SPRING 2014 Volume 15, Issue 1

Tracker News

Microwave Telemetry, Inc.

Conserving Biodiversity Through Technological Diversity

Dear Customers, Colleagues and Friends,

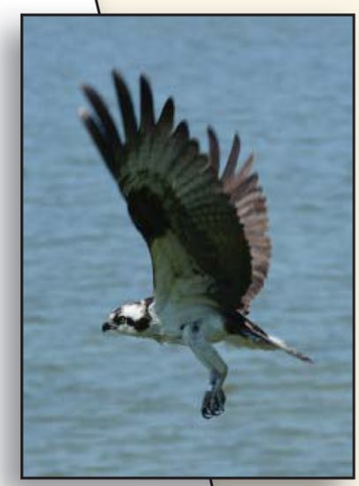
Reading through the articles featured in this issue of our newsletter spurred thoughts of common themes we, here at MTI, see every day. It is staggering how many taxa can now be tracked and studied in the year 2014. We hear, either first hand or though the literature, about the variety of species you are dedicating your lives to conserve. Not all are cute, charismatic or even economically important – undoubtedly some of you have trouble making the argument to your funders and institutions that the protection of your study species is a worthwhile endeavor – but we, as conservationists, are well aware that species diversity is the key to preservation.

I was nine when my parents started this company, relatively unimpressed and admittedly embarrassed (imagine explaining to other 3rd graders that your dad makes bird backpacks for a living). I do, however, remember the excitement after the first bird was tracked with a 95g satellite transmitter. Now, 23 years later, I am amazed (rather than embarrassed) but mostly humbled to still be a part of this journey.

Through the last quarter century of designing transmitters, we have amassed a diverse array of devices. In a way, the needs of avian and marine conservation and the availability of technology have coevolved. However, while the future brings the excitement of new technologies, human population growth, development and diminishing resources continue to threaten more species' existence. There is definitely more work to be done!

This issue explores a variety of species, transmitter models and examples of how studying animal movement can protect biodiversity and, ultimately, all life on this planet. Mihai Valcu writes about the long voyage of pectoral sandpipers tracked with 5g Solar PTTs, while Larry Bryan and his team share data from their GSM/GPS units used to examine fine-scale vulture movement. Brian Washburn reports on how he is using our smallest GPS transmitter to track gulls in Chicago. Lastly, Cindy Tribuzio explains migration patterns and habitat use of dogfish in the Gulf of Alaska. We are grateful for their contributions. Someone once told me that we must learn to appreciate and conserve all animal life because what happens to them, will eventually happen to all of us. Thank you for allowing us to share that goal through your research.

Lucy and the Team at MTI



Above: Osprey in flight.

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Tracking Pectoral Sandpipers with 5g Solar PTTs

Mihai Valcu is an ornithologist and behavioral ecologist at the Max Planck Institute for Ornithology, Germany (http://www.orn.mpg.de/valcu).

The Pectoral Sandpiper (*Calidris melanotos*) is a medium-sized migratory shorebird that breeds in the high-Arctic tundra from Hudson Bay in Canada, through Alaska and Siberia all the way to the eastern boundary of Europe. Males weigh on average 100 grams and are noticeably larger than females which are about 30 grams leaner. Males do not provide any parental care and during their short stay on the breeding grounds they are occupied solely with territory defense, competing and displaying to females, which they do in a most peculiar way (see photos). Over the past decade several studies in our group allowed us to understand much about the Pectoral Sandpiper mating system and breeding ecology; for example we discovered that males are unusually active during the breeding season and almost completely forego sleep for many days in a row with no obvious loss in performance (*Science* 337, 1654, 2012). There is also anecdotal evidence that Pectoral Sandpipers are extremely good fliers. In the non-breeding season birdwatchers are often reporting birds far away from their main migration route toward South America, in places like the United Kingdom or even Hawaii or the Micronesian islands. This fact potentially qualifies the Pectoral Sandpiper as an extreme flyer, perhaps in the same league as the Arctic Tern, but no supporting evidence existed before our study.

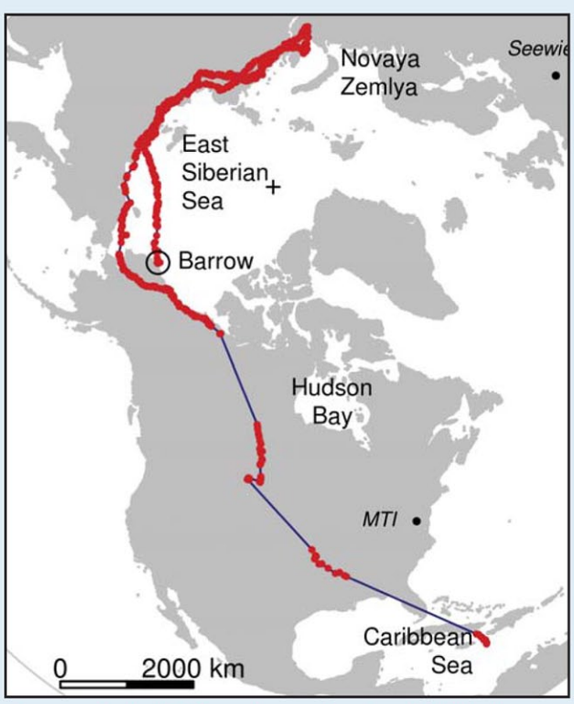
Photo by Mihai Valcu

A territorial Pectoral Sandpiper male sitting on a tundra elevation (a pingo) and displaying his throat. He carries a 5g PTT.

After a very successful pilot study in 2011 where we tested the 5g solar-powered PTTs on a few males, the following season we captured 60 males at the beginning of the breeding season and equipped them with 5g PTTs. Because we decided to use flexible heavy duty glue (Pattex® Repair Extreme) instead of a harness, the tag weight was in fact 4.7 grams. Tags were programmed to transmit continuously during the birds' stay in the ever-sunny Arctic summer and to switch to a standard duty cycle (10 hours ON followed by 48 hours OFF) afterwards. The tags performed exceptionally well and in order to get the best possible tracks we only had to filter out 5% of the data. We obtained on average 35 locations per male per day.

As an example we show one of our tagged males (102082) caught in Barrow on June 2nd (see map). He stayed in Barrow until the next day when he started to fly over the sea heading toward Siberia. He flew over the Beaufort and Chukchi Seas, crossed the East Siberian Sea and travelled over the pack ice for 1100 miles in about 25 hours. Once he reached land he rested less than a day before continuing his journey. He flew westward for another 2300 miles always keeping close to the coast. At the most westward point in his journey on June 18th he had already crossed the eastern boundary of Europe. After this, without any sign of weariness, 102082 started his way back to South America. While crossing Siberia, he followed roughly the same route as on his journey west. He did not come back to Barrow; instead he crossed the Brooks Range and stopped for a few days in the Eskimo Lakes area. At this point his tag switched to the standard duty cycle but we could track his route through Saskatchewan, Missouri, Arkansas and Mississippi. The later track suggests he traversed Florida, passed over Cuba and then crossed the Caribbean Sea between Jamaica and Haiti, only a week after the Hurricane Ernesto hit the area. 102082 transmitted the last signal only 360 miles short of South America, when the tag most likely detached and fell to the bottom of the sea.

During his trip from the wintering ground somewhere in the Pampas of South America and back, 102082 travelled roughly a distance equal to the Earth's circumference. This qualifies the Pectoral Sandpiper, by any standards, as an extreme migrant. By using a 4.7 gram tag on a 100 gram bird we reach the boundary of what a bird can carry without impairment. However, the Pectoral Sandpiper story is not complete until females can be tagged. Because females are the only ones caring for eggs and young, they are driven during their spring migration to find a predator-free home with plenty of food. Because they provide care, females are bound to stay at the breeding grounds for much longer than males. Many questions are still to be answered: are males following the females or the other way around? Are females also such extreme wanderers or are they more grounded than the males? Are females as likely to fly over the frozen Arctic Ocean for long hours just to arrive a little earlier to their destination? … A two gram Solar PTT will help answer those questions as well as open tracking possibilities for another 4000 species. We are looking forward to it!



Journey of male 102082 over four continents and 20,000 miles.

Photo by Mihai Valcu

A Pectoral Sandpiper male displaying over the tundra in Barrow, Alaska. By rhythmically inflating their throat sac and simultaneously producing a hollow sound (a hoot) males are trying to attract females and ward off competitors.

Gulls in the Windy City: Tracking Ring-Billed Gulls with the 17g Solar Argos/GPS Transmitter

Dr. Brian Washburn is a research wildlife biologist with the USDA, Animal Plant Health Inspection Service, Wildlife Services, National Wildlife Research Cender in Sandusky, Ohio and is an adjunct assistant professor with Michigan State University, North Carolina State University, and the University of Missouri. His research program involves finding science-based solutions to wildlife-aviation conflicts, stress and reproductive physiology of wildlife and habit management of grassland ecosystems.

Many birds and mammals are very adaptive and have shown the ability to not only tolerate, but flourish, in close proximity to people. Deer, coyotes, Canada geese, crows, gulls, and other wildlife have settled into cities and large urban areas. One such species, the ring-billed gull, commonly makes its home in many large cities in North America and finds places to feed (e.g., waste management facilities, parks), nest (including rooftops of buildings), and raise young. However, the presence of large numbers of gulls in urban areas can be problematic, resulting in conflict situations between gulls and people. For example, large numbers of gulls using Chicago beaches and near-shore waters contribute to decreased water quality and problems associated with high levels of pathogens in Lake Michigan. Recent efforts to mitigate gull impacts upon water quality in Chicago, such as managing nesting colonies and chasing gulls from beaches with dogs, appear to be successful, resulting in fewer swimming bans due to elevated bacteria levels in the water on Chicago's popular beaches during the summertime.

Effective management of human-gull conflicts requires a better understanding of gull movements during their breeding season. However, given the relatively small size of ring-billed gulls (400 to 650 grams) satellite telemetry has historically not been an option. And then it happened – while reading a copy of Microwave Telemetry's Tracker News newsletter, I noticed a small article that mentioned Paul was doing what he does so well – pushing the limits and making biologists very happy! A 17g solar Argos/GPS-capable satellite transmitter had been developed, within the acceptable weight range for use on ring-billed gulls. What luck! After discussing things with my cooperators and the Microwave Telemetry staff, an effort to evaluate these new satellite units in the field on ring-billed gulls began. We wanted to answer two questions during this work: (1) how do the 17g units perform when attached to ring-billed gulls in urban areas, and (2) what are the movement patterns of ring-billed gulls?

In May 2012, four adult ring-billed gulls were captured on their nests in a colony located right next to the famed Navy Pier in downtown Chicago. Each gull was fitted with a 17g satellite transmitter and released back into the nesting colony. The transmitters were set to collect locations 7 times each day, at 3-hour intervals, during the spring, summer and fall. This was reduced to 4 locations per day during the winter. The following year (in early May 2013), five additional adult ring-billed gulls were captured using a hand-held net launcher at the 63rd Street Beach in Chicago; french fries were the "magic bait." Each gull was fitted with a 17g satellite transmitter and released on the beach.

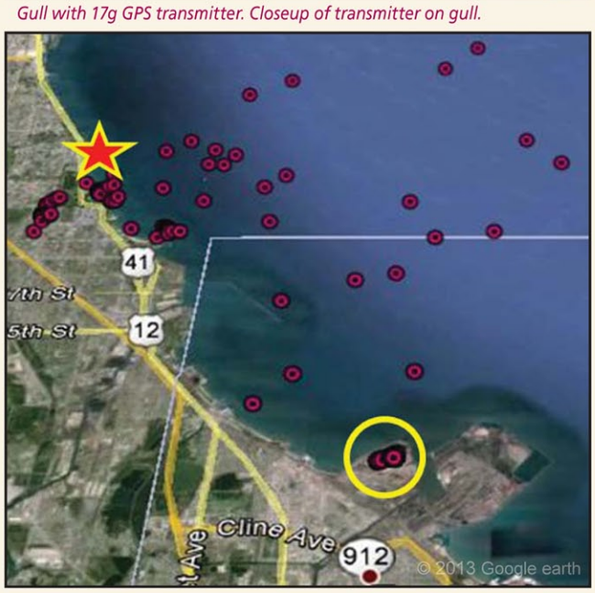
The satellite transmitters provided location information for the ring-billed gulls from 7 to 613 days, producing over 11,000 individual locations from May 2012 to March 2014. Five gulls are still being tracked. Overall, I found the satellite transmitters were very effective in obtaining and providing location data. The satellite transmitters provided useable data ~91% of the time, irrespective of the type of habitats that the ring-billed gulls used. This is particularly notable as the ring-billed gulls occasionally used highly urbanized areas that contained tall buildings and other structures that could interfere with data acquisition and/or transmission.

Ring-billed Gulls at the colony. Photo By Brian Washburn

Photo by Scott Beckerman

Photo by Brian Washburn

Gull with 17g GPS transmitter. Closeup of transmitter on gull.



Locations of an adult male ring-billed gull (PTT No. 115892) during July of 2013. This bird was tagged at the 63rd Street Beach (indicated on the map with a star). This gull was believed to have been nesting within a colony located on an industrial site (denoted on the map with a circle). He used a variety of terrestrial and aquatic habitats for feeding, roosting, and other activities.

The information provided by the satellite transmitters allowed for evaluations of fine-scale habitat use, movement and activity patterns, and travel routes during long-distance movements made by these ring-billed gulls. Post-fledging movements and behavior patterns of (apparent) successfully nesting gulls showed these ring-billed gulls stayed in the Chicago area during the post-fledging period and used a wide range of areas and habitats within the urban-freshwater lake interface, including beaches popular with residents during summer months, Lake Michigan, urban areas, and other terrestrial and aquatic habitats.

The future of satellite transmitter technology and what can be learned from it is very exciting! I look forward to seeing whether the 17g solar Argos/GPS transmitter proves to work as well with other wildlife species.

Small Shark, Big Ocean

Cindy Tribuzio is a fishery biologist at the Auke Bay Laboratories of the National Marine Fisheries Service in Juneau, Alaska. Her research focus is the life history and ecology of sharks, primarily reproductive physiology, aging and behavior, and stock assessment of data-poor species (such as non-target rockfish species).

Spiny dogfish (*Squalus suckleyi*) are a small shark common in coastal waters of the eastern North Pacific Ocean. This species is not to be confused with the similar spiny dogfish (*S. acanthias)* found in the Atlantic Ocean, and until recently they were considered the same species. For the purposes of this article, "spiny dogfish" will refer to the North Pacific Ocean variety, *S. suckleyi.* Spiny dogfish is a small coastal shark species. They grow to about 130 cm total length. They are long lived, living up to 100 years, and quite slow growing, not reaching sexual maturity until they are about 36 years old. Spiny dogfish are spread across the temperate coastal waters of the eastern North Pacific Ocean and there is a long history of commercial fishing for the species in some areas (British Columbia, CA and Puget Sound, WA, USA).

Tagged spiny dogfish. Photo by Cindy Tribuzio

Conventional tagging studies began in the 1970s with recoveries still occurring to this day (see McFarlane and King 2003). Early tagging studies suggested two behaviors. First, spiny dogfish had the ability to undertake large-scale migrations, the maximum distance between release and recovery locations was 7000 km. Second, most of the spiny dogfish tended to stay "close to home."However, the conventional tagging methods are limited in that they only show start and end points, and time at liberty may not have spatial relevance. No studies have previously investigated the daily behavior of the spiny dogfish and the intervening movement between the tag deployment and recovery locations.

Traditional pop-off satellite archival transmitters are too large for such a small species of shark, but the advent of the smaller tag technology has allowed expanded tagging studies on spiny dogfish. We began tagging them with the Microwave Telemetry X-Tags in 2009, and have since deployed 183 tags. Most of the tags we deployed were in the Gulf of Alaska, but some were deployed in British Columbia, Canada and Puget Sound, Washington waters (Figure 1). Data have been recovered from 147 tags with some tags still at liberty. While there is a substantial volume of data analysis to be done, preliminary analyses have yielded surprising results.

As expected, many (76%) of the tagged spiny dogfish did not venture far from the Gulf of Alaska. However, a surprising number of fish (24%) not only traveled a long distance (maximum of 3509 km in 9 months) but some fish (10%) traveled far offshore in their migration, not along the continental shelf as expected (Figure 1). We have preliminarily labeled fish as either migrants or residents based on the tag deployment location and distance to the tag recovery location (Figure 1). For example, a tag that was deployed near Southeast Alaska and recovered near Kodiak Island was labeled a resident, but a tag that was deployed near Kodiak and recovered in Canadian waters was labeled a migrant. Examination of the temperature and depth data in the winter months showed that the migrants executed large daily vertical migrations (0–479 m) and experienced wide ranges of temperatures (4.4–11.4°C), compared to the residents who tended to remain in a narrow temperature (4.8–8.1°C) and depth range (23–355 m) (Figure 2). Further, the migrant fish demonstrate a strong diel pattern, significantly shallower during the day and deeper at night ($p < 0.001$), which the resident fish did not demonstrate.

These are preliminary results, as tagged fish are still at liberty and much analysis is still to be done. Future analyses of satellite tagging data from spiny dogfish have the potential to provide information directly applicable to stock assessment. For example, data on the daily depth distribution may enable examination of the species availability (and thus catch ability) to the trawl survey which is used to estimate exploitable biomass and catch quotas. In addition to understanding the temperature preferences of spiny dog fish, results of this study may help us evaluate impacts of climate change with respect to this species.

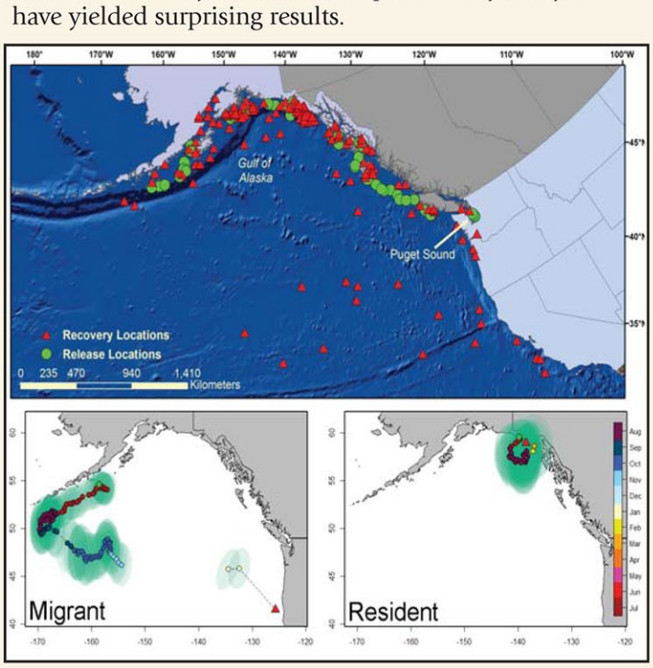


Figure 1. Map of release and recovery location for X-Tagged spiny dogfish (top). Estimated tracklines for a "migrant" (tag number 117197, bottom left) and "resident" (tag number 53691, bottom right) spiny dogfish, color coded by month.

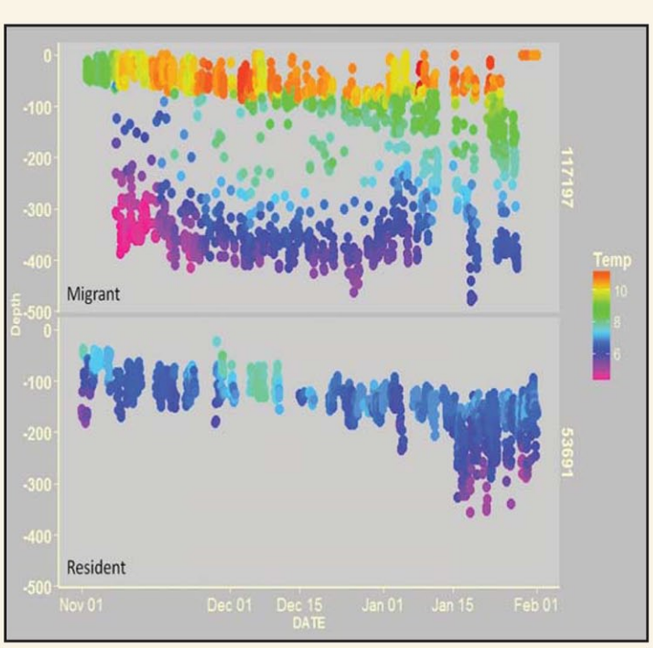


Figure 2. Graph of the depths that the migrant and resident spiny dogfish encountered from November through January. Colors represent the temperatures (°C) at those depths.

Examining Vulture Movements and Behaviors with GSM/GPS Transmitters

Larry Bryan, Amanda Holland, Jim Beasley and Gene Rhodes, University of Georgia's Savannah River Ecology Laboratory, Aiken, South Carolina




Larry Bryan is an avian wildlife researcher. Amanda Holland is a MS student at UGA examining vulture spatial ecology, Dr. Jim Beasley is an Assistant Research Scientist with interests in scavenging and mesopredator ecology, and Dr. Gene Rhodes is the Director of SREL with interests in wildlife ecology and genetics.

Globally, vulture species occupy important roles as scavengers, although human perceptions of vultures are often less distinguished. In North America, Turkey Vultures (*Cathartes aura*) and Black Vultures (*Coragyps atratus*) often congregate in unwanted locations (e.g., roosting on buildings/structures) and, due to their large size and soaring flight behavior, can be a collision risk to aircraft. The resulting bird strikes are dangerous to both birds and humans, and can also result in expensive aircraft repairs. In 2013, through funding by the Federal Aviation Administration, the University of Georgia's Savannah River Ecology Laboratory, in cooperation with researchers with USDA APHIS/ Wildlife Services National Wildlife Research Center (Drs. Travis DeVault and Brad Blackwell), initiated a study to examine methods of dispersing birds such as vultures from unwanted locations using an acoustic hailing device (AHD), which projects a narrow beam of loud noise over long distances. The approach to the study includes documentation of typical patterns of movements and behaviors (e.g., attendance at a site) of birds prior to and after treatment by the AHD. Microwave Telemetry solar GSM/GPS transmitters were selected to document vulture movements. Some of the initial results of the data collected using these GSM/GPS transmitters are presented here.

In June and July of 2013, a total of 20 GSM transmitters was deployed on Turkey and Black vultures (10 each) at dispersed locations throughout the U.S. Department of Energy's Savannah River Site in south-central South Carolina. The vultures were captured on bait sites using a Wildlife Control Supplies NetBlaster and transmitters were attached via backpack harnesses. As of mid-March 2014, 15 transmitters are in operation with one recovered and available for re-deployment, and four lost due to harness attachment failures. These transmitters are programmed to provide a maximum number of locations during periods of peak solar/battery charge, although locations are also provided throughout nocturnal and crepuscular periods. During this ~9 month post-deployment period, over 680,000 locations have been received from these 15 birds. Additionally, an average of approximately 200 locations was received per day per vulture, with a minimum average of 121 and a maximum average of 287 locations per day per bird. These transmitters frequently provided a location every 1-2 minutes, especially during the late morning/early afternoon period. The average proportion of locations with time intervals less than 1 minute is 25% (min 18%, max 37%). Roughly 76% of locations have been reported with time intervals less than 3 minutes and 85% with intervals less than 10 minutes (Figure 1). We also receive altitudinal data (Figure 2), which will be vital when we initiate the sound treatments.

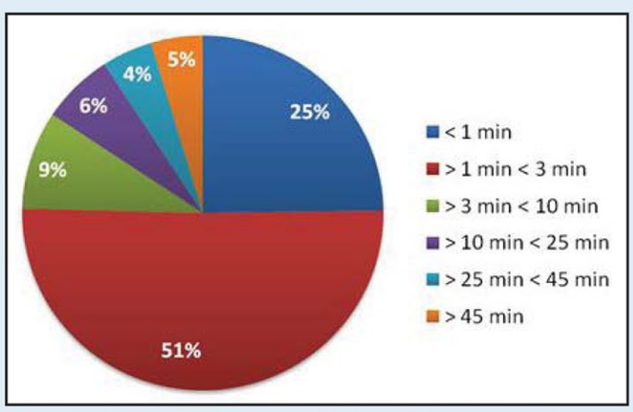


Figure 1. Average proportion of intervals between locations reported by 70g GSM/GPS transmitters.

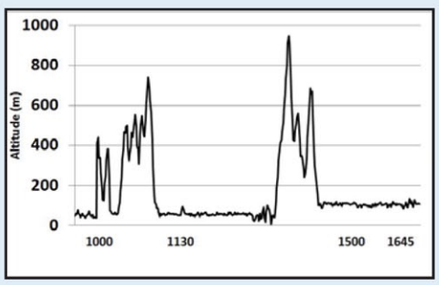


Figure 2. Daily altitude changes of a single Turkey Vulture. Our site is approximately 60-120m above MSL.

Overall the vultures exhibited varying degrees of regional site fidelity. Black Vultures generally remained within 50 km of their SRS capture area throughout the winter whereas a few of the Turkey Vultures exhibited intra-regional movements through Georgia and into Florida, with one Turkey Vulture traveling a one-way distance of approximately 775 km (Figure 3).

Figure 3. Map showing locations (n=71,739) dated June 26, 2013 - March 3, 2014, of a single Turkey Vulture (ID# 173) trapped at the Savannah River Site, South Carolina USA, and tracked by GSM/GPS transmitter.

Prior to conducting the sound treatment tests in the summer of 2014, we are working to establish normal ranges and activity patterns of these vultures. The GSM/ GPS transmitters allow us to monitor fine-scale vulture movements and potential differences in resource utilization among individuals and between species. Results from these analyses will fill important gaps in vulture research by quantifying space use and resource selection patterns of sympatric black and turkey vultures with finer resolution than previous studies conducted on these species. This study will advance understandings of vulture spatial ecology, benefitting conservation of these ecologically important species, and providing managers with enhanced tools for predicting vulture presence and ultimately reducing economic costs of bird-strikes and other conflicts.

Photo by Jim Beasley

Amanda Holland harnessing a Black Vulture with a GSM transmitter.

In the News

Middle School Students Follow Osprey

At MTI, we have always believed that education of young minds is one of the most effective conservation tools and have supported numerous educational projects over the years. In 2011, we teamed up with the Chesapeake Bay Foundation (CBF) and began laying the groundwork for future collaboration. We agreed that offering school-aged children a connection with the animals in the Chesapeake Bay ecosystem could have lasting impacts. Further, we wanted to provide a resource where students and educators could remain engaged long after their CBF educational program ended. CBF sees over 35,000 students pass through its programs each year.

After creating the foundation of our collaboration, we decided upon what species and technological approach would best benefit the new program. We chose osprey (*Pandion haliaetus*), an iconic Bay species with nests in great abundance throughout the Chesapeake region. This is a species researchers have successfully tracked for years in North America after its near demise due to DDT bioaccumulation. The osprey generally spend winters in South America away from the cold temperatures, though some individuals find refuge in the Caribbean. Much of the electronic tracking of osprey over the previous 20 years has used Argos PTTs. The GPS-enabled PTTs used on osprey provide highly accurate geopositional information during nesting, migration, and wintering; the Argos satellite constellation's global coverage allows such data to be collected over the Atlantic and deep into the Amazon basin. While receiving high-resolution GPS data through Argos was vital for understanding migration patterns, significant gaps remain with regard to behavior and fine-scale habitat use. The reason: due to a variety of constraints, PTTs are only able to transmit GPS positions recorded at hourly intervals. As noted on page 5, our GSM/GPS units are able to send users GPS data collected at much higher frequency, thereby allowing students to examine foraging behavior and migration data that match the expectations of a generation accustomed to almost unlimited high-speed mobile data transfer.

In early 2013, we contacted long-time friend and osprey expert Rob Bierregarrd (Research Associate, Academy of Natural Sciences of Drexel University) to ask if he would be willing to help us tag osprey for the collaborative project. Rob graciously offered his support and insight on the proposed project, as he has much experience with other educational programs. Once the permits were obtained, we were ready to go. John Rodenhausen, CBF's Maryland Director of Development – who is definitely no stranger to our GSM units (see Winter 2011 Tracker News) – spied a few nests for the project that he thought would physically connect the students to the osprey. These nests were easily accessible to educators and students during educational programs. Students can make *in-situ* observations of the behaviors of the tagged nesting male osprey. Then they can access the internet and follow where the birds have been foraging. Once their respective CBF educational program concludes, students and teachers can continue to monitor the birds' movements on the CBF website (http://cbf.org/ospreymap). In addition to an interactive map (thanks to Movebank.org) that enables visualization of movement data, the webpage includes information about each tracked osprey as well as resources for teachers and students. Teachers, in addition to using their own creativity, can access lesson plans while students can view entire datasets in Movebank or listen to the call of an osprey should they ever forget what one sounds like.

A day in the life of Woody as he tends to his mate's caloric needs near the Chesapeake Bay Bridge in Annapolis, Maryland. (Example of mobile .kml file that can be viewed on Android devices and later-generation iPad tablets.)

In April 2014, we tagged two more osprey on the Eastern Shore of the Chesapeake Bay in Maryland. We hope students and educators will be able to observe some general differences in foraging behavior among the individuals during the nesting season, in addition to watching their autumnal migrations. We have high hopes for this project and are grateful to all those that have supported the collaboration, including some citizen scientists who have helped us along the way.

Osprey instrumented with 30g GSM/GPS unit.

A. *Tagging team in Port Isobel near Tangier Island from left to right: Lucy Howey-Jordan, Lance Jordan, John Rodenhausen, Rob Bierregaard, Paul Howey, and Bart Jaeger.*

B. *An osprey affectionately known as Woody at CBF's Arthur Sherwood Environmental Education Center in Annapolis, Maryland has an obliquely built "Dr. Suess-esque" nest.*

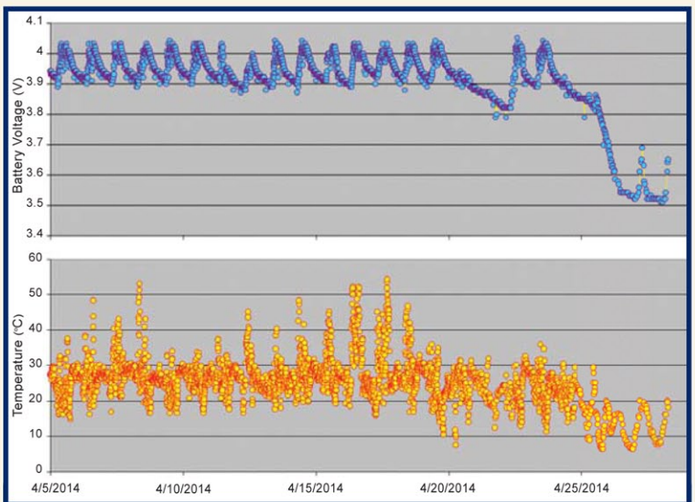
C. *Rob Bierregaard carefully extracting an osprey from its nest*

Tips from Ted: Examining Your Data

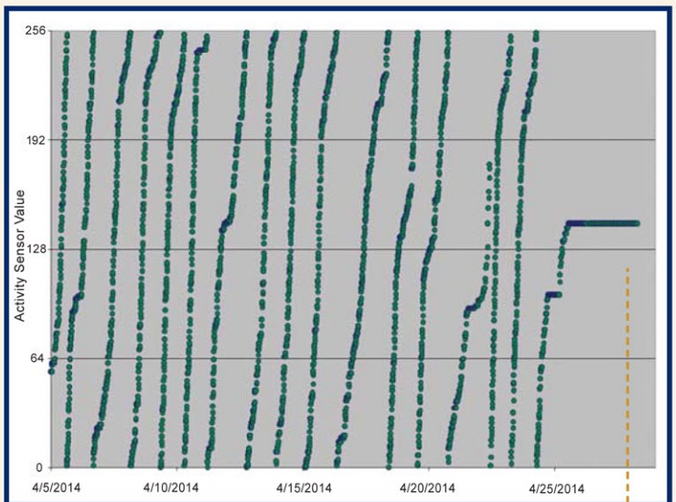
We are often asked to review data by concerned customers who suspect an animal has disappeared or has begun to act differently. Many times they ask how we examine the data in such cases. While we are not experts on the species they are tracking or that animal's activities, we do observe a lot of data and have a great understanding of how our transmitters work. Here are a few basic steps we follow when analyzing datasets.

Graph the Data

Trying to determine the behavior of an animal can be difficult when reading the data directly from the messages or looking at a list. Plotting the data can often simplify the analysis process and help one to visualize the animal's actions.



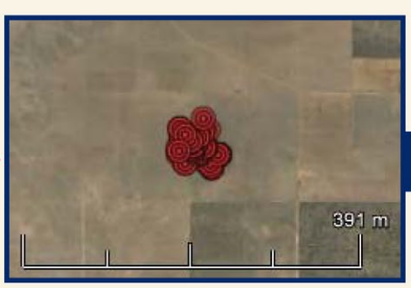
The above graph of sample data shows a period of "normal" temperature and battery voltage fluctuations, followed by a marked drop in battery voltage and temperature. Such a decline may be indicative of bird mortality or transmitter detachment, particularly if there is a concurrent lack of activity, as shown in the graph on the right.

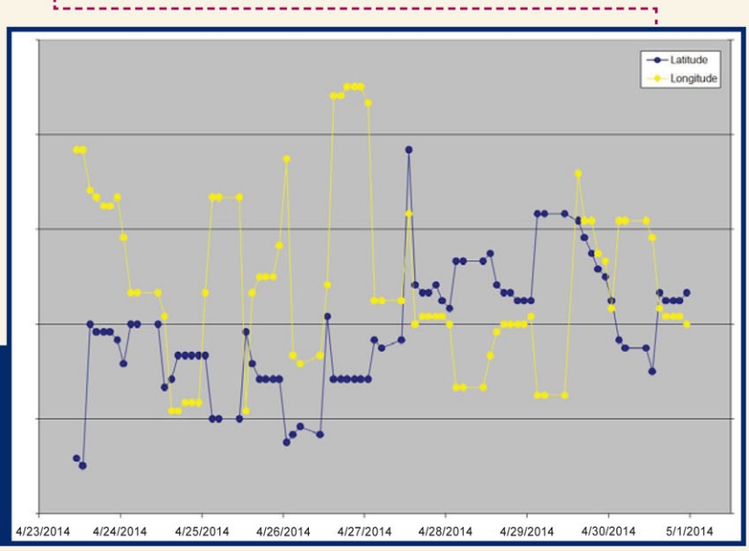


This plot of activity sensor data from one of our GSM/GPS transmitters clearly shows a change in behavior before messages stopped being received.

Plot Latitude & Longitude Through Time

Google Earth is a great tool for mapping your animals' locations and travels, but it can sometimes be difficult especially when working with the time slide bar. Graphing the latitude and longitude independently may give more insight into an animal's movements.





A customer was concerned that one of his GPS transmitters might be down (due to bird mortality or transmitter detachment) as the temperature and battery voltage had dropped for several days. A quick look at a graph of latitude and longitude data showed us that the locations were changing by distances greater than the margin of error for GPS; from this we could conclude the animal was still active.

Look at Your Entire Dataset

When asked to examine customer data we are often given only the last few days of received data. We try to make the best determination possible from the data we're given but misinterpretation may occur when there are few data to examine. Examining a full dataset allows us to detect trends, and gain insight into "normal" behavior for a particular animal and what represents a deviation from previous behavioral patterns.

2015 Christiane Howey Rising Scholar Award

Proposals for the 2015 Christiane Howey Rising Scholar Award will be accepted before October 31, 2014 and reviewed prior to the publication of the Winter 2014 issue of Tracker News. The award recipient will be notified in late December to schedule a production slot. Proposals will be judged by an internal committee. Applicants are encouraged to include an educational component in their research but this is not required. This award is intended to provide researchers who are starting out their careers with the means to get their projects off the ground. It will provide the recipient with five transmitters of his/her choice. Proposals should include an outline of the project indicating the scope and expected outcome. Please include a timeline and let us know what model of transmitter you are interested in using. We are looking for a maximum of 5 pages. The recipient will be responsible for any Argos or GSM data distribution costs. For more information please email support@microwavetelemetry.com or visit our website.

INTERNATIONAL USER CONFERENCE ON ARGOS WILDLIFE APPLICATIONS

NOVEMBER 18-20, 2014
NATIONAL AQUARIUM
BALTIMORE, MD USA

CLS America has announced it will hold an International User Conference on Argos Wildlife Applications.

When: November 18-20, 2014

Where: The National Aquarium in Baltimore, MD USA.

For more information and to register visit www.clsamerica.com

Registration is now open!

Space is limited.

"The International User Conference on Argos Wildlife Applications will showcase the incredible breadth of wildlife science that the international Argos satellite tracking system has enabled for decades, examine the evolving technology and capabilities of the Argos system, and explore the endless possibilities for wildlife monitoring that are within our reach for the future."
- CLS America website

Reminders

We refurbish avian transmitters during the months of August through February. Please return your recovered PTTs to us as soon as possible to ensure we have sufficient time to complete their refurbishment before new production ramps up in the spring.

We require a signed data distribution agreement for each order of GSM transmitters. Orders will not be shipped without a signed agreement on file.

Bits & Pieces

We are now able to accept credit card payments for invoices.

Please double check your transmitter label info on your production form.

Please send us your 2014 published papers so we can update our online library!