JUNE 2019

Prothonotary Warbler Geolocator Sponsorship Summary

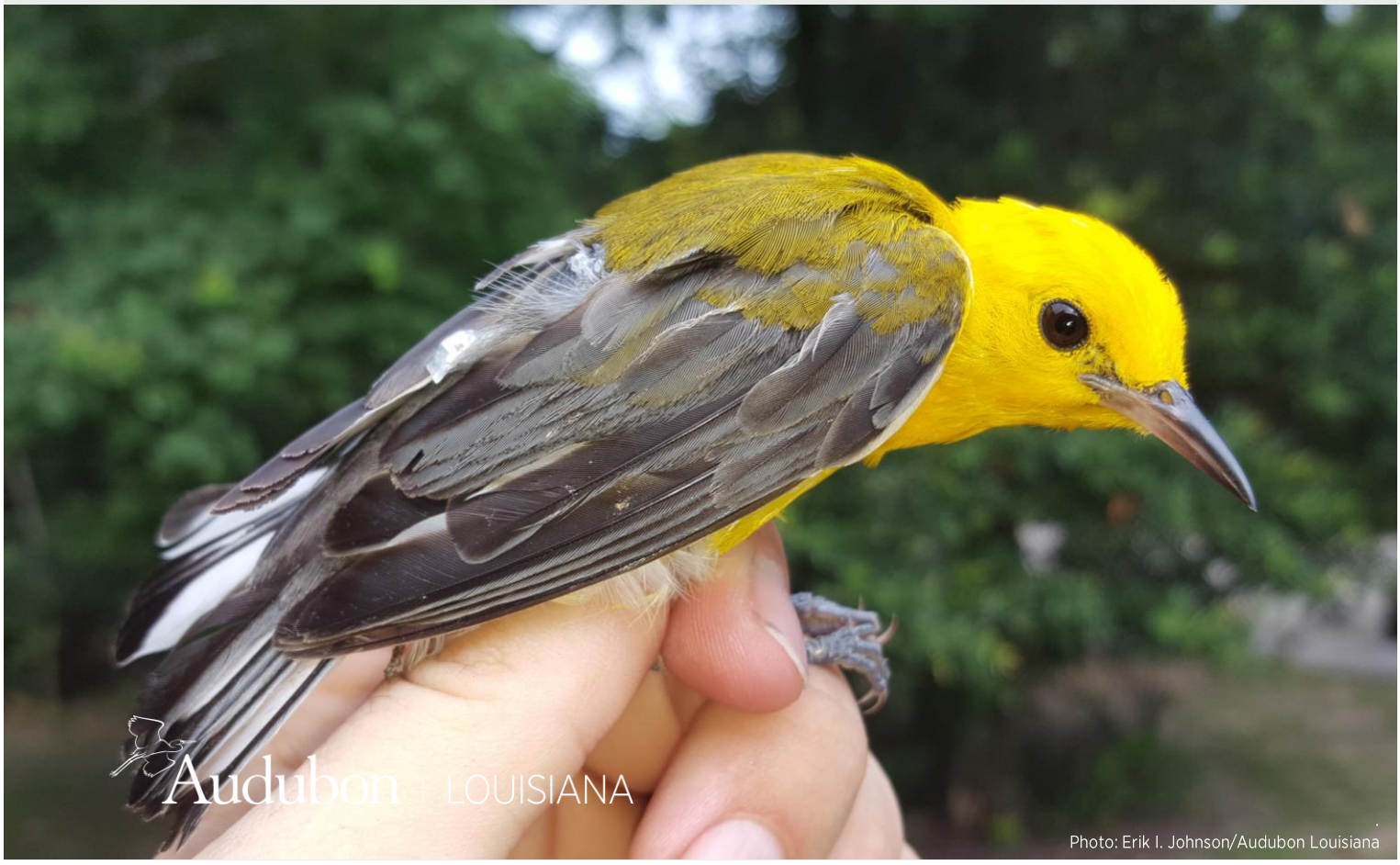

Photo: Erik I. Johnson/Audubon Louisiana

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Background

In 2013, Jared Wolfe with the Louisiana Bird Observatory (a program of the Baton Rouge Audubon Society) secured funding to deploy three geolocators on Prothonotary Warblers. A geolocator measures light intensity every few minutes and logs the data with a time stamp onto a small hard drive powered by a small battery. This information provides sunrise and sunset data, which in turn can be used to estimate latitude and longitude on each day of the year.

Because the data stored on the hard drive of the geolocator, and not wirelessly transmitted from a geolocator (which allows them to be so small and light), the data must be "recovered" the following year. This of course means that the bird carrying the geolocator must be relocated and subsequently captured. Although this sounds difficult, many breeding birds show relatively high site fidelity, and are likely to come back to approximately the same area year after year.

Prothonotary Warblers are cavity nesters and readily use nest boxes, making them a useful study candidate for this kind of work, despite the challenges of working with them in swamps and bottomland hardwood forests. Furthermore, Prothonotary Warbler populations have declined by about 40% over the last 50 years, which is more rapid than the concordant loss of their breeding habitat. This suggests that declines may in part be caused by challenges they face on the migratory or wintering grounds.

As such, geolocators could provide valuable information needed to inform conservation decisions throughout the annual cycle of this species.

First Prothonotary Warbler Geolocator

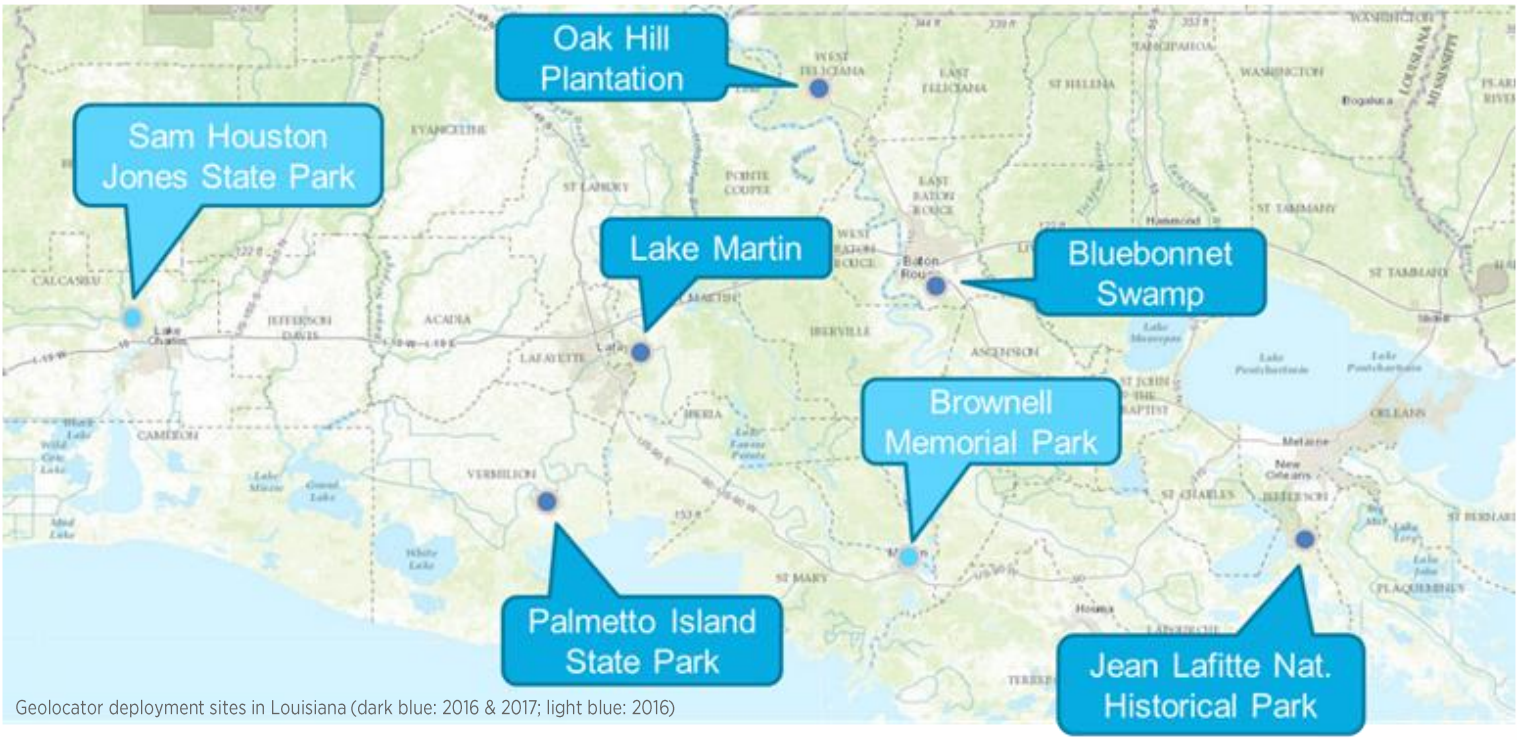
Upon receiving three geolocators in 2013, which weighed 0.5 grams (less than 4% of a Prothonotary Warbler's body weight), Jared and several volunteers (notably Eric Liffmann, Luke Powell, John Hartgerink, Jerry Seagle, and Carol and Jeff Newell) went to work placing nest boxes and catching birds at Bluebonnet Swamp Nature Center, in Baton Rouge. They quickly deployed all three geolocators, but unfortunately one bird dropped the geolocator a few days after deployment and a second bird disappeared from the study area (it may not have been nesting locally, what scientists call a "floater"). The third bird, however, was a known between-year returnee, and carried its geolocator through the rest of the nesting season.

It was a long wait until March 2014, when John Hartgerink located the bird singing on his territory on 24 March! Jared and Erik Johnson successfully recaptured the bird on 25 March and analyzed the data – the first year-round migratory route ever documented for this species. The results were published in the Journal of Field Ornithology.

Prothonotary Warbler Working Group

In February 2014, while still anxiously awaiting for the spring return of GeoDad, Audubon Louisiana organized the first Prothonotary Warbler Working Group meeting, bringing together a collection of researchers and conservation professionals, to begin coordinating a mass deployment of geolocators from across the Prothonotary Warbler's breeding range. Audubon Louisiana secured funding to deploy 20 geolocators in the summer of 2014, and recovered 10 of them in 2015. Between 2014 and 2016, researchers in Arkansas, Ohio, Virginia, South Carolina, and Wisconsin also deployed geolocators.

The biggest challenge was to deploy and recover enough geolocators to be able to provide insights at the population-level, and the Working Group anticipated that this would take several years of research to accomplish. Audubon Louisiana did not schedule a geolocator deployment in 2015 to be sure that the first large deployment in 2014 was successful, which it was. Hence, plans were soon underway for a 2016 geolocator deployment in Louisiana.



Geolocator deployment sites in Louisiana (dark blue: 2016 & 2017; light blue: 2016)

2016 Geolocator Deployment and 2017 Recovery

Geolocator Sponsors

During the end of the 2016 breeding season, thanks to the support of a number of generous and enthusiastic Prothonotary Warbler geolocators sponsors, we deployed 22 geolocators at seven sites across south Louisiana. We deployed geolocators on 14 males and 8 females toward the end of the nesting season, between 1 June and 21 July.

Field Work

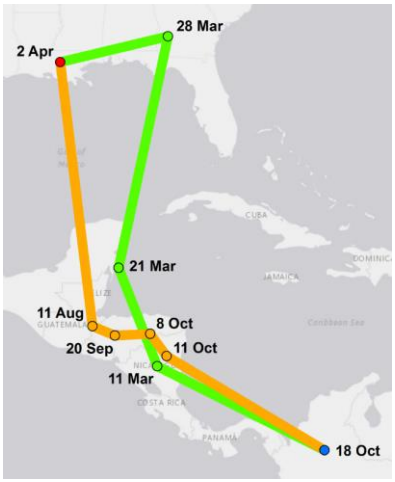
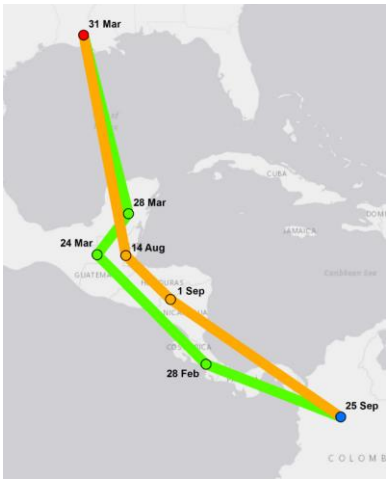
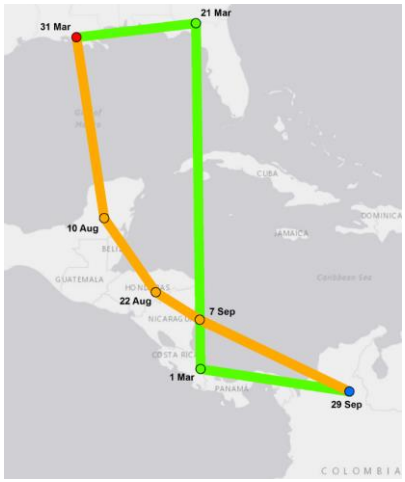
Males were typically captured with a mist-net, luring them in with a decoy and song playback, whereas females were generally captured with a hand net at the nest box. Extensive work between 2013 and 2018, in which we banded 360 adult Prothonotary Warblers using these methods, have demonstrated very low (<1%) nest abandonment rates.

In 2017, we revisited these sites once or twice a week between mid-March and mid-July to relocate returnees carrying geolocators, as well as color-banded individuals from previous years not carrying geolocators. We relocated a total of 6 (27.3%) of the 22 birds given geolocators compared to 42 of 98 (42.9%) color-banded adults not given geolocators.

Although it seems there was a trend for birds with geolocators to return less frequently than those without geolocators, given the sample size the difference in return rates between these two groups was not statistically significant (Chi-square = 1.82, P = 0.178). Furthermore, one bird given a geolocators in 2016 was not seen in 2017, but she was relocated in 2018 (and again has returned in 2019), unfortunately without her geolocator.

Among the six birds with geolocators that were relocated in 2017, one bird could not be recaptured (and she did not return in 2018), and one bird returned with its geolocators harness only (the geolocator had fallen off along the way). Of the four geolocators recovered, one unfortunately had not functioned properly due to a manufacturing error. The three remaining geolocators contained invaluable data showing the entire migratory routes of these individuals: “Caroline Elizabeth (CE)”, “Jimmy Straw”, and “Galadriel.”

Migratory Routes of Three Prothonotary Warblers from Geolocator Recoveries (2016-2017)

"CAROLINE ELIZABETH (CE)"	"JIMMY STRAW"	"GALADRIEL"
		

Leveraging 2016 Geolocator Sponsorships for Additional 2017 Deployments

Although the 2016-2017 geolocator deployment was less successful than our 2014-2015 deployment, we were optimistic that there were more opportunities to gather additional data on the migratory routes of Prothonotary Warblers from south Louisiana. We were able to leverage the critical support from the 2016 geolocator sponsors to receive funding from the Coypu Foundation for another season of geolocator deployments in 2017, as well from the National Geographic Society for field work in 2018 to recover geolocators and begin a project using VHF nanotags to examine fall stopover ecology along the northern Gulf of Mexico.

We again deployed 22 geolocators during the late 2017 nesting season (between 28 June and 12 July), with 10 given to males and 12 given to females. Learning from experiences in 2016, we increased our efficiency in deploying geolocators by focusing on fewer sites (this time 5 instead of 7 sites).

In 2018, we revisited these sites once or twice a week between mid-March and mid-July to relocate returnees carrying geolocators, as well as color-banded individuals from previous years not carrying geolocators. We relocated a total of 6 (27.3%) of the 22 birds given geolocators compared to 65 of 144 (45.1%) color-banded adults not given geolocators. Again, there was a trend for birds with geolocators to return less frequently than those without geolocators, but given the sample size the difference in return rates between these two groups was not statistically significant (Chi-square = 2.46, P = 0.117). Fortunately all six birds with geolocators provided at least fall migration data and over-wintering routes.

Prothonotary Warbler Migration – What We Have Learned

The Prothonotary Warbler Working Group has amassed geolocator data from across six states, having deployed a combined total of 149 geolocators. The results have been published in the June 2019 issue of *The Condor: Ornithological Applications*, a prestigious peer-reviewed ornithology journal. In this publication, we identify critical stop-over regions in Central America, as well as describe a convergence of breeding populations onto their core wintering grounds in northern Colombia. The implications of this has been nicely summarized by Audubon's online magazine.

These are extremely exciting and timely results, especially as Colombia emerges from a 50-year civil war, which will create new dynamics and pressures associated with economic development. We hope and anticipate that this research will lead to new conservation initiatives protecting critical migratory and over-wintering habitat in Central and South America, as well as provide a new appreciation for the challenges that migratory birds face.

Stay Involved

To learn more about Audubon Louisiana's ongoing Prothonotary Warbler research and to get involved,

contact us at Louisiana@audubon.org. Volunteer opportunities include nest box maintenance & monitoring, and assisting with bird banding activities.

Acknowledgements

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Photo: John Hartgerink