



Brown Shrimp Investigation Student Sheet

Lesson 3 > Part 3 > Changing Ecosystems

Expert Group 2: Understanding the Brown Shrimp Life Cycle

1. Use the Characteristics of Marsh Wetlands information below and the Brown Shrimp Life Cycle on page 22 to learn where Brown Shrimp might be found at different stages of their life cycle. Complete the table below.

	Post-larvae & Juvenile	Sub-adult	Adult
Salinity			
Temperature			
Location			
Habitat Description			

Characteristics of Marsh Wetlands

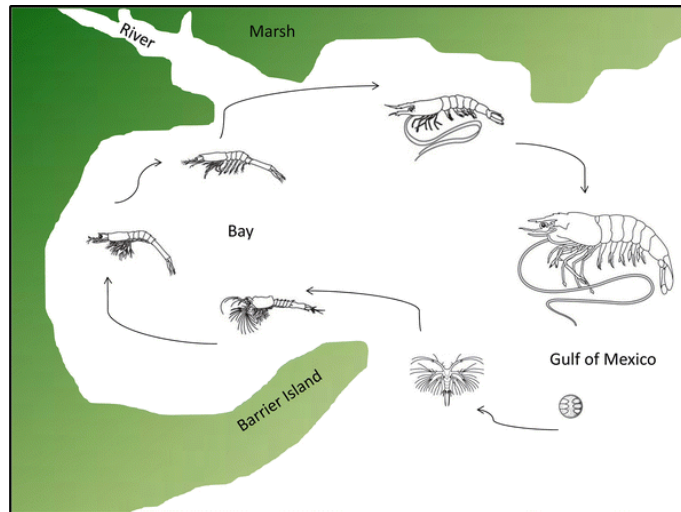
Marsh – an area dominated by grasses of various types and often interspersed with patches of open shallow water. The types of plants and animals that can live in a marsh depend on the location relative to open water and shoreline, salinity, and water depth. The salinities vary greatly between marsh types, which also affects whether an area is a suitable habitat for different stages in the life cycle of organisms.

There are four types of marshes:

- a. Freshwater Marsh
 - occurs farthest inland
 - salinity (salt content) averages between 0.5 –1.0 ppt (parts per thousand)
 - has the most diverse array of plant life; home to frogs, turtles, ducks, alligators, muskrat, mink, otters, egrets, herons, hawks, mosquitoes, and more.
- b. Intermediate Marsh
 - where slightly salty water mixes with freshwater
 - salinity averages about 3.3 ppt
 - provides nursery habitat for brown shrimp, blue crab, and other fishery resources
- c. Brackish Marsh
 - salinity averages about 8 ppt
 - affected by both tidal action and water from fresh marsh
 - fishing industry relies on the blue crab, shrimp, speckled trout, redfish, and mammals found in the brackish marsh
- d. Salt Marsh
 - occurs along the shoreline; salinity is about 16 ppt
 - most affected by the winds and tides
 - redfish, speckled trout, crabs, and shrimp move in and out of salt marshes at different stages of their life cycles.



Brown Shrimp Life Cycle



Typical life cycle of shrimp in the Gulf of Mexico. Tunnell J.W. (2017) Shellfish of the Gulf of Mexico. In: Ward C. (eds) Habitats and Biota of the Gulf of Mexico: Before the Deepwater Horizon Oil Spill. Springer, New York, NY. https://link.springer.com/chapter/10.1007/978-1-4939-3447-8_1

The brown shrimp life cycle both starts and ends in the ocean, but depends upon estuarine nurseries for life stages in-between. Adults spawn during the spring or fall months as long as water temperatures are not too cold and remain between 62-84°F (17-29°C). Spawning occurs mostly at night, offshore in the Gulf of Mexico at water depths of 59 feet (18 meters) or deeper. Because the eggs are more dense than seawater, they float down near the seafloor where they hatch into larvae. Post-larvae shrimp use tides to migrate to the safety of inshore estuaries, mainly from February through April, with an additional minor peak in the fall. Postlarvae and juveniles are found in shallow vegetated habitats within estuaries where the majority of their prey resides. They use the cover provided by the vegetation to avoid predators. They also live on silty sand and non-vegetated mud bottoms of interior marsh waters. These intermediate marsh habitats, where slightly salty water mixes with fresh water, have an average salinity of about 3.3 parts per million (ppt). After about three months of feeding and growing, sub-adult shrimp move out into slightly deeper brackish marsh (average salinity of 8 ppt) and salt marsh (average salinity 16 ppt) and then into coastal waters as they prepare to return to spawning grounds in the open ocean.

In late spring/early summer, adult brown shrimp move offshore, often during tides associated with the full moon, to deeper, saltier water where they live in silt, muddy sand, or sandy bottoms. They are most commonly found in waters 90 to 180 feet (27.5 to 55 meters) deep but have been reported at depths as great as 540 feet (164.5 meters). Adult brown shrimp are most abundant along the continental shelf of the Gulf of Mexico, but seasonal movements correlating with water temperature also influence distribution. Other factors that affect their distribution include salinity, food availability, and currents.

Excerpt adapted from Louisiana Shrimp, Fishery Management Plan, Louisiana Department of Wildlife and Fisheries, Office of Fisheries wlf.louisiana.gov/sites/default/files/pdf/page/37762-fishery-management-plans-marine/shrimpfmp4-11-16.pdf





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- Oysters are another important part of Louisiana’s fishing industry, but unlike shrimp, they lack the ability to move to a new environment. This makes them more vulnerable when conditions become unfavorable. Consider the ways that the life cycle of the Brown Shrimp makes them more and less vulnerable to environmental change by completing the T-chart below.

MORE VULNERABLE	LESS VULNERABLE

- How does this information relate to the investigation question for today: *How are brown shrimp impacted by the changing coastal environment? How does this affect the people of Louisiana?*
- When you return to your home group**, compare information about the salinity at each of the six CMRS sites from Group 3 to what you have learned about the Brown Shrimp life cycle to predict where in Lake Pontchartrain Brown Shrimp might be at different stages in their life cycle.

