Title	Continued Support for the Animal Telemetry Network (ATN)
Administered by	Headquarters
BOEM Contact(s)	James Price (james.price@boem.gov)
Procurement Type(s)	Interagency agreement
Performance Period	FY 2020–2024
Date Revised	March 11, 2019
PICOC Summary	Write one or two sentences for each of the following elements, as appropriate.
Problem	Observations obtained through animal telemetry are often research-based and owned/operated independently by multiple agencies and institutions with limited to no connectivity. This impedes effective collaboration within the scientific community and prevents the full utilization of the data to serve scientific and resource managerial needs.
Intervention	To solve this problem, upon the recommendation of the U.S. Interagency Ocean Observation Committee (IOOC), the national ATN was created to improve the coordination and collaboration among research projects using animal telemetry, facilitate access to data, and motivate the creation of data-derived products of value to scientists and resource managers. The ATN continues to perform these roles.
Comparison	The alternative is telemetry observations made through many individual research activities with particular objectives but conducted largely without coordination with others, possibly supporting research projects and with data stored in many different forms and formats and at many different facilities.
Outcome	We expect: continued and enhanced collaboration over many research efforts; the further development of the Data Assembly Center as a common data collection point with standardization metadata documentation and interface with the National Oceanic & Atmospheric Administration's (NOAA's) National Centers for Environmental Information (NCEI) data archive; closer collaboration between hardware manufacturers and the users; and possibly bulk purchases of satellite tracking services at reduced costs.
Context	All U.S. and Canadian research activities using animal telemetry.

BOEM Information Need(s): Animal telemetry has greatly expanded our knowledge of habit use and migratory behavior of many species, including threatened or endangered species. With the advent of multi-sensor animal tags, ancillary environmental information can be obtained, such as temperature, salinity, pH, *etc.* as well as recorded animal vocalizations. These kinds of observations add important context for better understanding of the roles that potentially impacted animals play in marine ecosystems. This, in turn, improves BOEM's impact assessments and, perhaps, the formulation of mitigation strategies.

As with other biological data, the information gleaned from animal telemetry is acquired in increments of individual observational projects designed to answer specific research questions. The ATN facilitates collaboration, data sharing, data preservation, data access, re-analyses of "historic" data, cost reduction, and technological improvements

which in turn enhance the information return from present and future research using animal telemetry and, consequently, improves BOEM's impact analyses using these observations.

Background: The ATN was launched in 2016 with joint funding from BOEM, the Office of Naval Research (ONR), and the NOAA Integrated Ocean Observing System (IOOS) Office. It had been in preparation for a few years before that, with consultation with the IOOC and an *ad hoc* committee of government and university scientists experienced in the use of animal telemetry.

A top priority was outreach to the scientific community starting with the integrated ocean observing systems. The purpose was to build participation in the network, and the IOOS regional associations are natural partners. The ATN convened six workshops covering a total of nine U.S. IOOS regions: (1) Mid-Atlantic Regional Association for Coastal Ocean Observing System (MARACOOS), (2) Southeast Coastal Ocean Observing Regional Association (SECOORA) / Caribbean Regional Association for Coastal Ocean Observing (CARICOOS), (3) Alaska Ocean Observing System (AOOS), (4) Gulf of Mexico Coastal Ocean Observing System (GCOOS), (5) Pacific Islands Ocean Observing System (PacIOOS), and (6) Northwest Association of Networked Ocean Observing Systems (NANOOS) / Central & Northern California Ocean Observing System (CeNCOOS) / Southern California Coastal Ocean Observing System (SCCOOS). Workshops in the two remaining IOOS regions will be conducted in the spring and late fall of 2019. In all of these, the participating researchers were amenable to coordinate their observational programs and share data. Specific agreements were reached to:

1. identify and prioritize regional observational needs to meet the objectives of the wider community of scientists and Federal agencies with resource managerial responsibilities;

2. catalog the existing global telemetry observing assets and scientific capabilities;

3. document stakeholder use of telemetry data; and

4. identify data management challenges (*e.g.*, creating a central data repository for common data access), and showcase regional capabilities and tools with global linkages for data management, sharing and collaboration. Consider needs common to other regions, and discuss strategies for applied, collaborative research across geographies and disciplines.

In 2018, the ATN convened a joint meeting among the West Coast IOOS regional associations, SCCOOS, CeNCOOS, and NANOOS, the BOEM-co-funded Marine Biodiversity Observation Network (MBON), and the extensive Ocean Tracking Network home-based in Canada. The attendees examined the overlap in their respective missions and created a working group to establish regionally coordinated research and data sharing and to develop a vision and approach to implement a West Coast Biological Observing system which would complement the pieces already in place.

With SECOORA and MARACOOS, “data wrangler” (data manager) positions were created for the Florida Atlantic Coast Telemetry network (FACT), a component of SECOORA, and the Alliance for Coastal Technologies (ACT), a component of MARACOOS, to interface between telemetry projects and the newly created telemetry data repository, the Data Assembly Center (DAC).

The DAC derived from an existing, rich collection of animal tag data acquired through the Tagging of Pacific Predators (TOPP) / Census of Marine Life programs and subsequent projects housed at ATN participant (and co-founder) Stanford University. When it became clear that the repository at Stanford would not be able to handle the anticipated large volume of telemetry data, the ATN sought the services of Axiom Data Science to manage the aggregation of satellite, acoustic, and archival telemetry data with the ultimate goal of permanent archiving at NOAA/NCEI.

The ATN is additionally discussing with ARGOS (Advanced Research & Global Observation Satellite), the satellite tracking service for scientific telemetry, the possibility of bulk-buys of tracking services for the wider research community at a discount price and is now paying the ARGOS service costs for ATN researchers who agree to submit their data to the ATN DAC in real-time. The ATN is also having discussions with equipment manufacturers on wanted capabilities with the next generation of animal tags and the possibility of making bulk purchases for discounts to be shared among individual research projects.

BOEM’s funding partners, the NOAA IOOS office and ONR, have committed to a comparable level of support in this continued effort. In addition, the Marine Mammal Commission will continue as a non-co-funding partner, lending their expertise.

Objectives: The objective of this study is to build upon the working relationships and agreements described above to make the most productive use of the capabilities of animal telemetry research presently and going forward.

Methods:

1. Expand outreach to include researchers and other stakeholders not affiliated with the regional IOOS associations.

2. Expand participation in the ATN by other NOAA offices and other Federal agencies (*e.g.*, the National Science Foundation [NSF]), including use of the DAC for data management and Public Access to Research Results (PARR) compliance.

3. Expand multi-agency collaborative baseline observations and infrastructure support to facilitate long-term ecosystem monitoring using telemetry in conjunction with other monitoring tools like passive acoustic monitoring.

4. Promote focused research on animals as sentinels of climate-scale changes in the ocean.

5. Support and instigate innovative analytical and visualization tools and data products of value to animal telemetry research; support and instigate enhanced capabilities in animal tags and satellite tracking.

6. Promote cost savings to researchers through group purchasing.

Specific Research Question(s): The ATN will not itself address any research questions, but two questions that can be addressed by analyzing data pooled from multiple research projects using animal telemetry are:

1. How are migratory routes of marine animals changing in the face of a changing ocean climate?

2. How does expanded ocean energy development affect habit use, migration, and reproduction of marine animals resident in or transient through energy development areas?

References: