

## Horseshoe Crabs (*Limulus polyphemus*)

Although Delaware Bay is famous for horseshoe crabs, the New York-New Jersey Harbor Estuary should not be overlooked when it comes to this animal. During the full moon in May or June, Horseshoe Crabs can be seen mating on the Estuary's sandy beaches including Sandy Hook Bay, Raritan Bay, Caven Point Beach in Jersey City, along Lower New York Harbor, in Staten Island's Great Kills and along Jamaica Bay. The current range of the Atlantic Coast Horseshoe Crab goes from Maine to the Yucatan Peninsula and the Gulf of Mexico. They are most abundant from Virginia to New York. Other than that, this particular species (*Limulus polyphemus*) is found nowhere else in the world.



Horseshoe Crabs live in different habitats during their various life stages. During mating season, mature Horseshoe Crabs move from offshore to the Estuary's sandy beaches where they take shelter from harsh ocean winds and waves. The female Horseshoe Crab digs a series of shallow holes on these calm beaches, depositing up to 20,000 pearl-sized, blue-green eggs per hole. Then males, using specialized claws called pedipalps, attach to the back of the female's shell to be dragged over the nests to fertilize them. A very small percentage of eggs hatch into larvae in 4-30 days at a similar high tide. These escape into the Estuary. Most eggs and even larvae serve as food for migrating shorebirds and other animals. The preferred habitat for juvenile horseshoe crabs is the shallow water of the Estuary's bays. When not mating, adult Horseshoe Crabs spend their time in ocean depths of more than 200 meters or in the deeper areas of the Estuary's bays.

Horseshoe Crabs offer numerous benefits to us. Their blood, which almost immediately clots when a foreign object such as bacteria enters it, has proved valuable in medical research. *Limulus* Amebocyte Lysate (LAL) is derived from the Horseshoe Crab's blue, copper-based blood. It is used to detect bacterial diseases and bacteria in pharmaceuticals. Certain properties of the horseshoe crab's shell are used to speed blood clotting, make absorbable sutures and treat severe burns. Horseshoe Crabs also have a long history of being used as bait, fertilizer and animal feed. They were harvested in Raritan Bay for use as fertilizer and livestock feed from the 1850's until the 1920's. They are still considered ideal bait for whelk and conch fishing, although recent conservation efforts in New Jersey and Delaware have placed limits and restrictions on how many horseshoe crabs can be harvested for these purposes.

They are an important part of the local food web. The New York-New Jersey Harbor Estuary is on the Atlantic flyway for migratory shorebirds, such as red knots, who stop to eat horseshoe crab eggs to fuel their long journey from their winter home in Central and South America to their nesting grounds in the Arctic. Horseshoe Crabs are an important food source for finfish and sea turtles. Local fish and invertebrates that feed on horseshoe crab eggs and larvae are Striped Bass, White Perch, American Eel, killifish, silver perch, weakfish, Atlantic Silverside, Summer and Winter Flounder, many crab species and some

gastropods. Finally, the Horseshoe Crab's shells serves as a home to many small species of marine animals. As a Horseshoe Crab gets older it molts less frequently and finally not at all. Over time, slipper shells, barnacles and other small organisms attach themselves to the Horseshoe Crab's shell, obtaining secure shelter at no harm to their host.

Horseshoe Crabs are invertebrates and are more closely related to spiders and scorpions than crabs. They can live 20 years or more, and during their lifetime they molt about 16-17 times in their first 9-11 years until mature and ready to spawn.

Horseshoe Crabs have been around for more than 250 million years and therefore have earned the name "living fossil." In recent years horseshoe crabs have been on the decline. There were 2.3 to 4.1 million horseshoe crabs in the Delaware Bay region in the mid 20<sup>th</sup> century, but by 1990's there were only an estimated 900,000. From 1999 to 2002, only about 400,000 were counted during spawning. Locally, a horseshoe crab spawning survey for the New York Marine District began in 2005. This survey has aided in the development of a horseshoe crab management plan for New York State Department of Environmental Conservation. The horseshoe crab survey tracks the abundance of spawning horseshoe crabs during the full and new moon high tides from May to June along Long Island Beaches. One of those beaches is Plum Beach in Brooklyn, which is part of the Jamaica Bay Unit of the Gateway National Recreation Area. The 2005 survey counted a total of 2933 horseshoe crabs at Plum Beach, where 2298 were males and 635 were females.



This entry was researched and written by Claire Antonucci, Rosemary Higgins and Cathy Yuhas of the New Jersey Marine Sciences Consortium/New Jersey Sea Grant Extension Program. It is part of a larger project, "The Key Species of New York/New Jersey Harbor Estuary" produced with funding from the New York/New Jersey Harbor Estuary Program.

