

# Public Support for Endangered Species Recovery: An Exploratory Study of the Kirtland's Warbler

Barry D. Solomon

Michigan Technological University

**Abstract:** This study examines public awareness, attitudes, and support for recovery of the endangered Kirtland's Warbler (KW). This bird species breeds only in Michigan in a fairly well-defined area of jack pines. The recovery program focuses on expansion of habitat and control of cowbirds, which parasitize nests. Despite a 40-year effort, the KW did not begin to recover until the 1990s when sufficient habitat finally became available. Local public sentiment has been divided, however, on prescribed burning to regenerate jack pines, ever since a fire burned out of control in 1980. To determine whether residents now support the KW and its recovery program, a mail survey of 290 residents near the breeding grounds was conducted. The results show that awareness and knowledge of the plight of the KW is high, especially among men and older residents. Broad support for the KW and endangered species recovery was found. While no significant correlates were observed with support for the KW recovery program, younger residents were found to be more supportive of the Endangered Species Act. Management implications are discussed.

**Keywords:** cowbirds, Endangered Species Act, jack pine, Kirtland's Warbler, public support

## Introduction

The protection and recovery of endangered species has been one of the most vexing and controversial challenges of environmental policy making and management in the United States (Clark, Reading, & Clarke, 1994). Most species, their geographic ranges, and habitat needs, are poorly researched and understood (National Research Council, 1995). Moreover, in the majority of instances species are not acknowledged by government officials to be endangered until they lie perilously close to the threshold of extinction (Mann & Plummer, 1996). Although there appears to be strong public support for endangered species protection in general (Ladd & Bowman, 1995), programs to recover some specific species have led to considerable land-use conflict, especially in the western U.S. The most

heralded of these cases include the northern spotted owl, red-cockaded woodpecker, grizzly bear, and gray wolf (Yaffee, 1994; Sellers, 1994; Ernst, 1991). Private property owners, in many cases, have taken or killed endangered species in order to avoid real or perceived restrictions on land use (Mann & Plummer, 1996). These controversies underscore the importance of local public understanding and support for individual recovery programs (Gilbert & Halstead, 1997).

The Kirtland's Warbler (*Dendroica kirtlandii*) is one of the most well researched and understood of the 1,135 U.S. species listed as of May 1, 1998 under the Endangered Species Act of 1973 (Public Law 93-205). A complete census of its population in Michigan was made in 1951, 1961, and 1971. The 1971 count showed a 60% drop in population from the 1961 level to just 201 singing males (Mayfield, 1960; Mayfield, 1972). This precipitous population decline has resulted in an annual census of Kirtland's Warbler (KW) since 1971. A considerable body of research had already shown that this bird was a specialist highly vulnerable to two factors: lack of sufficient jack pine (*Pinus banksiana*) habitat of suitable size, age and soil type, and a high rate of nest parasitism by the brown-headed cowbird (*Molothrus ater*) (Mayfield, 1960; Walkinshaw, 1983; Probst, 1986). Addressing these problems has formed the basis for the KW recovery program (Byelich et al., 1985). More recent research has refined knowledge of the influence of landscape structure and composition on the population of the KW as it has begun to recover (Zou, Theiss, & Barnes, 1992).

Previous research on environmental attitudes has found age and (formal) education to be the only socioeconomic variables strongly and consistently correlated with support for environmental programs. In particular, young people and educated people have been found to be more supportive than older people and less educated people of environmental programs and wildlife rights (Van Liere & Dunlap, 1980; Mohai & Twilight, 1987; Manfredo & Zinn, 1996). Research on other potential correlates with environmental values, such as income and gender, has been inconclusive (Van Liere & Dunlap, 1980; Blocker & Eckberg, 1997; Somma & Tolleson-Rinehart, 1997), though some studies have found women under certain circumstances to be more environmentally concerned (i.e., more likely to hold a pro-environment attitude) than men (Brown & Harris, 1993; Davidson & Freudenburg, 1996; Bord & O'Connor, 1997).

The present study allows for exploration of these general concepts in the context of a specific endangered species, the KW. Several research questions were considered: do age, gender, education, and wealth help to explain differences in awareness, attitude and support for the KW and its recovery program? The paper discusses local public awareness, attitudes, and support for the KW and its recovery program.

This species is unique in that it breeds only in Michigan, in a fairly well-defined geographic area of jack pines, and winters only in the

Bahamas and probably a few surrounding islands (Byelich et al., 1985). Controversy in the case of the KW has revolved around controlled burns for regenerating jack pines on forest lands. The specific focus of the paper is on the results of a survey of local residents near the primary breeding grounds of this bird that was conducted in the springs of 1996 and 1997. The results follow a brief description of the 40-year-old recovery program for this species.

### **The Recovery Program for the Kirtland's Warbler**

This highly specialized Warbler requires low shrubs and can breed only under young jack pines, between five and 20 feet in height, where it can hide its nests from predators. Moreover, the soil must be light, sandy, and well drained in order to prevent flooding of the nests. The "Jack Pine Plains" of the northern lower peninsula of Michigan are highly suitable for KW breeding (Zou et al., 1992).

Recognizing its low and tenuous population, scientists, government officials, and concerned citizens began habitat management for the KW in 1957, well before passage of the Endangered Species Act (Trauger & Bocetti, 1993). A significant focus of the habitat management effort has been to expand greatly and protect jack pine trees on state and federal lands in Michigan, occasionally using controlled burns. Currently about 15,000 hectares of productive nesting habitat for the KW are maintained at all times in Michigan. This program was begun by the Michigan Department of Natural Resources (MDNR), and expanded in the 1960s to include the U.S. Forest Service (FS). Local public sentiment has been divided on prescribed burning for regenerating jack pines, especially since a fire burned out of control in 1980 at Mack Lake, resulting in one fatality and minor property damage (Probst, 1986). Once jack pines mature and lose their suitability as KW habitat, they are clear-cut and integrated into the local logging industry. This practice has been an important factor in the partial recovery of the species and avoidance of land-use conflicts (Solomon, 1998), though some residents continue to object to the controlled burns and clearcutting. The government tree-planting program has been needed because jack pine seeds propagate naturally through wildfires, which occurred every 30-40 years before fire control efforts in the state (Mayfield, 1960).

Another major contributor to this population loss was the high rate of nest parasitism by cowbirds, which got as high as 70% (Walkinshaw, 1983). Consequently, the U.S. Fish and Wildlife Service (FWS), in cooperation with the FS and MDNR in 1972, began an annual program of cowbird trapping and removal that has been highly successful. To date, over 100,000 cowbirds have been extirpated solely to protect the KW (U.S. Fish and Wildlife Service, 1998). A major reason for the trapping program's success is that it has been supported by not only the agencies mentioned, but also the Michigan National Guard (at its Camp Grayling property), many volunteers, and nongovernmental organizations such as the Michigan Audubon Society and the Michigan Natural Areas Council.

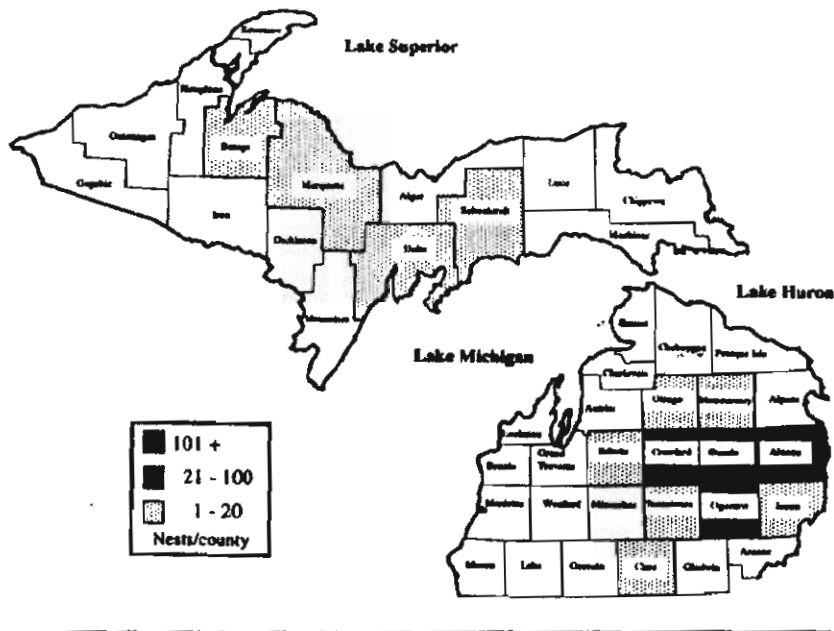
The 1995 breeding bird census of the KW found 765 singing males in Michigan (the population declined slightly in 1996-1997), a remarkable rebound from a population of 167 singing males in 1987 (Weinrich, 1996). The KW will not be considered fully recovered until its population reaches a self-sustaining minimum level of 1,000 pairs or more of breeding adults (Byelich et al., 1985, p. 14). The partial recovery can be attributed to the long-term recovery program of jack pine management and cowbird control. Success to date has been facilitated by the location of most of the prime KW habitat on state and federal lands, though as it recovers this species will saturate public lands and be increasingly forced onto private property. Consequently, given the still perilous status of the species, avoidance of further land-use conflicts with residents and public support for recovery will be imperative.

A recent focus of the recovery program has been expansion of tourism. This activity has undoubtedly increased an already strong level of awareness and interest in this bird among many local residents near the primary KW breeding grounds. For example, Oscoda County, where more of these birds breed than anywhere else, recognized its significance by building a large monument to the KW in front of the County Courthouse in 1963; thus there is some local pride in the bird. Kirtland Community College was founded in 1966 in nearby Roscommon, giving further publicity to the bird. In addition, wildlife officials with the FS and FWS have been conducting limited tours to the breeding grounds each late spring since 1974. Finally, in spring 1994 an annual Kirtland's Warbler Festival was begun, along with the Jack Pine Wildlife Viewing Tour, a self-guided automobile tour that includes a stop near KW habitat. The modest economic benefits from these activities have become an important spinoff from the recovery program (Solomon, 1998).

### **Research Design and Methods**

To assess the local public views about the KW since the Mack Lake fire, a survey was developed. The survey was mailed to residents of Mio and Grayling, Michigan, the two largest population centers (4,000 and 7,600, respectively) in Oscoda and Crawford Counties near two of the three largest breeding areas of the KW (Figure 1). Surveys were sent to a random sample of 5% of registered voters in Mio's two townships and 10% in the city of Grayling. While no differences were expected in the returned surveys for these two communities, the higher, 10% sample was drawn from the city of Grayling since it has only half the population of Mio. Township residents in Grayling outside its city limits comprise its majority but were not sent surveys, since publicity about the bird is concentrated in the city. For instance, late spring tours to the KW nesting grounds begin at the Holiday Inn in downtown Grayling. Since no more than one person per household was sent the survey, a much higher percentage of households received the survey than the 5% and 10% of registered voters. In both cases, the surveys were sent to samples of 50% male and 50% female residents. The total number of surveys mailed was 290.

**Figure 1**  
**Kirtland's warbler breeding grounds by county in Michigan.**  
 Source: Data from Weinrich (1996).



The survey included 21 nominal-scaled questions divided into four sections: awareness of the KW and the government program to protect and recover it, socioeconomic benefits, effects of the recovery program on other wildlife such as cowbirds, and general questions about the Endangered Species Act. The specific questions are provided in the results section below. Additionally, respondents were asked their age, gender, formal education level, length of local residence (a surrogate for informal education about the KW), and income level.

The survey was sent out in two waves: initially in May 1996 and again in May 1997 to non-respondents (only) from the first wave. Survey recipients were given five weeks to respond. To increase the probability of response, the surveys were mailed out near the time of the 1996 and 1997 Kirtland's Warbler Festivals, when there was greater publicity about the bird and its plight. The one-year time gap between the waves was chosen for three reasons: to capitalize on the spring publicity, because many residents of Mio and Grayling (like the bird) live elsewhere during the colder months, and especially to be responsive to the KW Recovery Team's strong request not to "overwhelm" local residents. For example, the team members emphasized that there are still some hard feelings in the area regarding the Mack Lake fire. The team was concerned that the

survey might inadvertently stir up negative feelings toward controlled burning, clearcutting, or government in general. Respondents were given the option of being mailed a copy of the Jack Pine Wildlife Viewing Tour brochure as an inducement to answer the survey (30% of respondents requested it). The returned surveys were analyzed with SPSS (Frude, 1987) for frequency counts and Cramer's V to determine strength of association between key variables and local socioeconomic variables (Blalock, 1972, p. 297).

## Results

### Survey Sample Description

Of the 290 surveys mailed to the local residents, twelve were returned as undeliverable. One hundred twenty-three total valid returns were received (81 and 42 in wave one and two), for a 44% response rate. The representativeness of the sample was checked by comparing it with U.S. Census data for Oscoda and Crawford Counties (U.S. Department of Commerce, 1994). Survey respondents were slightly older, wealthier, better educated, and predominantly male when compared with the two counties' residents overall. For instance, 49% of the respondents were aged 50 or more, compared with 36% of the general population; 40% of the respondents had household incomes of under \$25,000, compared with 64% of the general population; 32% of the respondents were college graduates, compared with only 10% of the general population; and the male to female ratio among respondents was 1.20, compared with about 1.01 in the general population. While there were clear differences between the sample and the general population, these differences were partially expected, since people who register to vote tend to be better educated and wealthier than the rest of the population (Piven & Cloward, 1988).

### Awareness, Knowledge and Attitude Toward the Kirtland's Warbler

Residents were asked "were you aware that for the endangered bird species, the KWs, its only known breeding area in the U.S. is in this region of Michigan?" Virtually all of the respondents (96%,  $n=118$ ) said yes; 68% ( $n=83$ ) said yes to the follow-up question, "do you know why the KW is endangered?" (16% each replied no and not sure). The latter result was verified by 86% ( $n=101$ ) and 56% ( $n=67$ ) of respondents, respectively, correctly identifying the bird's required habitat needs as young jack pines when given four choices and expressing knowledge of the effect of its nest parasite, the brown-headed cowbird. This level of knowledge can be partially explained by a degree of self-selection bias at work, perhaps with less knowledgeable (or disinterested) residents not returning the survey.

Only gender was found to be statistically significant for explaining differences in knowledge of why the KW is endangered, at  $p = .001$  (Table 1). Males (69%) tended to be slightly more knowledgeable than women (65%) about why the KW is endangered.

Two yes/no questions asked people if they think that the government agencies' forest habitat management efforts are effective in helping to recover the KW, and if they agree with the agencies' efforts to protect and help recover the KW (i.e., attitude). Sixty-two percent of the respondents (n=75) indicated a belief that the program is effective, though nearly one-third (n=38) were not sure. A comparable number of respondents (57%, n=69) expressed agreement with the program. These results undoubtedly reflect the level of public awareness of the program. If residents have heard anything about the KW, it is probably that the program finally seems to be working well, but a significant minority of respondents have not heard this or are not certain about cause (habitat management) and alleged effect (increase in population of the bird). None of the socioeconomic variables were found to be statistically significant correlates with agreement with the government's KW recovery program.

**Table 1**  
**Knowledge of the Kirtland's Warbler Endangerment: Results of Contingency Table Analysis**

Do you know why the Kirtland's Warbler is endangered?					
Variable	% Yes	% No	% Not Sure	V value	p-value
Age <sup>a</sup>				.228	.053
18-29	40	40	20		
30-49	69	19	12		
50-65	60	17	23		
Over 65	82	0	18		
Gender				.339	.001
Female	66	27	7		
Male	69	6	25		
Education <sup>b</sup>				.153	.474
High School	58	22	20		
Some College	71	9	20		
College Graduate	74	16	10		
Residence Length <sup>c</sup>				.214	.084
1-10 Years	58	19	23		
Over 10 Years	71	14	15		
Income <sup>d</sup> (%)				.180	.520
Less Than \$25,000	59	23	18		
\$25,000-49,999	74	12	14		
\$50,000 or More	72	12	16		

<sup>a</sup> Measured on an ordinal scale of 18-29, 30-49, 50-65, and over 65.

<sup>b</sup> Measured as high school only, some college, college graduate, or postgraduate.

<sup>c</sup> Measured on an ordinal scale of under 1 year, 1-5 years, 6-10 years, and over 10 years.

<sup>d</sup> Measured on an ordinal scale of under \$25,000 a year per household, \$25,000-49,999, \$50,000-74,999, \$75,000-104,999, and \$105,000 or more.

### Economic Benefits

Residents were asked "do you think the local communities benefit economically from having the KW nearby for almost half the year?" About 64% of respondents (n=76) agreed that local communities benefit economically from the presence of the KW. The local economic stimulus mentioned most frequently was in association with motels and campgrounds (used by bird-watching tourists), and restaurants. Less frequently identified was increased use of retail stores, and a small stimulus to employment in logging/wood products. None of the socioeconomic variables was found to be statistically significant correlates with belief in local economic benefits because of the recovery program.

### Effects on Other Wildlife

A significant part of the KW recovery program is the trapping and killing of its nest parasite, the brown-headed cowbird (Walkinshaw, 1983). A series of questions was asked about the effects of the program on other wildlife species. When asked "do you believe that cowbirds have effects on other bird species?" as noted earlier, 56% of the respondents said yes; 38% (n=46) were not sure. Similar responses were made when residents were asked about familiarity with the cowbird control program (57% yes, 43% no); 62% of respondents (n=75) support these activities (20% no, 18% no opinion). Fifty-four percent of respondents (n=65) thought that other wildlife species benefit from this habitat management program; 34% (n=41) were not sure. When asked "which of the following wildlife species do you think might benefit?", the species receiving the most frequent mention were other birds, deer, and snowshoe hare. Local wildlife officials informally indicated that these impressions were accurate. Finally, to provide a broader context, two additional questions were asked on ecosystem management. Fifty-two percent (n=63) knew that the KW recovery program was being done as part of an ecosystem management program, while 40% (n=48) were not sure. Seventy percent (n=81) thought ecosystem management was important.

### Kirtland's Warbler and the Endangered Species Act

When asked "what is the attitude of most local people you know toward the KW?", 46% replied positive (n=55); of the other respondents, just over 25% each selected negative and no opinion. Eighty-three percent of respondents with an opinion indicated that the local attitude has become more positive toward the KW as a result of the Kirtland's Warbler Festival. Respondents were somewhat divided when asked "do you support the federal Endangered Species Act (ESA) as it is now written?", with 57% favoring it and 43% opposing it. Moreover, 16 people (13% of the returned surveys) failed to answer this question, perhaps indicating survey fatigue or lack of familiarity with the ESA requirements. When asked about possible changes to the ESA, multiple answers were given.

While 28% thought it should be strengthened ( $n=30$ ), only four people felt it should be weakened. More respondents thought the ESA should be modified somehow ( $n=36$ ), and 26 favored integrating it with other mandates. These answers indicate that while most respondents believed the ESA needed to be changed, there was no consensus on what the changes should be other than not weakening it.

While more respondents than not indicating a positive attitude toward the KW existed among local people, none of the socioeconomic variables was significantly correlated with attitude. General support for the ESA, however, had a significant, inverse relationship with respondent age, at  $p = .012$  (Table 2).

**Table 2**  
**Support for the Endangered Species Act: Results of Contingency Table Analysis**

Do you support the federal Endangered Species Act (ESA) as it is now written?				
Variable	% Yes	% No	V value	p-value
Age			.324	.012
18-29	80	20		
30-49	67	33		
50-65	60	40		
Over 65	30	70		
Gender			.174	.075
Female	68	32		
Male	51	49		
Education			.086	.858
High School	59	41		
Some College	59	41		
College Graduate	56	44		
Residence Length			.219	.164
1-10 Years	57	43		
Over 10 Years	58	42		
Income			.170	.584
Less Than \$25,000	67	33		
\$25,000-49,999	62	38		
\$50,000 or more	48	52		

### Conclusions and Implications for Endangered Species Management

To summarize the statistical results, most of the socioeconomic variables were found to be insignificant determinants of differences in awareness, attitude, and support for the KW and its recovery program. Such findings may be attributable to the uncertainty of the views of non-respondents given the modest sample size, and the strength of the

minority opposition to endangered species programs. The presumption that non-respondents are generally less informed or less interested in the KW recovery program than are respondents may not be correct. Even the respondents exhibited weak knowledge of some aspects of the program (e.g. cowbird trapping and the requirements of the Endangered Species Act). Non-respondents might hold a lower degree of political efficacy or higher degree of antigovernment sentiments, or simply do not answer surveys in general.

While the majority of respondents supported the program to protect and recover the KW, a few opponents held strong feelings and provided unsolicited comments. Indicative remarks included some continuing, significant concern about the occasional controlled burns to regenerate jack pines, and that government could better spend its money. These comments, however, do not necessarily mean that the majority views were not also strongly held, since these people may have had less motivation to emphasize their beliefs.

The study results are relevant to the KW Recovery Team, and the findings on economic benefits and the cowbird control program are applicable to other endangered species programs. The recovery team already has an Information and Education (I & E) Committee responsible for public education in the local communities. These results are important because of the concentrated breeding of the KW in the jack pine areas of northern Michigan, where other endangered species have received much less attention. It can be concluded that the local awareness and knowledge of the KW and why it is endangered are high, especially among men. Government outreach efforts thus might focus on better informing local women of the plight of the KW (e.g., at meetings of local women's groups). The support for the KW recovery program is also high, and much of the existing support can be attributed to past efforts of the I & E Committee (Case, 1996). Older residents were least supportive of the ESA, so additional educational programs stressing the value of endangered species protection could target them.

Almost 64% of survey respondents said they believed that the presence of the KW during the spring and summer months provides a local economic stimulus. Government officials and businesses could build upon this important finding. Indeed, the local Kirtland Community College (host of the annual Kirtland's Warbler Festival since 1996) is trying to expand tourism as part of a local economic development strategy. The sense that endangered species protection can lead to new economic opportunities appears to be associated with a positive attitude toward the species in question (Miller, 1995). Summer birdwatchers, especially experienced ones, may help identify wildlife management issues and volunteer for conservation projects (McFarlane & Boxall, 1996). Economic aspects of a recovery program clearly are applicable to other endangered species (cf. Gilbert & Halstead, 1997).



The KW is only one of many bird species subject to nest parasitism by the brown-headed cowbird, though it probably has been the most serious case (Walkinshaw, 1983). A significant minority of the survey respondents (n=46) was neither aware of this problem nor the government effort to control the problem (n=52). About 62% of respondents, however, supported the trapping program, with only 24 respondents opposing this intervention. This result is encouraging for efforts to control cowbirds outside of Michigan. A similarly large number (n=48) of respondents were not familiar with the ecosystem management context of the recovery program. Ecosystem management could be a target for future educational programs. Such an effort would further bolster the arguments for cowbird control (a source of minor controversy even among ornithologists) and benefits to other songbird species, which has been difficult to fund in recent years.

The strong local support for the KW and its recovery program translated into similar support for the federal Endangered Species Act. The survey indicated that more than half the respondents supported the act as it is currently written. Nonsupporters, however, did not want to weaken the act but would rather see it strengthened, modified, or integrated with other mandates. This finding indicates that many respondents sensed problems with the act, but were unsure of what they were or what the solutions should be. While these results could be explained as part of decreased public support for government programs in general, they suggest an obvious additional area for public education. Such education can be most valuable when it is directly linked to the recovery program for a prominent local endangered species such as the Kirtland's Warbler.

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