erosion, thereby narrowing the bay by up to 1 km (0.6 mi) in some places. Approximately 600 m (1,970 ft) of this migration has occurred since 1942.

Assateague Island is migrating westward primarily due to overwash, a natural process in which waves combine with high tide or storm surge and carry sand from the beach and frontal dunes across the barrier island. The migration of the sand across the island provides the mechanism for the landward migration of the entire island system as sea level rises. This landward migration of Assateague Island has accelerated at the northern end of the island since the opening and

subsequent stabilization of the Ocean City Inlet in 1933, which disrupted sediment transport to the northern end of the island.

Some sand is deposited in the interior of the island, maintaining or building island elevation and serving as a source of loose windblown sand that is critical to the formation of new dunes. Sometimes, sand is also carried completely across the barrier island and deposited in Sinepuxent Bay, thereby widening the island. The resulting sand platform or tidal flat provides the base for growth of salt marshes. The overwash sand can bury or partially bury vegetation on the island. Depending on the thickness of the overwash deposit, existing vegetation may survive and grow up through the sand.

Assateague Island National Seashore surveys the position of the Sinepuxent Bay shoreline at least twice a year. This data is used for mapping purposes and to quantify rates of shoreline change and the widths of the Sinepuxent Bay and Assateague Island. For more information, see Chapter 12—*Dynamic Systems at the Land–Sea Interface*.

### Horseshoe crabs spawn in the Coastal Bays

During the latter part of May through mid-June, adult horseshoe crabs in the Mid-Atlantic region migrate inshore in search of sandy beach areas where they dig nests and deposit eggs for fertilization. Horseshoe crabs frequently nest on the shores of Sinepuxent Bay because of its close proximity to the inlet. Optimal egg development requires sufficient tidal activity to keep the eggs moist, salinity levels of at least 8 ppt, water temperature above 15° C (59° F), and a gentle beach slope for larvae to reach the water's edge. Horseshoe crab eggs are also an



MARY HOLLINGER, NOAA

Horseshoe crabs migrate inshore to nest in late May to mid-June.

Development continues in the Sinepuxent Bay subwatershed.



SINEPUXENT BAY

JANE THOMAS



JANE THOMAS

Aerial view looking east across Sinepuxent Bay, with the Route 611 bridge to Assateague Island on the left. Also shown here are some of the many shoals in this shallow bay, some seagrass meadows (the dark areas underwater), and ditches and marshes on Assateague Island.

important food source for many migratory birds which stop over in the Coastal Bays. For more information, see Chapter 14—*Diversity of Life in the Coastal Bays*.

### Recommendations

- Monitor horseshoe crabs, especially nesting sites and areas on Assateague Island.
- Protect horseshoe crab nesting habitat (bay beaches).
- Continue research into alternatives to horseshoe crabs as whelk bait.
- Educate residents and visitors about minimizing disturbance to horseshoe crabs during breeding, especially at developed bay beaches around Ocean City.

### Invasive & non-native organisms can threaten native species

In the Coastal Bays, at least two exotic aquatic species have been detected and

identified—the European green crab (*Carcinils maenav*) and the Japanese shore crab (*Hemigrapsus sanguineus*).

In Maryland, the green crab is currently only found in Isle of Wight Bay.<sup>2</sup> Green crabs can be purchased as bait in Maryland and they are frequently used as bait for tautog. Since this is a non-native species, leftover baits should be discarded shoreside and not returned to the water. The same method of discard applies to other live baits (minnows, worms, etc.) that are not native to the particular body of water where they are being used. There are currently no local surveys to monitor its spread or effects on local clam populations.

A native of the western North Pacific, the Japanese shore crab has been documented in Isle of Wight, Sinepuxent, and Chincoteague Bays.<sup>2</sup> As this crab is new to the East Coast, its ultimate impact is still unknown. For more information, see Chapter 14—*Diversity of Life in the Coastal Bays*.

### Recommendations

- Develop and implement a monitoring plan for invasive and non-native species.
- Research the impacts of non-native crabs on native crab species.
- Educate anglers to not release live crabs, as this assists their spread.

## FEATURES OF SINEPUXENT BAY & ITS WATERSHED

### Sinepuxent Bay offers many recreational opportunities

Sinepuxent Bay's long, thin dimensions give its recreational qualities a dichotomous feel. On its northern end, near the Ocean City Inlet, yachts and commercial fishing boats depart for sea from the sprawling West Ocean City Harbor. A public boat ramp there also brings jet skiers and recreational boaters from around the East Coast. Good fishing in the inlet and the northern half of the bay make for crowded conditions in July and August north of Assateague Road.

South of there, campgrounds, shallow water, and limited development change the scene to a rural one. Crabbing from shore, clamming, and some fall croaker fishing are the rule here. On Assateague Island, canoe and kayak rentals put paddlers in the bay near Sinepuxent Bay's southern end. A federal law prohibiting jet skis behind Assateague Island limit their numbers in this part of the bay. Due to Sinepuxent Bay's wide range of recreational interests, its health remains of critical importance to the local economy.

### Assateague Island provides an undeveloped refuge

On the eastern border of Sinepuxent Bay lies one of the East Coast's true gems—Assateague Island National Seashore. The barrier island, known for its wild horses, is a refuge for both wildlife and the two million people who visit the island every year. Detached from Ocean City during a 1933 hurricane, the island was once slated for development. However, after



Golf course in Sinepuxent Bay watershed. Newport Bay is visible in the background.

the building of hundreds of homes and roads, a 1962 nor'easter crushed the island with severe flooding and hurricane-force winds, destroying the man-made structures. Protesting renewed development calls, citizens rallied around the state and federal governments to protect the island, and in 1965 it became a National Seashore with its southernmost portion becoming Chincoteague National Wildlife Refuge.

Despite becoming a significant tourist attraction, the island remains an internationally important stopover for millions of migrating shorebirds, songbirds, hawks, and falcons. Thousands of acres of seagrass enjoy refuge on its western flank and its 68 km (42 mi) of unspoiled beach make it a haven for endangered birds, turtles, and insects.

The island's natural shores remain the sanctuary that citizens intended them to become some four decades ago. For more information, see Chapter 12—*Dynamic Systems at the Land–Sea Interface*.

### Sinepuxent Bay has the best water quality of the Coastal Bays

Sinepuxent Bay's small, relatively undeveloped shoreline and flushing from the Ocean City Inlet give it the best water quality among the Coastal Bays. With the lowest nitrogen levels, Sinepuxent Bay enjoys healthy fisheries and abundant seagrass. However, warning signs are emerging in the bay with increasing nutrients and brown tide. For more information, see Chapter 13—*Water Quality Responses to Nutrients*.

### Seagrass is widespread

At 787 ha (1,945 acres) of seagrass in 2006 and almost 70% of its seagrass goal met, Sinepuxent Bay has the best seagrass coverage in the Coastal Bays. Generally good water quality, sandy soils, and persistent flushing from the Ocean City Inlet make this bay a perfect

habitat for eelgrass (*Zostera marina*) and widgeon grass (*Ruppia maritima*) growth. Habitat is constantly changing due to island overwash, which buries some beds while creating sandy habitat in other areas. Chincoteague Bay follows closely with 50% of its seagrass goal met in the Maryland portion and an impressive 3,133 ha (7,743 acres) of seagrass meadows (Maryland and Virginia) in 2006.

However, of concern is the decline seen in seagrasses bay-wide since 2005. The unprecedented gains that occurred in the southern bays during the 1980s and 1990s have slowed or reversed. This combined with currently degrading water quality trends serve as a warning sign for the overall health of the bays.



## ACKNOWLEDGEMENTS

The authors would like to thank J.J. Orth from the Virginia Institute of Marine Science for comments helpful in the completion of this chapter.

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