Kirtland's Warbler Conspecific Playback Experiment
2014 Report

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Introduction

Kirtland's Warblers (*Setophaga kirtlandii*) have been found singing on territory in Wisconsin sporadically since 1978 (Tilghman 1979), including sightings in Juneau, Jackson, Douglas, Washburn, Vilas, Marinette, Adams, and Bayfield counties (Trick et al. 2008, Domagalski 2012). There are numerous areas within Wisconsin that hold the sandy soils and young jack pine (*Pinus banksiana*) required for this species, and managers in some areas have begun to incorporate Kirtland's Warbler into their management plans and devote resources to managing directly for this endangered species. Despite these factors, the only consistent population we know of in Wisconsin continues to be in Adams County. Although multiple Kirtland's Warblers have been found together in Jackson, Marinette, Vilas, and possibly Douglas counties, these populations have failed to become established.

Although the recent trend in global Kirtland's Warbler population size is promising, the majority of the pairs breed in a very small geographic area, leaving a large percent of the breeding population vulnerable to a single event like a large wildfire. Another threat is climate change, which is predicted to negatively impact jack pine in the primary breeding areas, both in the Lower Peninsula of Michigan and in Adams County Wisconsin (Prasad et al. 2007). Therefore, it would be beneficial for Kirtland's Warbler conservation and management if we had a tool to attract individuals to suitable habitats to help establish new colonies in Wisconsin.

Here, we used a technique called conspecific attraction to attempt to lure Kirtland's Warblers to suitable but unoccupied habitats in Wisconsin. This technique has previously been demonstrated to work well with endangered Black-capped Vireos (*Vireo atricapilla*) in Texas (Ward and Schlossberg 2004), threatened Least Terns (*Sternula antillarum*) in Missouri (Ward et al. 2011), and Grasshopper Sparrows (*Ammodramus savannarum*) in Illinois (John Andrews, University of Illinois Urbana-Champaign, unpub. data). Birds use the presence of conspecifics as one way to evaluate habitat quality, and birds that hear other members of their species (i.e., conspecifics) singing in an area are more likely to set up territories nearby (Muller et al. 1997, Ahlering and Faaborg 2006). We can artificially induce this by setting up callboxes (i.e., a weatherproofed audio speaker system) that broadcast Kirtland's Warbler songs in suitable habitat. Male Kirtland's Warblers are more likely to settle in an area if they hear the songs of other singing males because they assume other males have already established territories. Females in the area, hearing several singing males, may also be more likely to settle. This technique concentrates birds that may be roaming through an area at different times, but not "connecting" with each other, a pattern that is likely hampering establishment of populations in Wisconsin.

Methods

We deployed callboxes at 4 sites across northern Wisconsin (Fig. 1), Bayfield County Forest, Chequamegon-Nicolet National Forest, Vilas County Forest, and Marinette County Forest. These sites encompass the majority of sand landscapes that do not currently have a known population of Kirtland's Warblers, with the exception of Black River State Forest in Jackson County, where we found little suitable habitat at the present time. We intentionally avoided sites near Adams County to avoid interfering with settlement patterns of the existing population.

Each site had 3 callboxes, which we ran from 4–7 May to 1–22 July 2014. The callboxes consist of game callers (NX3 and NX4 modified to play autonomously, FoxPro, Lewiston, PA) powered by 12v deep-cycle batteries. Vocalizations were played daily from 21:00–05:00, 06:00– 09:30, and 13:00 – 14:00. These times were selected because night vocalizations may attract migrating warblers, morning is the time of most singing activity, and afternoon vocalizations reinforce that birds are still present. A 12-volt digital timer (CN101, Oktimer, Yueqing City, China) controlled when the game caller was powered and a single deep-cycle marine battery powered the system for 4–6 weeks. During the time the speaker was playing, Kirtland Warbler vocalizations played 85% of the time, and the remaining time was randomly interspersed with 0.5–3-minute periods of silence, and 45-second periods of song from Brown Thrasher (*Toxostoma rufum*), Eastern Towhee (*Pipilo erythrophthalmus*), Vesper Sparrow (*Pooecetes gramineus*), Clay-colored Sparrow (*Spizella pallida*), and Nashville Warbler (*Oreothlypis ruficapilla*), common species that co-occur with Kirtland's Warblers in barrens

habitat. Previous research with Black-capped Vireos suggests that interspersing tracks with silence and vocalizations of other species in the area is sufficient to attract target species.

We used GIS layers of forest stands and ground-truthing to select what we considered to be the most suitable stands for Kirtland's Warblers in each landscape. Treatment stands were on sandy soils with dense ground cover for nesting, and the tree cover was dominated by 9–13-year-old jack pine. We selected stands where trees provided a matrix of openings and thickets and still retained live low branches. We selected sites in landscapes in which singing males have previously occurred and in landscapes in which future management for young jack pine is feasible. Treatment stands averaged 73 acres in size (range = 44–121).

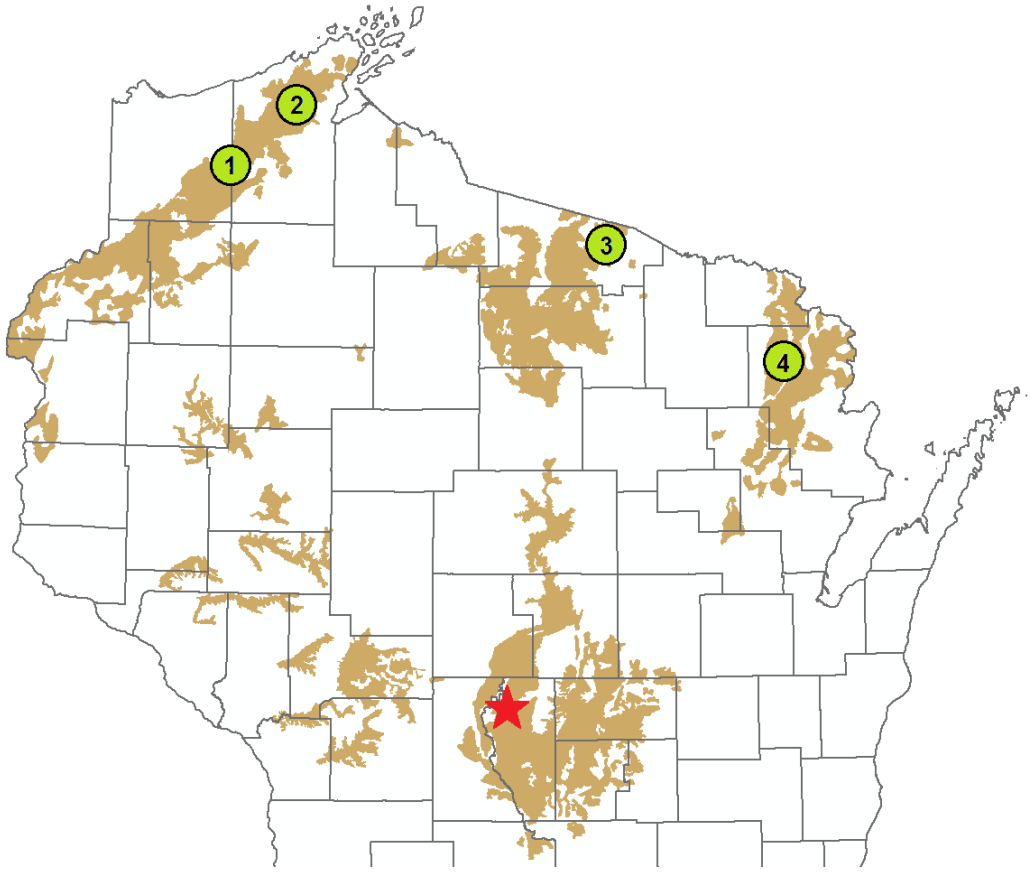

Fig. 1. Locations of audio playback stations for Kirtland's Warblers in Wisconsin. 1. Bayfield County Forest, 2. Chequamegon-Nicolet National Forest, 3. Vilas County Forest, 4. Marinette County Forest. Tan indicates forested lands with sandy soils, and the red star indicates the only currently known population of Kirtland's Warblers, in Adams County.

Sites were monitored weekly from 9–14 May to 5–10 July, by an experienced observer. We conducted point counts every 200 m, starting around dawn, listening and looking for Kirtland's Warblers. We also noted the number of Brown-headed Cowbirds (*Molothrus ater*; a potentially harmful brood parasite of Kirtland's Warbler) and noted other species we observed at the stand. In order to establish that occupancy at sites was due to use of our playback, surveyors also surveyed for Kirtland's at a nearby (1.2–3.2 km away) control site with similar habitat

where no playback occurred. Treatment stands averaged 54 acres in size (range = 15–105), and ranged from 8–12 years of age.

Results

Bayfield County Forest

We attracted 1 male to the treatment stand on Bayfield County Forest, and no birds to the control stand. The male was first observed on June 9 (Fig. 2) and seemed to be holding to a relatively small territory by then, so presumably he first arrived between June 9 and the June 4 visit when no birds were detected. On June 10, Joel Trick and Ron Refsnider arrived to band him (Fig. 3) and they aged the bird as SY (born last year). He was still present June 11 but did not linger as long as we had hoped, as he had apparently moved on by the June 18 visit. As that time of year is approaching the limit of possible nest initiation, he may have decided to move on relatively soon after not finding a female. Because of the colorbands, we will now be able to tell if this bird shows up at the site again; it is possible, if this bird did not find a mate elsewhere, that he will check this location first thing next spring.

We recorded 43 other bird species using the control and treatment stands, dominated by Eastern Towhee, Clay-colored Sparrow, Brown Thrasher, and Blue Jay (*Cyanocitta cristata*). Brown-headed Cowbird numbers averaged 0.7/visit on the treatment stand and 1.1/visit on the control stand. Notably, we observed Sharp-tailed Grouse (*Tympanuchus phasianellus*) using the open areas within the treatment stand.

Fig. 2. Kirtland's Warbler singing in Bayfield County Forest playback stand, June 9, 2014.

Joel Trick

Fig. 3. Kirtland's Warbler caught and colorbanded in Bayfield County Forest playback stand, June 10, 2014.

Chequamegon-Nicolet National Forest

No Kirtland's Warblers were found on the Chequamegon Nicolet National Forest playback or control stands. We recorded 44 other bird species using the control and treatment stands, dominated by Nashville Warbler, Clay-colored Sparrow, Brown-headed Cowbird, and Eastern Towhee. Brown-headed Cowbird numbers averaged 4.25/visit on the treatment stand and 0.9/visit on the control stand. Due to the relatively small size of these stands and little future habitat in this area at this time, we will likely drop this site in 2015.

Vilas County Forest

No Kirtland's Warblers were found on the Vilas County Forest playback or control stands. We recorded 36 other bird species using the control and treatment stands, dominated by Palm Warbler (*Setophaga palmarum*), Chipping Sparrow (*Spizella passerina*), Yellow-rumped Warbler (*Setophaga coronata*), and Red-eyed Vireo (*Vireo olivaceus*). Brown-headed Cowbird numbers averaged 0.2/visit on the treatment stand and 0.1/visit on the control stand. The most notable bird observations were a Common Nighthawk (*Chordeiles minor*) on a nest in the treatment stand, and a Spruce Grouse (*Falcipennis canadensis*) hen with brood in the control stand.

Marinette County Forest

No Kirtland's Warblers were found on the Marinette County Forest playback or control stands. We recorded 38 other bird species using the control and treatment stands, dominated by Chipping Sparrow, Nashville Warbler, Eastern Towhee, and Vesper Sparrow. Brown-headed Cowbird numbers averaged 0/visit on the treatment stand and 0.2/visit on the control stand.

A male Kirtland's Warbler returned to this landscape to the stand he had been occupying since 2011, which was 5.8 km from our treatment stand. Males have often been reported to persist at sites where they once nested, even as those sites become too old and younger birds colonize nearby sites with more suitable habitat (Bocetti et al. 2014). This bird behaved similarly and was never observed at our treatment stand. This is the first year since monitoring began in 2008 that no new male Kirtland's Warblers were found in Marinette County.

Discussion

Our playback successfully attracted one male to a treatment stand, and no birds were detected at control stands. However the bird we attracted did not linger significantly longer than other Kirtland's Warblers that have been found in northern Wisconsin. Perhaps if he had arrived earlier, he would have been more inclined to stay at the stand several weeks. His mid-June arrival suggests he had been wandering and apparently continued to wander in search of a female this year. It is possible this bird will return early in May next year to check the Bayfield County site.

We are unsure if any females found our playback sites. Females are difficult to detect when not seen with males or fledglings. If any females found our site, but remained undetected or left after not finding any males, they might also check the site in early May next year.

One of the uncertainties with this project was whether there were more Kirtland's roaming around northern Wisconsin than we thought. The one bird we detected represented 100% of the new birds seen in northern Wisconsin this year. 24 volunteers checked 39 additional areas across northern Wisconsin and found no Kirtland's (Rich Staffen, WDNR, pers. comm.). These findings suggest at this time, there are not many Kirtland's wandering around northern Wisconsin, and in fact, there seemed to be fewer this year than in past years (J. Trick, K. Grveles, pers. comm.; Table 1). This could be due to an extremely cold and late spring this year (there were still patches of snow on the ground when boxes were deployed) or could be due to limited productivity in recent years at the Adams County breeding site. We are still uncertain about the natal origins of northern Wisconsin birds; perhaps additional nestling banding done this year in Adams County will reveal whether that is the main source for our northern birds.

While some studies have used conspecific playback to immediate success (e.g. Ward and Schlossberg 2004) it is apparent that small number of birds in Wisconsin and the large distances between the quality habitat and the nearest known populations may pose a greater challenge in Wisconsin. Our sites were ~210–300 km from the Adams County population, ~80–230 km from the nearest possible breeding location in the Upper Peninsula, and ~280–560 km from the nearest breeding sites in Lower Michigan, and of course the small global population size of Kirtland's Warbler (~2000 pairs) also presents a challenge.

We intend to operate playback stations again in 2015, and will be interested in seeing if any birds that went undetected or found sites late in the season will return first thing in May. A second year will also help determine if the cold spring of 2014 made for a poorer year than usual up north. Given the distance from known populations, and the relatively few birds that seem to

be roaming across northern Wisconsin, even with our technique, the establishment of a nesting population up north may involve an element of luck.

Table 1. Number of male Kirtland's Warblers detected each year in the four major Northern Wisconsin landscapes. Numbers in parentheses correspond to regions shown in Fig. 1. All birds are presumed to be unique individuals (though some were never banded, hence the uncertainty in some years) with the exception of one colorbanded bird that returned to the same stand in Marinette 2011–2014.

Year	Bayfield/Douglas (1)	Moquah (2)	Vilas (3)	Marinette (4)	Total
2008	0	1	0	2	3
2009	0	0	0	2	2
2010	1	0	0	1–3	2–4
2011	1–2	0	0	1–2	2–4
2012	1–3	0	1	1–4	2–7
2013	1	0	0	2	3
2014	1	0	0	1	2
Total	5–8	1	1	10–16	

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