



## USGS Patuxent Wildlife Research Center - US Fish and Wildlife Service Partnerships

The USGS Patuxent Wildlife Research Center (PWRC) has a productive history of partnership with the US Fish and Wildlife Service, stemming from the creation of the National Biological Survey in 1993 and the subsequent establishment of the USGS Biological Resources Division in 1997. This fact sheet describes PWRC's research, monitoring, and other continuing partnerships with the US Fish and Wildlife Service (USFWS).

Primary partnerships are those in which PWRC and the USFWS share costs, or USFWS provides all direct support. The value in FY 2002 of the primary science partnerships listed in this fact sheet is \$8,084,000. Secondary partnerships occur when studies are funded solely by USGS but benefit the USFWS. The value in FY 2002 of secondary partnerships with the USFWS totals \$5,883,000.

### Highlights

In order to learn more about seaducks that breed in the Northeast and winter in the Chesapeake Bay, PWRC researchers are employing the use of satellite transmitters and various capture techniques to investigate the critical breeding and molting habitat of scoters. In March and April, 2001, five male surf scoters were captured utilizing a capture net gun from a fast-moving boat. These birds were then surgically implanted with satellite telemetry radios, held for a few days post-operatively, banded and released at the site of capture. Similarly, during March-May 2002, thirteen black scoters were caught using night lighting procedures in the Restigouche River of New Brunswick, Canada and 7 surf scoters were captured in the Chesapeake Bay using a net gun. The data being obtained from the satellite tracking of these 25 ducks is helping managers in Canada to identify the areas being used as breeding and molting habitats and will enable the managers of wintering habitat to provide optimum protection in those areas. More satellite tracking information is available at <http://www.pwrc.usgs.gov/resshow/perry/scoters/default.htm>. Another aspect of the seaduck study deals with the food habits of seaducks wintering in the Chesapeake Bay. Seaducks shot by hunters throughout the Atlantic Flyway during the 1999-2000 and 2000-2001 hunting seasons were collected for analysis. Examination of the gullet and gizzard contents reveal the food organisms eaten by the ducks at the various locations of their wintering areas during specific months of the winter. These data are being compared to historical food habits information to determine if changes have occurred over time. Changes could reflect a change in the wintering habitat or a change in the available food source. Such analyses are important to resource managers concerned with the protection of important wintering habitats and food source requirements.



The age-old spectacle of spring-migrant shorebirds feeding on horseshoe crab eggs may be threatened by a renewed interest in the harvest of horseshoe crabs as bait for conch and eel, and food for catfish. A potential decline in numbers of horseshoe crabs might lead to a decline in shorebird populations that depend on their eggs to complete migration and breeding. Objectives of this research are to (1) Scientifically confirm the importance of horseshoe crab eggs in the diet of red knots, and (2) Demonstrate by pen feeding trial that red knots feeding solely on crab eggs can make body mass gains comparable to those observed during spring stopover in Delaware Bay. Stable isotope (SI) technology is used to establish the unique isotopic signature of horseshoe crab eggs and develop methods to track the signature in shorebird tissue. Blood sampling, as a noninvasive approach, is used to track SI signature of red knots; blood plasma is a rapid turnover tissue that potentially will track diet SI signature change over the short 2-3 week May stopover period; and inventory of crab eggs and alternative foods of red knots in Delaware Bay will establish that the crab egg SI signature can be discriminated from the signature of other available food resources. Pen feeding trials with red knots establish consumption rate, diet-tissue fractionation value, and body mass gains of birds fed only crab eggs. Small samples of blood (in the 100-200 ul range) successfully were obtained from the medial metatarsal vein of live-trapped shorebirds using a heparinized capillary tube. Tubes of blood were centrifuged to separate plasma and cellular fractions. Remarkably, minute quantities of freeze-dried plasma (fraction of a milligram) were found sufficient for stable isotope analysis. Stable isotope signatures of horseshoe crab eggs sampled from various beaches in Delaware Bay were clustered and well separated from abundantly available alternative food resources such as blue mussels, amphipods, and sand shrimp. This result establishes crab eggs as uniquely labeled and thus traceable in shorebird tissue. The finding that a grab sample of red knots captured at one point in time would reveal a strong asymptotic regression of body mass to the crab egg signature is irrefutable evidence of the importance of crab eggs in the diet. This relationship is very powerful because it confirms four a priori predictions about stable isotope signatures of red knots arriving from distant locations to feed on crab eggs in Delaware Bay: that the isotope signatures of the birds would show distinct convergence over time; that the observed convergence would be virtually to the predicted crab egg value; that the birds would gain considerable body mass, and; that body mass gain would be correlated with feeding time on crab eggs. The small departure of the plasma mean from the egg locus likely suggests that the birds are ingesting a small proportion of invertebrate foods in the diet. This is predicted given the birds spend considerable time away from spawning beaches especially while roosting. The pen feeding trial with red knots demonstrated that the birds could not only survive on crab eggs alone, but could make body mass gains comparable to the maximum measured in the field over the same period of time. This clearly underscores the value and dependence of red knots and other shorebirds on this high quality food resource during stopover.

