



Whale Strike Research and Mitigation Efforts: Stellwagen Bank National Marine Sanctuary

T. Silva, M. Thompson, L. Hatch & D. Wiley

Realignment of TSS: Boston Port Operators Community, USCG, NEFSC (R. Merrick)

Right Whale Auto-Detection Buoys: C. Clark, Connell University, MARAD/USCG, Excellerate Energy

Large Whale Detection using Infra-red Camera Technology: Dan Zitterbart, (WHOI)

Large Whale Dynamic Management using Satellite-tagged Seabirds: J. Robbins, CCS; Right Whale Consortium

Right Whale Corporate Responsibility Project (Grading SMA compliance): International Fund for Animal Welfare, GARFO

**Underwater Behavior of Large Whales: S. Parks, Syracuse University, A. Friedleander, UCSC

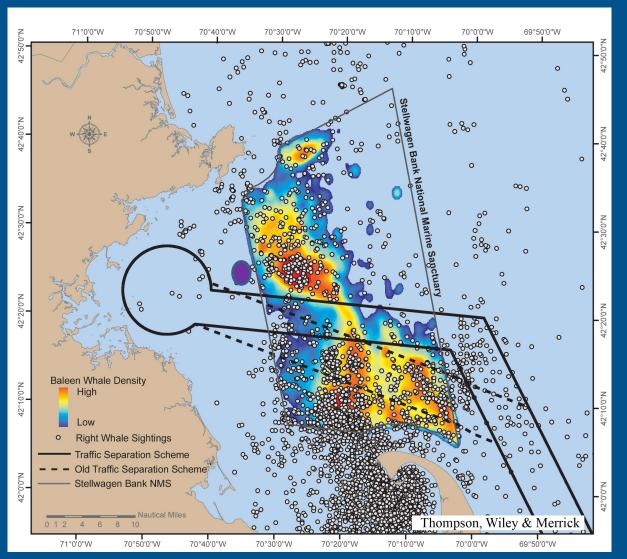
Whale Alert: V. Zetterling (Conserve IO), P. Ramage (IFAW)

Using Dimethylsulfide (DMS) to Predict Site Occupancy of North Atlantic Right Whales: D. Zitterbart (WHOI); Joe Warren (SUNY Stony Brook); D. Chowlewiak (NEFSC)





Realignment of TSS (2007)







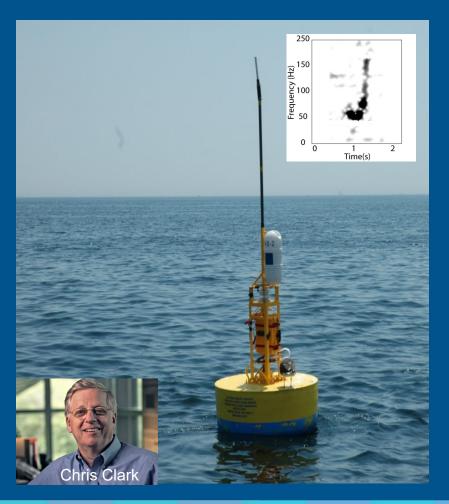
Reduced co-occurrence:
81% all whales
58% right whales





Right Whale Auto-Detection Buoys

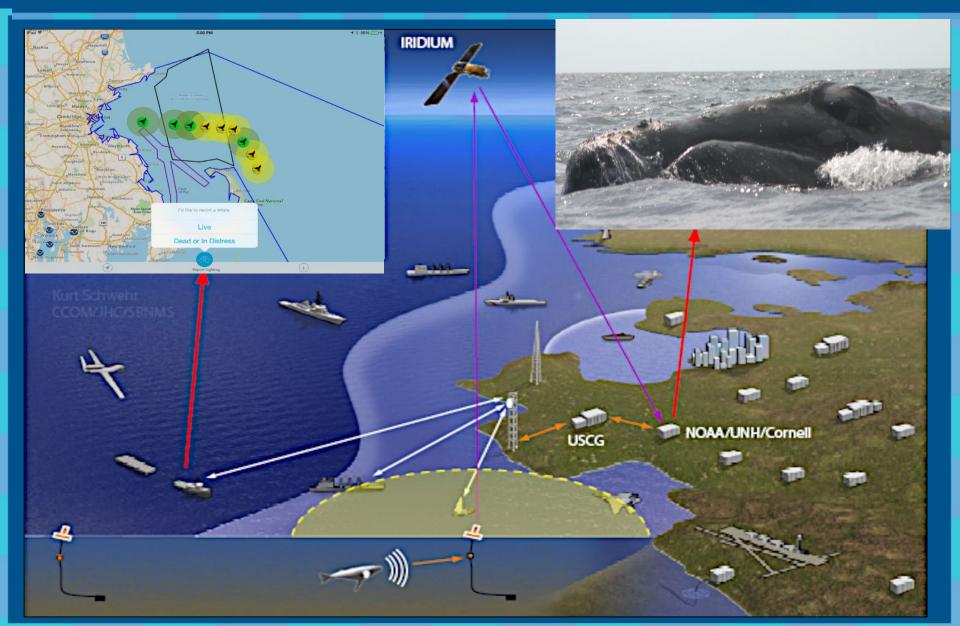
- Moored buoys (Cornell BRP & WHOI)
- Hydrophones to detect specific right whale call
- Computer software to identify specific call
- Satellite transmitter to immediately send data to land base for confirmation & communication











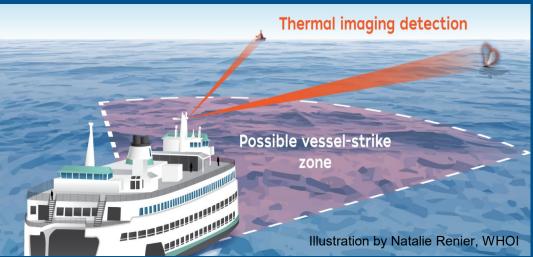




Large Whale Detection using Infra-red Camera Technology

Collaborators: Dan Zitterbart (WHOI)



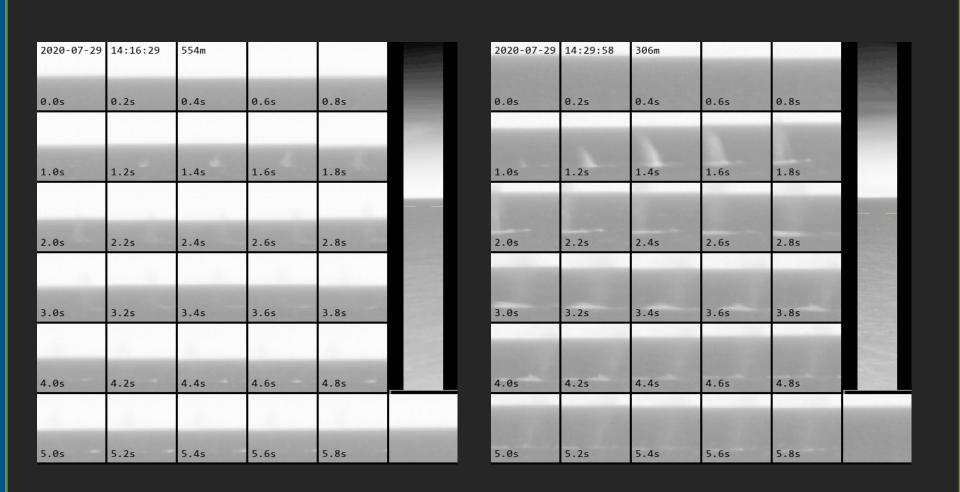


Goal: Reduce risk of ship strike by notifying vessels of right (or other) large whales in their path

How: A thermal imaging (infra-red) scanner searches the surface for blows. If a whale surfaces and blows, its thermal signature can be recorded by the camera and information provided to the ship's bridge.

Uses the temperature difference between blow and background (air).

System successfully detected humpback whales (2020) and right whales (2021)









Exploring the use of seabirds as a dynamic ocean management tool to mitigate anthropogenic risk to large whales

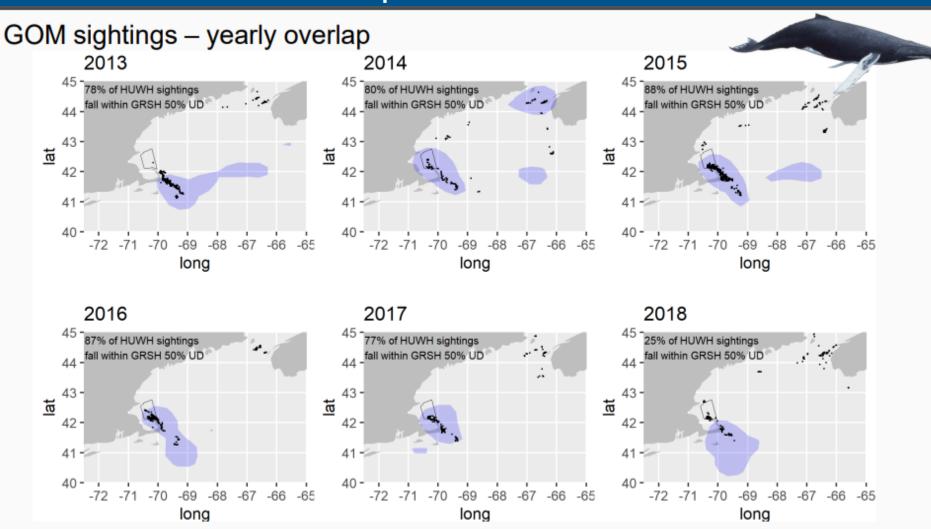
Tammy L. Silva¹, Kevin D. Powers¹, Jooke Robbins², Regina Asmutis-Silvia³, Timothy V.N. Cole⁴, Alex Hill⁵, Laura Howes^{6,7}, Charles A. Mayo², Dianna Schulte⁸, Michael A. Thompson¹, Linda Welch⁹, Alexandre N. Zerbini^{10,11}, David N. Wiley¹







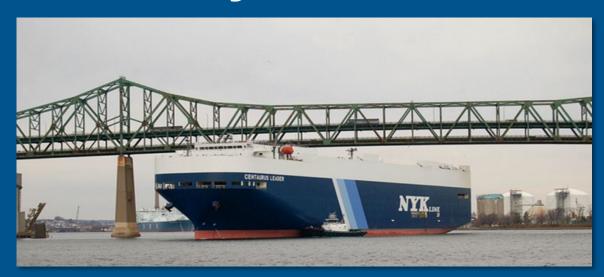
Can Satellite-tagged Great Shearwater seabirds locate humpback whales in space and time?







Problem with Real-time or Dynamic Systems



Unpredictable Hard to verify





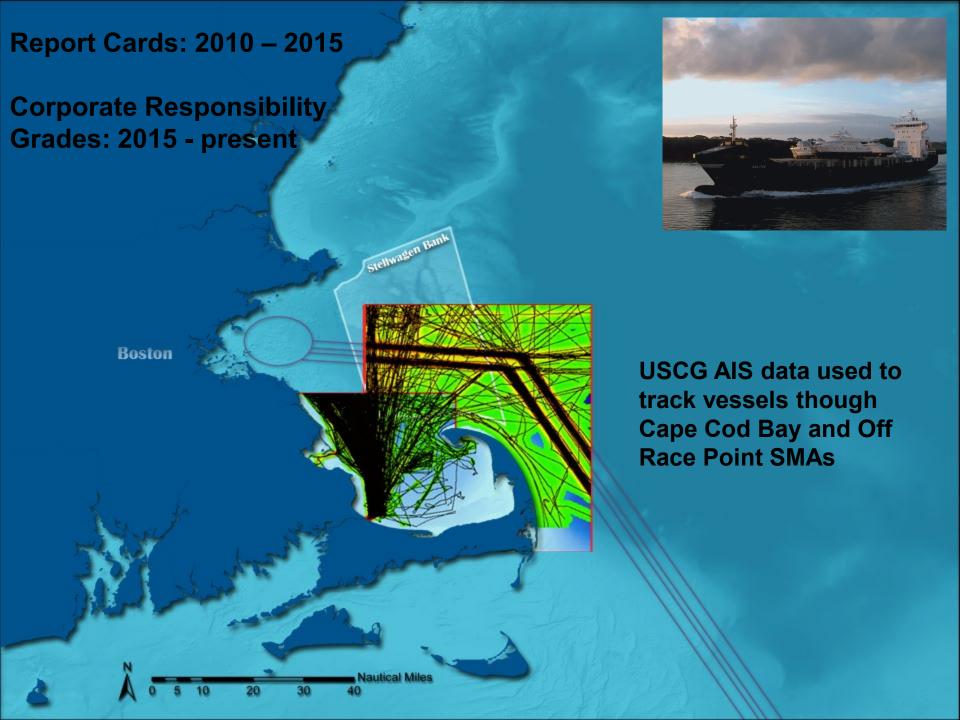
SBNMS Right Whale Corporate Responsibility Project

Collaborators: Ramage, Livermore (IFAW); Schuler (NOAA/GARFO)

Goals:

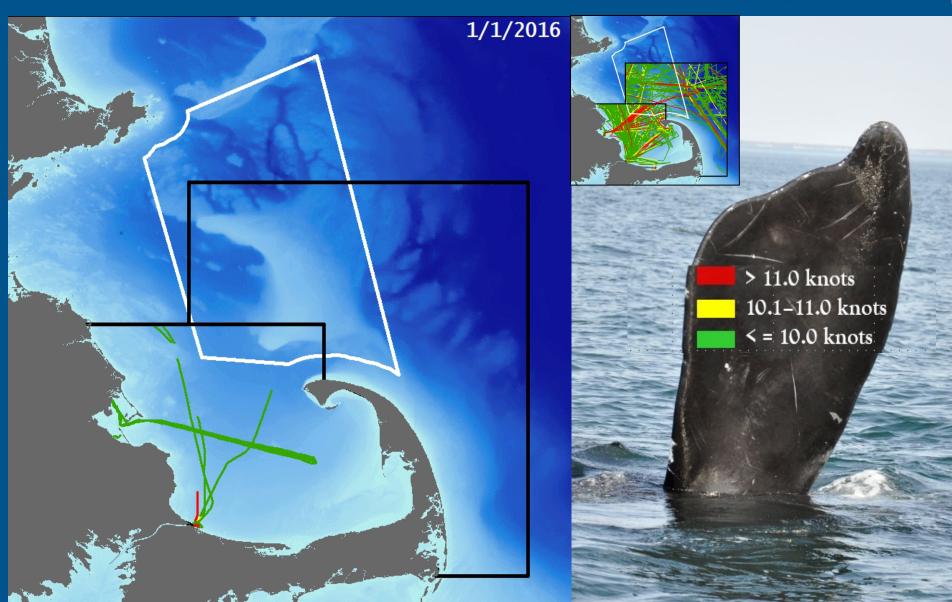
- Increase Vessel Compliance with NOAA's Right Whale Ship Strike Rule,
- Provide Increased Protection of North Atlantic Right Whales, and
- Recognize the Achievements of Deserving Maritime Companies













AIS-Based Report

Cards generated for all

ships transiting the

Seasonal Management

Areas



Vessel: Sample MMSI: 123456789 Stelwagen Bank National Marine Sanctuary Off Race Point SMA Cape Cod Bay SMA Almost Compliant 10-11 knots Not Compliant Greater than 11 knots

Vessel Information

Vessel Type Unspecified/Other Vessel Length 31.9 m

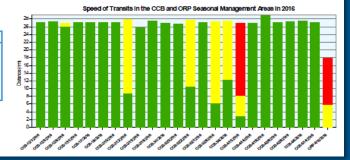
Total Number of Transits 24

Total Distance Traveled 643.4 nm

Percent of Distance Not Compliant 17.1 %

Mean Speed Over Ground 7.4 kts

Overall Compliance



SMA Transit of Least Compliance

CCB-4/10/2016 367006610 Distance Traveled

Distance Not Compliant

Mean Speed Over Ground

Percent of Distance Not Compliant

Time Lost to be 100% Compliant 0 hour 14 minutes 24 seconds

26.9 nm

Vessel Information

Name & MMSI #
Type
of Transits
Distance Traveled
% Distance Not Compliant
Mean Speed Over Ground
Overall Compliance



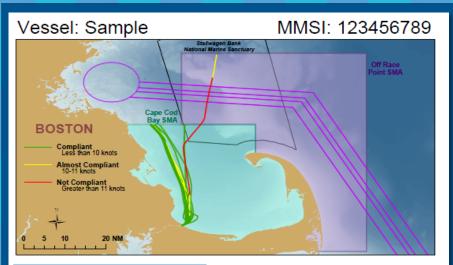
> 11.0 knots 10.1 - 11.0 knots < = 10.0 knots











Vessel Information

Vessel Type Unspecified/Other Vessel Length

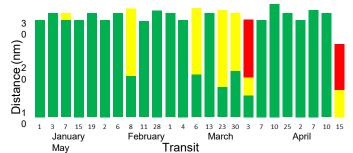
31.9 m Total Number of Transits

Total Distance Traveled 643.4 nm

Percent of Distance Not Compliant 17.1 %

Mean Speed Over Ground 7.4 kts

Overall Compliance 82.9%



SMA Transit of Least Compliance

Least Compliant SMA Transit April 3, 2017 (Cape Cod Bay)

Distance Traveled Not Compliant

Time Lost to be 100% Compliant

14 minutes and 23 seconds

Distance Traveled

26.1 nm (89%)

Mean Speed Over Ground

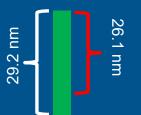
29.2 nm

13.2 knots

Transit of Least Compliance

Transit
Distance Traveled
Distance Traveled Not Compliant
% Distance Not Compliant
Mean Speed Over Ground
Time Lost to be 100% Compliant

Time Lost would be



00:14:23 sec

April 3, 2017 (Cape Cod Bay)

Greater Atlantic Regional Fisheries Office Stellwagen Bank National Marine Sanctuary









100% A90 - 99% A
80 - 89% B
70 - 79% C
60 - 69% D
<60% F

Ships and Companies that receive an

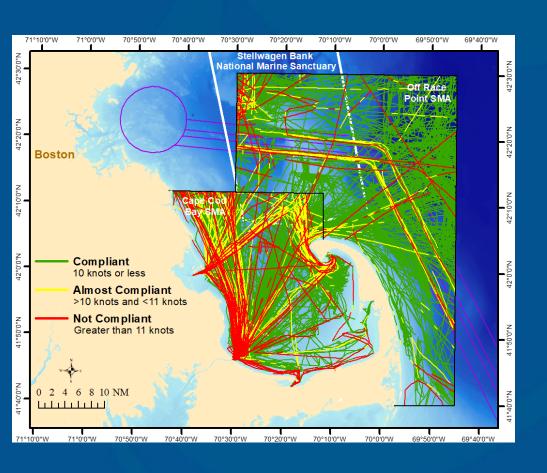
A+ or A
rating receive a
Certificate of
Corporate
Responsibility



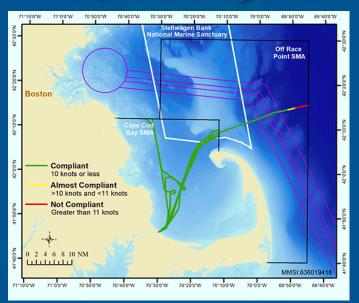








2021 2,228 Transits 97,862 Line Segments









2021

173 Vessels Report Cards

√ 148 Vessel Certificates



107 Companies

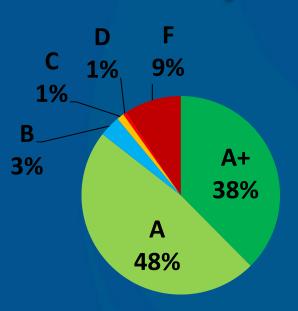
88 Company Certificates





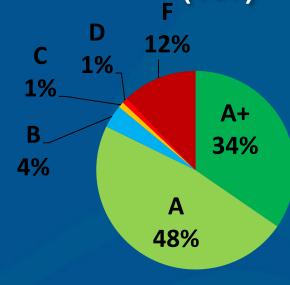


Corporate Responsibility Grades by Vessel (173)



Grade	2021
A+	38% (n=65)
Α	48% (n=83)
В	3% (n=6)
С	1% (n=2)
D	1% (n=1)
F	9% (n=16)
Total	173

Corporate Responsibility Grades by Company (107)



Grade	2021
A+	34% (n=37)
Α	48% (n=51)
В	4% (n=4)
С	1% (n=1)
D	1% (n=1)
F	12% (n=13)
Total	107

86% A or A+ grade

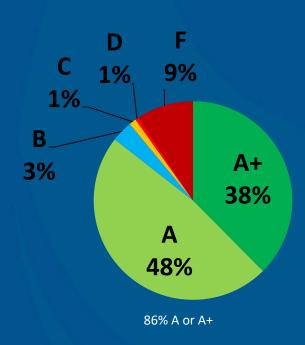
82% A or A+ grade

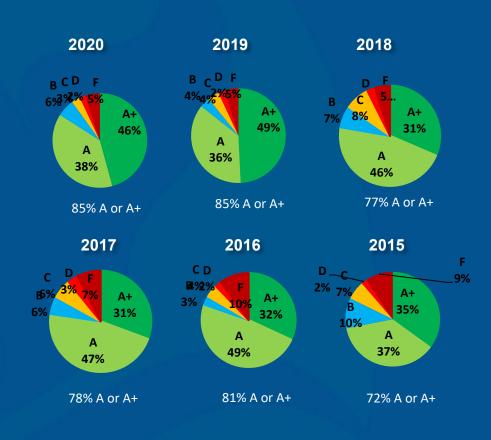






Corporate Responsibility Grades by Vessel (173)









Is the Program Effective?





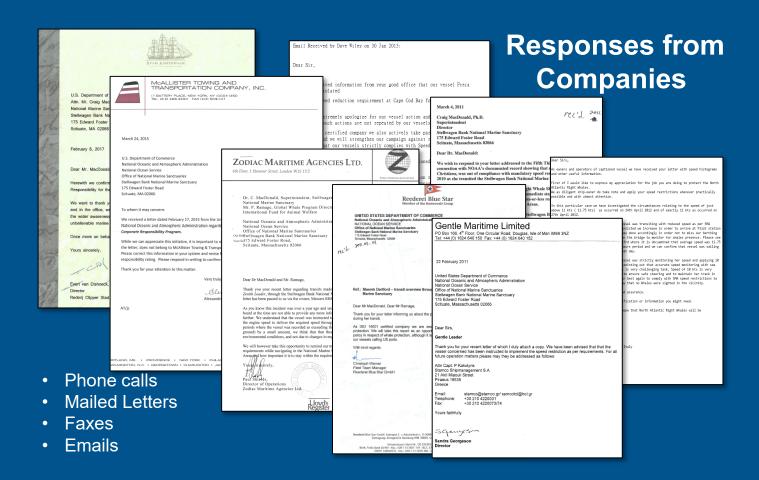












Greater Atlantic Regional Fisheries Office Stellwagen Bank National Marine Sanctuary









Herewith we confirm good receipt of your letter and the attached "Certificate of Corporate Responsibility for the protection of the North Atlantic right Whale through Compliance".

We want to thank you for this certification, we are very proud on this recognition onboard and in the office, we will where possible publish this achievement in order to support the the wider awareness of this important responsibility towards these fantastic and unbelievable marine species.

As owners and operators of captioned vessel we have received your letter with speed histograms and other useful information.

First of I would like to express my appreciation for the job you are doing to protect the North Atlantic Right Whales.

We as diligent ship-owner do take note and apply your speed restrictions whenever practically possible and with utmost attention.

In this particular case we have investigated the circumstances relating to the speed of just above 11 kts (11.75 kts) as occurred on

the wider

unbelieva









We wish to respond to your letter addressed to the connection with NOAA's documented record showing that our vessel, was out of compliance with mandatory speed restrictions on as she transited the Stellwagen Bank National Marine Sanctuary.

Rule at the time of her transit. We are taking immediate steps to make sure that mariners are well-informed of the 10- knots-or-less restrictions on Cape Cod Bay and Off Race Point Seasonal Management Areas.

Voluntary speed reduction requirement at Cape Cod Bay for short period of time.

In this we extremely apologize for our vessel action and we will endeavor and ensure that such actions are not repeated by our vessels in this future.

As ISO 14001 certified company we also actively take part in environment protection and we will strengthen our campaign against right whale protection and ensure that our vessels strictly complies with Speed reduction requirement.

In this regard we have already forwarded below mentioned message to all vessels in the fleet.

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IVER SHIPS

Iver Ships committed to whale protection

Iver Ships' six product tankers call at the US port of Boston many times a year. During the whale season, from 1 January to 15 May, they participate in a scheme of speed restrictions for Boston calls, requested by the National Oceanic and Atmospheric Administration (NOAA).

Whales passing through the Stellwagen Bank sanctuary during this period each year to feed are vulnerable to being struck by vessels. Right whales are particularly vulnerable to a ship strike, as they skim the surface of the water with open mouths. In 2008, NOAA, the agency in charge of protecting right whales in US waters, began

requesting large ships to slow down to 10 knots or less while passing through right whale seasonal areas. Some of these areas include the Stellwagen Bank National Marine Sanctuary, a critical seasonal feeding area for right, humpback, fin and mink whales. If ships slow down, any collision they may have with a whale has a smaller chance of being fatal.

In 2010, NOAA, the Massachusetts
Port Authority and the International
Fund for Animal Welfare launched the
Right Whale Corporate Responsibility
Project. The US Coast Guard (USCG)
provides information that tracks
each individual ship and its speed
while passing through seasonal

management areas. The USCG Responsibility Project team uses these data to generate report cards on compliance with speed limits that are then sent to the shipping companies, including Iver Ships.

In 2019, five of our product tankers called at Boston during the whale season and all received the Grade A Certificate for fully complying to the speed restrictions.

We are proud of our masters and crews for their adherence to the restrictions and contributions to the protection of this great animal. Well done!



U.S. DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administra National Marine Sanctuary Program Stellwagen Bank National Marine Sanctuary 175 Edward Foster Rd. Scituate, MA 02066 (781) 546-6004 FAX: (781) 545-8036

Vroon B.V. P.O. Box 6400 4802 HK Breda

Dave Venon B V

Your vessel(s) were monitored transiting the National Oceanie and Atmospheric Administration's (NOAA) Stellwage Bank National Marine Sancharay, profitors of which overlap the Cape Cod Bay and/or Off Race Point Seasonal Management Areas. These Seasonal Management Areas (SMA) were promulgated under NOAA's Flant Rule 1 on Implement Speed Retrictions to Reduce the Threat of Ship Collisions With North Adantic Right Whales (published 10/10/2008, FFR60/17s) and are designed to reduce the Richhood of deaths and serious injuries to these endangered whale that result from collisions with about 10 to 10

Mandatory speed restrictions of 10 knots or less are required in the Cape Cod SMA (Jm 1-May 15, annually) and the Off Race Foint SMA (Mar 1-Apr 30, annually). Mariters are advised to refer to Coast Plott 1 for information on these restrictions and to other states of the for roducing ship strikes. As a counter of the control of the control of the country that are also required to dother by the Right with the Cape Company of the Cape Company o

We at Stellwagen Bank National Marine Sanctuary and the International Fund for Animal Walfare believe that the specific information contained in this mailing will be helpful to you as you navigate these waters, which are heavily populated with endangered whales. We hope your innoveledge of this rule in conjunction with the information contained herein will increase overall compliance rates and reduce letals ship strikes. As part of this lettery row will find a map and summary of your vessel's transits of the SMAs within the sanctuary in 2019. Data were derived from the United States Coast Guard's Automatic Identification System, (16).





Product tanker fleet





Follow the link fo more information about Right Whale Corporate Responsibility Project





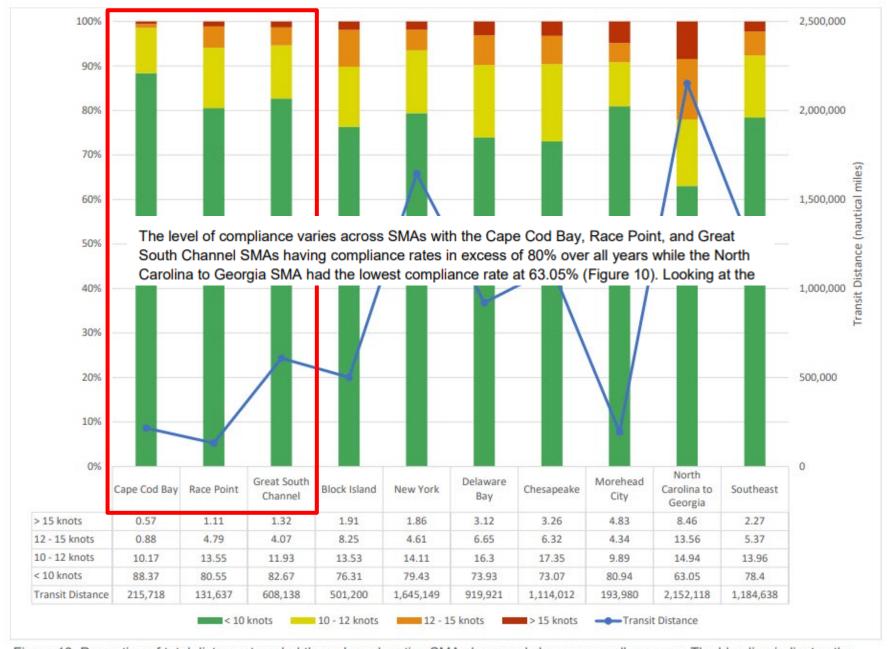


Figure 10. Proportion of total distance traveled through each active SMAs by speed class across all seasons. The blue line indicates the total distance transited in each SMA. From: National Marine Fisheries Service. 2020. North Atlantic Right Whale (Eubalaena glacialis) Vessel Speed Rule Assessment. National Marine Fisheries Service, Office of Protected Resources, Silver Spring, MD.





Cape Cod Bay and Off Race Point SMAs had the lowest level of non-compliance of all SMAs



Mariah Pfleger, Patrick Mustain, Marla Valentine, Emma Gee, Whitney Webber, and Brianna Fenty (2021) Speeding Toward Extinction: VESSEL STRIKES THREATEN NORTH ATLANTIC RIGHT WHALES. Oceana. DOI: 10.5281/zenodo.5120727





Recognizing Deserving Companies







Whale Alert: A Free Mariner's Tool to Reduce Collisions between Whales and Ships





Whale Alert: A Free Tool for Citizen Science





What is Whale Alert?

Whale Alert is a free mobile app for IOS and Android smart phones and tablets

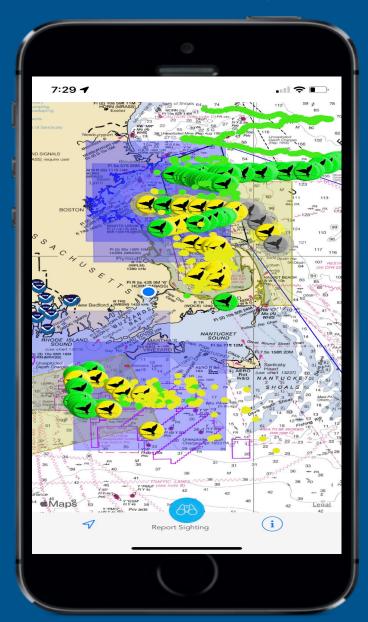
Provides one-stop information for mariners and visualizes it on nautical charts familiar to industry



Download at WhaleAlert.org







Where have right whales been seen/detected In New England on 3/14/22 and what management measures are in place for mariners?

Special thanks to NEFSC for contacting WA citizen science contributors to confirm sightings.







Where have right whales been seen or detected along the eastern seaboard on 3/14/22?

Where are right whales today?

Sightings contributed by: WA Citizen Science, M. Baumgartner (gliders; WHOI), T. Cole (NEFSC), M. Zanni (NEAq), A.James (CCS), J. Jakush (FFWC), M. White (CMARI).

Special thanks to Hansen Johnson (Dalhousie) &Tim Cole (NEFSC) for including WA in an MOA with DFO to show Canadian sighting on WA.





Using Dimethyl sulfide (DMS) to Forecast Site Occupancy by North Atlantic Right Whales

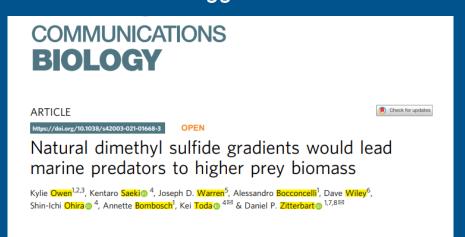
Collaborators: Dan Zitterbart (WHOI); Joe Warren (SUNY Stoneybrook); S. Mayo (CCS)





What is DMS and why could it be used to predict right whale occurrence?

DMS is a gas released in measurable quantities when zooplankton (e.g., Calanus copepods) eat phytoplankton. Therefore it could identify where and when right whales would aggerate to feed.



Meyer et al. 2020. Ocean regime shift is driving collapse of the North Atlantic Right Whale population. Oceanography Vol 34.

"Anticipating that similar processes will continue to unfold in the future, federal agencies in Canada and the United States will need to adopt more dynamic management plans, ones that utilize continuous monitoring of relevant ocean conditions and whale sightings to inform models that can forecast right whale habitat use."





DMS concentration (circles and numbers) and NARW sightings (crosses) during our April 2021 CCB experiment on R/V Auk. Black crosses are sightings from the R/V Auk and red crosses are sightings provided by CCS aerial survey team.





Future DMS Research:

CCB 2022; Funding – NMFS/NEFSC, IFAW, Volgenau Foundation Repeated 2021; added:

RHIB-bases focal follows of right whales to add behavioral context to sightings (e.g., feeding vs travel); measure of DMS along immediate track of whales; Continue - CCS collaboration for aerial survey sightings

Results: Pending

Dreamed:

Map DMS and NARW sightings throughout the CCB NARW season (Feb. May) to establish thresholds for arrival and departure using R/V Auk;

Autonomous surface vehicle with long endurance to allow for continuous low-cost CCB DMS mapping to identify thresholds; Develop remote sensing capabilities for DMS





Relevance to Management

Predictive modeling to provide advance notice of impending NARW arrival or departure provides managers with the ability to plan. PAM and aerial surveillance are reactive;

Wind Energy – site operators can plan for changes to more benign activities or begin planning for orderly and economically controlled reduction or ramp up in effort;

Whale Strike – port operators can plan for initiating or curtailing risk reduction measures;

Entanglement – managers can inform fisherman and response personnel of elevating or diminishing risk and modify risk reduction measures.