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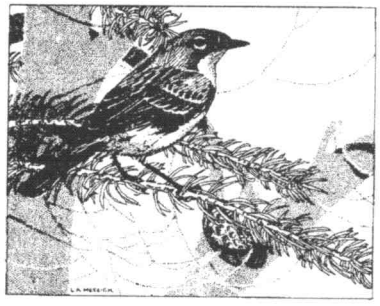
USDA Forest Service

2001 Kirtland's Warbler Census Report

Huron-Manistee National Forests



Philip W. Huber, Wildlife Biologist

Kenneth Rex Ennis, Wildlife Biologist

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2001 Kirtland's Warbler Census Report

Huron-Manistee National Forests

Evaluation

Introduction

The Kirtland's warbler census has been conducted annually since the 1971. The year 2001 was the 31st consecutive year that the census has been conducted. The 1971 census showed that the Kirtland's warbler population had declined 60% from the 1961 census to only 201 singing males. In the fall of 1971, a committee was formed and recommended the census be conducted annually to monitor the fate of this species. In 1974, the Kirtland's Warbler Recovery Team was appointed and immediately recommended that the annual census be continued. This recommendation was later documented in the Kirtland's Warbler Recovery Plan. This document states that the purpose of conducting the census is to not only monitor the fate of the species, but also to provide baseline data for needed research, evaluate habitat development programs, and provide species and habitat protection from potential human impacts.

The annual census data provides valuable information to assist managers in protecting the species and its habitat, and leads to modification of management practices. Data is critical to research related to this species in both its summer and winter habitats. Many researchers develop their hypothesis and request census data to test these theories.

The responsibility for the Kirtland's warbler census has been vested with the Michigan Department of Natural Resources (MDNR). Jerry Weinrich, MDNR biologist, has provided coordination for this effort. Those areas of Kirtland's warbler habitat within the Huron National Forest have been delegated to the Forest Service. Forest Service biologists Philip Huber, David Riegle and Kenneth Rex Ennis provided leadership in conducting the 2001 census on National Forest System land.

Methods

The 2001 census was conducted June 6 through June 15; the same period as is was conducted in the past. The Huron National Forest census was conducted as follows:

Day	Date	Area
Wednesday	June 6	Eldorado/Tawas/Oscoda Burn
Thursday	June 7	Big Creek
Friday	June 8	Big Creek/Luzerne Burn/Ogemaw (State)
Saturday	June 9	Pine River
Sunday	June 10	Pine River
Monday	June 11	Mack Lake
Tuesday	June 12	McKinley
Wednesday	June 13	Make-up day for rain and finish misc. areas
Thursday	June 14	Make-up day for rain and finish misc. areas
Friday	June 15	Make-up day for rain and finish misc. areas

The census was conducted in all areas believed to be occupiable Kirtland's warbler habitat. To cover the estimated 13,000 acres on the Huron National Forest, employees were needed from the Forest Service, MDNR, and Fish and Wildlife Service. Most importantly, 18 volunteers provided over 200 hours of time and expertise critical to accomplishing this task.

The methods and period for conducting the census were defined by the Kirtland's Warbler Recovery Team. Before the census, The Michigan Department of Natural Resources distributed "The Instructions for the 2001 Kirtland's Warbler Census". These instructions were used to conduct the 2001 census.

Pre-census planning involved reviewing past years monitoring efforts, census results, querying our vegetation databases (ArcInfo & CDS) to located young jack pine stands, and performing on-the-ground examinations to determine if additional areas needed to be censused. Areas that met the criteria for potential Kirtland's warbler habitat were identified from the data, and GIS maps were produced for all areas. A schedule for conducting the census for the different management areas was produced and census leaders were designated.

Areas Surveyed

Pre-census planning identified several new areas for the census and allowed us to delete several areas that had been censused in the past. Since the 1995 census, the Forest Service has focused on surveying younger plantings of jack pine to ensure the census was locating all the singing male

Kirtland's warblers. Often warblers are present in advanced natural regeneration within young plantations.

The 2001 census covered approximately 13,000 acres on National Forest System lands on the Huron National Forest. Two areas of State land in Ogemaw and Iosco Counties were censused by the Forest Service, but are not included in this document

Kirtland's Warbler Census Data

In 2001, 1085 singing males were counted. This is the first time ever that the number of singing males counted on a census exceeded 1000. The 2001 count exceeded the recovery goal of 1000 pairs by 85 individuals. The recovery goals for the Kirtland's warbler are not well defined in the Kirtland's Warbler Recovery Plan. The goals for recovery were refined and clarified in a letter from the Kirtland's Warbler Recovery Team to the US Fish and Wildlife Service in January 2002 (Appendix A).

Huron National Forest census efforts located 375 singing male Kirtland's warblers on National Forest System land (NFSL) in 2001. This is 35 percent of the total singing male Kirtland's warbler population, down from 41% in 2000. Once again, the 375 count is short of the expected production of 400 individuals from nesting habitat on NFSL.

The number of birds occupying habitat on the National Forest stayed roughly the same in 2001 (see 2000 Kirtland's Warbler Census Results). The amount of new occupiable nesting habitat balanced habitat that was lost across the Huron National Forest. From 2000 to 2001, the count on the Huron National Forest increased by eight male warblers (2%), from 367 to 375 birds. No singing males were counted in the 1980 Mack Lake Burn area. Ninety four percent (94%) of the singing males counted on National Forest system lands were in plantations specifically establish to provide habitat for the Kirtland's warbler; 3% were in natural regeneration and 3% were in wildfire areas.

9,197 acres of habitat were occupied (Table 1). Pine River KWMA continued to lead in the number of birds and the acres of habitat occupied. Eldorado had the smallest number of acres per singing male. The HMNF fell short in its goal for acres of occupied habitat and number of singing males.

Table 1. Summary of the 2001 Kirtland's Warbler Census

Kirtland's Warbler Census Area	Total Acres	Acres of Occupied Habitat in this Census (Goal 10,700)	Percent of KWMA's Occupied (Goal 15.8)	Singing Males (Goal 400)	Acres per Singing Male
Pere Cheney	2,015	0	0	0	
Eldorado	7,368	700	9.5	42	16.7
Big Creek	7,994	1,763	22.0	72	24.5
Mack Lake	17,059	1,335	7.8	71	18.8
McKinley	11,022	668	6.0	13	51.4
Pine River	15,299	4,164	27.2	166	25.1
Tawas	6,988	0	0	0	
Temporary Habitat	567	567	100	11	51.5
Total	**68,312**	**9,197**		**375**	
Average			**13.5**		**31.3**

Discussion

The Kirtland's warbler population in Michigan has increased in response to availability of suitable nesting habitat, protection provided by cowbird trapping, and area closures. In 2001, 94% of the occupiable habitat on NFSL resulted from the establishment of jack pine plantations. Only 10 singing males were found in wildfire areas. This year's count of 1085 is over six times (6.50) greater than the population in 1987, when the census count was 167. In past years most of the population was located within the Mack Lake Burn, approximately 11,000 acres of occupiable habitat in one location. No birds were found in that area in 2001. Now the population is more evenly distributed between the Kirtland's Warbler Management Areas on NFSL, better meeting the goals and objectives of the Kirtland's Warbler Recovery Plan.

A significant item of interest for 2001 is the percentage of Kirtland's warbler singing males that continue to be found within plantation habitats. Eighty percent (80.9%) of the birds in Michigan were found in plantation habitats, an increase from 2000 (76.0%). On the Huron National Forest, 94% were in plantation habitat, unchanged from 2000. Over the past two decades, many new plantations were established in the Pine River Kirtland's Warbler Management Area. Consequently, the largest increase in singing males counted on NFSL was in the Pine River KWMA. The count here has been steadily rising, increasing from 73 in 1998 to 136 in 1999, 134 in 2001, and 166 in 2001. For the third consecutive year, the Pine River KWMA had most of the birds (44%) on the Huron National Forest. This increase in occupancy of plantations is encouraging, as we continue to manage for this type of habitat in the future.

Another facet of habitat occupancy is that some blocks occur in a much larger and more open landscape. Current block size is larger in many instances because several age classes of habitat exist near one another, and stand sizes are larger. Future management decisions relating to scheduling of future habitat blocks should capitalize upon this knowledge.

Several stands on the Huron Forest are fully stocked with natural regeneration. Jack pine trees in these stands occur at densities greater than needed for Kirtland's warbler nesting habitat. However, some of these stands were heavily impact by *Sphaeropsis* in 2001, particularly in the Pine River KMWA. The stocking densities of these stands will continue to be monitored and evaluated. Some stands will be treated differently to determine if management can help prevent the effects of *Sphaeropsis* over the long term.

In October 2001, the Strategy for Kirtland's Warbler Habitat Management (Strategy) was completed. This document replaces the Kirtland's Warbler Management Plan for Habitat in Michigan (1981). The Strategy describes the actions needed to maintain and develop nesting habitat for the Kirtland's warbler, as well as actions needed to protect the species in its breeding habitat.

Charts and Graphs

2001 Kirtland's Warbler Census Results (Final)
Huron National Forest

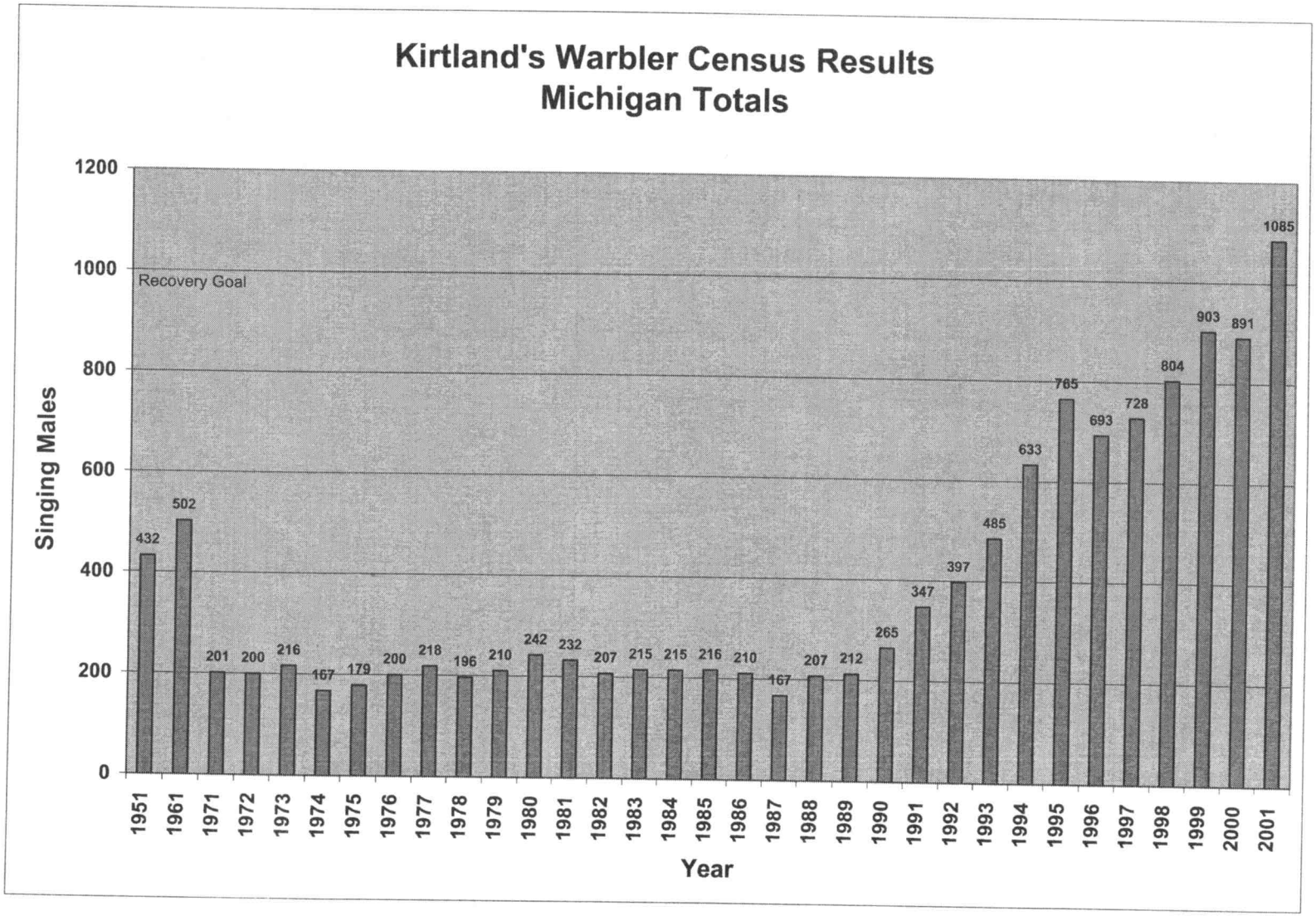
Singing Males

Census Area	Year: 1999	2000	2001
Eldorado KWMA	30	32	42
Markle Road Area	1	0	0
Big Creek KWMA	73	62	72
Luzerne Burn	3	10	9
Mack Lake KWMA	102	102	71
McKinley KWMA	26	18	13
Pine River KWMA	136	134	166
Tawas KWMA	0	7	1
Oscoda Burn	1	2	1
Total	372	367	375

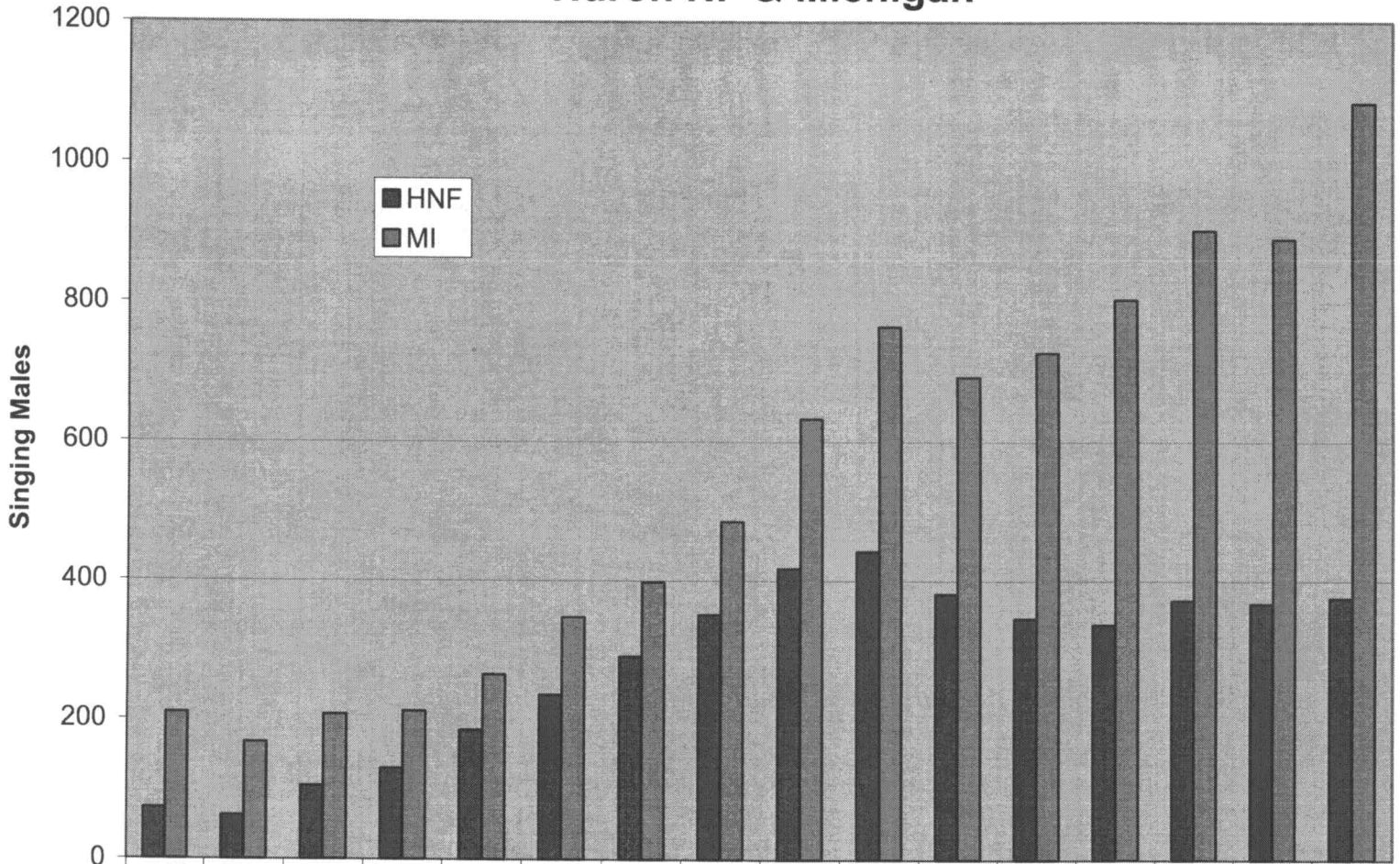
Habitat Type	1999		2000		2001	
Plantation:	351	94.4%	348	94.8%	353	94.1%
Wildfire:						
1980 Mack Lake Burn	10	2.7%	2	0.5%	0	0.0%
1983 Oscoda Burn	1	0.3%	2	0.5%	1	0.3%
1993 Luzerne Burn	3	0.8%	10	2.7%	9	2.4%
Natural Regeneration:	7	1.9%	5	1.4%	12	3.2%
Total	372		**367**		**375**	

Management objective: HMNF = 395 of 1000

Lower Peninsula Total	**885**	**883**	**1077**
Upper Peninsula Total	**19**	**8**	**8**
Michigan Total	**904**	**891**	**1085**

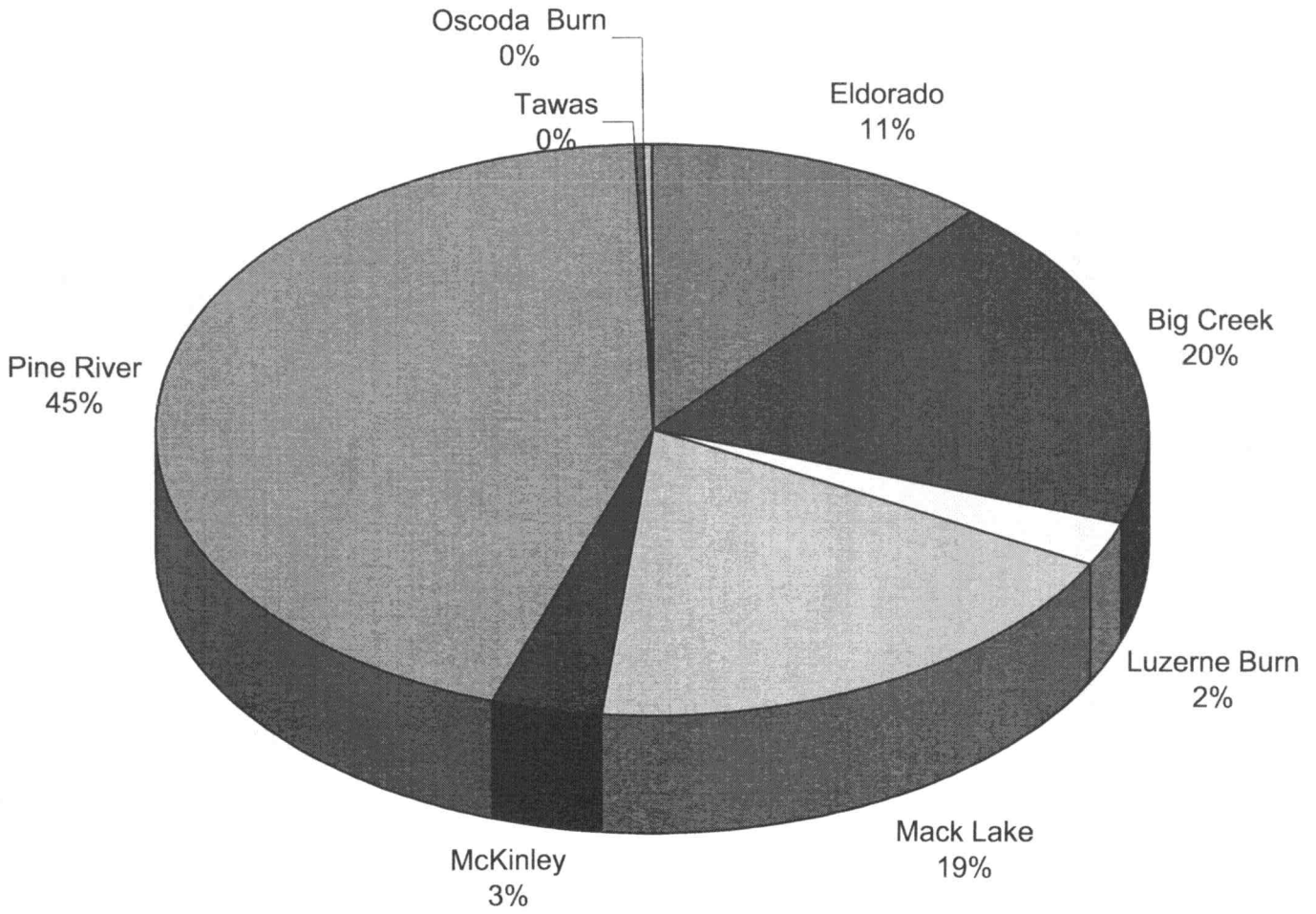

Kirtland's Warbler Census Results
Michigan Totals
Singing Males
Year
Recovery Goal
0
200
400
600
800
1000
1200
1951 1961 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001
432 502 201 200 216 167 179 200 218 196 210 242 232 207 215 215 216 210 167 207 212 265 347 397 485 633 765 693 728 804 903 891 1085

Kirtland's Warbler Census Results
Huron NF & Michigan

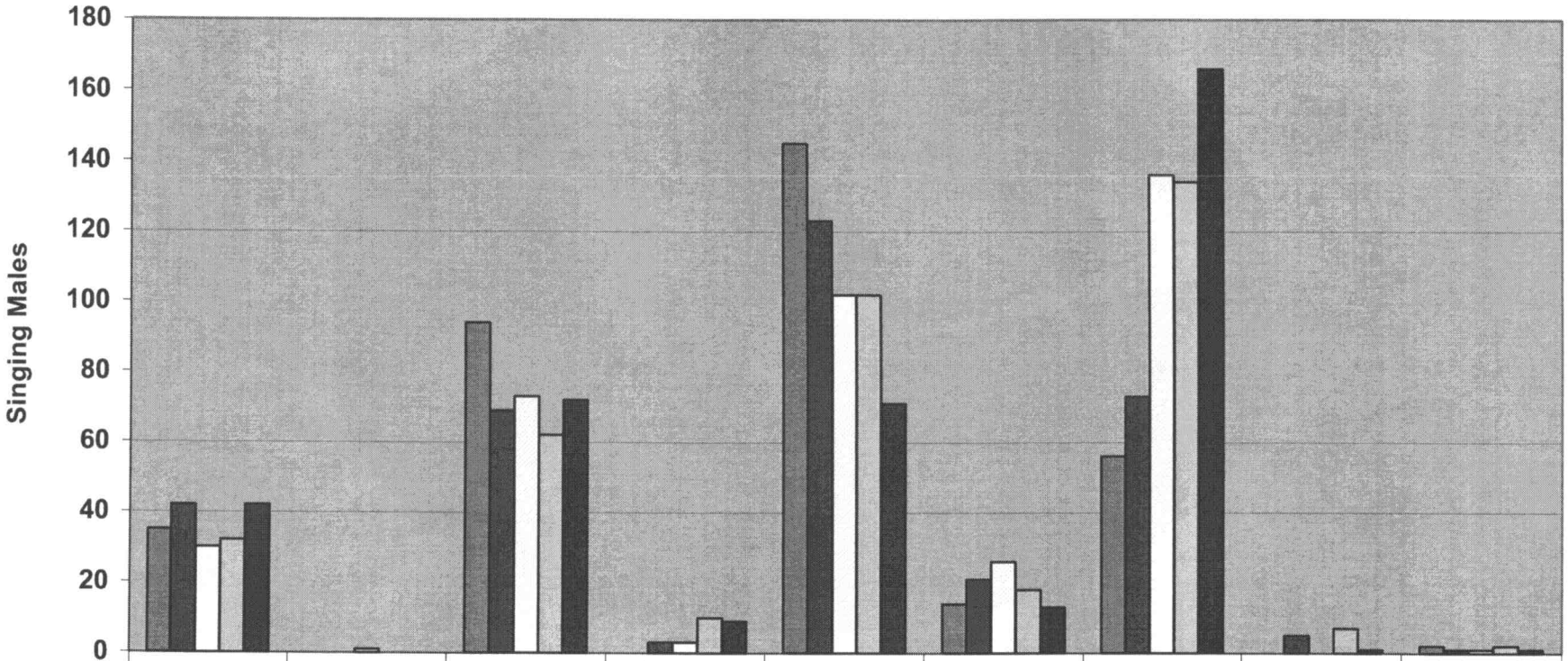


	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
HNF	73	63	105	130	185	235	291	351	417	442	381	346	337	372	367	375
MI	210	167	207	212	265	347	397	485	633	765	693	728	804	903	891	1085

2001 Kirtland's Warbler Census Results by KWMA
Huron National Forest



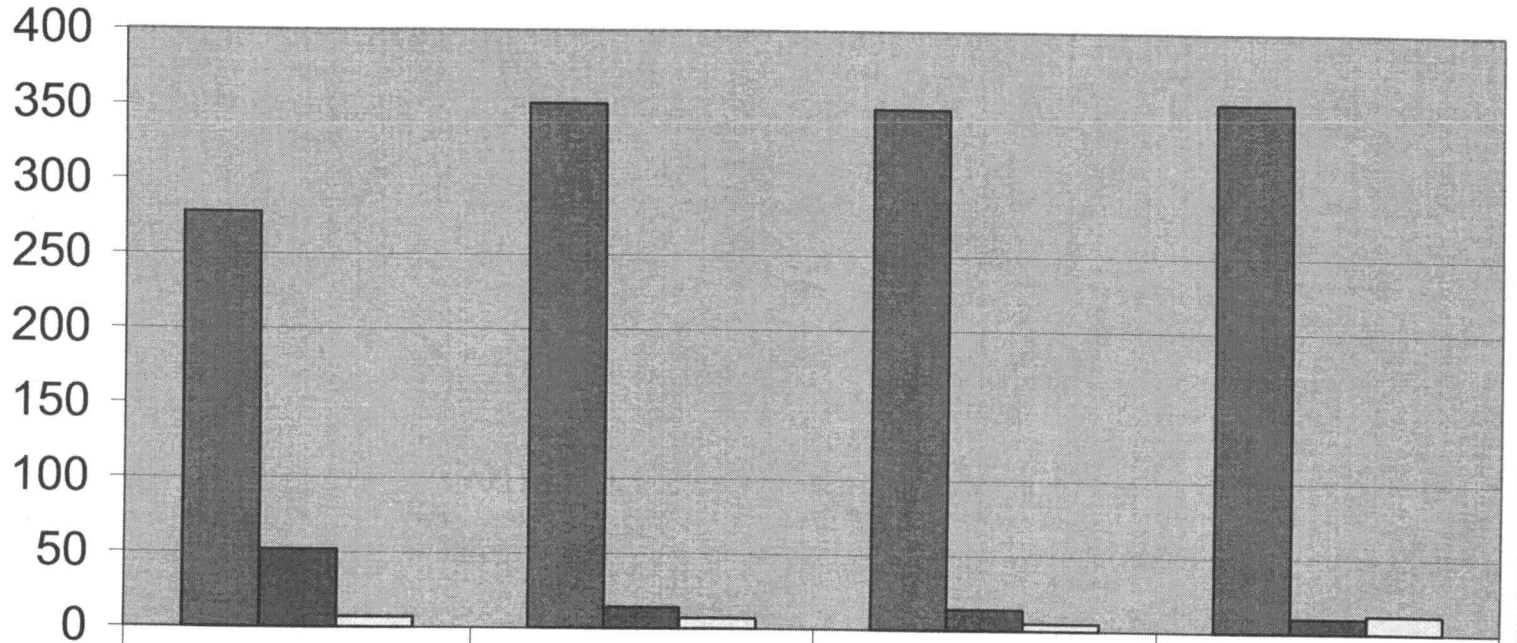
Kirtland's Warbler Census Results
KWMA Trends
Huron National Forest



	Eldorado	Markle Road	Big Creek	Luzerne Burn	Mack Lake	McKinley	Pine River	Tawas	Oscoda Burn
1997	35	0	94	0	145	14	56	0	2
1998	42	0	69	3	123	21	73	5	1
1999	30	1	73	3	102	26	136	0	1
2000	32	0	62	10	102	18	134	7	2
2001	42	0	72	9	71	13	166	1	1

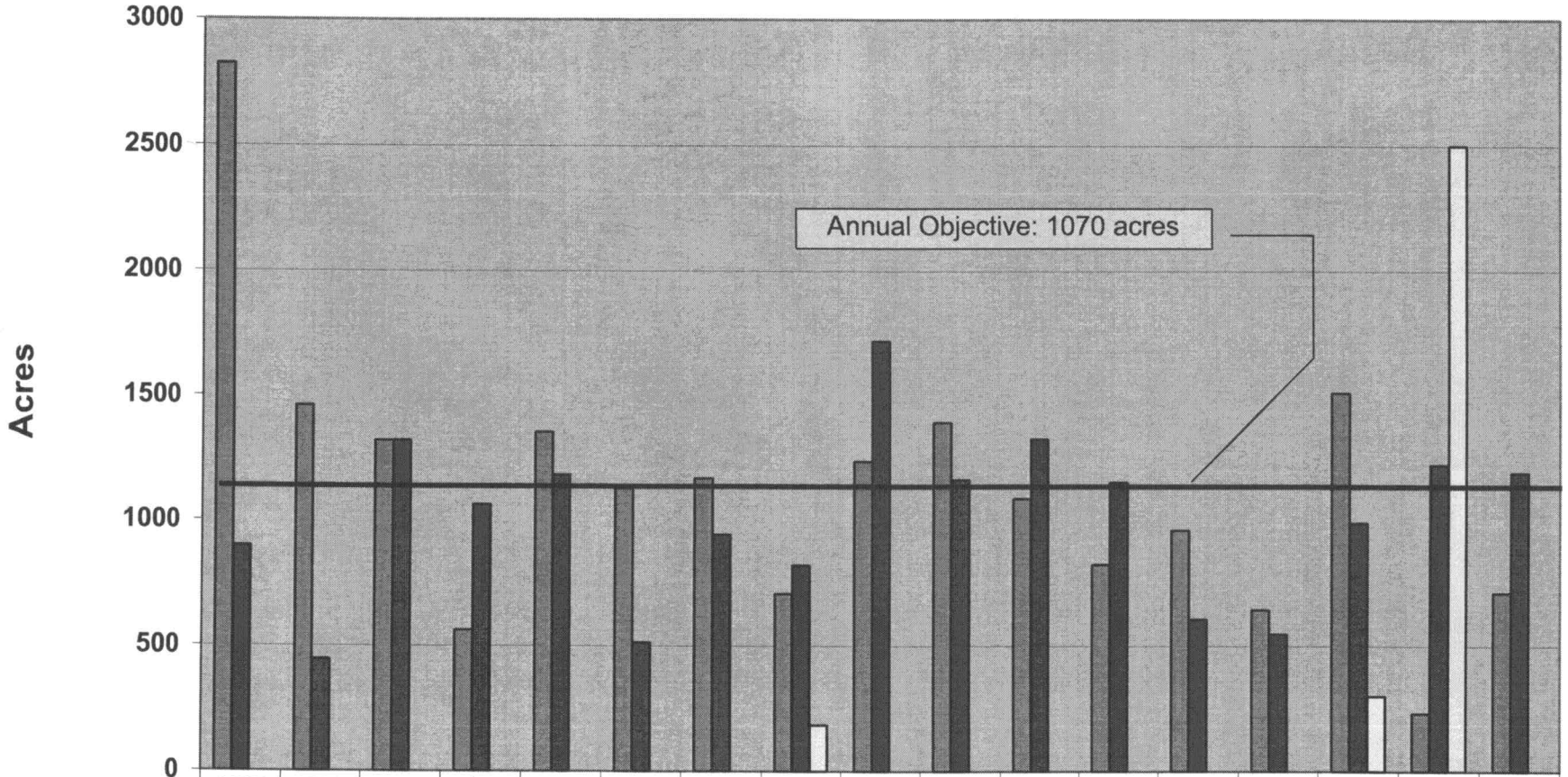
KWMA

Kirtland's Warbler Occupancy by Habitat Types
Huron National Forest



	1998	1999	2000	2001
Plantation	278	351	348	353
Wildfire	52	14	14	10
Natural	7	7	5	12

Kirtland's Warbler Habitat Treatments
Huron National Forest



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Sold	2823	1460	1320	560	1354	1129	1168	707	1237	1393	1088	825	961	643	1511	230	712
Reforested	898	444	1321	1063	1182	512	943	821	1718	1163	1326	1153	605	546	991	1224	1192
Wildfire								184							300	2500	

Year

Survey Summary and Maps

Big Creek

Eldorado

Luzerne Burn

Mack Lake

McKinley

Pine River

Oscoda Burn

Tawas

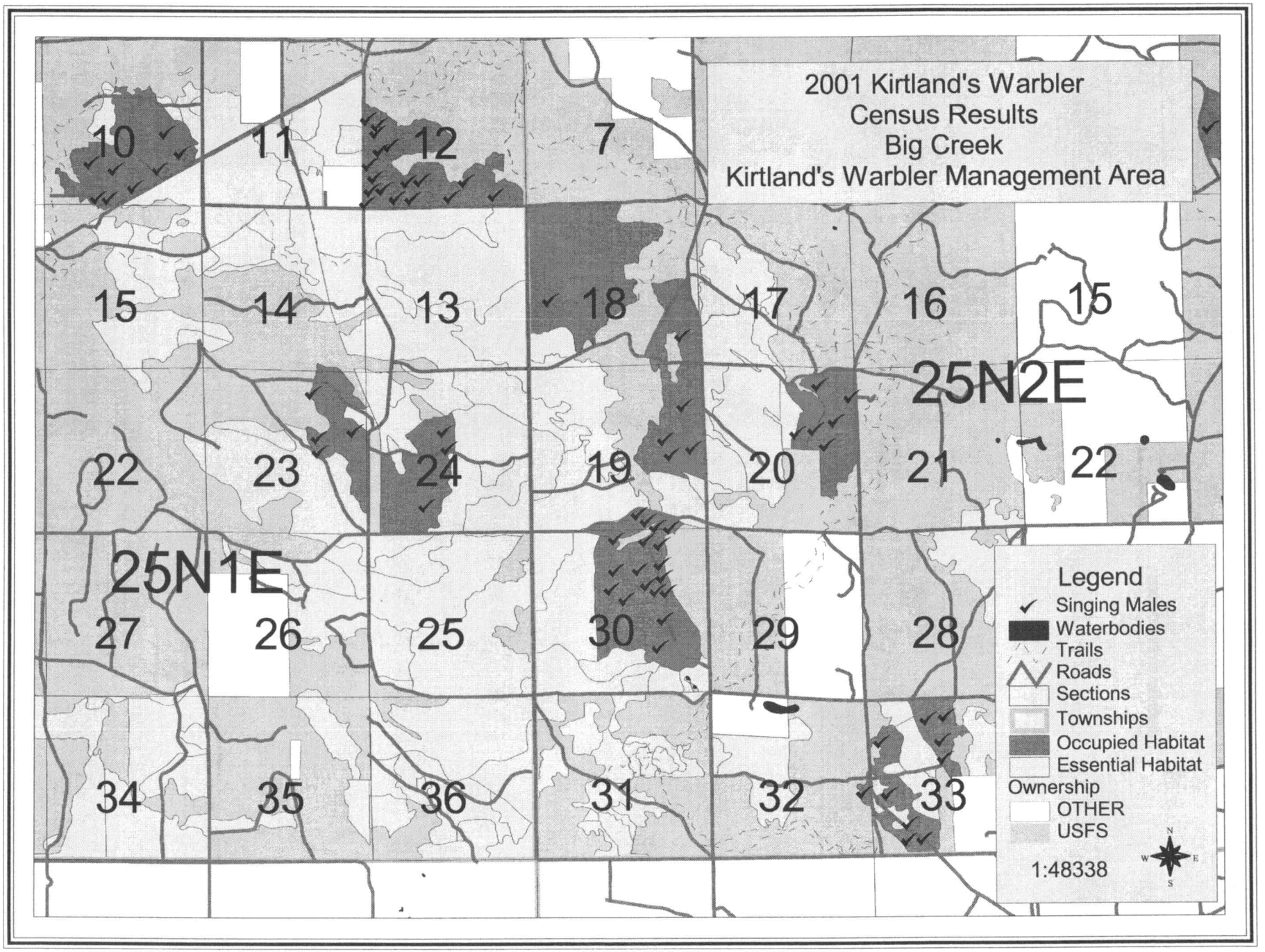
2001 Kirtland's Warbler Census of Singing Males

Huron-Manistee National Forests *19-Feb-02*

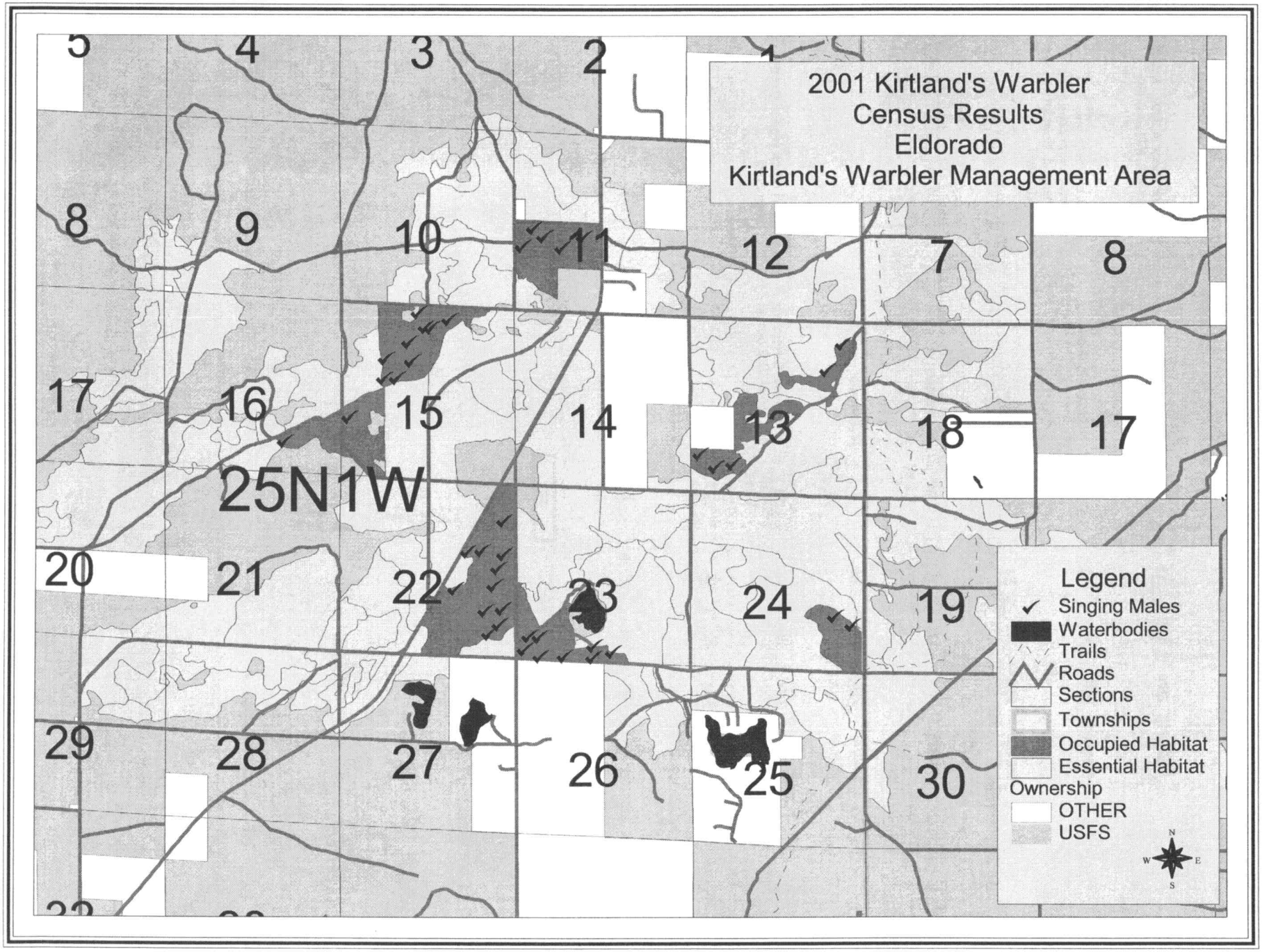
KWMA	Date	Town	Range	Section	Singing Males	Observers	Comments
BIG CREEK	6/7/2001	25N	1E	10	8	C.Schumacher, D.Mendus, J.Cook	
	6/7/2001	25N	1E	12	17	C.Racchini, D.Riegle, C.Hemmig	No birds east of red pine island - may be too fragmented.
	6/7/2001	25N	1E	23	4	J.Bull, J.Uhlmann, T. Tomaski	Spruce grouse hen and chick sighted.
	6/7/2001	25N	1E	24	3	J.Bull, J.Uhlmann	
	6/7/2001	25N	1E	26	0	T.Tomaski	
	6/7/2001	25N	1E	33	0	D.Mendus, C.Schumacher, J.Cook	
	6/7/2001	25N	1E	34	0	D.Mendus, C.Schumacher, J.Cook	
	6/8/2001	25N	1E	36	0	M.DeCapita, C.Schumacher, C.Hemmig, J.Uhlmann	
	6/7/2001	25N	2E	18	2	D.Riegle, C.Racchini, C.Hemmig, P.Huber, J.Stevens	Male and female spruce grouse sighted.
	6/7/2001	25N	2E	19	8	C.Schumacher, M.DeCapita, J.Uhlmann, C.Hemmig, P.Huber, J.Stevens	
	6/8/2001	25N	2E	20	6	P.Huber, J.Stevens	Prairie warbler heard 4 separate times, 1 sighting. Badger.
	6/8/2001	25N	2E	30	14	C.Schumacher, M.DeCapita, J. Uhlmann, C.Hemmig	
	6/8/2001	25N	2E	32	1	T.Tomaski, J.Stevens, H.Jennings, P.Huber	

KWMA	Date	Town	Range	Section	Singing Males	Observers	Comments
BIG CREEK	6/8/2001	25N	2E	33	9	T.Tomaski, J.Stevens, H.Jennings, P.Huber	

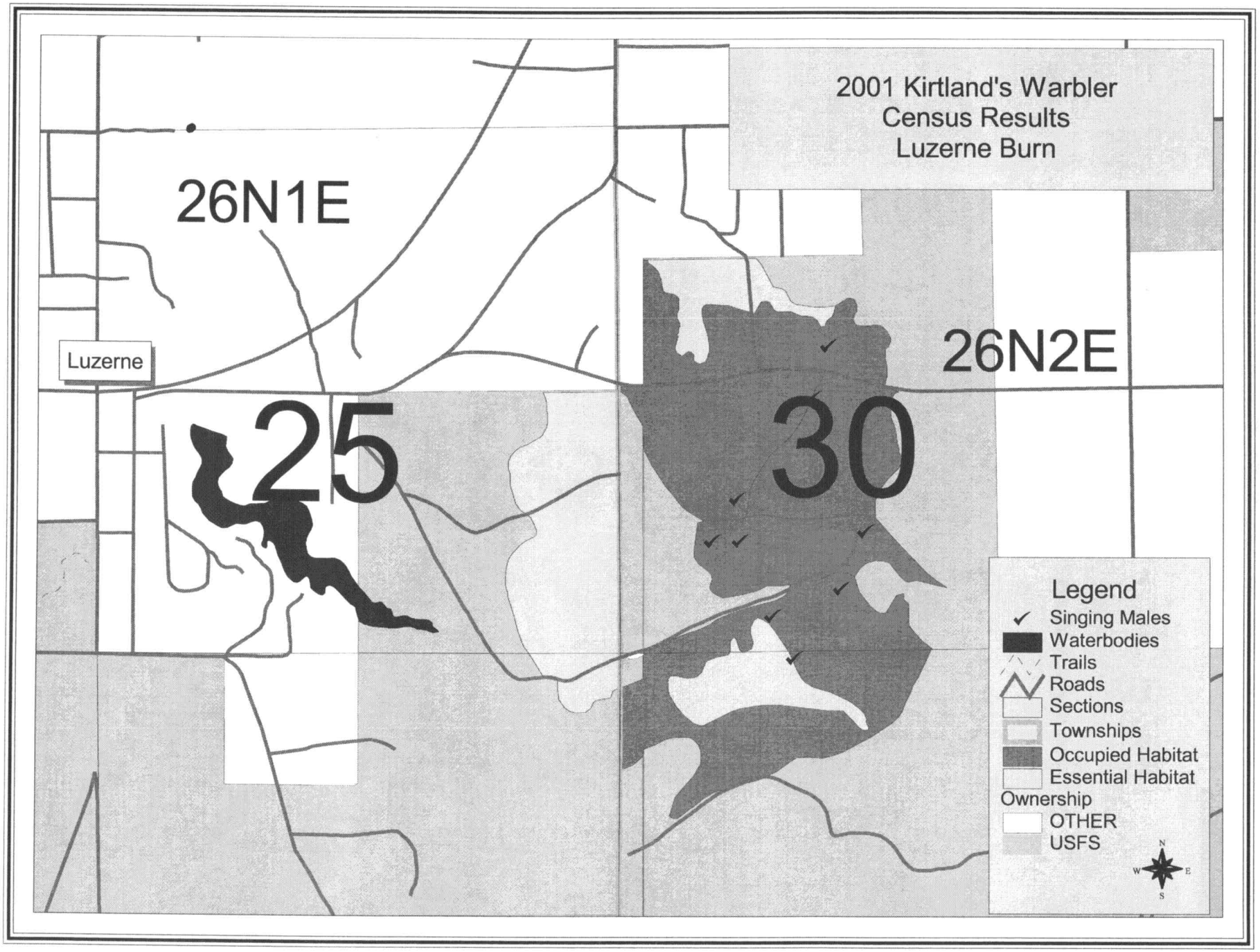
Subtotal for BIG CREEK : 72


2001 Kirtland's Warbler
Census Results
Big Creek
Kirtland's Warbler Management Area
10
11
12
7
15
14
13
18
17
16
15
25N2E
22
23
24
19
20
21
22
25N1E
27
26
25
30
29
28
34
35
36
31
32
33
Legend
Singing Males
Waterbodies
Trails
Roads
Sections
Townships
Occupied Habitat
Essential Habitat
Ownership
OTHER
USFS
1:48338
N
W
E
S

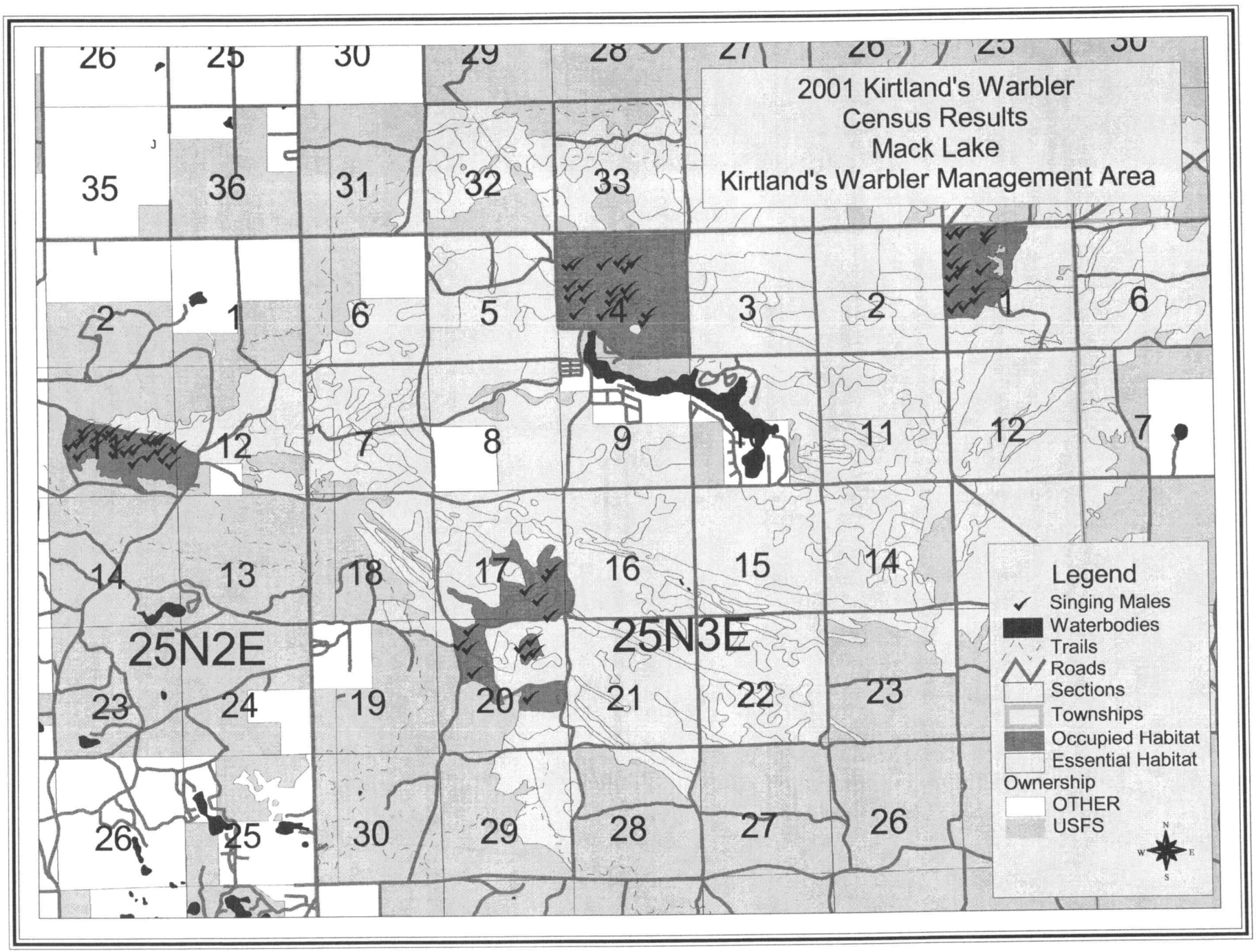
KWMA	Date	Town	Range	Section	Singing Males	Observers	Comments
ELDORADO	6/6/2001	25N	1W	11	5	G.Huber	
	6/6/2001	25N	1W	12	0	P.Huber	Don't check in 2002. Stand too small, trees too tall.
	6/6/2001	25N	1W	13	5	G.Huber, P.Huber	The stands in this compartment need to be remapped. Cowbird trap not in operation.
	6/6/2001	25N	1W	14	0	G.Huber	
	6/6/2001	25N	1W	15	10	T.Tomaski	
	6/6/2001	25N	1W	16	1	T.Tomaski	
	6/6/2001	25N	1W	22	11	D.Mendus, C.Hemmig, L..Leefers, D.Dickman	Don't check area NW of M-18 in 2002.
	6/6/2001	25N	1W	23	8	J.Bull	
	6/6/2001	25N	1W	24	2	J.Bull	
	Subtotal for ELDORADO :				42		


2001 Kirtland's Warbler
Census Results
Eldorado
Kirtland's Warbler Management Area
25N1W
Legend
Singing Males
Waterbodies
Trails
Roads
Sections
Townships
Occupied Habitat
Essential Habitat
Ownership
OTHER
USFS
N
W
E
S

KWMA	Date	Town	Range	Section	Singing Males	Observers	Comments
LUZERNE BURN	6/8/2001	26N	2E	30	8	D.Riegle, E.Zayicek	
	6/8/2001	26N	2E	31	1	D.Riegle, E.Zayicek	
	Subtotal for LUZERNE BURN :				**9**		

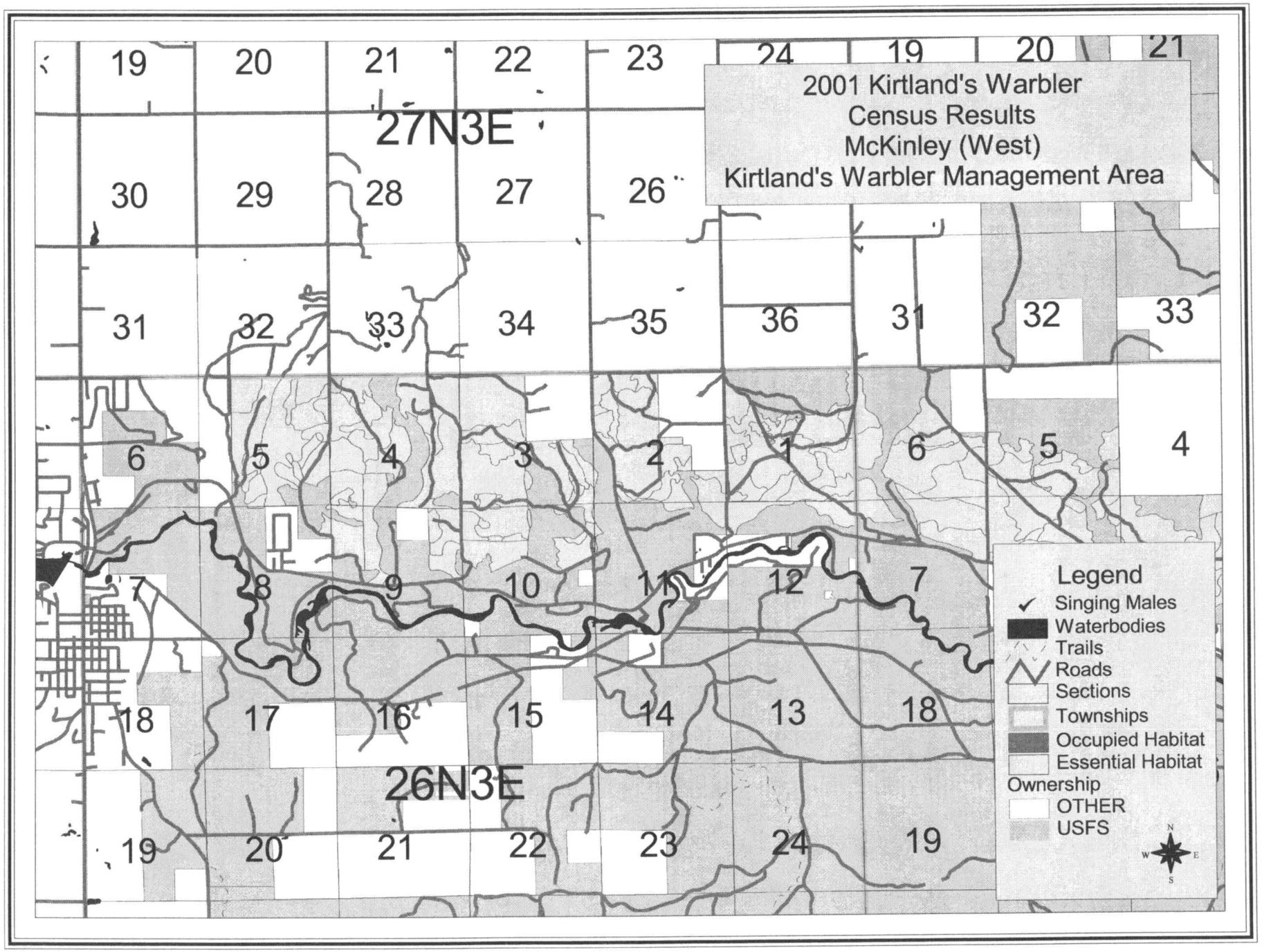

2001 Kirtland's Warbler
Census Results
Luzerne Burn
26N1E
26N2E
Luzerne
25
30
Legend
Singing Males
Waterbodies
Trails
Roads
Sections
Townships
Occupied Habitat
Essential Habitat
Ownership
OTHER
USFS
N
W
E
S

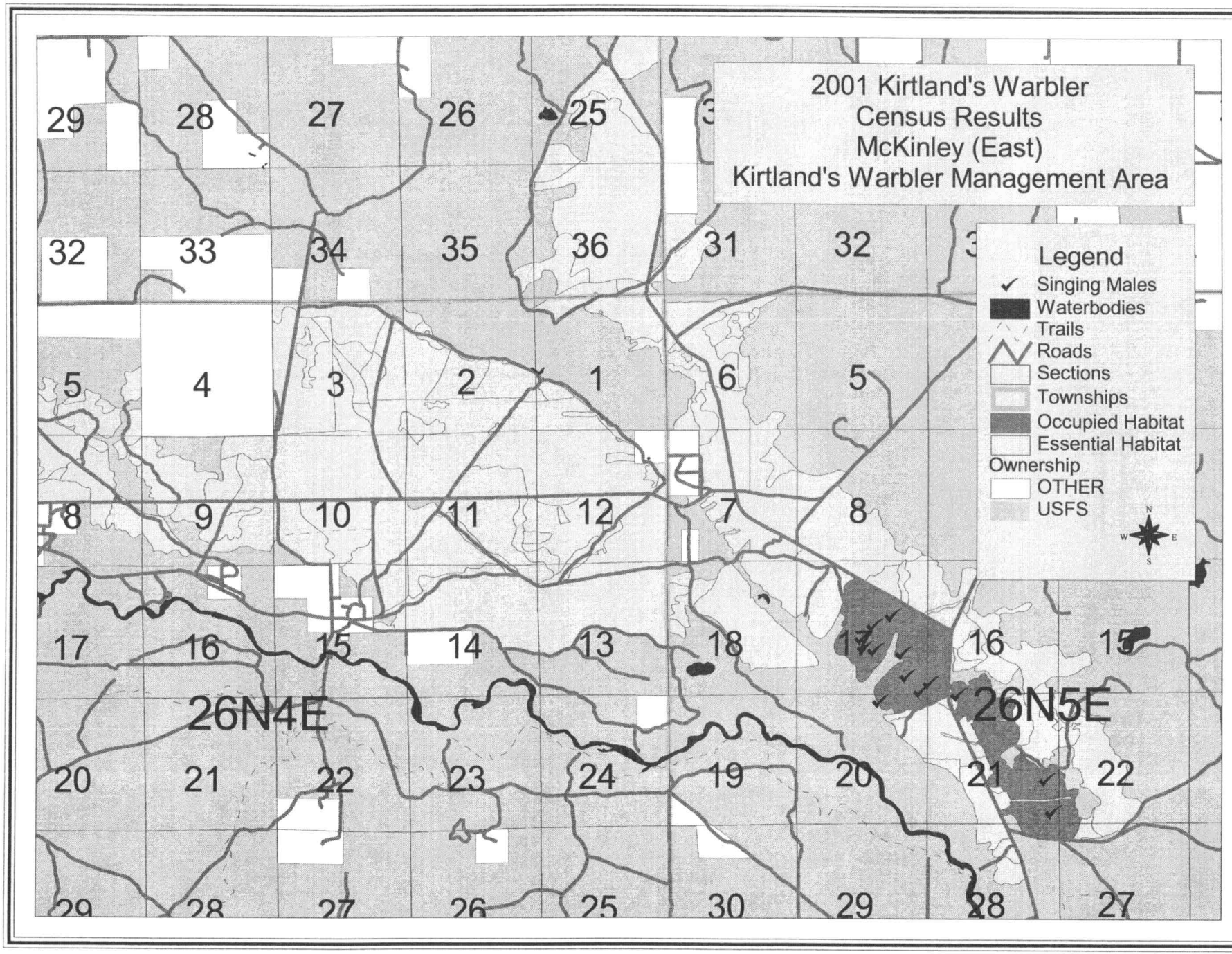
KWMA	Date	Town	Range	Section	Singing Males	Observers	Comments
MACK LAKE	6/11/2001	25N	2E	11	23	D.Mendus, N.Bischof	Recommend starting on west end in 2002, to hear birds better.
	6/11/2001	25N	2E	12	1	D.Mendus, N.Bischof	
	6/11/2001	25N	3E	1	15	K.Ennis, J.Biehl, P.Huber	Map needs to include oak stands. Need GPS starting points.
	6/11/2001	25N	3E	2	0	K.Ennis, J.Biehl, P.Huber	
	6/11/2001	25N	3E	4	18	H.Jennings, J.Bull, C.Mensing, J.Uhlmann	
	6/11/2001	25N	3E	17	5	C.Racchini, T.Tomaski, J.Stevens	
	6/11/2001	25N	3E	20	9	C.Racchini, T.Tomaski, J.Stevens	
	6/12/2001	26N	3E	31	0	A.Marzolo	
	Subtotal for MACK LAKE :				71		


2001 Kirtland's Warbler
Census Results
Mack Lake
Kirtland's Warbler Management Area
Legend
Singing Males
Waterbodies
Trails
Roads
Sections
Townships
Occupied Habitat
Essential Habitat
Ownership
OTHER
USFS
25N2E
25N3E
N
W
E
S

KWMA	Date	Town	Range	Section	Singing Males	Observers	Comments
MCKINLEY	6/13/2001	26N	3E	5	0	P.Huber	
	6/13/2001	26N	3E	10	0	P.Huber	Block too small. JP density and size good. Check in 2002.
	6/12/2001	26N	5E	7	0	T.Tomaski, C.Waite	
	6/12/2001	26N	5E	8	0	T.Tomaski, C.Waite	
	6/12/2001	26N	5E	16	1	H.Jennings, J.Stevens, J.Uhlmann, P.Butchko, C.Racchini, J.Biehl, P.Huber, L.Berkman, E.F.Huber, E.A. Huber	
	6/12/2001	26N	5E	17	8	H.Jennings, J.Stevens, J.Uhlmann, P.Butchko, C.Racchini, J.Biehl	
	6/12/2001	26N	5E	20	1	H.Jennings, J.Stevens, J.Uhlmann, P.Butchko, C.Racchini, J.Biehl	
	6/12/2001	26N	5E	21	3	P.Huber, L.Berkman, E.F.Huber, E.A. Huber	One male only sang twice.
	6/12/2001	26N	5E	22	0	P.Huber, L.Berkman, E.F.Huber, E.A. Huber	
	6/12/2001	26N	5E	27	0	P.Huber, L.Berkman, E.F.Huber, E.A. Huber	
	6/12/2001	26N	5E	28	0	P.Huber, L.Berkman, E.F.Huber, E.A. Huber	

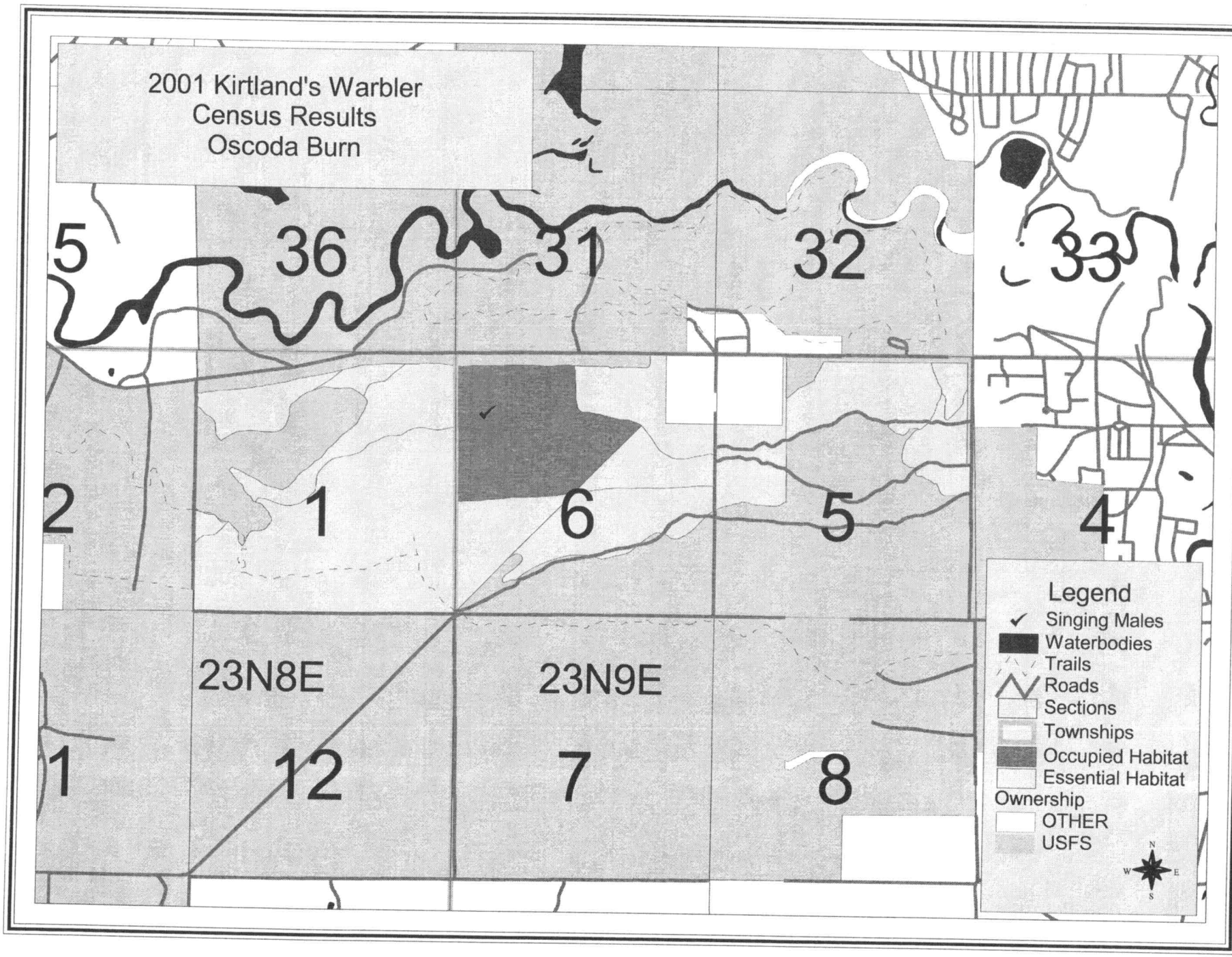
Subtotal for MCKINLEY : 13


2001 Kirtland's Warbler
Census Results
McKinley (West)
Kirtland's Warbler Management Area
27N3E
26N3E
Legend
Singing Males
Waterbodies
Trails
Roads
Sections
Townships
Occupied Habitat
Essential Habitat
Ownership
OTHER
USFS
N
W
E
S


2001 Kirtland's Warbler
Census Results
McKinley (East)
Kirtland's Warbler Management Area
Legend
Singing Males
Waterbodies
Trails
Roads
Sections
Townships
Occupied Habitat
Essential Habitat
Ownership
OTHER
USFS
N
W
E
S
26N4E
26N5E

KWMA	Date	Town	Range	Section	Singing Males	Observers	Comments
OSCODA BURN	6/6/2001	23N	9E	6	1	J.Cook, G.Falkenhagen	

Subtotal for OSCODA BURN : 1


2001 Kirtland's Warbler
Census Results
Oscoda Burn
5
36
31
32
33
2
1
6
5
4
23N8E
23N9E
1
12
7
8
Legend
Singing Males
Waterbodies
Trails
Roads
Sections
Townships
Occupied Habitat
Essential Habitat
Ownership
OTHER
USFS
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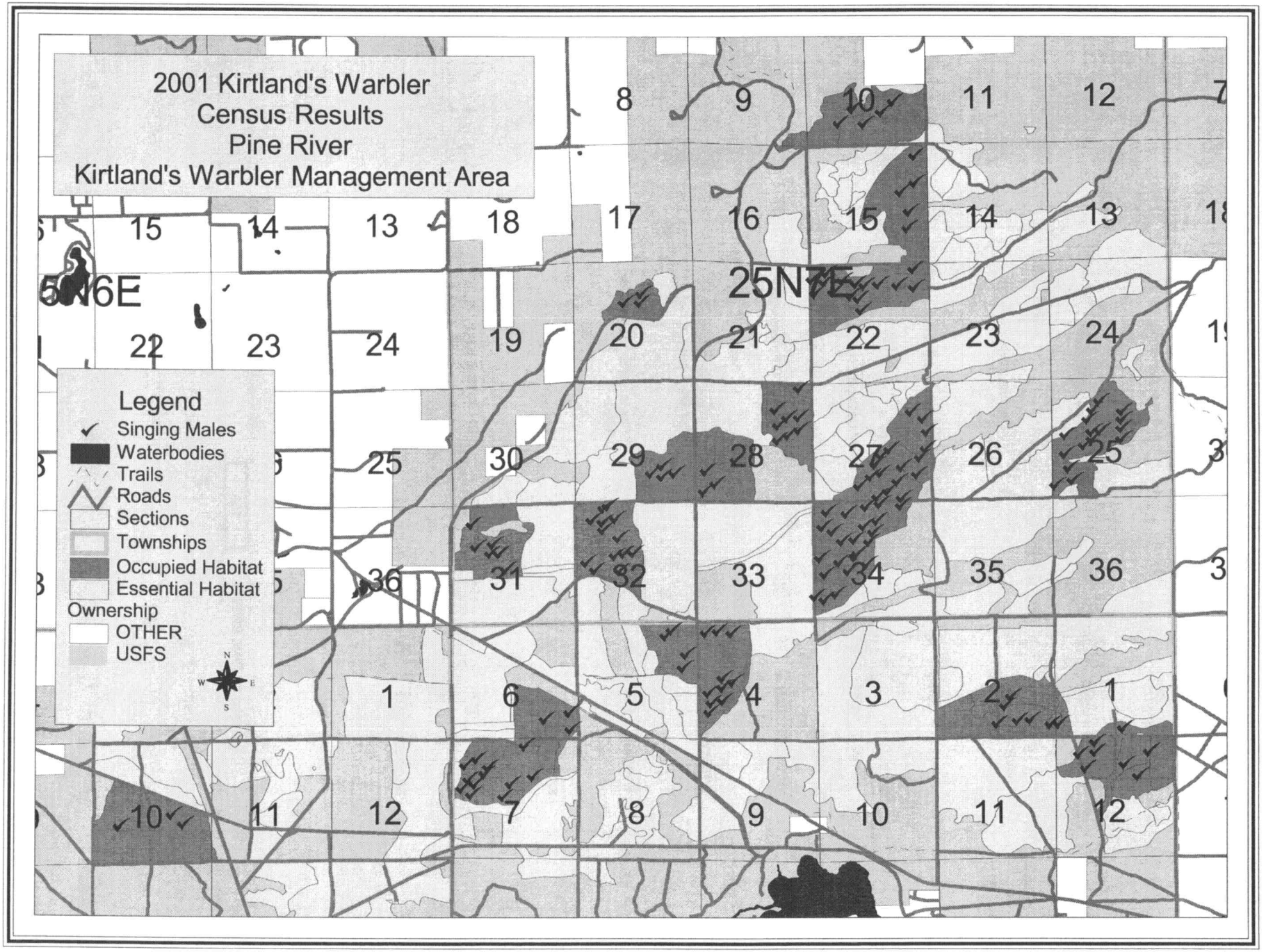
KWMA	Date	Town	Range	Section	Singing Males	Observers	Comments
PINE RIVER	6/9/2001	24N	6E	10	3	D.Mendus, T.Kuffel	
	6/10/2001	24N	6E	12	0	T.Tomaski, C.Mensing	
	6/10/2001	24N	6E	13	0	T.Tomaski, C.Mensing	
	6/10/2001	24N	7E	1	1	D.Mendus, T.Kuffel	
	6/9/2001	24N	7E	1	1	P.Huber, M.Jewett	
	6/9/2001	24N	7E	2	6	P.Huber, M.Jewett	
	6/9/2001	24N	7E	4	10	T.Tophooven, D.Riegle, B.Delo	
	6/10/2001	24N	7E	5	4	T.Tophooven, B.Delo	
	6/10/2001	24N	7E	6	3	J.Bull, L.Klemens, C.Klemens	
	6/10/2001	24N	7E	7	12	J.Bull, L.Klemens, C.Klemens	
	6/10/2001	24N	7E	9	0	C.Racchini, G.Berner	
	6/10/2001	24N	7E	10	0	C.Racchini, G.Berner	
	6/10/2001	24N	7E	12	7	D.Mendus, T.Kuffel	
	6/10/2001	25N	7E	9	0	K.Ennis, L.Berkman	

KWMA	Date	Town	Range	Section	Singing Males	Observers	Comments
PINE RIVER	6/10/2001	25N	7E	10	5	K.Ennis, L.Berkman	
	6/9/2001	25N	7E	15	5	K.Ennis, C.Hemmig	JP 10-16' tall. Birds in select areas - thicker than normal, w some natural. Not a lot of openings.
	6/10/2001	25N	7E	20	3	J.Cook, N.Bischof	
	6/9/2001	25N	7E	22	15	J.Stevens, G.Falkenhagen	
	6/9/2001	25N	7E	25	16	C.Racchini, G.Berner	
	6/9/2001	25N	7E	27	17	M.DeCapita, N.Bischof, J.Cook	
	6/10/2001	25N	7E	27	0	J.Stevens, G.Falkenhagen	
	6/10/2001	25N	7E	28	12	J.Stevens, G.Falkenhagen, C.Bocetti, A.Kelly, K.Kelly	
	6/10/2001	25N	7E	29	4	D.Riegle, B.Riegle, R.Riegle, J.Riegle	
	6/10/2001	25N	7E	30	0	M.DeCapita, J.Biehl	
	6/10/2001	25N	7E	31	6	M.DeCapita, J.Biehl	
	6/10/2001	25N	7E	32	13	P.Huber, M.Jewett	
	6/9/2001	25N	7E	34	23	M.DeCapita, N.Bischof, J.Cook	
	Subtotal for PINE RIVER :				**166**		


2001 Kirtland's Warbler
Census Results
Pine River
Kirtland's Warbler Management Area
25N7E
Legend
Singing Males
Waterbodies
Trails
Roads
Sections
Townships
Occupied Habitat
Essential Habitat
Ownership
OTHER
USFS
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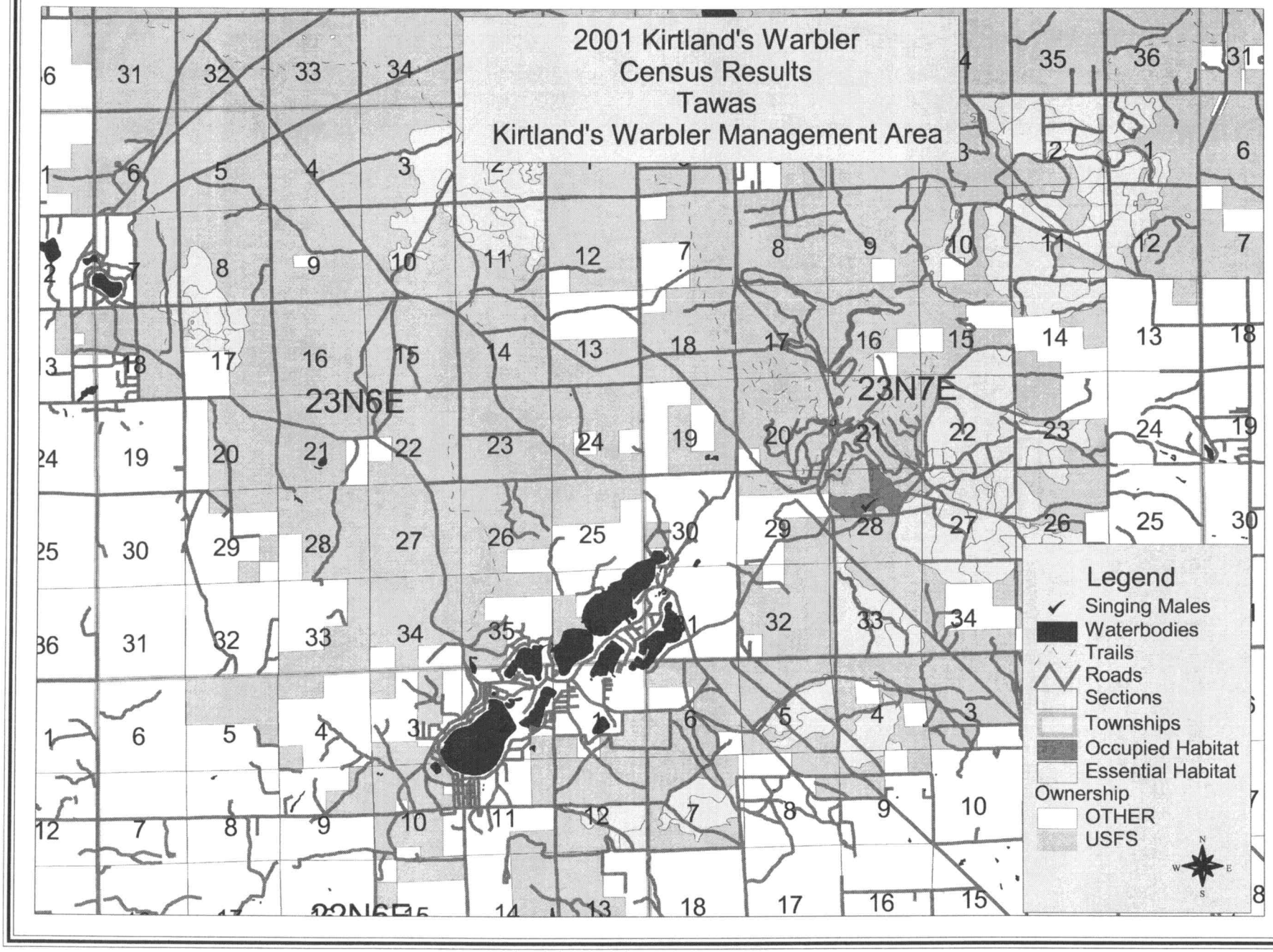
W
E
S

KWMA	Date	Town	Range	Section	Singing Males	Observers	Comments
TAWAS	6/6/2001	22N	7E	4	0	C.Racchini	
	6/6/2001	22N	7E	9	0	C.Racchini	
	6/6/2001	23N	7E	28	1	J.Stevens, D.Riegle	

Subtotal for TAWAS : 1


2001 Kirtland's Warbler
Census Results
Tawas
Kirtland's Warbler Management Area
23N6E
23N7E
Legend
Singing Males
Waterbodies
Trails
Roads
Sections
Townships
Occupied Habitat
Essential Habitat
Ownership
OTHER
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KWMA	Date	Town	Range	Section	Singing Males	Observers	Comments
			Grand Total :		375		

APPENDIX A

William F. Hartwig
Regional Director
U.S. Fish and Wildlife Service
1 Federal Drive
Fort Snelling, MN 55111

Dear Mr. Hartwig:

The Kirtland's Warbler population has increased steadily and significantly since 1989 as a result of interagency implementation of the *Kirtland's Warbler Recovery Plan*. The numeric goal of 1000 pairs was reached and exceeded for the first time in 2001. The recovery plan has not been revised since 1985 and the Recovery Team agrees that clarification of the recovery goals and objectives is necessary. These clarifications are based on the results of over 20 years of research on Kirtland's warbler ecology and management and are provided as an addendum to the 1985 Recovery Plan. In addition, these clarifications are designed to promote and enhance continued interagency cooperation to ensure the recovery of this species.

The primary objective in the 1985 plan was to "...reestablish a self-sustaining Kirtland's Warbler population throughout its known range at a minimum level of 1,000 pairs." We believe the term "self-sustaining" means a population free from intensive management. As pointed out in the Recovery Plan, fire suppression has decreased the frequency and size of burns which have regenerated warbler habitat historically. Today, only intensive management focused on developing appropriate aged stands of jack pine and removal of parasitic brown-headed cowbirds allows the warbler population to persist and increase. It is unlikely that human land use requirements, such as fire suppression, that preclude pre-settlement natural processes will change in the foreseeable future. Therefore, a true self-sustaining population is not possible and the need for intensive management will continue. Until the Recovery Plan is revised, the Recovery Team recommends clarifying the primary objective to:

> *The primary recovery objective is to establish and sustain a Kirtland's Warbler population throughout its known range at a minimum level of 1,000 pairs using adaptive management techniques.*

The ecological requirements for Kirtland's Warblers on the breeding grounds are well understood. A combination of continually-refined habitat management, cowbird control, closure of breeding areas, population monitoring, research, and educational programs has been successful. Population estimates have increased from 167 pairs in 1987, to 1085 pairs in 2001.

APPENDIX A

As further clarification of the 1985 plan, we recommend the Kirtland's Warbler be reclassified to threatened when population estimates are sustained at or above 1,000 pairs for five years. We also recommend removal from the endangered species list when mechanisms are in place to assure continuation of the required intensive management of the jack-pine ecosystem at the level required to sustain the population at or above 1,000 pairs in perpetuity.

Approximately 38,000 acres of the appropriate age and density of jack pine is required each year for breeding. This required acreage is based on a density of singing males averaging 26.5 per 1,000 acres of breeding habitat; an average based on data collected during the past 20 years.

Further, research over the past 20 years also indicates a 10-year duration of occupancy, which is shorter that the 15-year duration estimated in the 1985 Recovery Plan. Therefore, in order to maintain the annual 38,000 acre breeding habitat requirements, approximately 190,000 acres of jack pine would have to be managed on a 50-year rotation. Today, only about 150,000 acres are under management. A higher number of acres will require identifying and managing additional lands outside of current Kirtland's Warbler management areas. Opportunities remain for some additional management areas in the core breeding range of the northern Lower Peninsula of Michigan. However, a substantial portion of new management areas will need to be developed in the Upper Peninsula.

Because continuous, intensive management is required to maintain sufficient breeding habitat, efforts to sustain the population cannot be curtailed once reclassification or delisting occurs. Kirtland's warbler breeding habitat is short-lived and progresses rapidly to an unsuitable condition as the trees age, so management cannot stop once reclassification or delisting occurs. Commitments necessary to sustain population levels once recovery goals are reached include:

1) Adaptive Management of Breeding Habitat—Continual management of breeding habitat is the most critical component required to sustain the population at 1,000 or more breeding pairs. Recent research has resulted in a better understanding of how the Kirtland's Warbler responds to various habitat treatments. Population responses to changes in the habitat must be monitored and these results should be used to modify management techniques where appropriate.
2) Cowbird Control—For 30 years, cowbird control has contributed significantly to increasing Kirtland's Warbler productivity. Human-caused changes in Michigan's landscape in areas surrounding Kirtland's Warbler breeding areas resulted in the presence and maintenance of cowbird populations. Once recovery goals are reached, continued habitat management will be successful only in combination with continued cowbird trapping. Other agencies presently not involved with Kirtland's Warbler management (e.g., USDA-

APHIS, Wildlife Services) should be encouraged to become a partner in these efforts.

3) Closure of Breeding Habitat—Protection of breeding areas through closure orders and posting signage will need to continue. These closures should be conducted in association with local outreach and educational efforts.
4) Consolidation of Breeding Habitat—Consolidation of agency land holdings through exchanges, purchase, and conservation easements should be continued.
5) Wintering Habitat—On the wintering grounds in The Bahamas, additional work is required to identify and evaluate specific ecological requirements and threats during this critical time period of the warbler's life history. Efforts needed include monitoring of population numbers, habitat use, increased protection of habitat, and education and outreach.
6) Population Monitoring—Monitoring of the population using the annual census as a relative index of change is a critical component of adaptive management and must continue. Only knowledge of the warbler's response over time to management practices allows refinement of programs to enhance the sustainability of the population. In addition, because stochastic events potentially have much larger effects on small populations, it is critical to monitor populations to evaluate the impacts of such events.
7) Research Programs—Fundamental questions about the warbler's breeding biology have been addressed by recent research, but additional questions remain about its biology. Research opportunities in all appropriate areas should be considered, and wintering grounds research must be a high priority.
8) Educational Programs—Public support for Kirtland's Warbler habitat management must continue. With increased use of potential Kirtland's Warbler breeding and wintering areas for homes, cottages, and recreation, outreach and education must be continued and enhanced. These programs largely have been successful on the breeding grounds, but additional efforts must be expended on the wintering grounds.
9) International Relations—Our partnership with the Commonwealth of the Bahamas is strengthening and the Bahamian government is represented on the Recovery Team. This relationship must continue and be enhanced to help promote Kirtland's Warbler conservation efforts on the wintering grounds.

Kirtland's Warbler delisting should occur only if and when agreements or mechanisms are in place to assure the continuation of annual intensive management activities. The Recovery Team recommends an interagency Memorandum of Understanding (MOU) that ensures continued support for Kirtland's Warbler management efforts after recovery goals are met and the species is taken off the endangered species list. Signatories on the MOU should include at least the U.S. Fish and Wildlife Service; Michigan Department of Natural Resources; U.S. Department of Agriculture, Forest Service; the Bahamian government; U.S. Geological Survey, Biological Resources Division; Michigan Department of Military and Veterans Affairs; and any other

governmental or non-governmental agencies willing to invest in long-term Kirtland's Warbler management, research, and protection.

Given the fiscal uncertainty faced by resource management agencies, the Recovery Team recommends the establishment of a privately-endowed Kirtland's Warbler Trust Fund. Proceeds from this trust would be used annually to sustain the Kirtland's Warbler population on both the breeding and wintering grounds. A formal plan to establish such a trust should be developed and potential donors should be approached.

Successes on the breeding grounds could be negated if wintering habitat in The Bahamas is diminished or degraded. The Recovery Team recommends increasing the focus on understanding the ecological factors influencing Kirtland's Warblers during the eight months of the year not spent on the breeding grounds. Winter population monitoring, winter habitat evaluation, identification and evaluation of potential threats, and education and outreach all should be intensified. The Recovery Team recommends that U.S. Fish and Wildlife Service and other agencies make serious commitments to support winter work on Kirtland's Warblers in The Bahamas.

Sincerely,

Kenneth R. Ennis
Kirtland's Warbler Recovery Team Leader

And the rest of the recovery team:

Carol Bocetti, USGS-BRD
Eric Carey, Dept. of Agriculture, The Bahamas
Mike DeCapita, USFWS
Don Hennig, MDNR, Forest Management
Phil Huber, USDA, Forest Service
Pat Lederle, MDNR, Wildlife
John Probst, USDA, Forest Service
Mike Tansy, USFWS
Jerry Weinrich, MDNR, Wildlife