National Marine Sanctuaries
National Oceanic and Atmospheric Administration
STELLWAGEN BANK NATIONAL MARINE SANCTUARY

STELLWAGEN BANK *E*-NOTES: *sanctuary news & events*

January 2015

These three Common Murres were among the 70 counted during the 2014 Stellwagen Christmas Bird Count.
Photo by Peter Flood.

Ringing Out the Old Year and Welcoming the New

From counting primarily black and white winter seabirds to retrieving yellow submarines (actually yellow autonomous underwater vehicles), Stellwagen Bank National Marine Sanctuary continues its active and diverse agenda of marine science, education and conservation programs into the new year. This initial 2015 issue of *E-Notes* looks at some exciting projects that have kept the staff busy (and often quite cold). Keep reading….

http://sanctuaries.noaa.gov/earthisblue.html

Watch a short video about the Stellwagen Christmas Bird Count at the Earth is Blue website (posted week of 1/11/2015)

earth is blue

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In This Issue:

EDITOR: Anne Smrcina

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Gliders monitor winter spawning activity of Atlantic cod in Massachusetts Bay and Stellwagen Bank sanctuary

On December 22, the sanctuary's Research Vessel *Auk* set out on an unseasonably mild day to retrieve two underwater gliders from Massachusetts Bay where they had been used to study winter spawning activity of Atlantic cod. The gliders, a type of autonomous underwater vehicle that uses buoyancy-based propulsion and wings to move up and down through the water and conserve power, followed a programmed track heading south from Salem toward Plymouth with east-west transect lines between the center of Massachusetts Bay and the western portion of the sanctuary. During the three-week project, on-board equipment recorded both natural and man-made sounds.

The gliders supplement information collected by six underwater recording units deployed in the Bay in October that have been passively recording sounds and other active sensor and tagging efforts. Using these combined systems, scientists hope to confirm the location and duration of known coastal cod spawning grounds as well as identify possible new spawning areas in both state and federal waters.

"We are excited about adding new technologies to identify historic and perhaps new spawning grounds of cod," said Sofie van Parijs, who heads the passive acoustics group at the Woods Hole Laboratory of NOAA's Northeast Fisheries Science Center. "The gliders covered areas that stationary recorders and active sensors did not reach, giving us a better sense of where and when fish are in the area. This work builds upon our existing knowledge and adds another piece to the puzzle."

This latest deployment was one of several research efforts undertaken in a collaborative multi-year program to study the reproductive behavior of Atlantic cod in the wild. For several years, researchers from the passive acoustics group at NOAA's Northeast Fisheries Science Center have been working with Stellwagen Bank National Marine Sanctuary, the Massachusetts Division of Marine Fisheries, the University of Massachusetts Dartmouth School for Marine Science and Technology, and local fishermen. The Woods Hole Oceanographic Institution and The Nature Conservancy joined the group in this latest study.

Atlantic cod are known to gather in high concentrations in very small areas to spawn, sometimes forming vertical columns or "haystacks." They often return annually to the same location to spawn, a behavior known as spawning site fidelity.

During the spawning season, male cod produce low frequency sounds, called grunts, which are thought to serve as a courtship display to females or as an aggressive display to competitors. The grunts are picked up by bottom-mounted Marine Autonomous Recording Units (MARUs) that collect and store acoustic data for weeks or months. By analyzing these data, scientists are able to characterize ocean noise, study the acoustic behavior of marine mammals and fish, and gain a better understanding of the abundance and distribution of different species.

A pilot project initiated in spring 2011 used a single MARU in northern Massachusetts Bay and successfully recorded grunts from spawning cod, which are protected by the Commonwealth of Massachusetts, in a seasonal conservation area known as the Spring Cod Conservation Zone. Cod were also captured near the MARU as part of a tagging study conducted at the same time by Massachusetts DMF, confirming that cod were present.

In spring 2012, researchers deployed nine MARUs in the same area as the 2011 pilot study and beyond to record cod acoustically through an entire spawning season. These studies provided the basis for the current multi-year program to explore the size and extent of known cod aggregations in both state and federal waters during the winter.

Five MARUs were deployed in late 2013 and retrieved in spring 2014. Analysis of the sounds from this effort is now underway. The NOAA Saltonstall-Kennedy program and the NOAA Fisheries

continued on next page

Gliders Retrieved continued from page 2

Service Cooperative Research Program provided two more years of funding to continue this work.

Year Two of the project began this October with the deployment of six MARUs placed alongside the Massachusetts DMF "active acoustics" receivers, which record signals from cod tagged with acoustic transmitters. The study of winter cod spawning aggregations in Massachusetts Bay includes an area known as the Winter Cod Conservation Zone, where cod are known to spawn during this season.

Because cod vocalizations can be detected only within 50-100 meters (165-330 feet) of the source, the data from the gliders deployed in December will help identify possible cod spawning activity in areas outside the range of the stationary MARUs, including an area to the east that extends into the Stellwagen Bank sanctuary.

The two gliders, operated by the Woods Hole Oceanographic Institution, followed a programmed track line, one 12 hours behind the other, recording both day and night. The gliders were equipped with a variety of instruments, including acoustic receivers that were able to detect cod grunts and other receivers that could detect tagged fish in the vicinity.

An added bonus on both gliders was a separate passive acoustic device that recorded whale vocalizations in the area. Every two hours, real-time sound detections of humpback, right, fin, and sei whales were relayed to Van Parijs and other scientists on shore.

The cod spawning project is one of a series of projects involving passive acoustics that will be undertaken in the next three years by the NEFSC passive acoustic group, Stellwagen Bank sanctuary researchers and other marine science partners.

Article adapted from NOAA Fisheries Science Spotlight story, Dec. 22, 2014, by Shelley Dawicki

Science in the Stellwagen Bank Sanctuary

"Tick-tock" night noises help humpbacks hunt

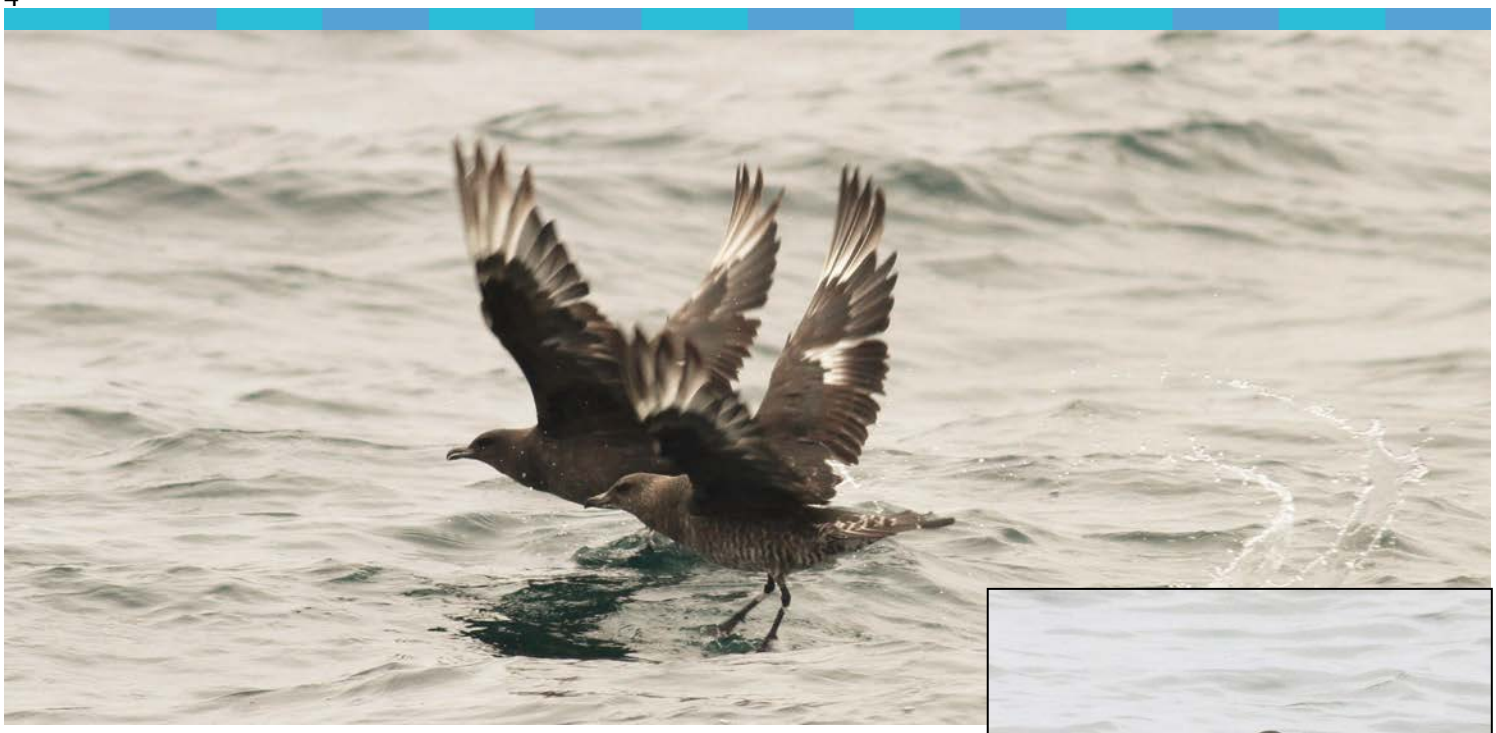
How do you find your food in the darkness of night at the bottom of the ocean? For humpback whales, it may be a matter of sound. Researchers, including several groups working in the sanctuary, are revealing that these whales have developed a variety of feeding techniques, performed either singly, in pairs, or in groups. Now, Susan Parks, a professor at Syracuse University, describes in the December issue of *Scientific Reports* that humpbacks make "tick-tock" noises while hunting in pairs at night at the seafloor but are silent when hunting alone.

The whales' food is the eel-like, pencil-thin sand lance that is known to bury itself in the sand. The whales' vocal sounds may be flushing the sand lance out of their hiding places. The clock-like sounds may also serve to attract nearby whales, who may be eavesdropping on these late-night meals. Data for these findings come from sound recordings made by small temporary tags applied to the backs of whales by means of suction-cups.

Humpback whale diving.
Credit: SBNMS

Museum-goer views sanctuary exhibit.
Credit: SBNMS

Animals without Passports -- With its Q&A flip panels, dramatic videos and colorful imagery, the sanctuary's traveling exhibit continues to fascinate Boston Museum of Science visitors. In addition to humpback whale biology, behavior and conservation issues, the exhibit provides information on our Sister Sanctuaries along the whales' migratory route. You can find "*Animals without Passports*" on the lower level adjacent to the dinosaurs. At present, there are no immediate plans to relocate the exhibit.



Calm Seas, Overcast Skies, Make 2014 Stellwagen Christmas Bird Count "One of the Best"

On December 16, a dozen dedicated birders made their way into Stellwagen Bank National Marine Sanctuary on board the Research Vessel (R/V) *Auk* for the combined 2014 Christmas Bird Count (CBC) and winter sanctuary seabird survey. This was the 27th Stellwagen CBC and it offered the "best conditions ever" according to Simon Perkins, the ornithologist/naturalist who founded the Stellwagen count and has led every trip. With overcast skies (no glare), calm winds from the south (0-8 mph), a flat sea surface (often glassy at times) and swells of under two feet, the R/V *Auk* made good time traversing the bank.

Christmas Bird Counts have been administered by the National Audubon Society for 115 years. [Interesting fact: the first CBC was done on Christmas Day 1900 as an alternative activity to the traditional hunts where the goal was to shoot as many birds as possible.] Audubon reports that more than 2,200 CBCs are conducted each year throughout North America and involve thousands of volunteers. The society notes on its web page that "Each of the citizen scientists who annually braves snow, wind, or rain, to take part in the Christmas Bird Count makes an enormous contribution to conservation. Audubon and other organizations use data collected in this longest-running wildlife census to assess the health of bird populations – and to help guide conservation action."

Each year, all counts must be conducted from December 14 through January 5, and most are run on the same date every year. However, because the Stellwagen count requires favorable sea conditions, the R/V *Auk* is put on stand-by for the first available good-weather day, which this year happened to fall very early in the CBC period.

Most CBCs use a circle with a 15-mile diameter as the survey area, with participants counting every individual bird they see or hear that day. In the early years of the Stellwagen count, local volunteer birders chartered a vessel for a day-long trip to a count circle at the southern end of Stellwagen Bank (the first few counts were done before Stellwagen Bank National Marine Sanctuary

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2014 Stellwagen CBC Results

Canada Goose	8
Common Eider	78
Surf Scoter	4
White-winged Scoter	1
Long-tailed Duck	1
Red-throated Loon	3
Common Loon	3
Red-necked Grebe	1
Northern Fulmar	2
Great Shearwater	62
Northern Gannet	134
Pomarine Jaeger	16
unidentified jaeger	6
Dovekie	25
Common Murre	70
Razorbill	134
unidentified large alcid	72
Atlantic Puffin	13
Black-legged Kittiwake	95
Herring Gull	106
Iceland Gull	1
Great Black-backed Gull	31
unidenitified gull	70

TOTAL BIRDS COUNTED: 935

2014 Bird Count continued from page 4

was designated). The original circle encompassed the northernmost tip of Cape Cod, which allowed for land-based results, even if the boat trip had to be cancelled due to inclement weather. In 1999, the sanctuary became a partner in the count and a few years later the R/V *Auk* became the observation vessel (with a more flexible schedule). Starting in 2009, Perkins and sanctuary researchers changed the count area, and instead of using a circle, adopted standardized, linear track lines that "mowed the lawn" (eight parallel E-W transects laid out at 2.5-nautical-mile intervals, ranging over the full length of Stellwagen Bank). The 63-nautical-mile track was based on previous resource surveys done in the sanctuary and provides for repeatability and better year-to-year comparison of data.

Stellwagen Sanctuary Seabird Stewards (S4), taking part in the winter season survey, also identified Bonaparte's gulls, ring-billed gulls, and black scoters. The S4 program , organized by the sanctuary in cooperation with Mass Audubon, has been conducted since 2011. Other marine animals identified during the trip were humpback whales, a fin whale, a minke whale, harbor porpoises, harbor seals, and gray seals.

Most noteworthy this year was the exceptionally large number of great shearwaters, a species of seabird that is rarely seen in our waters at this time of year, since its typical migration takes it to oceanic islands in the South Atlantic, where it breeds during the austral summer. The total of 62 far exceeded the previous North American CBC high count of 10. Many, if not all of these lingering sheawaters may have been immature birds that were still too young to breed, and instead chose to delay their migration to take advantage of the bank's abundance of fish. Other count highlights included unusually large numbers of Pomarine jaegers, common murres, and Atlantic puffins. The puffin numbers are a direct result of recent conservation efforts on the birds' nesting islands in Atlantic Canada and the Gulf of Maine.

Between the record-numbers of birds, the whales, and the glassy-calm seas which allowed for spectacular views of the wildlife, this year's Stellwagen Bank CBC was ranked by participants as one of the best.

All photos on pages 4-5 courtesy of Peter Flood

Photos: (page 4) Two Parasitic Jaegers take off from sea surface; Atlantic Puffin at rest. (page 5, from top) Dovekie attempting lift-off, group of Great Shearwaters; Black-legged Kittiwake in flight; Northern Gannet on patrol; four Razorbills fly by the research vessel.

Elizabeth "Bibi" Stokes named one of National Ocean Service's Team Members of the Year

Sanctuary staff are garnering official recognition at the national level. Bibi has been named a 2014 Team Member of the Year by the National Ocean Service for exceptional dedication and superlative performance in assisting with administration of grant support, foreign and gifted travel, Sanctuary Advisory Council and Sister Sanctuary Program support.

SBNMS's Leila Hatch 1 of 7 on research team to be awarded a Department of Commerce Silver Medal

Leila was one of a team of seven scientists who were recognized for developing internationally recognized innovative technology, CetSound, which quantitatively assesses human-induced noise impacts on marine mammals. This is the second highest honorary award granted by the Department of Commerce.

You Said It?

"You Said It!" – an interactive activity in two parts.

1. Readers are invited to submit their guesses (or informed beliefs) about the pictured event, item and/or place. The first person to email us the correct answer will receive a sanctuary poster.
2. Readers can write their own humorous captions – the funnier the better (but please refrain from crude, sexist or other inappropriate language). Sanctuary staff will vote for their favorite selection; the winning entry will be posted in the following issue of *E-Notes*. Again, the winner gets a sanctuary poster.

Winning selections (1. real-life caption and 2. humorous caption) will run in the following issue.

JANUARY 2015 Photo

Submit your entries to: stellwagen@noaa.gov. In the subject line of your email write: November (real or humorous) caption. Include your name and mailing address in the body of the email text along with your caption.

December 2014 Answers

REAL: Researchers collect samples of exhalations from the beak of a Great Shearwater during a sanctuary science cruise on board the R/V *Auk*. Breath samples may provide evidence of bird health, diet and local environmental conditions.

HUMOR: "Gee, Officer! I was at the bank all afternoon and didn't drink anything at all. I swear I can still fly a straight line."

"Does this beak make me look fat?"

"I always wanted to be a puffin."

Girl Scout Oceanography Badge activities now include sanctuary content

A program incorporating information about their local national marine sanctuary is now available to Eastern Massachusetts Girl Scouts pursuing the oceanography badge. Stellwagen Bank National Marine Sanctuary Ambassador and Girl Scout/ Gold Award Recipient Caitlin Fitzmaurice aided by sanctuary volunteer coordinator Anne-Marie Runfola, developed the curriculum, which includes information about food webs, whale migrations, ocean currents, and seafloor geology. At the first of these education sessions embracing sanctuary content, 40 girls earned their oceanography badges. In addition, 10 cadet scouts have been trained to lead similar sessions.

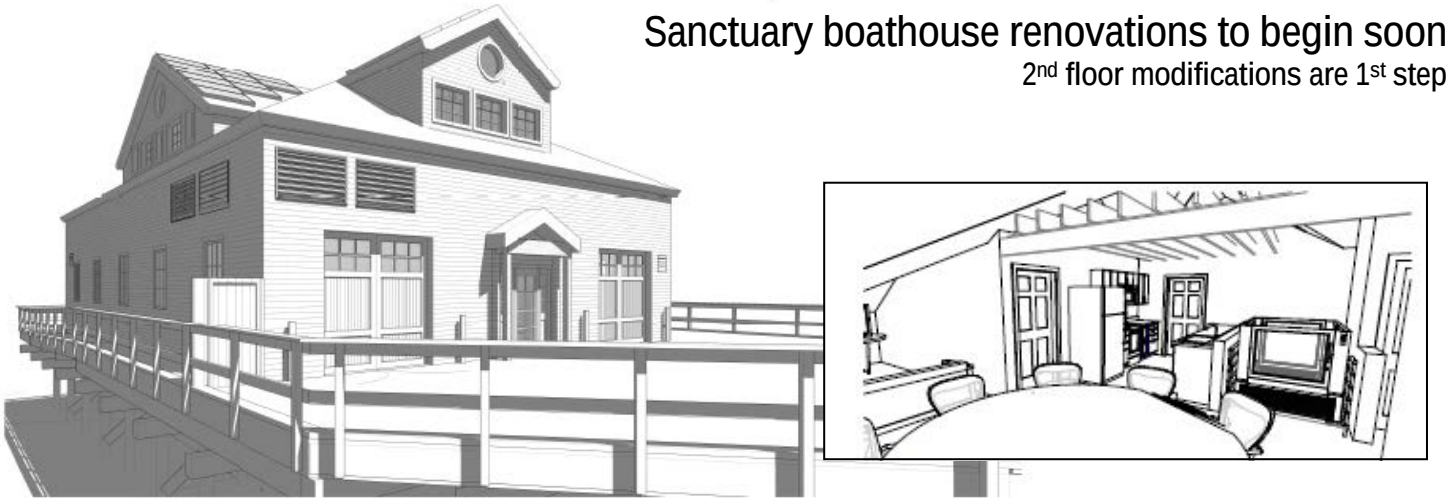
Girl Scouts learn about the sanctuary on their way to earning an oceanography badge. Photo: Anne-Marie Runfola

Have you seen this image on your television lately?

The distinctive icons for the right whale listening buoys that sit within the Boston shipping lanes and the sanctuary boundary are being viewed by millions of television and web viewers as part of a new global Apple Air 2 commercial. The image, which comes from the free *Whale Alert* app, remains on screen for only a fraction of a second, but those in the know can easily catch the colorful cameo appearance. *Whale Alert 2.0* was launched in December 2014. The original app, with a primary goal of right whale protection along the U.S. East Coast, has been downloaded thousands of times since its 2012 release.

Sanctuary boathouse renovations to begin soon

2nd floor modifications are 1st step



After a temporary hiatus, long-awaited renovations to the sanctuary's boathouse will begin soon. Plans call for conversion of the boathouse into a fully functioning Marine Operations Center, which will significantly improve NOAA's ability to support research and long-term monitoring in the sanctuary. Fiscal Year 2015 work will include: a new staircase, utility improvements and second floor renovations. Ultimately, this area will become a lodging area for visiting scientists and students with kitchenette and meeting area. Expanded dormers will maximize light and space and afford excellent views of Scituate Harbor. An open bid process will be conducted for the first phase of the renovation and should be announced in early summer.

BLUE HORIZON: SANCTUARY AT DUSK ON AN OVERCAST WINTER DAY
Photo by Anne Smrcina, SBNMS

It's official: 2014 was Earth's warmest year on record; global oceans also hit record-warm temperatures

Independent studies by both NOAA and NASA indicate that the globally averaged temperature over land and ocean surfaces for 2014 was the highest among all years since record keeping began in 1880. The December combined global land and ocean average surface temperature was also the highest on record. For more information and global highlights, go to http://ncdc.noaa.gov/sotc/summary-info/global/2014/12

NATIONAL MARINE SANCTUARY SYSTEM

Scale varies in this perspective. Adapted from National Geographic Maps.

National Oceanic and Atmospheric Administration

National Ocean Service

Office of National Marine Sanctuaries

Gerry E. Studds Stellwagen Bank National Marine Sanctuary

NOAA

NATIONAL MARINE SANCTUARIES

http://stellwagen.noaa.gov/