Kirtland's Warbler Essential Habitat Update
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Dr. Carol Bocetti, Dr. John Probst, Philip Huber

The 1985 Kirtland's Warbler Recover Plan (KWRP) estimated the amount of Kirtland's warbler (KW) essential habitat needed to meet the recovery goal of 1000 pairs. This data was based on the best information available at the time. The goal stated in the KWRP was to develop and maintain 38,000 acres of breeding habitat at all times by managing approximately 127,500 acres on Federal and State lands on 45- to 50-year rotation: 53,488 acres (42%) on Federal lands and 74,143 (58%) acres on State lands. This would require regenerating 2,550 acres of jack pine annually. It also assumed approximately 1 breeding pair per 30 acres during a jack pine stand's optimum stage, and 15 years total occupancy (see KWRP, pages 20 to 23).

More recent data suggests that some of these numbers may need to be updated. The average territory size is estimated to be 38 acres. The estimate of average territory size is based on the annual singing male census from 1980 to 1995.

Average Territory Size = 38 acres

Today, the number of acres of occupiable habitat required annually to establish and sustain a Kirtland's warbler (KW) population at a minimum level of 1000 pairs is the same as it was in the KWRP (38 acres/pair x 1000 pairs = 38,000 acres).

Total Occupiable Habitat Available at All Times = 38,000 acres

The following total acreage would be required to be managed as essential habitat if jack pine on a 50-year rotation:

Total habitat essential habitat required for management = 38,000 acres x (50-year rotation/10-year duration)

= <u>190,000 acres</u>

At present, approximately 151,000 acres of essential habitat has been identified for KW breeding habitat management. This represents a 26% shortfall in the total acres of essential habitat required to sustain the breeding population of Kirtland's warblers at 1000 pairs.

These estimates are base on habitat data from 1980-1995. For each year, the count from the annual singing male census was divided by the number of acres of occupiable habitat, and then the average from these years was calculated. This procedure was done for each habitat type: plantation and wildfire sites. The estimate on plantations was 0.017 males per acre and 0.020 male per acre on wildfire sites. We chose to use the value for plantations because at least 80% of the current warbler population occurs in plantations,

and because we can manage plantation acreage but not wildfire acreage. The recovery efforts for this species are based on an adaptive management approach, and, therefore, the estimate of the average density of male warblers per acre will certainly change with additional research and monitoring through time. The following paragraphs address important caveats to using the 0.017 estimate of the average density of warbler males per acre.

Caveats

During the time period used to calculate this estimate, the biogeography of the Kirtland's warbler population changed. From 1980 to 1986, the population was stable at or above carrying capacity. The total number of acres of suitable habitat was severely limiting the population, and individuals were occupying marginal habitats (Probst and Weinrich 1993). From 1987 to 1995, the population was increasing due to increasing availability of suitable habitat. Originally, the population increase was primarily on wildfire sites, but later it was mostly on plantation sites. Currently, approximately 80% of the warbler population occurs on plantation sites, and Probst (pers.comm.) believes the density of males per acre may range from 0.02 to 0.04. The density of males per acre is influenced by the biogeography of the species, which is a stochastic process. The use of 0.017 represents a minimum density of males per acre.

Biogeography affects not only the density of warblers per acre, but also the duration of use for any given stand. When the population is severely limited by habitat availability, marginal stands are used. Stands can be marginal due to stocking density or other vegetative characteristics or due to stand age. From 1980 to 9187, stands were likely used for a long time because new young stands were not available. Probst (pers.comm.) estimates that stands were used for 15-20 years, and the KWRP assumes 15 years of use (Byelich et al. 1985). Currently, stands are being used for a shorter duration, which Probst (pers. comm.) estimates to be about 10 years in plantations and 12 years in wildfire sites. Given a shorter duration of use, the total number of acres dedicated to warbler recovery would have to be larger in order to provide 38,000 acres of occupiable habitat at all times.

The estimate of average territory size is based on the annual singing male census from 1980 to 1995. The accuracy of the annual singing male census is under investigation (Probst et al. unpublished). Preliminary analysis suggests that the census is an excellent index for showing population trend, but not for predicting population size. The census is likely an overcount, particularly in stands with high densities of warblers.