Initial Deployment Tests of Tiny PTTs on the Red Knot (Calidris canutus rufa)

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The Western Atlantic population of the red knot (Calidris canutus rufa) has declined by 67-88% since the 1980's. This subspecies undertakes a phenomenal annual migration from wintering grounds in Tierra Del Fuego, Argentina, to breeding grounds in the Arctic and sub-Arctic tundra. Most of the journey is believed to be accomplished in long stretches, including a nonstop journey of over 3,000 miles from the north coast of Brazil to Delaware Bay in the United States, where at least half of the known population stops to refuel by gorging on abundant horseshoe crab (Limulus polyphemus) eggs.

There currently is no research linking specific breeding populations to specific stopover populations, and little information on ecology at alternate stopover sites and food sources outside of the Delaware Bay. Coastal Virginia, for instance, hosts nearly 6,000 migrating red knots each year, but the relationship of birds stopping in Virginia to birds stopping in the Delaware Bay is poorly understood.

Microwave Telemetry provided researchers at Virginia Tech and The Nature Conservancy's Virginia Coast Reserve with an opportunity to fill in these information gaps by tracking red knots throughout their annual cycle. To do this required a PTT light enough in weight that red knots could carry it safely and with a height that keeps the solar cells above the feathers, and a durable attachment method that nevertheless allows for the substantial weight changes the red knot undergoes during migration. In our first field trial, we attached four prototype Microwave Telemetry PTTs to four red knots wintering in Florida in January 2007, using a leg loop harness that held the transmitter just anterior to the tail. This attachment method had been successfully used on sora rails. These prototype PTTs ranged in weight from 5.2 to 6.6 grams. We expected these birds to begin migrating in mid April, and we intended to track their winter movements until that time, then to learn their migratory stopover period, was a nonbreeding bird, as it was sighted in late June in the company of a small number of conspecifics. The activity counter sensed a lack of activity and ceased to increment in late August, we lost the signal soon thereafter. However, the bird had ranged over 36 miles of shoreline during the time we tracked it, and the battery appeared to be fully charged at the start of each cycle. The maps show only the LC3 grade fixes obtained over the approximately 3 month period that the bird was tracked. The activity counter indicates a successful step in the development of a method to satellite track small long distance migrant birds. We intend to attach more tiny PTTs to some red knots in mid-May of 2008 in Virginia, since red knots tagged at that time should migrate to their breeding grounds within two weeks. We hope in this way to obtain unbiased locations of red knot breeding sites in the North American Arctic and sub-Arctic.

We are normally very secretive about our future products, but here we make an exception. Our goal has always been to reduce the weight of our PTTs, making them suitable for smaller species. We have recently had many enquires for PTTs in the 5 gram range.

Jonathan and Jim’s preceding article details their experiences with a few handmade prototypes of such a PTT, proving its feasibility. To put these very tiny PTTs into production is going to be a major undertaking, requiring investment not only in development time but also expensive new equipment to handle the very tiny components. Please be patient, we will make these new units available at the first opportunity.

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