Part 3
Chasing Tailers at High Tide

Redfish Habitat and What They Eat

Fiddler Crabs, Mud Minnows, Grass Shrimp & Clam Worms

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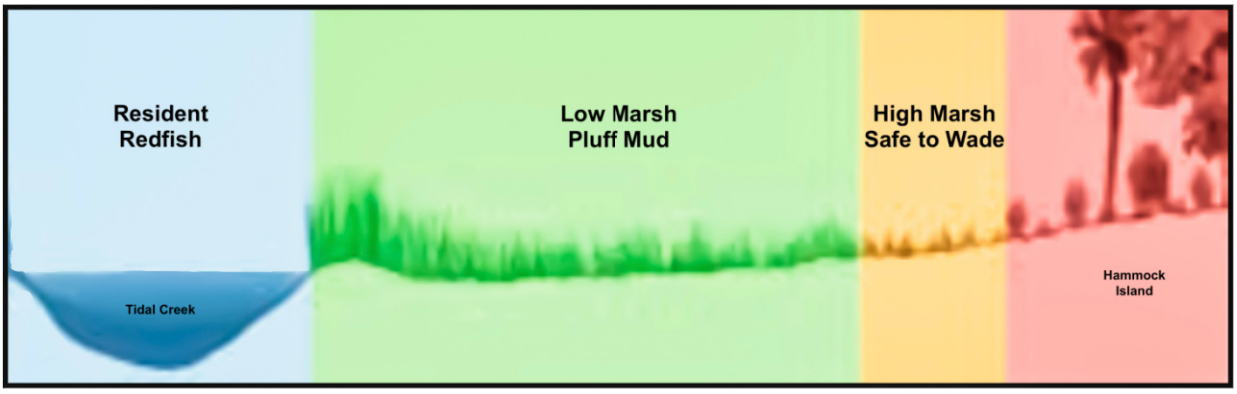
by Peter Lami | February 18, 2022

Habitat[1]

Redfish found inside South Carolina estuaries are typically juvenile fish; meaning they have not yet reached sexual maturity. These fish are often called sub-adults. Male Redfish mature at age three (27-30 inches long), females mature at age four (32-36 inches).

As Redfish develop, they utilize different habitats. Juvenile Redfish are abundant in the shallow creeks that meander through cordgrass (*Spartina alterniflora*) marshes. As juveniles mature, their habitat preferences change. Sub-adult Redfish can usually be found in larger creeks and rivers, although they have been observed in waters off barrier islands and sandbars.



Blue = Tidal Creek
Green = Low Marsh
Orange = High Marsh
Red = Upland Border

Young Redfish, between the Ages of 1 and 3, show a pattern of movement and feeding that is related to the tide. During the warm months, as the incoming tide begins to reach the marshgrass, fish move into the grass. Here, they feed on **fiddler crabs (80% of their diet)**, mud crabs, **grass shrimp**, and fishes that are associated with this structured habitat, example **mud minnows**. As the tide ebbs, the young Redfish move off the marsh surface to the shallow water of tidal mudflats adjacent to the marsh. Most Redfish prefer mud flats with structure,

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[1] Redfish - Life History SC DNR. https://www.dnr.sc.gov/marine/mrri/insh_fish/reddrum/reddrum.html

such as oyster reefs. This pattern of movement reduces their exposure to bottlenose dolphin, which is a major predator.

In winter, when water temperatures are low and the fiddler crabs are no longer active, Redfish display the same pattern of tidal movement, but they become sluggish and less active since they are unable to regulate their body temperature, and therefore are more prone to predation by the bottlenose dolphin.

Adults, sometimes called Bull Reds, are found in nearshore and coastal waters. As water temperatures decline in the fall (late October to November), adult Redfish move gradually offshore to deeper, warmer water. This offshore movement initiates a flurry of successful surf fishing. Fish move back to nearshore waters with temperature increases in the spring. As inshore water temperatures warm, Redfish move from deeper offshore waters to again inhabit the inlets and front beaches.The diagram below is color-coded to indicate which zone or zones Redfish and the food they eat primarily resides in. For example, a Redfish is designated here as primarily residing in the tidal creek zone; however, many can also be found feeding on the marsh surface at high tide. The colors for each zone are listed below, as well as some examples. For the fauna, you will also see an indication of whether the animal spends their whole life (Resident) or only part of their life (Transient) in the salt marshes and tidal creeks.

What Do Redfish Eat?

Redfish eat fiddler crabs, mud minnows, grass shrimp and clam worms in South Carolina's Lowcountry. Their feeding behavior is driven by the rising and falling saltwater tides within the salt marsh-tidal creek ecosystem. For example, "Resident" Redfish will move up into the "High Marsh" surrounding hammock islands at high tide to feed on fiddler crabs in the Summer.

Photo by Peter Lami

Larger hammock islands, of 10 acres or greater, are often of more irregular shape and many are at least partially transected by small tidal drains. Small drains are generally bordered by high Salt Marsh, Salt-Shrub Thicket or Salt Flat and occasionally contain permanent saline pools that are fed by flood tides. Tidal drains often terminate in sand flats or intertidal mud flats teaming with **Fiddler Crabs** (Uca sps.). The drains or small creeks have an abundance of small fishes, primarily **Mud Minnows** Mummichog (Fundulus heteroclitus) and **Sheepshead Minnow** (Cyprinodon variegatus). Saline and brackish pools, both permanent and semi-permanent, are often populated by **Grass Shrimp** (Palaemonetes sps.) and Sheepshead

Minnow and/or Marsh Killifish (Fundulus confluentus). These secluded wetlands with abundant food supplies attract an assortment of wading birds.

Fiddler Crabs — (*Uca pugnax*)

Source: https://www.dnr.sc.gov/marine/mrri/acechar/speciesgallery/Invertebrates/FiddlerCrab/index.html

Fiddler crabs are easily recognized by their square body and marked difference in size between the right and left claws of males. As the male grows to maturity, the relative weight of its large claw, or cheliped, changes from 2% to 65% of its total body weight. Mud fiddlers,(*Uca pugnax*) have an H-shaped depression in the middle of the carapace and their eyestalks are long and thin. ***They are brown in color, with the front of the shell and eyestalks ranging from blue to turquoise***. The large claw of the male is usually yellowish orange to yellowish white, and its walking legs are dark and banded. Besides mud fiddlers, two other species of fiddler crabs are common along the southeastern Atlantic coast: Uca pugilator, the sand fiddler; and Uca minax, the red-jointed fiddler. The three are easily differentiated on the basis of anatomical features and preferred habitat: sand fiddlers inhabit sandy habitats, they are typically a pinkish-purple color, and the inside of the male's large claw lacks a row of small bumps; ***mud fiddlers are a brownish-yellowish color***, they prefer muddy areas, and the inside of the male's large claw has a row of small granules; red-jointed fiddlers are larger than the other two species, and the joints of the male's large claw are red.

Mummichog, aka Mud Minnows (*Fundulus heteroclitus*)

Source: https://www.dnr.sc.gov/marine/mrri/acechar/speciesgallery/Fish/Mummichog/index.html

Mummichogs, locally called mud minnows, belong to a group of fishes known collectively as killifish. Killifish are members of the family *Cyprinodontidae*. They make up a large portion of the small fish in tidal creeks, saltwater marshes, lagoons, and other shallow coastal habitats. Mummichogs have a single, spineless dorsal fin and pelvic fins positioned near the anal fin. The head is flattened and the mouth is tilted upwards. Most species in the family *Cyprinodontidae* are sexually dimorphic; that is, males and females look different. ***Small female mummichogs are brownish above and pale below with 12-15 dark vertical bars. The dorsal and anal fins are tinged with green.*** Distinctive markings disappear as females grow larger. ***Males are darker in color, usually dark green or olive with a yellowish underside***; spawning males have a dark spot towards the rear of the dorsal fin. Their sides are silvery with approximately 15 vertical bars and many small spots that continue on to the f in membrane, varying in color from white to yellow. Maximum adult size is 12 cm (4.7 in), with females growing larger than males.

Preferred Habitat and Biology

This species is very common along the eastern U.S. coast, from the Gulf of St. Lawrence to northern Florida. Mummichogs are especially abundant in salt marshes and tidal creeks of the ACE Basin and coastal South Carolina. The spawning season extends from spring to fall and varies with latitude. During this time, male mummichogs become brighter in color. Spawning takes place during the new or full moon (when the tide is at its highest) in water of various salinities. Eggs may be laid in a variety of substrates, depending on availability. Mummichog eggs may be found in the empty shells of ribbed mussels, on the leaves of marsh grass, in pits dug out and covered by the female, or spread directly on the bottom. The eggs develop out of the water, and hatching takes place upon immersion during the successive moon tide. Mummichogs are extremely hardy and can tolerate widely fluctuating environmental conditions. During winter months, they may burrow in the mud or move to deeper water at the mouths of channels. The word "*mummichog*" comes from an Indian word meaning "*going in crowds*." Various age classes will gather, often close to shore, in schools that may number several hundred fish. Feeding occurs at the marsh surface, in mid-water, or on the bottom even though this species' upward tilted mouth is specialized for surface feeding. Mummichogs eat a variety of foods including marine worms, crustaceans, small shrimps, insects, and other fish.

Grass Shrimp — (*Palaemonetes vulgaris*)

Source: https://www.dnr.sc.gov/marine/mrri/acechar/speciesgallery/Invertebrates/GrassShrimp/index.html

Grass shrimp, sometimes called hardbacks or popcorn shrimp, are among the most common estuarine inhabitants of South Carolina waters. Their bodies are nearly transparent, except for orange (Palaemonetes vulgaris) or yellow (P. pugio) pigment in the eyestalks. Grass shrimp also have a well-developed rostrum (horn) with teeth along the edges, four spines on the telson (the pointed structure in the middle of the tail fan), and heads that are longer than the rest of the body. Unlike white shrimp (for which they are sometimes mistaken), grass shrimp lack claws on the third pair of walking legs and rarely grow larger than 5 cm (about 2 inches).

Preferred Habitat and Biology

Grass shrimp are found in estuarine waters along the Atlantic and Gulf coasts, usually associated with beds of submerged vegetation or oyster shells. Although both can live in a wide range of salinity, P. vulgaris can tolerate somewhat higher salinities than P. pugio; thus, there is some separation of the two species based on preferred habitat.

The grass shrimp spawning season extends from April to September, although this may vary depending on species and geographic location. During mating, which occurs within 7 hours of molting, the male transfers a spermatophore to the female. The eggs are fertilized externally as they are extruded, and the female attaches them to her pleopods, where they remain until hatching 12 to 60 days after they are fertilized. The incubation period varies among species and is shorter in warmer climates. The female molts again a few days after spawning and may produce another brood. Grass shrimp larvae undergo a series of

developmental stages (10 zoeae and a postlarva) whose duration depends on water temperature and food availability. Larvae are planktonic and feed on zooplankton, algae, and detritus. However, adults consume a wider variety of foods, including microalgae attached to aquatic plants, small marine worms, and crustaceans. The fecal pellets that are produced by grass shrimp from the unused part of their diet are rich in nutrients and therefore an important component of energy cycling in estuarine ecosystems.

Clam Worms — (*Alitta succinta, Family Nereis*)

Source: https://naturalhistory2.si.edu/smsfp/irlspec/Neanthes_succinea.htm
http://www.iucngisd.org/gisd/species.php?sc=1068

Clam worms are known to swarm at the surface en masse during spawning. Swarming is thought to be triggered by temperature, salinity, photoperiod and lunar cycle. Commonly swarm at night near artificial lights or natural moonlight. Swarming starts around spring and may continue into summer. After reproduction, the worms die. Swarming has been observed in South Carolina coastal waters from March — October at around the time of the new moon after sunset in some cases.

The worm has a darkly colored pigmented head area, with a greenish-yellow or pale red posterior (rear) region, and white or dark dots over the entire body, the ventral (underside) surface is pale when alive.

Characteristics:	Polychaete; head has four large eyes, four pairs of tentacles, and one pair of long palps
Range:	Atlantic and Pacific coasts of the U.S.
Size:	Up to 1.5 in (3.5cm) in length
Habitat:	Estuaries, tidal creeks, marsh platform, sand and mud
Fun Fact:	Worms in this family are highly preferred and sought after by shorebirds.