

# Tracking the Bald Eagle with 70g GSM/GPS Transmitters

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The Bald Eagle (*Haliaeetus leucocephalus*) was one of the first wildlife species tracked with satellite telemetry. Its large body size (>3,500 g) can easily carry the 100+ g transmitter without impeding breeding or their 4,000 km distance migrations. We estimate several hundred bald eagles have been tracked with PTTs since the 1980s. Over 200 of those were on the Atlantic flyway of North America from eastern Canada to Florida. The Chesapeake Bay is in the middle of the flyway and attracts eagles from three different breeding populations along the flyway.

We were approached by MTI last year to deploy a couple of their transmitters modified to use GSM technology. We wanted to test the units in areas we knew had consistent access to the cell phone network. Unlike most MTI customers, we chose to put the GSM/GPS units on a species where we already had extensive data on their movements. Bald eagles travel a fairly predictable migration route with no known transoceanic flights that would compromise

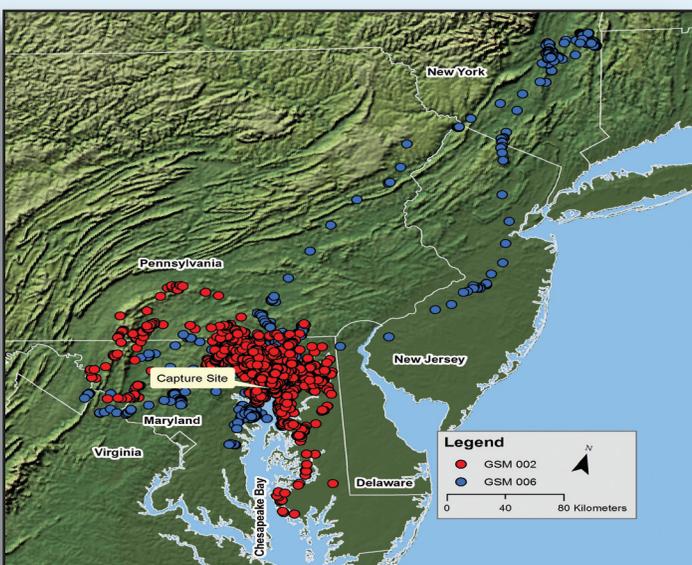
near real-time data transmission. We also chose to deploy the transmitters on individuals from the Chesapeake Bay eagle population because we knew they would not travel large distances and we could retrieve the transmitters if needed.



Photo by Lucy Howey-Jordan

A second-year bald eagle fitted with GSM unit 006

With the help of Lucy Howey-Jordan and Lance Jordan at MTI, we deployed 70g GSM/GPS units on two second-year bald eagles in February 2011. These prototype units were programmed to record a GPS location every hour of the day. We can locate each eagle after the transmitter sends the GPS data via the cell phone network each morning. So far the transmitters have each collected over 10,500 GPS locations over 473 days on the wing. Data transmission through the cell network has been extremely reliable with rare interruptions in the data.



Locations for both Bald Eagles tracked with GSM/GPS units in the Chesapeake Bay region since February 2011.

The GPS data is comparable to those of the 70g solar Argos/GPS PTTs we have on 67 other bald eagles in the same region. The GPS-PTTs are programmed with a majority of the fixes recorded during the day and one programmed at midnight. The additional hourly fixes on the GSM/GPS units have provided us with more data on eagle movements when the daylight increases during summer months. We expect this to be especially useful if an eagle summers in high northern latitudes when behaviors may not be tied to a strict time of day.

Both eagles moved within the mid-Atlantic region as expected. Eagle 002 spent 95% of its time within 50 km of the capture site on the Chesapeake Bay in Maryland but also made two exploratory flights. One



Lucy Howey-Jordan holding eagle 006 while Libby Mojica secures the Teflon backpack harness.

Photo by Lance Jordan

flight went west to the Blue Ridge Mountains of Maryland and Pennsylvania in Fall 2011 and another flight was made southeast to Blackwater National Wildlife Refuge in Spring 2012. Eagle 006 moved farther from the capture site with two flights west to the Blue Ridge Mountains and a 400 km flight North to the Hudson River in southeast New York. The eagle spent Fall 2011 on the Hudson River 130 km upstream of New York City and was likely foraging on seasonally available anadromous fish. Both eagles spent considerable time at the Conowingo Dam on the Susquehanna River (35 km north of the capture site). The hydroelectric dam provides a year-round source of food as stunned fish flow downstream through the turbines. The dam is also home to a large communal roost hosting between 100-200 eagles a night. The eagles also visited 58 of the known 122 roosts in the northern part of the Chesapeake Bay. These movement patterns are similar to the other eagles we are tracking in the region with large home ranges and exploratory flights. It is assumed their sub-adult years are spent exploring the landscape for future breeding territories and mating opportunities.

We plan to track both eagles until they settle into a breeding territory around age 5 which could happen as early as Fall 2013. Of the 34 eagles we are tracking that are of breeding age, only 4 are currently breeding. This high number of floating non-breeders is also reflected in our research on the overall health of the Chesapeake Bay eagle population. The population is exhibiting record high productivity and low mortality rates so the competition for a breeding territory is at an all-time high. It is unknown what the average age of first breeding is currently for the species in the Chesapeake Bay. Using tracking data, we will continue to monitor the complex dynamics of this population using the movements of sub-adult and non-breeding adult eagles. Tracking maps can be found on Movebank.org under the study "Chesapeake Bay Bald Eagles".