



FRIENDS OF BOMBAY HOOK

Newsletter



Vol. 25, No. 2
March 1, 2015

Our Mission Statement:

The Friends of Bombay Hook is a not-for-profit corporation working in conjunction with Bombay Hook NWR and the U. S. Fish and Wildlife Service. It supports and enhances educational and recreational programs at Bombay Hook, provides volunteer services and financial assistance and serves as a link between the Refuge and the public.

Spring is almost here and Volunteers are greatly needed at the Refuge -- please stop in for Volunteer Orientation on March 7 (see our Calendar of Events on pages 13-16) -- We Appreciate Your Help!

Published Quarterly by
Friends of Bombay Hook, Inc.
2591 Whitehall Neck Road
Smyrna, DE 19977
(302) 653-8322
<http://www.friendsofbombayhook.org>



The President's Corner *By Linda Osiecki*

There are many principles from which each of us can choose to lead our lives.

One is to look for opportunities for improving what you have and reaching out to others to let them know what is important and of value. This requires time, dedication, creativity and change.

This year, Friends of Bombay Hook has a tremendous opportunity. The America the Beautiful Quarter that will feature Bombay Hook in September, can be a springboard for events and activities at the Refuge, expanding our outreach to new people. This will need you as a participant and as a volunteer



Thanks to Dager's Waterfowl Hunting Guide Service and Outfitters, the Delaware State Chapter of the National Wild Turkey Federation, Cabela's, Inc. and Avery Outdoors, Inc. for their generous donations to the Wheelin' Sportsmen's Goose Hunt held on January 5th.

BIRD NOTES

By Franklin Smith

September through December 2014

Precipitation for the report period was near normal during the four-month period with each month receiving average rainfall amounts. No severe storms or prolonged droughts occurred. Impoundment water levels were sufficient to provide excellent shorebird and waterfowl feeding conditions. Light frosts were

first recorded by October 5 and the first heavy frosts occurred on November 8.

First Snow Geese of the year were observed during the first week of October and the population seemed to expand almost daily with 50 birds by October 12; 500 by October 13; 1,500 by October 16; 5,000 by October 20; and 10,000 by October 29. Up to 30,000 were in the area by mid-November but most roosted in the gravel pits near Little Creek rather than Bombay Hook until the last of November. The birds returned to the Refuge in mass by the first week of December with at least 75,000 recorded coming into Money Marsh at dusk on December 7.

Snowy Owls were again spotted on the Refuge and in the vicinity during December. A Sandhill Crane took up residence in the Refuge impoundments for portions of October and most of November and December.

Reported Sightings

Following are a collection of selected bird observations reported from Bombay Hook NWR during the report period. Sources of information include bird observation sheets by Refuge visitors, Internet postings of Refuge sightings such as *Birdline Delaware*, data collected by State and Federal biologists, as well as personal observations and communications. I have grouped the observations by land features (**in bold type**) when specific locations are included.

09/01-09/05 – Raymond Pool: Semi-palmated Plover, Black-bellied Plover; **Sheariness Pool:** Marbled Godwits (4), Hudsonian Godwits (3), Tundra Swan, Glossy Ibis, Blue-winged Teal, Stilt Sandpipers, White-rumped Sandpipers, Dunlin; **Bear Swamp:** Sora; **Finis Pool:** Arcadian Flycatchers (many); **Other Unidentified Refuge Areas:** Little Blue Heron, Glossy Ibis, Black-crowned Night Heron, Bobwhite, Peregrine Falcon, Blue Grosbeaks, Bobolink.

09/07-09/12 – Raymond Pool: Baird's Sandpiper, Red Knot, Marbled Godwits (8); **Sheariness Pool:** Marbled Godwits (6), Hudsonian Godwits (3), Peregrine Falcons (3), Merlin, Bald Eagle, Caspian Tern, Black Tern; **Bear Swamp:** Great Horned Owls; **Boardwalk Trail:** Black Rail; **Finis Pool:** Warblers included Magnolia, Parula, Chestnut-sided, Black-throated Green, Black and White, as well as Rose-breasted Grosbeak and Scarlet Tanager; **Other Unidentified Refuge Areas:** Bobolinks (scattered in many locations), Avocets (300+), Black-bellied Plovers (100), Semi-palmated Plovers (75), Stilt Sandpipers, Pectoral Sandpipers, Western Sandpipers, White-rumped Sandpipers, Long-billed Dowitchers, Tundra Swan, Ruddy Duck, Little Blue Heron, Black-crowned Night Heron, Glossy Ibis.

09/13-09/19 – Raymond Pool: Willets (7), Merlin, Peregrine Falcon, Black-bellied Plovers (90); **Sheariness Pool:** Marbled Godwits (5), Hudsonian Godwits (2), Stilt Sandpipers (20), Pectoral Sandpipers (10); **Bear Swamp:** Kingfisher; **Finis Pool:** Green Heron, Northern Parula, Black and White Warbler, Screech Owl; **Entrance Road:** Kestrel; **Other Unidentified Refuge Areas:** Savannah Sparrows, Bobolink, Bonaparte's Gull, Caspian Tern, Tundra Swan, Snow Goose.

Friends of
BOMBAY
Hook
Newsletter

is published quarterly by "Friends of Bombay Hook, Inc. (FOBH)", a non-profit 501(c)(3) organization working in conjunction with Bombay Hook NWR and U.S. Fish and Wildlife Service. FOBH provides financial and developmental support for environmental education programs at the Refuge and in communities throughout the region.

Our readers are encouraged to share comments, provide articles for publication and/or suggestions regarding the Refuge as well as notifying us of address changes.

Please direct communications to:

Friends of Bombay Hook, Inc.

2591 Whitehall Neck Road

Smyrna, DE 19977

Phone: (302) 653-8322

Fax: (302) 653-0684

email: fobhmembership@idv.net

<http://www.friendsofbombayhook.org>

09/20-09/26 – **Sheariness Pool:** Snow Geese (4), Tundra Swan; **Bear Swamp:** Peregrine Falcon; **Entrance Road:** American Golden Plover, Kestrel; **Other Unidentified Refuge Areas:** Bobolinks, Redstart, Magnolia Warbler, Chestnut-sided Warbler, Black-throated Blue Warbler, Ruby-crowned Kinglet, Yellow-breasted Chat, Blackpoll Warbler, Philadelphia Vireo, Red-eyed Vireo, Black and White Warbler, Palm Warbler, White-eyed Vireo, Common Yellow Throat, Arcadian Flycatcher, Wigeon, Shoveler, Pintail, Blue-winged and Green-winged Teal, Little Blue Heron, Black-crowned Night Heron, American Avocets (700), Black-bellied Plover, Semi-palmated Plover, Hudsonian Godwit, Marbled Godwit, Solitary Sandpipers, Dunlin, White-rumped Sandpipers, Pectoral Sandpipers, Long-billed Dowitcher, Merlin.

09/27-10/03 – **Sheariness Pool:** Snow Geese (6), Caspian Tern, Avocets (725), Pintail, Shoveler, Hudsonian Godwit, Marbled Godwit; **Bear Swamp:** Stilt Sandpipers; **Finis Pool:** Black-throated Blue Warbler, Black and White Warbler, Magnolia Warbler, Palm Warbler, Yellow-rumped Warbler, Blue-headed Vireo, Great Crested Flycatcher, Eastern Wood Peewee, Blue Grosbeak; **Other Unidentified Refuge Areas:** White-eyed Vireo, Chestnut-sided Warbler, Black-throated Green Warbler, Semi-palmated Plover, Willet, Western Sandpipers, Long-billed Dow, Glossy Ibis, Virginia Rail, Clapper Rail, Merlin, Peregrine Falcon, Bald Eagles, Blue-winged Teal, Ruddy Duck.



Black and White Warbler

10/04-10/10 – **Sheariness Pool:** American Bittern, Peregrine Falcons (4), Marbled Godwits (22), Hudsonian Godwits (3), White-rumped Sandpipers; **Bear Swamp:** Blue Grosbeak, Long-billed Dowitchers; **Entrance Road:** Black-bellied Plover, Horned Lark; **Visitor Center:** White-crowned Sparrows; **Salt Marsh:** American White Pelican; **Allee House:** Bobwhite; **Other Unidentified Refuge Areas:** Philadelphia Vireo, Black and White Warbler, Broad-winged Hawk, Magnolia Warbler, Red-shouldered Hawk, Salt-marsh Sparrow, Seaside Sparrow.

10/11-10/17 – **Raymond Pool:** Merlin, American Golden Plover; **Sheariness Pool:** Peregrine, Ruddy Ducks (50), Long-billed Dowitcher, American Wigeon, Marbled Godwit; **Finis Pool:** Wild Turkeys (16); **Other Unidentified Refuge Areas:** Avocets (200), Black-bellied Plover, Semi-palmated Plover, Black-necked Stilt, Least Sandpipers, Pectoral Sandpipers, White-rumped Sandpipers,

Short-billed Dowitchers, Little Blue Herons, Glossy Ibis, Black-crowned Night Heron, Great Egret, Snowy Egret, Snow Geese (1,200+), Pintail, Blue-winged Teal, Green-winged Teal.

10/18-10/24 – **Raymond Pool:** Sandhill Crane, Magnolia Warbler, Cerulean Warbler; **Sheariness Pool:** Pintails, Ruddy Ducks, Lesser Yellowlegs, Marbled Godwits, White-rumped Sandpipers, Stilt Sandpipers; **Bear Swamp:** Northern Harrier, Black-crowned Night Heron, Mute Swan; **Finis Pool:** Wild Turkey, Common Yellowthroat; **Salt Marsh:** Marbled Godwits (27), Avocets (350), Red Knot; **Entrance Road:** Ross's Goose; **Boardwalk Trail:** Seaside Sparrow, Marsh Wren; **Allee House:** Bobwhite; **Other Unidentified Refuge Areas:** Semi-palmated Plover, Pectoral Sandpiper, Gray-cheeked Thrush, Hermit Thrush, White-crowned Sparrow.

10/25-10/31 – **Raymond Pool:** Ring-necked Ducks (2); **Sheariness Pool:** Hudsonian Godwit, Marbled Godwit, Black-bellied Plover, White-rumped Sandpipers, American Golden Plover, Stilt Sandpipers, Red Knot, American Coots, Eastern Meadowlark, Willet, Cooper's Hawk; **Bear Swamp:** Wilson's Snipe, American Bittern; **Finis Pool:** Golden-crowned Kinglet; **Salt Marsh:** Ruddy Ducks (300); **Other Unidentified Refuge Areas:** Marsh Wren, Savannah Sparrow, Great Egrets, Snowy Egrets, Black-crowned Night Heron, Virginia Rail, Lesser Black-backed Gulls.

11/01-11/07 – **Sheariness Pool:** Cooper's Hawk, Marbled Godwits (6); **Bear Swamp:** Northern Harrier; **Refuge Entrance Road:** Sandhill Crane, American Pipits (100), Eastern Meadowlark, Horned Lark, Eastern Bluebird; **Visitor Center:** Fox Sparrow; **Salt Marsh:** Snow Geese (10,000), Marbled Godwits (28), American Avocets (400), American Golden Plovers (4), Black-bellied Plovers, Semi-palmated Plovers (2), Willets (4), Western Sandpipers, Least Sandpipers,

(Continued on next page)

Bird Notes (Continued from previous page)

Long-billed Dowitchers, Short-billed Dowitchers; **Other Unidentified Refuge Areas:** Ruddy Ducks (60), Tundra Swans (25), Hooded Mergansers, Great Egrets.

11/08-11/14 – **Shearneck Pool:** Sandhill Crane, American Golden Plover, Marbled Godwits (26), American Avocets (350); **Bear Swamp:** Rusty Blackbirds (25), Wilson's Snipe; **Salt Marsh:** Snow Geese, Ross's Geese (6), Greater White-fronted Goose; **Boardwalk Trail:** Nashville Warbler; **Allee House:** Woodcock; **Other Unidentified Refuge Areas:** Wood Duck, Tundra Swan, Black-bellied Plover, Semi-palmated Plover, White-rumped Sandpipers, Stilt Sandpipers, Pectoral Sandpipers, Western Sandpipers, Long-billed Dowitchers, Short-billed Dowitchers, Woodcock, American Pipit, Eastern Meadowlark, Wild Turkey, Tree Swallow, White-crowned Sparrow, Great Horned Owl, Barred Owls (4), Short-eared Owl.



Sandhill Crane

11/15-11/21 – **Shearneck Pool:** Sandhill Crane, Willet, American Bittern, American Avocets (350), Tundra Swans, Black-bellied Plover, Western Sandpipers, Long-billed Dowitcher, Great Horned Owl, Marbled Godwit; **Bear Swamp:** Black-crowned Night Herons, Bobwhite (adjacent uplands), American Bittern; **Other Unidentified Refuge Areas:** Buffleheads (60), Ruddy Ducks (30).

11/22-11/30 – **Raymond Pool:** Sandhill Crane, Tundra Swan, American Avocet, Shovelers, Pintail Ducks; **Shearneck Pool:** Wilson's Snipe, Marbled Godwit, Bufflehead; **Bear Swamp:** Eurasian Wigeon, American Woodcock; **Salt Marsh:** Snow Geese, Ross's Goose; **Whitehall Neck Road:** American Pipits; **Other Unidentified Refuge Areas:** Horned and Pied-billed Grebes, Hooded and Common Mergansers, Bufflehead, Ruddy Ducks.

12/01-12/05 – **Raymond Pool:** Sandhill Crane; **Shearneck Pool:** Snowy Owl, Marbled Godwits, Long-billed Dowitcher, Peregrine Falcon, American Avocet; **Entrance Road:** American Pipits; **Other Unidentified Refuge Areas:** Eastern Meadowlarks, Barred Owl, Tundra Swans (50), Mute Swans (6), Snow Geese (thousands).

12/06-12/12 – **Raymond Pool:** Sandhill Crane; **Shearneck Pool:** Redhead (drake), Osprey; **Finis Pool:** Hooded Mergansers, Eurasian Wigeon (drake), Bufflehead; **Entrance Road:** Lapland Longspur; **Other Unidentified Refuge Areas:** Cackling Goose, Mute Swan, Tundra Swan, Common Mergansers, Ruddy Ducks, Horned Grebe, Marbled Godwits (6), American Avocets, Red-shouldered Hawk, Northern Bobwhite, Marsh Wren, American Pipit, American Bittern, Great Egret.

12/13-12/19 – **Raymond Pool:** Sandhill Crane, Barn Owl; **Shearneck Pool:** Short-eared Owls; **Bear Swamp:** Least Bittern, Golden Eagle; **Finis Pool:** Goshawk, Barred Owl; **Salt Marsh:** Long-eared Owl, Marbled Godwits (5); **Entrance Road:** Horned Larks, Snow Buntings, Lapland Longspur; **Boardwalk Trail:** Virginia Rails; **Other Unidentified Refuge Areas:** American Pipits, American Bittern, Great Egret, Bald Eagles (20-30), Cackling Geese (5), Ross's Geese, Snow Geese (50,000), Canvasbacks, Redhead, Lesser Scaup, Greater Scaup, Bufflehead, Hooded and Common Mergansers, Ruddy Ducks, American Woodcock, Wilson's Snipe, Lesser Black-backed Gull, Marsh Wren, Common Yellow-throat, Purple Finch, American Tree Sparrow, Seaside Sparrow, Fox Sparrow, White-crowned Sparrow.

12/20-12/31 – **Raymond Pool:** Tundra Swan, Bufflehead (salt marsh side); **Shearneck Pool:** Shoveler, Pintail, Sandhill Crane, Tree Sparrow, Hooded Merganser, Ruddy Ducks, Woodcock, Snow Buntings (25); **Bear Swamp:** Goshawk, Red-shouldered Hawk, Bobwhite, American Bittern, Eastern Screech Owl, Common Merganser, Wood Ducks; **Finis Pool:** Great Horned Owl, Hooded Merganser, Gadwall, American Wigeon; **Whitehall Neck Road:** Snowy Owl; **Other Unidentified Refuge Areas:** Great Egret, Hooded Mergansers, Bufflehead, Little Blue Heron, Wild Turkey, Merlin, Kestrel, Tree Sparrows, White-crowned Sparrow, Fox Sparrow, Pine Siskins.



The Friends' Bird Club is open to all adults and teens from birding newcomers to veteran experts. Our field trips are usually once a month from September

through April or May. We visit many locales, including Bombay Hook, usually on weekends.

January 1, we started the New Year with a trip to Indian River Inlet, the nearby marina area and Silver Lake in Rehoboth Beach. The weather was good, and we had great views of sea birds and waterfowl. In February, we were treated to a private tour of Eastern Neck National Wildlife Refuge outside Rock Hall, MD, for excellent views of waterfowl and wintering song birds. Two Bird Club members who volunteer at Eastern Neck led this terrific outing.



Despite fog and a few showers, a great outing at Blackwater National Wildlife Refuge on December 6, 2014.

On March 8 we plan to go to Port Mahon Road in Little Creek, DE, looking for short eared owls, hawks and whatever else flies by. Later in March or April we will look for early migrants (locale and date to be decided), and on April 24 we plan another trip to White Clay Creek State Park near Newark. Late April is a perfect time to see a large number of species dressed in their finest plumage.



More than 40 species, including hundreds of Tundra Swans, were seen at Eastern Neck National Wildlife Refuge on February 8, 2015.

Dates, times, meeting places and any last minute changes due to weather or other factors are emailed to anyone interested. To receive trip details and the schedule of birding trips, please contact Hannah McLennan at hmclennan@comcast.net.

Please join us. Dress for the weather, and bring binoculars and water. A birding field guide is very helpful.

We hope to see you!

Service Protects Red Knot as Threatened Under the Endangered Species Act

Designation highlights concern over impacts of climate change, development across Americas

The U.S. Fish and Wildlife Service today announced federal protection for the rufa subspecies of the red knot, a robin-sized shorebird, designating it as threatened under the Endangered Species Act. A “threatened” designation means a species is at risk of becoming endangered throughout all or a significant portion of its range.

“The red knot is a remarkable and resilient bird known to migrate thousands of miles a year from the Canadian Arctic to the southern tip of South America,” said Service Director Dan Ashe. “Unfortunately, this hearty shorebird is no match for the widespread effects of emerging challenges like climate change and coastal development, coupled with the historic impacts of horseshoe crab overharvesting, which have sharply reduced its population in recent decades.”

Since the 1980s, the knot’s population has fallen by about 75 percent in some key areas, largely due to declines in one of its primary food resources – horseshoe crab eggs in Delaware Bay, an important migratory stopover site. Although this threat is now being addressed by extensive



Tagged Red Knot, Mispillion Harbor, Delaware.
Credit: Gregory Breese/USFWS

state and federal management actions, other threats, including sea-level rise, some shoreline projects and coastal development, continue to shrink the shorebird’s wintering and migratory habitat.

Changing climate conditions are also altering the bird’s breeding habitat in the Arctic and affecting its food supply across its range, in particular through climate-driven mismatches in migration timing that affect the peak periods of food availability. The bird must arrive at Delaware Bay at exactly the time when horseshoe crabs are laying their eggs.

“Although historic threats in the Delaware Bay area have been ameliorated thanks to the actions of federal and state partners, our changing climate is posing new and complex challenges to the red knot’s habitat and food supply,” Ashe said. “It has never been more critical that we take positive action to save this bird.”

One of the longest distance migrants in the animal kingdom, some rufa red knots fly more than 18,000 miles each year between breeding grounds in the Canadian Arctic and wintering grounds along the Gulf Coast, southeast United States and South America. One bird, banded by biologists in 1995 in Argentina, has been nicknamed Moonbird because he has flown the equivalent of a trip to the moon and at least halfway back in his 21 or more years of migrations.

Along its epic migration, the red knot, which can be identified by its rufous breast, belly and flanks during breeding season, can be found across 27 countries and 40 U.S. states in flocks ranging from a few individuals to several thousand. Although rufa red knots mainly occur along the Atlantic and Gulf coasts, small groups regularly use some interior areas of the United States during migration. The largest concentration of rufa red knots is found in May in Delaware Bay, where the birds stop to gorge themselves on the eggs of spawning horseshoe crabs; a spectacle drawing thousands of birdwatchers to the area. In just a few days, the birds nearly double their weight to prepare for the final leg of their long journey to the Arctic.

International, state and local governments, the conservation community, beachgoers and land managers are helping ensure red knots have safe areas to winter, rest and feed during their long migrations. These partners help knots in a variety of ways, including managing the harvest of horseshoe crabs (which are caught for use as bait in conch and eel pots), managing disturbance in key habitats, improving management of hunting outside the United States, and col-

lecting data to better understand these birds.

In making its decision, the Service analyzed the best available data in more than 1,700 scientific documents, and considered issues raised in more than 17,400 comments provided during 130 days of public comment periods and three public hearings. Protections under the ESA will take effect 30 days after publication in the *Federal Register*.

As required by the ESA, the Service is also reviewing the U.S. range of the rufa red knot to identify areas that are essential for its conservation, known as critical habitat. The Service expects to propose critical habitat for the rufa red knot for public review and comment in 2015 after completing the required review of economic considerations.

Visit <http://www.fws.gov/northeast/redknot/> to read the final rule and response to comments; view and download video, photos and maps; and explore more resources, such as an interactive timeline and infographic. The rule will be available at www.regulations.gov on December 11, 2014, under docket number FWS-R5-ES-2013-0097.

U.S. Fish and Wildlife Service Protects the Rufa Red Knot as Threatened Under Endangered Species Act

Questions and Answers

In a December 11, 2014 final rule, the U.S. Fish and Wildlife Service has made a final determination to protect the rufa subspecies of the red knot (*Calidris canutus rufa*) as threatened under the Endangered Species Act (ESA). The rufa red knot is a robin-sized shorebird that depends on several areas of the United States during its annual journey across North and South America, and its population has declined by about 75 percent in some key areas since the 1980s.

As noted in the [State of the Birds 2014](#) report, the knot's status is representative of the steep declines underway in shorebirds that migrate long distances. Threats to shorebirds have become more diverse and widespread in recent decades, requiring coordinated conservation efforts across their entire ranges.

To see the rule, responses to public comments and related materials, visit <http://www.fws.gov/northeast/redknot/>.

1. Why is the Service listing the rufa red knot as threatened under the ESA? The Service analyzed the best available science and determined the rufa red knot is threatened by the following primary factors:

1. Loss of habitat across its range due to sea-level rise, some shoreline projects and Arctic warming;
2. Reduced food availability and timing mismatches (asynchronies) throughout the bird's annual migratory cycle; and
3. Potential increases in predation by birds and mammals in the rufa red knot's Arctic breeding grounds.

The rufa red knot faces other ongoing and emerging factors that may cause additional mortality; individually these factors are not expected to affect the rufa red knot as a whole, but cumulatively they could exacerbate the primary threats and reduce the rufa red knot's resiliency. See the rule under the *Summary of Biological Status and Threats and the Determination* sections for more information.

2. Where is the rufa red knot listed? The Service is protecting the rufa red knot across all of its

(Continued on next page)

range, which we determined based on a thorough review of published scientific literature, submitted manuscripts, species experts, and historical and current occurrence data. This range includes inland areas, for a total of 40 U.S. states and two U.S. territories¹, as well as 24 other countries, two British territories and three French overseas regions².

The rufa red knot migrates annually between its breeding grounds in the Canadian Arctic and several wintering regions, including the southeast United States, the northwest Gulf of Mexico, northern Brazil and Tierra del Fuego at the southern tip of South America.

During both the northbound (spring) and southbound (fall) migrations, groups of a few individuals to thousands of rufa red knots can be found anywhere along the coastal and inland United States migration corridors from Argentina to Canada. In the spring, well-known staging and stopover areas include Patagonia, Argentina; eastern and northern Brazil; the southeast United States; the Virginia barrier islands; and Delaware Bay.

In the fall, well known migration stopovers include Hudson Bay, James Bay, St. Lawrence River, Mingan Archipelago and Bay of Fundy in Canada; Massachusetts and New Jersey coasts; Altamaha River in Georgia; the Caribbean; and the northern coast of South America from Brazil to Guyana.

Throughout the range, rufa red knots occur primarily along the coasts but also migrate across areas of open ocean as well as over land. In the United States, knots use both coastal and interior routes during migration, including the Central, Mississippi and Atlantic flyways. Most records in the interior states show small numbers (fewer than 10) of knots, but there are multiple records in every inland state included in this listing. Although several thousand knots migrate through inland areas each year, scientists are just beginning to discover where these birds are stopping to rest and feed along the way. For example, geolocator information shows rufa red knots using stopovers in North Dakota and in Montana, and there are clusters of sightings records along the tributaries to the Mississippi River and along the Great Lakes.

3. What is the size of the rufa red knot population? Due to challenges with the species' migratory habits and differing survey methods and observers across the rufa red knot's broad range, we do not have a range-wide estimate of total population. However, reliable regional estimates are available for key areas. The best available data from wintering and spring migration areas include:

- a. Recent winter surveys found about 10,105 knots wintering in Argentina and Chile (2013); 15,485 in northern Brazil (2013); 2,000 in the northwest Gulf of Mexico (2012); and 4,000 in the southeast United States (2011). We do not add these to produce a total population estimate because of differences in survey methods and timing, and incomplete geographic coverage.
- b. The spring mid-Atlantic knot population estimates are: 48,955 knots stopping in Delaware Bay (2013) and 5,547 to 8,482 knots annually stopping in Virginia (2011-2014). These estimates are produced from both direct counts and by using marked bird data in mathematical models, and they do not include the birds that bypass the mid-Atlantic, such as birds migrating overland from Texas or the Southeast directly to Canada.
- c. Comprehensive counts from the breeding grounds are not available because nesting

1 Range states include: Alabama, Arkansas, Connecticut, Colorado, Delaware, Florida, Georgia, Iowa, Illinois, Indiana, Kansas, Kentucky, Louisiana, Massachusetts, Maryland, Maine, Michigan, Minnesota, Missouri, Mississippi, Montana, Nebraska, North Carolina, North Dakota, New Hampshire, New Jersey, New York, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Virginia, Vermont, Wisconsin, West Virginia, Wyoming, Puerto Rico and the U.S. Virgin Islands.

2 Argentina, Aruba, Bahamas, Barbados, Belize, Brazil, British Virgin Islands, Canada, Cayman Islands, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, El Salvador, France (Guadeloupe, French Guiana, Martinique), Guatemala, Guyana, Haiti, Jamaica, Mexico, Panama, Paraguay, Suriname, Trinidad and Tobago, Uruguay and Venezuela.

knots are thinly distributed across a huge and remote area of the Arctic.

More details are available in the *Population Surveys and Estimates* section of the supplemental document to the rule.

4. How much has the rufa red knot population declined? Surveys have been conducted in a number of areas across the knot's range, but in many regions, these efforts have not been consistent enough to have high confidence in any apparent trends. However, two key sites have been surveyed consistently, and show numbers of knots declined and remain low relative to counts from the 1980s:

- a. The average counts for Tierra del Fuego (the most southern tip of South America) between 1985 and 2000 (52,244) dropped by about 75 percent between 2011 and 2013 (11,385).
- b. Comparing four different time periods, average knot counts in Delaware Bay declined about 70 percent overall from 59,946 (1981 to 1983) to 18,387 (2005 to 2014). Average counts between those years also include 46,886 (1986 to 1994) and 34,060 (1995 to 2004).

5. What process did the Service follow in preparing this rule? The Service carefully assessed the best scientific and commercial information available regarding the past, present and future threats to the rufa red knot. The rufa red knot has been a candidate for federal listing since 2006, but we were precluded from listing it due to other higher priority listing actions. In 2011, the Service committed to publishing a proposed listing determination for the rufa red knot by September 2013 through a court settlement agreement with WildEarth Guardians and the Center for Biological Diversity.

The Service solicited information from our state, federal, tribal, academic and other red knot partners, and we received occurrence and habitat use data from state natural resource and federal agencies. On September 30, 2013, we published a proposed rule in the *Federal Register* to protect the rufa red knot as threatened under the ESA. The proposal opened a 30-day public comment period. The comment period was extended and then reopened while we held three public hearings.

In accordance with our peer review policy, we sought the expert opinions of three independent specialists during the comment period. Peer review ensures our listing determination is based on scientifically sound data, assumptions and analyses. The peer reviewers have expertise in the rufa red knot's biology, habitat or threats, which informs our determination.

Our final determination is based on an analysis of the best available data in more than 1,700 scientific documents, from peer review and issues raised in more than 17,400 comments provided during 130 days of public comment periods and three public hearings. Learn more about the listing process: <http://www.fws.gov/endangered/esa-library/pdf/listing.pdf>.

6. What kinds of substantive comments did the Service receive on the proposal? Comments typically fell into these categories: appropriate listing status, adequacy of horseshoe crab management, critical habitat implications (which are outside the scope of the proposed listing rule), wind turbine impacts, inclusion of interior states in listed range, and critiques of use of best available data. The Service addressed and responded to these in the final rule under the *Summary of Comments and Recommendations* section. The proposed and final rules, along with the original comments can be found at [regulations.gov](http://www.regulations.gov).

7. What changes were made between the proposal and final rule? Our final determination of the red knot as a threatened species remained unchanged from the proposed rule. Changes were made to the final rule based on new information available since publication of the proposed rule and from peer review and public comments. These include additional location data and updated regional population estimates, updated information on possible effects of horseshoe crab harvest and management, and clarification to the wind energy discussion. The *Sum-*

(Continued on next page)

mary of Changes from the Proposed Rule section of the final rule fully describes these changes.

8. How will listing the rufa red knot affect beach management? The implications of listing the red knot for beach management will vary based on the specific patterns of beach use by knots and site-specific habitat and project details. Coordination has already begun with our partners in state and other federal agencies. Because many parts of the knot's coastal range overlap with areas used by other listed species, such as piping plovers and sea turtles, some of the management actions needed to protect the knot and its habitat are already in place.

9. How is development and associated shoreline stabilization affecting the rufa red knot? Coastal development, which often goes hand-in-hand with shoreline hardening, has already decreased the amount of available rufa red knot habitat. More than 80 percent of the coasts of Florida, New Jersey and New York are substantially or partly developed. From North Carolina south to Texas, just under half of the beaches are developed. Additionally, about a third of knot habitat in the United States is still available for development, and winter and stopover habitats in Argentina and sub-Arctic Canada face ongoing development pressure.

Further, sea-level rise is expected to increase efforts to stabilize shorelines and protect coastal development with hard structures, such as seawalls and jetties. These can further degrade and eliminate beach habitat and interfere with the creation of new beach habitat.

10. How can climate change affect the rufa red knot? Already reduced in size, the rufa red knot population is highly vulnerable to changes in the environment. The bird's lifecycle makes it susceptible to mismatches in its migration and the timing of its food supply and necessary weather conditions.

Adverse effects from altered timing have already been observed at migration stopovers in some years. For example, in Delaware Bay, warming coastal waters may cause horseshoe crabs to lay their eggs earlier than normal; conversely, more intense and frequent coastal storms can cause late spawning. In both cases, rufa red knots, which feed on the crabs' eggs, can miss their peak refueling opportunity. Additionally, ocean acidification and warming coastal waters are already starting to affect clams and mussels, on which the rufa red knot feeds in other areas along the Atlantic and Gulf coasts. New climate information reinforces this.

The rufa red knot's breeding grounds in the Canadian Arctic are experiencing pronounced effects from climate change. Due to warming temperatures, tundra habitats, which rufa red knots need for nesting, are already becoming shrubbier and less suitable for shorebirds. The ability of red knots to successfully raise their chicks depends on specific snow conditions, the availability of insects as food, and losses to predators—all of which are affected by climate change.

11. How is the availability of horseshoe crab eggs, mollusks and other food affecting the rufa red knot? Threats to food resources from climate change and other causes occur throughout the rufa red knot's range.

The best available data suggest reduced horseshoe crab populations in Delaware Bay due to commercial harvest were an important factor in rufa red knot population declines. Since 2000, the Atlantic State Marine Fisheries Commission has restricted harvest, and in 2012, it implemented an adaptive management framework that explicitly ties crab harvest levels to rufa red knot populations. Though crab numbers have not yet fully rebounded, the full implementation and monitoring of this framework should lead to increased crab populations and help rufa red knot recovery.

Outside Delaware Bay, the rufa red knot feeds mainly on small clams and mussels, except on its Arctic breeding grounds, where it feeds mainly on insects. The effects of climate change have begun affecting both types of prey. Oceans become more acidic as carbon dioxide emitted into the atmosphere dissolves in the ocean; this has been shown to interfere with the ability of

clams and mussels to form their shells. Clams and mussels also are sensitive to warming water temperatures, and changes in their geographic distribution or timing of spawning are likely to affect rufa red knot food supplies during important stopover periods. For example, the range of blue mussels, the young (called spat) of which are an important prey species for rufa red knots, has already shrunk due to warming ocean temperatures, and the mussel soon may not be available as a food resource for migrating rufa red knots in the Virginia stopover area. In the Arctic breeding grounds, insects are hatching earlier in the spring due to warming temperatures. This change in timing could cause rufa red knot chicks to miss the peak window for feeding and rapid growth before their long southward migration.

Additionally, sand placement projects and off-road vehicle (ORV) use are known to bury or crush animals that the knots eat. The negative effects to prey resources from these activities are typically short term, though repeated renourishing may prolong the adverse effects to the invertebrate community on which knots rely for food.

12. Does hunting or predation threaten the rufa red knot? Although legal and illegal sport and market hunting in the United States substantially reduced rufa red knot populations in the 1800s, the birds are no longer hunted here. Legal and illegal hunting does occur in other parts of its range, but we do not have enough information to determine if this mortality affects populations. The rufa red knot was recently protected from hunting in parts of the Caribbean and in French Guiana.

Despite some localized mortality and disturbance from predators such as peregrine falcons, predation is not currently a threat to the rufa red knot in the United States or other nonbreeding portions of its range. However, predation is an emerging threat on the Arctic breeding grounds. Natural predation cycles are driven by the availability of lemmings and other rodents; when rodents are scarce, predators (including the long-tailed jaeger and other jaeger species, herring and glaucous gulls, peregrine falcon and snowy owl, as well as Arctic fox and sometimes Arctic wolf) turn to shorebird eggs and chicks. Historically, high lemming abundance occurred in three- to four-year cycles and so was not a long-term threat to shorebirds. However, climate change is disrupting these cycles, which may put additional predation pressure on red knots resulting in prolonged periods of very low reproductive productivity. Warming temperatures and changes in vegetation may also increase predation pressure in the Arctic.

13. Will the Service designate critical habitat for the rufa red knot? If a species is listed as threatened or endangered, the Service must consider whether designating critical habitat is appropriate. The Service is considering which specific areas are essential to the rufa red knot's conservation and expects to issue a proposal to designate critical habitat for the rufa red knot in 2015.

Critical habitat designation under the ESA does not set up a preserve, change land ownership or allow government or public access to private land. Critical habitat refers to specific geographic areas that contain elements that are essential to the conservation of a threatened or endangered species. [Critical habitat](#) focuses the coordination of federal agencies, which are directed by the ESA to aid in the conservation of listed species. Designation of critical habitat does not affect land ownership nor establish a refuge, and does not affect private actions on private lands that do not receive federal funds or require federal permits. Where the species occurs and how often, as well as where the most important natural features exist for its feeding and resting, are considered when determining where critical habitat should be designated. For the rufa red knot, these features may include wide, open beaches for roosting or habitat supporting prey, among others.

14. How will the rufa red knot benefit from protection under the ESA? Listing raises awareness about the need for national and international cooperation and coordination of conservation efforts, enhances research programs, and encourages the development of conservation measures that could help slow habitat loss and population declines. A recovery plan, developed after a species is listed, identifies specific ways to recover the species and typically depends on the assis-

(Continued on next page)

tance of species experts; other federal, state and local agencies; tribes; nongovernmental organizations; academia; and other stakeholders.

The ESA includes regulatory protections regarding import and export and the “take” (killing, harming, harassing, pursuing or removing the species from the wild) of listed species. The ESA also requires federal agencies to conduct their activities in such a way that conserves listed species.

15. How does the ESA apply to rufa red knots in foreign countries? ESA regulations apply only to people subject to the jurisdiction of the United States. However, the ESA can generate conservation benefits in foreign countries, such as increased awareness of listed species, research efforts to address conservation needs, or funding for conservation of the species in range countries. The ESA also provides for limited financial and technical assistance to develop and manage programs to conserve listed species in foreign countries.

16. What actions are already underway to protect the rufa red knot? Governments and scientists from several countries where knots breed, stopover or winter are working to address threats faced by the rufa red knot.

In South America, several key rufa red knot sites are becoming shorebird reserves, and regional efforts include the protection of rufa red knot habitats in urban development plans. Hunting regulations, voluntary hunting restrictions, increased hunter education efforts, no-shoot shorebird refuges and sustainable harvest models are also underway to address hunting in various countries.

In areas along the U.S. coast, partners are managing beaches to minimize disturbance and to reduce interference from gulls and peregrines. In Delaware Bay, actions to conserve horseshoe crabs have been important in stabilizing earlier rufa red knot population declines. In addition, biologists in the Carolinas and Florida are improving beach habitat by controlling invasive plants.

Volunteers, conservation organizations and researchers have made valuable contributions to the understanding and conservation of the rufa red knot, such as surveying populations, banding and resighting birds, outfitting birds with geolocators, documenting breeding habitat, monitoring weight gains, studying the effects of disturbance, and scientific modeling.

The Western Hemisphere Migratory Species Initiative (WHMSI) has supported efforts to protect the Red Knot along with other migratory bird species in the Western Hemisphere by funding capacity-building efforts through workshops, training and development of a “Flyways of the Americas Plan,” which integrates migratory bird conservation initiatives in the Americas. This plan was adopted at the 11th Conference of the Parties of the Convention on Migratory Species (CMS) in Quito, Ecuador in November 2014, as the framework for CMS' work in the Americas.

17. What can I do now? The Service invites you to:

- a. Visit <http://www.fws.gov/northeast/redknot/> to learn more, and join the conversation at <http://www.fws.gov/home/socialmedia/index.html>.
- b. Learn what role your backyard plays in the lifecycle of the knot and contact local conservation groups for information on how you can help conserve it.
- c. Be a citizen scientist! Report knot and other shorebird sightings at bandedbirds.org and ebird.org.

Bombay Hook NWR

2591 Whitehall Neck Road, Smyrna, DE 19977

(302) 653-9345

http://www.fws.gov/refuge/Bombay_Hook/

2015 Calendar of Events

Bombay Hook Visitor Center is open Monday through Friday from 8:00 a.m. to 4:00 p.m. year round and on weekends from 9:00 a.m. to 5:00 p.m. starting March 7, 2015. **The Wildlife Drive is open daily from ½ hour before sunrise to ½ hour after sunset.** *The Allee House is in need of repairs and is closed until further notice.* For more information about programs contact Tina Watson at (302) 653-9345 or check the website above for additions or changes.

Saturday, March 7, 2015

- **Volunteer Orientation (10:00 a.m. - 12:30 p.m.)** A meeting about volunteer opportunities will be held in the auditorium. The meeting will cover volunteer opportunities and upcoming activities, with the latter part of the session being a tour of the Refuge. Individuals are needed to staff the Visitor Center on weekends and weekdays from March through June. Volunteers are also needed to provide environmental education programs for school groups, conduct Refuge tours, provide trail and landscaping maintenance, and help with highway cleanups. Volunteers may be called upon for special wildlife projects throughout the year. Training is provided.
- **Monitoring Osprey Nests (1:00 p.m. - 2:30 p.m.) VOLUNTEERS NEEDED!!!** The Delaware Division of Fish & Wildlife is seeking volunteers interested in monitoring the states Osprey population. Osprey will become a common sight, beginning around mid-March, where nesting pairs will return and start to rebuild many of the nests used in past years. Veteran volunteer monitors anxiously await the first signs of the Ospreys' return when they can begin recording data that is collected at least every other week. If you are interested in participating, attend the annual osprey monitoring workshop. Kate Fleming, wildlife biologist, will briefly describe the history of Osprey in Delaware, monitoring objectives and methods, and the future direction that this project will be taking. The meeting will be in Bombay Hook's Auditorium.

Saturday, March 14, 2015 **Tour of the Refuge - Celebrate the National Wildlife Refuge System's and Bombay Hook's Anniversary (9:00 a.m. - 11:00 a.m.)** The group will learn how the Refuge System provides diverse habitat for wildlife across the United States and how Bombay Hook manages habitats for diversity of wildlife along the Atlantic Flyway. The group will start in the auditorium, drive the wildlife drive, and walk a trail to learn about managing for wildlife and habitat conservation. Space is limited, contact Tina Watson to register, (302) 653-9345 or tina_watson@fws.gov.

Tuesday, March 17, 2015 **Toddlers/preschoolers (1 year old to 5 years old) and their family is FREE (9:00 a.m. - 2:00 p.m.)** Bombay Hook will be free for toddlers and their families on the 3rd Tuesday of the March, April, and May. Children from 1 to 5 years old are developing cognitive skills and being in nature can expose them to sights and sounds that might go unnoticed in their everyday setting. Take your child on the wildlife drive, walk a trail, climb a tower, and look at wildlife exhibits in the visitor center. You are never too young to explore and learn. This is a self-study for families. You can come anytime between 9:00 a.m. and 2:00 p.m.

Wednesday, March 18, 2015 **Garden Keepers Program: Pruning Techniques for the Home Garden (9:30 a.m. - 11:30 a.m.)** How and when to prune; tools needed to prune various plants will be discussed. Illustrated handouts will be provided. Hands-on work in the Visitor Center's garden. Light refreshments will be available. **To register, contact Leslie or Larry Cook at (302) 514-9371 or delveggie@gmail.com.**

(Continued on next page)

Bombay Hook NWR 2015 Calendar of Events (Continued from previous page)

Saturday, March 21, 2015 **Spring Family Exploration Series (9:30 a.m. - 11:30 a.m.)** For ages 7-10 years old. Families will explore the Refuge and learn more about the habitats of Bombay Hook and the animals that live there. Different areas will be explored in March, April, and May. The group will walk trails, dip net in wetlands, use binoculars, go to the bay beach, and have FUN! **Call to register, (302) 653-9345.**



Muskrat

Credit: R. Town/USFWS

Saturday, March 28, 2015 **Musk rats: Past to Present (9:00 a.m. – 11:30 a.m.)** Join Bruce Lantz and Arthur Straughn to learn about an important mammal on the Refuge, the very adaptable Muskrat. We will explore the prolific life cycle of this species on the Refuge. In addition, we'll explore the Muskrat's contribution to Delaware's rural history and some of the current challenges faced by Muskrats due to sea level rise and human activity. This program will include both a classroom and field trip component. **Contact the Refuge to register, (302) 653-9345. Hope to see you as we explore the Muskrat.**

Sunday, March 29, 2015 **Tour of the Refuge (11:00 a.m. – 12:30 p.m. & 1:30 p.m. – 3:00 p.m.)** Join volunteer, Ray Cullom, for a tour of the Refuge. Find out how the Refuge is managed for wildlife, visit different habitats, and walk a trail. Meet at the Visitor Center.

Saturday, April 4, 2015 **Environmental Education Workshop (9:00 a.m. – 12:30 p.m.)** This hands-on workshop will help people understand, and experience, what kind of environmental education field trips can take place at Bombay Hook. You will learn about the Refuge's habitats, explore the tidal salt marsh, dip net in the brackish and fresh water, identify birds, explore the forest, and learn about wildlife management techniques. This is an excellent opportunity for teachers, scout leaders, Refuge volunteers, and interested visitors to get outside and explore the Refuge. **Contact the Refuge to register, (302) 653-9345.**

Sunday, April 12, 2015

- **Birding Tour with Joel Citron (9:30 a.m. - 12:30 p.m.)** Beginner and experienced bird watchers will enjoy walking a trail to identify song birds and stopping along the impoundments and salt marsh to identify ducks, wading birds, and raptors. Meet at the Visitor Center.
- **Delaware Wildlife Rehabilitators Presentation – Spring Babies (1:30 p.m. – 2:30 p.m.)** When you find a baby animal, wildlife rehabber advises "If you care, leave them there." Along with flowers and showers comes another sure sign of spring: baby animals. If you look, you see them in fields, parks and sometimes your own backyard – a mother fox with her kits, a mama goose with a parade of little goslings, maybe even a doe with her fawn.

But what should you do if you come across these wild babies with no parent animal nearby? "Wait, watch and see before you interfere," advises Dawn Cox, a licensed wildlife rehabilitator with the Delaware Council of Wildlife Rehabilitators and Educators (DCWRE). Licensed rehabilitators take in hundreds of orphaned wildlife each year brought to them by well-meaning citizens who find them. "In almost every case, these animals should be left where they are found. It's not unusual to see a baby animal alone, but what you often don't see is its mother, who is most likely nearby and waiting for you to move on," Cox says. The presentation will offer advice on how to help wildlife and what to do if you encounter a wild animal. For more information on DCWRE, visit www.dewildliferescue.com.

Wednesday, April 15, 2015 **Garden Keepers Program: Nature's Gift – Celebrating Arbor Day with Native Trees (9:30 a.m. – 11:30 a.m.)** Join Ashley Peebles from the Delaware Forest Service as she discusses native tree selection and planting techniques. This is a great opportunity to learn about basic native tree selection and care. Free seedlings will be available. Following the workshop, participants will perform seasonal maintenance on the landscape around the Visitors Center. Light refreshments will be available. **To register,**

contact Leslie or Larry Cook at (302) 514-9371 or delveggie@gmail.com.

Saturday, April 18, 2015

- **Spring Family Exploration Series (9:30 a.m. - 11:30 a.m.)** For ages 7-10 years old. Families will explore the Refuge and learn more about the habitats of Bombay Hook and the animals that live there. Different areas will be explored in April and May. The group will walk trails, dip net in wetlands, use binoculars, go to the bay beach, and have FUN! **Call to register, (302) 653-9345.**
- **Bike Ride on the Refuge (1:00 p.m. – 3:30 p.m.)** Join Tina Watson for an eight-mile bike ride on the Refuge. The group will make several stops for bird identification and to discuss wildlife management techniques. Bicycle should have hybrid tires. Don't forget your helmet and check the air in your tires! Meet at the Visitor Center. **IMPORTANT:** Delaware State law states, "a person under sixteen years of age shall not operate, ride upon, or ride as a passenger any bicycle, unless that person is wearing a properly fitted and fastened bicycle helmet which meets or exceeds the ANSI Z90.4 bicycle helmet standard."
- **Spring Bird Walk (3:30 p.m. - 5:30 p.m.)** Join Eileen McLellan and Terry Willis for an expert led bird walk. Beginner and experienced bird watchers will enjoy bird watching along the wildlife drive and walking trails. The group will observe waterfowl, songbirds, wading birds, and early migratory songbirds. Meet at the Visitor Center.

Tuesday, April 21, 2015 **Toddlers/preschoolers (1 year old to 5 years old) and their family is FREE (9:00 a.m. - 2:00 p.m.)** Bombay Hook will be free for toddlers and their families on the 3rd Tuesday of the April and May. Children from 1 to 5 years old are developing cognitive skills and being in nature can expose them to sights and sounds that might go unnoticed in their everyday setting. Take your child on the wildlife drive, walk a trail, climb a tower, and look at wildlife exhibits in the visitor center. You are never too young to explore and learn. This is a self-study for families. You can come anytime between 9:00 a.m. and 2:00 p.m.

Sunday, April 26, 2015 **Tour of the Refuge (11:00 a.m. – 12:30 p.m. & 1:30 p.m. – 3:00 p.m.)** Join volunteer, Ray Cullom, for a tour of the Refuge. Find out how the Refuge is managed for wildlife, visit different habitats, and walk a trail. Meet at the Visitor Center.

Sunday, May 3, 2015 **Spring Warbler Bird Walk (8:00 a.m. – 11:00 a.m.)** Join Eileen McLellan and Terry Willis for a Spring Warbler walk. Beginner and experienced bird watchers will enjoy bird watching along the walking trails. They will walk several trails looking for colorful and songful small wood-warblers. Meet at the Visitor Center.

Saturday, May 9, 2015 **International Migratory Bird Day, Spring Bird Count (7:00 a.m.)** IMBD is celebrated in Canada, the United States, Mexico, Central and South America, and the Caribbean. Public awareness and concern are crucial components of migratory bird conservation. Citizens can learn about birds and their migratory threats, and can make a contribution by participating in the international spring bird count. Meet at the Visitor Center to participate in Bombay Hook's count. Teams will be formed and each team will survey a section of the Refuge. The teams tabulate their bird sightings and are usually finished around noon.

Saturday, May 16, 2015 **Spring Family Exploration Series (8:30 a.m. - 11:30 a.m.)** For ages 7-10 years old. Families will explore the Refuge and learn more about the habitats of Bombay Hook and the animals that live there. Today, the group will go to the Delaware Bay beach to study and look for shorebirds and horseshoe crabs. **Call to register, (302) 653-9345.**

Sunday, May 17, 2015 **Shorebird and Horseshoe Crab Presentation (8:00 a.m. – 12:30 p.m.)** Greg Breese, Project Manager for the Delaware Bay Estuary Project, will start the program with a presentation on shorebirds, their amazing migration journey, and horseshoe crabs on the Delaware Bay. The Red Knot, a robin-sized shorebird was designated as threatened under the Endangered Species Act December 9, 2014. A "threatened" designation means a species is at risk of becoming endangered throughout all or a significant

(Continued on next page)

portion of its range. The group will then go to Pickering Beach to see the shorebirds and the horseshoe crabs that come up onto the Bay beach to spawn. Meet at the Refuge's auditorium.

Tuesday, May 19, 2015 *Toddlers/preschoolers (1 year old to 5 years old) and their family is FREE (9:00 a.m. - 2:00 p.m.)* Bombay Hook will be free for toddlers and their families on the 3rd Tuesday of May. Children from 1 to 5 years old are developing cognitive skills and being in nature can expose them to sights and sounds that might go unnoticed in their everyday setting. Take your child on the wildlife drive, walk a trail, climb a tower, and look at wildlife exhibits in the visitor center. You are never too young to explore and learn. This is a self-study for families. You can come anytime between 9:00 a.m. and 2:00 p.m.

Wednesday, May 20, 2015 *Garden Keepers Program: Visit to Mt. Cuba – Ephemerals in the Garden (8:30 a.m. – 4:00 p.m.)* Mt. Cuba is a botanical garden on a former DuPont estate that focuses on native plants and their habitats. This extended docent-led tour is well worth it! Lunch on your own at a nearby restaurant. **Space is limited and reservations are required; contact Leslie or Larry Cook at (302) 514-9371 or delveggie@gmail.com.** There will be a \$10 fee for this two-hour guided tour of the grounds.

Sunday, May 24, 2015

- *Tour of the Refuge (11:00 a.m. – 12:30 p.m. & 1:30 p.m. – 3:00 p.m.)* Join volunteer, Ray Cullom, for a tour of the Refuge. Find out how the Refuge is managed for wildlife, visit different habitats, and walk a trail. Meet at the Visitor Center.
- *Bird Identification Station (2:00 p.m. – 5:00 p.m.)* Get a close look at the different bird species in the impoundments. Eileen McLellan and Terry Willis will be set up on the wildlife drive with scopes and binoculars to help you identify wading birds, shorebirds, terns, and whatever else flies by. Look for the blue ID Station sign along the auto tour route.

Various Days in June *Purple Martin Nest Checks During June (11:00 a.m. – 11:45 a.m.)* Joël Martin and Ray Gingerich will perform weekly Purple Martin gourd and house nest checks during the month of June. Individuals can observe and assist: you may record data, hold a chick, and count eggs and hatchlings. Hopefully, you will see an adult sitting on the nest or maybe hold a bird that spent the winter in Brazil. The nests need to be checked quickly to make sure the martins are not disturbed for a long period of time. Meet at the Visitor Center on the following dates:

Monday, June 1, 2015	Friday, June 19, 2015
Friday, June 5, 2015	Saturday, June 20, 2015
Wednesday, June 10, 2015	Wednesday, June 24, 2015
Monday, June 15, 2015	Monday, June 29, 2015



Purple Martin
Credit: Dr. Thomas G. Barnes/USFWS

Wednesday, June 17, 2015 *Garden Keepers Program: Building a Backyard Habitat and Getting Your Home Area Certified (9:30 a.m. – 11:30 a.m.)* Join us to share ideas about how to support native pollinators in your garden. Lori Ashley from Delaware Nature Society will share how to turn your home, school or business garden area into a certified Backyard Habitat.

IMPORTANT REMINDER TO REFUGE VISITORS....

To protect wildlife and their habitat and to provide the best opportunities in wildlife observation and photography, it is important not to disturb, injure, or damage plants and animals of the Refuge. In fact, it is a prohibited act as stated in 50 CFR27.51. This disturbance includes flushing birds and other wildlife or using electronic calls (taping) to lure birds closer for observation or photography. Please remember to take only memories and photographs and leave only footprints.

ARE YOU INTERESTED IN JOINING FRIENDS???

FRIENDS OF BOMBAY HOOK is a cooperating association formed with the Bombay Hook National Wildlife Refuge and the U.S. Fish and Wildlife Service. It is a private, non-profit corporation which was founded to promote conservation, environmental education, and better understanding of and appreciation for Bombay Hook National Wildlife Refuge.

Each year more than 3,000 students visit Bombay Hook. They use equipment to study habitats, watch videos about endangered species, and are taught from field guides - all provided by **FRIENDS OF BOMBAY HOOK!**

If you used an Auto Tour Brochure or the Bird or Mammal List, these too have been funded by **FRIENDS OF BOMBAY HOOK!**

Your Membership Dues will make it possible for Friends of Bombay Hook to continue its support of educational and recreational programs at Bombay Hook.

Proceeds from the Refuge Store in the Visitor Center at Bombay Hook also help support the Friends program and activities. Make this your place to buy field guides, books, T-shirts, Posters, and Souvenirs!

OUR MEMBERSHIP BENEFITS INCLUDE:

- 10% Discount on all items sold in the Refuge Store
- Subscription to the Friends Newsletter (published 4 times a year)
- Participation in special wildlife education programs and field trips
- Participation in the Birding Club
- Attendance at the Annual Meeting in June
- Eligibility in the Dover Federal Credit Union (DFCU)
- Opportunity to meet others with similar interests in birds, other wildlife, wetlands, and the environment

And perhaps best of all, the chance to say, *"Thank you Bombay Hook, for all the great times I've had here !"*

MEMBERSHIP APPLICATION

Submit completed application at the Visitor Center
(payment by cash, check or credit card) or Mail (with check) to:

*Friends of Bombay Hook
2591 Whitehall Neck Road
Smyrna, DE 19977*

Or you can go to www.friendsofbombayhook.org/membership.html
and follow the instructions in applying or renewing your membership

Renewal New Member

Date: _____

Name

Address

City, State, Zip

E-mail

Newsletter Preference:

Print E-mail (require E-mail address)

Membership Plan (Check One)

	Annual
<input type="checkbox"/> Junior (under 18)*	\$5.00
<input type="checkbox"/> Individual	\$15.00
<input type="checkbox"/> Family	\$20.00
<input type="checkbox"/> Sponsor***	\$25.00
<input type="checkbox"/> Sustaining	\$50.00
<input type="checkbox"/> Corporate**	\$100.00
<input type="checkbox"/> Life***	\$200.00

*Junior membership: under age 18.

**Corporate sponsorship includes link to FOBH website;
no voting privileges or store discount.

***Sponsor and Life memberships includes family .

Method of Payment

- Cash (payment at Visitor Center only)
 Check (payment by mail or at Visitor Center)
 Visa / MasterCard (payment at Visitor Center only)



2591 Whitehall Neck Road
Smyrna, DE 19977

NON PROFIT ORG.
US Postage
PAID
Permit No. 408
Wilmington, DE 198

A REMINDER.....

**The next release of the Friends of Bombay Hook
Newsletter is May 1, 2015.**

ALSO.....

**Check the website at
http://www.fws.gov/refuge/Bombay_Hook/
for updates on Refuge events.**