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Recent Sightings of Kirtland's Warblers on San Salvador Island, The Bahamas

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ABSTRACT.—Here we present recent accounts of Kirtland's Warblers (*Setophaga kirtlandii*) captured and observed on San Salvador Island, The Bahamas, in 2012

and 2013. We conducted mist-netting and passive surveys in a variety of habitats on the island from January–March 2012 and December 2012–March 2013. We captured four warblers and sighted at least six other individuals, including two color-banded birds originally banded near Mack Lake, Michigan, USA. Warblers were primarily captured or observed in coastal scrub and inland low coppice habitats where vegetation height is <4 m, has a scrub/shrub appearance, and openings because of disturbance. These habitats are similar to habitats preferred by Kirtland's Warblers on other Bahamian islands, and also have fruiting plants the warblers prefer such as *Erithalis fruticosa*, and *Lantana involucrata*. To our knowledge, these are the first confirmed cases of observed Kirtland's Warblers on the

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island in over 46 years. Received 11 January 2013. Accepted 7 April 2013.

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The Kirtland's Warbler (*Setophaga kirtlandii*) is a federally endangered Neotropical migrant bird that breeds in Michigan, Wisconsin, and Ontario (Probst et al. 2003, Richard 2008, Trick et al. 2008). Range-wide surveys on the non-breeding grounds indicate that the Bahamian archipelago is the center of Kirtland's Warbler distribution, with the majority of past sightings on Grand Bahama, New Providence, and Abaco, as well as more recent sightings from research conducted on Eleuthera (Haney et al. 1998, Sykes and Clench 1998, Wunderle et al. 2010). Here we present accounts of Kirtland's Warblers observed and captured in their wintering grounds on San Salvador Island, The Bahamas. We also present a description of the habitats in which these individuals were sighted, and compare them to other wintering habitats Kirtland's Warblers have previously been found utilizing. To our knowledge, these are the first confirmed cases of observed Kirtland's Warblers on the island since 1965 (Haney et al. 1998).

All of these sightings were observed incidentally as part of a larger study examining the wintering ecology of Prairie Warblers (*Setophaga discolor*) and other migratory birds on San Salvador Island, The Bahamas. The study encompassed a number of different habitat types, including two sites in coastal scrub habitat totaling about 13 hectares in size. These plots consist of plant species such as *Reynosia septentrionalis*, *Croton linearis*, *Erithalis fruticosa*, *Pithecellobium keyense*, *Bourreria ovata*, *Lantana involucrata*, and many other shrubby woody vegetation species and vines (Smith 1986, Sykes and Clench 1998). All of these species are low growing, resulting in dense vegetation ranging between 1–4 m in height. These sites were located within 600 m east and west of the Gerace Research Centre (24° 07' N, 74° 27' W) (Fig. 1).

Two additional sites ("GRC" and "RHP") were located south of the GRC. The 3 ha GRC plot (vegetation height ranging from 2–6 m) consists of plant species such as *Leucaena leucocephala*, *Casuarina equisetifolia*, *Corchorus hirsutus*, *Pluchea odorata*, and *Prunus amygdalus*. The RHP plot, 350 linear meters in size

(vegetation height ranging from 2–3 m), consists of short dense broadleaf vegetation (known as coppice), and *Rhizophora mangle*.

A fifth and sixth site ("Jake Jones Road" and "Little Lake") were located in the northwest part of the island. Jake Jones Road (24° 06' N, 74° 30' W), a 6-ha plot (vegetation height ranging from 1–8 m), consists of a mosaic of wet and drier areas with plant species such as *Rhizophora mangle*, *Sabal palmetto*, *Conocarpus erectus*, *Chrysobalanus icaco*, tall coppice (4–8 m) dominated by *Eugenia foetida*, *Metopium toxiferum*, and *Hippomane mancinella*, as well as upland areas with inland low coppice (1–4 m) with *Phyllanthus epiphyllanthus*, *Amyris elemifera*, and *Croton eluteria*. Located to the south of Jake Jones Road, the 8-ha site at Little Lake (24° 05' N, 74° 30' W) consists of tall coppice, *Conocarpus erectus*, and *Rhizophora mangle* surrounding a lake. Low coppice is present along ridges on the north, south, and west sides of the lake.

Finally, a seventh site known as "FM" (24° 03' N, 74° 31' W), is located adjacent to lakes and consists of patches of *Conocarpus erectus* and *Cladium jamaicense*. However, within the 7-ha plot there were also patches of low coppice, areas with vegetation such as *Leucaena leucocephala*, *Schinus terebinthifolius*, and *Casuarina equisetifolia*, and areas with coastal scrub vegetation. Vegetation heights within the site were highly variable, ranging on average from 1–10 m, although some scattered *Casuarina equisetifolia* were up to 15 m in height.

Mist-netting and surveys were conducted in every plot except for Jake Jones Road and Little Lake from early January–late March 2012, and in all plots from late December–March 2013. Mist-netting was done mainly in January and March, while surveys were mostly conducted in February. Point counts were also conducted during February of 2012. We quantified netting, point count, and survey efforts for each plot within each year (Table 1). Amongst both years and all study plots, we conducted over 3,000 12-m net-hours, 300 survey hours, and eight point count hours. Net-hours consisted of both target netting (using playback calls of Prairie Warblers and White-eyed Vireos (*Vireo griseus*) to lure birds toward nets) and passive netting.

On 24 January 2012, we captured a Kirtland's Warbler on San Salvador Island in the coastal scrub just west of the GRC. We determined the individual to be an after-second-year (ASY)

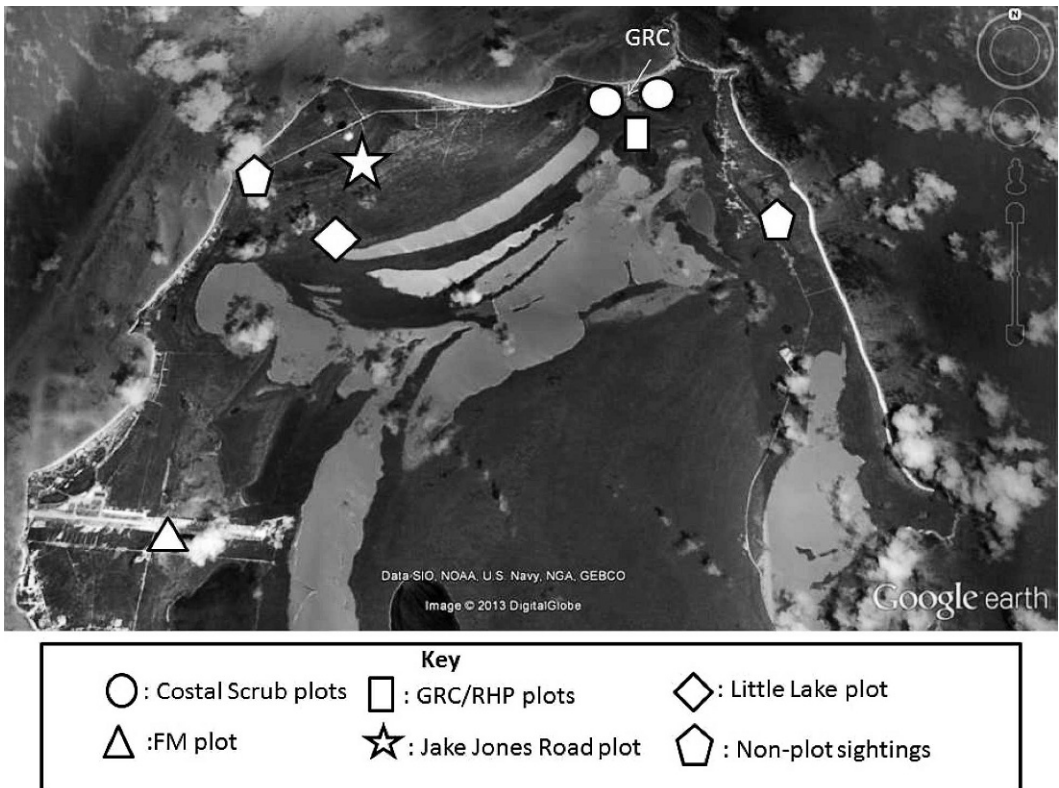


FIG. 1. Google Earth™ satellite imagery of the locations of study plots and other Kirtland's Warbler sightings on the northern half of San Salvador Island, The Bahamas.

female, based on plumage characteristics as described by Pyle (1997). Three additional individuals were also captured in the coastal scrub during the two field seasons, a second-year (SY) male on 1 March 2012 (Fig. 2), an ASY female on 10 March 2012, and a hatch-year (HY) female on 22 December 2012. Though the first and last individuals captured were never observed again, the other two individuals were re-captured on 14 and 11 March 2012, respectively. The male was re-captured 242 m from its original capture location, and the female was re-captured 99 m away.

In addition to capturing Kirtland's Warblers, we also had sixteen observations of foraging individuals on our study plots during the two study seasons. Most of these observations were relatively brief, with the observer sighting the bird long enough to identify it as a Kirtland's Warbler. We sighted individuals in coastal scrub habitat on 11, 17, 19, 20, 22, and 23 February 2012, and 9 and 27 February 2013 in the coastal scrub plots.

Additionally, a bird was seen by another researcher on 1 October 2012 in one of our coastal scrub plots (K. Peiman, pers. comm.). We also sighted Kirtland's Warblers in inland low coppice on 23 February 2012 at the edge of a coastal scrub plot, 18 January, 7 February 2013 in Jake Jones Road, and observed birds on 23 February, 11 March, and 1 April 2013 in Little Lake.

We also observed Kirtland's Warblers while birding in other parts of the island outside of the study plots. One bird was sighted near "Fresh Lake" (24° 05' N, 74° 26' W) on 3 March 2013 and by "Triangle Pond" (24° 06' N, 74° 31' W) on 10 March 2013. The warblers were sighted in coastal scrub habitat and were also found to be foraging in *Erithalis fruticosa*.

We were able to confirm that most of the individuals were unbanded; however, two individuals were color-banded. The first individual, seen over a 40-sec observation period on 23 February 2012, was determined to have been originally

TABLE 1. Mist netting (12-m net hours), surveying (hours), and point count (hours) effort for different plots and years, on a study examining the wintering ecology of Prairie Warblers (*Setophaga discolor*) on San Salvador Island, The Bahamas.

January 2012–March 2012				
Effort types	Habitat types			
	Coastal scrub	GRC/RHP	Jake Jones/Little Lake	FM
Mist Netting	610	227	0	166
Surveying	75	1	0	33
Point Counts	4	0	0	5
December 2012–March 2013				
Effort types	Habitat types			
	Coastal scrub	GRC/RHP	Jake Jones/Little Lake	FM
Mist Netting	925	307	405	444
Surveying	106	20	51	48
Point Counts	1	0	1	1

captured in 2009 as a SY male near Mack Lake, Michigan, USA (S. Rockwell, pers. comm.). On 9 February 2013 we sighted another color-banded warbler, this time an even older individual originally captured as a SY male in the same area of Michigan in 2006 (S. Rockwell, pers. comm.).

Knowing that Kirtland’s Warblers seldom travel more than 6 km during the non-breeding season (Wunderle et al. 2007), we conservatively estimate that we captured or sighted at least 10 individuals.

While capturing the individual on 11 March 2012 we observed a fecal sample that contained



FIG. 2. One of the Kirtland’s Warblers, a second year (SY) male, captured in March 2012 on San Salvador Island, The Bahamas. Prior to the capture of this individual and several others, there had not been a confirmed sighting of a Kirtland’s Warbler on the island since 1965. Photo by Todd Jones.

purple fruit. This is consistent with Wunderle et al. (2010) finding Kirtland's Warblers on Eleuthera frequently consuming fruit during the non-breeding season. Purple fruit-bearing plants occurred throughout the habitats where we encountered the birds. These included species such as *Erithalis fruticosa* and *Lantana involucrata*, whose fruits were frequently eaten by birds in Eleuthera (Wunderle et al. 2010). Presumably, the fruit from one of these plant species was what we observed in the fecal sample.

All of these observations occurred in coastal scrub and inland low-medium height coppice habitats. We did not capture or sight any birds within other sampled habitats in San Salvador, including tall coppice areas (>5 m in height), despite considerable search and mist-netting effort (Table 1). The coastal scrub and inland low coppice habitats on San Salvador are similar to Kirtland's Warbler wintering habitat described in other studies (Miller and Conroy 1990, Sykes and Clench 1998, Wunderle et al. 2010). These habitats generally have low vegetation (<4 m tall), a dense scrub/shrub appearance and usually have openings where the habitat has been disturbed, and contain fruit bearing plants. However, sightings in the Little Lake plot were an exception, where warblers were sighted in tree-like vegetation consisting of 4–5 m coppice. This habitat did have fruiting *Erithalis fruticosa*, suggesting that birds may also use slightly taller coppice if there is preferred fruiting vegetation.

Our observations of Kirtland's Warblers are, to our knowledge, the first documented sightings and captures on San Salvador Island in over 46 years (Haney et al. 1998). Despite surveys by birders, ornithologists, and student groups visiting the research center after 1970 (Miller 1978; Sordahl 1996; Murphy et al. 1998, 2001), it is possible that individuals were wintering on the island prior to our accounts, but were not detected for a number of reasons. The most likely being that previous surveys (Murphy et al. 1998, 2001) focused on habitat types such as stands of *Rhizophora mangle* and *Leucaena leucocephala* that appear to be less preferred by Kirtland's Warblers (Wunderle et al. 2010).

An alternative explanation for the gap in sightings of Kirtland's Warblers on San Salvador is that the species has actually been absent from the island for the past 46 years. Earlier sightings from the 1960s preceded observed declines in breeding populations in the 1970s (Probst et al. 2003) that could have caused the non-breeding

range to contract as well. By this logic, the numerous encounters we report could be result of the species' recent population increase (Probst and Weinrich 1993, Kepler et al. 1996, Probst et al. 2003, fig. 2 in Donner et al. 2008) and breeding range expansion into Michigan's Upper Peninsula, Wisconsin, and Ontario (Probst et al. 2003, Richard 2008, Trick et al. 2008).

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