United States Department of the Interior

FISH AND WILDLIFE SERVICE
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

IN REPLY REFER TO:
AF/SE

January 24, 1986

Mr. George W. Irvine
Huron-Manistee NF
Cadillac, MI

Dear George:

By this time we had hoped to have a Mack Lake Burn Area (MLBA) research proposal fleshed out in a form that would be satisfactory to all parties, and to present it for the team's approval at the February meeting. However, the various opinions expressed over the past eight months (at the June team meeting; by members of the original proposal writing group; subsequent comments by Bart, Probst, and DeCapita) have been sufficiently disparate and strongly held that we believe a team discussion of the various research options is still warranted.

Attached is a paper briefly describing five levels of research effort that could be initiated at MLBA. Other levels, of course, are possible, but we believe these five levels represent a reasonable gradient of knowledge which could be used to identify optimal habitat. One end of the gradient is a rather risky judgment of optimal habitat based solely upon the number of singing males which show up in a habitat type. At the other extreme, optimal habitat would be measured by the number of late summer immatures that are produced by a habitat type over the life of the stand.

Our request is that the recovery team members give some serious thought to this issue so that a team consensus can quickly be attained at the February meeting. Following this, we can move on the chore of having the appropriate study proposal written, and make a stronger case for funding the work in 1988.

Sincerely,

James M. Engel
Chief
Division of Endangered
Species

Attachment

MACK LAKE RESEARCH DISCUSSION

INTRODUCTION:

The following material is intended to provide a starting point for a comprehensive discussion of the extent of research that should be initiated at the Mack Lake Burn Area (MLBA). It provides one perspective of the information needed for a more successful habitat creation program and offers various levels of research effort which will satisfy the needs to various degrees. Primarily, however, this paper raises the two questions:

- how reliable do we want our habitat theories to be?
- at how much risk are we willing to place individual Kirtland's warblers (KW) in order to obtain the date needed to support our theories?

These questions must be answered now so a research plan can be developed which will be fully supported by all entities involved in KW recovery. Only with this full support do we have any chance of obtaining funding from a federal budget which is expected to decrease over the next few years.

PROBLEM:

The ever-present problem encountered in the KW management program has been not knowing how, with limited funding and manpower, to create habitat that will produce the most KWs and at the least cost. The chronic failures to reach the annual goals are likely to continue, thus we must strive to ensure that all habitat that is created is of optimal quality and location. The natural regeneration of KW habitat of various degrees of quality at the MLBA is providing an opportunity to study methods of alleviating this problem.

INFORMATION NEEDS:

1) What is the optimal habitat for Kirtland's warbler? This is not only knowing in what habitat KWs will nest (which we know fairly well by now) but also what habitat will produce the greatest number of successful fall migrants over the life of the stand. As this is very hard to get at, we had better be satisfied with a less accurate criterion to determine optimum habitat, e.g., singing males/100 acres over stand life, or estimated fledgling production per unit of area over stand life.

2) Where should an area of optimal habitat be located in relation to areas of existing habitat? Over what distance can newly developed habitat attract emmigrants from existing nesting areas?

3) How can we economically create optimal habitat?

OBJECTIVES:

1) To determine what constitutes optimal habitat. Optimal habitat can be defined at various levels of refinement, with the fifth and final level being the most desirable:

   a) that habitat attracting the first immigrant KWs
   b) that habitat hosting the highest density of singing males

over the life of the stand

c) that habitat hosting the highest density of paired males over the life of the stand

d) that habitat producing the highest number of fledglings per 100 acres over the life of the stand

e) that habitat producing the highest number of fall migrant immature KWs per 100 acres over the life of the stand.

2) To determine where such habitats should be located in relation to occupied habitats in order to provide for maximum KW production.

3) To develop methods to economically create habitat which resembles optimal habitat as closely as possible.

(The third objective should be addressed in a separate research effort, subsequent to the completion of studies to meet objective 1.)

STUDY DESCRIPTION:

Various levels of research effort can be described to achieve these objectives and satisfy these information needs. The levels will provide increasingly dependable data and conclusions as they also increase in their manpower and funding needs, along with increasing risk to the individual birds being studied. Each level should be viewed as also encompassing the research in the preceding levels.

Level 1 - Habitat description and continuation of census. This level of effort will tell us which habitat type attracted the first immigrating males and held the most singing males over the life of the stand. This is an inexpensive, but very undependable measure of productivity, as we won't even know if the censused males are mated. Limited data on dispersal and immigration will be obtained, telling us only where males appear and disappear. Objective 1b will be met. Objective 2 will not be met.

Level 2 - Color band by natal area, followed by intensive searches in MLBA and other nearby nesting areas. Coupled with the work from level 1, this will tell us something of dispersal behavior: direction, distance, timing, and trends over a few years. It still won't give a solid idea of reproductive success, or even if the immigrating birds were successful in defending a territory and mating at MLBA. Objectives 1b and 2 will both be met.

Level 3 - Individually color band adult and hatch-year birds from 4 or 5 natal areas and follow up with intensive searches in MLBA and other areas. Coupled with level 1, this will give us (with only a minimal increase in the risk to the birds being studied) site fidelity and relocation data for age and sex groupings, and which habitats have high or low turnover rates for the various groups. It may warn us of habitat types which act as "sinks" by pulling in a series of males and/or females but allowing them to have only very limited reproductive success. This research level will also provide survival and other demographic data. The individually marked birds will allow for a study of matedness. And, if carried out over a sufficient number of years, it will tell us when a stand ceases to attract new immigrant KWs. Objectives 1c and 2 will both be met.

Level 4 - Detailed nest studies in MLBA in various habitat types.

Studies of a number of KW pairs will provide reliable estimates of actual reproductive success per 100 acres of various types of habitat. Intensive studies can determine matedness, nest destruction rates, clutch size, hatching success, fledging rate, and the effects and sources of predation. This is as close as we are likely to get right now to an estimate of which habitat produces the most first year migrants. We may also gain insights into any predator problems which may exist. This will need to be done very carefully to minimize the risks to the KWs being studied. Objectives 1d and 2 will both be met.

Level 5 - Fledgling survival. Banding nestlings in a large number of nests in various habitat qualities in MLBA will provide a reliable estimate of fledgling survival in various habitats. Spring returns may provide estimates of overwinter survival of yearlings. This effort will get us very close to a measure of the production of fall-migrating KWs by habitat type, but at an increased risk of nest predation and parasitism. Objective 1e may be met. Objective 2 will be met.

BRIEF DESCRIPTION OF METHODS AT EACH LEVEL:

Level 1: Vegetation sampling will be done via permanently located transects stratified among four to eight contrasting sub-areas chosen by site quality and tree stocking differences. Line-intercept transects ~~(described in Noon 1981)~~ are best for describing the patchy distribution of jack pine thickets and openings. The number of points/plots to be sampled along the transects may be modified following the first year of field work.

Censusing would be done as in the past. It may be valuable to undertake a subsequent territorial mapping effort at MLBA to accurately delineate what areas are actually used by the singing males.

Level 2: Adults and fledged young will be banded with colored plastic leg bands at four or five currently active nesting areas at various distances from MLBA. Each natal area will be identified by a different color band. The various possible combinations and locatioins of the plastic band and the FWS aluminum band would allow the identification of up to six age/year classes of KWs from each natal area. (An alternative is to establish concentric circles around MLBA at distances of, say, 15 km, 25 km, and 35 km . All natal areas within the same band would receive the same band color designation.) An attempt will be made to band 20 birds from each natal area the initial year. Banding emphasis will be on immature KWs. Upon mastery of the required techniques and a lack of indications of adverse effects from the banding, 30 birds will be attempted per natal area the second year, and 40 birds per natal area in the third and any subsequent years.

Intensive searches will be made in the MLBA and nearby KW habitat to locate any color-banded birds. Territory mapping may also be carried out. It might be prudent to incorporate observations to detect any effects of color preferences by female KWs, ~~(Burley, et al. 1982).~~

Level 3: Banding will be done in the areas, and to the same extent, as described in the level 2 study. However, all banded KWs will be banded with an individually distinct combination of four leg bands. Continuing the banding scheme used by Craig Faanes and crew for the last two years (four colors plus aluminum, two bands per leg) will simplify reporting errors that might result

from changing colors or number of bands. Faanes' scheme allows 256 combinations, of which approximately 23 had been used by the end of 1985. The addition of a fifth color will allow an additional 244 distinct combinations.

Intensive searches will be conducted over the duration of the nesting season to locate and identify all banded KWs which appear at MLBA, and to document territory turnover between and during nesting seasons. Individual males occupying habitats of differing quality will be observed in detail to determine matedness.

Level 4: Individual nests in habitats of varying quality will be studied in detail to determine fledgling numbers per singing male. To lessen the risk to nests caused by frequent visitation, it might be best to incorporate video taping techniques for at least some of the observations. Banded males and pairs should be observed as early in the nesting cycle as is possible to detect early losses due to nest predation and abandonment.

Level 5: Nestlings will be banded in habitats of varying quality using the expanded color scheme described in level 3. Extensive post-fledging searches will be used to estimate the percentage of nestlings that survive through the period of parental care. Extensive searches the following spring will attempt to establish an estimate of winter survival of yearlings.