Stakeholder Workshop:
Framework for Offshore Motus Data

Workshop Summary
November 29, 2021

Prepared by:
Edward Jenkins, Biodiversity Research Institute
Kate Williams, Biodiversity Research Institute
Pam Loring, U.S. Fish & Wildlife Service
Stuart Mackenzie, Birds Canada
Lucas Berrigan, Birds Canada

Disclaimer

Funding for this report was provided by the New York State Energy Research and Development Authority (hereafter "NYSERDA") with additional support from the U.S Fish and Wildlife Service Migratory Bird Program. The views and opinions expressed herein do not necessarily state or reflect those of the United States government or any agency thereof, nor NYSERDA or any state government or agency thereof. In addition, the views and opinions expressed herein do not necessarily represent the views of all workshop participants, Biodiversity Research Institute, or U.S. Fish & Wildlife Service. Further, NYSERDA, the State of New York, and the contractors by which this report was prepared make no warranties or representations, expressed or implied, as to the fitness for particular purpose or merchantability of any product, apparatus, or service, or the usefulness, completeness, or accuracy of any processes, methods, or other information contained, described, disclosed, or referred to in this report.

Additional Information

This workshop is part of a broader effort among U.S. Fish & Wildlife Service Migratory Bird Program, Biodiversity Research Institute, University of Rhode Island, and Birds Canada to develop standardized protocols for using coordinated radio telemetry to monitor birds and bats in offshore environments. A pdf of presentations from the workshop and more information on the project are available at https://briwildlife.org/offshore-motus-guidance/.

Preferred Citation

Background

There are information gaps on the offshore movements of volant (i.e. flying) wildlife due to technological limitations and logistical challenges of offshore monitoring. The study "Development of Monitoring Protocols for Automated Radio Telemetry Studies at Offshore Wind Farms," funded by NYSERDA in 2019, is developing standardized guidance to inform the use of coordinated radio telemetry to monitor individual movements of volant wildlife in order to quantify species-specific exposure to offshore wind energy development at site specific and regional scales. Use of automated radio telemetry will build off the Motus Wildlife Tracking System[1], an international network of receiving stations ('Motus stations') and studies using digitally-coded radio transmitters ('Motus tags') operating on shared frequencies. Detailed protocols will enable the offshore wind industry to use standardized approaches to monitor a wide range of avian and bat taxa, including threatened and endangered species, and improve our understanding of how these species use offshore environments. The team of collaborators involved in this project include: Pamela Loring and Scott Johnston from U.S. Fish & Wildlife Service; Kate Williams, Andrew Gilbert, Evan Adams, Julia Gulka, and Edward Jenkins from the Biodiversity Research Institute; Peter Paton, Doug Gobeille, Erik Carlson, and Rob Deluca from the University of Rhode Island; and Stuart Mackenzie and Lucas Berrigan from Birds Canada. The project is funded by the New York Energy Research and Development Authority and overseen by project managers Kate McClellan Press and Greg Lampman.

The overall aims of the project are to develop standardized protocols for study design, monitoring methodologies, and data coordination in the U.S. Atlantic for implementation of automated radio telemetry in pre- and post-construction monitoring at offshore wind projects. Project components include:
- Monitoring framework – strategic framework and guide for using Motus technology to monitor wildlife in relation to offshore wind energy development;
- Guidance document – detailed guidance for setting up and operating Motus stations on offshore wind turbines and buoys;
- Online study design tool – interactive tool to help arrange arrays of Motus stations to optimize site-specific study designs at offshore wind projects and map detection coverage of offshore receiving stations;
- Simulation study – modeling study using animal movement data to inform estimates of detection and uncertainty using Motus technology;
- Motus Data Framework (*focus of this workshop*) – centralized framework and portal to coordinate data from the Motus Wildlife Tracking System from all birds and bats detected by stations on offshore wind turbines, monitoring buoys, and receiving towers along the Atlantic coast and Outer Continental Shelf (OCS;).

The above components are being developed with strong input from stakeholders via a series of workshops with offshore wind developers, environmental non-governmental organizations (eNGOs), regulators, resource managers, and researchers with expertise using the Motus Wildlife Tracking System and other technologies. Strong stakeholder guidance is key in providing the best possible protocols to end-users.

Workshop Summary

This workshop was held virtually on November 29, 2021 and included 72 participants (Appendix A). Workshop objectives included: 1) introducing the Offshore Motus Data Framework document; 2)

---

[1] https://motus.org/

obtaining initial feedback from stakeholders on the Motus Wildlife Tracking System's Atlantic Offshore Wind Group and data explorer portal, including a draft online tool for exploration of Motus summary data and draft designs for static and dynamic reporting; and 3) discussing opportunities for further engagement with the NYSERDA-funded guidance develop effort. See Appendix B for workshop agenda.

The Atlantic Offshore Wind Portal was renamed following this workshop to the Atlantic Offshore Wind Group; it is referred to by the latter name throughout the remainder of this report.

Overview of Offshore Motus Data Framework

Three project collaborators introduced the offshore Motus guidance project and specific aspects of the Offshore Motus Data Framework. First, Pamela Loring (U.S. Fish & Wildlife Service) introduced the overall project. Stuart Mackenzie (Birds Canada) briefly summarized the Motus Wildlife Tracking System and introduced the Offshore Motus Data Framework and its three objectives:

1) Develop the Atlantic Offshore Wind Group (AOWG) within Motus to coordinate information among projects collecting data for offshore wind applications in the U.S. Atlantic. The goals of the AOWG are to:
   a. Act as a collaboration platform and data hub for offshore wind monitoring projects;
   b. Ensure open and robust data access, storage, and standardization;
   c. Provide summary-level reports of information needed to support offshore wind assessments at site specific and regional scales; and
   d. Coordinate timely access to detailed data from offshore wind monitoring projects for use in research and monitoring efforts.
2) Establish minimum standards and centralized data management for various types of data within the AOWG, including: station metadata, calibration data, tag metadata, tag detection data, station health data and station maintenance data; and
3) Develop a framework for automated report generation to provide standardized, transparent, and timely summary-level information for offshore wind research and monitoring efforts.

Lucas Berrigan (Birds Canada) demonstrated the Motus data explorer portal, including dynamic and static automated reporting tools, for accessing summary-level information from the Motus Wildlife Tracking System. Examples of several draft report formats were also shared with the workshop attendees prior to the meeting.

Q&A and Discussion

There was an informative group Q&A and discussion about the AOWG and data explorer portal, covering topics ranging from data filtering to details about processing data. Key discussion areas included:

- **Data processing** – Data in the public tool are not raw. They go through a filtering process to remove most errors, and information on this process is available to all users.
- **Appropriate use of public summary data** – Though summary-level data provided via the public data explorer tool are filtered (above), these data should not be used for detailed analysis or publication. For these purposes, full raw data should be used and the filtering process should be examined to manually add/remove points as needed. Therefore, thorough analysis requires collaboration with the PIs from projects of interest.
- **Filtering data** – A modular approach to searching for data using various different filters means that users have a lot of flexibility when looking for, and combining, specific data needs. For

4

example, filtering for geographic specificity can be done by country, state, province, region, or area using a user-made polygon.

- **Creating groups** – Users cannot make Groups themselves (such as the AOWG), as they are an administrative tool that must be created by Birds Canada. However, grouping data for summarization purposes can be done within the currently available online tools without creating an official Group.
- **Features in development** – several aspects of the data explorer tool will be developed over time. Specific items mentioned during discussion include:
  - **Aesthetics** – Visuals including graphics and banners will be improved over time. The current priority of the development team is functionality.
  - **Species groupings** – Grouping species (all those that are federally endangered for example) is a feature that is in development.
  - **Receiver summary data** – This is a feature planned for the future.
- **Visualization of tracks** –Tracks are interpolated between stations and are not known movement routes. Disclaimer language must make it clear that interpolated tracks are provided for visualization purposes only.

Breakout Group Discussions

Workshop participants split into five breakout groups and were prompted to discuss six questions. Key takeaways from these discussions are outlined below.

Initial feedback? Did you find the reports easy to read and process? Did any of the aesthetic choices make it difficult for you to understand the report?

- Reports are intuitive and straightforward - an improvement on the current situation.
- Ability to create custom polygons to filter data was well received.
- Some recurring confusion on how to filter detections by project.

Who is the target audience for automated reporting in your organization?

- Students (summary data are well suited for students to work with).
- Public outreach and communications teams within NGOs and agencies.

What would you use the reports for?

- To review the siting of offshore wind and inform the permitting process.
- To share among partners to aid in establishing a network across multiple projects.
- In agency-level decision making (both stakeholder processes and internal data analyses).
- To show how an area (e.g., a FWS refuge) is used by different species across time.
- To demonstrate landscape connectivity and better understand the origins of migratory birds.
- To support outreach to property owners where research was conducted.
- Static reports are valuable for use in the field. They are also easy to include in other types of static reports (such as high-level deliverables). Dynamic reports are useful for data exploration and designing projects.

- Static reports should be a lower priority than dynamic reports for the development team but would still be useful in some contexts (see above).

What should be included in dynamic online reports versus the static pdf reports?

- Species-level static reports were suggested as being very useful.
- If all the information included in the example pdf (Kalamazoo) was also included in the dynamic report, then the dynamic version would be sufficient for most purposes (but the ability to covert the dynamic version to a static report would still be valuable).

Gaps/anything missing?

- Indication of whether the investigator has truthed their data.
- More information regarding station effort data such as an indication of whether stations were active at a certain time (e.g., downtime reports). As there is interest in using these data to inform important decisions, the ability to pair detection data with station effort data would be helpful.
- More information about the setup of specific stations including antenna information (e.g., number of elements, gain, bearing, height, beamwidth), and calibration status.
- Suggestion of inclusion of a "back" button on the map that would bring the user back to the same zoom level as before a station was selected.
- The ability to visualize all the stations in a geographic area, not just those part of a specific project group.
- The ability to select tracks that pass through a chosen area (acknowledging that the tracks are interpolated) to preliminarily assess possible habitat use in that area.
- While proxies such as antenna background noise and GPS hits are currently used to assess station uptime/downtime, there is no consensus on how to determine probability of detections. A gauge on the uncertainty of tag detection probability or station performance overall would be welcomed.
- More detailed information about tagged individuals such as 1) how fast they travelled; 2) where they travelled to; and 3) the route(s) they used to travel between stations. An estimation of average speed of movement between consecutive detections would be quite helpful, for example.

Would having access to public data tools incentivize summary-level data sharing?

- Access to public data tools would likely help from the developer's point of view.
- This would be the 'biggest bang for buck' collectively.
- Similar conversations are happening in state agencies (around fisheries, benthos, etc.)
- Some workshop attendees suggested that offshore wind developers may have potential data sharing concerns (though they have not heard of such to date), and that a 2-3 year embargo on full (e.g., raw) data may be beneficial.
- A sliding scale for the embargo period for full data could be a consideration? E.g., allow embargo to be longer for privately funded than for publicly funded data.

Other feedback

- Requested ability to integrate with other data portals (e.g., the Northeast Ocean Data Portal).
- A Standard Operating Procedure (SOP) for standardizing the data exploration process and gathering the best information should be included in the Motus Data Framework document.

- Interest in an application for mobile devices.

Next Steps

The next steps for development of the Offshore Motus Data Framework and AOWG are to incorporate stakeholder input from this workshop and continue development of both products. There will be opportunities to submit more detailed feedback in spring 2022.

Project Timeline

This was the third stakeholder workshop in 2021; the first two focused on guidance for deploying radio telemetry stations on offshore wind turbines and buoys, and the development of an online study design tool for offshore automated radio telemetry. Planned upcoming workshops will focus on monitoring frameworks (winter 2022) and calibration methods (spring 2022), with draft final products expected in fall 2022. However, interim products are available for stakeholders to review and contribute to upon request by emailing pamela_loring@fws.gov.

Appendix A: Workshop Participants

Workshop participants are listed in alphabetical order by first name.

Name	Affiliation
Alexandra Anderson	Trent University
Andrew Gilbert	Biodiversity Research Institute
Aonghais Cook	British Trust for Ornithology
Brita Woeck	Ørsted
Caleb Spiegel	U.S. Fish & Wildlife Service
Carmen Johnson	North Carolina Wildlife Resources Commission
Cheryl Horton	U.S. Geological Survey
Cris Hein	National Renewable Energy Laboratory
David Bigger	Bureau of Ocean Energy Management
David La Puma	Cellular Tracking Technologies
David Mizrahi	New Jersey Audubon
David Pereksta	Bureau of Ocean Energy Management
David Wiley	National Oceanic and Atmospheric Administration
Derek Hengstenberg	Tetra Tech
Donald Solick	Vesper Bat Detection Services
Doug Gobeille	University of Rhode Island
Ed Jenkins	Biodiversity Research Institute
Elijah Lee	Ohio University
Emily Argo	U.S. Fish & Wildlife Service
Emily Heiser	New Jersey Dept. of Environmental Protection
Emily Shumchenia	Regional Wildlife Science Entity
Emma Kelsey	U.S. Geological Survey
Erik Carlson	University of Rhode Island
Erik Johnson	National Audubon Society
Evan Adams	Biodiversity Research Institute
Greg Forcey	Normandeau Associates
Hannah Oermann	GE Renewable Energy
Hayden Whitbread	Pacific Northwest National Laboratory
Holly Goyert	CSS Inc. on contract to NOAA
Holly Niederriter	Delaware Fish and Wildlife
Jennifer Stucker	WEST Inc.
Jennifer Wehof	Ocean Tech Services, LLC
Joan Walsh	Mass Audubon
Josh Adams	U.S. Geological Survey
Julia Robinson-Willmott	Normandeau Associates
Jun Lu	Pacific Northwest National Laboratory
Kate Williams	Biodiversity Research Institute
Kathy Clark	New Jersey Department of Environmental Protection
Kelly Macleod	HiDef Aerial Surveying
Kevin Powers	Retired
Kim Peters	DNV GL
Kira Lawrence	New Jersey Board of Public Utilities
Kyle Hilberg	Atlantic Shores Offshore Wind

Name	Affiliation
Laney White	U.S. Geological Survey
Laura McKay	Virginia Department of Environmental Quality
Linda Welch	U.S. Fish & Wildlife Service
Lucas Berrigan	Birds Canada
Lucy Wright	Royal Society for the Protection of Birds
MacKenzie Hall	New Jersey Division of Fish & Wildlife
Margaret Rubega	University of Connecticut
Matt Robertson	Vineyard Wind
Meaghan McCormack	New York Natural Heritage Program
Michael Whitby	Bat Conservation International
Mike van den Tillaart	Lotek Telemetry
Pam Loring	U.S. Fish & Wildlife Service
Reneé Reilly	New Jersey Department of Environmental Protection
Rick Reynolds	Virginia Dept. of Wildlife Resources
Roberta Swift	U.S. Fish & Wildlife Service
Ruth Boettcher	Virginia Dept. of Wildlife Resources
Samantha Robinson	Delaware Division of Fish & Wildlife
Sander Lagerveld	Wageningen University
Sara Maxwell	University of Washington
Shari Matzner	Pacific Northwest National Laboratory
Shilo Felton	National Audubon Society
Stuart Mackenzie	Birds Canada
Susanna von Oettingen	U.S. Fish & Wildlife Service
Timothy White	Bureau of Ocean Energy Management
Tom Evans	Marine Scotland
Tracy Borneman	U.S. Fish & Wildlife Service
Wendy Walsh	U.S. Fish & Wildlife Service
Wing Goodale	Biodiversity Research Institute
Zak Poulton	The Nature Conservancy

Appendix B: Workshop Agenda

Offshore Motus Framework Workshop Agenda

Monday, 29 November 2021

1:00 – 3:00 PM (EST)

1:00-1:10   **Welcome and introductions**

1:10-1:40   **Motus presentation and demo**

- Overview of Motus and Offshore Motus Data Framework
- Demo of new online data exploration and reporting tools for summary Motus data, including for the Atlantic Offshore Wind Group

1:40-1:55   **Discussion/Q&A**

1:55-2:10   **Short break and opportunity to explore the web platform**

2:10-2:40   **Breakout groups to provide feedback on automated report options (static PDF report, dynamic html report, and data explorer portal)**

- *Audience and utility*
    - What would you use each of these reports for (static PDF report, dynamic html report, data explorer portal)?
    - Who is the target audience for automated reporting in your organization?
    - Would having access to public data tools incentivize summary-level data sharing among Motus users?
- *Format and components*
    - What should be included in dynamic online reports versus the static pdf reports?
    - Is any information missing that should be incorporated into reports?

2:40-2:55   **Report-out and further discussion with full group**

2:55-3:00   **Next steps**