US Animal Telemetry Network
Steering Group Meeting SG-2

November 8, 2017
Virtual Meeting Minutes

I. ATN Updates (B. Woodward)

B. Woodward called for consensus on the meeting agenda and provided a brief update on ATN activities from June-October 2017.

- Addition of live tracks to the ATN DAC:
  - James Sulikowski's (U. of NE) Porbeagle & Blue Sharks
  - BOEM/Navy (KSC) Canaveral Shoals Turtles
  - Kim Holland's (U. of Hawaii) Tiger Sharks
  - Robin Baird's (Cascadia Research Collective) Cuviers Beaked Whales, Pilot and Melon-Headed Whales
  - Lori Quakenbush (Alaska Dept. of Fish and Game) and Jonas Teilmann (AARHUS U.- Denmark) Bowhead Whales
- DAC site visit at Hopkins:
  - Reviewed and updated FY-17 tasking
  - Clarified the "Core I" & "Core II" (current vs. emerging) database actions
  - Addressed data attribution issues
  - Initial review of the updated website
  - Initiated transition discussions
- S. Hayes presented to the NMFS Science Board and described how the ATN can support NMFS needs
  - Led to an FY-18+ NMFS funding agreement
- Addition of 43,000 ocean profiles collected by NE turtles by the Coonamessett Farm Foundation (Falmouth, MA) and the NMFS/NEFSC to the ATN DAC
- The ATN Coordinator's Annual Report has been submitted to BOEM
- The SECOORA-FACT Acoustic Node is operational and will streamline data sharing across their large and growing membership; SECOORA and Axiom Data Sciences are hosting a FACT website which will serve as the front door for the node
- The new MATOS web-based acoustic data aggregation node developed by RPS/ASA is operational and will serve the Mid-Atlantic ACT Region
- The ATN has connected with Stephen Zepecki, the NOAA SOS Educational Outreach Coordinator for initial discussions on displaying marine animal telemetry tracks on the SOS, "Science On A Sphere".
- MBON & ATN are examining the role that a united ATN and MBON could play in implementing a long-term sustained biological observing component of IOOS.
  - The MBON-ATN team also met Vardis Tsontos from NASA/JPL to:
    - Learn about the Oceanographic In-situ Interoperability Project (OIIP) that is examining how to best integrate visualizations of animal movement and remotely sensed physical data
    - Explore the intersection of the proposed CEOS initiative COVERAGE with MBON-ATN
- Invitation to be a member of the Strategic Advisory Panel for their Migratory Connectivity in the Ocean (MiCO) system. MGEL is leading a consortium to develop MiCO as part of the larger Global Ocean

Biodiversity Initiative (GOBI) from the German International Climate Initiative. Among other things, MiCO will convey information on animal connectivity among aggregation of life cycle areas - 'nodes', and via travel paths – 'corridors' between nodes.

- ATN DAC & Australian IMOS teams have been working together to harmonize satellite and acoustic data base and web applications on our respective local machines

B. Woodward discussed the workshops held and being planned for the upcoming year.

- AOOS-ATN Workshop, Anchorage, AK, December 5-6, 2017
- GCOOS-ATN Workshop, New Orleans, LA, January 23-24, 2018
- PACIOOS-ATN Workshop, Honolulu, HI, Late Spring, 2018
- CETACEAN TAG DEVELOPMENT AND TAGGING BEST PRACTICES WORKSHOP in September 2017 in Silver Springs was sponsored by ONR (M. Weise), NMFS (T. Rowles) and the International Whaling Commission (G. Donovan). Workshop purpose was to review and evaluate progress in tag design and attachment since their previous ONR sponsored Workshop in 2009 to identify and collectively advance designs that maximize tag attachment duration while minimizing risks to animals. A set of specific recommendations that built on those from the 2009 meeting was developed, some of which called for ATN participation
- 6TH INTERNATIONAL BIOLOGGING SYMPOSIUM IN KONSTANZ, GERMANY We presented an ATN poster and had an opportunity to meet with a large number of the attendees on a wide range of ATN related topics including the possibility to join a multi-partner fellowship project with ONR support that includes MacQuarie Univ. (Australia) - IMOS/ATF, OTN, VEMCO and others, to support the development of an easily used animal movement analysis toolbox for the animal tracking community
- Society for Marine Mammalogy 22nd Biennial Conference, Halifax, NS
- OTN International Data Management Committee (IDMC) Meeting & OTN Symposium, Halifax, NS

DISCUSSION:

ATN members discussed collaborating with the International Whaling Commission to facilitate tag usage guidelines at their spring data standards workshop.

II. Voting Member Updates (M. Weise, J. Price, S. Hayes)

M. Weise discussed the ONR funding for 2017/2018 and indicated, i) that language has been added to ONR contracts/grants requiring PIs to submit their data to the ATN DAC. Ii) that the new Navy 'Task Force Ocean' advocates that all available environmental data, including data collected by animal tags, be assimilated into the NAVOCEANO forecast models and iii) that there are three new tags being developed: Wildlife Computers CTD tag and a new DTAG deployable for 2-3 days which will measure internal body condition to examine whether drift dive body conditions can be used as indicators of change. S. Hayes updated the team with the new tag technology using RAFOS acoustic technology being developed at WHOI for the Atlantic Salmon Project. J. Price discussed a new potential initiative between BOEM and NASA to deploy ARGOS receivers on cubesat satellites; NASA will consider deploying and testing the viability and cost-effectiveness of this method.

DISCUSSION:

K. Holland noted that a study was already published examining the use of land-based receivers and will send the files to J. Price.

B. Woodward agreed to provide J. Price and the SG members with the most recent Argos slides from the French Space Agency, CNES, and to engage in further discussions with BOEM (Price/Levenson) to explore possible joint cubesat activities with CNES.

III. Review of ATN-SG-1 Actions

- Intersection with PAM – NCEI Archiving (B. Woodward, J. Price)
    - J. Price updated on the status of the action: BOEM is working via Interagency Working Group to examine metadata standards. J. Price will be debriefed on pilot project structure and determine ATN data intersection.
    - **STATUS: On-going**
- Is Data in the DAC Subject to FOIA Regulations? (B. Woodward)
    - B. Woodward examined the FOIA regulations and determined that ATN DAC is subject to the regulations. *"... a Freedom of Information Act (FOIA) request for research data relating to published research findings produced under an award that were used by the Federal Government in developing an agency action that has the force and effect of law, the Federal awarding agency shall request, and the recipient shall provide, within a reasonable time, the research data so that they can be made available to the public through the procedures established under the FOIA."*
    - **STATUS: Complete**
- Agreement on the ATN Inventory Data Fields (B. Woodward)
    - B. Woodward is working on an agreement for additional data fields on the current inventory data sheet.
    - J. Young, M. Ogburn, S. Hayes, and S. Simmons will move this action forward and investigate the best method of obtaining vital data to the inventory. B. Woodward will provide an inventory sheet.
    - **Status: On-going**
- Template for ATN Workshop Reports (B. Woodward)
    - B. Woodward communicated the completion of this action. A template has been created and will be utilized in the next ATN workshop.
    - **STATUS: Complete**

IV. New Items for Review, Discussion, Decision (B. Woodward)

- Transition of the ATN DAC to an Operational Environment
    - **Review:** The SG was provided with the transition proposal. [APPENDIX 1.1]
    - **Discussion:** M. Weise noted the importance of an independent 3rd party technical assessment of the current ATN DAC to fully identify the current components and what can be operationalized
    - **Decision: ATN SG voting-members agreed to move forward on transitioning the DAC to an operational environment.**
- Baseline Observations: Candidate High-Priority National ATN Program Assets for FY-18 funding
    - **Review:** The SG was provided with the potential program assets. [APPENDIX 1.2]
    - **Discussion:** The SG discussed the variety of priorities—regional vs national, near-term vs long-term. In the end, it was agreed that ideally the program assets, eg., observations & data management need to be 'cross-cutting' and common to all regions/agencies. M. Weise noted that once the regional workshops were completed the reports could show threads that speak to the nation at-large. B. Houtman noted the importance of a transparent process and potential endorsements. There was a strong suggestion that the ATN should capitalize on the

momentum it has achieved by taking action as soon as possible to consider near-term, direct-funding of some high priority cross-cutting activities. J. Young indicated that to be successful the "ATN needs to be in the (telemetry) culture."

- **Decision: ATN SG voting-members agreed to develop a near-term and long-term formalized process for choosing ATN program assets for funding. M. Weise, B. Woodward, S. Hayes, J. Price, B. Houtman, and W. Turner will develop the process and begin with the priorities set out in the ATN Implementation Plan.**

- Sea World Proposal from Hendrik Nollens
  - **Review:** The SG was provided with the proposal. [APPENDIX 1.3]
  - **Discussion:** J. Young asked what the ATN would gain from collaboration. S. Simmons clarified that the DAC would have a greater input of data and the ATN would have authority over the location of a suite of tags which would be a program asset. The SG were curious of the roles of each partner in the collaboration.
  - **Decision: ATN SG voting-members agreed to reexamine the proposal. B. Woodward and S. Simmons will examine the proposal and address gaps/any areas of concern.**

V. Next Meeting

Next SG meeting will take place the **week of March 12th 2018.** Date will be finalized over the coming weeks.

Meeting Attendees

Steering Group Members

Hayes, S.	NMFS	sean.hayes@noaa.gov
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Price, J.	BOEM	james.price@boem.gov
Simmons, S.	MMC	ssimmons@mmc.gov
Turner, W.	NASA	woody.turner@nasa.gov
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Woodward, B.	IOOS/ATN	bill.woodward@noaa.gov
Young, J.	FWRI	Joy.Young@myfwc.com

Others

Desai, K.	IOOC	kdesai@oceanleadership.org
Rome, N.	IOOC	nrome@oceanleadership.org

Action Items

#	Action Item	Point	Due Date
1	Connect with International Whaling Commission on tag usage guidelines.	B. Woodward	
2	Provide J. Price with the land-based receivers publication.	K. Holland	
3	Formalize prioritization process for ATN program assets.	M. Weise B. Woodward S. Hayes J. Price B. Houtman W. Turner	
4	Reexamine Sea World Proposal.	B. Woodward S. Simmons	

#	Continuing Action Item	Point	Due Date
6	Intersection with PAM – NCEI Archiving	B. Woodward J. Price	
7	Agreement on the ATN Inventory Data Fields/ Investigate the best method of obtaining vital data for the inventory	J. Young M. Ogburn S. Hayes S. Simmons	

Appendix

1. 1

TRANSITIONING THE ATN DAC TO AN OPERATIONAL ENVIRONMENT

Bill Woodward – Michael Weise

The Current DAC at Stanford's Hopkins Marine Station

A fully functional and operational Data Assembly Center (DAC) is central to the ability of the U.S. Animal Telemetry Network to achieve its goals. A primary objective of the ATN has been to implement a DAC that would be an operational community resource with a data portal and visualization tools and data products to enable centralized U.S. marine animal tag data aggregation and public access to that data/metadata. Rather than build a completely new data assembly center, it was wisely decided during the early planning for the ATN program to establish a prototype ATN DAC by leveraging the extensive prior database development at Hopkins Marine Station for tag data management (TOPP, GTOPP, GulfTOPP) into a single quasi-centralized system. This system includes an intuitive webfront for data access that utilizes servers located at the NOAA/NMFS Southwest Fisheries Science Center (SWFSC) in Santa Cruz, California that are capable of delivering and visualizing United States telemetry data streamed from multiple animal and platform types. http://oceanview.pfeg.noaa.gov/ATN

This prototype DAC has evolved well over the last 3+ years and its current level of operability, functionality and user responsiveness is consistent with research laboratory data management efforts where in-house, shared technical responsibilities are applied and can be very effective for supporting focused internal research lab requirements and applications. It was envisioned that at some point the operational ATN DAC would require a much stronger and broader technical, administrative and customer service level in order to successfully and operationally serve the larger marine animal telemetry community defined by the ATN.

We have determined that now is time to define and implement a sensible, logical and appropriate transition of the DAC from its current research/developmental phase in the Hopkins research environment to a location and environment which is dedicated to operational execution/support and customer service and to do so within the next 6- 12 months. This conclusion is not a reflection on the skills or capabilities of the Hopkins team but rather on a frank and realistic evaluation of the requirements and the growing need for operational support of the tagging community. We are convinced that this transition and the timing of it are necessary for the ATN to be successful. Our expectation is that Hopkins will provide guidance and direction for this transition and they may also continue to play an important role in the future of the ATN (e.g., development of data products, analytical and visualization tools, etc.).

The Transition Vision

The ATN vision is for the DAC to be a community database and web front resource hosted in a 24/7, operational environment with accompanying enterprise-level supporting cyberinfrastructure. The

operational provider must be willing to commit to service level agreements for particular aspects of the DAC service including, for example, quality, availability, continuity, etc. That operational provider must also possess demonstrated experienced in the operation and maintenance of relational database management systems and have dedicated on-site skilled technical support for system operation, troubleshooting and ensuring state-of-the-art compliance of the software and hardware technology.

It is important to be clear that by this transition action the ATN is not seeking to redevelop the ATN DAC database structure or web front. Rather we wish to identify an adequate existing operational cyber infrastructure to which we can transition the current DAC technology and functionality and an organization which will assume full operational responsibility and customer service and support.

Our expectation is that the DAC operations will require 1.5 – 2 full-time on site technical personnel plus an ATN DAC community Data Manager/ Wrangler. ONR has expressed a willingness to transfer their ATN funding commitment to IOOS via a Memorandum of Understanding (MOU) to enable this transition approach. As soon as full agreement has been reached on the transition approach, the interagency funding transfer process will be initiated.

The DM/W position, which may not necessarily need to be located physically at the operational DAC site, would notionally be funded from the annual NMFS commitment that is expected to begin in FY-18.

The Transition Mechanism

The ATN team has analyzed a number of options both for funding mechanisms and for selecting qualified providers to insure we achieve a successful transition of the ATN DAC capabilities to an operational unit. These options included a competitive vs. noncompetitive selection process to choose the provider; funding a provider via a grant vs. cooperative agreement vs. contract; passing money through an RA to fund a provider, etc. To sort through the multiple pros and cons of each of these options we, jointly with the IOOS PO, did a tradeoff analysis that took into account the following considerations:

-This is a project exclusively to transition the technology, not to develop it

- The required time-frame to accomplish the transition, is driven by funding cycles and availability, is fixed and is relatively short (6-12 months)

- Since IOOS will oversee the DAC operations, the funding mechanism should originate from IOOS

- IOOS has a ten year demonstrated record of successfully implementing multiple operational activities through the RA Cooperative Agreement funding process- a primary mission of IOOS

We have analyzed the various options and the tradeoffs among them, and have also examined the existing operational data management capabilities within the IOOS Regions. Based on this our conclusion is that the most expeditious, prudent and technically viable approach is to transition the ATN DAC capabilities through one of the IOOS Regions to a suitable operational entity. It is important to note that since the planned action is to transfer an existing data management capability to an operational environment and is not to develop a new one, we concluded that a competitive selection process would not be warranted.

Next Steps

The next step is to prepare a coherent and carefully defined plan that clearly outlines the organizational steps, technical actions and responsibilities to be undertaken to successfully carry out this transition.

1. 2

*Excerpted from the **ATN Coordinator Report #1 to BOEM***

V. Identify High-Priority National ATN Program Assets

A top priority of the ATN is the sustainable operations of the existing United States tagging capability and receiver arrays that have been deployed during the past 15 years, mostly in incremental pieces for coastal ocean research. Phase II (2017-2019) of the ATN implementation calls for identifying and prioritizing infrastructure/assets that need to be supported in order to successfully sustain ATN operations.

These priority baseline observations will be of two types. The **First Type** will be consistent, long-term observations from satellites, archival tags, and acoustic systems intended as stable resources rather than responses to short-term requirements. Review and consideration of changes in these consistent, long-term priority baseline observations will occur on a regular cycle, and be initiated only after careful consideration and consultations among the SG, U.S. IOOS RAs, Federal agencies, non-Federal entities, and stakeholders.

The **Second Type** of priority baseline observations will be focused observations of animal responses to unexpected events such as warm-water anomalies (e.g., El Niños), oil spills (e.g., the Gulf of Mexico Deepwater Horizon oil spill), and natural disasters. The small and mobile nature of acoustic receivers and arrays, satellite and archival tags, and tagging equipment provides an inherent flexibility that can be used by the ATN. In limited cases or in response to an urgent national need, the ATN may request that assets held by the various regional operators and institutions be tasked with limited-duration, targeted tagging efforts. The U.S. IOOS RAs and SG can nominate targets, with scope and tasking determined by the voting members of the SG.

The following candidate infrastructure and assets have been identified from the broad extent of community interaction and engagement, including workshops, Steering Group Meeting, regional network and Association meetings, enjoyed during the period of this report.

Candidate Priority Infrastructure & Assets for Phase II Funding

A. Georgia DNR Acoustic Receiver Line off St. Simons Sound, GA – Est. $70K/year

[Cost estimate includes 3 months' salary for the PI, vessel support (both large and small) for servicing the offshore (16 VR2W) and shipping channel arrays (12 VR2W), miscellaneous supplies for housing and mooring constructions, dive pay for the diver corps, and some travel.]

Supporting text from Dr. Eric Reyier, Kennedy Space Center Ecological Program:

"Our research at Cape Canaveral (supported by BOEM, NASA, and US Navy) has benefited greatly by coastal receiver lines maintained by Georgia DNR and South Carolina DNR. My understanding is that while the SC line has received a funding extension, the line off St. Simons Sound, GA (managed by Chris Kalinowsky at GADNR) may be decommissioned as early as this December. I reviewed our data and this line alone has detected 109 animals in 10 species that were originally released here at the Cape. Almost all of these are federally managed species with defined EFH. I know this array also regularly detects animals from many other groups, including ESA-listed turtles and sturgeon. The attached animation of our finetooth sharks shows what type of info these coastal arrays can provide, and demonstrates how much time our sharks spend in GA nearshore waters. The same is proving true for many of our other species. Our take home….we think that this GA receiver line advances the research of many user groups along the US Atlantic coast, and its removal will be a step back for acoustic telemetry research in our region. We just wanted to make you aware of this in hopes it will be part of the ATN conversation moving forward."

B. Data Manager/Diplomat Funding for the SECOORA and MARACOOS Acoustic Data Nodes – Est. $150K/year

With partnerships among SECOORA, the Florida Fish and Wildlife Research Institute (FWRI), Axiom Data Sciences, OTN, MARACOOS, the NOAA Chesapeake Bay Office, the Atlantic States Marine Fisheries Commission and RPS/ASA and the ATN, acoustic telemetry data Nodes are now operational for both the ACT and FACT community-based telemetry networks. Each of these Nodes are now being populated with acoustic datasets from their regions. For the Nodes to be effective however, each Node requires some small annual O&M funding plus a dedicated Data Manager/Data Diplomat to be a trusted interface with their communities who will recruit PIs to submit their data, will encourage data sharing and will insure that the data is properly managed.

Currently, temporary O&M support for the nodes comes from internal RA funding, and the 'data management' responsibilities are discharged by volunteers who also are full-time state and federal employees: ACT (Kevin Schabow, NOAA/CBO) and FACT (Joy Young, FWRI). This is neither a satisfactory nor a sustainable way to operate these very capable telemetry Nodes. Since they are essential components of the U.S. Animal Telemetry Network infrastructure it is appropriate for the ATN to consider full funding for the O&M for these nodes and full or partial funding for these Data Manager positions to insure sustainability of these nodes.

C. Argos Service Funding for Priority Satellite Telemetry Activities of Agencies Funding the ATN

Similar to the receiver lines for acoustic telemetry detection, the satellite data collection and location service of Argos is an essential element of the U.S. national animal telemetry infrastructure. Consequently, providing sustained, robust Argos service that will insure the stability of high priority, long-term satellite tagging efforts in the ATN is an appropriate candidate for ATN funding. During the period of this report, I have had discussions about this with the Argos Joint Tariff Agreement Chairperson, Eric Locklear. In particular, he was receptive to the concept of negotiating a unique preferential Argos tariff rate for U.S. ATN members, as well as a fixed price, "all you can eat" Argos service contract for ATN satellite taggers. CLS is currently reorganizing their Argos tariff structure and will soon propose a new approach to the JTA members. We will be evaluating that as information becomes available.

D. Funding to Create an Off-the-Shelf Supply of Easily-Accessible Satellite and Acoustic Tags, and Acoustic Receivers for Quick Reaction Determination of Animal Responses to Anomalous Environmental Events (e.g., strandings, hypoxia, warm water,…)

Purchasing telemetry tags and acoustic receivers can be the single most expensive and time-consuming part of implementing animal telemetry programs. The ATN Steering Group, and others, have recommended that the ATN fund the establishment of a community inventory of tags and receivers that could be made available with short notice for quick reaction, high priority applications. This is a valuable concept that with careful planning and organization would be an appropriate candidate for ATN funding.

E. POSSIBLE JOINT OPPORTUNITY WITH OTN TO MONITOR RIGHT WHALES IN THE GULF OF MAINE AND THE SW NOVA SCOTIAN SHELF – Est. ~$100K/year

Researchers at Dalhousie University, in conjunction with Dalhousie's Ocean Tracking Network (OTN) and the Marine Environmental Observation Prediction and Response (MEOPAR) Network, have pioneered Canadian use of passive-acoustic monitoring technologies mounted on ocean gliders to identify calls and localize positions of marine mammals on the Scotian Shelf and in the Gulf of St. Lawrence, including the endangered right whale. These gliders are capable of staying at sea for 1 – 4 months in all sea conditions, and surface every 2h to report oceanographic data and whale species present back to shore through satellites. The program has been incredibly successful, offers an affordable way to monitor large ocean areas for whales, and complements gaps in other whale survey methods such as overflights, by informing the manned surveys of the best places to observe from the air or by providing data from periods when air surveys are not possible. Currently only a small portion of the potential right whale distribution in Canadian waters can be monitored by gliders due to the small numbers of these autonomous vehicles which are available to the scientific community.

The experienced glider team at Dalhousie University is fully capable of deploying more gliders but is currently limited by the number of gliders it has. Currently Dalhousie's fleet is composed of five gliders, and each needs to be removed from the water and overhauled after 20,000 inflections (approximately six months at sea). Dalhousie has a unique opportunity to partner with US scientist Dr. Neal Pettigrew at the School of Marine Sciences in the University of Maine. Dr. Pettigrew has six Slocum profiling gliders that are currently unused due to operational budget constraints. He has expressed interest in entering a partnership with Dalhousie University in which Dalhousie would take possession of his gliders and operate them in the Gulf of Maine and the SW Nova Scotian shelf, both areas of interest to right whale researchers as well as to oceanographic scientists in the North Eastern USA. This would free up Dalhousie's five gliders to be deployed in right whale monitoring on the central Scotian Shelf and the Gulf of St. Lawrence, where 13 right whales perished this summer. This arrangement would avoid the approximately $1.8 M in capital costs required to purchase new gliders. Knowledge of whale distributions in these areas is urgently needed to guide implementation of mitigation measures to minimize ship-strikes or fisheries entanglements.

While conducting whale monitoring missions Dalhousie's gliders are also collecting important environmental data such as water temperature, salinity, oxygen concentration and chlorophyll concentration. One of their gliders has a 300 kHz echo sounder on it which can produce estimates of

zooplankton concentration from backscatter signals. This sensor is critical for identifying concentrations of whale prey in near-real time. At present, the prime hypothesis to explain the recently changed right whale distribution in the Northwest Atlantic Ocean is a shift in the ocean areas that are producing the whale's food.

1. 3

Sea World Proposal

Hendrik Nollens, the VP of Animal Health at Sea World Parks & Entertainment, is looking for ideas on how to best make use of a number of satellite tags that SeaWorld is planning to make available to the scientific community. Current thinking is that they could make these tags available to the marine mammal stranding network. Teri Rowles and Sam Simmons recommended to Hendrik that he look into developing a collaboration with the ATN members for possible assistance in managing and distributing the tags as well as displaying the tracks on the ATN DAC site.

Mike and Bill spoke with Hendrik by phone several weeks ago and he further explained that Sea World has developed an arrangement with OCEARCH where OCEARCH will display the tracks of animals tagged with the Sea World tags and will link the displayed tracks to the Sea World website in return for Sea World providing financial support for the OCEARCH website.