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J. Christopher Haney

New findings have begun to question long-held beliefs about the wintering grounds of the endangered Kirtland's warbler (*Dendroica kirtlandii*). For most of the past 30 years, it was assumed that this Neotropical migrant's wintering habitat in the Bahamas was low scrub, which is not only abundant but also relatively stable from change. But these assumptions have been challenged with a variety of analyses conducted on reports compiled since 1841 (Haney et al. 1998. *Condor* 100: 201-217).

It all started with a 1995 sighting of a Kirtland's warbler in what seemed to be atypical habitat on Grand Bahama Island. Rick Oliver of the Bahamas National Trust was giving us a tour of Lucaya National Park, where native vegetation of Caribbean pine (*Pinus caribaea*) overtops a diverse understory. Up popped a Kirtland's warbler, and for the next several minutes this very active bird gave us quite a show. Days later, Lee relocated the bird here.

Because Kirtland's warblers were not supposed to use pine habitat in winter, curiosity prompted us to delve deeper into the historical record. For a century and a half, researchers and other observers visiting the Bahamas between August and May had accumulated sight reports and specimen records of the warbler. But Kirtland's warblers have been extremely difficult to find during this season, so we used a survey technique that employed acoustic playback in an attempt to elicit more detections of this elusive bird.

Field surveys from 1995 to late 1997 revealed at least six more Kirtland's warblers, all in pine woodland with evidence of recent low-intensity fire. (Even more reports from pine habitat were gathered over the 1997-1998 winter.) Acoustic surveys conducted during these recent winters revealed Kirtland's warblers in pine woodlands on the islands of Abaco and Grand Bahama more frequently than expected.

Based on the historical record, we were able to track down 501 accessible reports of 194 individual Kirtland's warblers through November 1997. The vast majority of reports (88 percent) were from the northern Bahamas, and 74 percent originated from pine-dominated islands. Most (75 percent) individual birds during the past century were also from northern islands dominated by Caribbean pine. Between 1841 and 1915, 78 percent of all museum specimens collected in the Bahama Archipelago came from the six pine-dominated islands or island groups.

Because of the irregular manner in which reports were obtained, we checked for potential biases in the historical record. Despite analyses for misidentification in sight reports and unequal survey effort across islands, we found no evidence to support previous speculation that Kirtland's warblers preferred scrub or avoided pine habitats during winter. Indeed, where habitat descriptions had been noted by observers, at least 60 percent specifically mentioned pines and pine understory.

More significantly, variability in the warbler's breeding population corresponded to periods of habitat alteration in the Bahamas. Two periods of apparent decline of the Kirtland's warbler this century occurred when Caribbean pine was extracted at commercial scales. Degradation of the pine ecosystem in the Bahamas accelerated between 1956 and 1973, a period that encompassed the precipitous 60 percent decline in warblers observed between the 1961 and 1971 breeding censuses. A modest population increase of the warbler on the breeding grounds since 1990 has taken place after two decades of recovery in the fire-dependent pine ecosystem in the northern Bahamas.

Due to nest parasitism by cowbirds (*Molothrus ater*) and relative scarcity of jack pine nesting habitat in Michigan, the Kirtland's warbler is usually thought of as "breeding season-limited." Surprisingly, we found that the breeding range (the area circumscribing known breeding sites) is actually 35 percent larger than the area of the entire Bahama Archipelago and 10 times larger than the area of Bahamian pine woodland. A severely restricted winter range could be even less able than the breeding grounds to withstand extensive habitat modifications and, hence, may be limiting Kirtland's warbler populations. But we caution that strong conclusions about the cause(s) of population trends in this Neotropical

migrant have been complicated by events that transpired simultaneously on the breeding and wintering grounds. In February 1998, researchers and recovery team members met on New Providence and Grand Bahama islands to survey warblers and discuss prospects for greater conservation of this species during winter. Our field work was organized by the Bahamas National Trust (Rick and Kathy Oliver), and included local ornithologists as well as the Bahamas Ministry of Agriculture and Fisheries (Eric Carey). Representatives from the recovery team included the U.S. Fish & Wildlife Service (Mike DeCapita), USDA Forest Service (Phil Huber), and Michigan Department of Natural Resources (Jerry Weinrich). North American organizations taking part in the field surveys included the North Carolina Museum of Natural Sciences (Lee), The Wilderness Society (Haney), and The Nature Conservancy (Dave Mehlman, Dave Ewert).

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