

NORTH CENTRAL FOREST EXPERIMENT STATION
Forest Service, U. S. Department of Agriculture
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Ralthe

Warbler

STUDY PLAN

THE BREEDING HABITAT REQUIREMENTS
OF THE KIRTLAND'S WARBLER

by

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APPROVED: _____ Date _____
Project Leader

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Problem Reference: This plan was developed within the Wildlife Habitat and Recreation Management Research (NC-1751) Problem No. 1 concerning endangered species. It is study No. 78-01 of the Problem Analysis for Problem No. 1, Kirtland's Warbler Problem Element No. 1: "Breeding Habitat."

Literature: The breeding biology of the Kirtland's Warbler, Dendroica kirtlandii has been studied for 45 years (Mayfield 1960, Berger and Radabaugh 1968). However, most of the research has centered on population estimates and nesting characteristics of the species, and there is only one study of the vegetation on the scale of a breeding colony (Buech unpublished). Nevertheless, the general habitat requirements of the warbler have been known for years (Mayfield 1960, Radtke and Byelich 1963). The bird selects 8-20 year old jack pine stands with trees of uniform age that have resulted from forest fires or controlled burns, and in recent times has occupied jack pine and red pine plantations. The acceptable stands have tree heights ranging from about 5-6 feet in the younger stands up to about 15 feet in the declining habitat. The presence of larger residual trees must be quite limited, unless they are concentrated in a few small clumps or "skips" that were missed by the forest fire. Areas with appreciable hardwood sprout-growth are not utilized and almost all occupied breeding areas are tracts of 80 acres or more in size. Almost all breeding areas have been located on the Grayling Sand Soil type; however, not all phases of Grayling Sand may be appropriate for the development of suitable vegetation, and some phases of Rubicon Sand may produce acceptable Kirtland's Warbler habitat. Despite these rather rigid requirements, the Kirtland's Warbler does not use large areas of seemingly ideal habitat both within and among separate stands, even though they fall well within the range of acceptable habitat (Mayfield 1953, 1960).

Since a better understanding of the suitable qualities of utilized areas is essential to the management plans for the warbler, this study is proposed to aid land managers in their efforts to expand Kirtland's Warbler habitat. This research should assist the State and Federal selection of lands for inclusion in the Kirtland Warbler Management Areas, maximize warbler use of existing areas, and help incorporate Kirtland's Warbler management into ongoing timber harvesting programs.

Objectives: The study may be separated into two phases, ¹ Research designed to evaluate; 1) the quality of occupied warbler breeding areas, and 2) the suitability of unoccupied breeding grounds within both existing and potential warbler areas.

A. Occupied Habitat

1. Rank the 12 breeding areas by their density of warblers, and ~~of warblers~~, and relate these densities to habitat factors.
2. Note the degree of utilization of available habitat on representative breeding grounds. Conduct behavioral studies to determine the importance of various habitat elements for foraging, singing, perching, etc.
3. Establish the limits of tolerance for jack pine age and density by taking appropriate vegetation measurements. Determine whether occupied red pine stands fall within the same range of characteristics as the jack pine. Examine the influence of hardwood sprout-growth on warbler habitat utilization.
4. Assess the role of adjacent habitat and history on the utilization of existing areas.

B. Unoccupied Habitat

1. Search for new present or potential breeding areas, mostly in the lower peninsula of Michigan.
2. Establish plots for experimental management for warbler habitat improvement, using the preliminary results and conclusions from Part A (above).
3. Compare regenerating vegetation in burned and unburned jack pine plots to determine whether there is a significant difference in response to these two general types of stand treatment.

Methods:

A. Occupied Habitat

1. The breeding density of Kirtland's Warbler will be estimated from the 1976 and 1977 census results combined with vegetation mapping obtained from foot surveys at each site.
2. The data on warbler behavior and spatial utilization will be obtained on selected sections, marked in a large-scale grid with plastic flagging. The positions of individual birds will be mapped. (Individuals will be recognized by location, and no color-banding is anticipated at this time). Care will be taken to walk around territories or colonies, and where possible, observations will be made from roads and trails. The areas of highest priority for this part of the study include incipient habitat (Mack Lake), dense incipient habitat (Fletcher), declining habitat (Military), and "middle-aged" habitat (Pere Cheney). The concentration on young stands is due to the ease of observation in such habitats, as well as their current abundance.

3. The limits of acceptable warbler habitat will be determined from vegetation measurements taken by line transects. Estimates will be obtained for tree density, spatial distribution of trees and openings, height distribution of trees, height interval of foliage, size and frequency of "residuals" and snags, and percent cover and growth form of ground vegetation. This represents a continuation and modification of the pilot study which Richard Buech conducted in 1976. This data will be obtained in the following manner:

1-Run L-shaped transects of 200 ft. length in a regular pattern through plots of roughly 40 acres size.

2-Measure percent cover of open patches and individual trees, as well as upper and lower height of foliage for trees.

3-Count trees and measure heights of all trees within 10 ft. of the transect.

4-Count and estimate heights of "residuals" and snags within 100 ft. of one side of the transect.

5-Measure percent cover of ground vegetation by growth form.

4. Vegetation data for the comparison of burned and unburned areas will be collected as in number 3 (above). However, care must be taken to compare stands of the same age and site quality, as moisture may be critical to seedling germination and survival. If possible the comparisons should be made at the same locality, to eliminate any variability associated with small-scale climatic differences.

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5. It is possible that the utilization of marginal warbler habitat may be favorably affected by the proximity of large colonies and optimal habitat, or a recent history of warbler use in the general vicinity (G. W. Irvine, personal communication). Accordingly, qualitative notes on the surrounding vegetation will be made at each area.

B. Unoccupied Habitat

1. Possible new or reestablished Kirtland's Warbler colonies will be sought in areas of past or potential breeding, such as the McKinley Area (used in 1976), Montmorency Co., various red pine plantations in the lower peninsula, and in the northern portion of the east unit of the Hiawatha National Forest. New burns will be examined to assess their warbler potential and to evaluate management practices in terms of warbler habitat production.

2. In order to obtain maximum utilization of planned or existing warbler areas, experimental plots will be chosen, and management recommendations formulated.

a. Recommendations for minimum size of treatment blocks (80 acres) and location near "proven" areas have already been incorporated into state and federal plans. The question of optimum size is still open, but most even-aged management units will probably be 200 acres or more (Kirtland's Warbler Recovery Plan, unpublished). An analysis of the effect of plot size on warblers density may be accomplished from existing data, but is complicated by the possibility that there may be a geographic component to the desirability of breeding areas (H. Mayfield, personal communication).

b. Some of the incipient habitat appears to be too dense for optimal breeding density, or any use at all (Fletcher Burn, Muskrat Lake) and experimental thinning treatments will be proposed at specific places with the advice and cooperation of the Kirtland's Warbler Recovery Team. These will be detailed in a later study plan.

c. On marginal soil types, hardwood sprout-growth could make a tract unsuitable, even when the density of jack pine could be sufficient to attract the birds. Brush-clearing may be proposed for several areas such as the north part of Fletcher Burn and possibly the McKinley Area. Brush-clearing followed by full-in planting of jack pine may be recommended for some of the developing habitat.

d. Since jack pine planting is necessary after brush-clearing, or when natural regeneration fails, tree spacing recommendations will be made based on the vegetation measurements taken in optimal habitats.

3. If appropriate jack pine habitat that has not been burned in the last cycle is available, vegetation measurements will be taken for comparison with recently burned plots, as described under Section A.

Manpower Requirements - (1 year)

Tasks:

Plot selection and mapping (April, Nov.)	15 man-days
Census and Behavior Data Collection (May, June)	65 " "
Vegetation data collection (Aug., Sept.)	60 " "
Management evaluation (Sept., Nov.)	30 " "
Data Processing	25 " "
Total	<u>195 man-days</u>

Costs:

*Perdiem: Scientist	120 days x \$35.00 =	\$ 4,320
Technician	75 days x \$35.00 =	2,700
Mileage Local	4,700 miles x 13¢ =	611
Trips	3,000 miles x 13¢ =	390
Commercial Travel		180
Supplies		<u>250</u>
	Total -	8,451

* The actual per diem costs will be 1/2 - 2/3 the projected figures if government housing near the study area is provided.

Assignment:

John R. Probst, Wildlife Biologist

1 technician (or temporary help)

Study Duration: 3-5 years

Cooperation:

- 1 - Michigan Department of Natural Resources
- 2 - Huron-Manistee National Forest
- 3 - Regional Office, National Forest System (Region 1)
- 4 - U.S. Fish and Wildlife Service
- 5 - Michigan Audubon Society

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Literature Cited:

- Berger, A. J. and B. E. Radabaugh. 1968. Returns of Kirtland's Warblers to the breeding grounds. Bird Banding 39:161-186.
- Mayfield, H. F. 1953. A census of the Kirtland's Warbler. Auk 70:17-20.
- _____. 1960. The Kirtland's Warbler. Cranbrook Inst. Sci., Bloomfield Hills, Michigan.
- Radtke, R. and J. Byelich, 1963. Kirtland's Warbler management. Wilson Bull. 75:208-215.