

The DuPont Nature Center – a unique place in Delaware Bay for shorebird science, conservation and education

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Designated as the first Western Hemisphere Shorebird Reserve Network site of hemispheric importance, Delaware Bay on the east coast of the United States has long been recognized as one of the most important shorebird stopover sites in North America during spring migration. Red Knots *Calidris canutus*, Ruddy Turnstones *Arenaria interpres*, Semipalmated Sandpipers *Calidris pusilla* and Sanderlings *Calidris alba* make up the majority of spring migrants but there are also good numbers of Dunlins *Calidris alpina* and Short-billed Dowitchers *Limnodromus griseus*. As many as nine species commonly stop in Delaware Bay with even more occasional or rare species rounding off the list.

Shorebirds time their arrival in Delaware Bay to coincide with horseshoe crab *Limulus polyphemus* spawning. Belonging to a lineage that goes back to Ordovician oceans some 400 million years ago, horseshoe crabs have made the sheltered sandy beaches of Delaware Bay the epicenter for their spawning activity. Each May and June, concentrated around the new and full moon high tides, horseshoe crabs come onto Bay beaches to bury their eggs in the sand. A portion of the eggs gets displaced to the surface by spawning activities and wave action where they provide a feast for migratory shorebirds to fuel up for their onward migrations. During their stay, shorebirds will feed almost exclusively on horseshoe crab eggs, the food resource most critical to their successful migration.

Mispillion Harbor (near Slaughter Beach, Delaware, USA) consistently contains the highest density of horseshoe crab eggs in the whole of Delaware Bay and regularly attracts a large proportion of Delaware Bay shorebirds. The Harbor area is particularly attractive to horseshoe crabs because there are several beaches that are ideal for spawning. These are protected from large waves that can inhibit spawning on the more exposed beaches of the Bay. Horseshoe crabs spawn less during times of heavy surf because they have a higher chance of being stranded high on the beach. They will spawn in Mispillion Harbor even when onshore waves limit spawn-

ing elsewhere. In addition, waters within the Harbor may warm earlier than Bay water so spawning may start earlier than on Bayshore beaches. Therefore, spawning events tend to be more frequent with higher concentrations of crabs than elsewhere in the Bay. The accumulation of spawning events throughout the spawning period can provide a tremendous amount of food for shorebirds and many species have come to rely on this horseshoe-crab-egg banquet.

For shorebirds, Mispillion Harbor serves as a harbor of refuge as well as an extremely important feeding area. They prefer to feed and roost in protected areas with less wind, waves, and disturbance from humans and this is just what Mispillion Harbor has to offer. Moreover, the Harbor is located within 2 km of what may be the only site in the world where Red Knots are known to roost inland. It is an ideal situation to meet most of the needs of migrating shorebirds. All of the feeding beaches in Mispillion Harbor as well as the adjacent marshes are in permanent conservation protection thanks to efforts by the Delaware Division of Fish and Wildlife, The Nature Conservancy, The Conservation Fund, the Public Service Enterprise Group's Estuary Enhancement Program and The DuPont Company. The result is a site of extraordinary ecological significance to migratory shorebirds. This is exemplified by the fact that during peak spring migration, tens of thousands of shorebirds can be observed within the Harbor.

Bird watchers come to Delaware Bay from around the world each spring to witness the extraordinary shorebird migration. And now there is an added bonus to their journey – a new, interactive, hi-tech interpretive center situated in the place where arguably the most concentrated shorebird viewing on the planet can be found. The DuPont Nature Center in the Mispillion Harbor Reserve lies on the banks of Mispillion Harbor, where the Mispillion River and Cedar Creek meet. This is a location that showcases the convergence of horseshoe crabs and shorebirds, life forms with widely different natural histories.

Owned and operated by the Delaware Division of Fish and Wildlife, the Center will serve as a science-based education



Fig. 1. The DuPont Nature Center in Mispillion Harbor. (Photo: Chris Bennett)



Fig. 2. Shorebird exhibition in the DuPont Nature Center, Mispillion Harbor. (Photo: Dawn Webb)





Fig. 3. Red Knots, Dunlins, Ruddy Turnstones, Short-billed Dowitchers and Semipalmated Sandpipers feeding frenetically on Horseshoe Crab eggs in Mispillion Harbor. (Photo: Kevin Kalasz)

and interpretive facility for schools, families, and other organized groups. It is designed to connect people with nature and will instill an appreciation for the ecological significance of the region. The Center, with its distinctive red roof includes an observation deck with spotting scopes to view the Harbor, Bay and shoreline.

Inside the Center, a large wall panel showcases the anatomy, adaptations, and life history of horseshoe crabs, including live tanks of hatchlings and juveniles. Additional smaller, stand-alone panels describe key aspects of human use of horseshoe crabs for bait and biomedical purposes, as well as efforts underway to conserve and educate about the species. Touch screen video programs are interspersed throughout the exhibits, complementing and enlivening the information provided in the panels.

Similarly expansive exhibit and video material are provided to enlighten visitors about the shorebird side of the story, including sections highlighting what shorebirds are, what makes them such a special group of birds, the migration routes they use, identification aids, and why Delaware Bay is so important to their life history. Binoculars are available for visitors to observe the shorebirds in the harbor outside. In addition, a remote camera located on one of the prime shore-

bird feeding beaches sends close up live video of horseshoe crabs spawning and shorebirds feeding on their eggs. Visitors can control and direct the camera to areas of the beach, species, or activities that are of interest to them and view the streaming video on a 42 inch plasma viewing screen. The Nature Center with the available optics and remote camera are key facilities to promote shorebird conservation and aid the protection of this ecologically sensitive area by providing visitors with impressive shorebird observation opportunities without disturbing the birds. To have this facility at a site such as Mispillion Harbor provides a truly remarkable experience.

The future development of the DuPont Nature Center includes an addition to the current observation deck, an observation platform, pier, and pavilion. Interior additions include a live sturgeon tank. Programs will be offered to increase public awareness and education about the importance and conservation of local and regional natural resources. The DuPont Nature Center at the Mispillion Harbor Reserve should be on every shorebird and horseshoe crab enthusiast's list of places to visit.



Fig. 4. Mispillion Harbor: the scene from the DuPont Nature Center (Photo: Chris Bennett)



Fig. 5. Mispillion Harbor at high tide: standing room only! (Photo: Chris Bennett)

