

Sands of the Chesapeake



Contributors

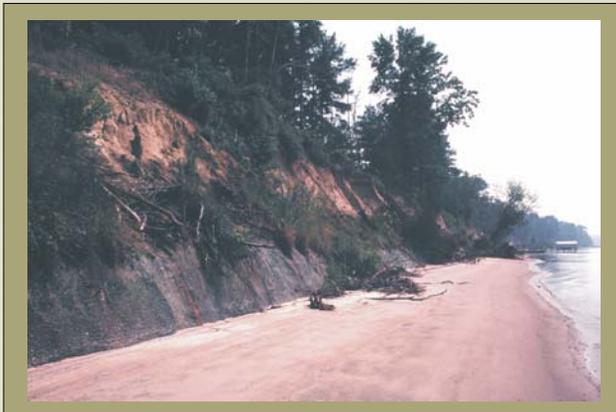
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What is the Origin of Our Sandy Shores?

- Sand is the foundation for beaches around the world.
- In Chesapeake Bay, most sand comes from erosion of bluffs next to the shoreline.
- Shores just inside the Bay also receive sand from the ocean.



Exposed and eroding upland banks along the Rappahannock River, Virginia.

As a bank erodes and slumps, waves suspend the finer material in the water and moves the heavier sand and gravel along the shore.



Beaches are dynamic features that are constantly reshaped by waves.

- Sand moves in the onshore-offshore direction as well as the alongshore direction.
- Erosion at one site may provide sand to adjacent beaches sometimes as spits.
- This redistribution of sand may create tidal flats, sand bars, and other nearshore features which may be prime habitat for submerged aquatic vegetation (SAV).



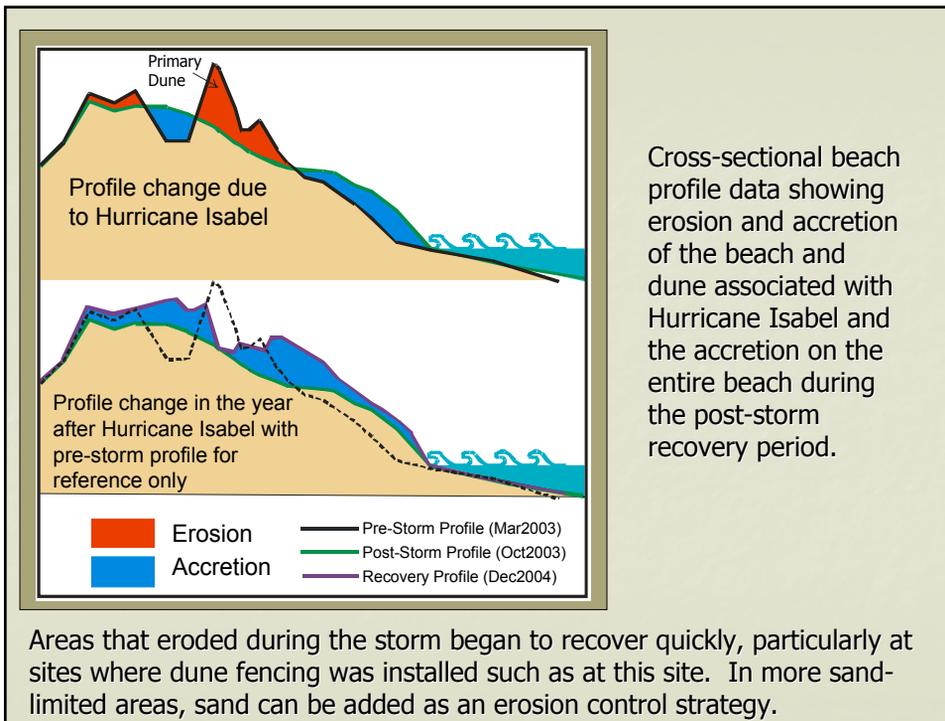
If a beach becomes wide enough, a dune can form along its landward side.

- A dune dimple forms close to the high water line on water-born debris and accumulates wind-blown sand allowing dune vegetation to grow into a dunelet.
- Over time, the area where the dunelets occur becomes a foredune. With continued accretion, a primary dune will evolve.

- Dunes may grow in height and in width during calm conditions when there is an adequate supply of sand, an onshore wind, and a stable coastal setting.

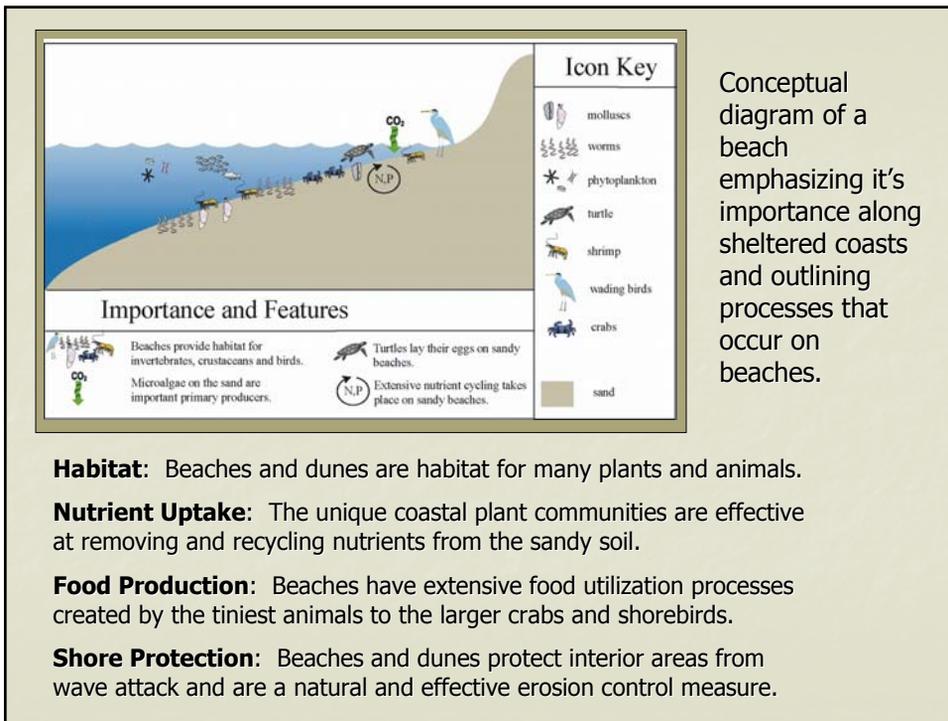


- Dunes may be damaged during storms, but their ability to reduce wave impacts make them an important shoreline feature.
- The ability of dunes and beaches to protect upland properties and recover from storms was well documented during Hurricane Isabel. This 100-yr event hit the Chesapeake Bay region in September 2003.



Why Should We Care About Beaches and Dunes?

- Beaches and dunes are home to specific salt-tolerant plants and numerous animals. Many more transit this unique landscape.
- The type of ecosystem services provided by beaches depend on local factors including climate, salinity, turbidity, and wave energy.
- Ecosystem services usually listed for beaches and dunes are: habitat, nutrient uptake, food production, shore protection, and recreation.



Habitat: Beaches and dunes are habitat for many plants and animals.

Nutrient Uptake: The unique coastal plant communities are effective at removing and recycling nutrients from the sandy soil.

Food Production: Beaches have extensive food utilization processes created by the tiniest animals to the larger crabs and shorebirds.

Shore Protection: Beaches and dunes protect interior areas from wave attack and are a natural and effective erosion control measure.

Where are Sandy Shores Located?

- Beaches and dunes are located throughout Chesapeake Bay and its tributaries.
- Remote sensing studies showed that 157 miles of beach and dune shoreline exists in Virginia's portion of the Bay, 57 miles of which has dunes.



Location of
beaches and
dunes within the
Virginia portion
of the
Chesapeake Bay
and its
tributaries

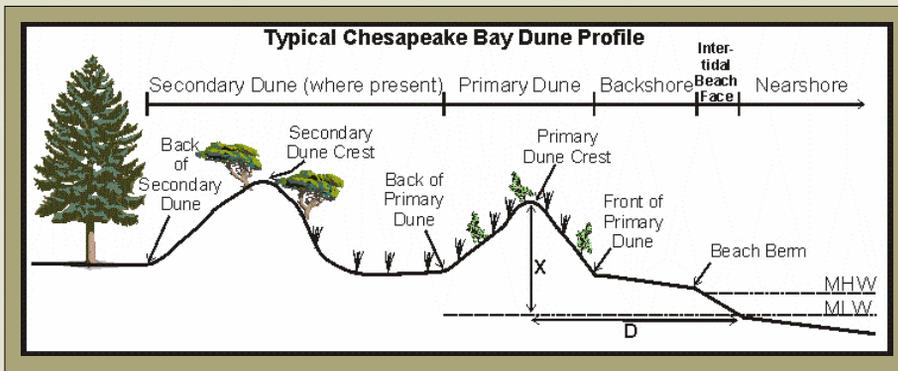
Diversity of Sandy Shores

- Estuarine, sandy shores occupy a wide variety of coastal settings.
- They can be in natural settings or influenced by man's activities.
- Beaches and dunes occur as isolated features or long "dune fields" and spits.



Recent Research

- The composition and form of Chesapeake Bay dunes were determined to better protect, manage, restore, and engineer sandy shores.
- Comprehensive inventories established the geology and biology of Chesapeake Bay dunes.
- Dune creation/decay and shoreline change through time were demonstrated and quantified.
- Coastal protection potential of dunes was assessed (dune height and width).



- Analysis of dune parameters shows a strong relationship between dune height (X) and beach and dune width (D).
- Research measured a 1:10 relationship which means that for every one foot of dune crest height (X), the distance to mean low water (D) is 10 ft.
- This metric has shown to be useful in the analysis and design of beach nourishment projects along Bay shores.

Sandy Shore Management

Historical Perspective

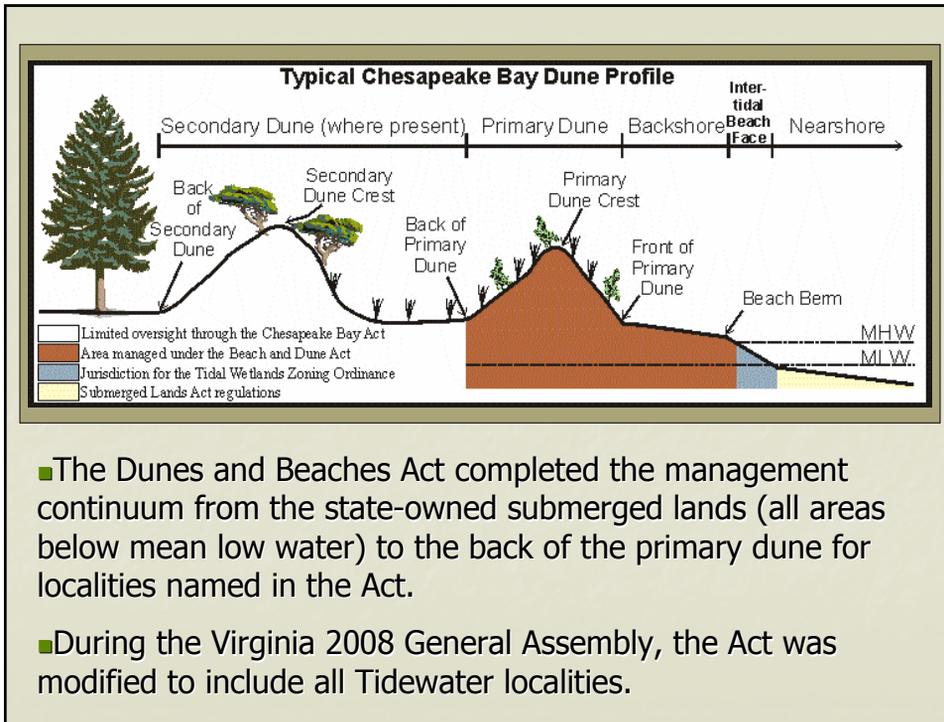
In 1932, Virginia politicians stated that

“Just a few years ago, beaches were desolate wastes of sand dunes and underbrush, little enjoyed by the people of the hinterland of our States, and each year finds this asset attracting more and more people, and contributing annually to the welfare and happiness of our people, with the logical result of enhanced values in land once considered of little value. It, therefore, behooves us to give careful thought to the permanence of an asset of such potential.”

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Historical Perspective

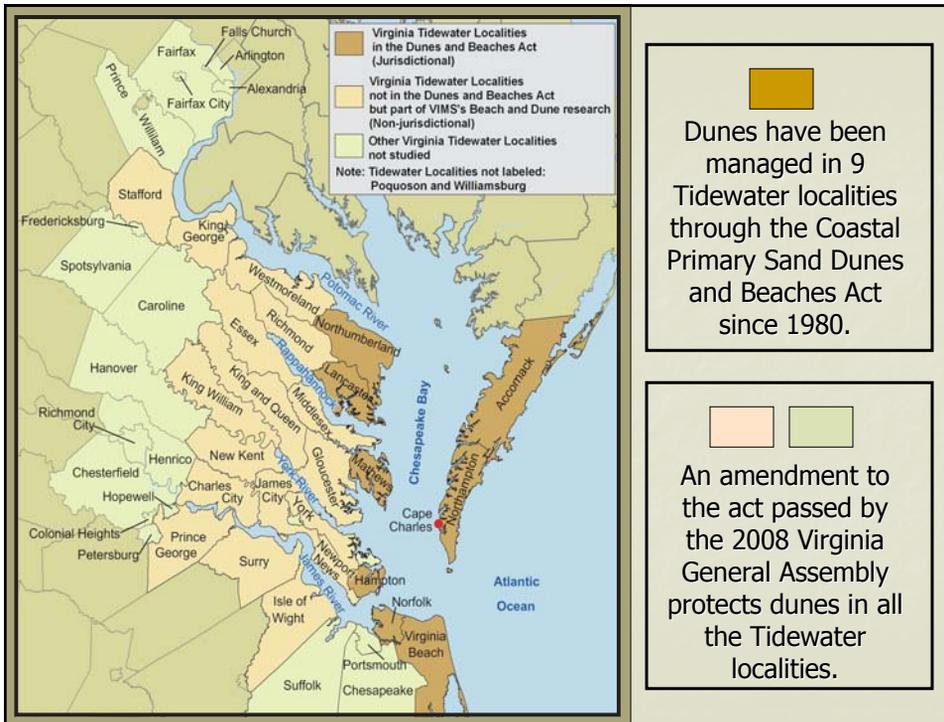
- It was not until 1980 that sand residing along Virginia’s shoreline became protected by law under the Dunes and Beaches Act. This act only applied to 9 localities (the counties of Accomack, Northampton, Northumberland, Lancaster, and Mathews; the cities of Hampton, Norfolk, and Virginia Beach; and the Town of Cape Charles.
- In 1982, the Tidal Wetlands Act (1972) was modified to include non-vegetated wetlands, and thus, gave every Tidewater locality jurisdiction over the intertidal portion of the beaches.



- The Dunes and Beaches Act completed the management continuum from the state-owned submerged lands (all areas below mean low water) to the back of the primary dune for localities named in the Act.
- During the Virginia 2008 General Assembly, the Act was modified to include all Tidewater localities.

- Beach and dune system in a locality managed by the Dunes and Beaches Act.
- Mean high water is the management limit of the Tidal Wetlands Act.
- The Dunes and Beaches Act manages to the back of the primary dune.

- Revetment and bulkhead are in a locality not managed by the Dunes and Beaches Act before the 2008 General Assembly.
- These structures have impounded bank sands decreasing the amount of sand available to the beach and dune system.
- The mean high water line is the limit of the Tidal Wetlands Act Jurisdiction.



Other Sandy Shore Management

- Sandy habitats landward of the primary dune such as secondary dunes, dune fields, and sandy scrub areas may receive some management oversight through the Chesapeake Bay Preservation Act.
- This oversight varies by locality and depends on how each locality administers the CBPA.

The Sandy Edge of Chesapeake Bay

A continuum of tidal flats,
beaches, and dunes



To Learn More

- Chesapeake Bay Dune Website
<http://www.vims.edu/physical/research/shoreline/cbdunes/>
- Available on this site are links to:
 - Chesapeake Bay Dune Inventories
 - Chesapeake Bay Evolution Reports
- Coastal Resources and the Permitting Process
<http://ccrm.vims.edu/wetands/techreps/CoastalResourcesandPermitProcess.pdf>
- Legislative Code
<http://law.justia.com/virginia/codestoc2802000/28.2-1403.html>

Length of Beaches and Dunes in Jurisdictional Localities

Jurisdictional Locality	Beach Only Length (miles)	Dune Length (miles)	Beach&Dune Length (miles)
Accomack	6.0	5.0	11.0
Hampton	4.0	2.0	6.0
Lancaster	4.1	2.8	6.9
Mathews	7.1	3.6	10.7
Norfolk	2.3	4.5	6.8
Northampton (with Cape Charles)	7.0	10.2	17.2
Northumberland	8.3	6.3	14.6
Virginia Beach	3.6	4.5	8.1
Total	42	39	81

Length of Beaches and Dunes in Non-Jurisdictional Localities

Non-Jurisdictional Locality	Beach Only Length (miles)	Dune Length (miles)	Beach&Dune Length (miles)
Charles City	0.6	0	0.6
Essex	1.5	0.01	1.5
Gloucester	5.1	3.6	8.7
Isle of Wight	8.0	2.3	10.3
James City	2.3	0.5	2.8
King & Queen	0.1	0.1	0.2
King George	5.8	2.9	8.7
Middlesex	7.4	2.7	10.1
New Kent	0.4	0	0.4
Newport News	1.9	0.3	2.2
Prince George	1.3	0	1.3
Richmond	0.7	0.3	1.0
Stafford	1.9	1.4	3.3
Surry	10.1	0.3	10.4
Westmoreland	9.0	3.2	12.2
York	1.6	0.7	2.3
Total	58	18	76