

COOPERATIVE AGREEMENT
Between
Michigan Department of Natural Resources and Department of Military Affairs

Implementation of a Management Plan for the
Range 30 Complex (Tank Range)

May 22, 1986



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MANAGEMENT OF KIRTLAND'S WARBLER ON MILITARY LANDS
IN NORTHERN LOWER MICHIGAN

I. Introduction

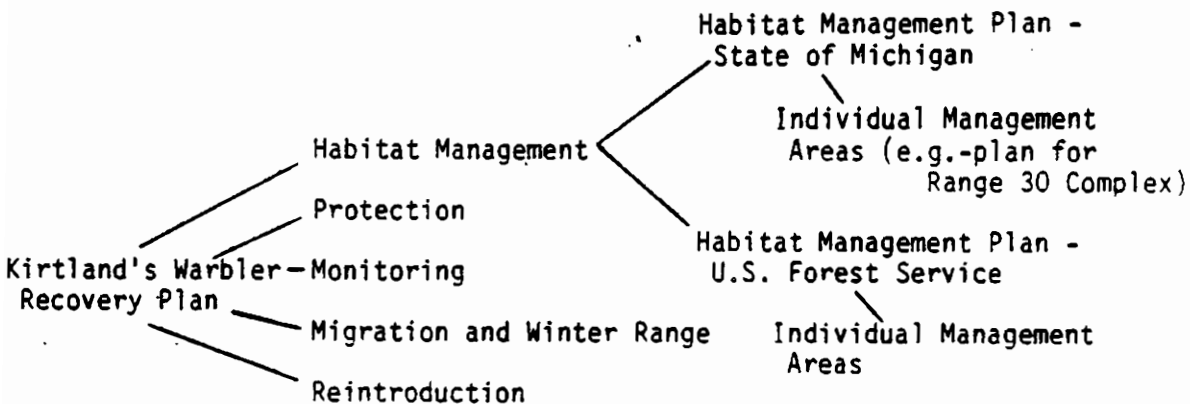
The Kirtland's warbler (Dendroica kirtlandii) is an endangered songbird which winters in the Bahama Islands and nests nowhere else on earth but on the jack pine plains of northern lower Michigan. Young jack pine stands regenerated by fire provide ideal nesting habitat between 8 and 18 years after the burn. In presettlement times, naturally occurring forest fires periodically burned large tracts of land. Today, efficient fire control has reduced newly burned acreage and breeding populations far below minimum numbers needed to ensure survival of the species.

Within the warbler's range, fire succession is most prevalent in the vicinity of the Michigan National Guard Range 30 Complex (Tank Range) in Crawford County. As a result, the Range has become a critically important nesting area. The Michigan National Guard, having produced this ideal nesting habitat incidental to field training exercises, is in an ambivalent position--that of creating habitat for an endangered species in the midst of disruptive training activities.

A cooperative program between the U.S. Department of Interior (USDI), U.S. Forest Service (USFS), and Michigan Department of Natural Resources (MDNR) seeks to remove the Kirtland's warbler (KW) from endangered status by means of a 50-year commercial jack pine rotation on 150,000 acres of state and federal lands throughout northern lower Michigan. Once an age-class balance is achieved, there should be, at any given time, 30,000 acres of young jack pine which will support 1,000 pairs of KW or five times the present population. Because achievement of this goal is decades into the future, an interim plan is needed for management of the Military lands. This will supplement the approved state and federal forests management plans.

The Camp Grayling Plan will be based on a Cooperative Agreement between the Michigan Department of Military Affairs (MDMA) and the MDNR. A comprehensive plan will include several special area plans. Because land-use conflicts are most critical in the vicinity of the Range 30 Complex (Tank Range), a special plan is being developed in detail in advance of the comprehensive plan. The key is cooperation by the Military in increasing warbler numbers where land-use conflicts are slight in exchange for reduction of restrictions in areas vital to military operations.

The following summarizes the relationship between the Range 30 Complex plan and other components of the KW Recovery Plan.



II. Kirtland's Warblers on Military Lands

A general review of census records and correspondence files shows Kirtland's warbler locations scattered over a wide range of Military lands, with the exception of the Artillery Range north of County Road 612. Figure 1 indicates the sections with warbler nesting in the past. On the Hanson Reserve in 1937, birds were found in Sections 5 and 6, T26N, R4W. The remainder of locations on Military lands are from data provided by censuses in 1951, 1961, and 1971 through 1985. Most of the birds have concentrated in two areas:

1. The area commonly known as the Tank Range, T27N, R2W; T27N, R1W.
2. The area commonly known as the Fletcher burn, T25N, R5W.

Currently, most of the warblers are located in the same two areas. For the most part, nesting habitat was generated by fire. These fires have occurred periodically, providing the basis for continued nesting on Military lands. While most of these fires were beneficial to warblers, some occupied habitat was burned during the nesting season.

Throughout the period of KW nesting on Military lands, management efforts have been in the form of protection. These actions have included verbal agreements, cowbird trapping, and posting of areas against entry. There has been no habitat management on Military lands with the exception of areas recently covered under the new 20-year lease. Protection efforts have been restricted to the breeding season, from May 1 to August 15, and limited to the actual nesting areas. Use of roads and trails has been allowed within nesting areas during the breeding season. Non-military activities, such as public recreation and commercial timber harvest, are allowed after the breeding season.

Conflicts caused by Military activities in KW habitat have been occurring for decades. Documentation began in the late 1950's with a complaint from a wildlife biologist that units from the Indiana National Guard trespassed into KW nesting habitat in the Fletcher area. Use of small arms, light machine guns, mortars, and tanks within the nesting area was reported. News of the incident reached several newspapers which blamed the units for contributing to extinction of the warblers. Subsequently, there are numerous reports of Military activities either damaging warbler habitat or causing disturbance during the breeding season. More recently, tanks strayed into posted breeding habitat, aircraft flew at low levels over occupied habitat, fires were started in breeding habitat, military personnel entered posted areas, and sign posts were run over.

With the present low population of KW, destruction of breeding habitat and disturbance are very serious public concerns. Agencies and organizations involved include the MDNR, USFS, USFWS, KW Recovery Team, and the Audubon Society. Since the early 1970's there has been a strong commitment from these management agencies and the public to preserve this endangered species. This commitment encouraged further restrictions on activities that are not compatible with the management of the warbler, further affecting Military operations.

Most Military activities occur during the nesting season of the KW. Scheduling Military exercises during this period is increasingly difficult. Warbler colonies occupy land needed for large scale maneuvers. New fires on strategic areas are followed by habitat regeneration favorable to nesting warblers. These new habitats have been posted against entry, severely hampering Military operations already scheduled far in advance.

With tighter restrictions on activities in KW areas and a corresponding increase in Military training, it is a safe assumption that conflicts will continue. The resource management agencies as well as the Military wish to minimize these conflicts. A long-term solution is prevention of jack pine regeneration where annual Military use is critical and incompatible. While this proposal will end or minimize the conflicts, it will also limit the potential breeding range of the warbler. Military lands have consistently produced about one-fourth of the total warbler population (Table 1). To compensate for this loss of breeding habitat, the Military agrees to set aside less critical Military lands for habitat management for the KW. Compatible Military use will be allowed in these areas.

The concept of precluding favorable jack pine regeneration has been accepted by all parties involved. As a first step, it has been agreed that management efforts should be concentrated on the Range 30 Complex. This area is of immediate concern because of its large number of warblers and because it is used for tank training, one of the Military's most important missions. The Range 30 Complex has been a tank training area since the late 1920's, and due to the requirements of this type of training, it is not practical to relocate it.

NUMBER OF KIRTLAND'S WARBLER FOUND ON THE TANK RANGE

LOCATION	T	R	S	1951	1961	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
	27N	IW	7	5															1	
			18	5												2				
			4																	
			20															7	9	11
			21			4	2	1											2	
			24											3						
			28													1			1	4
			29													1			2	3
	27N	2W	1	17																
			3	2																
			7								1	1	1							
			8		2			5	14	16	20	18	15	14	19	21	15	16	22	12
			9	14			1	3	5	11	13	14	15	21	29	17	17	11	10	11
			10	5	4															
			12	6																
			13	5	1															
			14		1														4	2
			15	4	2	15	10	8	3	1	2									
			16	1	1	31	24	22	11	10	2	2								
			17	3	6	16	19	19	11	12	3	1								
			19								5			2	2	2	2	3	5	3
			20								3	3	3	2	2	3	5	3	2	3
			31		2															
			32		3		1												1	4
			33					1												
TOTAL				65	33	66	57	59	44	50	49	39	36	42	53	46	40	48	65	64
STATE TOTALS				439	502	201	200	216	167	179	200	218	196	210	242	232	207	215	215	216
% OF STATE TOTAL				15	7	33	29	27	26	28	25	18	18	20	22	20	19	22	30	30

III. The Range 30 Complex (Tank Range)

Table 1 shows the number of singing male warblers recorded in the Tank Range since the 1951 census. The total number of warblers in the Tank Range represents a very significant portion of the total breeding population. Of equal importance is the high consistency in number of birds produced. During the low years of 1974-76, the area still held over 25 percent of the total state population. Such consistency reflects the high quality of nesting habitat on the Tank Range. Most of this habitat was created by fires, the rest being plantations of jack pine or mixed jack pine and red pine.

This training area consists of approximately 39,900 acres of land south from County Road 612 to North Down River Road. It is primarily used for tank firing and maneuvering with both tracked and wheeled vehicles permitted. It is also used by helicopter gunnery units. This area has a capacity of two to three armored/cavalry or mechanized infantry battalions at one time. During yearly annual training, it is used in excess of 800 hours. Units also utilize this training area for weekend training an additional 15 to 16 weekends per year. Two battalion size base camps are also located in the area.

This land is under long-term lease in perpetuity from the state to the National Guard and has been in use for the above activities since the late 1920's.

The continued use of this area by warblers has caused conflicts with Military activities, especially during the nesting season. Correspondence indicates tank maneuvers in nesting areas as early as 1964 when a squad of tanks and other vehicles manned by the Indiana National Guard deployed into a nesting colony of warblers near Buck's Crossing. Subsequent correspondence documents Military activities resulting in actual habitat destruction or disturbance during the breeding season. Habitat destruction has been caused by armored vehicles running over young jack pine or by fires started during Military exercises. Disturbance included low-level flights by jets and helicopters, as well as helicopters landing in occupied habitat. Designation of the KW as an endangered species by both federal and state statutes [P.L. 93-205 (87 Stat. 884) as amended and Michigan P.A. 203, 1974] accentuated the problem.

Severe restrictions on Military use of active nesting areas were begun in the early 1970's when all active nesting areas were posted against entry for the period May 1 to August 15. A MDNR Director's Closure Order made it unlawful for anyone, including the Military, to enter these areas without written permission from the MDNR. The Closure has presented special problems, since the exclusionary period coincides with greatest use of the Tank Range. Rescheduling exercises and areas has affected Military planning. Intrusions into posted areas have occurred, culminating in an illegal entry citation issued by a conservation officer to a tank commander in the spring of 1985.

For several years the DNR and the Military have met to resolve the various issues and conflicts of the Tank Range. Both agencies now support a plan shifting breeding habitat to more compatible areas of the Range. This strategy has resulted in development of a Management Plan for the Range 30 Complex.

The main long-term objectives are:

1. The Military will discourage new regeneration of jack pine where there is potential for warbler use on all lands inside the Tank Range west of Bald Hill Road. This will permit unrestricted Military use of this area in the future.
2. Establishment of a Kirtland's Warbler Management Area on Military lands east of Bald Hill Road to include:

Section 25, T27N, R2W

Sections 17, 18, 19, 20, 29 and 30, T27N, R1W

W $\frac{1}{2}$, Section 28, T27N, R1W (non-military land)

The plan requires implementation of several tasks:

- a. Protect existing warbler nesting habitats through continued posting under Director's Closure Order (Figure 2).
- b. Allow unrestricted Military use of those areas that no longer support warblers.
- c. Allow developing habitat near Kyle Lake (Figure 2).
- d. Construct a 3 to 5 chain fire break around Sections 13 and 14, T27N, R2W (Bald Hill burn, Figure 2).
- e. Promote cowbird trapping on all active nesting areas.

COOPERATIVE AGREEMENT
BETWEEN
MICHIGAN DEPARTMENT OF MILITARY AFFAIRS
AND
MICHIGAN DEPARTMENT OF NATURAL RESOURCES

THIS AGREEMENT is entered into between the Michigan Department of Military Affairs, hereinafter referred to as the Military (which also means authorized representative), and the Michigan Department of Natural Resources, hereinafter referred to as the DNR, to establish by mutual agreement a management program for the Kirtland's warbler.

WITNESS THAT:

WHEREAS, the Kirtland's warbler (Dendroica kirtlandii) is an endangered species included in the United States and State of Michigan's endangered species lists pursuant to P.L. 93-205 (87 Stat. 884) as amended, and Michigan P.A. 203, 1974, and

WHEREAS, of the many factors which have an impact on this bird's continued existence, habitat is of great importance, and

WHEREAS, lands under primary jurisdiction of the Military contain parcels essential to the continued existence of the Kirtland's warbler, and because it is the desire of the Military and DNR to cooperate in a program of habitat management for the benefit of the Kirtland's warbler.

NOW THEREFORE, it is mutually agreed that:

1. The DNR with cooperation of the Military will develop and implement a Management Plan for all Kirtland's warbler areas on Military lands.
2. The DNR will advise the Military of occupied territories of the Kirtland's warbler on Military lands by publishing a Closure Order, under authority of the Director of Department of Natural Resources, at the first of the year based on the previous year's census subject to change based on the actual year's census, and provide a copy of the census used to develop the Closure Order to the Military.
3. With the cooperation of the Military, the DNR will post against entry the areas occupied by Kirtland's warblers. The posted areas will be determined by habitat needs and definable boundaries. Maps of these areas will be provided to the Military.
4. The DNR will determine those activities detrimental to the Kirtland's warbler and restrict same on appropriate areas identified in the Closure Order.
5. Established trails in the Closure Order areas will be open for travel by the Military unless mutually agreed to by the DNR and the Military.

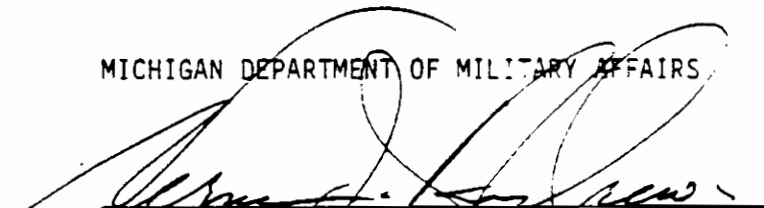
6. The Military will keep all Michigan and visiting Military staff and unit commanders advised of their responsibilities under federal and state endangered species statutes and this Cooperative Agreement.
7. Under terms of the existing Memorandum of Understanding between the Military and DNR concerning fire management, the Military shall cooperate to prevent and suppress fires in areas of currently occupied habitat and developing habitat.
8. The Military will permit access to Military lands for official Kirtland's warbler activities with coordination of the Camp Commander.
9. In the event that the Military fails to implement the control of habitat regeneration with mechanical means or fire and Kirtland's warbler occupy such habitats, the area will be protected under Director's Closure Order.

This Cooperative Agreement shall be in effect as soon as approved and signed by representatives of the Departments of Military Affairs and Natural Resource Management plans developed under this Agreement will be reviewed annually by both agencies and revised by mutual consent.

APPROVED:

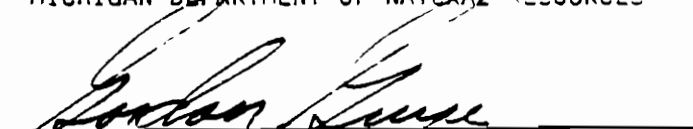
22 May 86
Date

MICHIGAN DEPARTMENT OF MILITARY AFFAIRS


Adjutant General Vernon J. Andrews, Director

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

22 May 86
Date


Gordon E. Guyer, Director

Camp Grayling Annual Training Site (CGATS)

1.0 Introduction

Camp Grayling is a State of Michigan National Guard Training facility. It is located in Crawford, Kalkaska, and Otsego counties in northern Michigan, approximately 200 miles north of Detroit. The main gate is approximately 5 miles from Grayling, Michigan. Refer to location map (Map A).

The Camp presently consists of 146,600 acres including 10,000 acres in Otsego County, 36,000 acres located in Kalkaska County, and 100,000 acres in Crawford County.

The Camp is divided into four geographical areas: (1) Main Camp (Cantonment Area, 968 acres); (2) Grayling Army Airfield/Mobilization and Training Equipment Site (MATES), 456 acres; (3) South Camp (Rifle Ranges and Maneuver Area, 78,291 acres); and (4) North Camp (Artillery Tank Ranges and Maneuver Area, 66,868 acres). Refer to Site Map (Map A).

The function of Camp Grayling is to provide the necessary support and facilities for all training. This includes shelter, messing facilities, basic administrative equipment, training supplies, ammunition, petroleum products, training facilities, vehicular maintenance facilities, procurement storage and issue of food supplies and community facilities for all troops.

Since 1960, Camp Grayling has undergone an extensive building program. More than 24 million dollars have been spent since that date to make Camp Grayling one of the finest state-owned training facilities in the United States. Presently Camp Grayling can house over 7,200 people and give support to another 8,000 plus in the field. The area has increased from the original Hanson Grant of 26,000 acres to over 146,600 acres. Although this may seem excessive, the mission of Camp Grayling has broadened as have the space requirements of today's advanced weaponry. Presently Camp Grayling is one of nine (9) state-owned mobilization sites in the United States to be utilized in the event of a national emergency.

1.3 Training Areas

1.31 Training Areas A1-A5 (Artillery and Air to Ground Range)

This training area consists of approximately 27,400 acres of land north of County Road 612. Refer to training area map (Map D). It is primarily used for field artillery training activities with both tracked and wheeled vehicles permitted.

Over 7,000 acres are dedicated for use as an impact area for field artillery, mortar, armored/cavalry, helicopter gunnery and air-to-ground units. There is also limited use by infantry units. This training area has a capacity of up to five (5) field artillery battalions at one time. During annual training it is used in excess of 800 hours. Units also utilize this training area for weekend training an additional 15 to 16 weekends per year. Further, the Air National Guard uses the air-to-ground portion of the range daily except during the 15-30 November firearm deer hunting season.

This land was purchased by the State of Michigan between 1918 and 1921. It is presently under long-term lease in perpetuity to the Michigan National Guard. It has been in use for the above activities since the late 1920's. See Military Lands map (Map C).

1.32 Training Areas B1-B5 (Tank Range)

This training area consists of approximately 39,400 acres of land south from County Road 612 to North Down River Road. Refer to Training Area map (Map D). It is primarily used for tank firing and maneuvering with both tracked and wheeled vehicles permitted. It is also used by helicopter gunnery units. This area has a capacity of two to three armored cavalry or mechanized infantry battalions at one time. During yearly annual training, it is used in excess of 800 hours. Units also utilize this training area for weekend training an additional 15 to 16 weekends per year. Two battalion size base camps are also located in this area.

This land is under long-term lease in perpetuity from the State to the National Guard and has been in use for the above activities since the late 1920's, also. Refer to Military Lands map (Map C).

1.33 Training Areas C1-C6

This training area consists of approximately 11,400 acres of land north of Highway M-72 and west of Grayling to include the Grayling Army Airfield and the area northeast of the airport. Refer to Training Area map (Map E). This area is used primarily by engineer or combat support units. Most vehicular traffic is wheeled, but tracked vehicles are permitted in a few locations. This area has a capacity of four (4) battalions. The area is used in excess of 800 hours during summer annual training. Its use is very limited for weekend training activities. Howes Lake, which is a small five-acre lake in this training area, is utilized heavily for float bridge training.

Land in this training area is classed in two categories. Areas C-3, C-4, and C-5 are under long-term lease in perpetuity. Areas C-1, C-2, and C-6 are under 20-year lease with renewable 10-year options. See Military Lands map (Map C).

This training area consists of approximately 14,800 acres of land south of Highway M-72 west and west of Lake Margrethe. Refer to Training Area map (Map E). This area is primarily used by infantry units and wheeled vehicles although limited use by tracked vehicles is permitted in areas D-1, D-2, and D-4. Most of the small arms ranges are located in this area with the corresponding safety fan taking up approximately 1/3 of the entire area. This area has a capacity of one to two infantry battalions and is used approximately 600 hours during summer annual training. Its use is very limited for weekend training activities.

Except for area D-1 which is under a 20-year lease agreement with renewable 10-year options, the rest of this training area is under long-term lease in perpetuity. See Military Lands map (Map C).

1.35 Training Areas E1-E11

This training area consists of approximately 35,400 acres of land south and west of the main camp. Refer to Training Area map (Map E). The area is utilized by several types of users. Areas E-1 through E-4, E-7 and E-9 are open for use by both wheeled and tracked vehicles. Areas E-5, E-6, E-8, and E-10 are limited to wheeled vehicles only. Primary users of training area "E" are engineers, combat support, infantry, and armored cavalry units, with armored/cavalry units restricted to those areas open to tracked vehicles only. Areas E-1 through E-4, E-7 and E-9 have a capacity of four to five battalions of infantry, armored/cavalry and engineers. Areas E-5, E-6, E-8 and E-10 can handle several combat support battalions. There is also a mortar and demolition range located in this training area. This area is utilized in excess of 600 hours during summer annual training. It is also used for additional weekend training activities approximately 17 to 18 weekends per year. Also, a brigade size base camp is located in the south central part of this training area (E-2). A buried gas line runs through the area from north to south in the western part of the area.

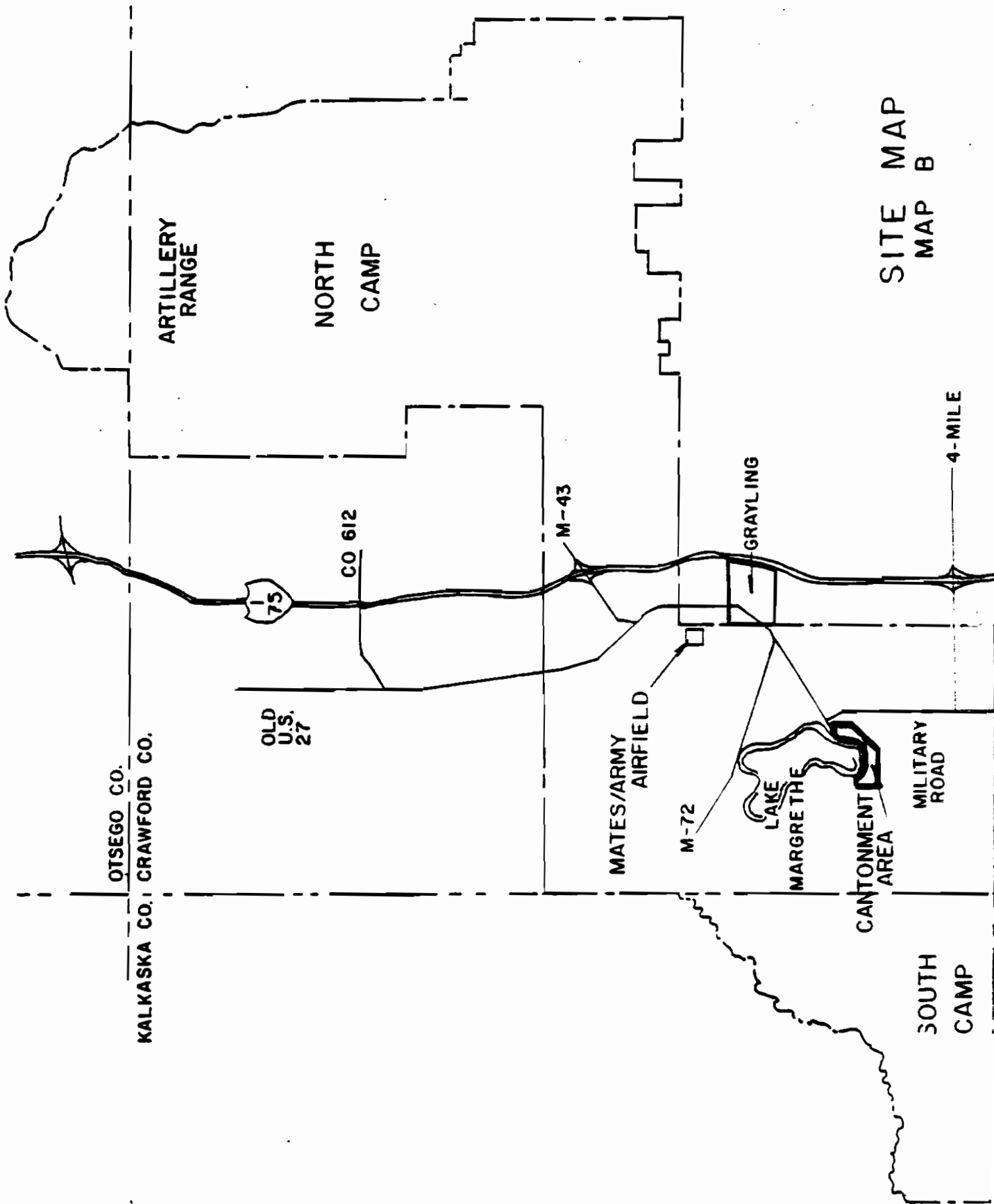
All land in this training area is under long-term lease in perpetuity except for areas E-6 and E-11. These are under a 20-year lease agreement with renewable 10-year options. Refer to Military Lands map (Map C).

1.36 Training Area F1-F4

This training area consists of approximately 17,000 acres of land. Area F-1 is located south of Highway M-72 and to the extreme west of the installation. Areas F-2 through F-4 are located in the southwest corner of the installation. Refer to Training Area map (Map E). This area is used primarily by

infantry and combat support units with some helicopter support. Tracked vehicles are not allowed and wheeled vehicles are restricted to existing road networks. The area has a capacity of approximately two infantry battalions. This area is utilized in excess of 600 hours during summer annual training. It is also used for additional weekend training activities for approximately 16 to 18 weekends per year.

All land in this training area is under a 20-year lease agreement with the State with renewable 10-year options. Refer to Military Lands map (Map C).



SITE MAP
MAP B

OTSEGO CO.
KALKASKA CO. CRAWFORD CO.

ARTILLERY
RANGE

NORTH
CAMP

OLD
U.S.
27

75

CO 612

M-43

GRAYLING

MATES/ARMY
AIRFIELD

M-72

LAKE
MARGRETHE

CANTONMENT
AREA

MILITARY
ROAD

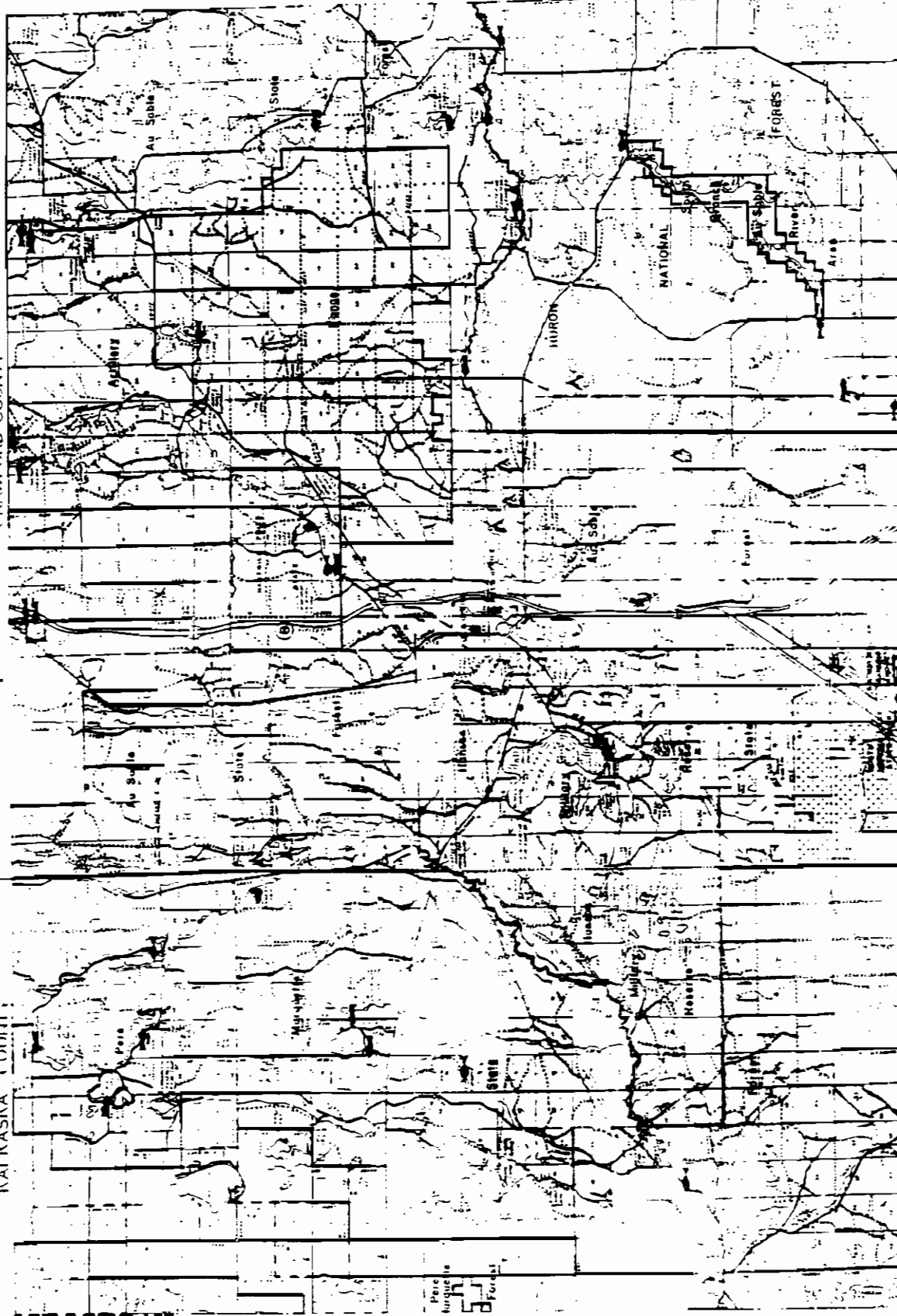
SOUTH
CAMP

4-MILE

MILITARY LANDS

KAI KASKA COUNTY

RAWLORD COUNTY



HABITAT MANAGEMENT PLAN FOR THE RANGE 30 COMPLEX

The boundary of the Range 30 Complex is shown in Figure 2. Four areas will receive special management treatments.

1. Active Nesting Area

This area consists of current nesting habitat. All areas in this category will be posted under Director's Closure Order until no longer productive. Cowbird trapping will continue as long as KW are present. The Buck's Crossing nesting area, consisting of portions of Sections 7, 8, 9, 19, and 20, has had warblers since 1973. Based on observed occupancy for most colonies, these areas should become nonproductive by 1987 or 1988. When census indicates no occupancy, the areas will be returned to unrestricted Military use. The area in Section 32, T27N, R2W, was first occupied in 1984 and should continue to support birds until about 1998. It will also be returned to unrestricted Military use when occupancy ends.

2. Nesting Area in Sections 13 and 14, T27N, R2W

This area is part of the Bald Hill burn of 1975. To avoid Military intrusions, a 3 to 5 chain strip will be cut and cleared along section lines. The edge of the cleared strip will be posted. The strip will provide a highly visible boundary for tanks and other Military vehicles.

3. Developing Nesting Habitat

This area consists of approximately 200 acres of regenerating jack pine that appears favorable for nesting. The two separate blocks will be allowed to develop. If warblers begin to use the area, the Military will be advised, but the area will not be posted unless the total warbler population level is below 200. Cowbird trapping will be allowed as long as needed.

4. New Management Area

This area has been set aside for the specific purpose of Kirtland's warbler habitat management. It will become a part of the MANAGEMENT PLAN FOR KIRTLAND'S WARBLER HABITAT IN MICHIGAN. All of this area has been inventoried under the Operations Inventory system. Compartments, cutting blocks, year-of-entry, and specific treatment have been incorporated as in other management areas. Other land use will be allowed as in other management areas with the exception of the following restrictions in Military activity.

- a. In habitat that is active or newly created, no Military vehicles of any type will be allowed to enter; travel is restricted to established trails only.

- b. Helicopter and other aircraft flights under 500 feet will not be allowed over active habitat.
- c. Helicopters will not be allowed to land in newly created habitat.
- d. In the absence of developing habitat or nesting warblers Military activities will be restricted to foot travel and wheeled vehicles. Military will consult with MDNR for approval of such use.

CRAWFORD COUNTY
T27N R1W and T27N R2WINVENTORY COMPARTMENTS:

AuSable State Forest, Mio Area: 276 (Management Unit 1)
277 (Management Unit 2)
278 (Management Unit 3)

AREA DESCRIPTION:

A. General Location and Background Information:

The Down River Road Kirtland's Warbler Management Area is located on the east side of Crawford County. It is located within the Range 30 Complex, a part of Military lands (Figure 3) under the administration of the Department of Military Affairs. Soils fall into two major groups. Grayling sands support the important jack pine community while Rubicon sand supports nonusable habitat consisting primarily of aspen and oak. This unit is bounded on the east by the North Branch Kirtland's Warbler Management Area.

The Down River Road Kirtland's Warbler Management Area was created as part of a broader management plan designed to resolve conflicts between Military activities and KW use of the Range 30 Complex (Tank Range). The land in this unit will remain under Military control, with the primary use being habitat management for KW.

B. Land Ownership Patterns:

Except for the two small private holdings, the remainder is State-owned. The NW $\frac{1}{4}$ of Section 28, T27N, R1W, was purchased by the U.S. Fish and Wildlife Service and is not Military land. The SW $\frac{1}{4}$ is also outside of Military lands. No major inhibitors for KW management are expected.

C. Status of Other Resources:

Management of blocks with mixed red pine-jack pine plantations will result in the red pine being harvested along with the jack pine. There are no fisheries considerations. The snowmobile trail use will not be affected. Military activities will be restricted: current nesting area will be posted against entry during the nesting season; Military vehicle of all kinds will be restricted from entering current and newly-created nesting areas to avoid habitat destruction; only foot troops and wheeled vehicles will be allowed in areas outside of developing or active nesting areas.

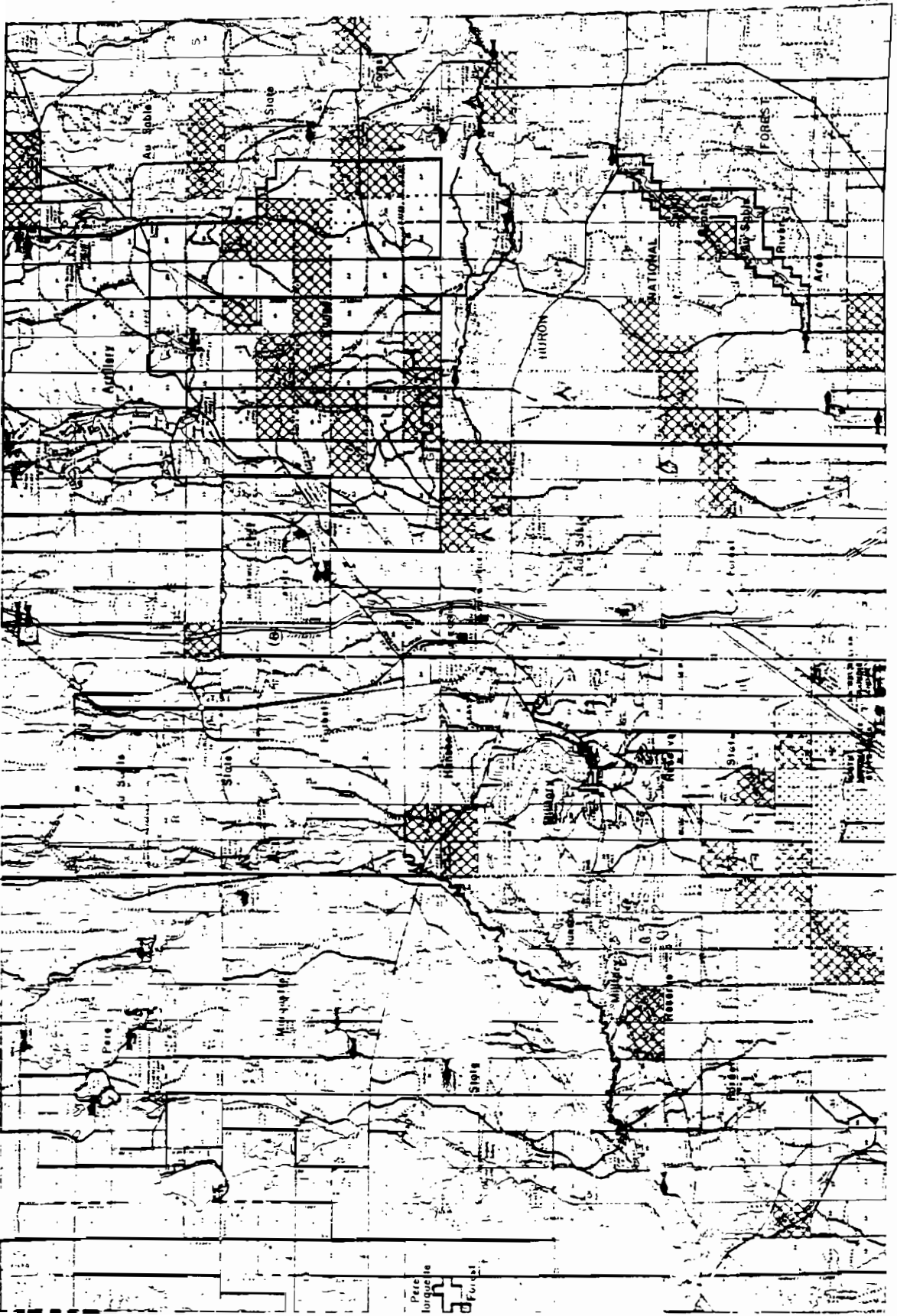
D. History of Occupancy by Kirtland's Warbler:

The 1951 census reported five males in Section 18; adjacent sections also had KW in the same census; as a result of a large fire in 1975, KW have been reported in:

Section 18	1 male	1984
20	7 males	1983
	9 males	1984
	11 males	1985
21	2 males	1984
28	1 male	1983
	1 male	1984
	4 males	1985
29	1 male	1983
	2 males	1984
	3 males	1985

As a result of the same fire, there are KW in Sections 13 and 14, T27N, R2W. Predictions are for KW to increase substantially in this unit during the 1980's.

Fig. 1

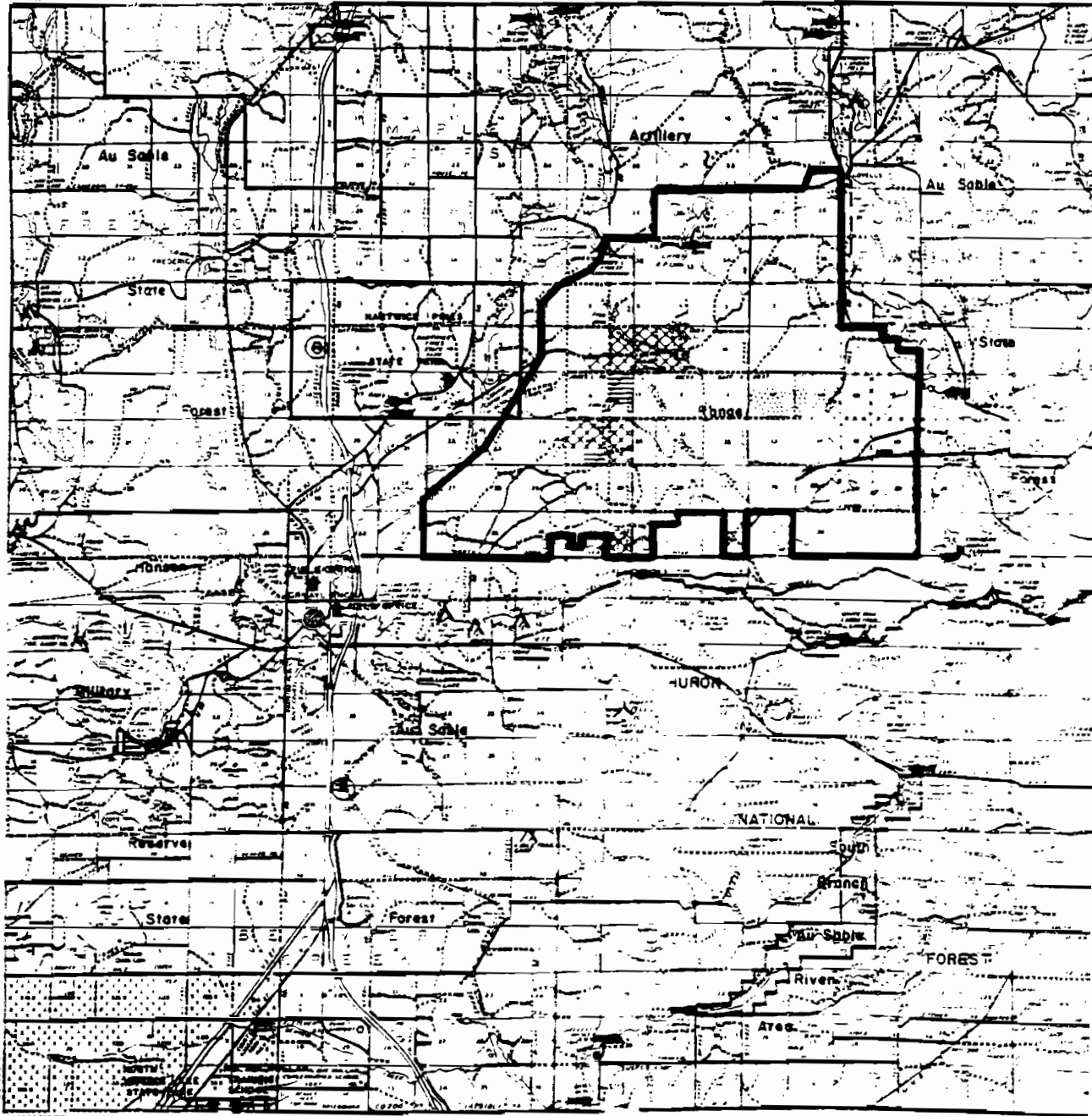


1000 KIRTLAND'S WARBLER

MILITARY LANDS

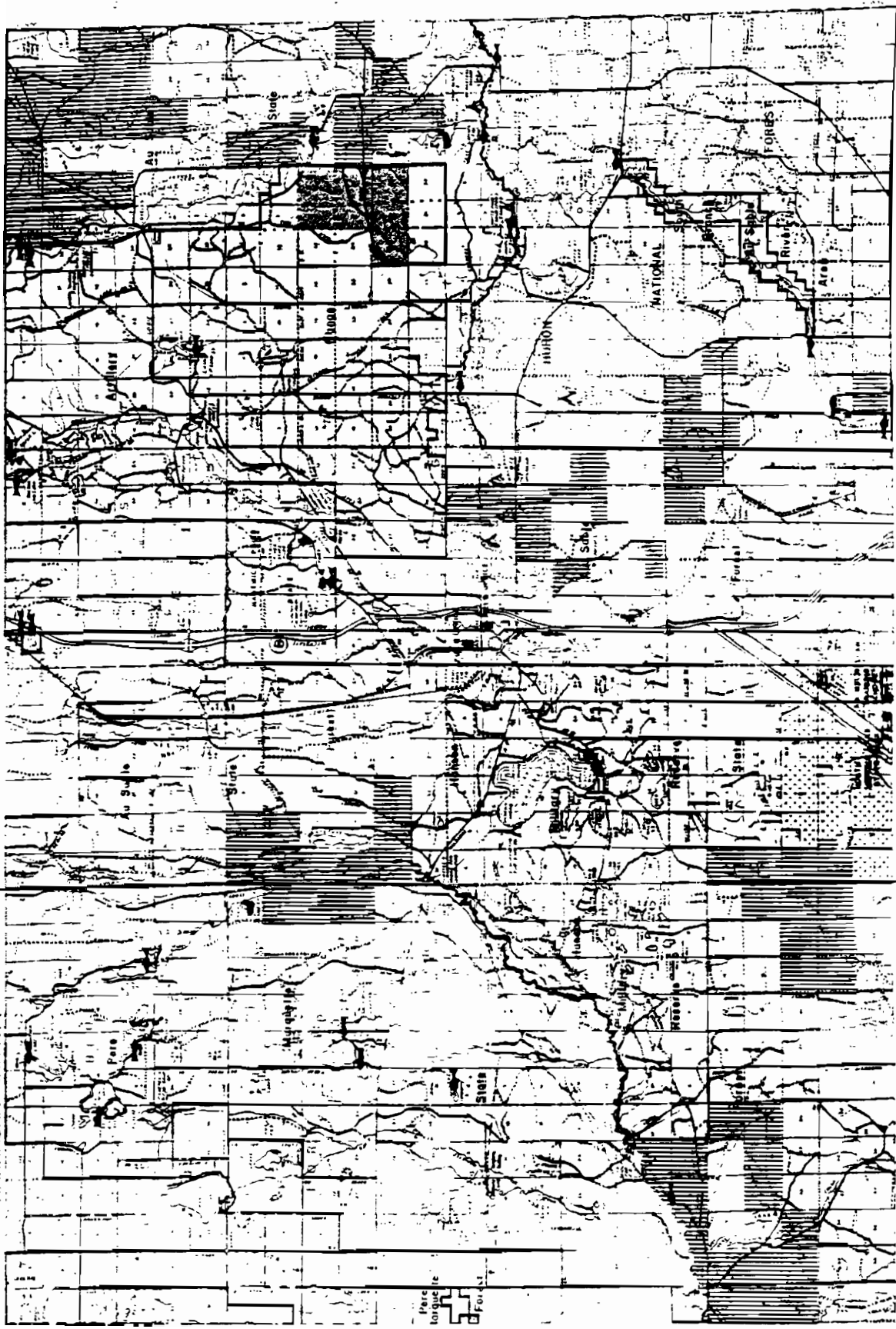
TANK RANGE MANAGEMENT AREAS

CRAWFORD COUNTY



- | | |
|---|---|
|  ACTIVE NESTING AREA |  NEW MANAGEMENT UNIT |
|  ONCOMING NESTING HABITAT |  TANK RANGE BOUNDARY |
|  BALD HILL BURN ACTIVE NESTING AREA | |

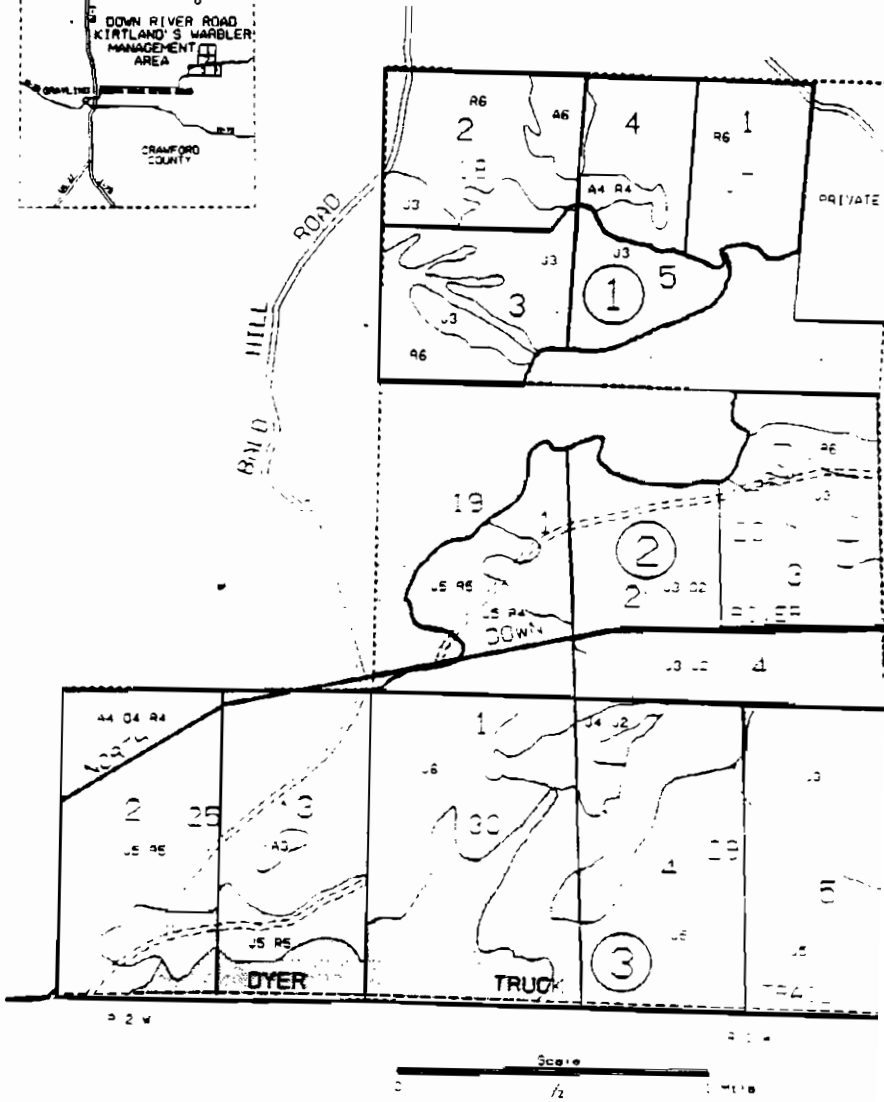
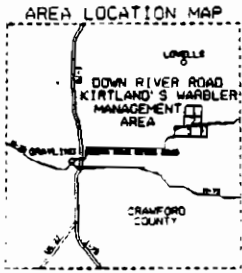
Fig. 3



DOWN RIVER ROAD KIRTLAND'S WARBLER MANAGEMENT

CRAWFORD COUNTY, MICHIGAN
(COMPARTMENTS NO. 1, 2 & 3)

T 27 N , R 1 & R 2 W



TYPE CLASSIFICATION

- A-Aspen, White Birch
- G-Upland Grass
- J-Jack Pine
- O-Oak-red, white or black
- R-Red Pine

STAND SIZE and STOCKING

- Reproduction
 - 1-low
 - 2-medium
 - 3-high
- Pole Timber
 - 4-low
 - 5-medium
 - 6-high
- Saw Timber
 - 7-low
 - 8-medium
 - 9-high

