AN ABBREVIATED LOOK AT COMMON CHARLOTTE HARBOR FISH LIFE HISTORIES

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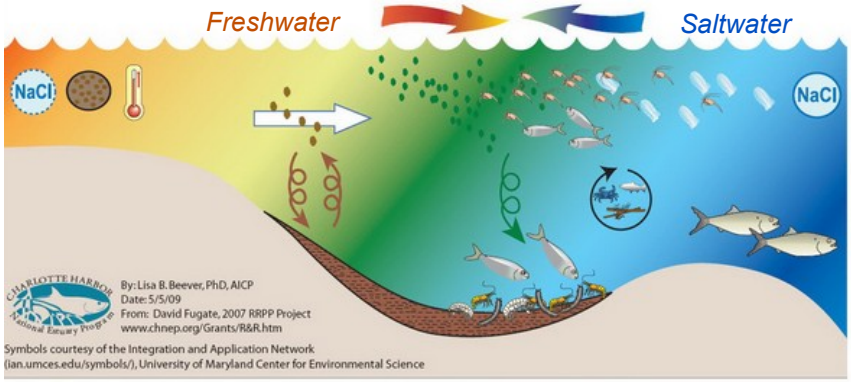
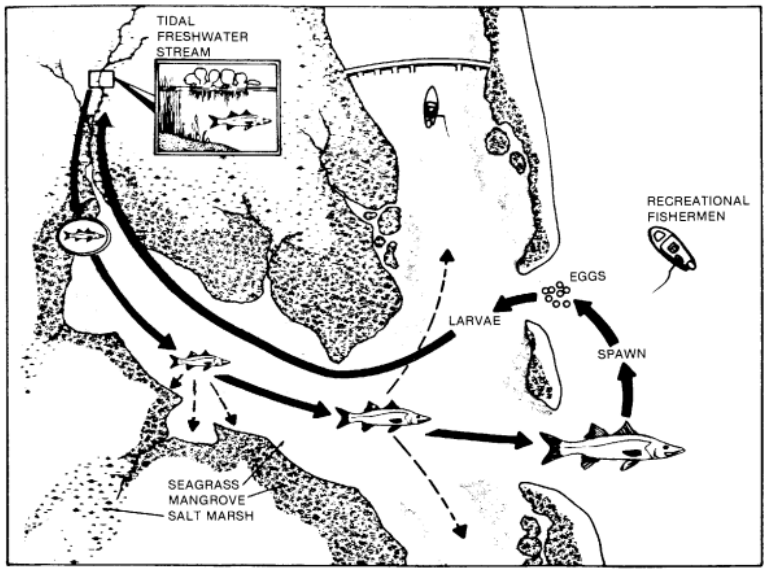
Perhaps the most well-known function of estuaries, such as Charlotte Harbor, is their role as nursery grounds for growing fish, shrimp and shellfish. Very few marine species spawn in estuaries, but estuaries are used extensively as nursery grounds. Most fish and crustaceans (crabs, shrimp, etc.) spawn offshore. The eggs are typically planktonic (free floating). Eggs develop into larvae that depend upon tides and currents to transport them to suitable habitats to settle out and grow within. Settling young fish and crustaceans utilize a number of different survival strategies, but common to all is a quest to not be eaten.

A juvenile redfish—FSG Image

Redfish, sand sea trout, southern kingfish and spot larvae for example, when ready to settle as juveniles, look for low salinity waters associated with river mouths. Low salinity waters tend to support less predator fish than higher salinity waters. According to Dr. Phil Stevens, FWC Charlotte Harbor Field Lab, three times as many piscivores (fish eaters) are found in lower Charlotte Harbor (where the water is deeper and saltier) than are found in the upper harbor, so if your survival strategy is not to be eaten, river mouths associated with the upper harbor are good places to be (if you can tolerate low salinities). River mouths are also areas of high productivity. These areas are associated with turbidity maximums. Turbidity maximums are areas where freshwater meets and mixes with saltwater. The mixing causes sediments to become trapped in suspension. Turbidity maximums also concentrate phytoplankton algae which in turn attract tiny animals such as copepods and mysids who feed on the algae. These animals are eaten by small fish and predatory invertebrates such as comb jellies (the non-stinging jellies that are not true jellyfish) which are then fed upon by slightly larger fish. For juvenile fish, river mouths and turbidity maximums associated with them mean less predators and ample food.



Estuary turbidity maximum—CHNEP Image



Snook life cycle—Robin Lewis Image

Snook in their quest to not be eaten seek out back country areas (at the land margins) that are very shallow (big things can't get to it), low in salinity and low in dissolved oxygen. Juvenile snook have a very high tolerance for low dissolved oxygen, but they will lose that tolerance as they grow. While they are in the back country juvenile snook feed on what's available, and what's available is primarily

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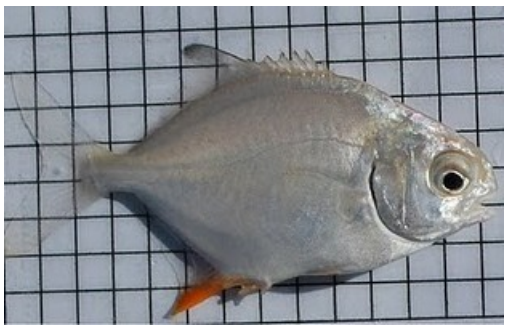
mosquito fish. When snook reach a size of about 5-6 inches in length they begin to lose their tolerance for low dissolved oxygen and are forced to move out of the back country. At this size they are also in pursuit of food and they require deeper water due to their increased size. Snook at this size will hang out at the entrances of creeks for a while where they are afforded some protection from predators. They are now eating bigger food items such as pinfish and pink shrimp. Adult snook have a very diverse diet but at the top of their prey foods are pinfish, pigfish and swimming crabs.

A juvenile snook—FSG Image

Not all juvenile fish utilize low salinity waters to escape being eaten. Juvenile gag for instance requires stable salinity conditions. As such they settle out in the first suitable habitat encountered, generally seagrass beds found in the sounds (Gasparilla & Pine Island sounds) as well as in the mangrove prop roots. These habitats allow juvenile gag to hide from predators. As with the other fish mentioned, juvenile gag's priority at this stage is to not be eaten. As such they are feeding upon whatever is common in the environment and appropriate for their size range. Young juveniles feed primarily on pinfish and shrimp. As they get bigger they feed on pinfish, pigfish, scaled sardines (white bait) and silver perch. Other species that settle out in seagrasses as juveniles include gray (mangrove) snapper, grunts and spotted sea trout.

A juvenile gag grouper—FWC Image



A juvenile permit—FSG Image

Like gag, permit also settle out in areas of higher salinity waters. Juvenile permit establish along estuary beaches where they are easily camouflaged against the sand. Small juveniles feed upon copepods, mysids and shrimp. As they get larger they shift to mole crabs, coquina clams and barnacles. Adults feed upon sea urchins, bivalves and crabs.

As fish increase in size, habitat and diet demands largely determine where it will be found. How and for how long fish utilize the estuary varies by species. Gag will only spend about a year in the estuary before moving offshore. Redfish stay in the estuary for several years. Snook go offshore to spawn but then come back to the estuary and spotted sea trout live their entire life in the estuary. The innate need to reproduce, to ensure survival of the species, also determines where and when different fish species are found. Tides, day length, the lunar cycle, temperature and salinity all influence the fish spawning patterns.

This is just a very basic look at the life history of some of our common fish species. Of course it is much more complicated in the real world and includes other cool strategies not discussed here. Estuaries and life cycles are intricate and complicated, which of course is why they are so fascinating.

Sources:

Blewett et al. 2006. Feeding habits of common snook, *Centropomus undecimalis*, in Charlotte Harbor, Florida. Gulf Carib Res, 18: 1-16.

Casey et al. 2006. Habitat use by juvenile gag, *Mycteroperca microlepis* (Pisces: Serranidae), in subtropical Charlotte Harbor, Florida (USA). Gulf Carib Res, 19, 1-9.

Stevens et al. 2007. Variable habitat use by juvenile common snook, *Centropomus undecimalis* (Pisces: Centropomidae): Applying a life-history model in a southwest Florida estuary. Bull Mar Sci, 80(1): 93-108.

Ichthyology at the Florida Museum of Natural History, http://www.flmnh.ufl.edu/fish/

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