Further Advances on Burrowing Owl Migration





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In 1799, an Italian physicist and chemist, Alessandro Volta, invented the battery. At that time, it was called the "voltaic pile," a cylindrical stack of alternating zinc and copper plates with copper conductors. A marble statue of Volta (built in 1926) shows owls at the corners of the pedestal supporting him, symbolizing the positive relationship between owls and science. Small, powerful batteries are a critical part of the Platform Terminal Transmitters (PTTs) that we are using to examine the migration of Western Burrowing Owls (*Athene cunicularia hypugaea*).

Six young Burrowing Owls. (Photo by Alexandra Munters)

Our project builds upon the efforts of Geoff Holroyd and Helen Trefry (see "5g PTTs Improve Tracking of the Burrowing Owl" MTI Tracker News, Winter 2010) and colleagues in New Mexico. At that time, a 5g backpack-mounted PTT was attached to the owls, often with a neoprene pad glued to the device's underside to raise the transmitter and prevent it from being obscured by feathers.

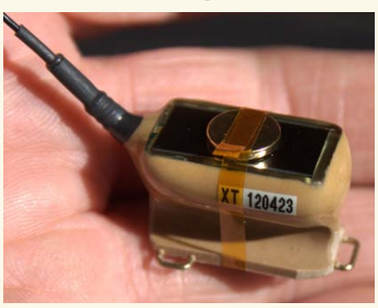


Photo by D.H. Johnson

A solar-powered PTT with lift-kit base. Total weight of modified unit with Teflon tubing harness is 6.2 g. The shape minimizes aerodynamic drag and weight, and allows the owls' feathers to be groomed alongside the unit.

The neck feathers of the owls also needed to be trimmed to reduce obstruction of the solar-panel. To deal with the weight (and eventual failure) of the neoprene pad, and to eliminate the need to trim the feathers (which are molted), we sought out the expertise of MTI's Russell Howey to help design and build a 'lift kit' for the 5g PTTs. In June 2013, we attached 10 of these new lift-kit-equipped PTTs to adult female Burrowing Owls in Oregon, Washington, South Dakota, and Colorado. We used 32-kg-test nylon-coated stainless steel cable for the harness (other scientists use 18-kg-test cable for PTT harnesses on falcons). Owls are tough on equipment, and at least 5 of these 10 owls chewed through this steel cable harness, dropping their units. In 2014, we switched to Teflon tubing for harness material.

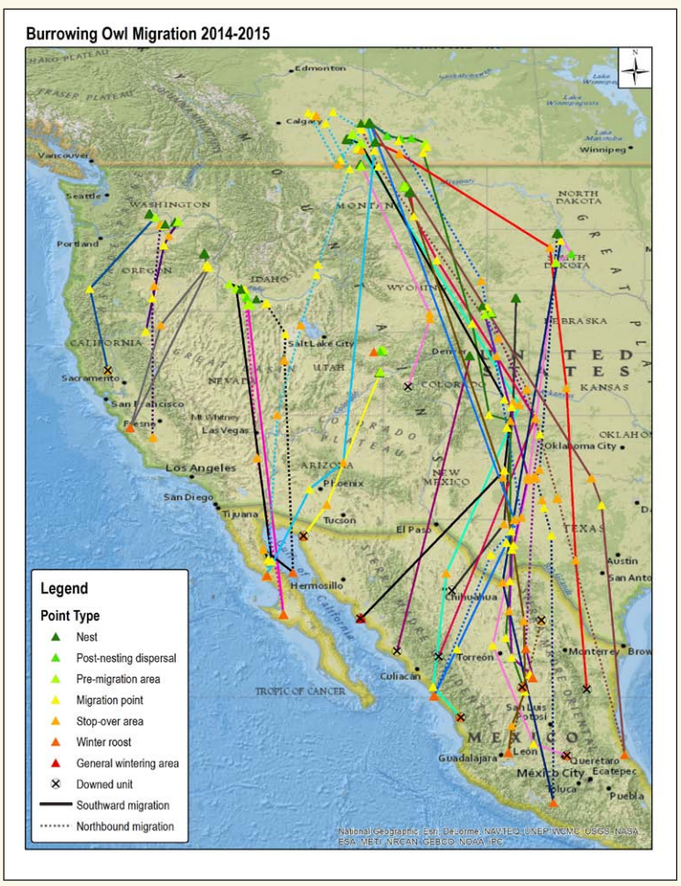
Photo by Dan Somers

Solar PTT with lift kit just attached to a female Burrowing Owl. The owl will groom the unit into her feathers a bit, but feathers will not cover the solar array.

In June 2014, we attached PTTs to 12 Burrowing Owls in Alberta and Saskatchewan, and 10 owls in Idaho, Utah, Montana, and Nebraska. We also had 3 owls marked in Oregon and Washington that continued to carry the PTTs that we placed onto them in June 2013. All owls marked were adult females; females are heavier than males and better suited to carry the combined weight of the modified PTT and harness (6.2 g). Of the 25 owls we tracked during 2014-2015, 9 owls made full-year migrations, and 12 made partial migrations; we recovered 4 other PTTs from the nesting areas because the owls either died or dropped their PTTs before migration.

For the specific time period of 1 June 2014 through 31 May 2015, Argos satellites received signals and calculated 25,493 locations from 25 of our PTTs; of these, 8.7% were Class 3 and 15.8% were Class 2 locations. Burrowing Owls use burrows for nesting and, especially in the case of females, for winter roosts. We have found that wintering females will rest at burrow entrances during the day, ducking farther into the burrow when necessary. While this scenario reduces the vulnerability of the owls, it also results in the PTTs receiving reduced sunlight for recharging. Subsequently, we have had a few PTTs that gave no signals for 1.5-2 months. When the owls started migrating, and were again in the sun, the PTT signals began again.

We have gained important insights on the migration timing and routes, as well as winter destinations, of 21 Burrowing Owls (see map). Results from our project emphasize the critical need for tri-national conservation efforts for this species.



The migration routes of 21 adult female Burrowing Owls. Southward migration in October/November 2014, and northbound migration in March/April 2015. The vast majority of migratory owls from the U.S. and Canada winter in Mexico.