

# KIRTLAND'S WARBLER RESEARCH NEEDS

## I. Life history

### A. Breeding grounds

#### 1. Predation and disturbance

##### a. Nest - eggs and nestlings

- Lo (1) Cowbird
  - (a) Control levels needed for Kirtland's warbler population recovery
  - (b) Optimum trap densities
  - (c) Optimum trapping period
  - (d) Other control methods

##### Lo (2) Human

- (a) Effect of recorded calls
- (b) Effect of disturbance by birders and photographers
- (c) Effect of disturbance by off-road vehicles and military operations
- (d) Effect of housing developments

##### ♀ (3) Relative importance of other species (bluejays, grackles, ground squirrels, red squirrels, snakes, ants, etc.)

- (a) Control measures
  - (1) Trapping and moving or killing
  - (2) Effect of fire
  - (3) Shooting

##### b. Fledglings and adults

- (1) Species involved (hawks, house cats, weasels, others)
- (2) Importance
- (3) Control measures

#### 2. Habitat preferences

##### a. Nesting

- (1) Structure of overstory on occupied sites
- (2) Overstory species and diversity on occupied sites
- (3) Structure of ground cover on occupied sites
- (4) Ground cover species and diversity on occupied sites
- (5) Slope
- (6) Size and configuration of habitat type
- (7) Soil type
- (8) Comparisons with similar unoccupied habitat
- (9) Estimating historical changes in "suitable" habitat
- (10) Determining amount of "suitable" habitat needed for population goals

*(in conjunction with other species)*

*Mack Lake ?*

*Probat*

*low*

*Monitoring job*

*41*

*In progress  
Winters  
& Carlson  
Hi for FW*

*LD  
LO*

*LD*

*Mark P. Study  
Pop. Dynamics  
1. Dispersal  
2. Recolonization  
3. and many related  
Habitat*

*In progress*

*LD - mod*

*Included  
How many  
would be  
part of Mark P.  
Study*

- b. Fledgling
  - (1) Structure of overstory on sites used
  - (2) Overstory species and diversity on sites used
  - (3) Structure of ground cover on sites used
  - (4) Ground cover species and diversity on sites used
  - (5) Comparison with non-used habitats in vicinity
- 3. Weather
  - a. Effects on fledglings produced
  - b. Effects on fledgling survival
- 4. Food supplies
  - a. Kinds of insects consumed in relation to time
  - b. Effect of pesticides on food
  - c. Number of insects per unit area in various habitats occupied and unoccupied
- 5. Diseases and parasites
- 6. Range expansion
  - a. Imprinting on breeding sites
    - (1) When territories selected
    - (2) How habitat located
  - b. Cross-fostering
    - (1) Development of techniques on related species of warblers raised by various foster parents
      - (a) Transfer of eggs
      - (b) Transfer of nestlings
    - (2) Trials with Kirtland's warblers
  - c. Inventory of potential breeding habitat outside traditional range
    - (1) Michigan
    - (2) Other states and Canadian provinces
- 7. Census methodology and related
  - a. Frequency of singing
    - (1) By date and time of day
    - (2) In relation to nesting progress
    - (3) With various weather conditions
    - (4) In relation to matedness
  - b. Determination of matedness
    - (1) Males without mates
    - (2) Females without mates
    - (3) Males with two females
  - c. Identification of individual singing males
    - (1) Plumage
    - (2) Sonagrams
  - d. Use of sensitive microphones to aid in detection of song
  - e. Determining distances songs can be heard under various weather conditions, land forms, and vegetation
- 8. Nesting and nest success
  - a. How territories are selected
    - (1) Males
    - (2) Females
    - (3) Differences by age

- b. Differences in production by yearling and adult females
- c. Extent of double-broodedness
- d. Success of first nestings and second nestings
- e. Survival of first broods and second broods

*Low*

- B. Plumages
  - 1. Identification of sex in fledglings
  - 2. Identification of yearling plumages in both sexes

- C. Migration

- 1. Spring and fall
  - a. Timing of migration by sex and age classes
  - b. Migration routes
  - c. Whether birds fly non-stop or in steps
  - d. Whether birds fly in groups or singly
  - e. Effects of storm fronts and other weather patterns on movements
  - f. Mortality factors
    - (1) Lighted structures
    - (2) Storms
    - (3) Predation
    - (4) Pesticides
  - g. Habitat used during migration
  - h. Navigational methods
- 2. Spring - possible staging areas in Bahamas

- D. Wintering grounds

- 1. Determination of wintering areas
  - a. Using tape recorded calls in Bahamas
  - b. Following radio-equipped birds from Florida
  - c. Other methods
- 2. Habitats occupied
  - a. Location and extent of such habitat
  - b. Disturbance by human activities
  - c. Habitat changes, natural and man-caused
  - d. Management possibilities
  - e. Need for refuges
- 3. Food supplies
  - a. Insects
  - b. Other foods
- 4. Mortality factors
  - a. Predation
  - b. Food shortages
    - (1) Drought
    - (2) Competition with other birds
      - (a) Other Kirtland's warblers
      - (b) Other species
  - c. Storms, hurricanes and thunderstorms
- 5. Sociability
  - a. Do birds winter alone or in groups
  - b. Other associates
  - c. Are they territorial?

*P. Committed*

- E. Population modeling
  - 1. Development of a predictive model using a variety of population, habitat, and weather parameters
  - 2. Determining optimum management strategies using model
  - 3. Obtaining weather data directly from Bahamas

II.

Habitat regeneration on breeding grounds

A. Creating preferred jack pine habitat

- 1. Regeneration by fire
  - (a) Compare success of stands which have been regenerated with and without fire
    - (1) Overstory
    - (2) Ground vegetation
  - (b) Investigate how to achieve proper fire characteristics for optimum seed production with prescribed burns
    - (1) Surface versus crown fires
    - (2) Season of burn
    - (3) Intensity
    - (4) Ground moisture conditions
  - (c) Determine optimum number and placement of seed trees
  - (d) Determine role of slash in seed production following regular cutting cycle
- Planting
  - (a) Site preparation needed
    - (1) Cutting methods, clearcut vs. shelterwood for shade and wind control
    - (2) Need for fire for ground preparation
    - (3) Value of roller chopper for ground preparation
    - (4) Other scarification and weed control techniques
    - (5) Slash disposal methods
  - (b) Evaluate various sizes and configurations of blocks
    - (1) Optimum spacing of blocks from each other
    - (2) Optimum block size
    - (3) Optimum configuration of plantings
      - i. Standing wave
      - ii. Other
      - iii. Tree density - spacing
  - (c) Type of planting material used
    - (1) Compare various genetic stocks
    - (2) Compare success of seeds versus seedlings
    - (3) Evaluate age of seedlings on costs and survival
    - (4) Develop optimum cultural methods for seedlings
    - (5) Determine value of using seedling containers
    - (6) Conduct trials of pelleted seeds

*Hi priority  
Jack pine pil. X  
various intensity  
of burn and  
no burn.*

*Needs to be developed  
in conjunction with  
Bennett - DNR - W  
Botti - DNR - Forestry  
Dart - MSU - Forestry?*

*& H-MNF + DNR  
Mgt. people and  
sent to NCFES*

*Develop  
Problem statement  
to NCFES to give priority  
to Jack pine*

