

KIRTLAND'S WARBLER MANAGEMENT

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The Kirtland's Warbler (*Dendroica kirtlandii*) is a rare and perhaps vanishing songbird. Like the Ivory-billed Woodpecker and the California Condor, it has become adapted to certain environmental conditions that are now limited in extent. This warbler is perhaps the first songbird on which a census of the entire population was conducted throughout the nesting range (Mayfield, 1953:17-20; 1962:173-182). It is also the first songbird for which intensive forest management has been applied.

The objective of this paper is to report what is currently being done by the Michigan Department of Conservation and the U.S. Forest Service to assist the Kirtland's Warbler. Two major topics are covered here: One, how special management areas for the bird fit into the overall resource programs of the Conservation Department and Forest Service and, two, how silvicultural and land management practices are being modified to assist this bird.

We are indebted to Mr. Harold Mayfield, the late Josselyn Van Tyne, and others mentioned in Mayfield's report (1963) for their research on this species. Their studies have provided much essential background information required to develop and maintain suitable habitat for the birds.

MANAGEMENT OBJECTIVES

The primary objective for the establishment of special management areas is to maintain, continuously, areas of forest land to provide for the habitat requirements of the Kirtland's Warbler during the nesting season. Normally, the range of this songbird is limited to blocks of extensive natural jack pine stands over 80 acres in size. It may inhabit red pine or jack pine plantations. Almost without exception, this songbird can be found only in homogeneous blocks of jack pine varying from 5 to 15 feet in height and occurring in a "patchy" condition of dense stands interspersed with nearly an equal area of small openings. "The crucial requirement appears to be not the *height* of the trees, but the presence of living pine-branch *thickets* near the ground" (Mayfield, 1960: 14).

These habitat requirements of the bird created a few problems. How can proper interspersion of openings and various densities of jack pine be arranged in an area of sufficient size for the Kirtland's Warbler? And, at the same time, how can the entire unit be managed on the basis of sound forestry practices?

Basically, any suitable area should be subdivided into a series of management units, each at least 80 acres in size, and on which even-aged coniferous stands can be managed on a commercial rotation. The areas should be managed for a sustained yield, or continuous supply of suitable habitat.

Although the objectives of both agencies will be the same, that of producing desirable warbler nesting habitat, the methods each will use to accomplish this goal varies somewhat. Both will coordinate the wildlife objective (suitable warbler nesting habitat), with timber production, watershed protection, and recreation. The establishment of these areas has not eliminated the production of other forest resources. In fact, commercial harvest of timber makes possible the economic development of these special areas. Thus, the areas represent good examples of multiple use, a basic principle guiding the use of both state and federal lands.

MANAGEMENT

The primary difference in approach used by the State Conservation Department and the Forest Service is the method by which jack pine regeneration will be accomplished. Special planting techniques will be used on state lands to produce the desired habitat. The Lower Michigan National Forest will attempt to create the essential habitat primarily by controlled or "prescribed" burning. Today it is not known whether one management system will be more effective than another. These separate approaches, however, should result in valuable information concerning future habitat management practices. A brief description of the major habitat management efforts is offered here, together with comments on evaluating the need for reducing competing cowbirds and maintaining cooperation of the public to help insure survival of the Kirtland's Warbler.

MANAGEMENT AREAS

The Kirtland's Warbler nests in scattered locations in the northeastern part of Michigan's Lower Peninsula. Much of this warbler's existing range lies within public lands administered by the Michigan Department of Conservation or the U.S. Forest Service. Both agencies are in an excellent position to adjust forest management practices on portions of their lands to maintain suitable nesting habitat for this songbird.

In 1957 the Michigan Conservation Commission formally established three warbler management areas. Each one is four square miles (total of 7,680 acres) in size. Several areas, located in a number of counties and having different types of habitat, were designated to provide better chances for success and to obtain information for future management. All areas have been mapped in detail showing tree species, density of stands, size of trees, uniformity of cover, approximate time for harvest, and acreage of each type.

The field survey indicates the Ogemaw County area presently contains the best Kirtland's Warbler habitat, attracting 58 singing males. All of the birds were recorded in the south half of the area.

The Crawford County area is predominately open grassland with a few scattered stands of medium-sized jack pine. Warblers occur in limited numbers. Habitat is underdeveloped and requires improvement through planting.

The Oscoda County area supports a heavy stand of older jack pine. In the past this area carried a good population of Kirtland's Warblers, but there are none there today. This stand requires severe disturbance to improve the habitat.

In 1962, the 4,010-acre Kirtland's Warbler Management Area was established by the Lower Michigan National Forest. The area contains various-age jack pine timber, and has a good warbler population of 32 singing males on approximately 600 acres of suitable breeding habitat. The combined 11,690 acres of public land provide sites where this warbler will be given special encouragement in future years.

These State and Federal lands are established as management areas. They are not what we normally think of as a preserve or sanctuary. Each management area is large enough to maintain portions in varying successional stages, ranging from openings to merchantable trees. A part of each area should always provide suitable warbler breeding habitat.

CONTROLLED BURNING

Historically, wildfires have been the most important factor in the establishment of natural jack pine. The jack pine "plains" of northern Michigan were undoubtedly created by fire. Extensive areas of slash were produced during the turn of the century when lumbering was at its peak. Unimpeded fires swept through this slash, burning over

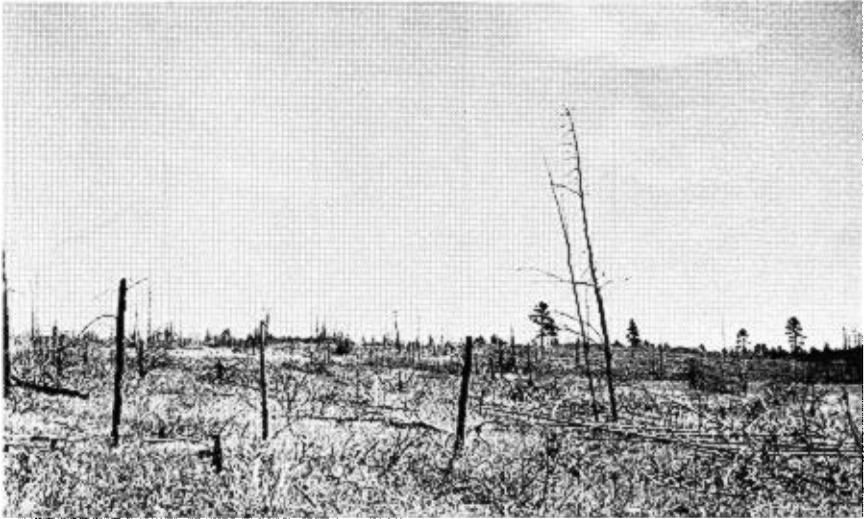


FIG. 1. Jack pine plains following the 1946 forest fire in the Mack Lake Area, Oscoda County, Michigan. The area does not provide breeding habitat for the Kirtland's Warbler.

much of the northern Lower Peninsula of Michigan. These early fires also played an important part in preserving this bird since, "under natural conditions, the habitat of the Kirtland's Warbler is produced only by forest fires" (Mayfield, 1960:23).

Serious efforts to control forest fires in Michigan began in 1927. The average Michigan fire burned more than 300 acres. Today this figure has dropped to less than 15 acres. Intensive forest management requires greater fire protection. Although the possibility of a large fire always exists, modern detection and control methods greatly curtail the chances of any large-scale forest fire. For example, only one large fire has occurred on the Huron National Forest since the early 1930's. In 1946, a series of fires occurred early in April, as a result of very strong winds and unusual burning conditions. These fires produced much of the suitable habitat that now exists (Figs. 1-4). In a few years, the habitat created by these fires will no longer be suitable for this warbler.

What then is the future of the Kirtland's Warbler in light of future forest fire control objectives? Few fires are likely to reach such size that they will create suitable nesting habitat for Kirtland's Warblers.

Although "wild" fires are undesirable, fire used at the proper time and under controlled or prescribed conditions can be a useful tool to the forest manager. The use of controlled burning in the regeneration, or modification, of certain timber types has become of increasing interest to the forester and wildlife biologist. It is being used more and more in efforts to regenerate jack pine following harvest of the mature timber. The Michigan Department of Conservation has pioneered in the use of fire for the improvement of game habitat.

Jack pine will not grow under dense shade. It is also a "fire species." Most cones of this tree exhibit the characteristic known as serotony. The cones do not open under normal temperature conditions; to release seeds for regeneration, high temperatures, such as those produced during a forest fire, are necessary to open them. Through fire,



FIG. 2. Jack pine "snags" left standing after the 1946 Mack Lake Forest fire, Oscoda County, Michigan. The cones have opened and released their seed. Regeneration of jack pine has begun. This early successional stage is of little value to the Kirtland's Warbler as breeding habitat.

the seeds are released from the cones and permitted to germinate. Competition from other plants is also reduced by the fire.

To be a useful tool, however, controlled burning must release the seed, but not destroy its viability. With adequate precautions, controlled burning can be accomplished with safety to achieve regeneration. The Kirtland's Warbler Management Area was set up by the U.S. Forest Service to facilitate controlled burning operations. Twelve units of about 320 acres each, cut on a 55-60 year rotation, have been established so that one unit will be cut every five years. Selected seed trees (15-20 per acre) are now being marked in two units. Cutting began during the winter of 1962-63. Controlled burning operations have been scheduled for the spring of 1964. This area should provide suitable habitat before the existing habitat in the adjoining areas becomes unacceptable to the warblers.

SILVICULTURE

Jack pine occupies nearly one million acres of forest land in Michigan. It is an economically important tree, used chiefly for the production of paper products. Many cut-over jack pine stands have failed to regenerate within a reasonable length of time. Although these sites can be planted, it is an expensive program, costing \$25.00 to \$30.00 per acre. The most economic solution lies in successful regeneration through new and improved management techniques, including controlled burning.

At present, controlled burning is not a regular management tool. Research now in progress could lead to its use as a management technique in the future, which in turn might provide additional nesting habitat. The Kirtland's Warbler has never been found in an area which has been kept free of fire following timber cutting. More important, present logging operations do not occur over large solid blocks, but are generally



FIG. 3. Natural regeneration of jack pine six years after the Mack Lake fire, Oscoda County, Michigan. Trees are 3 to 5 feet high, and just beginning to provide Kirtland's Warbler breeding habitat.

distributed in units ranging in size from 40 to 80 acres. Different timber types or age classes of jack pine exist in most cutting units. The residual stand, following normal cutting practices, contains numerous non-merchantable trees. These residual trees, and the variety of timber types which exist in an area, make normal timber cutting areas unsuitable for the Kirtland's Warbler. Thus, it was necessary to establish special management areas for this songbird.

PLANTING

The Kirtland's Warbler has, at times, nested in extensive jack and red pine plantations. Existing plantations which now provide suitable habitat will soon pass the stage of growth acceptable to this warbler. Extensive open areas, suitable for planting, no longer exist.

Natural jack pine stands are preferred to planted jack or red pine. Jack pine occurs in dense "thickets" interspersed with small openings. These stands maintain their lower branches, providing cover near the ground. Such areas may provide habitat as early as 5 years and as late as 20 years of age. When the trees are 15 to 20 years old (about 15 feet high) the lower branches begin to die and the area is no longer used by the warbler.

Plantations at their normal spacing of 6 × 6 feet do not produce suitable thickets where branches touch until they are 6 to 7 feet tall (about 10 years old). In forest plantations there are few openings. Shortly after the plantation becomes dense enough to provide suitable habitat the lower branches begin dying and the area is no longer used.

Planting configuration and density, however, can be altered to provide nesting cover that should persist as long as natural stands (10-15 years). Portions of two of the three state management areas have been planted in an effort to duplicate conditions found in a natural stand. Other species of conifers are being planted to determine if this warbler



FIG. 4. Nine years after the forest fire in the Mack Lake Area, Oscoda County, Michigan; jack pines are 6 to 8 feet in height, dense, with lower branches reaching the ground. Scattered openings exist. The area provides optimum Kirtland's Warbler breeding habitat.

will nest in spruce thickets, for example, as readily as jack pine. "It seems probable that plantings of other needle-bearing trees might be equally acceptable to the warbler. As Odum (1945:197) has pointed out about birds in general, the requirement of the Kirtland's Warbler probably is a certain 'life form,' not a species of plant" (Mayfield, 1960: 16).

The state management areas contain primarily young growth, which at present, is too small to provide ideal nesting habitat. These areas should begin to provide ideal habitat in the near future.

COOPERATION

The development of these management areas is dependent upon funds to undertake the necessary improvement work. Fortunately, they can be managed for multiple-use benefits. Adjustments in the normal timber cutting methods can be made with minimum loss to timber value. Therefore, much of the development can be accomplished under normal timber sale procedures. Special jobs, such as the removal of non-merchantable trees, hardwood brush control, and controlled burning, which ordinarily is not a part of normal jack pine management, will be the responsibility of the wildlife management programs of the state and the U.S. Forest Service. The U.S. Forest Service has suggested that a special project of this nature be assisted by groups primarily interested in the survival of this bird. The Michigan Audubon Society, Pontiac Audubon Society, Detroit Audubon Society, and the Michigan Natural Areas Council have signed a Cooperative Agreement to assist the U.S. Forest Service in the development of this area.

The question might arise whether or not dedicating these special areas might create excessive use by the public and be detrimental to this warbler. We do not believe this

will happen. The type of person who may be willing to make a special trip to see this bird is likely to be well informed about birds, and an "ultra-conservationist" in his viewpoint. The individual observer would probably do little or no harm. Of some concern would be large groups, or photographers, who, if not careful, could cause the abandonment of nests.

The Kirtland's Warbler Management Area, on National Forest lands near Mio, will be marked with signs. People will be allowed access, but only by permit. It is not the intent of the U.S. Forest Service to prohibit access, but to control large groups, photographers, or use of the area which might be detrimental to this bird. Another objective will be to secure some accurate visitor-use data for the area. Restrictions on the Kirtland's Warbler Management Area will apply only during the nesting season (1 May to 15 August). The area will be adequately posted—including several large rustic-type signs which will outline the objectives of the area, and list the cooperating groups. A small brochure is planned for distribution by the Department of Conservation and U.S. Forest Service to satisfy the numerous requests for information about this bird.

COORDINATION

Projects of this nature require coordination between the other forest resources. Some of the coordination with timber and fire control, has already been mentioned. Several other important considerations involve mineral leasing and recreational use of the land.

Special use development, such as mineral leasing, must necessarily be limited in these areas. Oil and gas lease permits have been prohibited on federal lands where active Kirtland's Warbler colonies are known to exist. Of invaluable assistance are the data from the 1961 warbler census, since the location of all nesting birds is known. Minerals, such as oil and gas are important resources. Their removal by such means as directional drilling can be permitted, since this will not conflict with the primary purpose for which these areas are to be managed.

Scenic roadside zones, which are a normal management consideration along routes of travel, will be eliminated on these areas. This is necessary to permit the extensive homogeneous tracts desired by the bird. Hunting and other recreational uses, such as blueberry picking, which occur after the warbler's breeding season will not be restricted. The Game Division feels that creating and maintaining these management areas will also benefit deer by the openings provided.

Although this warbler is not now threatened with extinction, because of lack of suitable nesting territory, it is very rare (about 1,000 birds). Changing conditions might reduce this bird toward the vanishing point in the future. It is the hope of both the Michigan Department of Conservation and the U.S. Forest Service that these management areas will provide some measure of assurance that this species will not disappear.

COWBIRD CONTROL

Cowbird parasitism is a major deterrent to warbler survival. ". . . the cowbird causes the loss of about 43 per cent of all Kirtland's Warbler eggs between laying and fledging, in nests not destroyed or abandoned" (Mayfield, 1960:177). Some control of the cowbird is anticipated, although there are, as yet, no definite plans. Research is needed to find an adequate method of control.

SUMMARY

The Kirtland's Warbler is a rare and possibly vanishing songbird. It will probably always remain rare because of its exacting requirements for nesting habitat.

Management areas have been established by the Michigan Department of Conservation

and the U.S. Forest Service where habitat will be developed to maintain areas attractive to the Kirtland's Warbler. These areas will be managed on sound multiple-use and sustained-yield principles, with recognition being given to the various other forest resources.

Special planting and controlled burning techniques will be employed to produce the required nesting habitat on a portion of each management area. With the cooperation of various conservation groups it is hoped that these areas will provide some measure of assurance that this songbird will not become extinct.

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