

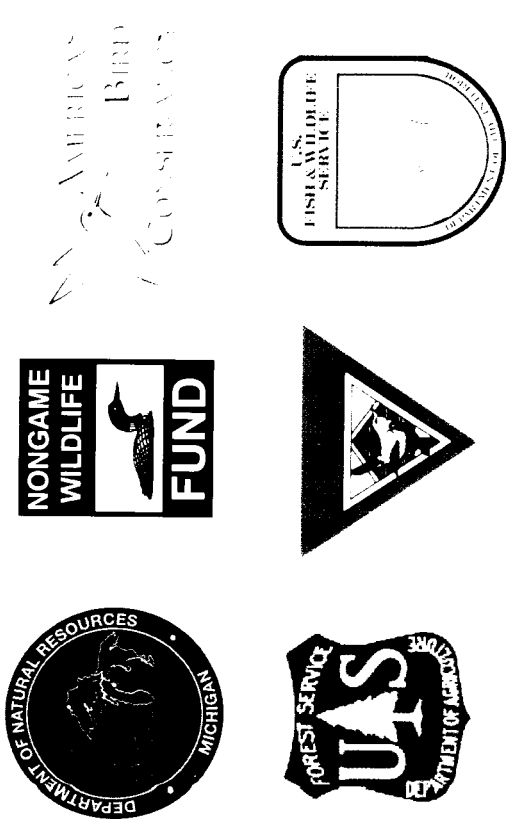




An adult male Kirtland's warbler in breeding plumage. (Natural Heritage Photo)

The endangered Kirtland's warbler (*Dendroica kirtlandii*) is one of the rarest members of the wood warbler (Parulidae) family. It is a bird of unusual interest for many reasons. It nests in just a few counties in Michigan's northern Lower and Upper peninsulas, in Wisconsin and the province of Ontario and, currently, nowhere else on Earth. Its nests generally are concealed in mixed vegetation of grasses and shrubs below the living branches of five- to 20-year-old jack pine (*Pinus banksiana*) forests. The male Kirtland's warblers' summer plumage is composed of a distinctive bright yellow colored breast streaked in black and bluish-gray back feathers, a dark mask over its face with white eye rings, and bobbing tail. The female's plumage coloration is less bright; her facial area is devoid of a mask. Overall length of the bird is less than six inches.

Because of its restricted home range and unique habitat



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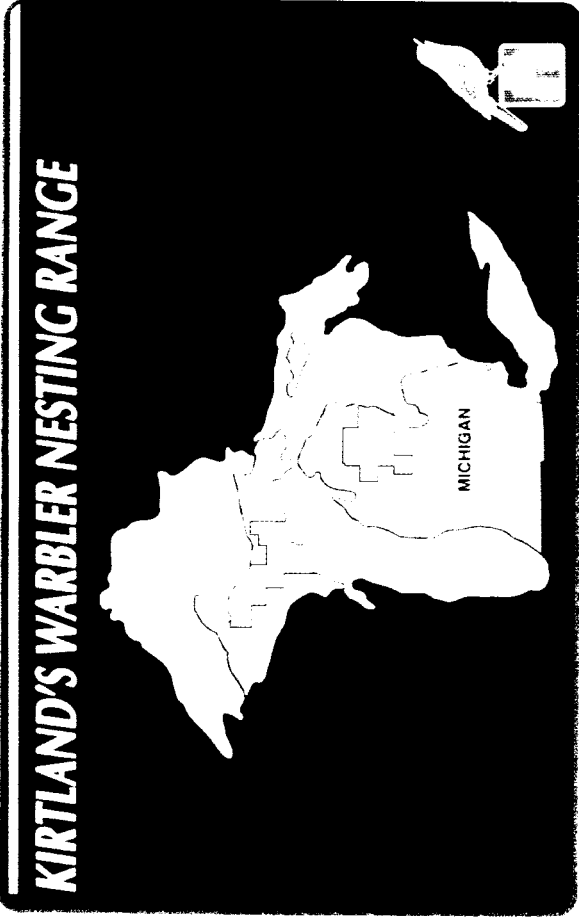
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requirements, the Kirtland's warbler probably has always been a rare bird. Scientists did not describe the species until 1851 when a male was collected on the outskirts of Cleveland, Ohio. That first specimen was sent to the Smithsonian Institution in Washington, D.C. The species eventually was named in honor of Dr. Jared P. Kirtland, a physician, teacher, horticulturist, and naturalist who authored the first lists of birds, mammals, fishes, reptiles, and amphibians of Ohio.

The winter range of the Kirtland's warbler was discovered in 1879 when a specimen was collected on Andros Island in the Bahama Islands archipelago. All sightings or collections of wintering Kirtland's warblers since then have been in the Bahamas and in the Turks, Caicos, and Hispaniola islands. Because of its subtle fall and winter dull-brown plumage and behavior, population information on the warbler's winter grounds is scarce. Additional research, education, and public outreach is required during the warbler's eight-month stay in the Bahamas. Kirtland's warblers are one of more than 200 neo-tropical migratory species that nest in



Primary nesting sites are in the lower peninsula, with some nests in the upper peninsula.

North America and winter in the tropics.

It was not until 1903 that Norman A. Wood discovered the first nest in Oscoda County in northern lower Michigan. Until 1996, all nests were found within 60 miles of this site. Since then, a small number of nests have been found each year in Michigan's Upper Peninsula. Nesting also has occurred in Wisconsin and the province of Ontario.

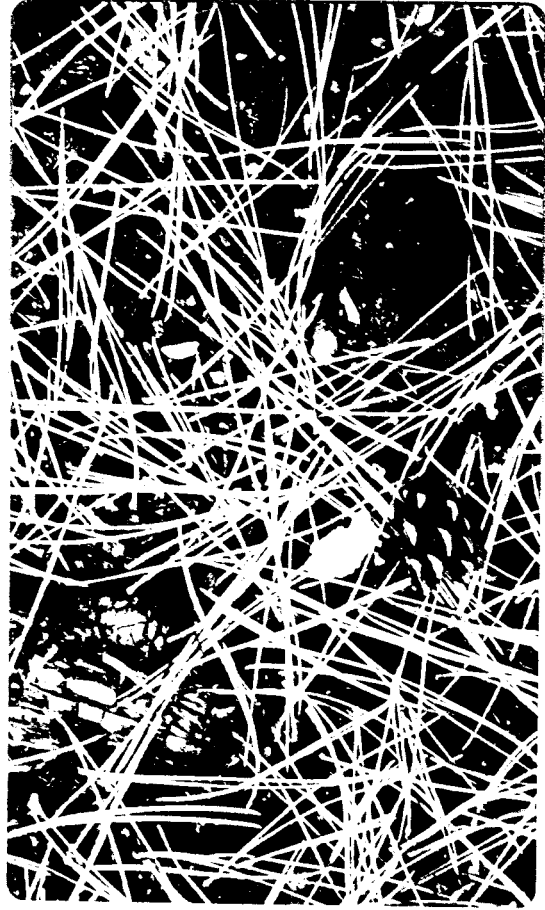
The jack pine forest community provides the primary nesting habitat for the Kirtland's warbler. This forest species is adapted to dry land conditions and has been present on the sandy outwash plains of northern Michigan since the retreat of the Wisconsin ice sheet about 14,000 years ago. A narrow, band of jack pine habitat can be found across the north central states and the province of Ontario. The Kirtland's warbler has very restrictive habitat requirements.



Kirtland's warblers migrate a distance of at least 1200 miles to their wintering grounds in the Bahamas.

in addition to being ground nesters. Kirtland's warblers prefer jack pine stands over 80 acres in size. Those stands, which are most suitable for breeding, are characterized by having dense clumps of trees interspersed with numerous small, grassy openings, sedges, ferns, and low shrubs. The birds nest on the ground under the living branches of the small trees. Jack pine stands are used for nesting when trees are about five feet high or about five-to-eight years of age. Nesting continues in these stands until the lower branches of the trees start dying, or when the trees reach a height of 16 to 20 feet (about 16-to-20 years of age). A breeding pair of warblers usually requires about six to ten acres for their nesting territory, although as little as 1.5 acres may be adequate under optimal conditions.

Nearly all nesting occurs in jack pine stands where the soil type is Grayling sand. This is an extremely well-drained sandy soil with low humus and nutrient content. Water percolates through the sand so quickly that nests seldom are flooded during a rainstorm. This soil also supports the plant community required for nesting habitat.



Heat from fire causes the seeds of the jack pine cone to fall to the ground, helping to regenerate new seedlings. (Photo by Raymond Rüstern)



The use of prescribed burns in a jack pine area is an important management practice. (Photo by David Kenyon)

Fire always has been an important disturbance factor in the jack pine barrens. The young jack pines upon which the Kirtland's warbler depends grow after fire removes older trees and rejuvenates the forest. Heat from fire opens jack pine cones to release seeds. Fire also prepares the ground for the germination of the seeds.

Historically, the jack pine barrens were maintained by naturally occurring wildfires that swept through the region. The jack pine held little value for the lumbermen who came in search of white pine. Once logging activity ended in the 1880's, the continuing forest fires helped increase the range of jack pine, which created more nesting habitat. As a result, the Kirtland's warbler population reached its peak between 1885 and 1900.

With the advent of modern fire protection and suppression efforts, forest management practices did not emphasize the regeneration of jack pine. Consequently, there was a drastic decline of available warbler nesting habitat, and its numbers plummeted. In order to

provide appropriate habitat for the Kirtland's warbler, the U.S. Department of Agriculture Forest Service and the Michigan Department of Natural Resources created four areas within state and national forests to be managed specifically for Kirtland's warbler nesting habitat between 1957 and 1962. By 1973, these areas contained 53% of the nesting population.

It was clear that providing more jack pine areas would be necessary to increase the Kirtland's warbler population. During the mid-1970s, some 134,000 acres of jack pine were designated for management as Kirtland's warbler nesting habitat within 24 management areas of state and national forests. Additional lands were added through the 1990's to bring the total public land specifically set aside for the Kirtland's warbler to more than 150,000 acres.

Jack pine stands are managed by logging, burning, seeding, and replanting on a rotational basis to provide approximately 38,000 acres of productive nesting habitat at all times. By carrying these stands to a 50-year rotational age, nesting habitat can be maintained for the warblers with little sacrifice to the commercial harvest of jack pine. These jack pine stands also provide habitat for the upland sandpiper, Eastern bluebird, white-tailed deer, black bear and snowshoe hare, and for several protected prairie plants, including the Allegheny plum, Hill's thistle, and rough fescue. Unfortunately, the jack pine habitat also provides a home for the brown-headed cowbird, an undesirable nest parasite.

The brown-headed cowbird (*Molothrus ater*), once called the "buffalo bird," was common in the open plains. Cowbirds followed the vast herds of American bison and then cattle, eating the insects that swarmed around the hoofs of the grazing herds. Unable to move with the wandering herds while maintaining a nest, these birds developed an unusual behavior: they began to lay their eggs



Parasitic cowbird (photo by Ron Austing)



Dark cowbird (photo by Ron Austing)

Predatory cowbirds are controlled through the use of live traps

in the nests of other birds. The cowbird chicks, which hatch earlier than most songbirds, are more aggressive and will outcompete their nest mates for food. This added competition reduces the number of non-cowbird young that fledge.

As land in Michigan was opened up during logging and agricultural development, cowbirds moved into the new areas, and the Kirtland's warbler was an extremely vulnerable host. The egg-laying activity of the cowbirds began to impact the Kirtland's warbler population.

Studies have revealed that when one cowbird egg is laid in a warbler nest, only one to three warbler chicks may survive. If two cowbird eggs are laid and hatched in a warbler's nest, none of the warbler chicks survive. Heavy cowbird parasitism is believed to have been a major factor in the decline of the Kirtland's warbler population. In 1972, the U.S. Fish and Wildlife Service, in cooperation with the USDA Forest Service, Michigan Department of Natural Resources, and the Michigan Audubon Society, began controlling cowbirds with large live-traps that are placed in Kirtland's nesting areas during spring and early summer. The traps, which are baited with millet, water, and several live cowbirds, are checked daily and any trapped cowbirds are euthanized. Non-target species are released unharmed. Since 1972, an average of 4,000 cowbirds per year have been removed from Kirtland's warbler breeding areas.

Kirtland's warbler reproductive success has improved dramatically since cowbird trapping began. The nest parasitism rate has declined from the 1966-71 average of 69% to less than 5%. Average clutch size has increased from 2.3 eggs per nest to more than four. The average number of young warblers fledged per nest increased from less than one to almost three birds during the same period. The 2001 annual census counted over 1000 singing males.

Nesting population size is estimated annually by counting the singing male Kirtland's warblers. The songs of the males are distinct, loud and melodious, and can be heard at a distance of one-quarter mile. These counts of the singing males are doubled to determine an estimate of the nesting population. Biologists and other agency personnel, researchers, and volunteers conduct this survey. The first survey was conducted in 1951 and has been done annually since 1971. Additional jack pine areas in the Great Lakes region are being surveyed. Unmated males have been found in Wisconsin, Ontario, and Quebec.

In the late 1990s, a partnership that includes agencies in the U.S. and the Bahamas was formed to identify and protect habitats within the Bahamas that are used by wintering songbirds, including the Kirtland's warbler. The partners include The Nature Conservancy, Canon USA, the Bahamas Ministry of Agriculture and Fisheries, and the Bahamian National Trust. Protection of the wintering grounds includes the development of pine islands and controlling the impact on the use of the forested and broad-leaved scrub areas by wild cats.

In 1997, State and Federal government agencies in Michigan, working in partnership, hosted a delegation from the Bahamas. The Bahamian delegates came to Michigan to review endangered species management and to learn more about the Kirtland's warbler, its summer nesting locations, and interagency management. This visit began an international effort to protect this bird in its summer, fall, and wintering habitats.

The following year, a research team of state and federal agencies joined international representatives in the Bahamas to discuss future Kirtland's warbler recovery projects. These projects include: (1) training birding groups in the identification and monitoring of Kirtland's warblers and other rare resident birds, (2) surveying the Bahamian chain of islands to identify critical wintering bird habitats and, (3) forming partnerships to support conservation work in the Bahamas and Michigan.

Kirtland's warbler population estimates from 1971-2001. These estimates were derived from the annual spring census.

Recovery Plan was developed in 1976, and to provide state and federal agency personnel with a guide to direct management efforts toward the Kirtland's warbler population. The primary recovery goal is to establish and sustain a Kirtland's warbler population in Michigan in a range at a minimum level of 1,000 pairs using current management techniques. A major component of the management plan is the Kirtland's Warbler Wintering Grounds in Michigan. It is necessary to maintain and develop nesting grounds for the Kirtland's warbler, and to establish the following

to maintain some 36,000-40,000 acres of suitable habitat for the Kirtland's warbler on a sustained basis. This will be achieved through planned rotation cuttings on 140,000 acres of stands within designated management areas.

to monitor the Kirtland's warbler on its wintering grounds and migration routes.

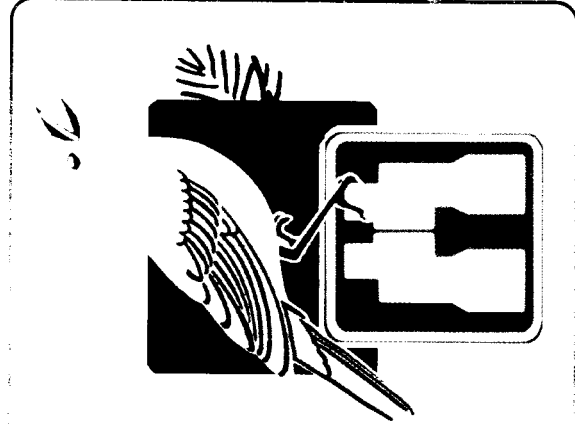
to identify factors adversely affecting reproduction and survival of the Kirtland's warbler.

to monitor the population of the Kirtland's warbler to determine responses to management practices and to make necessary changes.

to implement emergency measures to prevent

The Kirtland's Warbler Recovery Team recognizes the need to review several factors necessary in managing this endangered species. These include the role of information and educational outreach in resource management, the development and increased tourism interest in the jack pine forests, the Au Sable River corridor, and the wintering grounds of the Kirtland's warbler. The team supports several educational events, projects and wildlife-viewing opportunities. These include a video, guided Kirtland's warbler tours, annual Kirtland's Warbler Festivals, and the self-guided auto tour through the jack pine ecosystem. Educational outreach is expected to continue in Michigan, and several new programs are being developed in the Caribbean. A source of continued funding will be necessary to maintain the current level of resource management and research, and is vital to expanding educational outreach efforts here as well as in the Bahamas.

We invite you to become a partner in helping the Kirtland's warbler by supporting the many efforts of the Kirtland's Warbler Recovery Team.



*The 58 miles of the Kirtland's Warbler Viewing Tour provide a great opportunity for viewing wildlife.
(Graphic courtesy of D.J. Case & Associates)*

1. Staying out of posted nesting areas.
2. Camping only in designated campgrounds.
3. Staying with the tour guides and following their instructions.
4. Operating all vehicles only on open roads and designated trails within the area.
5. Leaving your pets in a safe area. Pets are not allowed to run in posted nesting areas.
6. Not using recordings or imitations of Kirtland's warbler songs to attract birds.
7. Learning more about endangered species and ways you can help them and their habitats.
8. Sharing this information with your family and friends.
9. Being extremely careful with fire.
10. Donating to the Nongame Fish and Wildlife Fund.

For more information on the Kirtland's warbler, visit these Web sites: www.michigan.dnr.com, www.fws.gov, and www.fs.fed.us.



Many songbirds can be sighted within the jack pine ecosystem. (Photo by David Kenyon.)

The Kirtland's warbler was first described in Ohio in 1851

It is commonly referred to as the jack pine warbler

This songbird is one of 56 species of wood warblers found in North America

Its nesting habitat is jack pine stands from 5- 20 years old

It nests on the ground under living jack pine branches

Management of jack pine forests includes clearcutting, fire, replanting, and reseeding

Adult Kirtland's warblers are lightweight birds, weighing 1/2 oz

Its average life expectancy is two years

Breeding males have plumage of blue-gray with black streaks

Migrating at night, this wood warbler can come in contact with towers and other high structures

It spends the fall and winter seasons in the Bahamas

Cowbird management is necessary for the Kirtland's warbler's survival

Brown-headed cowbirds are parasites of Kirtland's warbler nests