The First Annual Census of the Kirtland's Warbler (*Dendroica kirtlandii*) in Wisconsin

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INTRODUCTION

A federally endangered bird, the Kirtland's Warbler (*Dendroica kirtlandii*) was found nesting in Wisconsin for the first time in June 2007 (Trick et al. 2008). Prior to this event, the breeding range of this species was confined to a few counties of Michigan's Lower and Upper Peninsulas. The recent dispersal of Kirtland's Warbler from Michigan into Wisconsin (and also into southern Ontario) is considered a direct result of an active conservation and management strategy enacted by the Kirtland's Warbler Recovery Team in Michigan. Because of the unique requirement of this bird for breeding in 5 to 20 year-old jack pine stands, dispersal of offspring is limited to the narrow band of jack pine habitat that occurs across the northern Great Lakes states and southern Ontario.

Range expansion into Wisconsin may be critical for the long-term survival of the Kirtland's Warbler because additional breeding sites in new locations could alleviate the species' vulnerability to catastrophic events on its narrow breeding range in Michigan. For new breeding populations to become established in the State, management issues at the new sites need to be addressed in a timely manner (Kirtland's Warbler Recovery Team, 1976). These issues include control of the Brown-headed Cowbird (hereafter referred to as cowbird), a nest parasite that reduces reproductive success of the Kirtland's Warbler, and regeneration of jack pine so that habitat of the appropriate age and size will continuously be available in a given landscape. Before these management strategies can be implemented, however, new or potential breeding sites must first be located.

This project has established an annual volunteer census in Wisconsin in an attempt to locate existing and/or potential breeding sites of Kirtland's Warblers and to obtain a population estimate for the state. This effort is an extension of the Michigan census and results were reported to the Kirtland's Warbler Recovery Team for inclusion in the global population estimate.

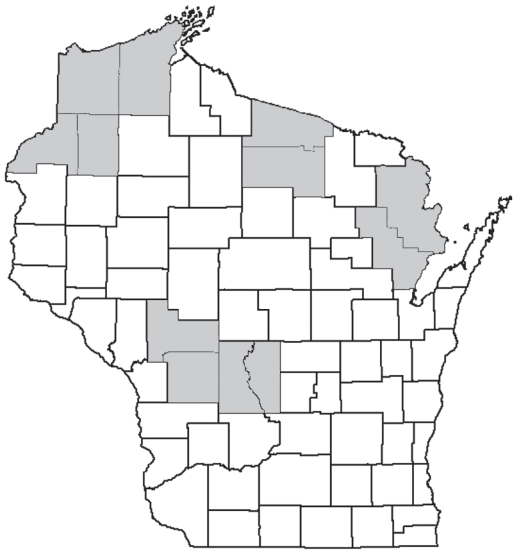

Figure 1. Map of Wisconsin counties. Sites in shaded counties were surveyed during the 2008 Kirtland's Warbler Census.

METHODS

Sites in twelve counties (see Fig. 1) were chosen for survey using the Wisconsin Department of Natural Resources (WDNR) WisFIRS database (WDNR 2007), GIS digital spatial data layers of forest compartments and stands, and paper maps of jack pine stands on public and private lands.

Volunteers were recruited from bird clubs and through newsletter articles during 2007 and early 2008. Survey orientations were held regionally in April and May 2008 and included a presentation on Kirtland's Warbler life history and ecology, distribution of survey packets, and assignment of survey sites.

Sites were surveyed beginning at dawn and continuing up to four hours post dawn beginning on 6 June and ending on 15 June. Surveys were not conducted on windy days or in periods of heavy rain, but were allowed in light rain conditions. Volunteers walked through jack pine stands stopping every 200 m to listen for singing males for 1–3 minutes. Use of playback recording following the passive listening period was optional. If playbacks were used, recording was played for 30 seconds followed by a 30-second passive listening period. Playbacks were shut down immediately if a response was heard.

Numbers of singing males, males observed not singing, females, and cowbirds were recorded along with an associated bird species list. Habitat characteristics were also noted. Volunteers were instructed to immediately report observations of Kirtland's Warblers to agency staff (U.S. Fish and Wildlife Service and/or WDNR) by phone or email. Verification by staff during follow-up visits was required for a sighting to be confirmed. Follow-

up visits took place within two days after the volunteer report was received.

RESULTS

Of 314 Wisconsin sites identified as having at least 50 acres of jack pine cover type of a suitable age, 89 were surveyed by 41 volunteers. These sites were located in Burnett, Douglas, Washburn, Bayfield, Vilas, Oneida, Marinette, Oconto, Adams, Juneau, Monroe, and Jackson Counties. Confirmed observations of singing males were made at two sites in Marinette County and at one site in Adams County between 6 and 15 June. Marinette sites had one singing male each while the Adams site had seven confirmed males. Five females and five nests were also confirmed at the Adams sites (see Trick et al. [2009] for details).

Reports of singing Kirtland's Warbler males came from eight additional sites: Vilas (3 sites), Jackson (3 sites), and Marinette (2 sites). These observations, however, could not be confirmed by agency staff.

Due to heavy rain that disrupted surveys on several days during the two-week survey period, volunteers were permitted to continue with surveys beyond 15 June if they so desired. (However, observations made after 15 June were not included in the official population estimate reported to the Recovery Team.) A male without leg bands was seen at the Adams site on 25 and 26 June. Because all males observed prior to 25 June at the Adams site had been banded (Refsnider et al. 2009), this was the tenth bird to be counted in the state. Other confirmed reports in the post-census period included a singing male observed by a participant in Douglas County on 9 July and a male found in Bayfield County during an independent survey conducted by the U.S. Forest Service (see Trick et al., 2009 for a description of this sighting). Because these additional observations could have been of the same individual as the un-banded male seen at the Adams site, they were not included in the final count. For 2008, at least 10 Kirtland's Warbler males were documented in Wisconsin, while 9 singing males were reported as the official state census record.

To assess sites for habitat suitability, volunteers were asked to provide the following information for each site visited: dominant tree species, secondary tree species, presence of jack pine with branches close to ground, understory species, presence of open grassy areas, approximate canopy height, and soil conditions (e.g., sandy, wet or dry, etc.). Based on this information as noted by volunteers on the data sheets, 61% of the 89 sites surveyed were categorized as suitable, 19% were unsuitable, and 24% were marginal. Another 6% of these sites did not have sufficient comments on habitat conditions to determine suitability. "Suitable" was defined as a site dominated by conifers including jack pine with lower hanging branches on dry, sandy soils, having some openings between trees, and a canopy height of less than 18 ft. Sites not meeting these criteria were considered unsuitable unless they were described as having suitable vegetation composition and structure, canopy height, etc. but with wet soils. Because heavy rainfall during the survey period could have saturated upland soils at sites that are

Table 1. Number of Brown-headed Cowbirds counted at 2008 Kirtland's Warbler Census sites per Wisconsin County.

County	No. Cowbirds
Adams	4*
Bayfield	9
Jackson	54
Juneau	6
Marinette	2
Vilas	0

*Tally is from surveys on private land near the Adams breeding site and does not include cowbirds caught in traps at the breeding site (see Trick et al. 2009).

typically dry, these sites were considered to be "marginal" and will be included for survey again in 2009.

Tallies of cowbirds were recorded for six of the twelve counties and these appear in Table 1. A total of 73 cowbirds were counted not including the 300+ cowbirds caught in traps at the Adams breeding site as reported by USDA-APHIS-WS (2008). The remaining six counties were omitted from the tallies because no number or indication of presence/absence was recorded on the data sheets.

In addition to cowbirds, 68 associated bird species were reported from seven counties. Table 2 shows the distribution of these species by county.

DISCUSSION

The first annual census of Kirtland's Warblers in Wisconsin was suc-

Table 2. List of associated bird species recorded during the 2008 Kirtland's Warbler Census listed by property names: BCNF=(Bayfield County) National Forest, BRSF=Black River State Forest, JCF=Jackson County Forest, JUCF=Juneau County Forest, MCF=Marinette County Forest, NHSF=Northern Highland-American Legion State Forest, VCNF=(Vilas County) National Forest, VCF=Vilas County Forest. XF denotes flyovers.

Bird Species	BCNF	BRSF	JCF	JUCF	MCF	NHSF	VCNF	VCF
Canada Goose					X			
Ruffed Grouse	X	X			X		X	
Spruce Grouse					X			
Wild Turkey			X		X			X
Common Loon					XF			
Osprey					X			
Northern Goshawk					X			
Broad-winged Hawk		X	X					
Sandhill Crane			XF		X			
Mourning Dove	X	X	X	X	X		X	
Black-billed Cuckoo			X		X			
Yellow-billed Cuckoo		X	X					
Common Nighthawk		X			X			
Ruby-thr. Hummingbird					X			
Red-bellied Woodpecker		X			X			
Yellow-bellied Sapsucker	X	X					X	
Downy Woodpecker	X						X	
Hairy Woodpecker					X			
Pileated Woodpecker		X			X			
Eastern Wood-Pewee		X			X			
Yellow-bellied Flycatcher						X		
Willow Flycatcher								X
Least Flycatcher						X		
Great Crested Flycatcher		X			X			
Eastern Phoebe		X						

(Continued next page)

Table 2. Continued.

Bird Species	BCNF	BRSF	JCF	JUCF	MCF	NHSF	VCNF	VCF
Eastern Kingbird		X						
Yellow-throated Vireo		X						
Warbling Vireo					X			
Red-eyed Vireo	X	X	X		X	X	X	X
Blue Jay	X	X	X	X	X	X	X	X
American Crow	X	X			X	X	X	X
Common Raven	X	X	X		X		X	
Barn Swallow			X					
Tree Swallow		X						
Black-capped Chickadee	X	X	X		X	X	X	X
Red-breasted Nuthatch		X			X	X		
House Wren		X						
Winter Wren								X
Golden-crowned Kinglet								X
Eastern Bluebird		X						
Veery	X	X	X				X	
Hermit Thrush	X	X	X		X	X	X	X
Wood Thrush			X			X		X
American Robin	X	X	X		X	X	X	X
Gray Catbird		X	X	X				X
Brown Thrasher	X	X	X	X	X	X	X	
Cedar Waxwing					X			
Blue-winged Warbler		X				X		
Golden-winged Warbler		X	X	X				
Nashville Warbler	X	X	X	X	X	X	X	X
Yellow Warbler		X			X			X
Chestnut-sided Warbler	X	X	X		X	X	X	X
Cape May Warbler					X			
Black-thr. Blue Warbler					X			X
Yellow-rumped Warbler	X	X			X		X	X
Black-thr. Green Warbler		X						
Pine Warbler		X	X		X			
Black-and-white Warbler	X	X			X		X	
American Redstart	X						X	X
Ovenbird	X	X	X	X	X	X	X	X
Connecticut Warbler			X					
Mourning Warbler			X					
Common Yellowthroat		X	X	X				
Canada Warbler	X						X	
Scarlet Tanager	X	X			X		X	
Eastern Towhee	X	X	X	X	X	X	X	
Chipping Sparrow	X	X	X	X	X	X	X	X
Clay-colored Sparrow	X		X	X	X	X	X	
Field Sparrow		X	X	X	X			
Vesper Sparrow		X			X			
Lark Sparrow				X				
Song Sparrow		X	X	X	X			X
White-throated Sparrow	X	X			X	X		X
Dark-eyed Junco					X	X		X
Rose-breasted Grosbeak	X	X	X		X		X	
Indigo Bunting		X			X			
Red-winged Blackbird			X					
Common Grackle					X			
Brown-headed Cowbird	X	X	X	X	X			
Baltimore Oriole			X		X			
Purple Finch	X						X	
American Goldfinch	X	X	X		X		X	X

cessful in meeting its objective to locate additional sites with singing males. Consistent presence of singing males at sites in Marinette County until early July indicates that Kirtland's Warblers may be attempting to nest at those sites. Indeed, nesting may have occurred on at least one site as an immature warbler was observed in the vicinity of the singing male (J. Probst, personal communication). Unfortunately, a positive identification of the juvenile could not be made.

Jackson County is another area that may have breeding Kirtland's Warblers. Two individuals were heard at one site and a third individual was spotted at a second site in the Black River State Forest. Although these observations could not be confirmed, the first site was a large site with good jack pine habitat of appropriate age for nesting and will be targeted for survey again in 2009.

Kirtland's Warblers may also be nesting in northern Wisconsin. At least one confirmed male was found in Douglas County and three sites with possible singing males were reported for Vilas County. Furthermore, a female may have been present in association with the confirmed Bayfield County male on National Forest land (L. Parker, personal communication).

Sites that were determined to have suitable habitat will be included for survey in 2009. Sites classified as marginal may actually have suitable habitat, but inclement weather during the census period may have precluded proper assessment of soil conditions. These sites together with new sites drawn from the pool of sites that were identified as appropriate through the WisFIRS database (WDNR 2007) will be added to the list of survey sites for 2009. Special survey emphasis will be needed in Adams, Marinette, Douglas, Bayfield, Jackson, and Vilas Counties where males were either confirmed or suspected. Locating appropriate habitat near the breeding site in Adams County is of particular concern because habitat at the breeding site is over twelve years old and because 2008 fledglings may disperse to nearby sites in 2009 (Trick et al. 2009). Although the number of participants is expected to increase in 2009, the amount of sites that can be visited will fall short of the total potential sites in need of survey. Therefore, prioritizing sites based on appropriate habitat characteristics, on presence of bird species typically associated with Kirtland's Warblers, and on Kirtland's Warbler sightings may help to direct survey efforts to the most likely places to find this species in future years.

Despite the fact that not all volunteers recorded cowbirds, the high cowbird tallies of Jackson and Bayfield Counties indicate that cowbirds may be problematic at these locations and that trapping of cowbirds may be needed if and/or when breeding Kirtland's Warblers are discovered. Conversely, no cowbirds were found on any of the Vilas County sites and only two individuals were counted at one site in Marinette County. These low numbers may mean that cowbirds will not be enough of a problem to implement trapping. Although cowbirds are present at Kirtland's Warbler breeding sites in Michigan's Upper Peninsula, their numbers are not sufficient to make trapping worthwhile (M. DeCapita, personal communication). In order to improve knowledge of cowbird presence at potential breeding

sites, data collection techniques should be emphasized at future training workshops.

Concluding Remarks

This first census of Kirtland's Warblers in Wisconsin has increased our knowledge of the state population and how it may be distributed. Immediate reporting of singing male observations and follow-up staff visits made it possible to band two males in Wisconsin outside of the existing breeding site. Although attempts to confirm nesting at the Marinette sites were not successful, future monitoring of these sites may clarify whether females are present and if nesting is occurring.

Other important aspects of the census included collection of habitat and cowbird data. Habitat descriptions recorded by volunteers were useful for determining if sites should be included in future surveys. Cowbird tallies provided an indication of potential cowbird trapping needs for some locations which will be of benefit for financial and other project-related planning in the event breeding pairs become established at those sites.

Acknowledgments

Eunice Padley of the Wisconsin Department of Natural Resources – Division of Forestry provided site data from the WisFIRS database. Site data and maps were also provided by the following agencies: Burnett, Washburn, Douglas, Bayfield, Vilas, Oneida, Marinette, Jackson, and Juneau County Forest Departments; Black River State Forest, Northern Highland-American Legion State Forest, and the U.S. Forest Service. Joel Trick of the U.S. Fish and Wildlife Service adapted the survey protocol, assisted with survey preparations and workshops, and conducted follow-up field surveys. Jennifer Goyette helped with surveys in Adams County. A special thank you goes to WDNR staff, especially Jim Robaidek, Jim Baughman, Steve LaValley, Armund Bartz, Sue Foote-Martin, Rebecca Schroeder, and Sumner Matteson. The Coulee Region Audubon Society, the Northeast Wisconsin Bird Club, and the Wisconsin Bird Conservation Initiative offered forums for recruiting volunteers. Finally, sincere gratitude is extended to the 41 volunteers who made this survey possible by donating their time and expertise.

Literature Cited

Kirtland's Warbler Recovery Team. 1976 Kirtland's Warbler Recovery Plan: updated 1985. John Byelich, Leader. Michigan Department of Natural Resources, Lansing. Proc., 78pp.

Michigan Department of Natural Resources. 2008. Michigan's 2008 Kirtland's Warbler Population Reaches Another Record High. News Release dated September 29, 2008. Michigan Department of Natural Resources web site at http://www.michigan.gov/dnr/0,1607,7-153—200899—,00.html

Refsnider, R. L, J. A. Trick, and J. L. Goyette. 2009. First capture and banding of Kirtland's Warblers (*Dendroica kirtlandii*) in Wisconsin. Passenger Pigeon 71: 115–121.

Trick, J. A., K. Grveles, D. DiTommaso, and J. Robaidek. 2008. The first Wisconsin nesting record of Kirtland's Warbler (*Dendroica kirtlandii*). Passenger Pigeon 70: 93–102.

Trick, J. A., K. Grveles, J. Goyette. 2009. The 2008 nesting season: first documented successful nesting of Kirtland's Warbler (*Dendroica kirtlandii*) in Wisconsin. Passenger Pigeon 71: 101–114.

USDA-APHIS-WS. 2008. 2008 WI WS Final Report, Brown-headed Cowbird Removal to Protect Nesting Endangered Kirtland's Warblers, Adams County, Wisconsin. Unpublished one page report prepared by Jason

Suckow, State Director of USDA-APHIS-WS. July 2008.
WDNR (Wisconsin Department of Natural Resources). 2007. Wisconsin Forest Inventory and Reporting System - Release 1 (WisFIRS).

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Caspian Terns *by Dennis Kuecherer*