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Feature Story

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Red knot's incredible journey Critically endangered shorebird focus of new children's book

Grab your atlas of the Western Hemisphere. Point to the tip of South America and follow the Atlantic coastline northward along Argentina and southern Brazil. Hop over the Amazon rainforest to the northeast coast of Brazil. Then trace a northwest arc 4,000 miles over the Atlantic Ocean, landing in Delaware Bay.

Catch your breath (briefly), and then head for the arctic tundra north of Hudson Bay, Canada. Distance covered: 10,000 miles.

By the way, you're a shorebird no bigger than a robin. Shorebirds are a class of birds that feed along shorelines, marshes and bays.

"How can you not be captivated by a 10-inch bird that migrates 20,000 miles every year?" says Middletown author/illustrator, Nancy Carol Willis. "Red Knots fly 10 times farther than the monarch butterflies we all know and love," says Willis, "but very few people have ever heard of them."

What's worse is the rust-colored red knots may soon become extinct. Over the past two decades, their population has collapsed from 100,000 to 13,315 in 2004.

With the release this month of her nonfiction picture book called Red Knot: A Shorebird's Incredible Journey, Willis hopes to educate children and raise public awareness about this amazing species before time runs out.

Narrated in journal entries from the point of view of a red knot, the book depicts in stunningly-detailed colored pencil illustrations scenes such as the flight over the

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Atlantic Ocean, a landing in Delaware Bay, the arctic nesting grounds, chicks feeding on hatching insects, a close call with an arctic fox, and the return home.

Willis' own journey studying red knots began in 1998. She was hired by the Delaware Department of Natural Resources and Environmental Control (DNREC) to design, write and illustrate an educational poster brochure on Delaware shorebirds. She learned that hundreds of thousands of various species of shorebirds stop in Delaware Bay each May, drawn by a banquet of horseshoe crab eggs.

Beginning in Tierra del Fuego, red knots make several long-distance flights along their travels, stopping for food only a few times and at the same coastal locations each year. Delaware Bay is the critical feeding site, because it's the last stop before reaching the arctic nesting grounds.

"Red Knots are what's known as an 'indicator species,'" says Willis. "They're a relatively big shorebird that migrates farther than any other animal on earth, except perhaps the arctic tern. Food shortages will hurt red knots before affecting the smaller birds," she says.

Red knots reach Delaware Bay following a five-day-and-night nonstop flight over the Atlantic Ocean. Arriving barely more than bones and feathers, the birds must double their body weights from 3.5 to 7 ounces in just two weeks. Their only food is the tiny, grey-green eggs of the horseshoe crab, a prehistoric creature related to spiders and scorpions. In good years, red knots can consume up to 18,000 eggs a day, 135,000 total during their Delaware Bay stopover.

But the number of spawning horseshoe crabs has dwindled. For 150 years, millions of horseshoe crabs were ground up and used as fertilizer. More recently, commercial trawlers have dredged the waters of Delaware Bay and waterman pile crabs from the shoreline high into pickup trucks to sell for bait in conch and eel traps.

For five years Willis followed the newspaper accounts about red knots and horseshoe crabs. "Birders and scientists pushing for drastic conservation efforts argued with watermen who depended upon the crabs for a living," says Willis. Government agencies in the states bordering the bay couldn't agree on the research and were slow to act. But the population trends grew increasingly worse until they couldn't be ignored.

That's when Willis decided to take up the cause and write her third children's picture book about red knots. Unlike the familiar American robin and raccoons of her previous two books, Willis had never seen a red knot close-up. "I also wasn't able to

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rely on my own backyard as the setting for the book," she says. She had to depict scenes from Argentina's mudflats, Brazil's grassy lagoons and mangroves, and the rocky arctic tundra.

In January 2004, Willis began her research by contacting the Delaware Shorebird Monitoring program. "They not only gave me a ton of information," she says, "but they also signed me up for the training program so that I could participate in the annual shorebird study."

In May Willis joined a team of scientists from Great Britain and birders from around the world staying at the St. Jones Reserve south of Dover. For a week she followed experts with clip boards and spotting scopes. She helped count birds and record letters on color-coded leg bands. The data provide information on population trends and help scientists track individual birds from year-to-year and place-to-place.

Willis also participated in the capture and banding of red knots. She recalls one capture using a cannon net. "A huge net is attached to two small cannons and buried at the high tide line," she says. "About 15 people are involved in the catch, and everybody is assigned a task. Several scientists hide in a blind and observe the birds feeding at the water's edge. The rest of the team stays quietly hidden from view."

When the cannons go off, team members grab their gear and race to free four hundred birds trapped under the net. Willis helped transport the birds to a make-shift camp and place them in burlap "keeping" cages. Each bird is then weighed, measured, banded, and released. "First-hand experience is extremely important to accurate writing and illustration," says Willis, who included the banding event in her book.

She also pumped visiting scientists, like Nigel A. Clark, Head of Projects with the British Trust for Ornithology, for information. It turned out red knots were worse off than she knew. Bad weather in 2002 and 2003 in Delaware Bay and in the arctic resulted in disastrous breeding seasons.

In spring 2004, efforts to protect red knots heated up, and beach collection of horseshoe crabs was banned during shorebird season. Willis hoped red knots would launch a comeback. It didn't happen.

The number of red knots fell to 13,315 in Delaware Bay and only 17,653 in the wintering grounds, well below the 40,000 needed to sustain a healthy population. Population models were predicting red knots could go extinct by 2010.

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Willis decided to get her book to press as fast as possible, sacrificing other income opportunities to accomplish the goal. She presented the book storyboard to Lorraine M.

Fleming and Michael E. Riska with the Delaware Nature Society, whose mission includes nature education. They were keen to support the project, providing editorial review and offering to assist in seeking seed money to defray some of the printing costs.

In addition to Nigel Clark, Willis' editorial team of red knot experts included: Brian A. Harrington, author of *Flight of the Red Knot*; Allan J. Baker, Head of the Department of Natural History for the Royal Ontario Museum; and Patricia M. Gonzalez, Fundacion Inalafquen, who provided all of the reference photographs for the South American sites.

Willis worked the first eight months of 2005 on the colored pencil illustrations for the book, which are rendered with great detail and accuracy. In August, leading conservation groups, including the National Audubon Society, Defenders of Wildlife, and the American Bird Conservancy, filed an emergency petition asking the U.S. Fish and Wildlife Service to protect red knots under the Endangered Species Act. "I was shipping the book overseas for printing at the same time the petition to protect red knots was filed," says Willis.

Funding support for the book arrived just-in-time. Willis received a \$750 Artist opportunity grant, and printing grants totaling \$3,000 from Premcor (now Valero) Refining Group and Uniquema Atlas Pointe Site. John Hughes, Secretary for the Delaware Department of Natural Resources and Environmental Control (DNREC) saw a mock-up of the book and pledged \$15,000 from penalty funds collected from polluters to purchase books at a discount. The grant includes funds to mail a copy of the book to every public library and public elementary and middle school in the state.

"Doing author visits to schools is a big part of what I do," says Willis. She has taken her message of "caring for the earth and all living things" to over 30,000 school children, mostly in the tri-state area. In October 2004 she was invited to give her popular program describing how nonfiction picture books are made at four international schools in Germany.

Willis hopes her book, which supports national and state education standards, can be integrated into elementary school curricula in Delaware. The book includes a glossary, range and route map, annual timeline, and information on the history and conservation of red knots.

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Willis says she enjoys visiting schools, because it gives her an excuse to remain kid-like. "Did you know," Willis asks, "that most adult red knots leave the arctic weeks before their chicks? Many of the young somehow find their own way to South America." She shares other kid-friendly facts, such as red knots can fly for five days and nights without food, rest or sleep. Red knots can consume one horseshoe crab egg every

second for five hours a day, 18,000 eggs a day total. Red knots only eat eggs on the surface that wouldn't hatch anyway. Red knots can double their body weights in two weeks. Horseshoe crabs were already old when dinosaurs were young – they haven't changed in 350 million years.

Willis' other two books, the Robins In Your Backyard, and Raccoon Moon have received numerous awards and were selected for the Accelerated Reader Program. Willis founded Birdsong Books in 1998 because she felt that traditional publishers had become unresponsive to niche markets such as environmental education. She is currently considering manuscripts by other authors for her next book publishing project.

Nancy Carol Willis was widowed in 2001 from her husband, Larry Field. She spends her spare time teaching design classes at Wilmington College and competing in agility trials with her Border collie, Alex. She sings in her church choir, directs the church drama troupe, and serves as an elder on the session at New Covenant Church in Middletown.

Red Knot: A Shorebird's Incredible Journey will be available in May 2006. To order books or schedule a school program, contact Birdsong Books at (302) 378-7274 or www.BirdsongBooks.com.

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