

Kirtland's Warbler Conspecific Playback Experiment 2016 Report



Photo: Eric North

Nicholas M. Anich
Wisconsin Department of Natural Resources
nicholas.anich@wisconsin.gov

Eric North
All Things Wild Consulting

Michael P. Ward
Illinois Natural History Survey

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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 (see Bocetti et al. 2014), and managers in some areas have begun to incorporate Kirtland's Warbler into their management plans and devote resources to managing for this endangered species. Despite these factors, the only known persistent population 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 individuals have failed to establish consistent breeding populations.

While the recent increase in the global Kirtland's Warbler population is encouraging, the majority of the breeding population is in a very small geographic area, leaving a large percent of the breeding population vulnerable to a single event such as a large wildfire. Climate change has also been 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 to develop a tool to attract individuals to suitable habitats and establish new colonies in Wisconsin.

We used conspecific attraction to attempt to lure Kirtland's Warblers to suitable but unoccupied habitats in Wisconsin. This technique uses persistent broadcast of the primary song of a species to induce individuals to settle in an area (Ward and Schlossberg 2004). Conspecific attraction 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 (Andrews et al. 2015). Birds use the presence of conspecifics 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 replicate the presence of conspecifics via 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 for the third consecutive year at 2 sites in opposite corners of northern Wisconsin (Fig. 1), on Bayfield County Forest and Marinette County Forest. We intentionally did not include sites near Adams County at this time to avoid interfering with settlement patterns of the existing Kirtland's Warbler population.

The Bayfield County site had five callboxes on four stands which we operated from 5 May to early August 2016, whereas the Marinette County site had four callboxes on three stands, which operated from 2 May to early August 2016. 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's 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*). These

are the most 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 (Ward and Schlossberg 2004)

We used GIS layers of forest stands (Wisconsin Department of Natural Resources) in ArcMap (10.2.2, Esri, Redlands, CA) and ground-truthing to select what we considered to be the most suitable stands for Kirtland’s Warbler in each landscape. Treatment stands were on sandy soils with dense ground cover for nesting, and the tree cover was dominated by 7–13-year-old jack pine. We selected stands where trees provided a matrix of openings and thickets and still retained live low branches. One of the playback stands in Marinette County had openings cut in it in early 2015, to make it more attractive for Kirtland’s Warblers, as without openings, the stand would soon have become unsuitable. 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 67 acres in size (range = 15–121).

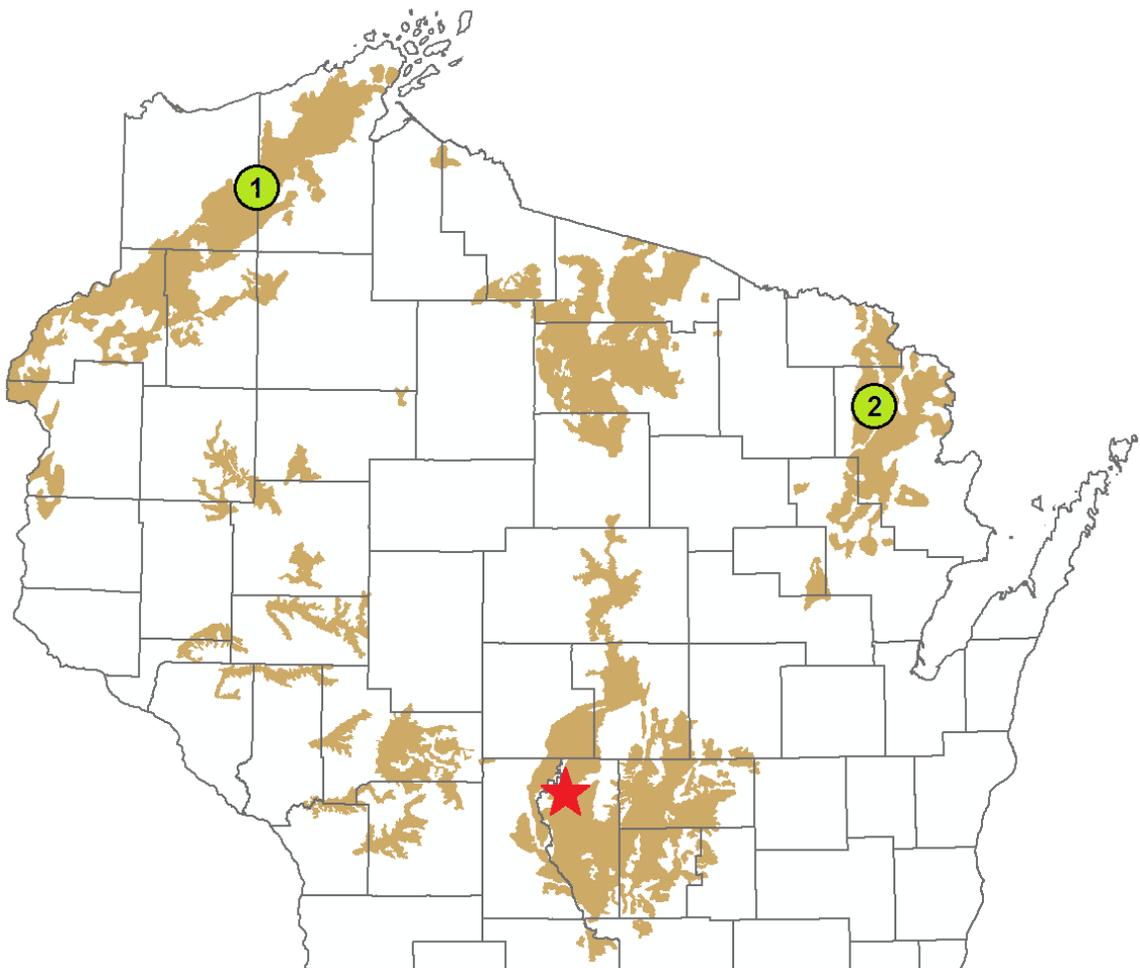


Fig. 1. Approximate locations of audio playback stations for Kirtland’s Warblers in Wisconsin. 1 = Bayfield County Forest, 2 = Marinette County Forest. Tan indicates forested lands with sandy soils, and the red star indicates the only currently known consistently reproducing population of Kirtland’s Warblers in Wisconsin, in Adams County.

Sites were monitored weekly from 5 May to 16 July, by an experienced observer. We conducted point counts every 200 m, starting around dawn, listening and looking for Kirtland’s Warblers. In order to establish that occupancy at sites was due to use of our playback, we also surveyed for Kirtland’s at a nearby (2.6–3.2 km

away) control site with similar habitat where no playback occurred. Control stands were 50 and 105 acres, and 10 years of age.

Results

Bayfield County Forest

In 2015, three male Kirtland's Warblers were detected at and to the north of the experimental playback stands, and one was colorbanded. No female Kirtland's Warblers were detected, and no nests were located (North et al. 2015).

In 2016, three males and one female were detected and one nest fledged five young. The first full survey of the experimental and control stands was performed on May 13. On the second survey, May 24, two unbanded male Kirtland's Warblers were detected in the north stand very close to where 3 males were detected in 2015. Shortly thereafter on May 27, we detected a third male. With three males at the site exactly a full month earlier than 2015, there were high hopes that a female would arrive and Bayfield County would fledge its first nest. These three males were all successfully banded by Ron Refsnider and Nick Anich on June 7 with band combinations AKKO (age = ASY [after second year]), AKJY (ASY), and AKKG (SY [second year]). On June 17, Eric North ran surveys while Ryan Brady and Dick Verch checked on the birds. During that check-up a female was visually noted (Fig. 2) and observed to be potentially paired with AKKO. In addition to the pairing, Ryan Brady followed the female and recorded GPS coordinates in the vicinity of a suspected nest. The following week, on June 24th, the female was again spotted with AKKO, while both were clearly feeding young at a nest. After a short time, Eric North discovered the nest when both the male and female were observed returning to the exact same spot on the side of a furrow, tucked up underneath an overhanging *Vaccinium angustifolium* (blueberry; Fig. 3). Five nestlings were noted at this first discovery date, and all five were subsequently banded on the 27th by Nick Anich and Ron Refsnider (Fig. 4). All five nestlings had fledged by the following survey on July 1st. Two males (AKKO and AKJY) were still present on July 8th, although neither was singing spontaneously. By July 16th, the final survey, no Kirtland's Warblers were detected.



Fig. 2. Female Kirtland's Warbler in Bayfield County. Photo by Ryan Brady.



Fig. 3. Structure of jack pine stand and groundcover. The Bayfield County nest was located directly underneath the pink flagging in the upper right. Photo by Eric North.



Fig. 4. Five Kirtland's Warbler nestlings at the Bayfield County Forest experimental site on June 24. Photo by Eric North.

Marinette County Forest

In 2015, Three males and two females were detected at the playback stands in 2015, while none were detected at the control stand. Two males were colorbanded. One female nested successfully, producing two young (North et al. 2015).

In 2016, four males and three females were detected at the playback stands and two of three nests succeeded, fledging ten young. The callboxes were deployed on 2 May, and comprehensive surveys began on 10 May. On 17 May, the first bird to be detected was an unbanded singing male on the control stand. On 22 May, an unbanded male was detected at the playback site, along with an unbanded female. On 24 May a banded male was resighted at the playback site, which proved to be AROG, banded here last year as an ASY bird. On 2 June, Joel Trick, Sarah Warner, Kaitlyn Reintsma, and Aaron McCullough banded the initial bird at the playback stand as AORK (ASY; Fig. 5), and banded the control stand bird as AOYK (SY). On 3 June, a third unbanded male showed up at the playback stand, and was found to be paired with an unbanded female on 7 June. On 18 June, Joel Trick and Kaitlyn Reintsma banded this pair as ARJK (M, ASY) and APJK (F, ASY). On 20 June another unbanded male was found at the playback stand, primarily using a very young stand to the east and a very old stand east of that. This fourth playback stand male was never banded.

Since 2011, banded male AORJ had held a territory on a small stand 2.5 km from the control site, and was seen there on 7 and 8 June, but was not seen on other visits. An unbanded male was also seen at the 2.5-km-away stand on May 22, and another unbanded bird was seen 10 km away from the playback stand on 16 June. On 30 June, AORJ joined AOYK at the control stand.

Three nests were found at the playback stand. On 22 June, Aaron and Craig Leitzke followed AROG with food and were able to locate his nest. On 23 June, Jack Swelstad located the nest of AORK. On 24 June, Sarah banded 10 Kirtland's Warbler young, 5 from each of these nests, and on 30 June, Kaitlyn confirmed that both these nests successfully fledged. Also on 30 June, Kaitlyn found the nest of ARJK and APRK, with 4 eggs. The female was still brooding on 14 July, but by 21 July, the nest was determined to have failed.

Overall at both sites, we detected 7 males, 4 females, and 4 nests at the playback stands. We detected 2 birds at the control stands. This represents an increase from 6 males, 2 females, and 1 nest at the two treatment stands in 2015 (North et al. 2015; Table 1.). Ten young were produced from 3 Marinette County nests (2 successful and 1 failed nest), and 5 young were produced from 1 Bayfield County nest.



Fig. 5. Male AORK, banded in Marinette County this year. Photo by Joel Trick.

Table 1. Summary of results at two Kirtland’s Warbler conspecific playback treatment sites in Wisconsin. Omitted from this table are sites run in 2014 on Vilas County Forest and Chequamegon-Nicolet National Forest sites that we subsequently dropped in 2015 because we considered these sites and landscapes to be of lower habitat quality (Anich and Ward 2014).

Year	Bayfield County Forest				Marinette County Forest			
	Treatment Stand			Control Stand	Treatment Stand			Control Stand
	Males	Females	Nests	Males	Males	Females	Nests	Males
2014	1	0	0	0	0	0	0	0
2015	3	0	0	0	3	2	1	0
2016	3	1	1	0	4	3	3	2

Discussion

Conspecific playbacks appear to be an effective means of establishing populations of Kirtland’s Warblers in Wisconsin, despite the great distances from source populations (~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). In three years these stands went from no Kirtland’s Warbler occupancy to 4 nests producing 15 young. Nevertheless, there does seem to be some delay in this process, as one year of playback was not enough to establish these populations (Table 1).

The result of the conspecific attraction research resulted in the first known nesting in Bayfield County (the next closest nest ever recorded was in Marinette County) and the second female ever seen in Bayfield County. In Bayfield County this year, we retained the speakers set up in the original stand, and then established 3 speakers slightly to the north where the 3 males moved to last year. The males eventually chose to settle near each other in a stand in between all three speakers. The stand where the males settled had no speakers in it, but the songs were clearly audible from nearby stands. The stand they chose was relatively young (planted in 2011), so presumably the habitat there will be suitable for several more years. More study is needed on optimal speaker placement, but in the end the birds that settle where they want, despite our impressions of which habitat is best.

While Marinette has historically been the next most likely site for Kirtland’s to colonize, with several recorded nests in the decade before this project, there has never been more than one confirmed nest there in a season, so our results there are also unprecedented. The return of AROG (thought to have paired and had an early unsuccessful nest in 2015) demonstrates philopatry to our playback sites.

The birds we observed at the Marinette control site and at two other stands within 10 km of the Marinette playback and control sites suggest that we now have enough birds on that landscape that they may be spreading out beyond our treatment stand. The timing of the sightings of unbanded birds at the two other stands in the region suggests it is likely that these individuals are the same birds that eventually arrived at the playback and control stands. Although recording birds at the control stand in some sense “counts against” the experiment, in another sense, we interpret it as a credit to the experiment, that the playback stand has now attracted enough birds to the area that it is having a positive effect on occupancy in other stands in that region.

The fact that birds at our playback stands produced 15 young from 4 nests (compared to 22–23 fledged from 17 nests at the main population in Adams County this year [USFWS 2016]) speaks to the direct effect this experiment has already had on the Wisconsin Kirtland’s Warbler population. While it was already known that conspecific playback had the potential to colonize these sites (e.g. Ward and Schlossberg 2004), our work has shown it is possible with species with small populations (~2,300 pairs) over long distances. This has great implications for conservation in general, whether managers seek to connect populations with managed habitat

or seek to boost overall populations by obtaining productivity from dispersing birds that might not otherwise pair.

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