

Grass beds help form a complex web of life in coastal waters. However, because they are underwater and out of sight, few people realize there are more than 138,000 acres of this public resource in North Carolina. Grass beds are relatively fragile and sensitive to human activities.

Not Your Average Bermuda Grass

Resource managers and scientists refer to coastal grass bed plants as submerged aquatic vegetation or SAV. These plants grow entirely underwater and rely on buoyancy to support their stems and leaves.

SAV is generally found in shallow waters of our estuaries and creeks where there is enough sunlight for it to survive and grow. Freshwater SAV also is abundant in some of our larger blackwater streams and in rivers. SAV cannot live where there are strong currents or waves, or in muddy or turbid waters that block sunlight.

The extent of a bed can change from year to year depending on environmental conditions. It may measure from just a few square feet to many acres. No matter what the size, SAV provides underwater structure and habitat for animals, much like a forest does on land.

Grass beds also help protect coastal shorelines and property from erosion and improve water quality. Beds provide an extensive root system that holds soil in place and stems and leaves that reduce the amount of wave energy reaching the shore. Plants supply much-needed oxygen. They also help purify water by removing pollutants and excess nutrients often responsible for harmful algal blooms and fish kills.



Many coastal species rely on SAV for food sources or habitat. (Photos: tundra swans, USFWS; flounder, NCSG; blue crab, NCDMF)



Large sea grass beds like this one near Beaufort, N.C., are vital to maintaining healthy fish populations. (Photo: Scott Taylor)

Grass Beds Bring Life

Dozens of bird, fish and shellfish species depend on grass beds for survival. Our coastal residents, culture and economy — including tourism — rely on that wildlife in order to thrive. Without SAV habitat, we would not have the fishing activities or seafood that many of us enjoy.

Fish and Seafood

Fishermen know to try their luck near grass beds because SAV provides habitat for many commercially and recreationally valuable fisheries. Think of a seafood species. It likely spends at least part of its life dependent on a grass bed for food, cover or as a spawning location. For example:

- Larval stages of blue crab detect and migrate towards SAV, where they remain until adulthood.
- Shrimp, bay scallops and clams use grass beds for refuge and spawning.
- River herring, Atlantic croaker, flounder, spot, striped mullet, spotted sea trout, red drum, black sea bass, gag and kingfish rely on underwater grasses for food, refuge and nursery areas.

Waterfowl and Wildlife

Grass beds are important to waterfowl populations and the tourism industries built around them. Ducks, geese and tundra swan flock to grass beds to eat nutrient-rich shoots and seeds. Hunters follow, hiring guides, buying gear and frequenting local hunt clubs, restaurants and hotels. Outdoor enthusiasts, including birders and kayakers, enjoy exploring areas where grass beds exist because of the wildlife they attract. In 2011, nature-based tourism resulted in \$3.3 billion in spending statewide.

Preserving Grass Beds

The N.C. Marine Fisheries Commission has a definition in their rules for what constitutes SAV and implements fishing gear restrictions to prevent damage to this critical fish habitat. SAV receives some protection from impacts of activities permitted by other state agencies including dredging, docks and bridges. State and federal regulations that promote good water quality also benefit the resource.

There are many other activities that pose hazards to SAV that are not or cannot be addressed by state-level authorities or programs. Communities can protect SAV with local actions — many of which benefit more than just grass beds and contribute to an overall healthier coastal environment. Local officials can consider the approaches below to maintain and protect grass beds and increase the benefits received from them.

Shoreline and Riparian Land Management

- Establish local requirements that preserve natural vegetation along waterways.
- Encourage riparian restoration, such as planting grasses, bushes and trees along waterways where vegetation has been removed.
- Encourage living shoreline — or soft shoreline — stabilization methods instead of bulkheads, where appropriate.
- Discourage lawns that extend to the water's edge.
- Implement the above practices on government-owned land to serve as a model.



The dark areas in the photo represent SAV bordering a North Carolina coastal forest. (Photo: N.C. Division of Coastal Management)

COMMUNITIES IN ACTION

In 2011, Currituck County adopted a two-zone, 50-foot riparian buffer requirement for new development to protect water quality, wildlife and critical aquatic nurseries. (Section 7.6 of Currituck County's Unified Development Ordinance)

Why? Plants along the shoreline provide a transition zone from water to developed land. Dense vegetation — including woody plants such as bushes and trees — on the landward side of waterways helps slow stormwater runoff so it infiltrates the soil where plants can absorb some of the pollutants.

Bulkheads may increase the water depth in the nearshore environment and result in the loss of vegetated areas, including grass beds.

Sediment from construction sites or any disturbed or unvegetated land can easily erode and cover grass beds and reduce light availability.

Community-wide Stormwater Pollution Control

- Ensure construction sites have proper erosion and sediment-control practices in place and that these practices are maintained.
- Ensure there are no bare or eroding areas that can serve as a source of sediment.

Community-wide Stormwater Pollution Control (continued)

- Reduce stormwater runoff from new and existing development. Divert rooftop runoff to natural or landscaped areas or capture rainwater in cisterns for use where potable water is not necessary.
- Encourage proper fertilizer management and use of native plants.
- Encourage wetland restoration.
- Implement the above practices in local government operations to serve as a model for citizens and businesses.

Why? Polluted stormwater runoff can damage grasses or prevent them from growing. Excess nutrients from over-fertilized landscapes can cause algal blooms that shade and kill grass. Herbicides can damage desirable SAV. Native plants require fewer nutrients and pesticides to keep them healthy.

KEEPING TRACK OF SAV

A team of organizations is working on an accurate account of where SAV occurs throughout North Carolina and southeastern Virginia by mapping and monitoring its changes. Led by the Albemarle-Pamlico National Estuary Partnership, members of the SAV Partnership have created an initial map of SAV that is available at: portal.ncdenr.org/web/apnep/sav-map.



Left: Maurice Crawford of Elizabeth City State University identifies SAV. Top: Widgeon grass is found in N.C. (Photos: APNEP; Maryland Department of Natural Resources, www.dnr.maryland.gov)

Boater Education

- Educate boaters and personal recreational watercraft users to avoid SAV beds.
- Provide tourists and boaters with maps of grass bed locations and encourage them to avoid these areas.
- Encourage local marinas and boatyards to participate in the Clean Marina Program. For more information visit: dcm2.enr.state.nc.us/marinas/clean.htm.

Why? Boat propellers and personal recreational watercraft can damage or completely uproot plants. A propeller scar through a grass bed can take several years to recover. Waves from boat traffic can cause erosion and loss of plants, stir up sediment that makes the water turbid and reduce sunlight availability for plants.

Marinas can be a significant source of water pollution due to the activities at the facility, such as fueling and boat cleaning, and because of their proximity to waterways.

Be Aware of and Control Aquatic Weeds

- Promptly and correctly identify and control invasive aquatic weeds. For assistance with weed diagnosis and other problems, contact the N.C. Division of Water Resource's Aquatic Weed Control Program at 919/707-9012; www.ncwater.org/Education_and_Technical_Assistance/Aquatic_Weed_Control/.

Why? Invasive aquatic weeds can be introduced to coastal waters and grow so rapidly that they outcompete native plants, interfere with recreation, and destroy fish and wildlife habitats. Weeds can be transported from one body of water to another on boats, boat trailers and fishing equipment. Eurasian milfoil, a plant native to Europe, Asia and North Africa, is an invasive weed that caused significant problems in Currituck Sound beginning in the 1960s. The source of the introduced milfoil is not known.

More about SAV

Many SAV species are annuals that produce flowers and seeds each year prior to dying. These seeds persist in the sediment until the following spring when they sprout into new plants when growing conditions become favorable. Other species of SAV are perennials that live for several years.

North Carolina has three groups of coastal aquatic grasses: High salinity, such as eel grass or shoal grass; moderate salinity or brackish, such as widgeon grass; and low salinity, such as wild celery.



Grass beds are often hard to discern in North Carolina's low-visibility waters. (Photo: APNEP)

POTENTIAL HAZARDS TO SAV

- Polluted water including large amounts of nutrients, sediment and herbicides.
- Boating and other watercraft activities that directly damage plants or cause turbid water.
- Bottom-disturbing fishing gear.
- Dredging and construction.
- Shading from structures such as docks, piers or bridges.
- Invasive plants, like hydrilla.



Boat propellers can damage SAV. (Photo: Marine Joe Cavaretta/South Florida Sun Sentinel, State of Florida)

Information for this document was drawn from:

- Deaton, A.S., Chappell, W.S., Hart, K., O'Neal, J., Boutin, B. (2010). North Carolina Coastal Habitat Protection Plan. portal.ncdenr.org/web/mf/59.
- North Carolina National Estuarine Research Reserve Technical Paper Series, Number 1, Submerged Aquatic Vegetation. (Accessed June 2013). www.nccoastalreserve.net/uploads/Image/siteMaps/SAV/%20tech%20paper.PDF.
- U.S. Fish and Wildlife. (2012). National Survey of Fishing, Hunting and Wildlife-Associated Recreation, State Overview. digitalmedia.fws.gov/cdm/fullbrowser/collection/document/id/858/rv/singleitem.

Other pieces in the *Sustainability Series* are available by searching for the term "Sustainability" at: www.ncseagrant.org. For more information on specific topics, coastal communities should contact Gloria Putnam of North Carolina Sea Grant at gloria_putnam@ncsu.edu or 919/513-0117.

This fact sheet was produced with assistance from the Albemarle-Pamlico National Estuary Partnership and the N.C. Division of Marine Fisheries.



Your link to
research and resources
for a healthier coast

North Carolina Sea Grant
North Carolina State University
Campus Box 8605
Raleigh, NC 27695
Phone: 919/515-2454
Website: www.ncseagrant.org

UNC-SG-13-04

Summer 2013