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

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

April - May 2014

This minke whale was photographed during a 2008 sanctuary research cruise. Credit: Cara Pesarcik. Taken under NOAA Fisheries Permit #775-1875.

Minke Whale Behavior Studied Using Acoustic Monitors in Sanctuary

Scientists using passive acoustic monitoring to track minke whales in the Northwest Atlantic have found clues in the individual calling behaviors and movements of this species. These findings, recently published online in the journal *Behaviour*, provide insight into one of the least studied baleen whales.

"Although we regularly observe minke whales in our Gulf of Maine surveys, we know very little about minke whale vocalizations and how they use sound in their behavioral and social interactions," said Denise Risch, lead author of the study and a marine mammal researcher at NOAA's Northeast Fisheries Science Center (NEFSC).

Information on individual calling behaviors and source levels are important in understanding marine mammal social interactions. Risch and colleagues used passive acoustic recordings to track and assess the sound production behavior of 18 minke whales in the Stellwagen Bank National Marine Sanctuary in the Gulf of Maine. The study periods were October to November 2009 and August through October 2011.

The recordings came from arrays of bottom-mounted marine autonomous recording units (MARUs) deployed in the sanctuary since December 2007 to

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To hear a recording of a minke whale in the sanctuary, visit the Northeast Fisheries Science Center's online newsroom at: http://www.nefsc.noaa.gov/press_release/pr2014/scispot/ss1402/

In This Issue:

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Minke whale acoustic monitoring

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continuously record low-frequency sounds. The recordings are analyzed for the presence of vocally active baleen whales and fish species. The sound data are also being used to calculate a noise budget for the sanctuary and to examine potential effects of human-induced noise on the acoustic communication of marine animals.

Water spews from the mouth and the expanded throat grooves are clearly visible in this minke whale. The distinctive white patch on its flipper just clears the water line. Credit: Denise Risch, NOAA/NEFSC

Sounds produced by minke whales in the Gulf of Maine region have only recently been described in more detail, thanks in part to the recordings from the Stellwagen Bank MARUs. A 2013 study by Risch and others on minke whale acoustic behavior and vocalization patterns in Massachusetts Bay described seven distinct pulse train types, which fall into three main categories and occur with varying frequency. The behavioral significance of these vocalizations and whether they are specific to sex, age, recording site, or season is unknown.

Marine autonomous recording units, or MARUs, fill the deck before deployment in the sanctuary. Credit: NOAA/NEFSC.

Given that the minke whale vocal repertoire has several typical call types, the main objective of this study was to investigate whether individual minke whales use the full vocal repertoire, or combine pulses in predictable sequences. How individuals use the different call types when they interact with other individuals was also a study priority.

Risch and colleagues found that none of the 18 minke whales studied produced all of the call types. Instead, they produced two call sequences that combined three to four different call types in a specific order. The sequences were stable across years and were shared between individuals. Seven of the whales used one calling pattern, ten used another pattern, and one animal combined the call types differently. Animals producing different call sequences were in acoustic range of one another on several occasions. Although the specific behavioral function of the call patterns is unknown, the sound sequences may be important in social interactions between individuals, or may reflect age or sex differences.

"Because the same calling patterns were shared by several individuals, the patterns may contain information related to sex, age or a specific behavior," said Risch, a member of the passive acoustics group at the NEFSC's Woods Hole Laboratory. "The whales seem to regularly use different patterns of calling when in hearing proximity of one other. We don't know yet what purposes these patterns serve or which sex is producing the calls."

"In several other baleen whale species only the males produce songs, which serve in a reproductive context," Risch said. "This could also be true for minke whale vocalizations, which appear to be more common during migration and the winter breeding season than during the summer feeding period."

Minke whales are the smallest of the "great whales" or rorquals, a group that includes the blue whale, Bryde's whale, and humpback, fin and sei whales. Rorqual whales are relatively smooth in appearance and have pointed heads

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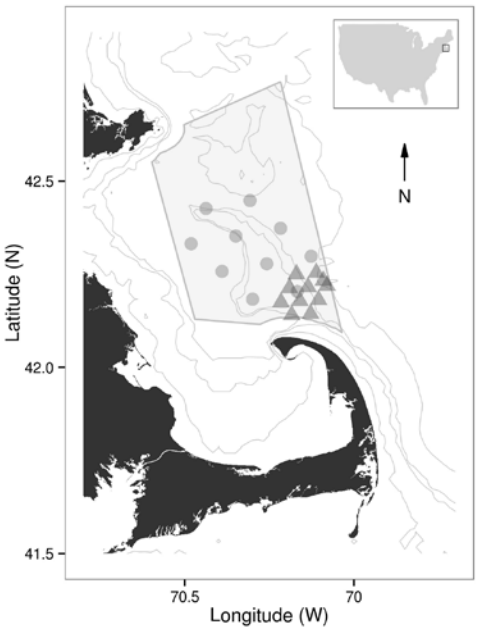
Two studies in Stellwagen Bank National Marine Sanctuary used marine acoustic monitoring devices (MARUs) to listen for minke whales.

Filled dots represent MARUs deployed from October 2-November 30, 2009.

Filled triangles represent MARUs deployed between August 17-October 11, 2011.

The sanctuary is the light gray between Cape Ann and Cape Cod at the mouth of Massachusetts Bay.

Credit: Denise Risch, NOAA/NEFSC



Minke whale acoustic monitoring *continued from page 2*

and small pointed fins. Rorquals can be distinguished from other whales by the many deep grooves along their throats that expand when they feed.

The 18 acoustically tracked animals in this study exhibited swim speeds that matched those of migrating minke whales in other areas. The summer feeding grounds of minke whales in the North Atlantic generally extend from Labrador to the Barents Sea. Since there are few documented minke whale calls or sightings in the Stellwagen Bank sanctuary during the summer, the area appears to be part of the migration route rather than a primary feeding ground destination.

"Minke whales have a streamlined body shape and move quickly, so few acoustic recording tags have been successfully attached," Risch said. "Passive acoustic recordings can be a less costly and more feasible option to track minke whales, given limited visual observations to correlate with vocalizations. The successful tracking of 18 individual minke whales demonstrates the feasibility of using long-term passive acoustic arrays for this purpose."

The small dorsal fin is a characteristic feature of the minke whale. Credit: Denise Risch, NOAA/NEFSC

This study has contributed to an improved understanding of minke whale calling behavior, and provided source levels for the calls to determine how far these animals can be heard in different habitats. The results will also be important in further developing and interpreting passive acoustic monitoring for this species.

In addition to Risch, study co-authors are Ursula Siebert of the Institute of Terrestrial and Aquatic Wildlife Research at the University of Veterinary Medicine Hannover in Germany and Sofie Van Parijs of the Woods Hole Laboratory of NOAA's Northeast Fisheries Science Center.

Article by Shelley Dawicki, NOAA Fisheries

Wayward ONMS Unmanned Aircraft System (UAS) parts spark viral story

A mis-placed label at a shipping company sent part of an unmanned aircraft system (UAS) intended for the sanctuary to a student dorm room, leading to one of the biggest media stories in the sanctuaries' recent history. Fortunately, the package was recovered and the vehicle was put back together again. The PUMA system (two vehicles and a controller, packaged in eight containers) was sent to Stellwagen Bank National Marine Sanctuary for at-sea testing of its camera capabilities and potential use for monitoring sanctuary resources and uses, in this case buoy locations.

The May test results will be used to compare overflight observations to boat-based counts which were done simultaneously. In the past, vessel surveys have provided this important user information to sanctuary managers.

Unmanned aircraft systems (often labeled "drones," especially in military uses) are becoming an important research and monitoring tool for marine protected areas. Both manned and unmanned aircraft operations for the national marine sanctuaries are managed from the Aircraft Operations Center at Channel Islands National Marine Sanctuary.

An unmanned aircraft is released from the deck of the RV *Auk* during a May 19 cruise into Stellwagen Bank National Marine Sanctuary. Credit: Matt Pickett, NOAA/ONMS

Watch the news story at: http://boston.cbslocal.com/2014/05/20/drones-being-used-for-environmental-research-off-mass-coast/

Charles W. Morgan on display. Courtesy of Mystic Seaport

NOAA Partners with Mystic Seaport for Historic Whaleship Voyage

On March 25 NOAA's Office of National Marine Sanctuaries announced its partnership with Mystic Seaport to support the 38th Voyage of the *Charles W. Morgan*. Nearly 100 years after its last whaling voyage, the *Morgan* will sail along the New England coast this summer to celebrate America's maritime heritage and the whales that gather in Stellwagen Bank National Marine Sanctuary.

The *Morgan*, a National Historic Landmark built in 1841 and restored to seaworthy status over the past five years, is the flagship of the watercraft collection at Mystic Seaport. During its 80-year whaling career, the ship sailed on 37 voyages to remote corners of the globe, including waters of national marine sanctuaries in California, Hawaii, and American Samoa.

"America's pursuit of whales is an epic story of global dimensions that shaped the nation's identity," said Daniel J. Basta, director, Office of National Marine Sanctuaries. "Today, thanks to pioneering work by sanctuary scientists and others to understand whale behavior, and develop conservation strategies to reduce risks to whales, we're writing a new chapter based on respect and stewardship for these magnificent creatures of the deep."

During the 38th Voyage, NOAA will host a Dockside exhibit at ports of call and Develop various science and outreach activities. Upon its return to Mystic Seaport, the ship will resume its status as an exhibit at the museum.

"The *Charles W. Morgan* is an exceptional and truly unique artifact of our shared maritime heritage," said Mystic Seaport President Steve White. "While the ship is an American icon and a living portal into an important chapter of American history, she now embarks on a new journey with transformed purpose. She's no longer an instrument of commerce but a source of education, knowledge, and understanding."

The *Morgan* left Mystic for New London, Conn. on May 17. After a month-long fitting out period, she will embark on her voyage to historic New England ports, including Newport, R.I.; Vineyard Haven, Mass; New Bedford, Mass.; a mooring off Provincetown, Mass.; Boston; and Buzzards Bay, Mass. From her Provincetown stop, the *Morgan* will take three one-day sails into Stellwagen Bank National Marine Sanctuary.

Photos this page by Anne Smrcina, SBNMS

Whale Watching News

An April 13 whale watch from Provincetown to the southwest corner of the sanctuary offered some exciting early season sightings, including Tongs and her calf and another four humpbacks showing the effects of the adults' over-winter loss of blubber (visible vertebra along the back), nine fin whales, a minke whale, about 150 Atlantic white-sided dolphins, and a variety of birds (laughing gull and northern gannet pictured here).

The whale watch was provided by the Dolphin Fleet to participants in the annual Whale Watch Naturalists Workshop, sponsored by Whale and Dolphin Conservation and the Center for Coastal Studies.

In May whale sightings continued to be plentiful as schools of sand lance , the whales' favored prey, returned to sanctuary waters.

Sanctuary exhibit at Museum of Science. Credit: Deborah Marx, SBNMS

Exhibit migrates to Museum of Science

The *Animals Without Passports* traveling exhibit has migrated to the Museum of Science, Boston, where it will be on display in the Nichols Gallery from May 25 through September 1, 2014. This is the third venue to host the exhibit that follows the humpback whale's migration between North Atlantic feeding grounds in Stellwagen Bank National Marine Sanctuary and the Caribbean breeding grounds. It showcases information on our Sister Sanctuaries program and describes the various hazards humpbacks face as they journey across ocean borders. Exhibit funding was provided by the Office of National Marine Sanctuaries and National Marine Sanctuary Foundation.

The Museum of Science, Boston, is one of the world's largest science centers and Boston's most attended cultural institution. It introduces approximately 1.5 million visitors a year to science, technology, math and engineering via dynamic programs and hundreds of interactive exhibits. Founded in 1830, the Museum was the first institution to embrace all of the sciences under one roof.

The museum is advertising *Animals without Passports* as one of its special exhibits for the summer season. For more information about the exhibit please visit the Museum of Science, Boston website at: http://www.mos.org/exhibits/animals-without-passports

Computer system installed in RV *Auk*

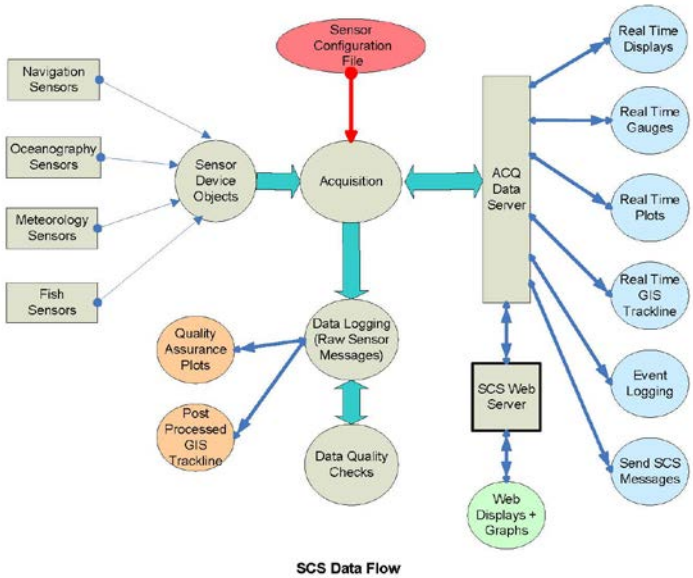
To make NOAA's Research Vessel *Auk* the best possible platform for a wide range of marine research in the sanctuary, a scientific computer system was installed over the winter as the vessel underwent seasonal maintenance and repairs.

This computer system, now an integral component on many NOAA research vessels around the nation, provides data acquisition and display capabilities for oceanographic, atmospheric and fisheries research applications. It acquires data from shipboard sensors and relays this information to scientists in real time via text and graphic displays, while simultaneously logging the data to disk for later analysis. The system also performs quality checks by monitoring input/output, providing range checks and plotting data after acquisition.

Sensor systems installed on the RV *Auk* include:
Navigation: AIS, GPS (position/tracking), heading, speed, Whale ALERT;
Oceanography: sea surface temperature, depth, conductivity, salinity, dissolved oxygen, fluorescence;
Meteorology: wind direction and speed, air temperature, relative humidity;
Fish: echo sounder/fish finder.

Eventually, all data will be archived at the National Oceanographic Data Center (NODC) and made available to researchers as needed.


RV *Auk*. Credit: SBNMS



SCS Data Flow

Tom Freeman paintings of *Charles W. Morgan* and Stellwagen Bank Sanctuary Unveiled

On May 14, at the USS Constitution Museum in Boston, the National Marine Sanctuary Foundation unveiled a set of paintings commemorating the historic 38th voyage of the whaleship *Charles W.Morgan* and its return to the former whaling grounds at Stellwagen Bank.

Created by Thomas W. Freeman, National Marine Sanctuary Foundation artist-in-residence, one painting depicts mother and calf humpback whales and other elements relating to the sanctuary's efforts to protect whales. The second Freeman work is the official 2014 painting for the *Morgan's* unprecedented voyage next month to historic ports on the New England coast.

The *Morgan*, a National Historic Landmark built in 1841, is the oldest American commercial ship still afloat. Over an 80-year whaling career, the ship sailed on 37 voyages to the remote corners of the globe. The *Morgan's* voyage to Stellwagen Bank National Marine Sanctuary represents the vessel's full-circle transformation from being a hunter of whales to one bearing a message about their conservation.

"Taking the *Charles W. Morgan* onto Stellwagen Bank where she can sail amongst the whales will be the highlight of the 38th Voyage," said Steve White, president of Mystic Seaport. "The mission of the ship is to help us understand why our forebears hunted whales, what that industry did for this country, and why ultimately we have chosen to cease that activity in lieu of preservation. The juxtaposition of the old and the new in the sanctuary will bring that message into focus for all of us."

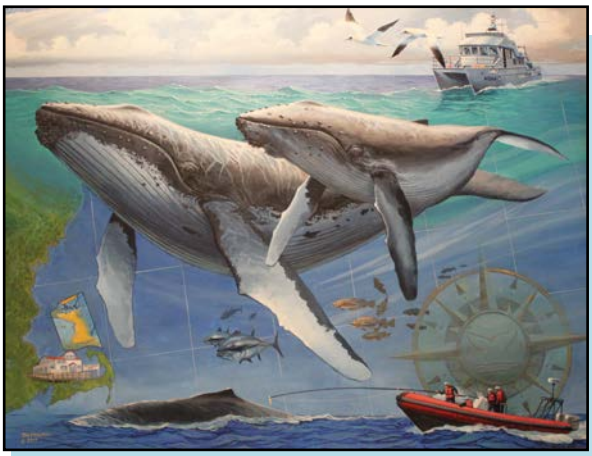
After the *Morgan* passes through the sanctuary, it will berth in the Boston National Historical Park adjacent to "Old Ironsides," the U.S. Navy's oldest warship.

"Stellwagen Bank National Marine Sanctuary offers some of the best whale watching in the world," said Jason Patlis, president and CEO of the National Marine Sanctuary Foundation. "Tom's paintings represent not only this special place and the iconic whales that depend on it for survival, but also a larger message of national whale conservation. NMSF is proud to be a part of the *Morgan's* exciting voyage this summer."

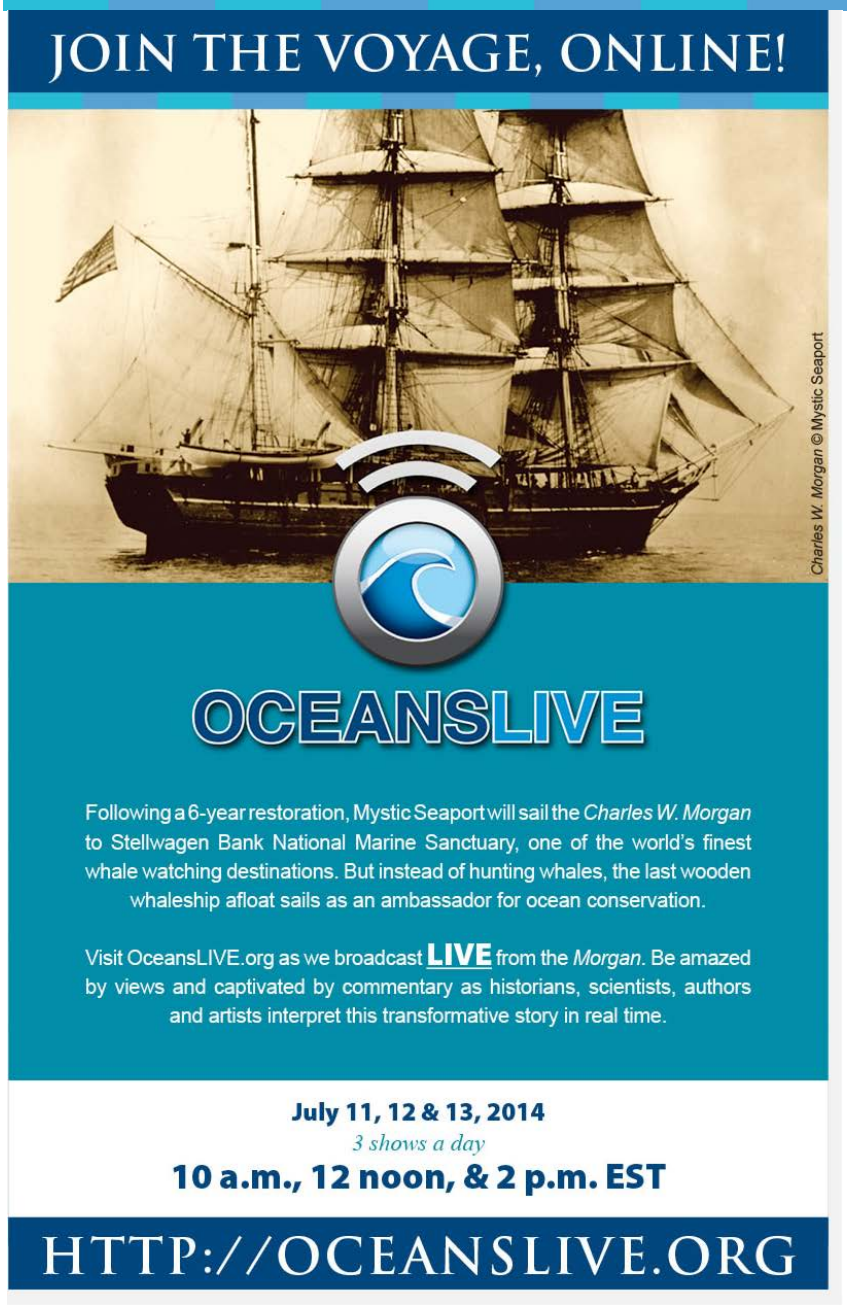
Freeman is a nationally and internationally recognized artist whose paintings hang in many galleries around the nation as well as in the White House. He is best known for his portrayals of heroic American maritime events and subjects. Freeman said his goal in creating the paintings is to raise awareness about the various human and natural threats facing humpback and other whales and highlight the innovative research the sanctuary conducts in order to better understand how whales use the water column relative to human activities. Despite their impressive size, humpbacks and other whales face considerable threat from vessel strikes, underwater noise and marine debris – particularly lost or abandoned fishing lines and nets.

"Whales are some of the most magnificent creatures on earth and they have been around for millions of years," Freeman said. "As stewards of the planet, we have an obligation to protect these majestic creatures so that current and future generations learn to understand and appreciate the need to keep the ocean productive and healthy."

Through summer, Freeman's paintings will be exhibited as part of the *Morgan's* historic voyage. Fine art prints of the two paintings will be available through the Seaport Store during the voyage.



Top to bottom: *Humpback Whales of Stellwagen Bank National Marine Sanctuary* by Tom Freeman; Commemorative painting for *Morgan's 38th Voyage* by Tom Freeman; Dan Basta, ONMS Director, Tom Freeman and Stephen White, Mystic Seaport Prresident at the unveiling of the 38th Voyage paintings; Craig MacDonald, SBNMS Superintendent thanks Tom Freeman for his painting in support of Stellwagen Bank National Marine Sanctuary.



38th Voyage Events Sponsored by NOAA

NOAA and the Office of National Marine Sanctuaries, along with the National Marine Sanctuary Foundation, are working with Stellwagen Bank National Marine Sanctuary and Mystic Seaport to sponsor a number of programs during the *Charles W. Morgan*'s 38th voyage.

NOAA Tent at the Dockside Exhibit -- information and activities about sanctuary research and conservation.

OceansLive Web TV – live broadcasts from the Morgan and Provincetown during the days when the whaleship will sail into the sanctuary. Programs will cover a wide range of topics, including technology, art, women's roles, historical changes. Visit http://oceanslive.org to confirm times and programs.

Future Visions Lectures – special guest lectures by:

- *Sylvia Earle*, ocean explorer, on July 12, 3:30pm at the Hiebert Marine Laboratory, Center for Coastal Studies, 5 Holway Street, Provincetown; and
- *Jean-Michel Cousteau*, ocean advocate, *David Wiley*, sanctuary research coordinator and *Stephen White*, Mystic Seaport president at historic Faneuil Hall in Boston, July 16, 6:00pm.

National Marine Sanctuaries Whales Website – whale information from the sanctuaries, including species, whale watching, whale expeditions and whaling history. The website provides insights into changing perceptions of whales from whaling to watching. The initial pages will be available in June. http://sanctuaries.noaa.gov/whales

Fathom That! –stories and information about whales, sanctuary research and other topics via audio messages accessible by phone and a mobile website. 781-304-1013 ext. 38# or https://bycell.mobi/stellwagen

Library Programs and Materials – posters, reading lists and bookmarks providing information about the changing perceptions about whales will be provided to participating libraries in the region.

For more information about sanctuary programming during the Morgan's 38th voyage, visit: http://stellwagen.noaa.gov.

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