

Acoustic Telemetry Data Management & Storage Recommended Practices



Regional Wildlife Science Collaborative for Offshore Wind

Responsible Offshore Science Alliance

Version 1.0

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Introduction

This document was compiled by RWSC and Responsible Offshore Science Alliance (ROSA) staff at the request of the Protected Fish Species and Sea Turtle Subcommittees, and in collaboration with the Atlantic Cooperative Telemetry Network (ACT), the Smithsonian Environmental Research Center (SERC), and NOAA Fisheries.

This is a living document that will be updated by the Subcommittee as practices and technologies advance.

This document is also responsive to the needs and priorities articulated in the [RWSC Science Plan](#), [ROSA Offshore Wind Project Monitoring Framework and Guidelines](#), and several workshops and expert working group proceedings, including:

- [RWSC Acoustic Telemetry Workshop](#), February 15, 2024, virtual
- [ACT Network Meeting and Offshore Wind Workshop](#), June 3-6, 2024 in New Haven, CT
- [NOAA Fisheries Draft Federal Survey Mitigation Plans](#)
 - Coastal Shark Bottom Longline Survey Mitigation Plan
 - Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Survey Mitigation Plan
 - Passive Acoustic Monitoring Survey Mitigation Plan (for acoustic telemetry receivers co-located with hydrophones)
- [ROSA Report and Recommendations on Fisheries Resource Data Production, Storage, and Accessibility](#)

The purpose of this document is to address the data collection, management, and storage phases of an acoustic telemetry project to ensure that while numerous individual entities may be deploying, collecting, and analyzing telemetry data as part of an offshore wind project's required fisheries or protected species monitoring plan or voluntary research, the infrastructure and information exists to facilitate future meta-analyses and syntheses of telemetry data across the U.S. Atlantic Outer Continental Shelf (OCS).

This document supports a peer-reviewed publication, *in preparation*, led by Beth Bowers and Matt Ogburn, SERC/ACT. The draft manuscript, "Best practices for acoustic telemetry applications to offshore wind impact assessment" will provide recommendations for acoustic telemetry applied to the offshore wind community with respect to impact monitoring for offshore wind effects or contributions to the [NOAA Fisheries and BOEM Federal Survey Mitigation Implementation Strategy](#). The paper will describe data management and governance best practices, the scientific questions that can be answered using acoustic telemetry alone or in concert with other data and technologies, key considerations for study designs, challenges associated with acoustic telemetry such as gear loss and data retrieval, and common practices that are currently used in data cleansing and analyses.

This document is separated into three sections that correspond to a generic workflow for planning, deploying, and analyzing/interpreting acoustic telemetry data. Each section contains several detailed steps that were identified by ROSA and the RWSC Subcommittees.

1. Planning & Coordination Steps

Planning steps include pre-deployment coordination and communication best practices that help ensure that any new deployments are responsive to acoustic telemetry data gaps and needs in the region (to the extent practicable), and that individuals or entities responsible for deployments and data are connected to the existing network of experts and can benefit from lessons learned and other existing bodies of knowledge.

I. Engage with the RWSC Protected Fish Species or Sea Turtle Subcommittees and Responsible Offshore Science Alliance

Groups or individuals planning to deploy acoustic telemetry receivers and/or tag animals on the Atlantic OCS are encouraged to attend RWSC Subcommittee meetings to introduce their project, discuss their deployment plan with experts, and receive input on optimal location and other considerations (visit <https://rWSC.org/events> to view the Subcommittee meeting schedule).

II. Add acoustic telemetry instrument metadata to the RWSC Research Planning Map

In collaboration with ACT, ROSA and the Subcommittees are maintaining an understanding of acoustic telemetry receivers deployed on the Atlantic OCS and periodically updating maps that show current deployments on the [RWSC Research Planning Map](#).

The maps are developed from location and deployment information shared by principal investigators and ACT. The following best practices ensure that information about new and completed deployments is shared so that the maps maintain their accuracy and relevance.

Recommended Practices

Share any instrument metadata using the [template provided by ACT](#).

Send the completed Instrument Metadata form to admin@rWSC.org for inclusion in the Acoustic Telemetry Layer of the [RWSC Research Planning Map](#).

The Research Planning Map and regional ocean data portals (<https://www.northeastoceandata.org>, <https://portal.midatlanticocean.org>) also contain data products that may assist funders and researchers in selecting locations for receiver deployment. For example, the Research Planning Map and Portals contain data products representing monthly and annual vessel traffic for several classes of vessels; commercial fishing activity; offshore wind planning and leasing areas; and bathymetry and seafloor composition information. The Subcommittees encourages users to examine these data to inform acoustic telemetry receiver deployment site selection.

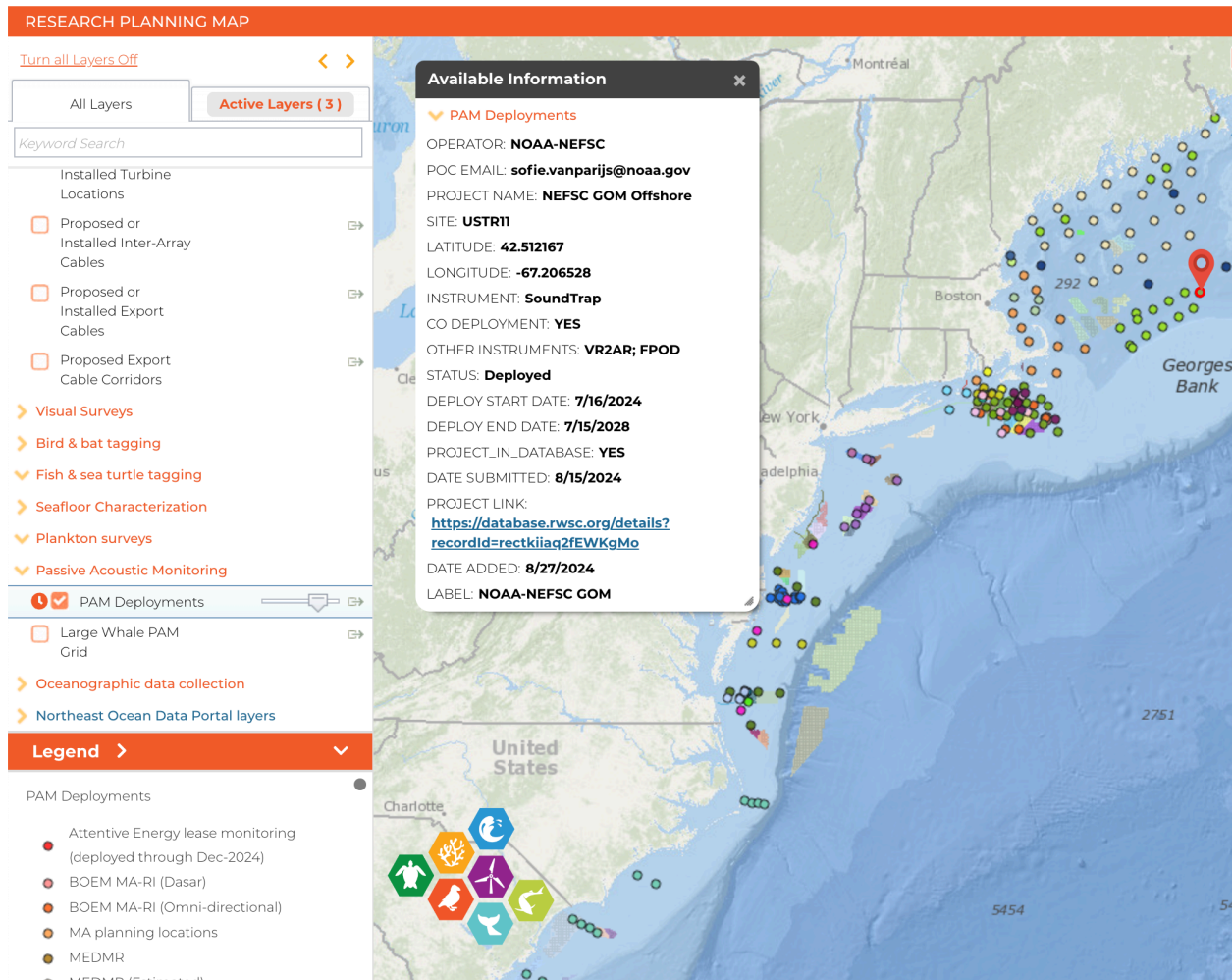
III. Codeployment of other sensors

Introducing new instruments and moorings into the environment presents an opportunity to co-locate other sensors and equipment. For example, several active and planned PAM deployments include support for acoustic telemetry receiver devices. This type of co-deployment builds the receiver network for studies of other taxa such as sea turtles and highly migratory fish species, and is strongly encouraged.

While the location of PAM instruments and moored PAM arrays may not represent ideal receiver locations needed to address research questions answered with acoustic telemetry for other taxa, RWSC and its partners encourage the deployment of multiple sensors per mooring, when practicable, while research questions and best practices for acoustic telemetry are under development. Regardless, acoustic telemetry receivers codeployed on PAM moorings provide additional insight into animal movement and behavior.

In August 2022, the RWSC Sea Turtle Subcommittee recommended that acoustic telemetry receivers be included on each new PAM deployment as the RWSC Marine Mammal Subcommittee considers the design and implementation of a regional PAM network. The Protected Fish Species Subcommittee then committed to working with the Marine Mammal Subcommittee to fully account for all codeployed acoustic telemetry receivers.

The locations of actively deployed PAM sensors on the Atlantic OCS can be viewed in the [RWSC Research Planning Map](#). Clicking on each point will open a popup box that indicates whether an acoustic telemetry receiver is codeployed with the PAM hydrophone. Once a standalone acoustic telemetry layer is also added to the map, the locations of codeployed PAM-acoustic telemetry instrumentation will overlap.



Map showing current passive acoustic monitoring (PAM) for baleen whales deployments in U.S. Atlantic waters. The highlighted instrument location north of Georges Bank shows a codeployed VR2AR (acoustic receiver) and FPOD (sensor to detect dolphin clicks). View an interactive version of this map: <https://rwsc.org/map/?link=c8XVYns3>.

IV. Participate in Regional Telemetry Networks and set project to "public"

Recommended Practices

Participate in the regional acoustic telemetry network for the study area (e.g., Atlantic Cooperative Telemetry Network (ACT), FACT Network, Ocean Tracking Network (OTN)).

Project data and metadata submitted to regional telemetry networks should be set to "public".

Participation involves submitting all completed data products and metadata forms ([templates provided by ACT](#)).

Visit the ACT Network's Data Portal, MATOS (<https://matos.asascience.com>), for the mid-Atlantic and Northeast U.S. or FACT (<https://secoora.org/fact>) for the Southeast U.S. for more information including User Agreements.

V. Navy awareness of acoustic telemetry receiver deployments on the Atlantic OCS

The purpose of the following steps is to ensure that the US Navy is aware of and can provide feedback on the precise location of bottom-mounted acoustic monitoring equipment on the Atlantic OCS. The Navy is requesting that all individuals consider the following steps prior to deployment. Developers may be subject to additional requirements under the BOEM issued permits.

Recommended Practice

RWSC periodically shares data from the Research Planning Map directly with Beth Levy, Program Coordinator for the US Navy's Ocean Observing Systems Situational Awareness Office (OOS SAO), so that the Navy may operate safely in the vicinity of deployed sensors.

Investigators may also email Beth Levy directly to share deployment plans for US Navy awareness: beth.m.levy2.ctr@us.navy.mil

2. Deployment & Data Collection

This document recognizes that deployment and data collection steps are likely specifically established by entities deploying instruments and collecting data; and in some case these procedures could be proprietary. The following steps outline minimum considerations for ensuring that data being collected by various entities around the region can eventually be collated and analyzed in the future to examine regional-scale questions or issues of interest.

VI. Calibration best practices and minimum specifications

[to be populated with content from *Bowers, et al. in prep*]

VII. Best practices for acoustic telemetry data QA/QC

[to be populated with content from *Bowers, et al. in prep*]

Regional acoustic telemetry networks provide data standardization and QA/QC services by acoustic telemetry data experts for all datasets in their network. This provides accuracy and consistency for researchers and analysts working with big datasets and saves time. This makes the data easier to use, and guarantees the data is stored somewhere other than a local drive, preventing accidental data loss. It also ensures that all data is standardized and analysis-ready. See the section on [Participation in Regional Telemetry Networks](#).

3. Analysis & Visualization

This section provides an overview of steps to ensure consistent analysis of acoustic telemetry data that enable the development and visualization of regional scale telemetry data products.

[to be populated with content from *Bowers, et al. in prep*]

4. Archiving & Access

Raw data, metadata, and citations that are submitted to an Ocean Tracking Network OTN compatible regional networks (i.e., ACT or FACT) can also be transferred to global databases such as the [Ocean Biodiversity Information System](#) (OBIS) and/or [NOAA's National Centers for Environmental Information](#) (NCEI) upon request.

Recommended Practice

Archive data products through NCEI, OBIS, and other permanent archives to maintain the integrity of the data through standardized product delivery and to make the data publicly discoverable.

[to be populated with content from *Bowers, et al. in prep*]
