

Extending the Passive Acoustic Open Data Initiative

Description

Passive acoustic monitoring of the ocean sound field is a critical aspect of NOAA's mandate for ocean and coastal data stewardship. Sound can travel vast distances underwater (e.g. across ocean basins) making passive acoustic monitoring a powerful observational tool that is used across NOAA to detect and characterize: (1) sounds produced and used by living marine resources (e.g., endangered marine mammals, commercially important fish species); (2) natural sources of noise from physical oceanographic processes; and (3) anthropogenic noise sources that contribute to the overall ocean noise environment. Passive acoustic data are used broadly across NOAA for a wide range of activities central to NOAA's mission including marine mammal stock assessments, monitoring of earthquake and geological activity, and assessing impacts of anthropogenic noise on marine life. The newly established Ocean Noise Reference Station Network, through a collaborative effort across NOAA's OAR, NMFS, and NOS offices with the National Park Service, is the first ever acoustic monitoring system deployed broadly throughout the US EEZ, and allows NOAA to collect consistent and comparable multi-year acoustic data sets covering all major regions of the U.S. NOAA's Ocean Noise Strategy's two flagship projects are the collection of these baseline noise data and the subsequent archival of those data. Towards that end, NMFS and collaborative partners are proactively seeking mechanisms to efficiently maintain and store passive acoustic data collected from this network in addition to the extensive data backlog present at each NMFS Fisheries Science Center.

The National Center for Environmental Information (NCEI) is uniquely positioned to assist NOAA in meeting these needs due to the in house expertise, already established partnerships with NMFS, and the ability to build upon previous work. In 2016, a one year BEDI project established the framework to receive and archive passive acoustic data from the Ocean Noise Reference Station Network. Two major outcomes of this project were 1) a data submission tool to facilitate the entry of metadata and the transfer of the resulting metadata records and raw acoustic data to NCEI for archival and 2) a web-based map viewer to allow the public to discover, query and access archived passive acoustic data. This dataset improvement proposal will address remaining challenges in the archival, discoverability, accessibility and usability of passive acoustic data. The basic framework for the data submission tool has been established but additional work is needed to ensure the system is robust and fully captures the inherent complexities of the broad range of acoustic datasets to be archived. As additional passive acoustic data are incorporated into the archive in the future, map viewer enhancements will facilitate the delivery of these data and the understanding of the data quality and content by incorporating product images, such as long-term spectrograms created for each deployment.

Work Breakdown Structure (WBS)

1. Harden the data submission software (Deadline: 1 Jan 2018)
 - a. Finalize the code underlying the submission software to address the full complexity of data collected using multiple channels and sampling regimes.
 - b. This work will be completed with an eye for handling platforms beyond moored stations (e.g., glider, towed array, and drifter).
2. Enhance delivery of requested data (Deadline: 1 Jan 2018)
 - a. Data requests created through the map viewer are currently filled using a time intensive, manual process. This task will identify and implement a more automated and efficient workflow.
 - b. The success of this improved delivery system is dependent on the development of underlying views of the passive acoustic database. This task is proposed with the assumption that NCEI maintains its current Oracle database structure.
3. Incorporate product images (Deadline: 1 Mar 2018)
 - a. Long-term spectrograms are being created for the Ocean Noise Reference Station Network data. To increase the public understanding of these data, we will incorporate the images into the map viewer.
 - b. A thumbnail will be visible in the Deployment Details window in the map viewer and will link to a higher resolution image.
4. Archive additional passive acoustic datasets (Deadline: 30 Jun 2018)
 - a. Ocean Noise Reference Station Network data along with NMFS backlogged data will be archived at NCEI as time and resources allow.
 - b. Following the methods developed in the 2016 BEDI project *Passive Acoustic Open Data Initiative*, ISO-compliant metadata records will be created and made discoverable in data.gov and noaa.data.gov; digital object identifiers will be assigned, and public access will be provided through the web-based map viewer.
5. Finalize map services (Deadline: 30 Jun 2018)
 - a. Enhancements to the map viewer will allow for increased efficiency as additional datasets and improved delivery methods are incorporated. This work will produce a robust system that can accommodate an increasing volume of data, display relevant deployment details and associated imagery, successfully query the backend database based on desired filter criteria, and allow for data requests to be filled efficiently.

Budget and Personnel

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Amount of funding requested

\$48,000

NOAA Accounting Code to receive funds transfer from NESDIS

NCEI Org code: 40-14

Financial POC for NOAA Accounting Code

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Grants, Contracts, or Cooperative Agreements that will be used to obligate the funds

Cooperative Institute for Research in Environmental Sciences (CIRES):
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