

Coastal Natural Communities

- Controlled by soil types, fire, water, and salinity
- Communities of plants occur within 20 miles of the coast
- Soil composition: mineral, organic, or a mixture
- Submergence: frequency and duration of flooding in salt or fresh water
- Salt spray exposure



Source: NC Division of Coastal Management



Library of Congress, Highsmith, Carol M.

Pocosin

- Occur in broad, low-lying shallow basins that do not drain naturally
- Formed by the accumulation of organic matter which builds up over thousands of years
- Soils are highly acidic and nutrient-deficient
- Sequester carbon
- Protect water quality in estuaries
- Control flooding in low-elevation areas
- Provide wildlife habitat



Pocosin



James Steakley
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Inkberry
Ilex glabra



Peganum CC-BY-SA 2.0

Titi
Cyrilla racemiflora

Fetterbush
Lyonia lucida



Peterson



Pond Pine Woodland

- Pond pine overstory with a pocosin shrub, switchcane, or shrub/cane/savannah understory
- Often occur at the edges of longleaf pine forests and surrounding pocosins
- Fire and flooding are important aspects of this habitat



Pond Pine

Pinus serotina

- Cones remain closed for years, open following fire
- Trees are particularly resistant to fire



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CliffCC BY 2.0

Pond Pine Forest

- Holly Shelter Gameland
- Croatan National Forest
- Carolina Beach State Park
- Green Swamp



Loblolly Bay
Gordonia lasianthus



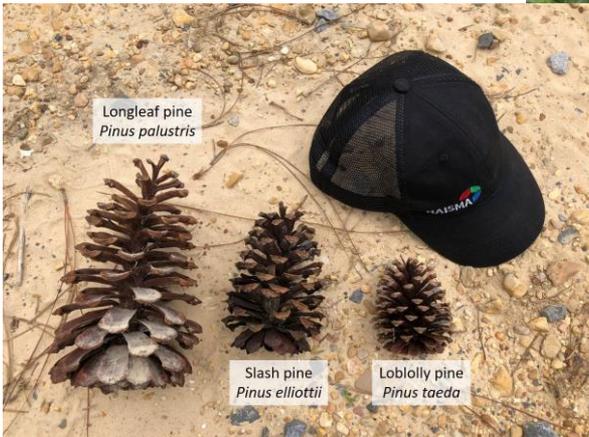
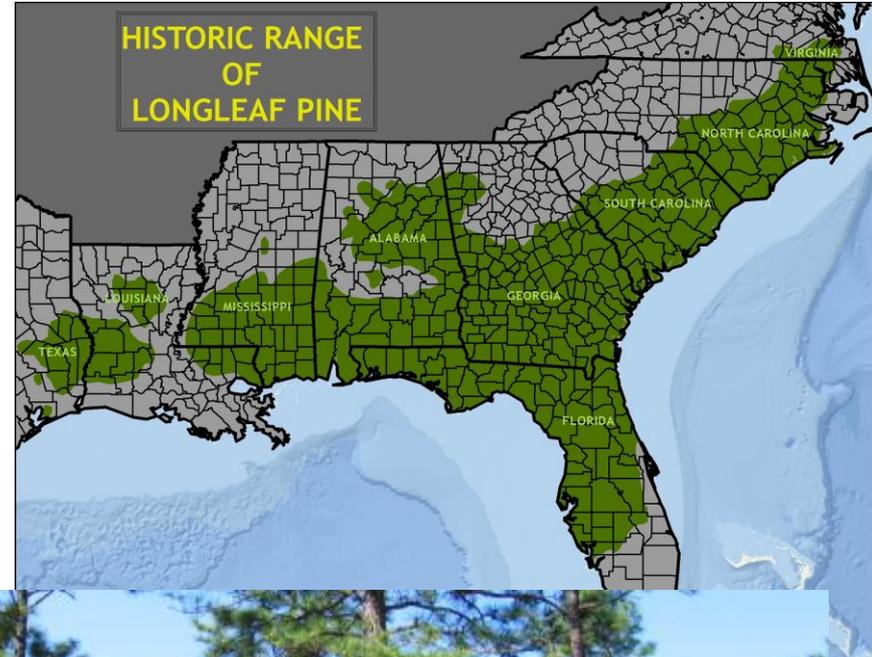
Sweet Gallberry
Ilex coriacea

Long Leaf Pine Forest

Long Leaf Pine *Pinus palustris*

NC State Toast

Here's to the land of the long leaf pine,
The summer land where the sun doth shine,
Where the weak grow strong and the strong
grow great,
Here's to "Down Home", the Old North State!



Credit: Susan L. Miller/USFWS



David McAd



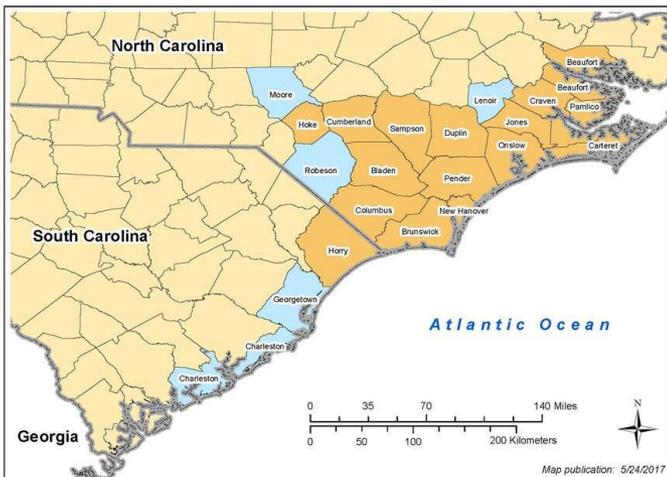
USFWS/Flickr (CC BY 2.0)



The Nature Conservancy © Sydney Bezanson



Venus Flytrap (*Dionaea muscipula*)

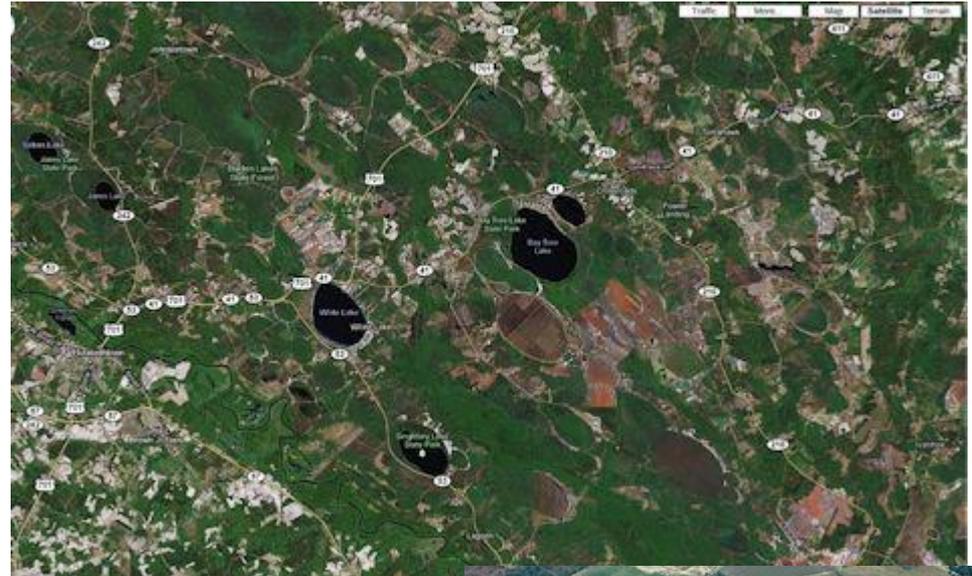


Legend
Historic counties of occurrence (not found in 20+ years)
Counties of occurrence



Carolina Bays

- Shallow wetland depressions that are fed by rainwater or groundwater
- Around 500,000 Carolina Bays in NC and SC, most densely found in Bladen County
- Distinct elliptical shape, northeast to southwest orientation
- Named for the bay trees that thrive in peaty soil
- Lake Waccamaw, Columbus County



<https://www.ourstate.com/riddle-of-the-bays/>



Photo by Ken Taylor/Wildlife Images

Carolina Bays



All pictures: Coastalreview.org

Carolina Jessamine
Gelsemium sempervirens



Carolina Cherry Laurel
Prunus caroliniana



Redbay
Persea palustris



Bottomland Hardwood Wetland



Freshwater Wetland

Wetlands

- Water table is at, near, or above the land surface long enough to support water-dependent plants
- Serve as nurseries for both freshwater and marine fish and shellfish, as well as providing habitat for birds and mammals
- Help regulate water flow, providing flood control. They act as giant sponges, soaking up water when it rains, filtering contaminants

Bottomland Hardwood Forest



Source: Pete Williams, All Trails

Ev-Henwood Nature Preserve



“Gus”

Bald Cypress
(*Taxodium distichum*)



John Ennis 2010

Stewartia malacodendron



Frankenschulz CC BY-NC-SA 2.0

Red Maple (*Acer rubrum*)



Jim Robbins CC BY-NC-ND 4.0

Black Gum (*Nyssa sylvatica*)



ssa Wilkins CC BY-NC-ND 4.0

Swamp Chestnut Oak (*Quercus michauxii*)



N. Kurzenko, 2015. CalPhoto

Sweetgum (*Liquidambar styraciflua*)

Riparian Forests

- Important factors that control the ecology of riparian forests are the dynamics of the river channel and the flooding regime (hydroperiod)
- Brown water rivers headwaters occur outside the coastal plain
- Black water rivers are slow moving through swamps and wetlands



Cypress swamp at Bladen Lakes State Forest, NC Forest Service

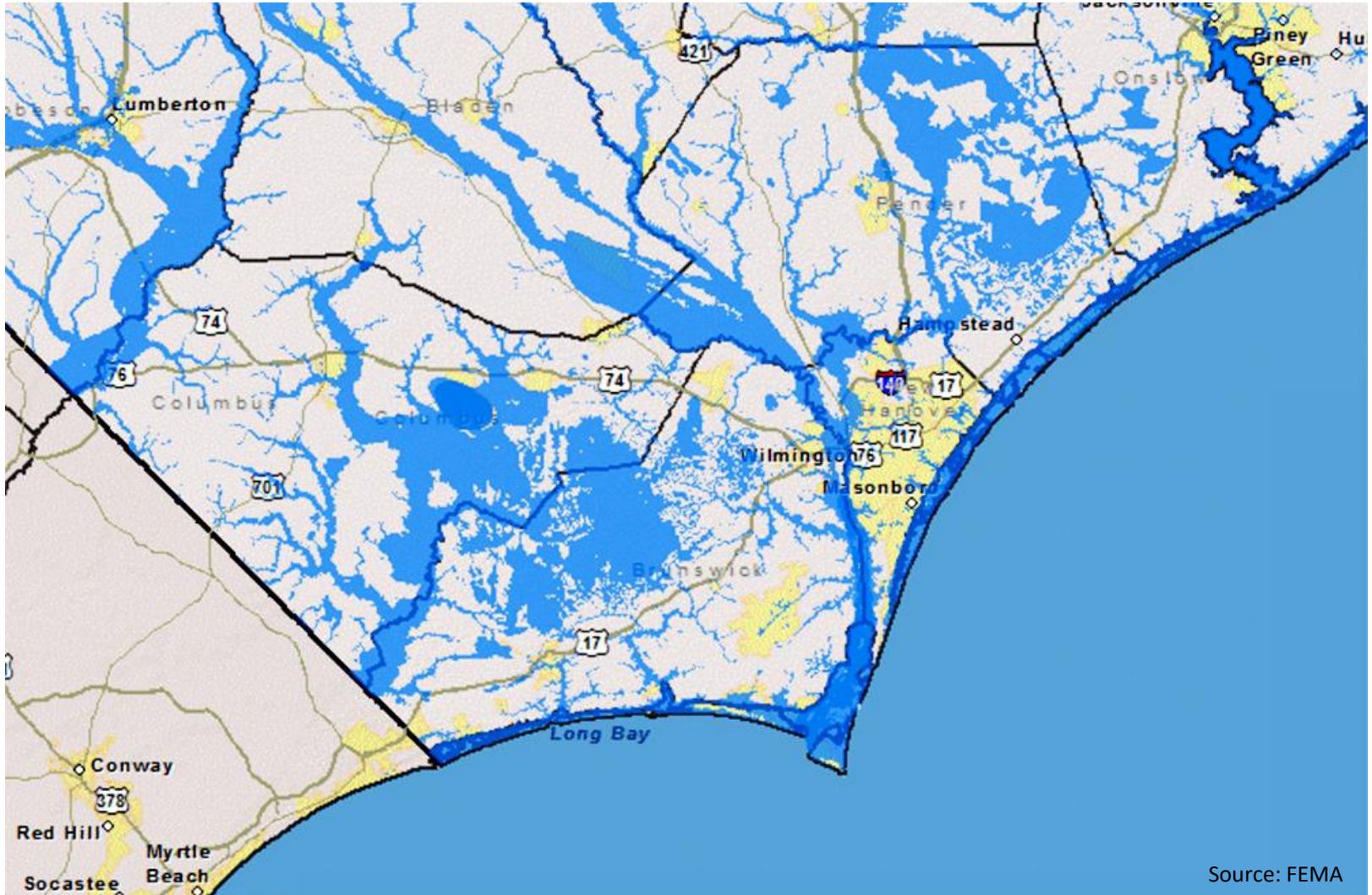


Charlie Peek NC Parks

Black Water Rivers

- Streams that drain the acidic soils of hardwood swamps
- The Black River is home to some of the oldest Bald Cypress in the world- 605 BC
- The State of North Carolina designated the Black River an Outstanding Resource Water in 1994
- Bobcat, river otter, black bear, and neotropical songbirds like the prothonotary warbler and yellow-throated vireo.

Flood Plain Map



Source: FEMA

Tidal Freshwater Marsh

- Gradually mixes with salt marshes along many streams and rivers
- Characterized by freshwater or oligohaline plants (less than 0.5ppt salinity)
- Examples can be found in the Albemarle and Currituck Sounds and at the mouths of the Cape Fear, Neuse, Tar, and Roanoke Rivers.



Agnieszka Kwiedien CC BY-SA 4.0

Typha angustifolia

Sawgrass *Cladium jamaicense*



White top sedge *Rhynchospora colorata*



Blue Flag Iris *Iris virginiana*



Pickerelweed *Pontedaria cordata*



Moving from Freshwater to Saltwater...



White Oak River in Carteret County Photo: Bill Meserve

Maritime: Adaptations to life in salt water

- **Halophytes** are flowering plants which are naturally found in saline habitats
- They have evolved a number of strategies to survive and reproduce under highly saline conditions where most plants cannot
- **Salt Excluders**
- **Salt Excretors**
- **Succulents**



Salt crystals on a Black Mangrove leaf (*Avicennia germinans*). Photo: Wiki Commons

Salt Aerosols

- Plants growing near estuaries, sounds, and lagoons must tolerate atmospheric salts as well as elevated soil salinity
- Dunes plants are well adapted to salt aerosols
- Salt-aerosol damage: reduced stem growth, browning on margins of leaves, thinning of the leaf crown, and death of twigs on the windward side of a tree or shrub



Maritime Swamp Forest

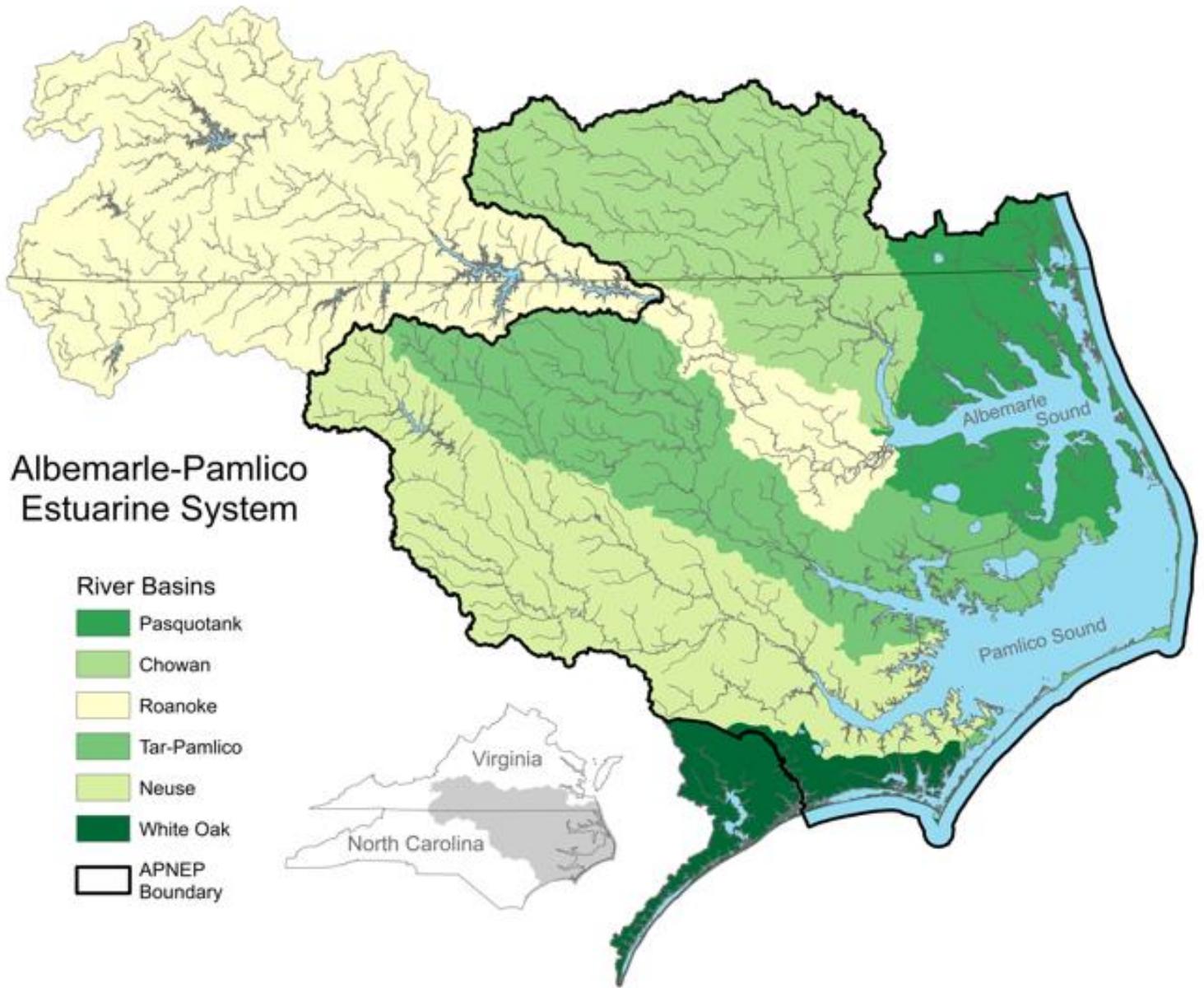
- Seasonally flooded woody vegetation, as well as saturated forests, of sheltered and near-estuarine maritime wetlands
- Habit of plants is highly variable depending on the extent to which they are exposed to pruning by wind and salt spray
- Groundwater and surface water are typically fresh (< 0.5 ppt), although salt water may pool in these areas after episodic storm surges during events such as hurricanes

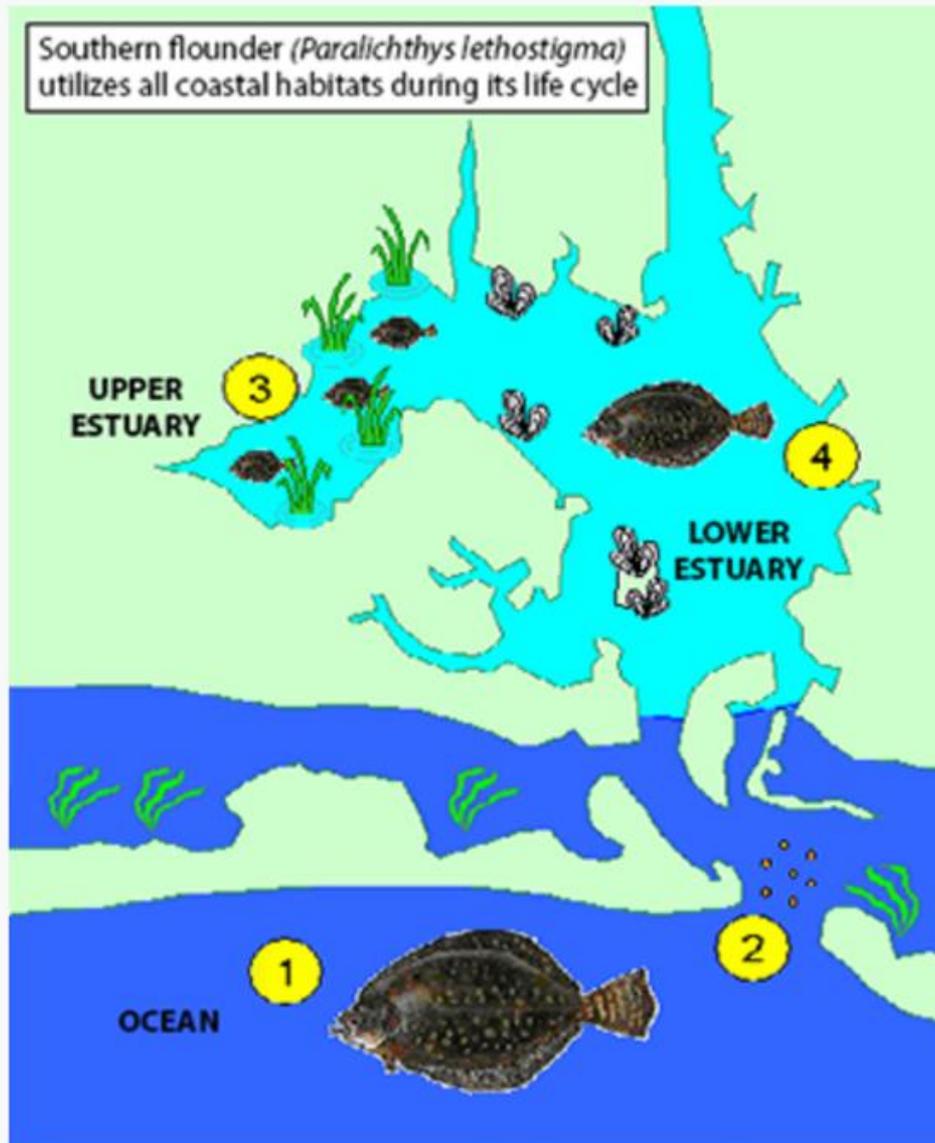


Estuary



- Partially enclosed body of water with a connection to the ocean, **Brackish**: salinity ranges from 0.5 to 30 ppt
- Filter out sediments and pollutants
- Estuarine wetlands act as natural barriers, absorb floodwaters, protect inland areas from storms, and provide that first line of defense from sea level rise and climate change
- Habitat for fish, shrimp, clams, oysters, birds



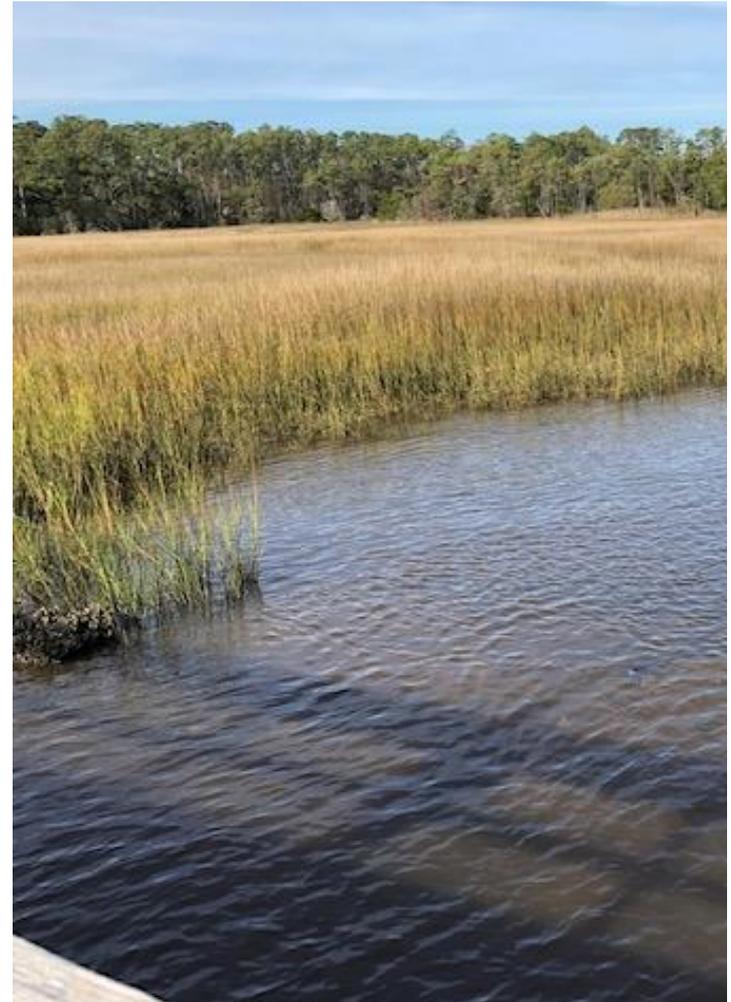


Life cycle of the southern flounder

1. Adults spawn in near-shore ocean waters around hard bottom habitat in late winter months.
2. Larvae drift through the water column on currents, eventually passing through inlets and to the estuary beyond.
3. Small juveniles settle out of the water column in upper, low-salinity estuaries containing marsh wetlands and shallow soft bottom habitat.
4. Large juveniles move throughout the estuary foraging on crabs and small fish living in oyster reefs, along the marsh edge and among seagrass beds. Once the juvenile flounder recruit to the adult population, the cycle is completed and begins again.

Salt Marsh

- Occur in the intertidal zones on the edges of sounds, estuaries and lagoons
- Best developed in the upstream and downstream of estuaries
- Need sediment to form the shallow beds where grasses grow
- Most common species is the Salt Marsh Cordgrass, *Spartina alterniflora* or *Sporobolus alterniflorus*



Salt Marsh Soils

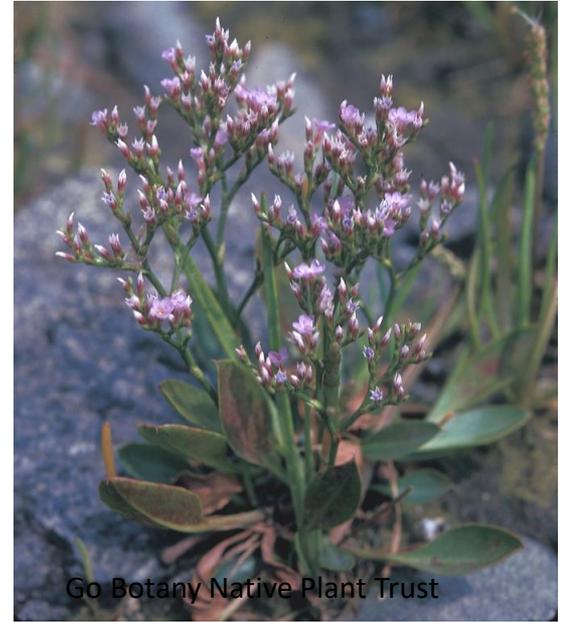
- Phew! What's that smell!?
- Soil is composed of deep mud and peat that is often several feet thick. Peat is waterlogged, root-filled, and very spongy
- Salt marshes are frequently submerged by the tides and contain a lot of decomposing plant material, oxygen levels in the peat can be extremely low—a condition called **Hypoxia**





https://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/lapmcot10763.pdf

Black Needlerush *Juncus roemerianus*



Go Botany Native Plant Trust

Sea Lavender *Limonium sp*



Sawgrass *Cladium jamaicens*



Anna Armitage CC-BY-NC-ND

Glasswort *Salicornia* spp

Salt Marsh Wildlife



Clapper Rail



Photo by jere7my tho?rpe/flickr/CC BY NC-SA 2.0

Blue crabs



Patrick Coin/Flickr

Fiddler Crab



Travis Brown Wrightsville Beach Magazine

Marsh Periwinkle

Diamondback Terrapins

Malaclemys terrapin

- Two subspecies in NC
- NC Species of Special Concern
- Tolerate a wide range of salinity
- Skin prevents the uptake of salt and when they do take in salt, they excrete it through salt glands
- Feed on periwinkle snails





“Living” Shorelines



Photos: NC Coastal Federation