

Kirtland's Warbler (*Setophaga kirtlandii*)

Status: Federal & State Endangered

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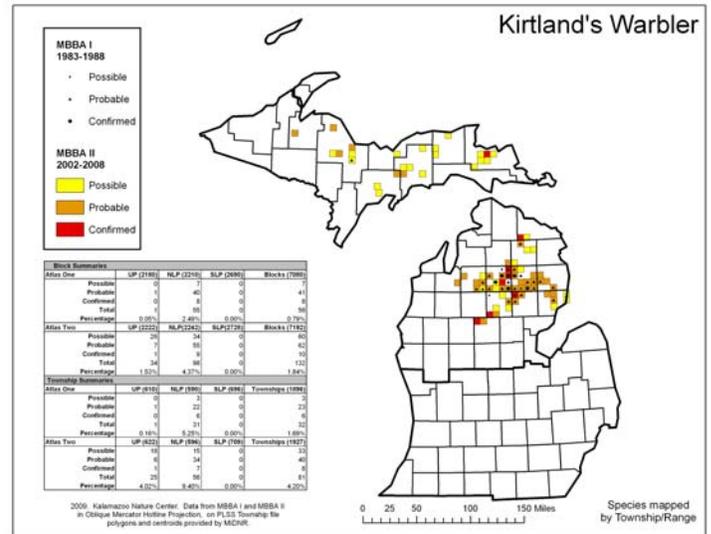
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This species sponsored in honor of Robert W. Moss.

Spring travelers from around the world are attracted to the young jack pine forests of Michigan for a chance to hear the loud distinct song of the endangered Kirtland's Warbler. This blue-gray-backed warbler with a yellow underside can be heard singing from its perch in the tops of standing snags or jack pine trees, or seen hopping from tree to tree or to the ground, pumping its tail while searching for insects and blueberries. The breeding range of the Kirtland's Warbler is primarily restricted to public lands within 12 counties in northern Lower Michigan and scattered locations across Michigan's Upper Peninsula. Recent searches have documented occasional breeding in parts of Wisconsin and Ontario. This long-distance migrant winters in the Bahamas archipelago where it has primarily been found on Eleuthera Island. There has been one winter sight record from Mexico.

Distribution

It was not until 1903 that the first Kirtland's Warbler nest was discovered near the AuSable River in Oscoda County. Surveys beginning in the 1950s found the breeding population confined to a 120 by 150 kilometer core breeding area in the northern LP (Mayfield 1953). During MBBA I, the majority of the



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breeding population continued to nest on public lands within this region. Currently, the Kirtland's Warbler population has expanded its breeding range into several key townships in the central and eastern regions of the UP (Probst et al. 2003), as documented by the annual census and MBBA II. Additional breeding records have been added by researchers and volunteers since MBBA I.

The Kirtland's Warbler's restricted breeding distribution follows from its narrow breeding habitat requirements and the availability of this habitat across Michigan. This warbler breeds exclusively in large, jack pine-dominated landscapes on nutrient-poor, sandy soils in glacial outwash ecosystems where trees are five to 23 years and 1.7-5.0 meters tall (Probst and Weinrich 1993, Kashian et al. 2003). Occupied suitable habitat is characterized by dense stands of young jack pine typically greater than 2,500 stems per hectare with 20-80% canopy cover. Optimal breeding habitat (where the highest density of warblers are typically found) has more than 7,500 stems per hectare and between 35% and 65% canopy cover, which was historically regenerated naturally following wildfire. Since the early 1980s, suitable habitat has also been created by planting trees (jack

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pine and rarely red pines) at densities about twice the normal forestry prescriptions (Probst 1988).

The majority of the breeding population has been found in wildfire-regenerated habitat until recently. Since MBBA I, the LP population has shifted into primarily plantation habitat (80-95% of singing males) in response to declining wildfire habitat and extensive plantation management on state, U.S. Forest Service, and U.S. Fish and Wildlife Service lands. Between 1960 and 1987, Kirtland's Warblers were found in unburned stands that had marginal natural regeneration after timber harvesting, presumably because of a shortage of higher-quality primary habitat (Ryel 1979, Probst 1986). When a large area of wildfire-regenerated habitat became available around 1987 along with an increase in dedicated plantations, the Kirtland's Warbler breeding population abandoned the unburned, naturally-regenerated habitats (Probst and Weinrich 1993). As plantation habitat has filled in the last decade, stands of unburned, unplanted habitat are once again becoming occupied (Donner et al. 2008).

Male populations in major breeding areas initially increase, then stabilize, and finally decline during the 10-15 year period of occupancy. Average tree heights range from 2.4 to 3.9 meters tall when populations peak at approximately 13-15 years of stand age. When trees reach 3.5 meters or more in height and no live needles are present below about 1.0 meter, the Kirtland's Warbler male population begins to decrease in the area due to declining habitat structure important for nesting and fledgling cover and for female foraging space. Characteristic ground cover in these areas consists of a mixture of low shrubs (e.g., blueberry, juneberry, sweetfern), grasses, sedges, forbs and exposed bare ground (Walkinshaw 1983). Ground cover is determined as much by site and shade-history

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factors as wildfire, despite dramatic ground cover differences immediately after fire (Probst and DonnerWright 2003).

Breeding Biology

Kirtland's Warblers arrive on the breeding grounds between 5 and 20 May (Mayfield 1960, pers. obs.) but some males settle in secondary habitat as late as early June. Nests are built on the ground typically near small openings. Male singing remains frequent throughout most of June, probably due to attempts to establish polygynous pairings (Radabaugh 1972, Bocetti 1994). By the last week of June, singing is sporadic. Unmated males sing twice as much as mated males (Hayes et al. 1986) but mated males may sing as much as unmated ones while females are incubating eggs. Females incubate eggs of first nests in early June and young fledge beginning 15 June (Walkinshaw 1983, Mayfield 1972, Bocetti 1994). Few second nestings or renestings are initiated after 25 June but nests have fledged young as late as 20 August (Walkinshaw 1983). Individuals begin to disappear in early August, but many Kirtland's Warblers (mostly adults) stay on the Michigan breeding grounds through late September (Sykes et al. 1989). Kirtland's Warblers feed on a variety of insects such as aphids, spittlebugs, ants, wasps, and beetles, and also blueberries just after young have fledged (Deloria-Sheffield et al. 2001).

Abundance and Population Trends

Since MBBA I, the male Kirtland's Warbler count has increased every year. In 2008, results from the official comprehensive census of singing males throughout the known breeding range exceeded 1,800 males. Almost 3% of the males recorded were outside the historical breeding range in the LP. The increase of male sightings in the UP and eight counties (principally Jackson, Adams, Vilas and Marinette) in Wisconsin overlapped temporally with the discovery of scattered breeding pairs in the UP (summarized by Probst et al. 2003).

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Recently, at least 14 males and nine nests (2007/2008) were found in two Wisconsin counties (J.Trick pers. comm., pers. obs.). Three males were discovered in Petawawa, Ontario in 2006 and nesting was recorded in 2008 (Richard 2008).

These population trends are encouraging given the low number of males found during the 1961 census (502 males) and the stable population numbers of near 200 males found from 1971 to 1986 (Mayfield 1962, Mayfield 1972, Probst 1986). The increasing trend can be attributed to increasing suitable habitat available within the LP breeding range due to several large natural wildfires and the large-scale habitat management program put in place during the early 1980s (Donner et al. 2008), plus the continued Brown-headed Cowbird control program initiated in 1972 to reduce nest parasitism (Kelly and DeCapita 1982). Productivity increased from less than one fledgling per pair to 3.1 after cowbirds were controlled, and polygynous pairings did not seem to decrease productivity per pair (Walkinshaw 1983, Bocetti 1994), which is unusual when a male bird provides parental care of young.

Because habitat is only suitable for a 10-15 year period, habitat maturation forces young birds to find new breeding areas. Thus, the Kirtland's Warbler population is maintained or increased only if new breeding "colonies" are established to replace existing ones. The population fluctuations observed from 1971 to 1990 are related to a synchronous increase and subsequent decrease among maturing colonies (Probst 1986). Prior to 1986, about 70-80% of the counted males (between 155 and 180) were concentrated within six maturing wildfire areas that represented about one-third of the suitable habitat area available (Probst 1986, Donner et al. 2008). The population was being affected by the low proportion of suitable wildfire and plantation habitat (Probst 1986, Donner et al.

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2008). By 1987, males began declining in these former areas and colonized developing habitat composed primarily of a 10,000 hectare wildfire (1980 Mack Lake Burn area, Oscoda County) and plantations created in the early 1980s that nearly doubled the amount of suitable habitat. In response, the male count tripled from 1988 to 1994. Because of the sudden increase in habitat availability, however, breeding male densities were much lower during this period than from 1981 to 1986 when suitable habitat amount was more limiting.

Although the rate of population increase has slowed, the male count has more than doubled since 1994. After this time, areas of the 1980 Mack Lake Burn were becoming unsuitable and few new areas were being created by natural wildfires. The increasing male count has redistributed into available plantation habitat. In addition, the Kirtland's Warbler population has broadened its spatial distribution across the LP breeding range since MBBA I in response to the type of breeding habitat available and the increasing population (Donner et al. 2008). Currently, the overall average density of Kirtland's Warblers in occupied habitat is the highest ever recorded (Probst et al. 2005, Donner et al. 2009). In addition, males are using marginal unburned, naturally regenerated habitat again after abandoning this habitat type during the rapid population increase in the early 1990s. The increasing breeding activities recorded in the UP and elsewhere reflect periods of rapid population growth and potential overflow from stabilization in suitable habitat within the LP breeding grounds serving as "source habitats" to population regulation (Probst et al. 2003).

Conservation Needs

The area targeted for Kirtland's Warbler habitat management within the LP core breeding area is over 80,000 hectares under the Kirtland's Warbler Recovery Plan (developed under authority of the Federal Endangered Species Act

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of 1973; Byelich et al. 1976). The original plan called for regenerating jack pine habitat through harvest followed by burning on state and federal lands to provide approximately 16,000 hectares of suitably-aged habitat per decade to reach a goal of 1,000 breeding males. Because this goal has been met and the population has been shown to be regulated by habitat amount, the recovery plan may be modified to reflect a goal in suitable habitat area rather than male numbers. To meet future breeding habitat needs within the UP, the U.S. Fish and Wildlife Service is planning land exchanges or acquisition in the UP. Additionally, the Hiawatha National Forest is actively incorporating Kirtland's Warbler habitat management within existing multispecies management objectives. Early succession jack pine habitat management for the Kirtland's Warbler also can provide important habitat for other species such as the Upland Sandpiper, Eastern Bluebird, Black-backed Woodpecker, Sharp-tailed Grouse, and Northern Harrier. Any reduction of the Brown-headed Cowbird control program (as has been proposed for budgetary and biological reasons) has the potential to lower productivity within the core LP breeding population, which may lower the overall male population and reduce the number of male dispersers to peripheral areas such as the UP and Wisconsin.

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