research management
findings
Number 20 • February 1989

REINTRODUCTION OF WILD TURKEYS TO THE KETTLE MORAINE STATE FOREST

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The eastern wild turkey (*Meleagris gallopavo silvestris*) was once native to Wisconsin, inhabiting most of the southern half of the state. Clearing of mature oak forests (*Quercus* spp.), the bird's primary habitat, and uncontrolled killing were significant causes of its extirpation from the state. The last wild turkey sighting in Wisconsin occurred near Darlington in Lafayette County in 1881. Although early attempts to restore wild turkeys failed, a project initiated in 1976 by the Wisconsin Department of Natural Resources using live-trapped wild birds has been very successful. Birds were trapped in Missouri and released in southwest Wisconsin, Vernon County. As densities increased, birds were live-trapped and released in other areas of the state to accelerate range expansion. Current estimates place Wisconsin's turkey population at over 45,000.

This article presents the results of a recent reintroduction effort in the Kettle Moraine State Forest-Southern Unit (KMSF-SU). Forty-two wild turkeys were released in the Forest during January and February 1986. Subsequent dispersal, survival, nesting, and habitat use by 11 radio-tagged birds were monitored through December.

Study Area

The KMSF-SU is located in Waukesha, Jefferson, and Walworth Counties along an interlobate moraine (Fig. 1). State ownership is about 18,450 acres in an area 20 miles long and 1.0-3.5 miles wide. Elevation varies from 845 to 1,100 ft. The KMSF-SU is 75% forested uplands dominated by oak trees. Various central hardwoods occur both in association with and exclusive of oak trees. Pine plantations cover 13% of the forested land. Nonwooded or lowland areas cover 25% of the Forest and are characterized by grassland, prairie, and oak openings. Although only 5% of the KMSF-SU is farmland (share-cropped and private inholdings), agricultural activities dominate the land

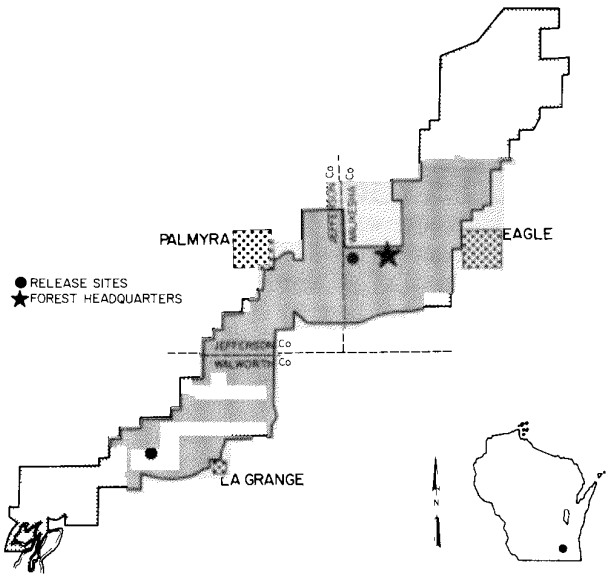

FIGURE 1. Location of the KMSF-SU within the state. Release sites are marked.

immediately outside the Forest boundary. The KMSF-SU is a multiple-use forest emphasizing outdoor recreation. Over 192 miles of trails are used for hiking, skiing, snowmobiling, and horseback riding. Recent attendance estimates make it the second highest use area in the state with nearly 1.5 million visitors per year.

Methods

Source birds were captured by rocket netting in Crawford County, Wisconsin. Sex and age ratios of the 42 relocated turkeys were 11 males to 31 females and 16 adults to 26 juveniles. The birds were tested for diseases, measured, weighed, wing-tagged with plastic patagial markers (red for hens and yellow for gobblers), and transported by vehicle to 2 preselected release sites within 24 hours of their capture. The release sites were 9 miles apart (Fig. 1). Releases were made on 4 dates between 9 January and 18 February 1986.

Solar-powered radio transmitters were attached to 9 hens at the southern release site and 2 gobblers at the northern site. The hens were released on 29 January and the males on 14 February. Transmitter/turkey azimuths were obtained 2-4 times weekly from 30 January to 10 December. Azimuths were transferred to a 1:24,000 scale USGS topographic map, and locations were established by triangulations. Locations were then translated into specific grid cells using the Universal Transverse Mercator grid system (100 x 100 m grid size). Turkey habitat usage was determined by plotting locations on 1":400′ aerial photographs. Turkeys were also monitored through sightings reported by the public.

Dispersal and Movements

Fifty-six percent of the total area traversed by radio-tagged turkeys occurred inside the Forest boundary. Sightings reported by the public encompassed a slightly larger area, although the 2 areas were comparable. Dispersal averaged 1.8 miles from the release sites with a range of 0.3-4.0 miles.

The 9 radio-tagged hens remained within one mile of the release site during the 2 weeks following their release. Seven were monitored into the breeding season (April-May). Four of these remained together through February and separated during March. The greatest distance traveled by this group occurred in early March and covered 2.4 miles northeast of the release site. By early May, nesting sites had been selected 4.0, 0.4, 3.9, and 1.4 miles from the release site. Two other hens remained together through February and separated in late March. During late March through early April these birds traveled the farthest south of any radio-tagged turkeys. By early May (nesting season), each had returned north to within 2.1 and 0.3 miles of release. The 7th hen joined hens of each group and eventually split from both, nesting 0.7 miles east of the release site.

The 2 radio-tagged gobblers traveled 2.5 miles during the 2 weeks following release, and they remained in this location throughout March. The birds then established separate home ranges 4.7 miles apart. This separation coincided with the onset of the breeding season.

Habitat Use

Based on 292 locations, we found that radio-tagged birds preferred hardwood stands, the most abundant habitat type in the Forest (Table 1). They visited these hardwoods and scattered hardwoods more often than expected. Conifer stands, though scattered, were used according to their availability, and both grasslands and agricultural lands were used less often than expected. Grasslands were used largely during May, June, and July. Hardwoods, scattered hardwoods, conifers, and agricultural lands were utilized year-round.

Three of the 4 nests discovered in the KMSF-SU had conifers in the vicinity, all had an overhead object (shrub, tree limb), and all were located on the field side of the ecotone between forests and fields. Brood habitat data were obtained largely from a radio-tagged hen and her 11 poults They utilized an oatfield the first week after hatching and a hayfield (quackgrass

and alfalfa) the third week. Extensive movements were made through grassy areas adjacent to woodland during the next 4 weeks. In August and early September the brood visited areas of lightly stocked hardwoods and fields with scattered shrubs. Several dusting sites were located in these habitat types as well. Insects found in crop fields and hayfields provide critical protein for poults. The 4 winter roost sites found during this study were in mature pine plantations, suggesting a preference.

Survival and Reproduction

Six of the 11 radio-tagged turkeys survived the 11-month study period yielding a 45% mortality rate. Of the 4 clutches located, only 2 were complete. They averaged 15.5 eggs/clutch. The only brood under study decreased from 11 to 7 poults, a 36% loss, during a 22-day period in early to mid July. All 7 poults were still alive on 1 September.

Human Activity

Wild turkey abundance is usually inversely correlated with human abundance. Because the KMSF-SU is a high use area, human disturbance of turkeys is inevitable. The greatest potential for disturbance is in areas where trails and roads pass through forested habitats. One nest was abandoned near the end of incubation due to disturbance from a cross-country running race. A second nest was abandoned on 9 May when the investigator flushed a hen from her nest. Renesting could compensate for such initial losses, although second attempts by both hens in this study resulted in nest predation and subsequent failure.

Exaggerated November movements by 5 of the 6 radio-tagged birds may have been caused by the sudden influx of hunters, particularly gun deer hunters, into the KMSF-SU. Turkeys moved outside of areas inhabited during the summer. Two hens traveled a straight line distance of 4.5 miles in 6 days. Evidence of direct hunting mortality appeared on 24 November when a deer hunter found a jake that had been shot. During late March to early April and again in late September, a flock of domestic turkeys attracted both radio-tagged gobblers to within 1/8 mile, or closer, of the farm where they were being kept. No evidence of disease transmission or cross-breeding was found, although the potential existed.

Prospects for a Permanent Population

Based on one year of study, it appears that our efforts to reintroduce wild turkeys to the KMSF-SU were successful. Over one-half of the radio-tagged birds were alive at the end of the study period and young were fledged. Movements and

TABLE 1. Wild turkey habitat preference on the Kettle Moraine State Forest - Southern Unit, February-November 1986.

Habitat Type	Total Area Acres	Total Area %	Usage (no. visits) Expected	Usage (no. visits) Actual	Proportion Total Usage	Confidence Interval	Preference**
Hardwoods	5,484	36.9	108	151	0.517*	±0.063	+
Scattered Hdwds	493	3.3	10	27	0.092*	±0.036	+
Conifers	1,158	7.8	23	30	0.103	±0.038	=
Grassland	2,970	20.0	58	41	0.140*	±0.045	-
Agric. Land	4,017	27.0	79	43	0.147*	±0.044	-
Wetlands	330	2.2	6	0	0.000	--	-
Urban Areas	397	2.7	8	0	0.000	--	-
Total	14,849	99.9	292	292	0.999		

* A difference between expected and observed usage at the 0.05 level of significance.
** + more locations visited than expected; - fewer locations visited than expected; = expected number of locations visited.

habitat usage indicate that sufficient food and cover exist within the Forest to support wild turkeys. Results of our study were similar to those obtained from other studies of wild turkeys in the Midwest. However, establishment of a permanent population will require attention to the following problems and recommendations:

1. To reduce the potential for severe winters decimating the KMSF-SU turkey population, the number of strategically located food patches on Forest property should be increased. The food patches may also help to keep the wild turkeys within the confines of the Forest boundary and away from domestic turkeys. In addition, small forest openings should be maintained throughout the KMSF-SU to provide ample feeding areas for poults.

2. A proactive disease monitoring program and control of domestic turkey flocks in the vicinity of the KMSF-SU is necessary to prevent decimation of the established flock. Any significant die-offs should be investigated.

3. Human activity should be minimized during April and May. Nesting hens may tolerate small numbers of hikers and birdwatchers but probably will not tolerate large disturbances such as cross-country races without deserting their nests. All visitors using the KMSF-SU at this time of year should be encouraged to remain on established trails. Dogs brought into the KMSF-SU should remain on leashes and under the owner's control during this critical period. Any law or regulation enacted to protect turkeys from human disturbance must be strictly enforced.

4. Additional releases planned to build up the population should be carried out. Inbreeding could result if the population remains small since the Forest is isolated from other wild turkey flocks.

5. A continued education program must keep the public informed and interested in the reestablishment of wild turkeys to the KMSF-SU. Strong public support is essential to the long-term success of wild turkeys in the KMSF-SU.

The authors work for the Wisconsin Department of Natural Resources in wildlife management. Robert Longwitz worked as a wildlife management assistant at the KMSF-SU during this project and conducted much of the field work. David Matheys is a wildlife management technician at the Bong State Recreation Area. He assisted in data analysis and report writing for the project. Mark Andersen is the wildlife manager at the KMSF-SU and led the turkey restoration effort described in this article. Address: S91 W39091 HWY 59, Eagle WI 53119. Telephone: (414)594-2135.

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