



Best Survey Period



Status: Federally endangered and state endangered

Global and state ranks: G1/S1

Family: Parulidae (wood warblers)

Total Range: The Kirtland's warbler breeding range currently encompasses ten counties in Michigan's northern Lower Peninsula and four counties in the Upper Peninsula. There is only one confirmed nesting occurrence of the species outside of its present breeding grounds in Michigan. In 1945, a pair was observed feeding a juvenile near Midhurst, Ontario (Speirs 1984). Historically, Wexford, Presque Isle and Alpena Counties in the Lower Peninsula had breeding Kirtland's warbler, but none have been documented since 1977. Singing males without mates have been observed in Wisconsin, Ontario and Quebec (Mayfield 1992). Kirtland's warblers primarily overwinter in the 600 mile Bahama Archipelago, although, individuals also have been observed on surrounding island chains (Evers 1994).

State distribution: In 1951, the first complete census of the Kirtland's warbler located 432 singing males in Michigan (Mayfield 1953). A second survey in 1961 located 502 singing males (Mayfield 1962), but by 1971, the third decennial survey, only 201 singing males were counted (Mayfield 1972). Since 1951, singing males

have been documented in seventeen Michigan counties including Alcona, Alpena, Baraga, Clare, Crawford, Delta, Iosco, Kalkaska, Marquette, Montmorency, Ogemaw, Oscoda, Otsego, Presque Isle, Roscommon, Schoolcraft and Wexford. For the first time since annual census data has been collected, the 2001 census documented a record 1085 singing males in Michigan. Singing males were documented in twelve counties including Alcona, Clare, Crawford, Delta, Iosco, Kalkaska, Marquette, Ogemaw, Oscoda, Otsego, Roscommon and Schoolcraft. The bulk of the breeding population, 93% of the singing males in 2001, resides in the northern Lower Peninsula counties of Crawford, Ogemaw, Oscoda, Roscommon, and Alcona.

Recognition: This relatively large wood warbler (adults are 5 3/4 inches in length and weigh 12-15 grams) has a **yellow breast with black streaks confined to the sides; two white wing bars, and a heavily streaked blue-gray back.** The distinctive **white eye ring is broken at the front and back of the eye.** The adult female is less colorful than the male, having gray cheeks, paler streaked sides and breast and a grayish-brown back. The Kirtland's warbler **persistent tail-pumping** habit is similar to that of the palm warbler (*Dendroica palmarum*) and prairie warbler (*Dendroica discolor*). Palm warblers are distinguished/ by a brown back, chestnut cap and yellow eyebrow and



prairie warblers have an olive back with faint chestnut streaks, and a distinctive black eye line over its yellow cheek. The **song** of the Kirtland's warbler is a series of **loud emphatic notes** sounding like “**chip-chip-tew-tew-weet-weet.**” The northern waterthrush (*Seiurus noveboracensis*) has a similar song variation but is not found in the same habitat.

Best survey time: Kirtland's warblers arrive on the breeding grounds in early to mid-May. Males establish relatively large, 6 to 38 acre (J. Weinrich, pers. comm., Walkinshaw 1983, *in lit.* Ennis 2002) territories, which they defend both physically and vocally. Males sing from the date of arrival through the month of June. An annual census of singing males takes place June 6th – 15th, using straight line compass transects or in small areas, meander surveys (M. DeCapita, pers. comm.).

Habitat: During the breeding season, the Kirtland's warbler is dependent upon large, relatively homogeneous stands of jack pine (*Pinus banksiana*) with scattered small openings. Stands less than 80 acres in size are seldom occupied, and nesting success has been found to improve greatly where “colonies” of warblers occupy stands 200 acres and larger (Byelich *et al.* 1976, rev. 1985). As stated in the recovery plan, warblers will start using a jack pine stand when the height of the tree

reaches 5 to 7 feet, or at an average tree age of 5-8 years old. Nests are built on the ground, concealed in the low cover of grasses (*Andropogon* spp. and *Danthonia* spp.), sedges (*Carex* spp.), blueberries (*Vaccinium* spp.), sweet fern (*Comptonia peregrina*), bracken fern (*Pteridium aquilinum*), blackberry (*Rubus* spp.), trailing arbutus (*Epigaea repens*), and/or wintergreen (*Gaultheria procumbens*). Once jack pines reach a height greater than 18 feet (approximately 20 years old), the lower branches begin to die and the ground cover changes in composition, thereby leading to unfavorable nesting conditions (Evers 1994). Jack pines need fire to open the cones and release seeds. All managed jack pine stands are harvested and planted or seeded mechanically to create warbler nesting habitat. Occasionally, harvested sites may be burned prior to planting or seeding.

Kirtland's warblers winter in the Bahama Archipelago. Limited information is available about the warblers wintering habitat. One study from Sykes and Clench (1998) indicates Kirtland's warblers use six broad habitats including: natural scrub/shrub, secondary shrub/scrub, low coppice (broadleaf woodlands less than 15 feet high), pineland understory, saline/upland ecotone, and suburban. Available data are not sufficient to show absolute preference but the majority of observations (i.e.



Photo by Phil Huber



based on 98 observations) were made in natural shrub/scrub, secondary shrub/scrub, and low coppice, and saline/upland ecotone (transition zone between the salt marsh and mangrove communities and the upland coppice). Such conditions are abundant and widespread on the islands. Winter observations from February through April 2002 reported Kirtland's warblers in natural shrub/scrub, secondary shrub/scrub, and low coppice (M. DeCapita, pers. comm.).

Biology: This species is a neotropical migrant that breeds in North America and spends its nonbreeding period primarily south of the United States. After a nearly 1,400 mile northward migration, the majority of the male Kirtland's warblers arrive on Michigan breeding grounds between 11-14 May, with females normally arriving less than a week later (Walkinshaw 1983). The earliest record of Kirtland's warbler arriving on the breeding grounds is May 2 (J. Weinrich, pers. comm.). Pair formation normally begins within 1 week after arrival (Mayfield 1992). Kirtland's warblers nest on the ground, sometimes near the base of young jack pines. The nest is typically sunken and well concealed by the surrounding vegetation. The sandy soil on which the jack pines grow permits water to quickly percolate downward, preventing flooding of nests. The first clutch, typically five eggs, may appear the last week of May, but most clutches are not started until the first week in June (Mayfield 1992). If unsuccessful, a second attempt averages four eggs (Walkinshaw 1983). The female incubates the eggs for 13 to 15 days, but both parents care for the young. Food for nestlings and adults consists of flying insects, larvae, and ripe berries. On average, nestlings leave the nest at 9 days old. As the fledglings grow, they continue to receive food from the adults up to 44 days, but by 23 days they appear to be gathering most of their own food (Mayfield 1960). Some pairs with successful first nests initiate a second nest. In those cases the male continues to feed the first brood while the female incubates the second clutch (Walkinshaw 1983). Immatures leave the nesting grounds from mid-August to early September and most adults depart by late September. The latest record for a Kirtland's warbler on the breeding grounds is October 1 (Sykes and Munson 1989).

Conservation/management: The ultimate limiting factor for the warbler is its specific nesting habitat (Byelich et al. 1976, rev. 1985). There is persuasive

evidence to suggest that the amount of suitable jack pine habitat was at a historic maximum during the 1880's and 1890's, when lumbering and forest fires were rampant. The Kirtland's warbler population appears to have been at its historic peak during the same time based on the large number of specimens taken in the Bahamas during that period (Mayfield 1960). Modern forest fire suppression techniques have been successful at minimizing fire danger to homes, private property, and commercially valuable forests, but as a result, have also reduced the amount of nesting habitat available for Kirtland's warblers. Because habitat is only suitable for about 10 years, habitat maturation forces birds to find new breeding areas (Ennis 2002). Thus, Kirtland's warblers can be maintained or increased only if new breeding habitat is continually established.

The first major effort to provide breeding habitat for the warbler was made in 1957. Three areas, each approximately four miles square, were established specifically as warbler management units on state land in Ogemaw, Crawford and Oscoda counties (Radtke and Byelich 1963, Mayfield 1963). Today approximately 150,000 acres are managed as designated warbler management units on state and national forest lands (Ennis 2002). Each year 2,000-2,500 acres of jack pines are burned (occasionally), seeded, planted, and commercially harvested on a 50-year rotation cycle. This system is designed to provide approximately 38,000 acres of suitable nesting habitat at all times (M. DeCapita, pers. comm.).

Based on a letter written by the Recovery Team in January 2002 (Ennis), approximately 38,000 acres of the appropriate age and density of jack pine are required each year for breeding. This required acreage is based on an average territory size of 38 acres for each singing male; an average based on data collected during the past 20 years. In order to maintain the annual 38,000 acres of breeding habitat requirements, approximately 190,000 of jack pine would have to be managed on a 50-year rotation. This increased number of acres will require identifying and managing additional lands outside of current Kirtland's warbler management units. Kirtland's warbler breeding habitat is short-lived and progresses rapidly to an unsuitable condition as the trees age, so continuous intensive management practices cannot stop once reclassification or delisting occurs.



To extend the occupation of warblers in jack pine stands, Kashian and Barnes (2000) suggest that increased site variation, represented as high elevation and low elevation landforms, be incorporated into management units. Although similar in soil, the multiple landforms have different microclimates as influenced by physiography. Because of a warmer microclimate on higher landforms, jack pines grow faster and are colonized by warblers first. The pines in the cooler low-elevation landform grow more slowly and are colonized later. The result is an extension of Kirtland's warbler use in the area.

A second limiting factor is parasitism of Kirtland's warbler nests by the brown-headed cowbird (*Molothrus ater*) (Byelich et al. 1976, rev. 1985). Historically a bird of the prairies, this species reached the warblers nesting range in the late 1800's with the clearing and burning of forests and the development of agriculture in northern Michigan. Cowbirds lay one or more eggs in a host's nest. Their young typically hatch first and overpower the smaller Kirtland's nestlings. This relatively new threat is particularly ominous because the warbler has not evolved the defense mechanisms against cowbird parasitism which are exhibited by many other host songbirds. Walkinshaw (1972) found that 69% of the Kirtland's warbler nests examined during 1966 – 1971 were parasitized. After a 60% decline in the population of Kirtland's warbler between 1961 and 1971 (502 to 201 singing males), the United States Fish and Wildlife Service initiated an annual cowbird trapping program starting in 1972 and continuing today. Cowbirds are captured in large walk-in decoy traps set within management areas. This efficient and successful trapping program has reduced parasitism to nearly negligible levels and warbler fledging success is healthy.

Occupied Kirtland's warbler habitats are closed to visitors during the May 1 through August 15 (September 10 for selected areas) breeding season except for guided tours originating from the Grayling Holiday Inn or U.S. Forest Service District Ranger Office in Mio.

The primary objective in the 1985 Recovery Plan was to "...reestablish a self-sustaining Kirtland's warbler population at a minimum level of 1,000 pairs". In a January 12, 2002 letter to the U.S. Fish and Wildlife Service, the Recovery Team clarified the primary recovery objective. The term "self-sustaining" is

believed by the Recovery Team to mean free from intensive management. Today, only intensive management focused on developing appropriate aged stands of jack pine and removal of parasitic brown-headed cowbirds allows the warbler population to persist and increase. It is unlikely that human land use requirements, such as fire suppression, will change in the foreseeable future. Therefore, a true self-sustaining population is not possible and the need for intensive management will continue. The Team clarified the primary objective of the Recovery Plan to state, "The primary recovery objective is to establish and sustain a Kirtland's Warbler population throughout its known range at a minimum level of 1,000 pairs using adaptive management techniques."

Research needs: Population responses to changes in the breeding habitat should be monitored and those results incorporated into habitat management techniques. Foraging requirements and specific food habits remain poorly understood and may be a worthwhile research topic. Kirtland's warblers are seldom observed during migration. Research efforts should focus on possible stop over sites and migration routes. Because this endangered species spends at least 40% - 60% of the year on its wintering grounds (Sykes and Clench 1998), it is important for long-term management and conservation to know more about the warbler's winter habitat requirements and potential threats. Winter population monitoring, winter habitat evaluation, and the identification and evaluation of potential threats in The Bahamas are critical to understanding the factors influencing the Kirtland's warbler. Research is currently being undertaken on the warblers wintering grounds.

Related abstracts: pine barrens, Hill's thistle, pale agoseris, rough rescue, prairie warbler, secretive locust, red-legged spittlebug, blazing star borer.

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