

Metocean and Wildlife Surveys, Reporting, and Visualization



Metocean and Biological Buoys Platforms of Opportunity

Understanding meteorological and oceanographic (metocean) conditions is essential to the operational design and development of an offshore wind project. Equally critical is biological monitoring to inform where and when operations are potentially in conflict with local wildlife populations. Combining accurate wind resource data with detailed patterns of biological activity enables the developer to maximize power generation while minimizing impacts to wildlife.

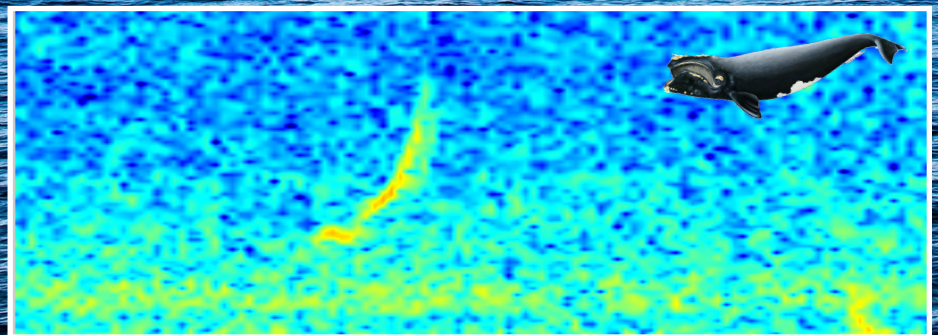
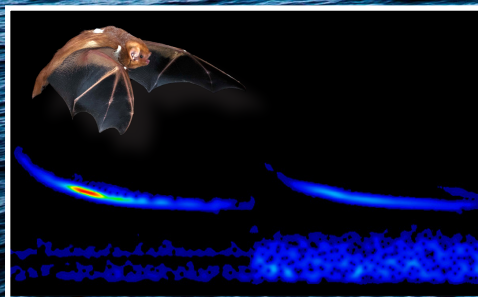
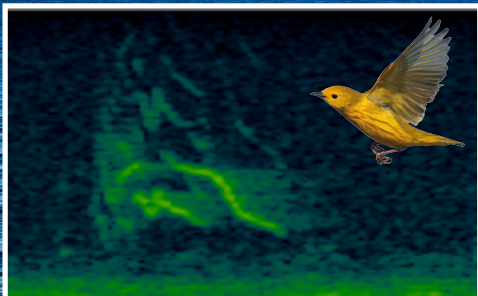
To help offshore wind developers achieve maximum productivity with minimal environmental impact, Ocean Tech Services LLC (Ocean Tech) and Normandeau Associates Inc. (Normandeau) have teamed up to offer buoy-based metocean and wildlife surveys to facilitate successful permitting of offshore wind farms in the U.S. and overseas. Buoys are custom-designed for simultaneous metocean and biological monitoring. Using calibrated sensors and proven remote communications, we deliver the highest quality data, analysis, results, and system reliability to our clients so they can make informed decisions regarding project design, construction, operations, and maintenance activities.

Our approach is to work with you to develop a cost-effective, clearly defined study design and sampling strategy based on the unique needs of your project.

Floating LiDAR and traditional weather buoys are used by Ocean Tech–Normandeau to host atmospheric, oceanographic, and biological sensor systems. Each buoy is custom-fitted with the sensor packages required by customers for a specific project area. A **full suite of environmental and biological data collection** is offered through additional sensor packages deployed on the buoy or sea bed. We collect data day and night, above and below the ocean's surface.

In addition to metocean systems, optional sensors include:

- ⚠ **VHF antennas and receivers (MOTUS/Lotek/CTT)** to provide species-specific information from tagged birds and bats. In collaboration with FWS, this technology provides data on tagged endangered species including Red Knot, Piping Plover, and Roseate Tern.
- ⚠ **Bird Acoustic Sensors** to record diurnal and nocturnal bird calls 24/7, filling data gaps for spring and fall migrant passerines and shorebirds, including threatened and endangered species.
- ⚠ **Bat Ultrasonic Sensors** to record calls of bats active in the area.
- ⚠ **Underwater Hydrophones** to record vocalizations of marine mammals including baleen whales.
- ⚠ **Receivers** to record species-specific information on tagged fishes.
- ⚠ **Sensors** to record waves and currents.
- ⚠ **Sensors** to record salinity, temperature, and water-level.



Solid, Reliable Results to Inform Your Decisions

Data and Reporting Accessibility

Remote Marine and Onshore Technology (ReMOTE) is Normandeau's secure data portal (ReMOTE, normandeau.com) providing the ability to access, analyze, and visualize a variety of species information on a secure, user-friendly platform.

Data Types

Initially developed for Normandeau's bat acoustic studies and our high-resolution aerial imaging data, ReMOTE is also suitable for species data collected by other methods, including visual and acoustic data collected via commercial or client-specific methods. All data are stored at our secure data management center.

Access

Access to data through ReMOTE is project-specific. Data access can be public, restricted, or a combination of both depending on client needs. Data visualizations and outputs are customizable depending on client needs.

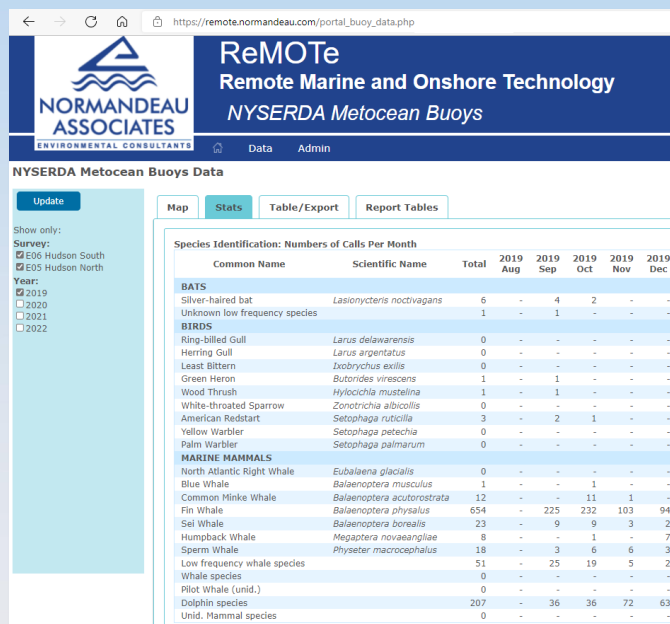
Analyze

As data are reviewed and processed, ReMOTE records all changes made by each analyst, thus ensuring total traceability and allowing easy and

transparent tracking of progress and quality control. Identifications and data analyses are updated in real time as completed, making project tracking easy for both client and collaborators.

Visualize

Data and metadata are displayed in the most appropriate format for the project purpose and type of data collected. Georeferenced image data may be displayed on an interactive map with associated species identifications, metadata, and tabular reports available at the click of a mouse.

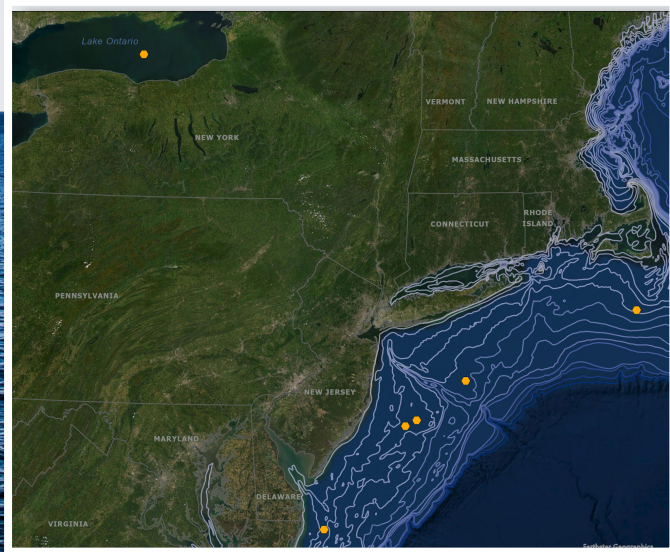


The screenshot shows the ReMOTE web portal interface. The header includes the Normandeau Associates logo and the text 'ReMOTE Remote Marine and Onshore Technology NYSEDA Metocean Buoys'. Below the header, there are tabs for 'Map', 'Stats', 'Table/Export', and 'Report Tables'. The 'Stats' tab is selected, displaying a table of species identification data. The table has columns for 'Common Name', 'Scientific Name', 'Total', and months from '2019 Aug' to '2019 Dec'. The data is categorized by 'BATS', 'BIRDS', and 'MARINE MAMMALS'.

Common Name	Scientific Name	Total	2019 Aug	2019 Sep	2019 Oct	2019 Nov	2019 Dec
BATS							
Silver-haired bat	<i>Lasiurus noctivagus</i>	6	-	4	2	-	-
Unknown low frequency species		1	-	1	-	-	-
BIRDS							
Ring-billed Gull	<i>Larus delawarensis</i>	0	-	-	-	-	-
Herring Gull	<i>Larus argentatus</i>	0	-	-	-	-	-
Least Bittern	<i>Ixobrychus exilis</i>	0	-	-	-	-	-
Green Heron	<i>Butorides virescens</i>	1	-	1	-	-	-
Wood Thrush	<i>Hylocichia ustulata</i>	1	-	1	-	-	-
White-throated Sparrow	<i>Zonotrichia albicollis</i>	0	-	-	-	-	-
American Redstart	<i>Setophaga ruticilla</i>	3	-	2	1	-	-
Yellow Warbler	<i>Setophaga petechia</i>	0	-	-	-	-	-
Palm Warbler	<i>Setophaga palmarum</i>	0	-	-	-	-	-
MARINE MAMMALS							
North Atlantic Right Whale	<i>Eubalaena glacialis</i>	0	-	-	-	-	-
Blue Whale	<i>Balaenoptera musculus</i>	1	-	-	1	-	-
Common Humpback Whale	<i>Balaenoptera acutorostrata</i>	12	-	-	11	1	-
Fin Whale	<i>Balaenoptera physalus</i>	654	-	225	232	103	94
Sei Whale	<i>Balaenoptera borealis</i>	23	-	9	9	3	2
Humpback Whale	<i>Megaptera novaeangliae</i>	8	-	-	1	-	7
Sperm Whale	<i>Physeter macrocephalus</i>	18	-	3	6	6	3
Low frequency whale species		51	-	25	19	5	2
Whale species		0	-	-	-	-	-
Pilot Whale (unid.)		0	-	-	-	-	-
Dolphin species		207	-	36	36	72	63
Unid. Mammal species		0	-	-	-	-	-

Advantages of Metocean Data

Adding a suite of biological sensors to a metocean buoy provides data sets that may be correlated with environmental data characterizing site-specific conditions during the life of the project. An understanding of wind, air temperature, water temperature, waves, currents, and other variables is often valuable for better understanding and interpreting the presence and behavior of wildlife across seasons.



remote.normandeau.com

Who We Are

Ocean Tech Services LLC was formed in 2007 to address the need for specialized services and support in the marine monitoring and offshore operations industry. Ocean Tech customers include marine contractors, offshore wind developers, port and harbor managers, government agencies, and research institutions. With decades of experience designing and executing offshore marine projects around the world, Ocean Tech has a solid reputation for delivering quality performance and results and building long-lasting professional relationships with customers. Ocean Tech is a leading provider of buoy-based data collection solutions, with each system individually selected and configured according to location and purpose. Our experienced personnel provide complete turn-key services for sampling strategies, mooring design, installation, maintenance, and daily system-health monitoring.

Normandeau Associates, Inc., is a highly regarded environmental consultancy offer-

ing innovative solutions and technologies for answering biological questions in all environments. Recognized as a national leader in providing science-based environmental consulting services, research, and technological innovation across a biological spectrum, Normandeau's specialized technical expertise for offshore wind developments includes extensive experience with remote sensing using high-resolution aerial photography along with bird, bat, and marine mammal acoustics; thermographic imagery; and VHF/MOTUS receivers and antennas deployed on offshore platforms, buoys, and offshore wind turbines. Our team of scientists and acousticians is highly skilled in species identifications, including those with cryptic acoustic frequencies that may be easily overlooked.

The Ocean Tech–Normandeau team combines advanced technological approaches with scientific integrity and regulatory experience, providing you with a new standard for gathering offshore wildlife data in North America.



Services

The **Ocean Tech–Normandeau** team can undertake specific parts of an environmental project or handle the entire work package from beginning to end. Your project will have access to scientific specialists, making the **Ocean Tech–Normandeau** team the best choice for a variety of existing and new scientific studies.



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