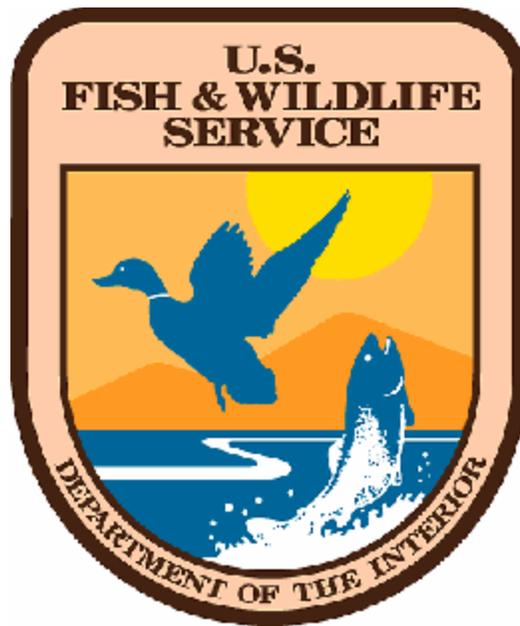


WILDLAND FIRE MANAGEMENT PLAN

KIRTLAND'S WARBLER WILDLIFE MANAGEMENT AREA



2003

WILDLAND FIRE MANAGEMENT PLAN

KIRTLAND'S WARBLER WILDLIFE MANAGEMENT AREA

GREAT LAKES-BIG RIVERS REGION

Prepared: /s/ Cal Gale
Cal Gale
Fire Program Analyst, R.S. Staffing Services, Inc. Date

Mike Tansy
Refuge Biologist Date

Greg Corace
Refuge Forester Date

Gary Lindsay
Prescribed Fire Specialist Date

Tracy Casselman
Project Leader, Kirtland's Warbler Wildlife Management Area Date

Concurred: Brian McManus
Regional Fire Management Coordinator Date

Tom Worthington
Chief, Refuge Operations Date

Nita Fuller
Chief, Division of Refuges

Date

Approved:

William Hartwig
Regional Director

Date

TABLE OF CONTENTS

INTRODUCTION	1
NEED AND REASON FOR FIRE MANAGEMENT PLAN	1
HOW FMP ACHIEVES LAND MANAGEMENT PLAN OBJECTIVES.....	1
MEETING REGULATORY REQUIREMENTS.....	1
COLLABORATIVE DEVELOPMENT PROCESS FOR LAND AND FIRE MANAGEMENT PLANS	2
AUTHORITIES FOR FIRE MANAGEMENT PLAN DEVELOPMENT	2
RELATIONSHIP TO LAND MANAGEMENT PLANNING/FIRE POLICY.....	4
AGENCY SPECIFIC FIRE MANAGEMENT POLICY	4
RELATION OF FIRE MANAGEMENT PLAN TO ENABLING LEGISLATION AND PURPOSE OF UNIT.....	5
SUMMARY OF SIGNIFICANT RESOURCES AND VALUES.....	5
BROAD MANAGEMENT PLAN DIRECTION PERTINENT TO FMP	5
Land Management Goals	5
Land Management Objectives	5
Desired Future Condition	5
WILDLAND FIRE MANAGEMENT STRATEGIES	6
GENERAL MANAGEMENT CONSIDERATIONS.....	6
Area-wide Considerations	6
10 Year Comprehensive Strategy Core Principles	6
WILDLAND FIRE MANAGEMENT GOALS	6
Fire Management Goals in Context of Land Management Plan.....	6
Fire Management Plan Contribution to Achieve Land Management Plan Goals.....	7
Contribution of Wildland Fire Goals to Regional/National Plans	7
WILDLAND FIRE MANAGEMENT OPTIONS	8
Wildland Fire Management Options to be Implemented.....	8
Rationale for Strategies to be Applied to Each FMU	8
DESCRIPTION OF WILDLAND FIRE MANAGEMENT STRATEGIES BY FMU	8
FMU Descriptions	8
FMU Objectives, Standards, Guidelines or Desired Future Condition with Strategies.....	9
WILDLAND FIRE MANAGEMENT COMPONENTS	10
WILDLAND FIRE SUPPRESSION.....	10
Program Direction	10
Preparedness	10
Initial Attack	11
Extended Attack.....	11
Other Management Considerations	11
WILDLAND FIRE USE.....	12
PRESCRIBED FIRE	12
Long-Term Program Objectives	12
Annual Preparation	12
Required Staffing.....	12
Sensitive Resource Considerations	12
Prescription Requirements.....	13
Prescribed Fire Plan Elements	13
Documentation and Reporting.....	13

Public Information/Interaction.....	14
NON-FIRE FUEL TREATMENTS	14
Long-term Program Objectives	14
Annual Preparation	14
Required Staffing.....	14
Sensitive Resource Considerations	14
Restrictions	14
Documentation and Reporting	15
Public Information/Interaction.....	15
EMERGENCY REHABILITATION AND RESTORATION.....	15
Burned Area Emergency Stabilization and Rehabilitation Handbook	15
Pre-Identified Areas with Restoration Needs	15
ORGANIZATION AND BUDGET	16
STAFFING.....	16
Current Level.....	16
Level Needed to Achieve Wildland Fire Management Goals	16
FUNDING.....	16
Current Level.....	16
Level Needed to Achieve Wildland Fire Management Goals	16
Additional Support.....	16
COOPERATIVE AGREEMENTS	16
MONITORING AND EVALUATION	17
MONITORING	17
Prescribed Fire.....	17
Non-Fire Treatments.....	17
EVALUATION	17
Wildland Fire Suppression Operations.....	17
Effectiveness of Prescribed Fire Operations.....	17
NATIONAL WILDLAND FIRE PERFORMANCE MEASURES	17
National Fire Plan Goal 1	17
National Fire Plan Goal 2	18
National Fire Plan Goal 3	18
National Fire Plan Goal 4	18
APPENDICES	19
APPENDIX A: REGIONAL REQUIREMENTS FOR NHPA	20
APPENDIX B: ENVIRONMENTAL GUIDELINES FOR FOAM/RETARDANT USE.....	21
APPENDIX C: PRESCRIBED FIRE DOCUMENTS.....	22
APPENDIX D: FMU PHYSICAL AND BIOLOGICAL ADDENDUM	33
Physical Characteristics	33
Climate.....	33
Fire Season	34
Vegetation.....	34
Wildlife.....	35
Threatened and Endangered Species	35
FMU Risk Assessment and Management Potential.....	39
APPENDIX E: COOPERATOR AND LANDOWNER CONTACTS	43
Cooperator Contacts	43
Adjacent Landowner Contacts.....	43

Cooperative Agreement.....	43
APPENDIX F: MANAGEMENT UNIT LOCATION MAPS.....	50
APPENDIX G: RISK/MANAGEMENT POTENTIAL EVALUATORS	78

LIST OF FIGURES

FIGURE 1 – KIRTLAND’S WARBLER WMA LOCATION MAP.....	10
FIGURE 2 – GAYLORD, MI CLIMATOLOGY	33
FIGURE 3 – GRAYLING, MI CLIMATOLOGY	34
FIGURE 4 – HOUGHTON LAKE, MI CLIMATOLOGY	35

LIST OF TABLES

TABLE 1 – COMMUNITIES AT RISK.....	7
TABLE 2 – FIRE REGIME GROUPS.....	9
TABLE 3 – CONDITION CLASS EXPLANATION.....	9
TABLE 4 – FEDERALLY LISTED THREATENED OR ENDANGERED SPECIES.....	36
TABLE 5 – STATE LISTED THREATENED OR ENDANGERED SPECIES – KIRTLAND’S WARBLER WMA	36
TABLE 6 – MANAGEMENT UNIT RISK ASSESSMENT	39
TABLE 7 – MANAGEMENT UNIT MANAGEMENT POTENTIAL ASSESSMENT	41

INTRODUCTION

NEED AND REASON FOR FIRE MANAGEMENT PLAN

This document establishes a Fire Management Plan (FMP) for the Kirtland's Warbler Wildlife Management Area (WMA). The plan is written as an operational guide for managing the WMA's wildland fire program including the use of prescribed fire. It defines levels of protection needed to ensure (1) safety of employees and visitors and (2) protect resources, given current understanding of the complex relationships in natural ecosystems. It is written to comply with both departmental and service-wide requirements that units with burnable vegetation develop a fire management plan (620 DM 1).

This FMP outlines a program of cost efficient and ecologically responsible suppression of wildland fires. While wildland fire has always been a critical component of warbler habitat, the proliferation of structures on private lands scattered throughout the warbler's historic range requires significant suppression actions to protect those lands, improvements, and the owners/users. There is potential for the use of prescribed fire on the WMA. Lands comprising the WMA were purchased under authority of the Endangered Species Act of 1973 (as amended).

Land management oversight is provided by staff from Seney National Wildlife Refuge in coordination with the Michigan Department of Natural Resources (MIDNR) under a Cooperative Agreement. Fish and Wildlife Service (Service) ownership includes 119 parcels totaling approximately 6,700 acres scattered over eight counties in northern lower Michigan.

HOW FMP ACHIEVES LAND MANAGEMENT PLAN OBJECTIVES

Historically, Kirtland's Warbler has benefited from naturally occurring wildland fires. The species has been described as "the bird of fire", naturally adapted to fire and utilizing areas regenerated naturally following wildland fire.

The suppression aspects of this plan will provide protection from wildland fires to private lands adjacent to WMA lands. Hazardous fuels treatments of various types may be used to provide some level of protection to adjacent lands. Application of prescribed fire to warbler habitat when possible will maintain or enhance warbler habitat while providing a minimum level of short-term protection to adjoining private lands by reducing fuels.

MEETING REGULATORY REQUIREMENTS

As no new Federal actions that would affect the environment are included in this Plan, the Plan is deemed a categorical exclusion and requires no additional environmental documentation under the National Environmental Policy Act (NEPA). It is the policy of the Service to provide opportunities for public participation in management planning. This document will be available for a 30-day comment period following completion of the draft Plan.

An intra-Service Section 7 consultation will be conducted to ensure no adverse effects to the warbler or any other Federally threatened or endangered (T&E) species that may be present. Tables with list of both Federal and State T&E species are found in Appendix D.

There are some buildings remaining on purchased WMA lands. None are believed to be historic buildings. No known surveys of cultural sites have been conducted on these lands. Procedures listed in Appendix A will be followed during both wildland fire suppression and prescribed fire operations. Concurrence with this plan by the State Historic Preservation Officer will be obtained.

Documentation showing compliance with these and any other regulatory requirements are found in Appendix C.

COLLABORATIVE DEVELOPMENT PROCESS FOR LAND AND FIRE MANAGEMENT PLANS

A revised recovery plan for Kirtland's Warbler is in draft stages. The existing recovery plan for the Kirtland's Warbler (1985) contains the guiding principles for management of WMA lands. During formulation of the recovery plan the U.S. Forest Service and State of Michigan were involved as well as the U.S. Fish and Wildlife service. This FMP has been provided to MIDNR and affected local governments for input. In addition, the Cooperative Agreement for management between the Service and MIDNR involves regular communication to insure the use of optimum management strategies.

Continuing opportunities exist for future collaboration in acquisition and management planning of additional land acquisition.

AUTHORITIES FOR FIRE MANAGEMENT PLAN DEVELOPMENT

Authority and guidance for developing and implementing this plan are found in:

- Protection Act of September 20, 1922 (42 Stat. 857; 16 U.S.C.594): authorizes the Secretary of the Interior to protect from fire, lands under the jurisdiction of the Department directly or in cooperation with other Federal agencies, states, or owners of timber.
- Economy Act of June 30, 1932: authorizes contracts for services with other Federal agencies.
- Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 U.S.C. 1856, 1856a and b): authorizes reciprocal fire protection agreements with any fire organization for mutual aid with or without reimbursement and allows for emergency assistance in the vicinity of agency lands in suppressing fires when no agreement exists.
- Disaster Relief Act of May 22, 1974 (88 Stat. 143; 42 U.S.C. 5121): authorizes Federal agencies to assist state and local governments during emergency or major disaster by direction of the President.
- Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 U.S.C.2201): provides for reimbursement to state or local fire services for costs of firefighting on federal property.
- Wildfire Suppression Assistance Act of 1989. (P.L. 100-428, as amended by P.L. 101- 11, April 7, 1989).
- Departmental Manual (Interior), Part 620 DM, Chapter 1, Wildland Fire Management: General Policy and Procedures (April 10, 1998): defines Department of Interior fire management policies.
- Service Manual, Part 621, Fire Management (February 7, 2000): defines U.S. Fish and Wildlife Service fire management policies.
- National Wildlife Refuge System Administrative Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd et seq.: defines the National Wildlife Refuge System as including wildlife refuges, areas for the protection and conservation of fish and wildlife which are threatened with extinction, wildlife ranges, game ranges, wildlife management areas and waterfowl production areas. It also establishes a conservation mission for the Refuge System, defines guiding principles and directs the Secretary of the Interior to ensure that biological integrity and environmental health of the system are maintained and that growth of the system supports the mission.
- National Environmental Policy Act of 1969: regulations implementing the National Environmental Policy Act encourage the combination of environmental comments with other agency documents to reduce duplication and paperwork (40 CFR 1500.4(o) and 1506.4).
- Clean Air Act (42 United State Code (USC) 7401 et seq.): requires states to attain and maintain the national ambient air quality standards adopted to protect health and welfare. This encourages

states to implement smoke management programs to mitigate the public health and welfare impacts of Wildland and prescribed fires managed for resource benefit.

- Endangered Species Act of 1973.
- U.S. Fish & Wildlife Service Fire Management Handbook.
- National Fire Plan, Departments of Interior and Agriculture, 2001.
- 10-Year Comprehensive Strategy Implementation Plan, Departments of Interior and Agriculture, 2002.
- Draft Cohesive Strategy for Protecting People and Sustaining Resources in Fire-Adapted Ecosystems.

RELATIONSHIP TO LAND MANAGEMENT PLANNING/FIRE POLICY

AGENCY SPECIFIC FIRE MANAGEMENT POLICY

Fish and Wildlife Service fire management policy is based on the Departmental Manual (620 DM 1) and the 2001 Federal Wildland Fire Policy. **Firefighter and public safety is the first priority.** All Fire Management Plans and activities must reflect this commitment. With the possible exception of instances where the life of another is threatened, no Service employee, contractor, or cooperators will be purposely exposed to life-threatening conditions or situations (See 241 FW 7).

Only trained and qualified people will be assigned to fire management duties. Fire Management personnel will meet training and qualification standards established or adopted by the Service for the position they occupy. Agency Administrators will meet training standards established or adopted by the Service for the position they occupy. Employees who are trained and certified will participate in the wildland fire management program as the situation demands. Non-certified employees with operational, administrative, or other skills will support the wildland fire management program as needed. Agency Administrators will be responsible, be held accountable, and make employees available to participate in the wildland fire management program.

Fire management planning, preparedness, wildland and prescribed fire operations, monitoring, and research will be conducted on an interagency basis with the involvement of all partners when appropriate. Every area with burnable vegetation must have an approved Fire Management Plan. Fire Management Plans must be consistent with firefighter and public safety, values to be protected, and land, natural, and cultural resource management plans, and must address public health issues. Fire Management Plans must also address all potential wildland fire occurrences and may include the full range of appropriate management responses. Fire Management Plans must be coordinated, reviewed, and approved by the responsible agency administrator, to ensure consistency with approved land management plans.

Fire, as an ecological process, will be integrated into resource management plans and activities on a landscape scale and across jurisdictional boundaries as partnerships are developed. Integration of fire into resource management will be based upon best available science. All use of fire for natural and cultural resource management requires an approved plan which contains a formal prescription.

The Service will employ prescribed fire whenever it is an appropriate tool for managing Service resources and to protect against unwanted wildland fire whenever it threatens human life, property and natural and/or cultural resources. Once people have been committed to an incident, these human resources become the highest value to be protected. If it becomes necessary to prioritize between property and natural and/or cultural resources, this is done based on relative values to be protected, commensurate with fire management costs.

Management actions taken on wildland fires must consider firefighter and public safety, be cost effective, consider benefits and values to be protected, and be consistent with natural and cultural resource objectives. Refuges will work with their local cooperators and the public to prevent unauthorized ignition of wildland fires on Service lands.

Structural firefighting is not the functional responsibility of the Service. Service assistance in structure protection should only be performed on an emergency basis to save lives. (See Fire Management Handbook, 1.5.4) Fire management policies and procedures for safety, training and equipment are mandatory. See 241 FW 7 (Safety Operations - Firefighting), 232 FW 6 (Firefighting Training), and 241 FW 3 (Personal Protective Equipment).

Further clarification and interpretation of policy may be found in Section 1.1.2 of the FWS Fire Management Handbook.

RELATION OF FIRE MANAGEMENT PLAN TO ENABLING LEGISLATION AND PURPOSE OF UNIT

The Endangered Species Act is intended to provide protection to listed species by protection of the species by regulations, protection of critical habitat, and any other method that is deemed appropriate. Thus, acquisition of lands suitable for warbler habitat carries out the intent, and management of those lands supports the purpose, of the legislation.

This plan provides a framework for management of critical warbler habitat while providing some protection to adjoining land owners where hazardous fuels can be managed. It also provides an opportunity to restore the natural role, and cycle, of fire to the jack pine (*Pinus banksiana*) ecosystem in which WMA lands are located.

SUMMARY OF SIGNIFICANT RESOURCES AND VALUES

The value of the acquired lands as potential critical habitat for the warbler is the most significant resource value in the WMA. Other values derived from these lands include habitat for other flora and fauna, especially non-game species. These lands have been acquired in an effort to consolidate manageable areas of sufficient size to provide adequate warbler nesting habitat. Protection of the land base from further habitat fragmentation is an additional consideration.

BROAD MANAGEMENT PLAN DIRECTION PERTINENT TO FMP

Management, based on the existing Kirtland's Warbler Recovery Plan, will continue to focus on providing high quality forest habitat to benefit the nesting needs of the warbler. Fire management, particularly the use of prescribed fire, can contribute to this management direction by managing and restoring target habitat using the more natural process of fire.

Land Management Goals

Maintenance and improvement of existing habitat is the primary land management goal for the WMA. A secondary goal is returning fire to the ecosystem on a cycle that closely follows the natural cycle found in jack pine forests.

Land Management Objectives

Objectives from the recovery plan in support of the above goals include: (1) provide improved habitat conditions to support a self-sustaining population of 1,000 nesting pairs; (2) continue coordination of management efforts, particularly related to prescribed fire use, with MIDNR and other interested land managers to manage a minimum of 153,000 acres of warbler habitat. Objectives for the WMA portion of the land base are similar on a reduced scale.

Desired Future Condition

According to the Recovery Plan, the desired future condition is adequate habitat (153,000 acres) that supports a self-sustaining population (1,000 nesting pairs). For WMA lands, the desired future condition is management of stands of all age classes in a manner which provides continuous availability of some warbler habitat.

WILDLAND FIRE MANAGEMENT STRATEGIES

GENERAL MANAGEMENT CONSIDERATIONS

Area-wide Considerations

Interagency Relationships

There is an ongoing Cooperative Agreement between MIDNR and FWS for management of the existing lands. This relationship is expected to continue. As these parcels are in areas normally subject to large, intense, fires with significant wildland-urban interface areas in place and continually expanding. MIDNR is the primary suppression agency providing wildland fire protection to Service lands. Agreements between involved Federal agencies and the state further improve cooperation in fire related activities.

Regional Strategies

No regional strategies related to fire management exist.

Other Collaborative Processes

Some opportunities will result from NEPA requirements while others derive from local user groups. This plan was placed out for public, and cooperator review and input for a thirty day period to insure local concerns were addressed and potential misconceptions cleared.

10 Year Comprehensive Strategy Core Principles

Collaboration

For this FMP, collaboration (meaning input to the planning process) at the local level includes the MIDNR, county, and town governments as well as cooperating Federal agencies. Adjacent landowners (representative stakeholders) will also be involved by having an opportunity to comment during the public review process.

Collaboration beyond the local level is not likely as individual management units are generally less than 160 acres and not adjacent to each other.

Priority Setting

Project proposals (either prescribed fire or wildland fire oriented) will be rated locally for initial priorities. Overall priorities for funding fuel management projects on the WMA will be established at the federal regional level with appropriate input from state and local officials in the immediate area.

Accountability

Accountability for achieving objectives developed in this Plan will be accomplished by reporting results of projects or activities to the National Fire Plan Operations and Reporting System (NFPORS) as it is implemented. For objectives related to suppression, the annual report of fire activity, available from the Zone Fire Management Officer at Leopold WMD in Portage, WI will document results of suppression or prescribed fire actions taken on the WMA.

WILDLAND FIRE MANAGEMENT GOALS

Fire Management Goals in Context of Land Management Plan

The primary fire management goals on the WMA are to protect habitats from premature degradation as a result of unwanted wildland fire and (where possible) use prescribed fire to create warbler habitat.

Accomplishing the second goal would also reestablish the expected fire regime and maintain affected habitats in Condition Class 1 (Table 3).

Fire Management Plan Contribution to Achieve Land Management Plan Goals

Effective wildland fire suppression actions, taken quickly, will prevent excessive damage to adjoining privately owned lands. In addition, mechanically based fuel treatments when feasible may provide some protection as well. The application of prescribed fire will safely and effectively work to achieve management goals established in the Recovery Plan.

Contribution of Wildland Fire Goals to Regional/National Plans

National Fire Plan

Due to the small size and scattered nature of the individual holdings, wildland fire operations are not expected to contribute significantly to any of the National Fire Plan goals. A more detailed description of effects on National Fire Plan Goals is found in the section entitled: National Wildland Fire Performance Measures.

10 Year Comprehensive Strategy

Priorities to Protect Communities and High Risk Watersheds

There are numerous small interface areas near or adjacent to Service land holdings in the WMA. Additionally, many of the holdings are within 2 miles of the Au Sable River, a high quality trout water with significant public visitation. Communities at Risk, (listed in the Federal Register, Friday, August 27, 2001, Volume 66, Number 160) are listed in Table 1 below. In addition, communities not listed but in close proximity to the lands under this plan are listed in the same table.

Table 1 – Communities at Risk

Community	Listed (Yes/No)
Case Township	No
Foster Township	No
Garfield Township	No
Montmorency Township	No
Richfield Township	No
Rose Township	No
Summerfield Township	No
Winterfield Township	No
Beaver Creek Township	Yes
Frederick Township	Yes
Grayling Township	Yes
Greenwood Township	Yes
Lovells Township	Yes
South Branch Township	Yes

Collaboration among Governments and Representative Stakeholders

Collaboration will occur between the MIDNR, county and local governments and adjacent landowners (representative stakeholders).

Performance Measures and Results Monitoring

The primary performance measure applicable to the WMA involves effective protection of life and property. Once application of prescribed fire is established, a second measure is the restoration of fire to its traditional role to maintain and/or improve affected habitats.

Cohesive Strategy Elements (Draft from USFS)

Institutional Objectives and Priorities

There are numerous refuge units in the Great Lakes-Big Rivers Region of FWS that support large fire-adapted habitats. These areas will receive priority attention. Kirtland's Warbler WMA needs will be addressed within available funding and staffing limitations and subject to broader regional priorities.

Program Management Budgets and Authorities

At the present time, with no recently reported (1991-2002) fire history, and its' status as an un-staffed satellite of Seney NWR, the WMA fails to generate any support from the FIREBASE fire planning and budgeting tool. As occurrence information becomes available and management needs are identified, budget requests will be processed within existing constraints and priorities.

Social Awareness and Support

Due to the small size of the units acquired and their scattered nature, the areas are mostly known only to local residents and local land managers. Educational efforts by the Service and U.S. Forest Service are seasonal in nature, based on escorted tours.

WILDLAND FIRE MANAGEMENT OPTIONS

Wildland Fire Management Options to be Implemented

Due to the scattered nature and small size of the lands within the WMA, the proximity of adjacent landowners and improvements, and high intensity nature of fires in jack pine forests, full suppression is the wildland fire management option of choice. Firefighter safety and that of neighbors and visitors is of primary concern.

Mechanized equipment, when used, will produce the least environmental damage possible.

Rationale for Strategies to be Applied to Each FMU

With the scattered locations of lands involved, potential for extensive areas to be affected, and safety needs of firefighters, suppression is the most reasonable fire management strategy. Actual suppression tactics could range from full, aggressive, suppression to containment between man-made and/or natural fire breaks. Wildland fire use is not an option.

DESCRIPTION OF WILDLAND FIRE MANAGEMENT STRATEGIES BY FMU

FMU Descriptions

All acquisition units will be treated as one FMU. The primary fuel complex is a jack pine/grass/shrub combination. Some wetlands and hardwood forest types also occur. Topographically the entire area is generally flat to gently rolling. Historically, most of the jack pine forest probably would classify as fire regime II. With settlement, its resulting habitat fragmentation, and the introduction of fire suppression the jack pine forest now generally classifies as fire regime III or IV. Fire regime definitions are displayed in Table 2.

Additional physical and biological descriptive information for the WMA is found in Appendix D.

Table 2 – Fire Regime Groups

Fire Regime Group	Frequency (Fire Return Interval)	Severity
I	0-35 years	low severity
II	0-35 years	stand replacement severity
III	35-100+ year	mixed severity
IV	35-100+ year	stand replacement severity
V	>200 years	stand replacement severity

Most WMA lands are expected to be Condition Class 2, as defined in Table 3. Lightning may be a factor in fire occurrence on the WMA although most extensive fires in the area since settlement have resulted from human causes.

Table 3 – Condition Class Explanation

Condition Class	Fire Regime Example Management Options
Condition Class 1	Fire regimes are within an historical range and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within an historical range. Where appropriate, these areas can be maintained within the historical fire regime by treatments such as fire use.
Condition Class 2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range. Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to the historical fire regime.
Condition Class 3	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range. Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments, before fire can be used to restore the historical fire regime.

FMU Objectives, Standards, Guidelines or Desired Future Condition with Strategies

The primary fire management objective for the WMA FMU is the protection of adjacent privately owned lands. Wildland fire suppression is the appropriate management strategy to be applied.

Prescribed fire application will be accomplished using standards described in the FWS Fire Management Handbook Chapter 2.

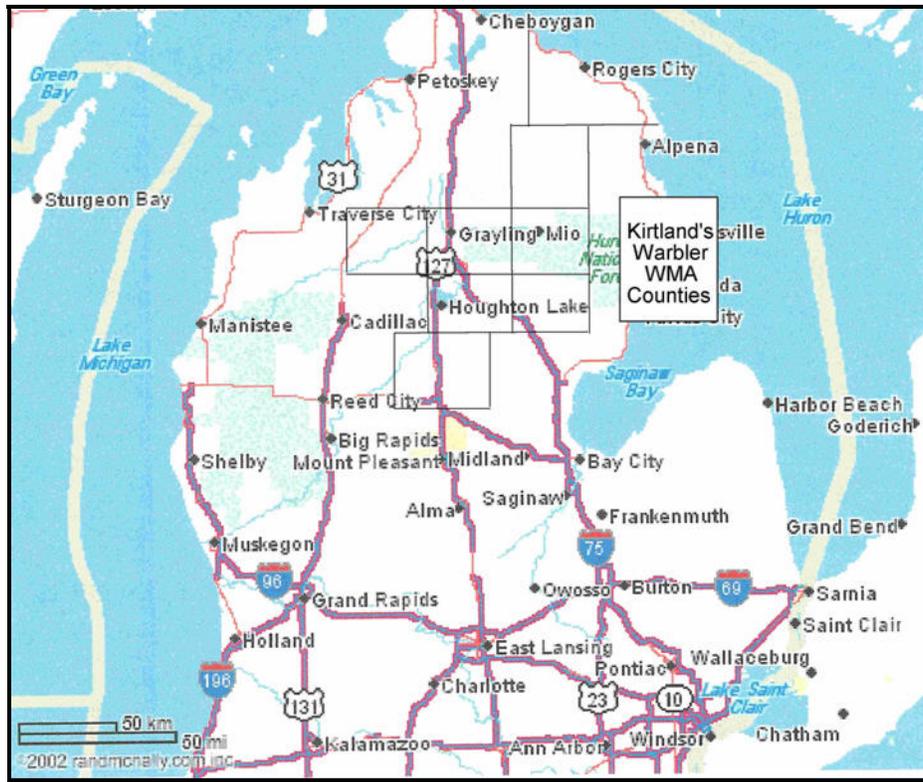
WILDLAND FIRE MANAGEMENT COMPONENTS

WILDLAND FIRE SUPPRESSION

Program Direction

Because this WMA is scattered across eight counties in northern lower Michigan, initial attack suppression action will be provided by MIDNR with backup by local fire departments. Figure 1 shows the relative location of these units.

Figure 1 – Kirtland's Warbler WMA Location Map



Preparedness

Prevention and Community Education

Prevention and community education will not be undertaken solely by FWS. Any efforts will be coordinated with MIDNR or local fire departments. They have the contacts and local infrastructure to deliver programs of this type.

Community Assistance and Grant Programs

Currently there are no agreements for assistance with local fire departments. Should agreements be established, involved local fire departments will then be eligible for Rural Fire Assistance grants through the Department of the Interior.

Training and Qualifications

Departmental and FWS policy requires that all personnel engaged in suppression and prescribed fire duties meet the standards set by the National Wildfire Coordinating Group (NWCG). As

suppression will be supplied by either MIDNR or local fire departments, their qualification requirements will be accepted in accordance with existing national level agreements/guidance.

Readiness

As no suppression can be readily furnished by FWS, readiness will be the responsibility of either MIDNR or local fire departments providing protection.

Detection

With the proximity of adjacent landowners and public roads, detection is expected to be by means of public contact with appropriate authorities. A lack of fire history in the approximately twenty years since initial acquisition indicates wildland fire is an infrequent occurrence. During periods of very high to extreme fire danger, MIDNR and the U.S. Forest Service conduct additional ground and aerial patrols as necessary.

Aircraft Operations

Aircraft operations would be expected only for large fires. As the Service lacks sufficient qualified personnel for those operations, they would be handled with interagency assistance following appropriate U.S. Forest Service and Department of Interior procedures and policies.

Initial Attack

Initial attack operations would be undertaken by either MIDNR or local fire departments. The nature of the vegetative cover limits effectiveness of local fire department equipment. Types of equipment and numbers of personnel needed for initial attack will be determined by MIDNR planning and response procedures.

Extended Attack

Although the parcels are relatively small, the nature of fire in a jack pine forest make it likely that active suppression operations would exceed the initial burning period. Extended attack operations would be conducted by MIDNR using their extensive experience and pre-planned procedures. For fires extending for several days, the Service will provide a resource advisor to assess fire effects, damages and input biological needs into the suppression planning process.

Other Management Considerations

Clean Air Act

The area of the WMA is a Class II air quality area. Wildland fires could have significant short-term effects on local air quality. These effects are unavoidable, however, suppression operations will attempt to minimize emissions within the safety requirements of firefighters on the ground.

Endangered Species Act

Of primary concern within the wildlife management area is the protection of the Kirtland's warbler. The warbler is adapted to a community where fire is a natural force and has provided a specific habitat condition used for nesting. With reduced acreages of nesting habitat and shrinking, contiguous, areas of potential habitat, wildland fire suppression to protect active nesting habitat within recovery plan guidelines is critical.

Several other federally listed species have been reported in the counties that make up the WMA. They include Houghton's goldenrod, Pitcher's thistle, dwarf lake iris, Hine's emerald butterfly, and bald eagle. Wildland fires are not expected to have significant effects on these species. Prescribed fire operations which maintain or enhance habitat will also be designed to mitigate potential adverse effects, i.e. seasonality, fire intensity and others.

Other Legislation or Codified Rules

There have been no cultural resource surveys conducted on individual tracts. Should suppression operations uncover sites with potential, FWS personnel will be notified and the regional direction found in Appendix A will be followed.

WILDLAND FIRE USE

There will be no wildland fire use on the Wildlife Management Area. Reasons include the lack of qualified Service on-site personnel to maintain the required documentation, generally small acreages involved, risk to adjacent property, and risk to visitors and/or residents. On most parcels it is anticipated that a wildland fire with stand replacement potential would extend beyond Service boundaries within the first or second burning period.

PRESCRIBED FIRE

Long-Term Program Objectives

The primary program objective is the regeneration of habitat and maintenance of existing habitats. Prescribed fire is the tool that most closely mimics the historic, natural, process. Current management involves the use of mechanical biomass removal followed by either additional mechanical treatment to replant or reseed the area. Prescribed fire use would be beneficial to the habitat as ground disturbance beyond harvesting operations would be reduced with a subsequent reduction of potential erosion effects on watersheds, and reduced disturbance of understory plants important to the overall health and value of the habitat.

Annual Preparation

Planning for each burn season begins the year prior to that season. Prescribed fire projects will be planned by refuge forester and refuge prescribed fire specialist with assistance from the Zone FMO based on the goals and objectives in this plan. Budget requests will be prepared and submitted, by assigned deadlines, into FIREBASE. A Prescribed Burn Boss, qualified at the expected level of complexity for each proposed prescribed fire will conduct a field reconnaissance of the proposed burn location with the FMO, and appropriate staff to discuss objectives, special concerns, and gather all necessary information to write the burn plan. After completing the reconnaissance, the Prescribed Burn Boss will write the prescribed burn plan.

Both neighbors and cooperators will have opportunities for input into the planning process. Examination of U.S. Geological Survey (USGS) Topographic Quadrangles at a scale of 1:24,000 indicates numerous residences adjacent to or within ½ mile of the Service's boundary. In Appendix F, maps derived from 1:100,000 scale USGS quadrangles provide a broad overview of the approximate center of each management unit. Markers (Clare-6, Ogemaw-1) on the maps match the management unit designations in Tables 6 and 7 of Appendix D.

Required Staffing

Personnel needed to conduct the prescribed fires on the WMA will come from other FWS units. As part of the planning process, the prescribed burn boss will determine, for each individual burn, the numbers and types of positions required. Depending on qualifications and the nature of current and future cooperative agreements, both MIDNR and local fire department personnel would be welcome participants in prescribed fire operations.

Sensitive Resource Considerations

There are no surveyed cultural or historic sites on the acquired units. Buildings still exist on a few units and will be surveyed as necessary prior to removal although no specific process is in place to protect them from wildland fire. The reconnaissance conducted as part of the planning process will identify potential

cultural sites and they will be surveyed in accordance with the Regional Office guidance found in Appendix A.

Beyond the warbler, no other threatened or endangered species (T&E) are known to be present on WMA lands. Because there is potential for other listed species to be present, should pre-burn reconnaissance indicate their presence, an intra-Service Section 7 consultation will be initiated. Efforts will be made to determine potential fire effects on any T&E species present using literature searches, biological consultation and review of existing on-line databases. Lists of Federal and Michigan listed T&E species are found in tables in Appendix D.

Prescription Requirements

Prescriptions will describe in detail the acceptable ranges of fire behavior and parameters of weather and fuel moisture content or other site variables that are used to define the prescription, acceptable smoke duration and patterns of dispersal, seasons when the burns can be done, and other specific parameters. The use of fire behavior and smoke management prediction aids (e.g., BEHAVE, RXWINDOW, nomograms, SASEM, is recommended).

Prescribed Fire Plan Elements

The prescribed fire plan is a site specific action plan describing the purpose, objectives, prescription, and operational procedures needed to prepare for and safely conduct the burn. The treatment area, objectives, constraints, and alternatives will be clearly outlined. No burn will be ignited unless all prescription parameters of the plan are met. Fires not within those parameters will be suppressed. As part of the plan, minimum contingency resources will be listed.

Prescribed Fire Plans will follow the format contained in the FWS Fire Management Handbook. This format is reproduced in Appendix C. Each burn plan will be reviewed by the Refuge Forester, Prescribed Fire Specialist, Zone FMO, and Prescribed Fire Burn Boss. The Project Leader has the final authority to approve the burn plan. The term burn unit refers to a specific tract of land to which a prescribed burn plan applies. Smoke management will be addressed in accordance state regulations.

Documentation and Reporting

Effects Monitoring

Monitoring of prescribed fires is intended to provide information for quantifying and predicting fire behavior and its ecological effects on Service resources while building a historical record. Monitoring measures the parameters common to all fires: fuels, topography, weather and observed fire behavior. In addition, ecological changes such as species composition and structural changes in vegetation will be monitored after a fire. This information will be very useful in fine-tuning the prescribed burn program. During prescribed burning, monitoring should include mapping, weather data, site and fuel measurements and direct observation of fire characteristics such as flame length, rate of spread and fire intensity. Operational monitoring provides a check to insure that the fire remains in prescription and serves as a basis for evaluation and comparison of management actions in response to measured, changing fire conditions, and changes such as fuel conditions and species composition. Monitoring actions are addressed in the Prescribed Fire Plan as illustrated in Appendix C.

Cost Accounting

All costs of planning, implementation and first order, post-fire, monitoring will be charged to the appropriate cost code. This data may be tracked in several locations including FIREBASE, the National Fire Plan Operations and Reporting System (NFORS) as well as the Federal Financial System (FFS). Detailed cost tracking provides for constantly improving cost estimates for budget purposes.

Public Information/Interaction

In order to support and improve the efficacy of the prescribed fire program, it is necessary to insure that the affected public is well informed as to the purposes of prescribed fire activities. Early contact with local residents, community leaders and neighbors and providing an opportunity for planning process input through public meetings and review goes a long way towards reducing burn day questions and concerns.

NON-FIRE FUEL TREATMENTS

Long-term Program Objectives

The primary program objective is the regeneration and maintenance of existing habitats. Current management involves the use of mechanical biomass removal (timber harvest). To the extent possible, treatments are coordinated with MIDNR to achieve recovery plan objectives. Additional mechanical treatment may be required following harvest to establish new jack pine stands. Even with the initiation of a prescribed fire program on the WMA, some areas will likely require mechanical treatment to achieve habitat objectives.

Annual Preparation

Following timber harvest there is little preparation needed for the mechanical treatments. Of primary concern is season of treatment to reduce likelihood of damage to sensitive species that may be present and timing of ground disturbance to enhance jack pine seed germination potential. There are no surveyed cultural or historic sites on the acquired units. The reconnaissance conducted as part of the planning process will identify potential cultural sites and they will be surveyed in accordance with Regional Office guidance found in Appendix A.

Required Staffing

Equipment and personnel to accomplish mechanical treatment may come from Seney; MIDNR under contract or agreement; or under a private sector contract. Service staffing under the second two options would be limited to one person to monitor project for compliance with agreement or contract. Most force account operations would require 2-3 equipment operators with a monitor.

Sensitive Resource Considerations

Prior to mechanical operations designed to reduce remaining biomass after timber harvest, a reconnaissance of the unit to look for evidence of cultural sites will be conducted.

Beyond the warbler, no other threatened or endangered species (T&E) are known to be present on the WMA. Because there is potential for other listed species to be present, should pre-operation reconnaissance indicate their presence, a formal Section 7 consultation will be initiated. Efforts will be made to determine potential effects on any T&E species present using literature searches, biological consultation and review of existing on-line databases. Lists of Federal and Michigan listed T&E species are found in tables in Appendix D.

While minor amounts of fugitive dust may be produced, air quality is not expected to be affected by mechanical operations.

Restrictions

Equipment

There are no restrictions on the type of equipment used. Soil moisture conditions may require temporary delays to prevent soil damage and reduce erosion probabilities.

Seasonal

Seasonal restrictions may be in place during high rainfall periods. The only other seasonal restriction anticipated involves delay of operations until other species nesting is complete.

Documentation and Reporting

Effects Monitoring

Monitoring of mechanical operations is intended to provide information for quantifying and predicting ecological effects on resources while building a historical record. In addition, ecological changes such as species composition and structural changes in vegetation will be monitored after each operation. Operational monitoring provides a basis for evaluation and comparison of management actions. Possible monitoring actions addressed in the Prescribed Fire Plan as illustrated in Appendix C are usable for mechanical operations as well..

Cost Accounting

All costs of planning, implementation and first order, post-operation, monitoring will be charged to the appropriate cost code. This data may be tracked in several locations including FIREBASE, NFPORS as well as FFS. Detailed cost tracking provides for constantly improving cost estimates for budget purposes.

Public Information/Interaction

Land purchases from willing sellers began in 1980 with the most recent purchase in 1998. Habitat management by the Service has consisted of timber harvest followed by replanting or reseeded efforts on over 2,500 acres. Cowbird trapping and area closures in nesting areas have been common since the mid-1970's. MIDNR and the U.S. Forest Service have been actively managing habitat, including the application of prescribed fire, since the mid-1970's. A successful program of fire application requires opportunities for public input. Coordination of basic information dissemination with both MIDNR and U.S. Forest Service is critical to ensure optimum public support for fire management in all its' land management roles.

EMERGENCY REHABILITATION AND RESTORATION

Burned Area Emergency Stabilization and Rehabilitation Handbook

While wildland fire may occur on the WMA, the flat to rolling topography is not likely to require stabilization or rehabilitation. An exception is where proximity to streams (i.e. Au Sable River and others) may create an erosion problem with resultant sedimentation and aquatic habitat degradation. There is potential for damage to access roads during suppression operations due to the generally sandy soil most roads are built on. These needs would be addressed during or immediately following suppression operations. All other rehabilitation needs would be addressed following the guidance found in the Burned Area Emergency Stabilization and Rehabilitation Handbook.

Pre-Identified Areas with Restoration Needs

There are no pre-identified areas with restoration needs within the WMA. As management actions increase the basic knowledge about habitat conditions, some areas with potential restoration needs may be appended to this plan.

ORGANIZATION AND BUDGET

STAFFING

Current Level

This is no resident staffing on the WMA. Management oversight, including forestry and fire operations is provided from Seney NWR. The WMA is a satellite unit of Seney. Seney staff provides for coordination with MIDNR in all aspects of land management on the WMA including fire suppression..

Level Needed to Achieve Wildland Fire Management Goals

Due to the scattered nature of WMA lands, and lack of reported fire history since 1991, the precise level of additional staffing needed is unknown. Under current conditions one wildland fire specialist is needed and several firefighters could be needed for wildland fire suppression operations. Staff borrowed from other stations (Shiawassee, Ottawa, Big Oaks and more distant stations) or interagency prescribed fire modules for prescribed fire operations should be adequate to accomplish stated objectives. As a fire history is developed and prescribed fire is applied, FIREBASE will begin to show staffing needs.

FUNDING

Current Level

Current funding is adequate for purposes of management oversight. Prescribed fire project funding will be allocated using the FIREBASE process on a project by project basis.

Level Needed to Achieve Wildland Fire Management Goals

To achieve wildland fire management goals, additional funding for on-site capability, contract services, or to pay salary and travel costs of remotely located FWS employees would be necessary. For prescribed fire application, the needed funding can be requested through FIREBASE.

Additional Support

No additional support is needed under current conditions.

COOPERATIVE AGREEMENTS

No formal agreements exist for wildland fire suppression with MIDNR. Under state statues MIDNR has primary responsibility for wildland fire suppression. The cooperative agreement for management of Kirtland's warbler lands does contain language for cooperative prescribed fire application with MIDNR. The National Interagency Agreement (All of Us) does provide a framework for assistance from the U.S. Forest Service and National Park Service, the closest Federal partners for both suppression and prescribed fire assistance.

MONITORING AND EVALUATION

MONITORING

Prescribed Fire

Minimum Levels

At the least, permanent photo points should be installed and documented on each management unit. Before and after photos will document the overall visual changes following prescribed fire operations.

Intermediate Levels (NPS Fire Monitoring Handbook)

The National Park Service Fire Monitoring Handbook, 2001 is scheduled to become the de facto monitoring guidance for all Federal land management agencies. Monitoring at levels 1 and 2 is preferred as a minimum level.

Maximum Levels

If and when it becomes feasible, fire monitoring should become part of a comprehensive refuge monitoring program. All monitoring, i.e. species surveys, water level monitoring, vegetation changes, fire effects and others would be integrated into one program supporting adaptive management.

Non-Fire Treatments

Minimum Levels

At the least, permanent photo points should be installed and documented on each management unit. Before and after photos will document the overall visual changes following mechanical operations.

Volume/Weight Removed Measures

At a higher level, information about the volume or weight of biomass removed is valuable to quantify treatment effects.

EVALUATION

Wildland Fire Suppression Operations

Review of Outside Resource Performance

Evaluation of outside resources (MIDNR, other overhead or resources) will occur in accordance with guidance in the Fire Management Handbook, Section 3.6, Reviews.

Review of Internal Service Actions

Evaluation of Service suppression actions, if any, will be handled the same as the review of outside resource performance. Again the guidance found in the Fire Management Handbook, Section 3.6, Reviews will be followed.

Effectiveness of Prescribed Fire Operations

The effectiveness of prescribed fire operations will be judged using the monitoring results developed in the section on monitoring above.

NATIONAL WILDLAND FIRE PERFORMANCE MEASURES

National Fire Plan Goal 1: With no fire history available for the WMA, there are, currently, no reductions in acres or costs to be achieved. As public involvement in WMA management increases, there

is some potential to improve cooperative suppression operations and the viability of the interagency prevention program in the eight county WMA area.

National Fire Plan Goal 2: Projects or activities that relate to hazardous fuels reduction would be entered into NFPORS and reported through that system. The current overall fuel condition class of the WMA is estimated as 60 % Class 2, 10% Class 1, and 30% Class 3 (condition class definitions are found in Table 3).

National Fire Plan Goal 3: As management of lands within the WMA moves forward and prescribed fire is applied, the habitats affected will move toward their original fire-adapted condition. Prescribed fire application would be beneficial in restoring the role fire in maintaining natural habitat conditions. Current WMA acreages are insignificant in the northern lower peninsula to have any measurable effect on National Fire Plan Goals. Service lands only constitute approximately 6,700 acres or 4.4% of the 153,000 acres identified as necessary in the Kirtland's Warbler Recovery Plan (1985). That 153,000 acres represents a small part of the fire adapted jack pine ecosystem found in the northern Lower Peninsula of Michigan.

National Fire Plan Goal 4: Six of the communities within the eight county WMA are listed as communities at risk (see Table 1) in the Federal Register. An additional eight are in close proximity to Service lands and can be considered at risk. Cooperative efforts with other federal and state agencies may provide additional community assistance.

APPENDICES

APPENDIX A: REGIONAL REQUIREMENTS FOR NHPA

Preparation for prescribed fires (such as constructing fire lines) are subject to Section 106 of the National Historic Preservation Act. The procedures in the Notice dated December 8, 1999, "Historic Preservation Responsibilities," apply to the planning and preparation for conducting prescribed fires.

Efforts to control wildland fires (including prescribed fires that get out of control) are also subject to Section 106 of the National Historic Preservation Act. We will meet our obligations under this act in the following ways:

When the land covered by a wildfire has been inventoried to identify cultural resources, and the cultural resources have been evaluated for significance according to the criteria for the National Register of Historic Places, the Fire Management Officer will direct ground disturbing fire suppression efforts around (will avoid impacting) historic properties. Nevertheless, evidence of a previously undetected cultural resource may be encountered. The project leader shall immediately notify the Regional Historic Preservation Officer (RHPO). The RHPO will take immediate steps to have the cultural resource evaluated and protected, as appropriate, to the extent required by law and policy. This may require arranging for a qualified professional to visit and evaluate the site's importance and recommend a course of action. An evaluation and decision on the disposition of the cultural resource should be made within 48 hours of the discovery unless the project's schedule allows greater flexibility.

When the land covered by a wildfire has not been inventoried for cultural resources and wildfire suppression activities do result in ground disturbing activities, we will take the following action. Soon after fire control, the project leader will contact the RHPO to arrange for an archeologist to investigate the disturbed areas to determine if sites were affected.

Refuge operations and maintenance funds (sub-activity 1261) will pay the cost of these activities unless the action is an emergency archeological and historic property survey in unstable areas prone to further degradation (i.e., erosion) following a wildland fire or in association with an emergency fire rehabilitation treatment. Emergency archeological and historic property surveys in unstable areas prone to further degradation (i.e., erosion) following a wildland fire or in association with an emergency fire rehabilitation treatment, and archeological, historic structure, cultural landscape, and traditional cultural property resource stabilization and rehabilitation can be funded with emergency rehabilitation funding (sub-activity 9262).

APPENDIX B: ENVIRONMENTAL GUIDELINES FOR FOAM/RETARDANT USE

The following guidelines should be followed to minimize the likelihood of retardant chemicals entering a stream or other body of water.

- No use of either foam or retardant chemicals within 300' of any waterbody.
- During training or briefings, inform field personnel of the potential danger of fire chemicals, especially foam concentrates, in streams or lakes.
- Locate mixing and loading points where contamination of natural water, especially with the foam concentrate, is minimal.
- Maintain all equipment and use check valves where appropriate to prevent release of foam concentrate into any body of water.
- Exercise particular caution when using any fire chemical in watersheds where fish hatcheries are located.
- Locate dip operations to avoid run-off of contaminated water back into the stream.
- Dip from a tank rather than directly from a body of water, to avoid releasing any foam into these especially sensitive areas.
- Use a pump system equipped with check valves to prevent flow of any contaminated water back into the main body of water.
- Avoid direct drops of retardant or foam into rivers, streams, lakes, or along shores. Use alternative methods of fire line building in sensitive areas.
- Notify proper authorities promptly if any fire chemical is used in an area where there is likelihood of negative impacts.
- While it is preferable that drops into or along any body of water not occur, it is possible that the fire location and surrounding terrain make it probable that some retardant may enter the water. The person requesting the retardant (such as the incident commander) must balance the impacts on the environment, i.e., potential fish kill, with the resources and values to be protected from the fire.

APPENDIX C: PRESCRIBED FIRE DOCUMENTS

Prescribed Fire Plan Format

COVER PAGE

Refuge or Station:	
Unit:	
Prepared By: Prescribed Fire Planner	Date:
Reviewed By: Refuge Manager	Date:
Reviewed By: Prescribed Burn Boss	Date:
Reviewed By: Regional Fire Management Coordinator	Date:
Reviewed By: (Others)	Date:

The approved Prescribed Fire Plan constitutes the authority to burn, pending approval of Section 7 Consultations, Environmental Assessments or other required documents. No one has the authority to burn without an approved plan or in a manner not in compliance with the approved plan. Prescribed burning conditions established in the plan are firm limits. Actions taken in compliance with the approved Prescribed Fire Plan will be fully supported, but personnel will be held accountable for actions taken which are not in compliance with the approved plan.

Approved By:	Date:
--------------	-------

PRESCRIBED FIRE PLAN

Refuge:			Refuge Burn Number:		
Sub Station:			Fire Number:		
Name of Area:			Unit Number:		
Acres to be Burned:			Perimeter of Burn:		
Legal Description:	Lat.:	Long.:	T	R	S
County:					

Is a Section 7 Consultation being forwarded to Fish and Wildlife Enhancement for review ?
Yes No (circle).

(Page 2 of this PFP should be a refuge base map showing the location of the burn on Fish and Wildlife Service land)

The Prescribed Fire Burn Boss/Specialist must participate in the development of this plan.

I. GENERAL DESCRIPTION OF BURN UNIT

Physical Features and Vegetation Cover Types (Species, height, density, etc.):

Primary Resource Objectives of Unit (Be specific. These are management goals):

- 1.
- 2.
- 3.

Objectives of Fire (Be specific. These are different than management goals):

- 1.
- 2.
- 3.

Acceptable Range of Results (Area burned vs. unburned, scorch height, percent kill of a species, range of litter removed, etc.):

- 1.
- 2.
- 3.

II. PRE-BURN MONITORING

Vegetation Type	Acres	%	FBPS Fuel Model

Habitat Conditions (Identify with transect numbers if more than one in burn unit.):

Type of Transects:

Photo Documentation (Add enough spaces here to put a pre-burn photo showing the habitat condition or problem you are using fire to change/correct. A photo along your transect may reflect your transect data.):

Other:

III. PLANNING AND ACTIONS

Complexity Analysis Results:

Site preparation (What, when, who & how. Should be done with Burn Boss):

Weather information required (who, what, when, where, how, and how much):

Safety considerations and protection of sensitive features (Adjacent lands, visitors, facilities, terrain, etc., and needed actions. Include buffer and safety zones. Be specific, indicate on a burn unit map. Map should be a USGS quadrangle if possible, so ridges, washes, water, trails, etc. can be identified.)

Special Safety Precautions Needing Attention (Aerial ignition, aircraft, ignition from boat, etc.):

Media Contacts (Radio stations, newspaper, etc., list with telephone numbers):

Special Constraints and Considerations (Should be discussed with Burn Boss):

Communication and Coordination on the Burn (Who will have radios, frequencies to be used, who will coordinate various activities.):

IV. IGNITION, BURNING AND CONTROL

Scheduling	Planned or Proposed	Actual
Approx. Date(s)		
Time of Day		

Acceptable Range of Prescription Elements - Complete for Each Applicable Fuel Model

BEHAVE Fuel Model:	Low	High	Actual
Temperature			
Relative Humidity			
Wind Speed (20' forecast)			
Wind Speed (mid-flame)			
Cloud Cover %			
Wind Direction	Between:		

BEHAVE Fuel Model:	Low	High	Actual
ENVIRONMENTAL CONDITONS			
Soil Moisture			
1 hr. Fuel Moisture			
10 hr. Fuel Moisture			
100 hr. Fuel Moisture			
Woody Live Fuel Moisture			
Herb. Live Fuel Moisture			
Litter/Duff Moisture			
FIRE BEHAVIOR			
Type of Fire (H, B, F)			
Rate of Spread			
Fireline Intensity			
Flame Length			
Energy Release Component			
NFDRS Fuel Model Used:			

Cumulative effects of weather and drought on fire behavior:

Ignition Technique (Explain and include on map of burn unit. Use of aerial ignition must be identified in this plan. Last minute changes to use aircraft will not be allowed and will be considered a major change to the plan. This will require a resubmission):

Prescribed Fire Organization (See Section VII, Crew and Equipment Assignments. All personnel and their assignments must be listed. All personnel must be qualified for the positions they will fill.)

Other (If portions of the burn unit must be burnt under conditions slightly different than stated above, i.e., a different wind direction to keep smoke off of a highway or off of the neighbors wash, detail here.)

Prescription monitoring (Discuss monitoring procedure and frequency to determine if conditions for the burn are within prescription):

V. SMOKE MANAGEMENT

- Make any Smoke Management Plan an attachment.
- Permits required (who, when):
- Distance and Direction from Smoke Sensitive Area(s):
- Necessary Transport Wind Direction, Speed and Mixing
- Height (Explain how this information will be obtained and used):
- Visibility Hazard(s) (Roads, airports, etc.):
- Actions to Reduce Visibility Hazard(s):
- Residual Smoke Problems (Measures to reduce problem, i.e., rapid and complete mop-up, mop-up of certain fuels, specific fuel moistures, time of day, etc.):
- Particulate emissions in Tons/Acre and how calculated
 - Estimated before the burn:
 - Actual after the burn:

VI. FUNDING AND PERSONNEL

Activity Code:

Costs

	Equipment & Supplies	Labor	Overtime	Staff Days
Administration (planning, permits, etc.)				
Site Preparation Ignition & Control				
Travel, Per Diem				
Total	0	0	0	0

VII. BURN-DAY ACTIVITIES

Public/Media Contacts on Burn Day (List with telephone numbers):

Crew & Equipment Assignments (List all personnel, equipment needed, and assignments. The following is not an all inclusive list for what you may need.)

- Burn Boss/Manager -
- Ignition Specialist -
- Ignition Crew -
- Holding Specialist -
- Holding Crew -
- Aircraft Manager -
- FWBS -
- Dispatcher-
- Other -

Crew Briefing Points (Communications, hazards, equipment, water sources, escape fire actions, etc. To be done by Burn Boss. Refer to Safety Considerations in Planning Actions and points listed below):

Ignition Technique (Methods, how, where, who, and sequence. Go over what was submitted in Section IV and any changes needed for the present conditions.) Attach ignition sequencing map if necessary:

Personnel Escape Plan:

Special Safety Requirements:

Go-No-Go Checklist:

Holding and Control:

- Critical Control Problems:

- Water Refill Points:
- Other:

Contingency Plan:

- Holding Plan Failure (Are there dedicated crews standing by to initial attack or will people doing other jobs be called upon to do initial attack, who must be called in case of an escape, what radio frequencies will be used, etc.)
 - Initial Escape
 - Escape Exceeding 1 Burning Period:
- Smoke Management Plan Failure
- Fire Behavior Outside Prescription
- Other

Mop Up and Patrol:

- Resources needed
- Duration

Rehabilitation Needs:

DI 1202 Submission Date:

Special Problems:

VIII. CRITIQUE OF BURN

Were burn objectives within acceptable range of results? (Refer to Section I):

What would be done differently to obtain results or get better results?

Was there any deviation from plan? If so, why?

Problems and general comments:

IX. POST-BURN MONITORING

Date: Refuge Burn Number:

Length of Time after Burn:

Vegetative Transects:

Comments on Habitat Conditions, etc.:

Photo Documentation:

Other:

X. FOLLOW-UP EVALUATION

Date: Refuge Burn Number:

Length of Time after Burn:

Vegetative Transects:

Comments on Habitat Conditions, etc.:

Photo Documentation:

Other:

Monitoring Plan

Critique of Burn

Were burn objectives within acceptable range of results?

What would be done differently to obtain results or get better results?

Was there any deviation from approved plan? If yes, why?

Problems and general comments:

POST-BURN MONITORING

Date: _____ Refuge FIREBASE Project Number: _____

Length of time since burn: _____

Vegetative Transect:

Comments on Habitat conditions, etc.:

Photo Documentation:

Other:

FOLLOW-UP EVALUATION

Date: _____ Refuge FIREBASE Project Number: _____

Length of time since burn: _____

Vegetative Transect:

Comments on Habitat conditions, etc.:

Photo Documentation:

Other:

Burn Severity Data Matrix

	Unburned (5)	Scorched (4)	Lightly Burned (3)	Moderately Burned (2)	Heavily Burned (1)	Not Applicable (0)
Substrate (litter/duff) (S)	Not burned	Litter partially blackened: duff nearly unchanged; wood/leaf structures unchanged	Litter charred to partially consumed: upper duff layer burned; wood/leaf structures charred but recognizable.	Litter mostly to entirely consumed leaving light colored ash; duff deeply burned; wood/leaf structures unrecognizable	Litter and duff consumed leaving fine white ash; mineral soil visibly altered, often reddish.	Inorganic This may be used in grasslands where there is only sand as a substrate and no organic material or where litter/duff layer is lost due to disturbance (as in a gopher mound, badger/fox den, ant hill, etc.)
Vegetation (understory /brush/herbs) (V)	Not burned	Foliage scorched and attached to supporting twigs. Bases of stems of brush lightly browned with blisters visible, but stems still standing. In grasslands, most cured grasses/forbs still left standing after the burn. Green plants are essentially unaffected.	Foliage and smaller twigs partially consumed. Stems of brush burned at bases with heavy blistering. Many stems burned through and fallen over, but not consumed. Most cured forbs, grasses and sedges are burned but may not all be consumed. In grasslands, cured grasses burned off and fallen over. Most are consumed, but some may lay on the ash unburned. There may still be a small percentage of stems left standing. Green plants are discolored.	Foliage, twigs and small stems consumed. Stems of brush burned off and consumed. There will still be charred "stubs" sticking out of the ground where the brush was growing from. All cured forbs, grasses, sedges are consumed. In grasslands, cured grasses are all consumed. Any plants are brown and shriveled.	All plant parts consumed leaving some or no major stems/trunks. Stems of brush burned off and consumed. "Stubs" where shrubs once grew are burned off the ground line. Cured and green grasses, fobs & sedges are completely consumed.	None present

GO/NO-GO Checklist

**NWCG
 PRESCRIBED
 FIRE
 GO/NO-GO
 CHECKLIST**

Yes	No	Questions
		Are ALL fire prescription Elements Met?
		Are ALL smoke management specifications met
		Has ALL required current and projected fire weather forecast been obtained and are they favorable?
		Are ALL planned operations personnel on-site, available and operational?
		Has the availability of ALL contingency resources been checked, and are they available?
		Have ALL personnel been briefed on the project objectives, their assignments, safety hazards, escape routes, and safety zones?
		Have ALL pre-burn considerations identified in the prescribed fire plan been completed or addressed?
		Have ALL the required notifications been made?
		Are ALL permits and clearances obtained?
		In your opinion, can the burn be carried out according to the prescribed fire plan and will it meet the planned objective?

If all questions were answered "YES" proceed with a test fire. Document the current conditions, location, and results.

 Prescribed Fire Burn Boss

 Date

 Refuge Manager

 Date

APPENDIX D: FMU PHYSICAL AND BIOLOGICAL ADDENDUM

The Kirtland's Warbler Wildlife Management Area consists of 119 parcels covering 6,684 acres in eight counties of northern Lower Michigan. Properties within the WMA have been acquired from willing sellers. The original intent of acquisition was to consolidate ownerships adjacent to MIDNR lands managed for the warbler. Approximately 1,000 acres are still in need of acquisition to achieve FWS ownership goals. Acquisition began in 1980 with the most recent acquisition occurring in 1998.

Physical Characteristics

The physical characteristics of the WMA are consistent with most of the northern half of the Lower Peninsula of Michigan. Topographically, the land is flat to gently rolling. Landforms are glacially derived.

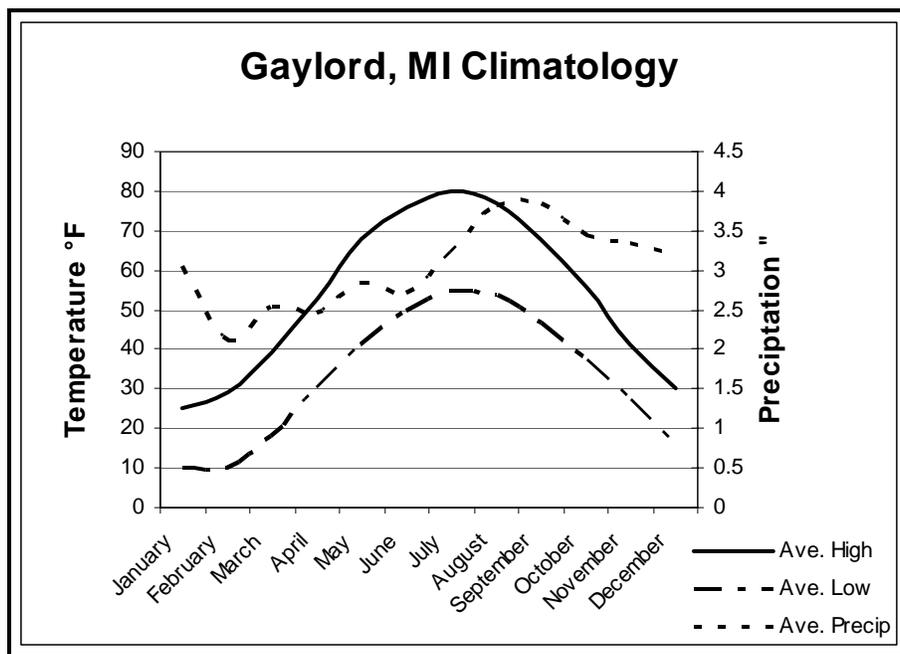
Soils are generally classified as in the Kalkaska or Grayling series. These series consist of very deep, somewhat excessively drained soils formed in sandy deposits on outwash plains, valley trains, moraines, and stream terraces. They have rapid permeability. Slopes range from 0 to 70 percent. This soil type appears to support the majority of the warbler breeding population.

Several rivers cut through the eight county area providing outstanding cold water fisheries and extensive recreational opportunities. The best known is the Au Sable River, others include the Muskegon and Manistee and their tributaries.

Climate

Climatologically, the area is subject to cold winters with some lake effect snows common in the northern portion. Summers are warm and humid. Three climatology charts are presented below, ranging from Gaylord (northernmost), to Grayling to Houghton Lake (southernmost). The climatology from Gaylord is found in the figure below.

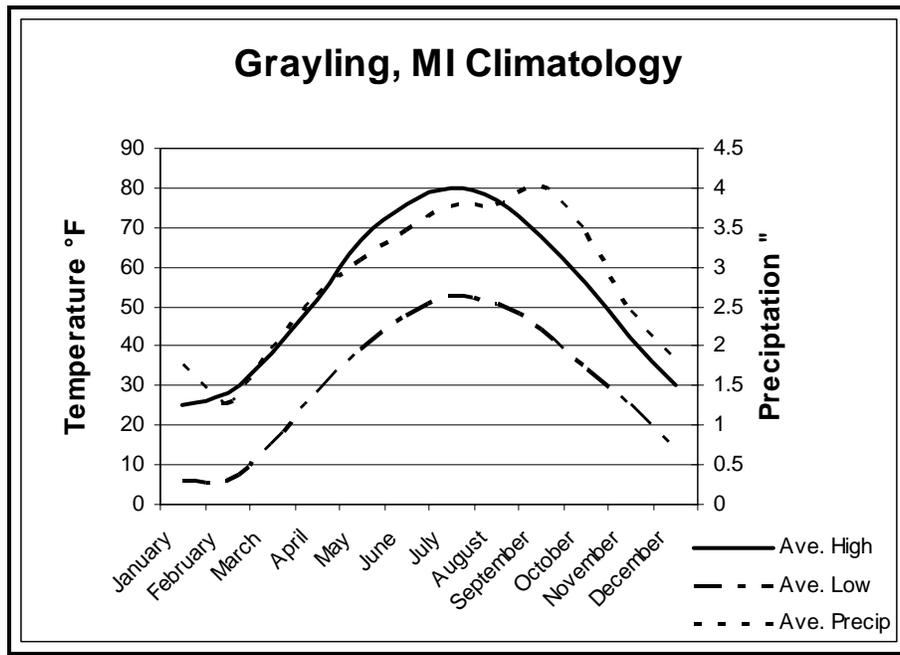
Figure 2 – Gaylord, MI Climatology



The Gaylord area is most subject to climatic variation, influenced by the proximity of Lakes Michigan and Huron. Average precipitation ranges from 36.59" at Grayling to 33.42" at Grayling and 29.45" at Houghton Lake. Seasonal precipitation is similar at Grayling and Houghton Lake basically following the temperature curve. Gaylord maintains a higher precipitation occurrence in the fall (September-December).

Mean temperatures vary little with Houghton Lake reporting slightly warmer average temperatures than either of the other stations. July is the warmest month with average highs of 80 F at Gaylord and Grayling and 81 F at Houghton Lake. The average growing season in the area varies from 110 to 120 days.

Figure 3 – Grayling, MI Climatology



Fire Season

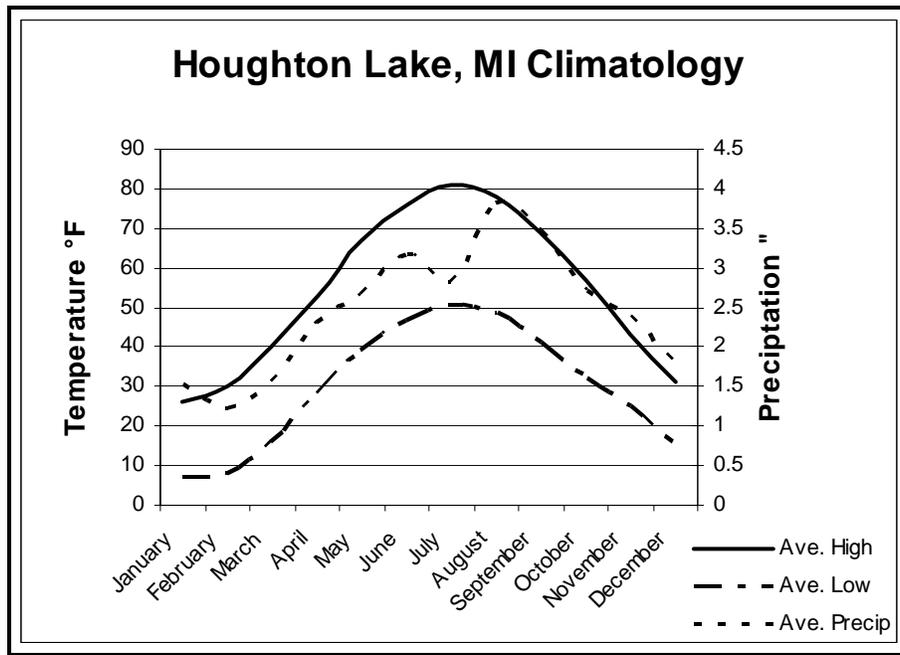
The fire season in the area is typically bimodal. From the time of snow disappearance to green-up, generally from April to late May or early June, is the spring fire season. This is generally the most active season as fuels are dry, and the preceding months are generally the driest of the year. Winds during this period also tend to be higher although we have no empirical data available to document this assertion.

Following the first frost and until snow cover there is frequently a fall fire season. This season is not generally as active as the spring season and in some years shows little or no activity.

Vegetation

The primary vegetative cover on Service lands is jack pine forest with interspersed openings of grass or shrubs and occasional areas of hardwood forest. There is insufficient information to detail acres of cover types to develop hazard fuel assessments. Shrub and tree species to be found include: white ash (*Fraxinus americana*), green ash (*Fraxinus pennsylvanica* var. *subintegerrima*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), bigtooth aspen (*Populus grandidentata*), trembling aspen (*Populus tremuloides*), red oak (*Quercus rubra*), pin oak (*Quercus palustris*), blueberry (*Vaccinium spp.*), various species of ferns, and several species of grasses.

Figure 4 – Houghton Lake, MI Climatology



Wildlife

While no wildlife species lists have been developed for the WMA, numerous bird species are known to be present. Birds that can be reasonably expected to be found within the eight counties of the WMA include: 14 species of warblers, turkey (*Meleagris gallopavo*), wood ducks (*Aix sponsa*), mallards (*Anas platyrhynchos*), several species of woodpeckers and others.

Mammalian populations are expected to include: black bear, (*Ursus americanus*), coyote, (*Canis latrans*), eastern chipmunk, (*Tamias striatus*), fox squirrel, (*Sciurus niger*), gray squirrel, (*Sciurus carolinensis*), long-tailed weasel, (*Mustela frenata*), mink, (*Mustela vison*), muskrat, (*Ondatra zibethicus*), porcupine, (*Erethizon dorsatum*), raccoon, (*Procyon lotor*), red fox, (*Vulpes vulpes*), red squirrel, (*Tamiasciurus hudsonicus*), river otter, (*Lutra canadensis*), snowshoe hare, (*Lepus americanus*), striped skunk, (*Mephitis mephitis*), Virginia opossum, (*Didelphis virginiana*), white tailed deer, (*Odocoileus virginianus*), woodchuck, (*Marmota monax*). Many small mammals such as field mice and voles are also likely residents.

Threatened and Endangered Species

Other than Kirtland’s warbler, no other federally listed T&E species are documented on units of the WMA. Table 4 lists federally listed species expected to be found in Michigan.

Table 4 – Federally Listed Threatened or Endangered Species

Common Name	Scientific Name	Status
BIRDS		
Bald Eagle	<i>Haliaeetus leucocephalus</i>	T
Kirtland's Warbler	<i>Dendroica kirtlandii</i>	E
Piping Plover	<i>Charadrius melodus</i>	E
MAMMALS		
Canada Lynx	<i>Lynx canadensis</i>	T
Eastern Puma	<i>Puma concolor cougar</i>	E
Indiana Bat	<i>Myotis sodalists</i>	E
Gray Wolf	<i>Canis lupus</i>	E
INSECTS: BUTTERFLIES & MOTHS		
Karner Blue Butterfly	<i>Lycaeides melissa samuelis</i>	E
Mitchell's Satyr Butterfly	<i>Neonympha mitchellii mitchellii</i>	E
PLANTS		
American hart's-tongue fern	<i>Asplenium scolopendrium var. americanum</i>	T
Dwarf lake iris	<i>Iris lacustris</i>	T
Eastern prairie fringed orchid	<i>Platanthera leucophaea</i>	T
Fassett's locoweed	<i>Oxytropis campestris</i>	T
Houghton's goldenrod	<i>Solidago houghtonii</i>	T
Lakeside daisy	<i>Hymenoxys herbacea</i>	T
Michigan monkey-flower	<i>Mimulus glabratus var. michiganensis</i>	E
Pitcher's thistle	<i>Cirsium pitcheri</i>	T
Small whorled pogonia	<i>Isotria medeoloides</i>	T

Michigan State Threatened or Endangered Species

Table 5 is derived from the Michigan Natural Features Inventory and includes those state T&E species reported in, or reasonably expected to be found in the eight county WMA.

**Table 5 – State Listed Threatened or Endangered Species – Kirtland's Warbler WMA
Clare County**

Common Name	Scientific Name	Status
Birds		
Common loon	<i>Gavia immer</i>	T
Osprey	<i>Pandion haliaetus</i>	T
Plants		
Ginseng	<i>Panax quinquefolius</i>	T

Crawford County

Common Name	Scientific Name	Status
Birds		
Common loon	<i>Gavia immer</i>	T
Osprey	<i>Pandion haliaetus</i>	T
Red-shouldered hawk	<i>Buteo lineatus</i>	T
Insects		
Dusted skipper	<i>Atrytonopsis hianna</i>	T
Plants		
Calypso or fairy-slipper	<i>Calypso bulbosa</i>	T
False-violet	<i>Dalibarda repens</i>	T
Fleshy stitchwort	<i>Stellaria crassifolia</i>	T
Ginseng	<i>Panax quinquefolius</i>	T
New England violet	<i>Viola novae-angliae</i>	T
Prairie or pale agoseris	<i>Agoseris glauca</i>	T
Rough fescue	<i>Festuca scabrella</i>	T
Vasey's rush	<i>Juncus vaseyi</i>	T

Kalkaska County

Common Name	Scientific Name	Status
Birds		
Common loon	<i>Gavia immer</i>	T
Osprey	<i>Pandion haliaetus</i>	T
Plants		
Canada rice-grass	<i>Oryzopsis canadensis</i>	T
Hill's pondweed	<i>Potamogeton hillii</i>	T
Whorled pogonia	<i>Isotria verticillata</i>	T
Reptiles		
Spotted turtle	<i>Clemmys guttata</i>	T

Montmorency County

Common Name	Scientific Name	Status
Birds		
Common loon	<i>Gavia immer</i>	T
Red-shouldered hawk	<i>Buteo lineatus</i>	T
Plants		
Calypso or fairy-slipper	<i>Calypso bulbosa</i>	T
Limestone oak fern	<i>Gymnocarpium robertianum</i>	T
Prairie or pale agoseris	<i>Agoseris glauca</i>	T
Rough fescue	<i>Festuca scabrella</i>	T
Whorled pogonia	<i>Isotria verticillata</i>	T
Yellow pitcher-plant	<i>Sarracenia purpurea ssp heterophylla</i>	T

Ogemaw County

Common Name	Scientific Name	Status
Birds		
Common loon	<i>Gavia immer</i>	T
Osprey	<i>Pandion haliaetus</i>	T
Red-shouldered hawk	<i>Buteo lineatus</i>	T
Plants		
False-violet	<i>Dalibarda repens</i>	T
Fragile prickly-pear	<i>Opuntia fragilis</i>	E
Rough fescue	<i>Festuca scabrella</i>	T

Oscoda County

Common Name	Scientific Name	Status
Birds		
Common loon	<i>Gavia immer</i>	T
Prairie warbler	<i>Dendroica discolor</i>	E
Red-shouldered hawk	<i>Buteo lineatus</i>	T
Trumpeter swan	<i>Cygnus buccinator</i>	T
Insects		
Dusted skipper	<i>Atrytonopsis hianna</i>	T
Plants		
Prairie or pale agoseris	<i>Agoseris glauca</i>	T
Rough fescue	<i>Festuca scabrella</i>	T

Presque Isle County

Common Name	Scientific Name	Status
Birds		
Common loon	<i>Gavia immer</i>	T
Common tern	<i>Sterna hirundo</i>	T
Migrant loggerhead shrike	<i>Lanius ludovicianus migrans</i>	E
Osprey	<i>Pandion haliaetus</i>	T
Prairie warbler	<i>Dendroica discolor</i>	E
Red-shouldered hawk	<i>Buteo lineatus</i>	T
Insects		
Hine's emerald	<i>Somatochlora hineana</i>	E
Lake Huron locust	<i>Trimerotropis huroniana</i>	T
Plants		
Bayonet rush	<i>Juncus militaris</i>	T
Bulrush sedge	<i>Carex scirpoidea</i>	T
Calypso or fairy-slipper	<i>Calypso bulbosa</i>	T
Hill's pondweed	<i>Potamogeton hillii</i>	T
Lake cress	<i>Armoracia lacustris</i>	T
Lake Huron tansy	<i>Tanacetum huronense</i>	T
Pine-drops	<i>Pterospora andromedea</i>	T

Roscommon County

Common Name	Scientific Name	Status
Birds		
Common loon	<i>Gavia immer</i>	T
King rail	<i>Rallus elegans</i>	E
Least bittern	<i>Ixobrychus exilis</i>	T
Osprey	<i>Pandion haliaetus</i>	T
Yellow rail	<i>Coturnicops noveboracensis</i>	T
Plants		
Calypso or fairy-slipper	<i>Calypso bulbosa</i>	T
Rough fescue	<i>Festuca scabrella</i>	T
Reptiles		
Spotted turtle	<i>Clemmys guttata</i>	T

FMU Risk Assessment and Management Potential

Due to the scattered nature of the lands of the WMA, a wildland fire risk assessment of each of the 53 management units (1 to many individual parcels) was conducted using information from county platbooks and U.S. Geological Survey topographic maps. The assessment uses an Excel spreadsheet to record information and calculates a relative risk. Factors considered include the fire regime and condition class as defined in the 10-year Comprehensive Strategy (USDA, USDI, 2001), distance from fire protection resources, road class for access, percentage of boundary adjacent to MIDNR lands, presence of petroleum extraction operations, power line presence and pipeline presence. A summary of the risk rating of each management unit is found in Table 6

Table 6 – Management Unit Risk Assessment

Management Unit	Management Unit Acres	Acres - Extreme Risk	Acres - High Risk	Acres - Moderate Risk
Clare-1	40.00			40.00
Clare-2	40.00			40.00
Clare-3	80.00	80.00		
Clare-4	40.00	40.00		
Clare-5	275.01			275.01
Clare-6	100.00			100.00
Clare-7	80.00			80.00
Clare-8	160.00	160.00		
Clare-9	40.00			40.00
Clare-10	485.00			485.00
Clare-11	160.00	160.00		
Crawford-1	159.00			159.00
Crawford-2	40.00			40.00
Crawford-3	38.78			38.78
Crawford-4	80.00		80.00	
Crawford-5	49.85			49.85
Crawford-6	100.02			100.02
Crawford-7	52.52			52.52
Crawford-8	150.00			150.00
Crawford-9	40.00			40.00
Crawford-10	40.00			40.00
Crawford-11	50.00			50.00

Management Unit	Management Unit Acres	Acres - Extreme Risk	Acres - High Risk	Acres - Moderate Risk
Kalkaska-1	80.00			80.00
Montmorency-1	40.00			40.00
Ogemaw-1	160.00			160.00
Ogemaw-2	320.00			320.00
Ogemaw-3	115.35			115.35
Ogemaw-4	174.69			174.69
Ogemaw-5	108.68			108.68
Ogemaw-6	50.00			50.00
Ogemaw-7	80.00			80.00
Ogemaw-8	181.91			181.91
Ogemaw-9	210.03			210.03
Ogemaw-10	80.08			80.08
Ogemaw-11	80.00			80.00
Ogemaw-12	140.00			140.00
Ogemaw-13	20.00			20.00
Ogemaw-14	38.40			38.40
Ogemaw-15	40.00			40.00
Ogemaw-16	80.00			80.00
Ogemaw-17	149.90			149.90
Ogemaw-18	475.00			475.00
Ogemaw-19	80.00			80.00
Ogemaw-20	19.25			19.25
Oscoda-1	70.00			70.00
Oscoda-2	30.10		30.10	
Oscoda-3	40.00			40.00
Oscoda-4	320.89			320.89
Oscoda-5	80.00			80.00
Oscoda-6	800.00			800.00
Oscoda-7	80.00			80.00
Presque Isle-1	200.00			200.00
Roscommon-1	40.00			40.00
Totals	6,684.46	440.00	110.10	6,134.36

A similar first order assessment was made of the management potential of each management unit. This assessment used the surrounding ownership, presence or absence of petroleum extraction operations, power lines and pipelines as well as the acreage in the unit. A summary of the management potential rating of each unit is found in Table 7.

Table 7 – Management Unit Management Potential Assessment

Management Unit	Management Unit Acres	Acres - High Potential	Acres - Moderate Potential	Acres - Poor Potential
Clare-1	40.00	40.00		
Clare-2	40.00			40.00
Clare-3	80.00			80.00
Clare-4	40.00	40.00		
Clare-5	275.01	275.01		
Clare-6	100.00		100.00	
Clare-7	80.00			80.00
Clare-8	160.00		160.00	
Clare-9	40.00	40.00		
Clare-10	485.00		485.00	
Clare-11	160.00	160.00		
Crawford-1	159.00		159.00	
Crawford-2	40.00		40.00	
Crawford-3	38.78		38.78	
Crawford-4	80.00	80.00		
Crawford-5	49.85	49.85		
Crawford-6	100.02	100.02		
Crawford-7	52.52	52.52		
Crawford-8	150.00	150.00		
Crawford-9	40.00	40.00		
Crawford-10	40.00		40.00	
Crawford-11	50.00		50.00	
Kalkaska-1	80.00		80.00	
Montmorency-1	40.00	40.00		
Ogemaw-1	160.00		160.00	
Ogemaw-2	320.00		320.00	
Ogemaw-3	115.35		115.35	
Ogemaw-4	174.69	174.69		
Ogemaw-5	108.68	108.68		
Ogemaw-6	50.00		50.00	
Ogemaw-7	80.00	80.00		
Ogemaw-8	181.91		181.91	
Ogemaw-9	210.03		210.03	
Ogemaw-10	80.08		80.08	
Ogemaw-11	80.00	80.00		
Ogemaw-12	140.00		140.00	
Ogemaw-13	20.00		20.00	
Ogemaw-14	38.40	38.40		
Ogemaw-15	40.00	40.00		
Ogemaw-16	80.00	80.00		
Ogemaw-17	149.90	149.90		
Ogemaw-18	475.00	475.00		
Ogemaw-19	80.00	80.00		

Management Unit	Management Unit Acres	Acres - High Potential	Acres - Moderate Potential	Acres - Poor Potential
Ogemaw-20	19.25	19.25		
Oscoda-1	70.00		70.00	
Oscoda-2	30.10		30.10	
Oscoda-3	40.00	40.00		
Oscoda-4	320.89		320.89	
Oscoda-5	80.00	80.00		
Oscoda-6	800.00	800.00		
Oscoda-7	80.00	80.00		
Presque Isle-1	200.00		200.00	
Roscommon-1	40.00	40.00		
Totals	6,684.46	3,433.32	3,051.14	200.00

A detailed assessment of each management unit will be conducted as habitat management operations are considered.

APPENDIX E: COOPERATOR AND LANDOWNER CONTACTS

Cooperator Contacts

Table to be developed

Clare County		
Cooperator	Address	Phone
MIDNR		
Crawford County		
MIDNR		
Kalkaska County		
MIDNR		
Montmorency County		
MIDNR		
Ogemaw County		
MIDNR		
Oscoda County		
MIDNR		
Presque Isle County		
MIDNR		
Roscommon County		
MIDNR		

Adjacent Landowner Contacts

Lists of adjacent landowners will be developed for each individual prescribed fire plan. In most instances the adjacent land owner will be MIDNR. Other parcel owners may change frequently as many parcels are held for recreational purposes.

Cooperative Agreement

The text of the cooperative agreement between U.S. Fish and Wildlife Service and Michigan Department of Natural Resources is reproduced on the following pages.

FWS# 14-16-0003-91-961

COOPERATIVE AGREEMENT
BETWEEN THE
U.S. FISH AND WILDLIFE SERVICE
U.S. DEPARTMENT OF THE INTERIOR
AND THE
DEPARTMENT OF NATURAL RESOURCES
STATE OF MICHIGAN

I. BACKGROUND. AUTHORITY AND PURPOSE:

This Cooperative Agreement is entered into by and between the Department of Natural Resources, State of Michigan, hereinafter called the "DNR" under Sections 3.321 and 299.201 of the Michigan Compiled Laws, and the Fish and Wildlife Service, United States Department of the Interior hereinafter called the "Service, acting by and through the Regional Director, Region 3, under the authority of the Endangered Species Act (87 stat. 889. 16 U.S.C. 1531-1543 As amended; the Migratory Bird Conservation Act of February 18, 1929 (45 Stat. 1222 et seq), as amended (16 U.S.C. 668dd- 668jj); and in accordance with the policy of cooperation with the various states expressed in Section 6 of the Endangered Species Act.

The DNR has been created under the laws of the State of Michigan to provide an adequate and flexible system for the protection, development, and use of natural communities that include lakes, streams, fish, wildlife, plant life, endangered and threatened species, and other outdoor resources, and the DNR has a responsibility for management of the Kirtland's warbler and other wildlife within the boundaries of the State of Michigan.

The Service has as its responsibility the management of migratory birds and the recovery of endangered and threatened species and seeks to maintain and increase populations of the endangered Kirtland's warbler so they may continue to exist on earth.

It is the mutual desire of the DNR and Service to work in harmony for the purpose of cooperatively acquiring and managing Service-owned Kirtland's warbler habitat in Michigan in order to bring additional land under appropriate habitat management to maximize long-term nesting and recruitment on Service-owned land. This Agreement supersedes #14-16-0003-82-930, dated March 31, 1982, between the Service and DNR and the Cooperative Agreement for "Management of Certain Lands to Benefit the Kirtland's Warbler), dated September 14, 1978 between the Service and DNR.

14-16-0003-91-961

Page 2

II. SCOPE OF WORK

The goal of this Agreement is to:

- 1) To acquire up to 7,700 acres of. land which are not currently within Kirtland's warbler management units, but have the potential for creation of jack pine habitat suitable for Kirtland's warbler, and are near existing management units, approximately 6,500 acres of this goal has now been met;
- 2) To provide for prompt initiation of habitat management for Kirtland's warbler on these lands as they are acquired;
- 3) To use the jack pine management expertise within the DNR to facilitate the planning and initiation of habitat management on these lands.

The DNR and the Service Mutually Agree:

- 1) To cooperative in the implementation of a program to acquire and manage lands for Kirtland's warbler habitat in the State of Michigan for the expressed purpose of maintaining and increasing the population of Kirtland's warbler.
- 2) To cooperate in identifying Kirtland's warbler habitat in Michigan, for Service fee or easement acquisition, lands of high nesting habitat capabilities, parcels so selected for habitat acquisition shall be prioritized on an acquisition list, a total of 7,700 acres may be acquired by the Service as funds and willing sellers become available.
- 3) To cooperate in preparing guidelines for the management of lands acquired under this program for the recovery of the Kirtland's warbler.
- 4) That appropriate representatives of both agencies will meet annually for coordination and planning, including but not limited to review, evaluation, and planning for completed, ongoing, and future management on Service lands.
- 5) To exchange interests in land of high nesting habitat capability where necessary for effective management.
- 6) The Fish and wildlife Service Regional Director and the Director of the Michigan DNR shall reconcile any program disagreements.

14-16-0003-91-961

Page 3

SPECIFICALLY THE FISH AND WILDLIFE SERVICE AGREES TO:

- 1) To conduct its activities as authorized under the Endangered species Act and the National Wildlife Refuge System Administration Act.
- 2) To acquire, as funds become available, priority-listed lands in accordance with Service procedures, taking steps to vest title in the United States in land associated interests so acquired for this program, and make payment for property so purchase.
- 3) Provide full documentation of lands acquired to the Chief of the DNR Real Estate Division.
- 4) Implement necessary procedures to ensure that these lands are open to recreational hunting and trapping compatible with Kirtland's warbler management, and in accordance with the provisions of 50 CFR and other applicable Federal laws, with hunting and trapping governed by applicable state and Federal regulations.
- 5) Salvage, remove, or retain at its option, any capital improvements on all land acquired under this program.
- 6) Coordinate specific management activities, such as cowbird population management and experimental habitat management actions in such a way as to be compatible with adjacent DNR management for Kirtland's warbler.
- 7) Conduct cowbird control activities on DNR Kirtland's Warbler Management units.
- 8) Provide the DNR \$15,000 annually as endangered species funding allows, to manage Kirtland's warblers on State-owned lands and where agreed to, funds to manage Kirtland's warblers on Service-owned lands.
- 9) Conduct a prescribed burning program on Service-owned lands, involving planning, site preparation and burning, by mutual agreement and in cooperation with the DNR.
- 10) Provide funds to the DNR to cover expenses incurred in the removal of forest cover, site preparation, burning and replanting on Service-owned lands, up to the value of the receipts generated in timber sales.

14-16-0003-91-961

Page 4

SPECIFICALLY THE DEPARTMENT OF NATURAL RESOURCES AGREES TO:

- 1) Conduct management of Service-owned lands for Kirtland's warbler.
- 2) Any revenues derived from the administration of these lands under Service ownership shall be subject to the provisions of section 401 of the Act of June 15, 1935 (49 Stat. 382; 16 U.S.C. 7155).
- 3) Account for in detail and transmit to the Service within 90 days of each fiscal year, beginning October 1, all revenues derived from Service lands.
- 4) Cooperative and assist in implementing a prescribed burning in program on Service-owned lands using mutually agreed upon burn plans and site preparation plans.
- 5) Use the funds provided by the Service, including but not limited to Endangered species Act Section 6 funds, for the removal, site preparation and planting of trees, to defray the costs of managing Kirtland's warbler habitat on Service lands.
- 6) Assist the Service by completing resource inventories and cover typing of the Service-owned lands that will be compatible with and compliment DNR resource data on State Kirtland's Warbler Management units.
- 7) Incorporate all or mutually selected Service tracts into DNR Kirtland's Warbler Management Units.
- 8) Make available to the Service within one year of this agreement or upon completion of DNR Kirtland's Warbler Management Plan revision, maps and treatment schedules for compartments and cutting blocks containing Service Tracts.

III. PERIOD OF PERFORMANCE

This Cooperative Agreements will become effective as soon as signed by the parties hereto.

IV. MODIFICATIONS AND TERMINATION

Modifications may be proposed at any time during the period of performance by either party and shall become effective upon approval by both parties upon thirty (30) days written notice.

14-16-0003-91-961

Page 5

V. FINANCIAL ADMINISTRATION

The service will provide the DNR \$15,000 annually as endangered species funding allows, to manage Kirtland's warblers on state-owned lands and where agreed to, funds to manage Kirtland's warblers on service-owned lands.

The DNR will use the funds provided by the service, including but not limited to Endangered Species Act section 6 funds, for the removal, site preparation and planting of trees; to defray the costs of managing Kirtland's warbler habitat on service lands.

Nothing in this Agreement shall be construed as obligating the Service or the state of Michigan in the expenditure of funds or for the future payment of money in excess of appropriations authorized by law.

VI. PROJECT OFFICERS

U.S. Fish and Wildlife Service
Michael Tansy, Refuge Manager
Seney National Wildlife Refuge
Seney, Michigan 49883
Phone: 906/586-9851

Mr. George E. Burgoyne, Jr.
Assistant Chief of Wildlife Division
Michigan Department of Natural Resources
Steven T. Mason Building,
P.O. Box 30028
Lansing, Michigan 48909
Phone: 517/373-1263

VII. SPECIAL AND GENERAL PROVISIONS

Each party agrees that it will be responsible for its own acts and the results thereof and shall not be responsible for the acts of the other party and the results thereof. Each party therefore agrees that it will assume all risk and liability to itself, its agents or employees, for any injury to persons or property resulting in any manner from conduct of its own operations, and the operations of its agents or employees under the agreement, and for any loss, cost, damage, or expense resulting at any time from any and all causes due to any act or acts, negligence, or the failure to exercise proper precautions, of or by itself or its own agents or its own employees, while occupying or visiting the premises under and pursuant to this Agreement.

14-16-0003-91-961

Page 6

The U.S. Fish and wildlife Service General Provisions for Grants and Cooperative Agreements dated August 1, 1985, shall be applicable to this Agreement.

IN WITNESS WHEREOF the parties hereto have caused this agreement to be executed as of the date therein written.

U.S. Fish and Wildlife Service

Michigan Department of
Natural Resources

/s/ James C. Gritman

/s/

Title: Regional Director

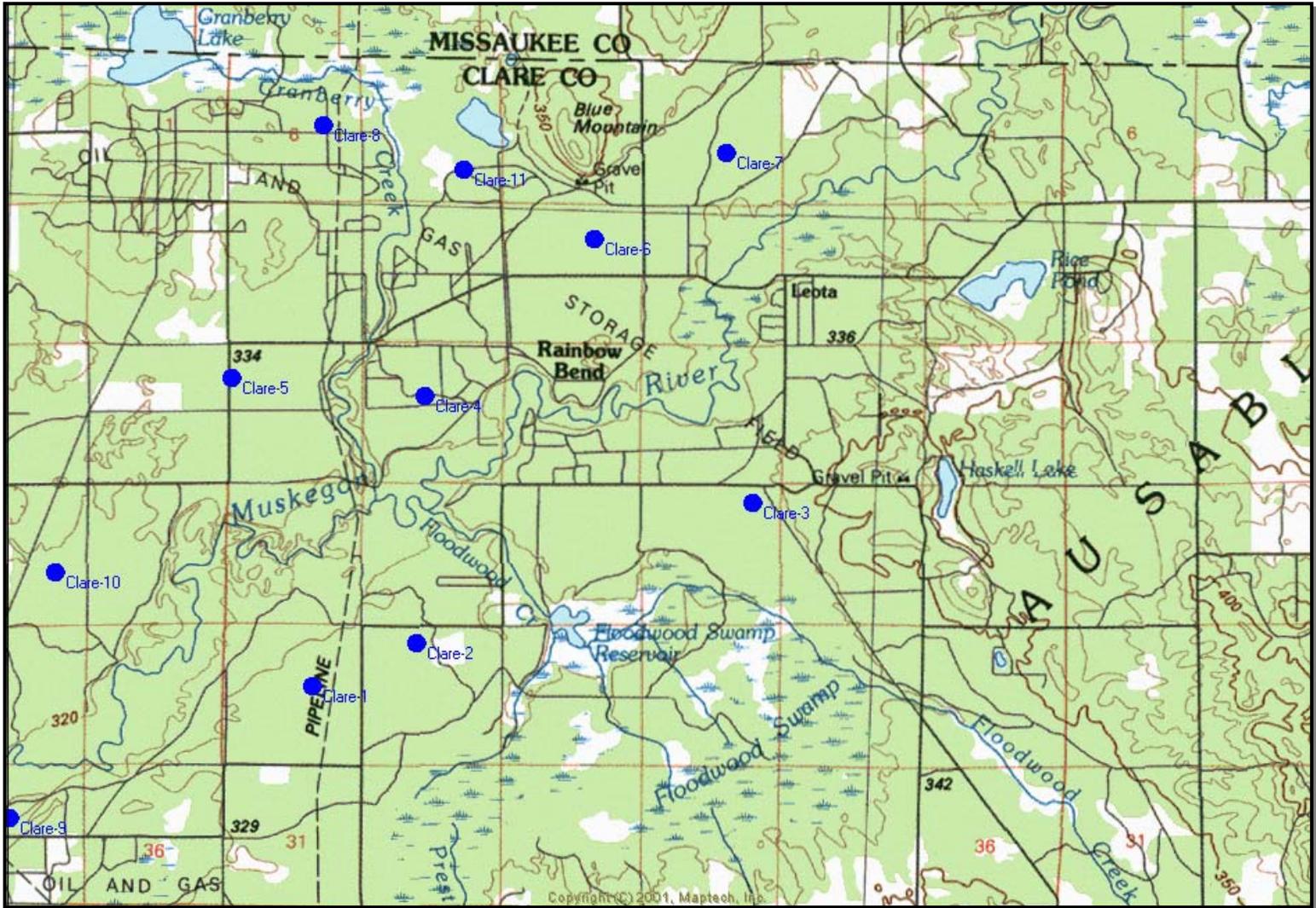
Title: Deputy Director

Date: May 2, 1991

Date: May 13, 1991

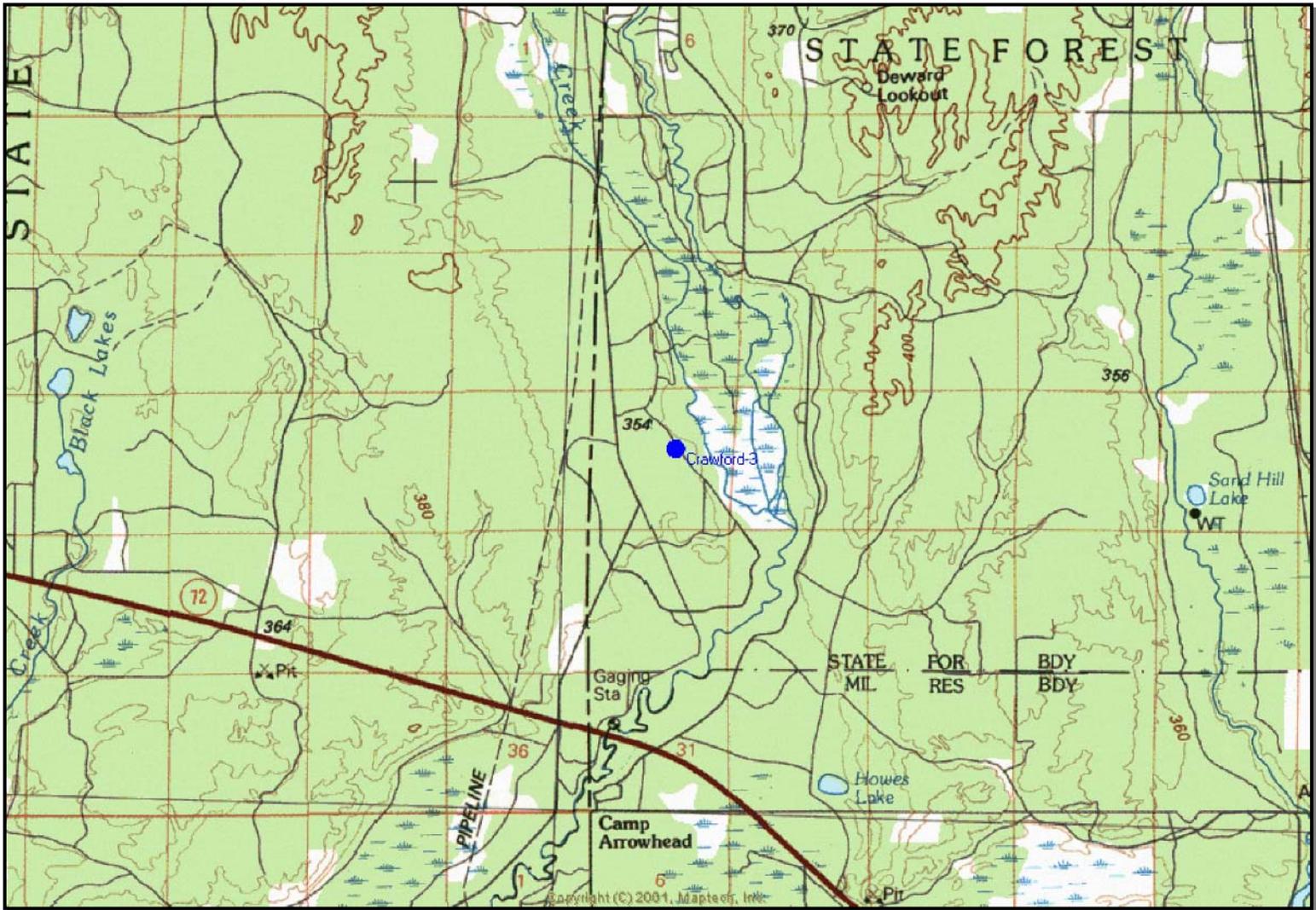
APPENDIX F: MANAGEMENT UNIT LOCATION MAPS

Clare County



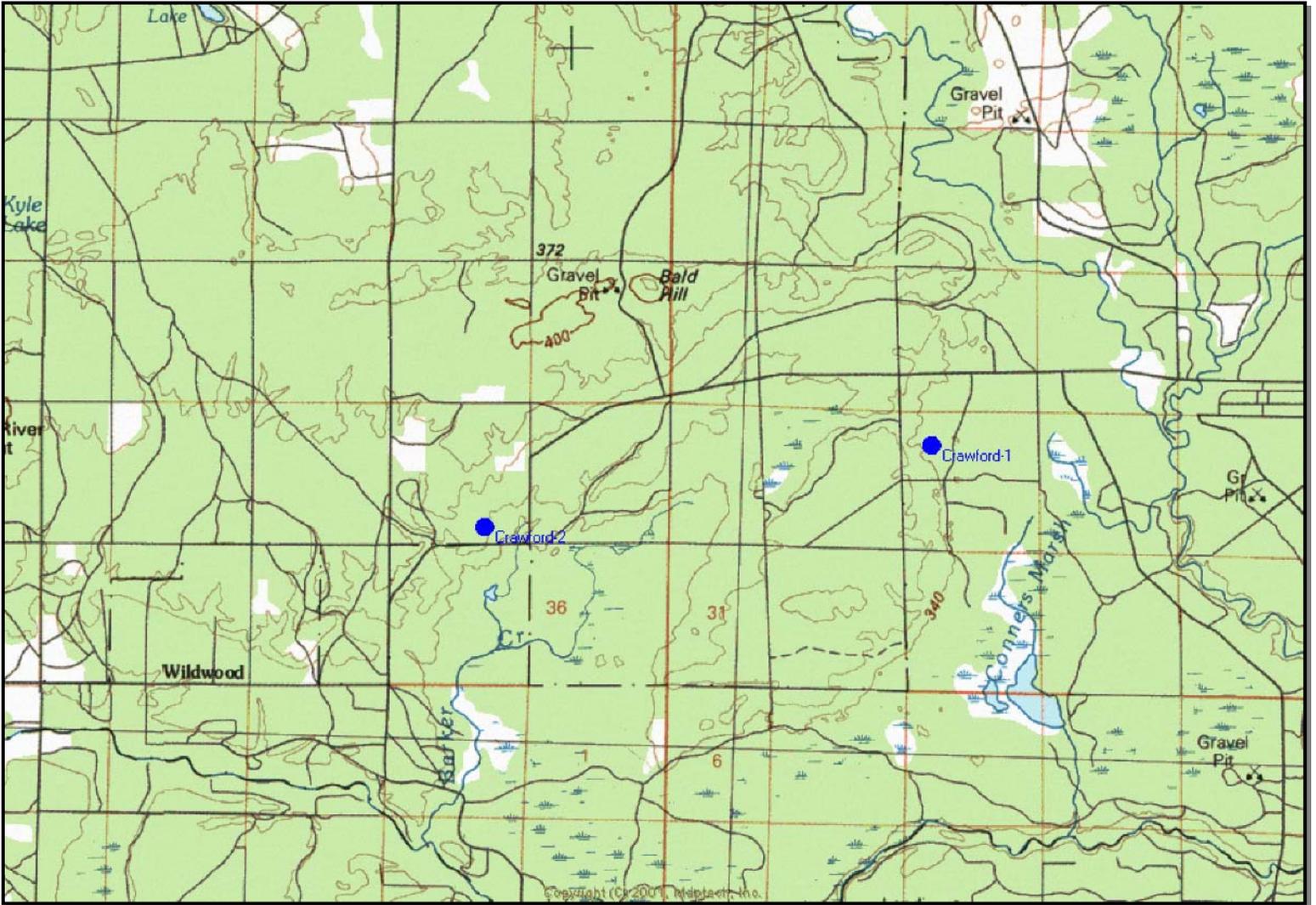
Approximate Scale 1"=6,000'

Crawford County



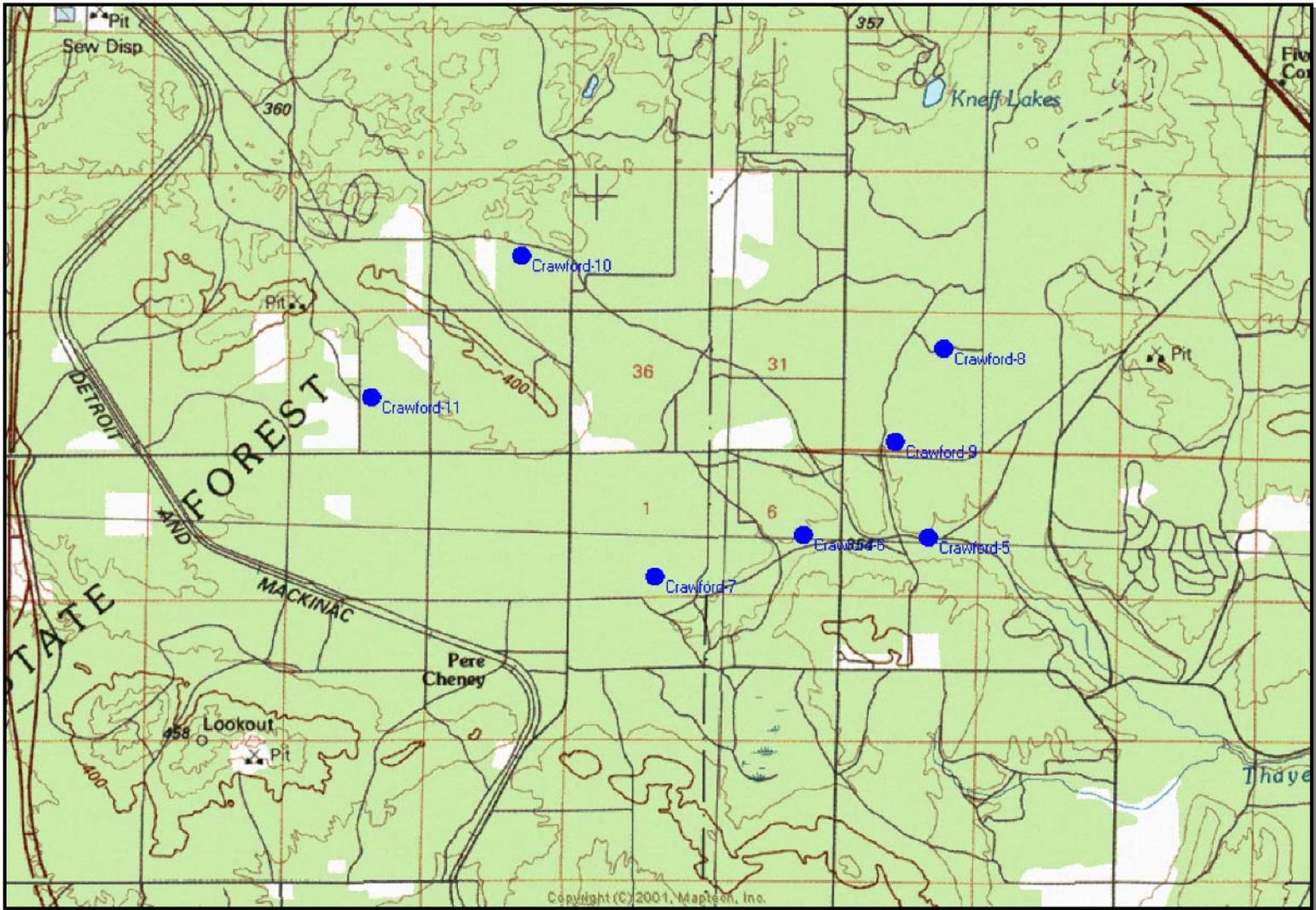
Approximate Scale 1"=6,000'

Crawford County



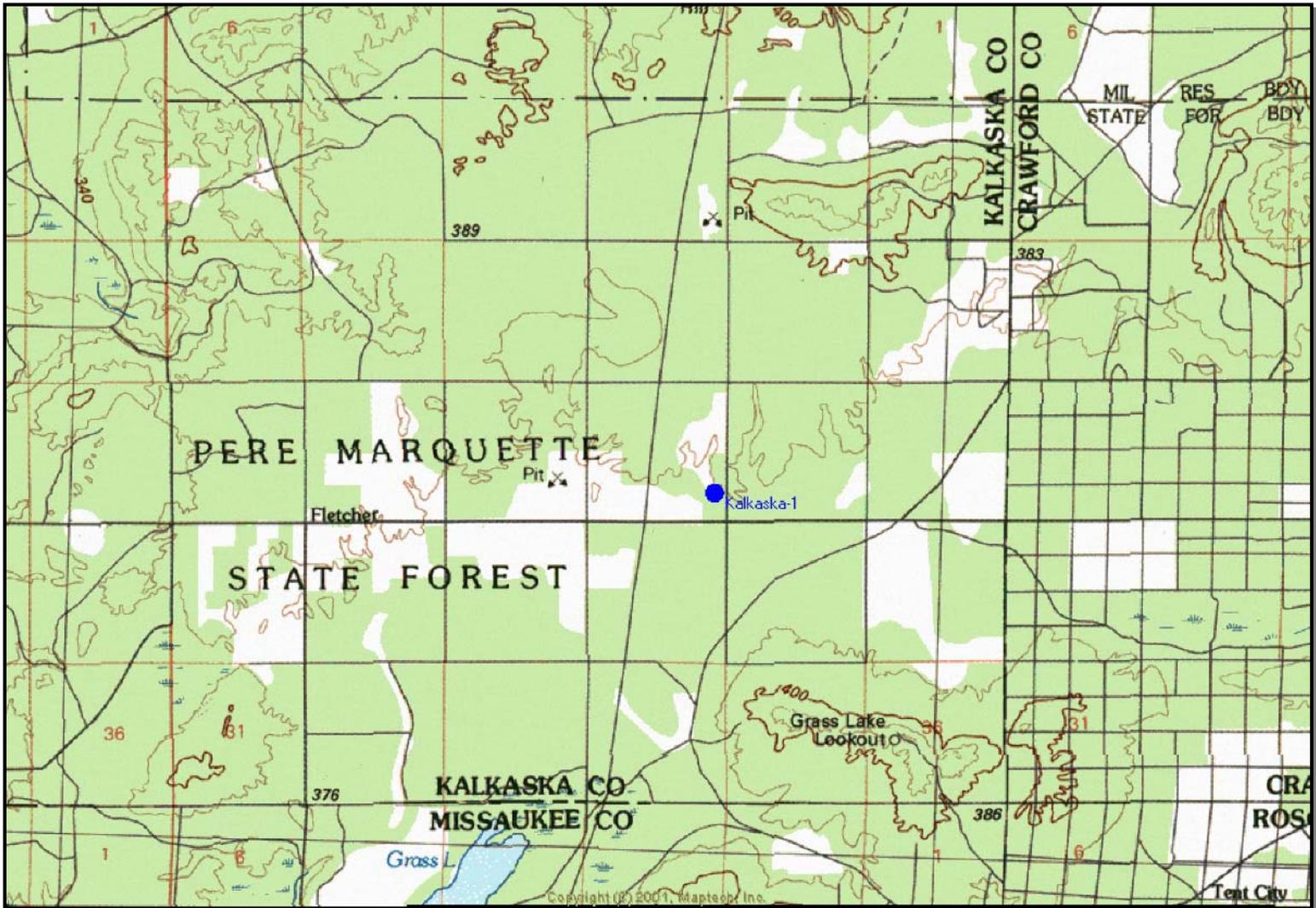
Approximate Scale 1"=6,000'

Crawford County



Approximate Scale 1"=6,000'

Kalkaska County



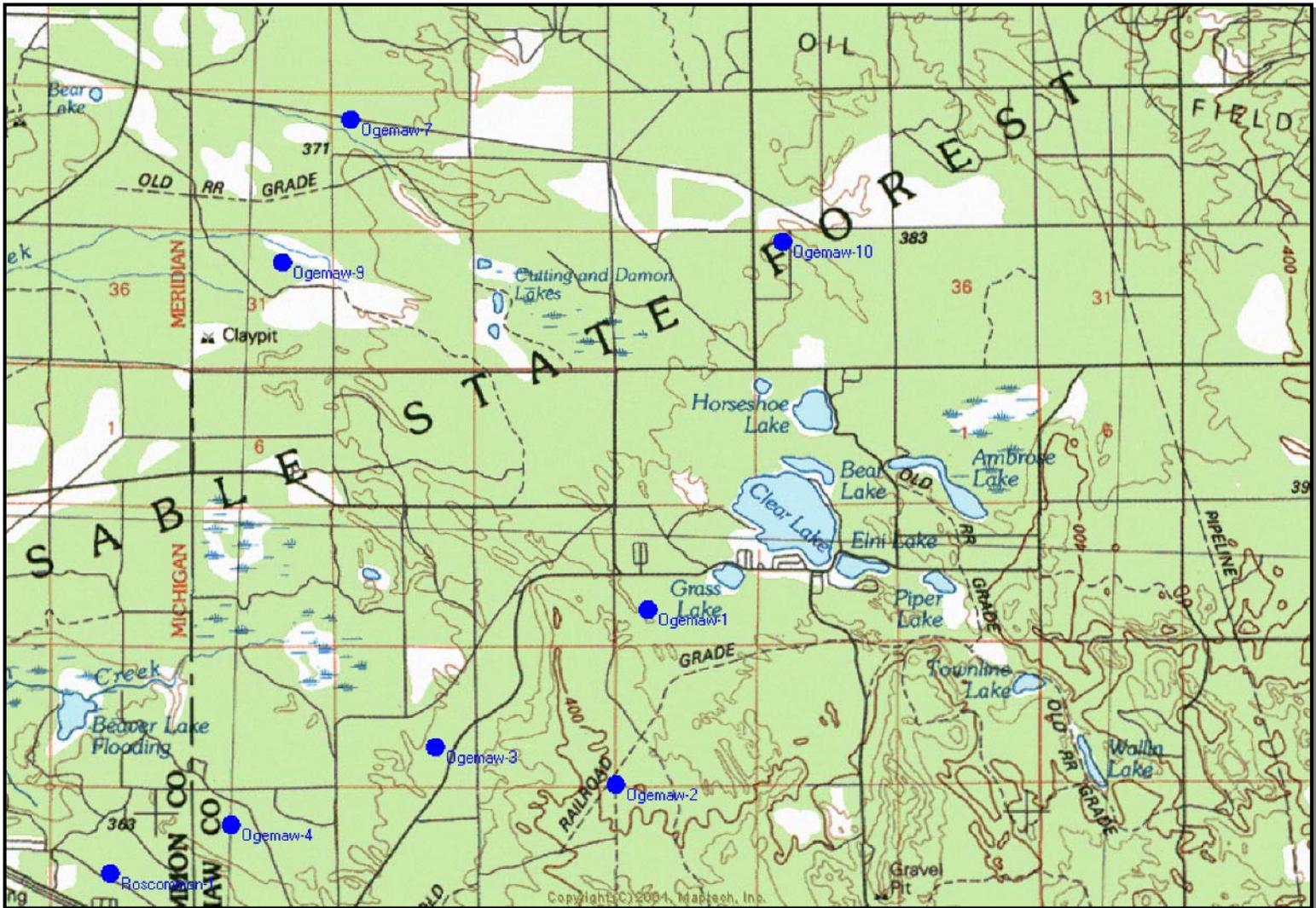
Approximate Scale 1"=6,000'

Ogemaw County



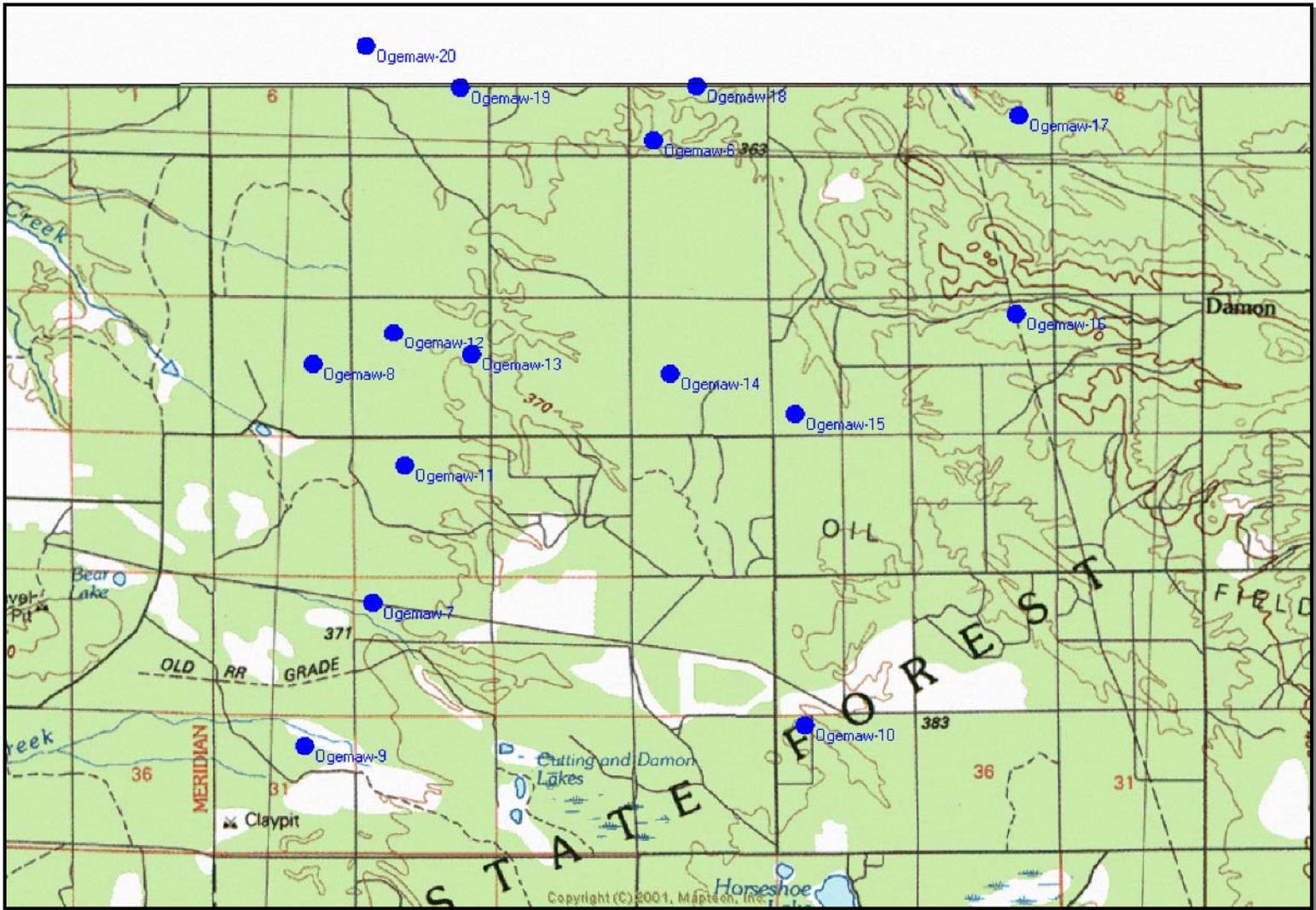
Approximate Scale 1"=6,000'

Ogemaw County



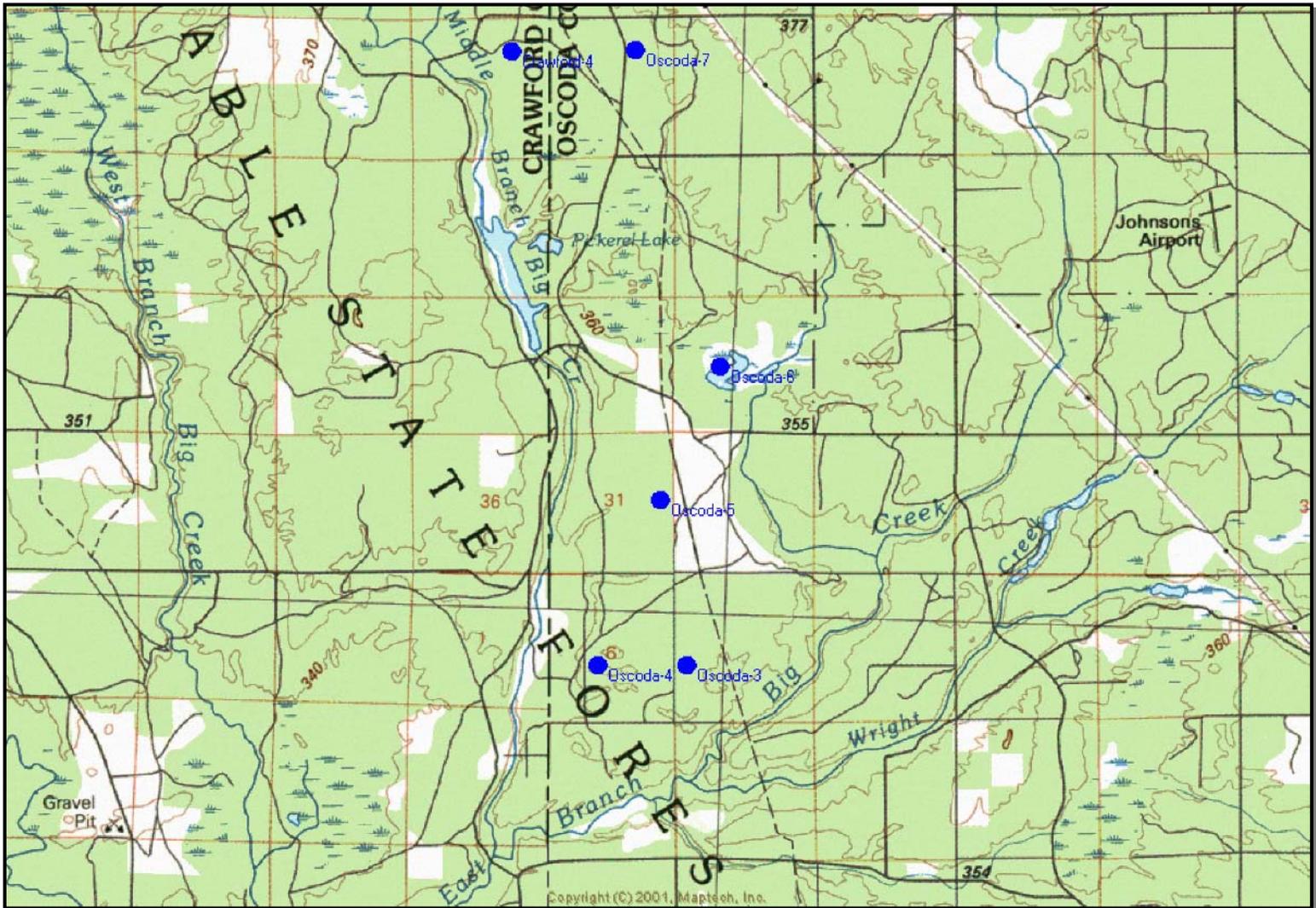
Approximate Scale 1"=6,000'

Ogemaw County



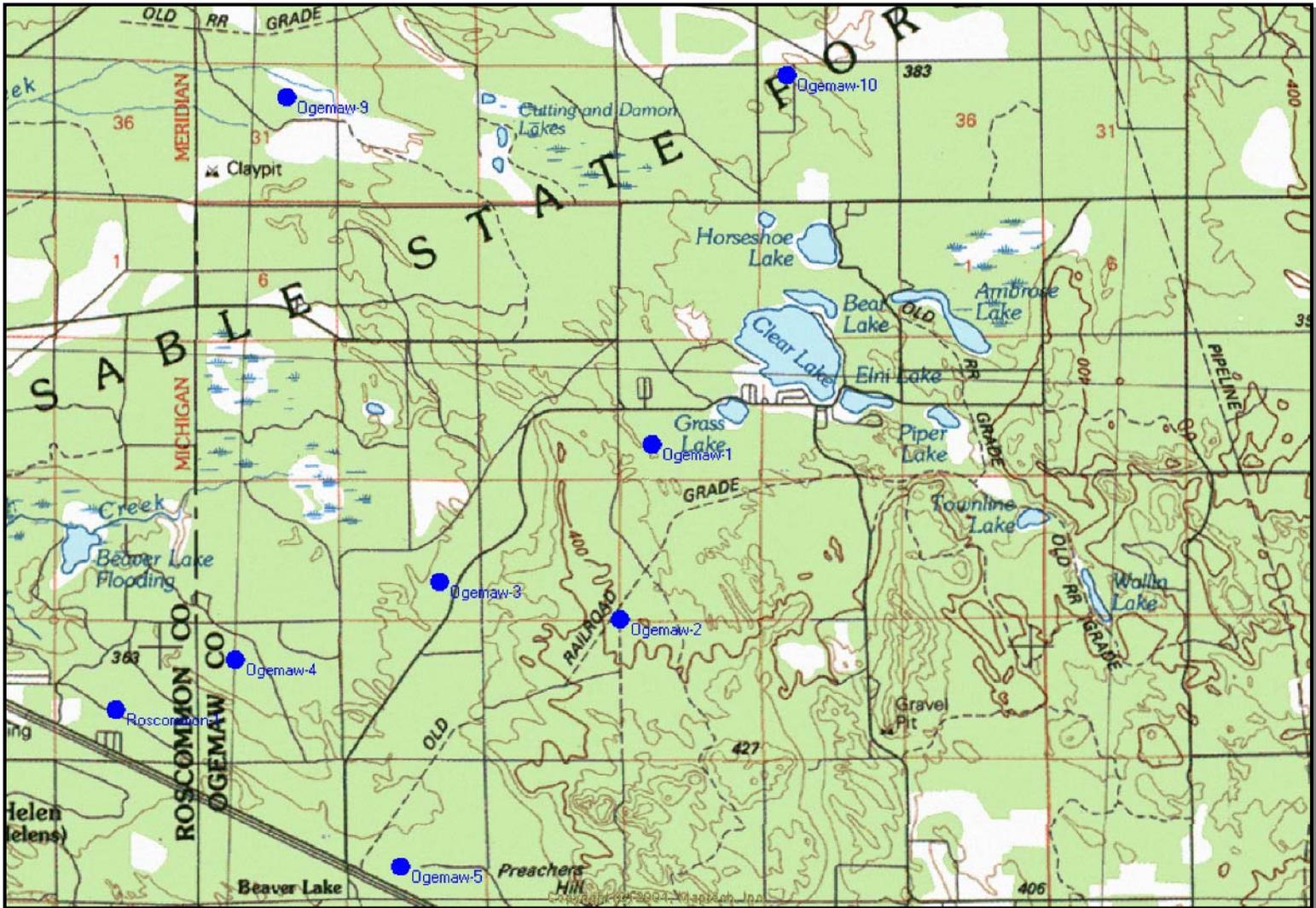
Approximate Scale 1"=6,000'

Oscoda County



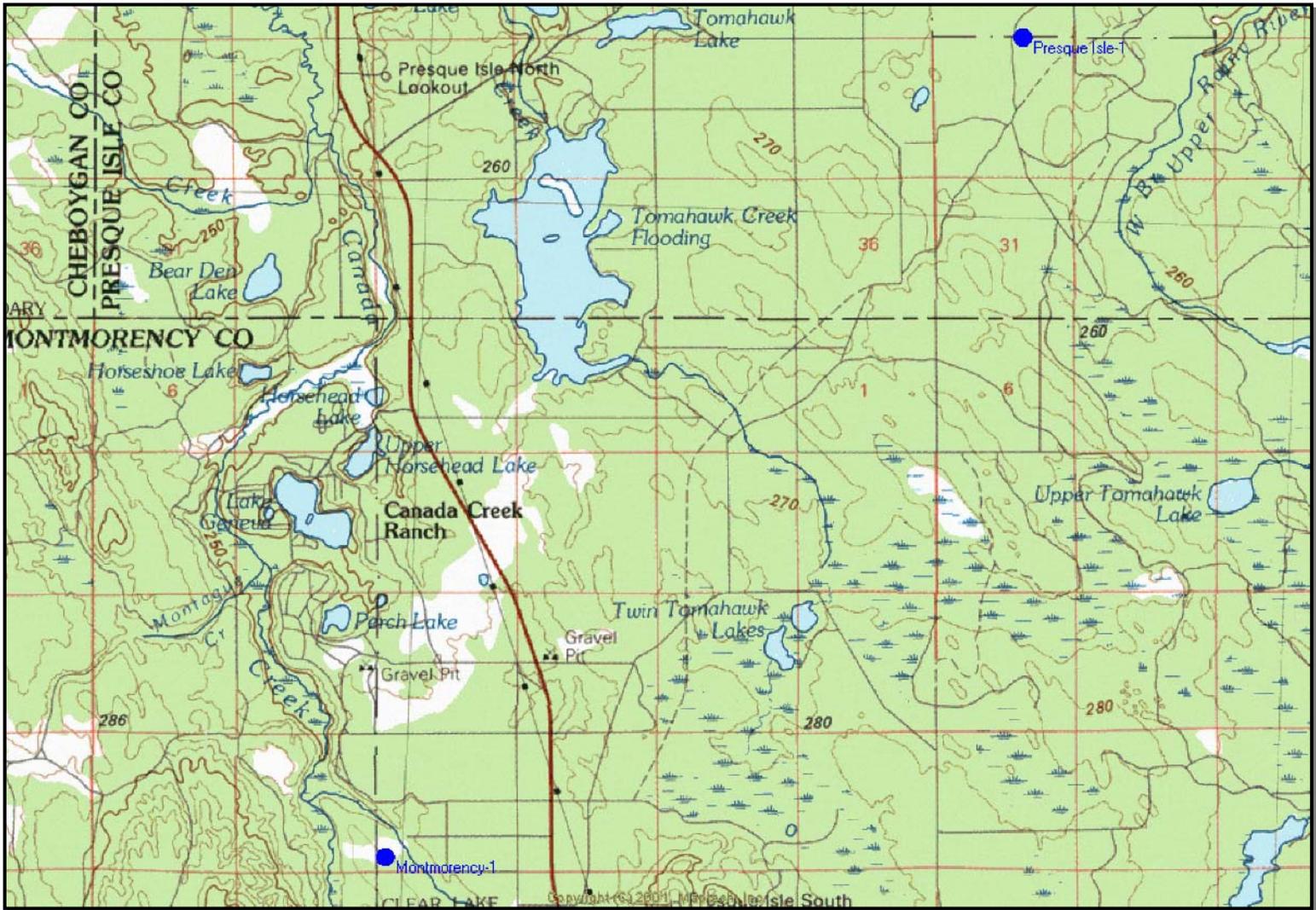
Approximate Scale 1"=6,000'

Oscoda County



Approximate Scale 1"=6,000'

Presque Isle County

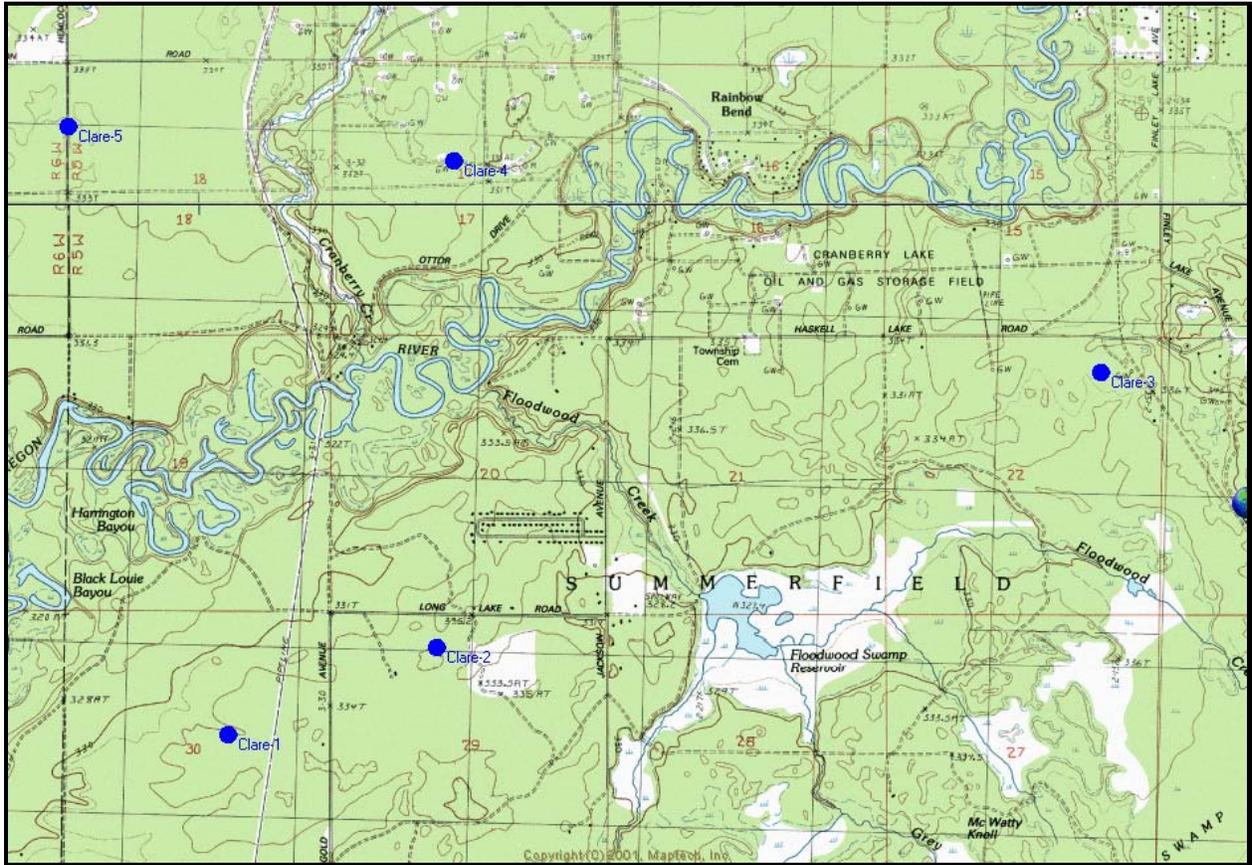


Approximate Scale 1"=6,000'

APPENDIX F: MANAGEMENT UNIT LOCATION MAPS

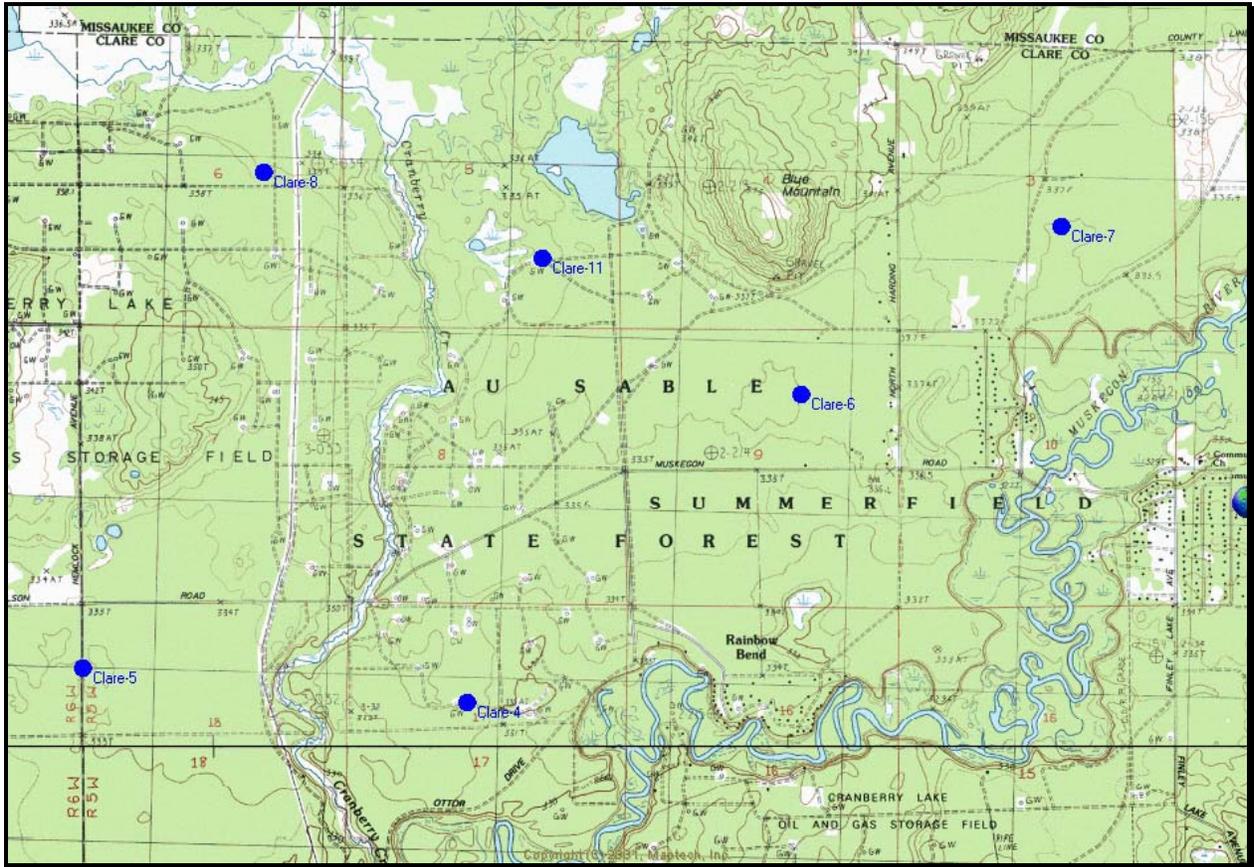
Clare County

Units CL-1 through CL-5



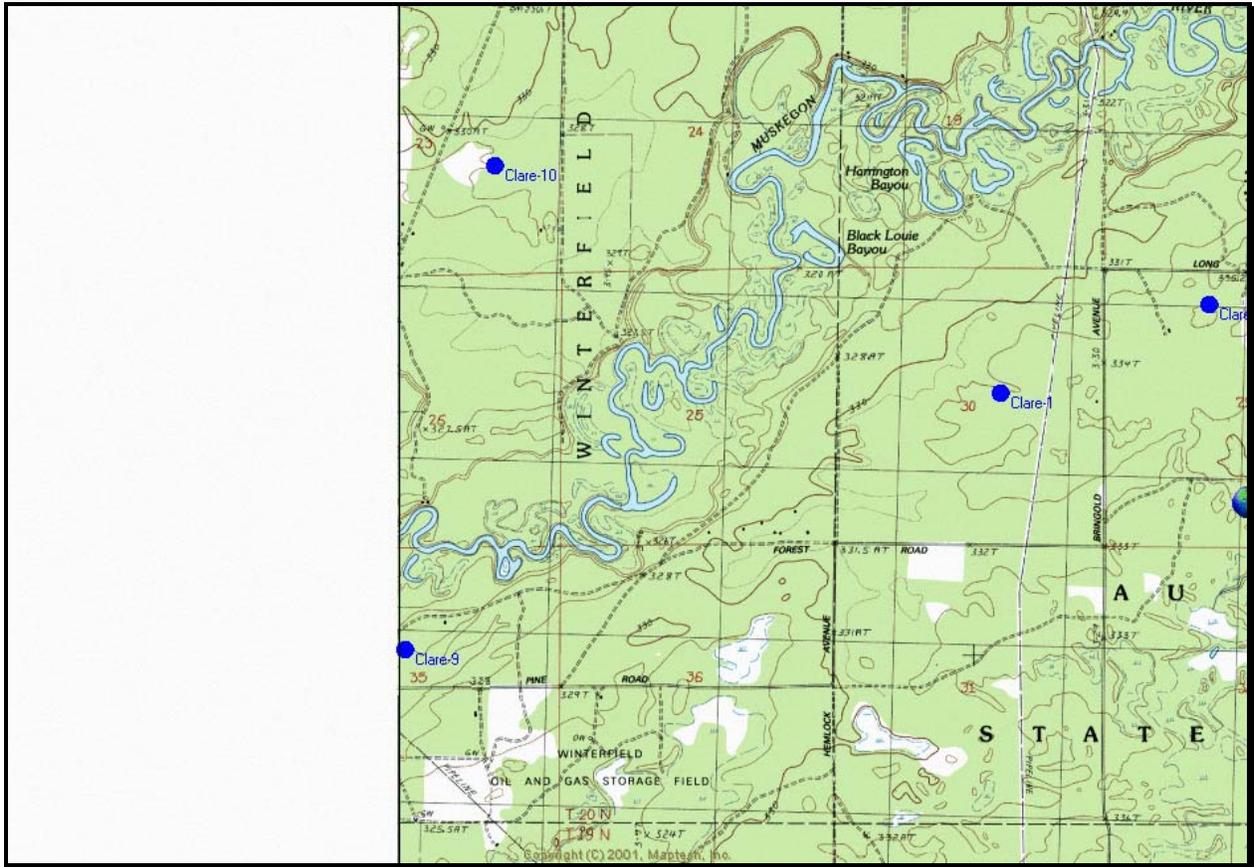
Clare County

Units CL-4 through CL-8 and CL-11



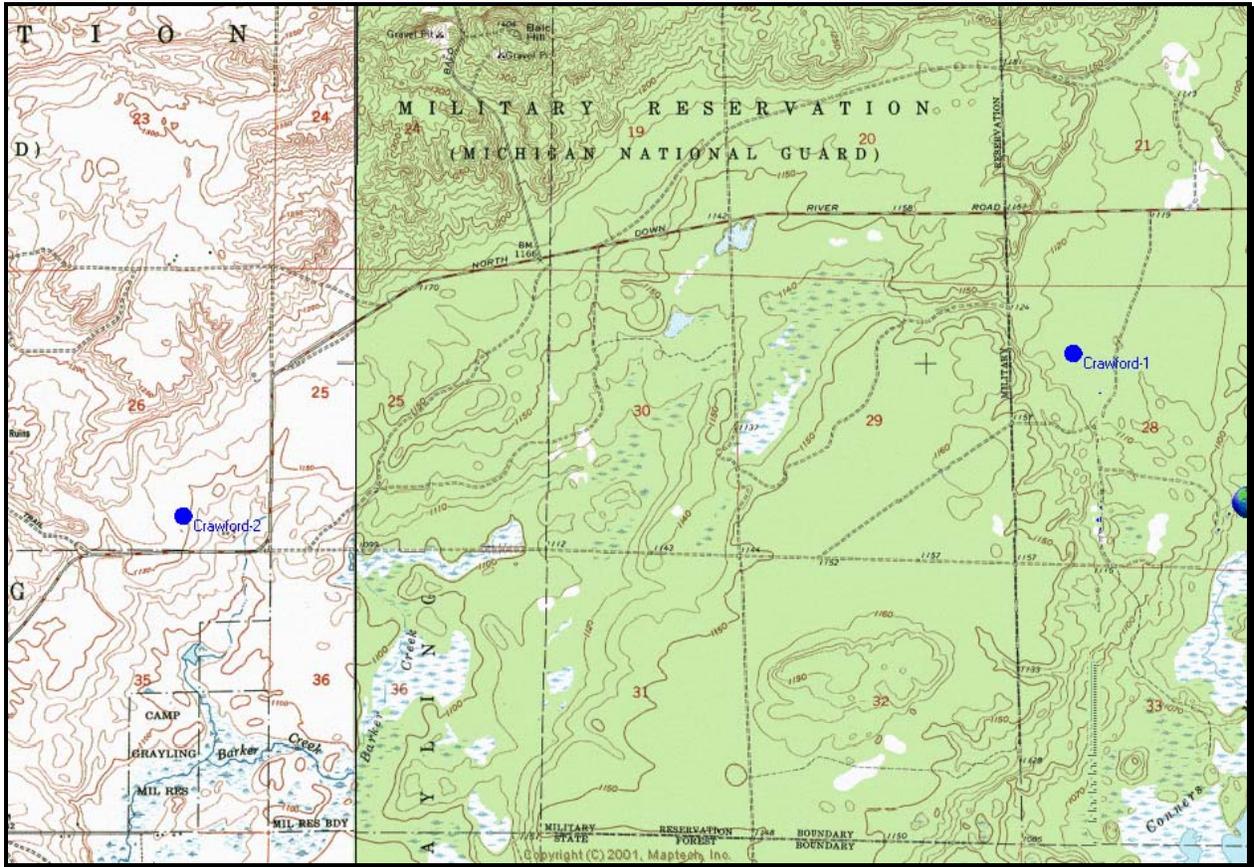
Clare County

Units CL-9 and CL-10



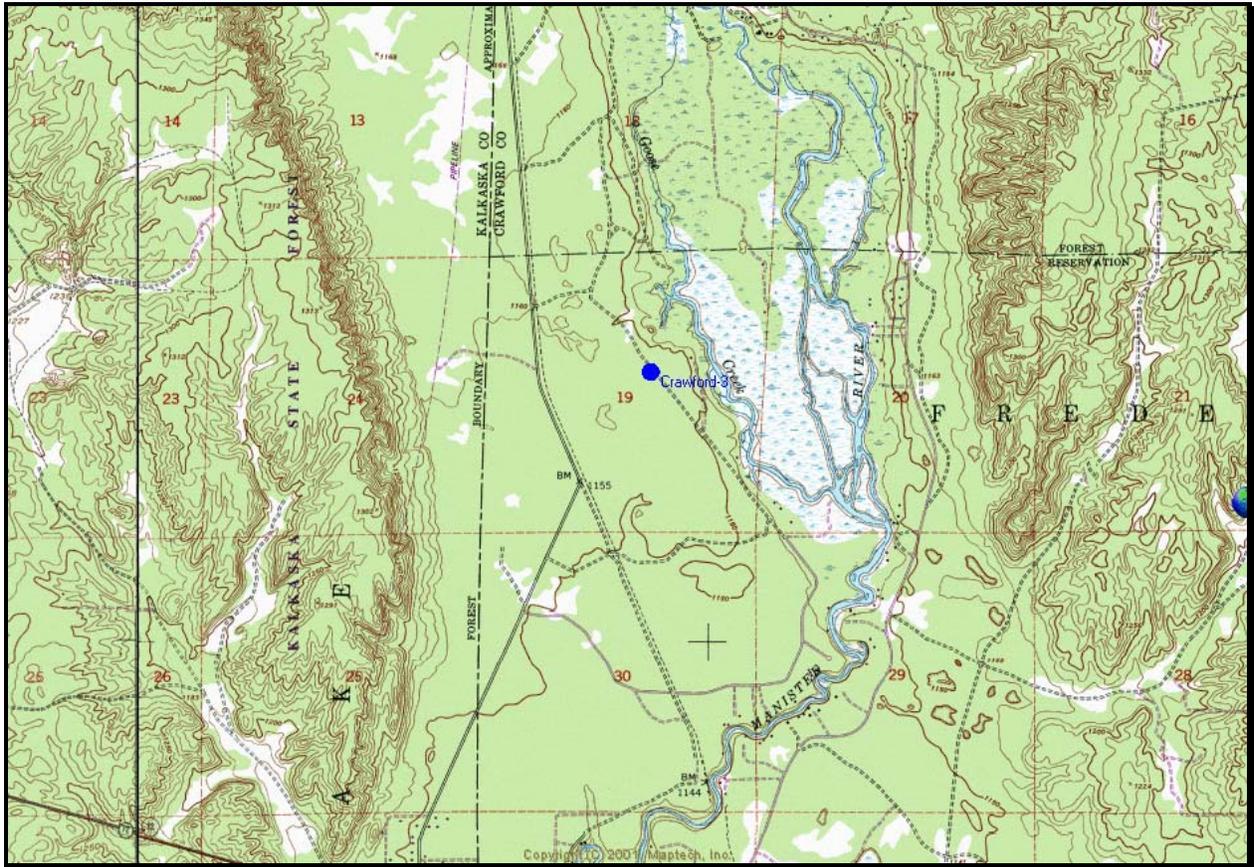
Crawford County

Units CR-1 and CR-2



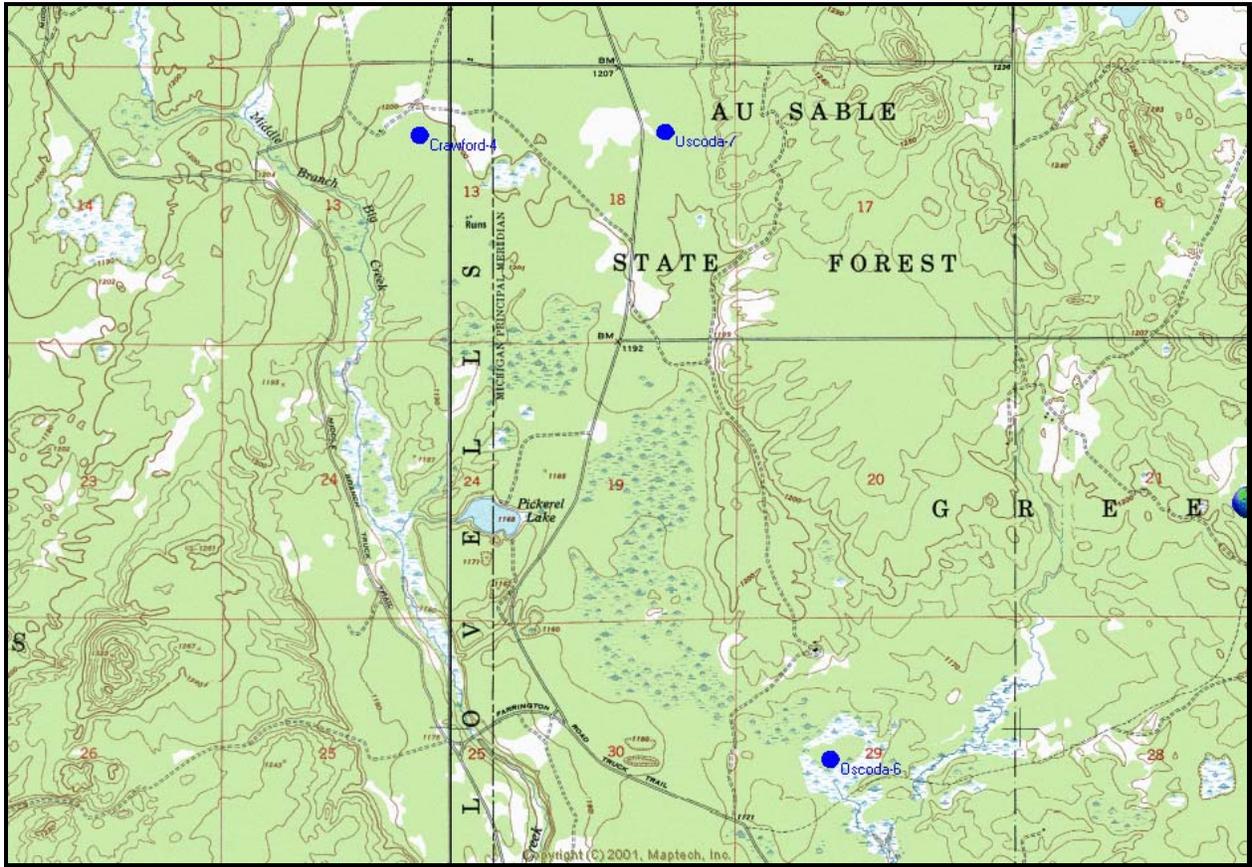
Crawford County

Unit CR-3



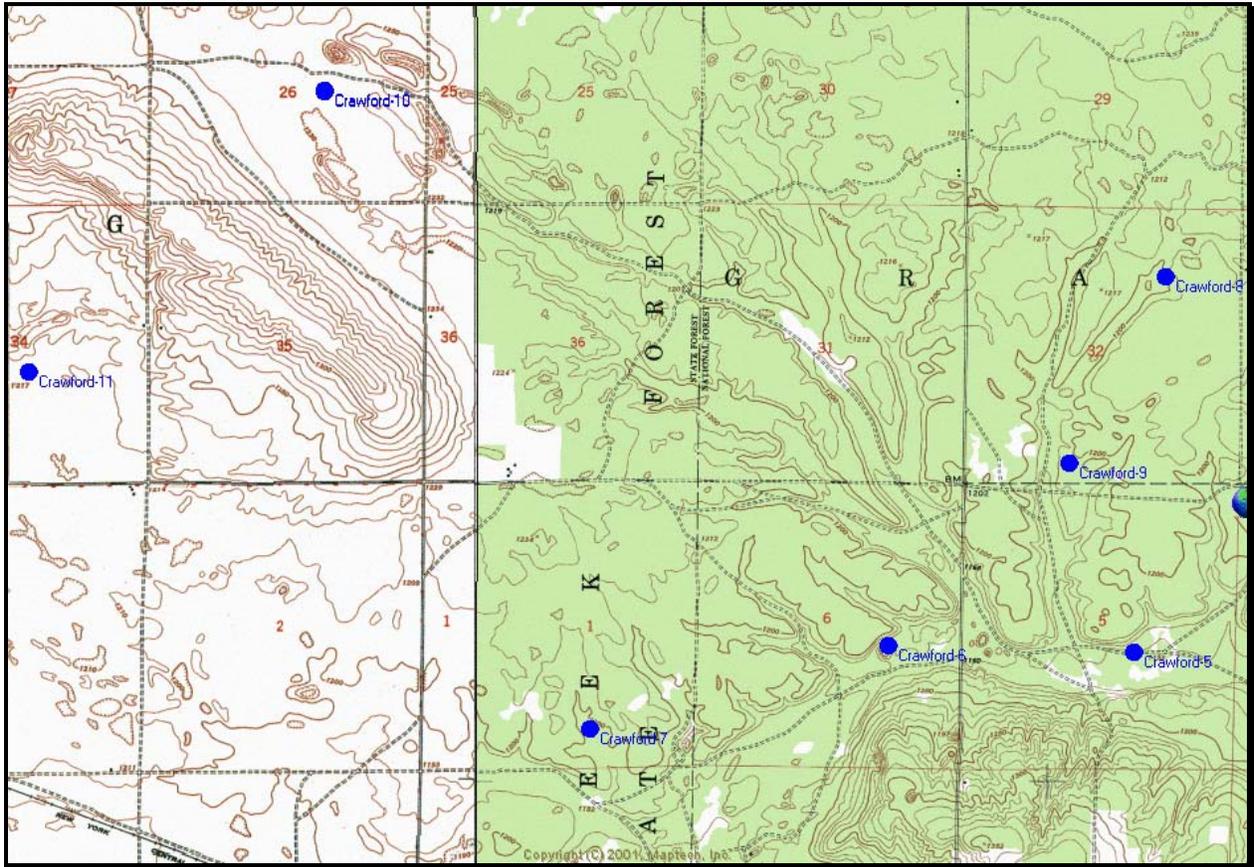
Crawford County

Units CR-4 and OS (Oscoda County)-6 and OS-7



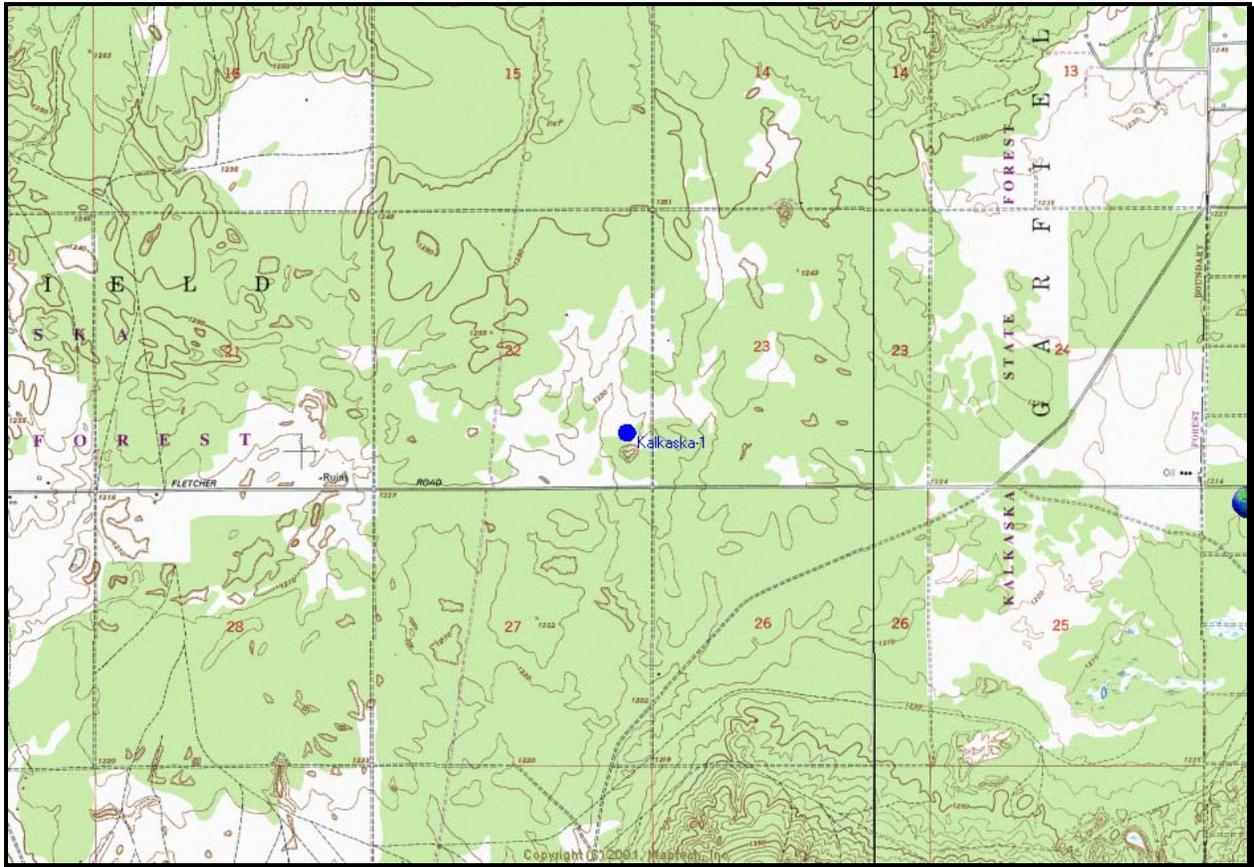
Crawford County

Units CR-5 through CR-11



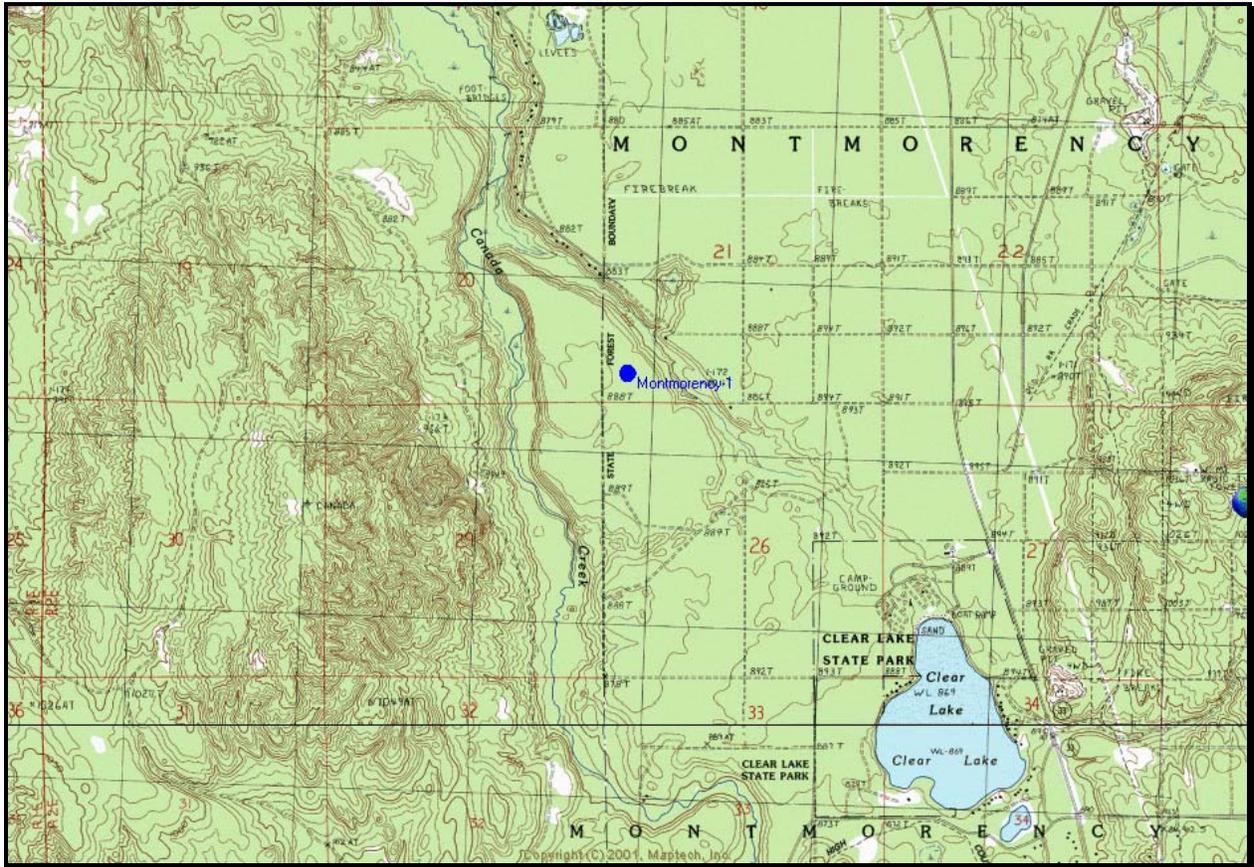
Kalkaska County

Unit KA-1



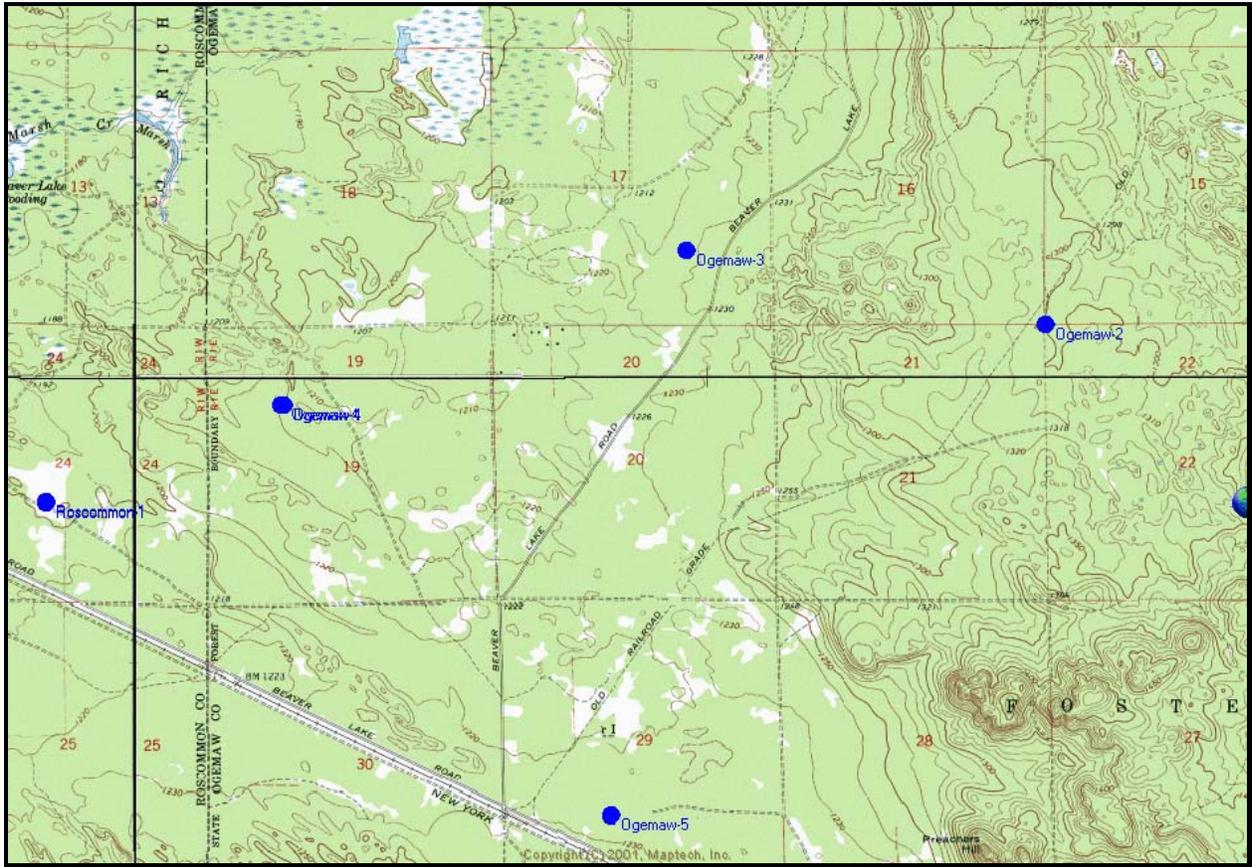
Montmorency County

Unit MO-1



Ogemaw County

Units OG-2 through OG-5 and RO (Roscommon)-1



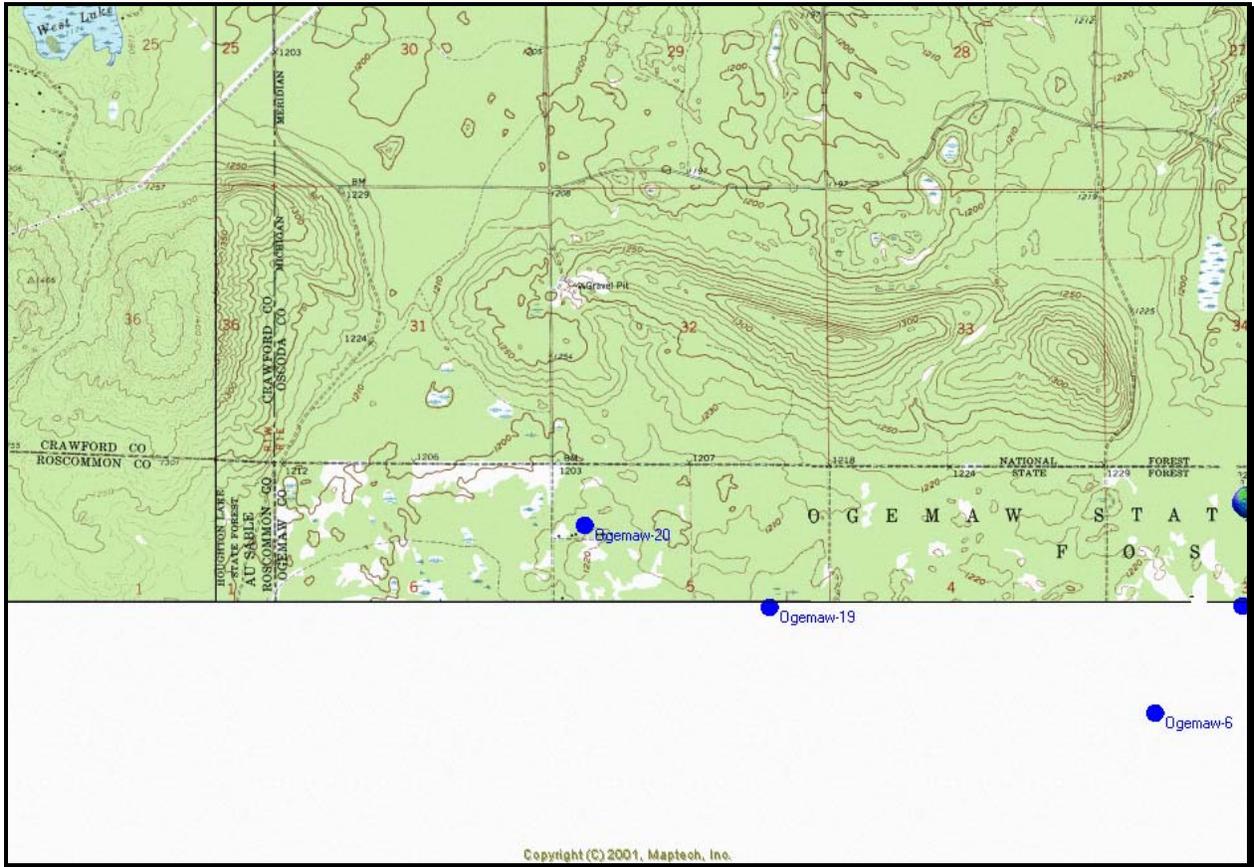
Ogemaw County

Units OG-1 and OG-9



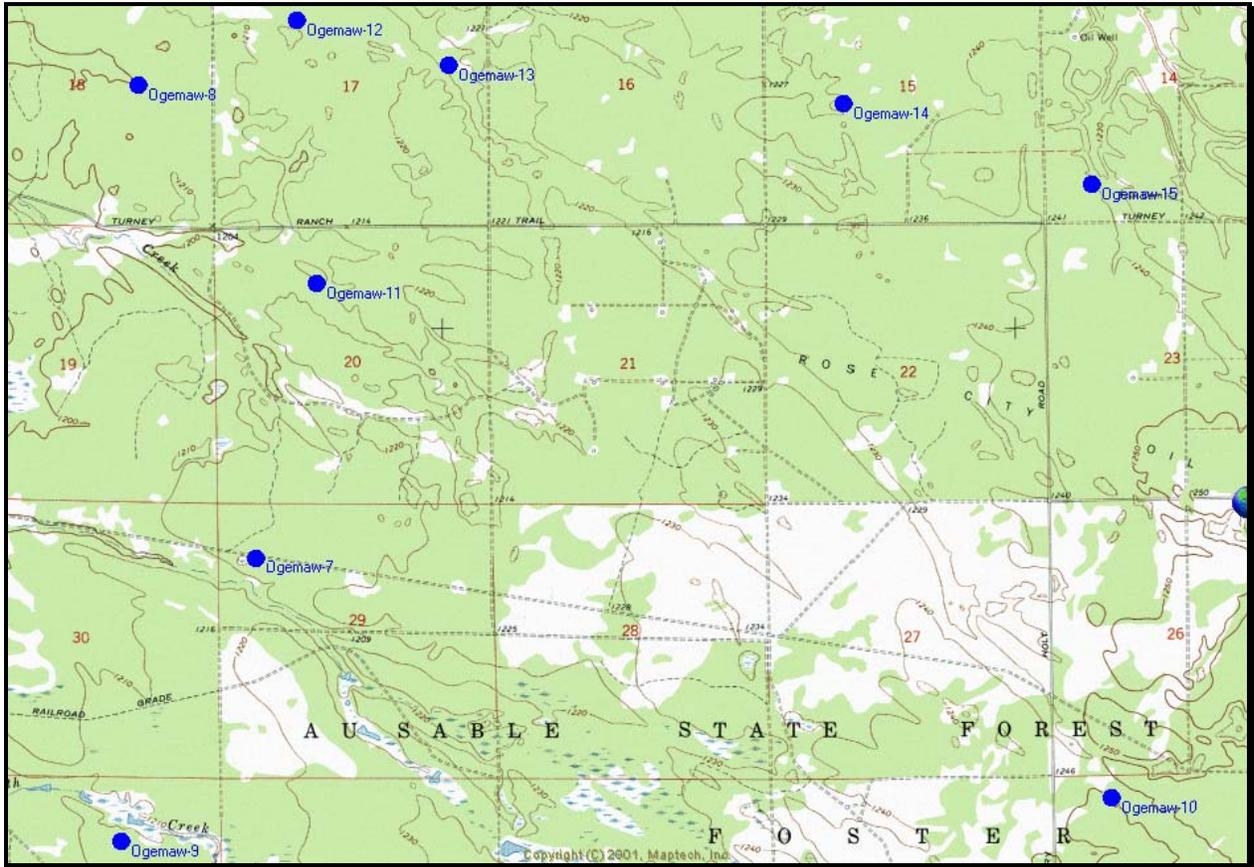
Ogemaw County

Unit OG-20



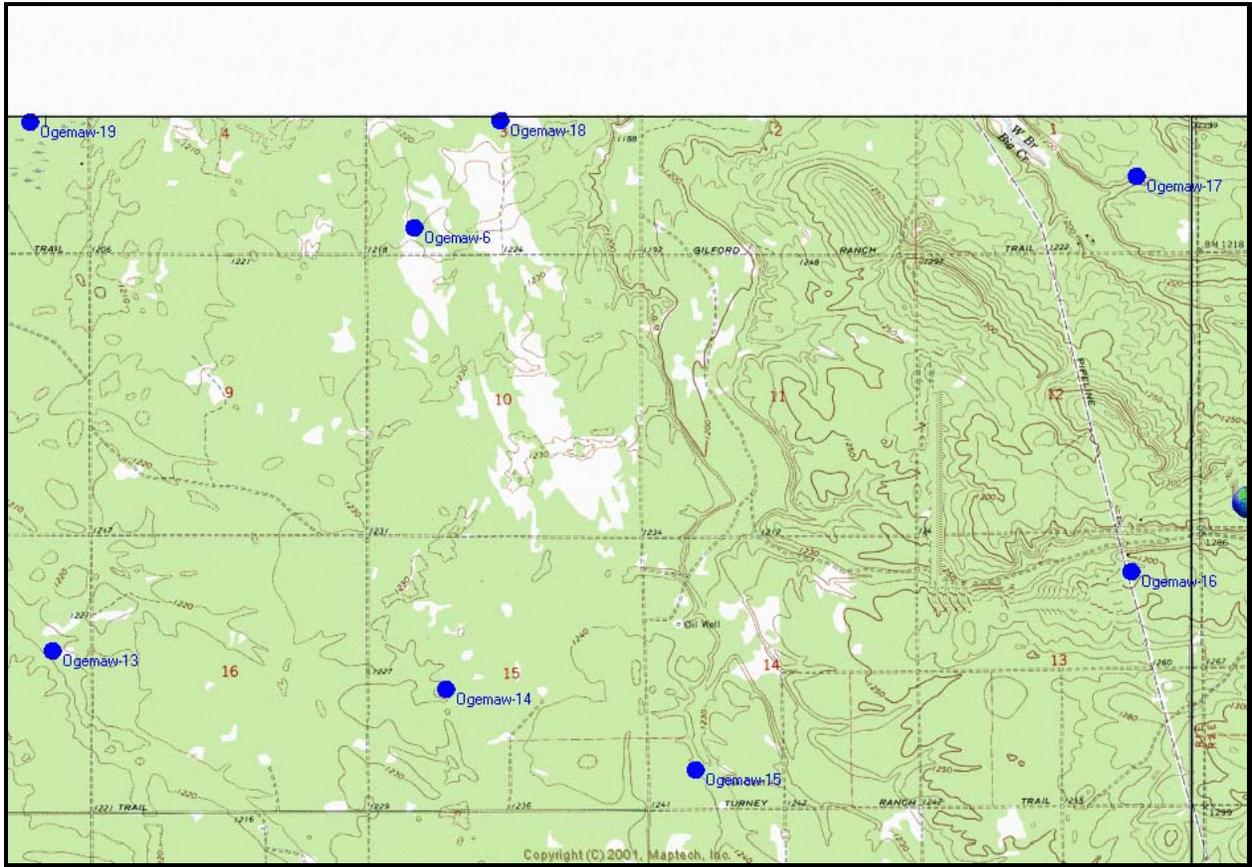
Ogemaw County

Units OG-7 through OG-15



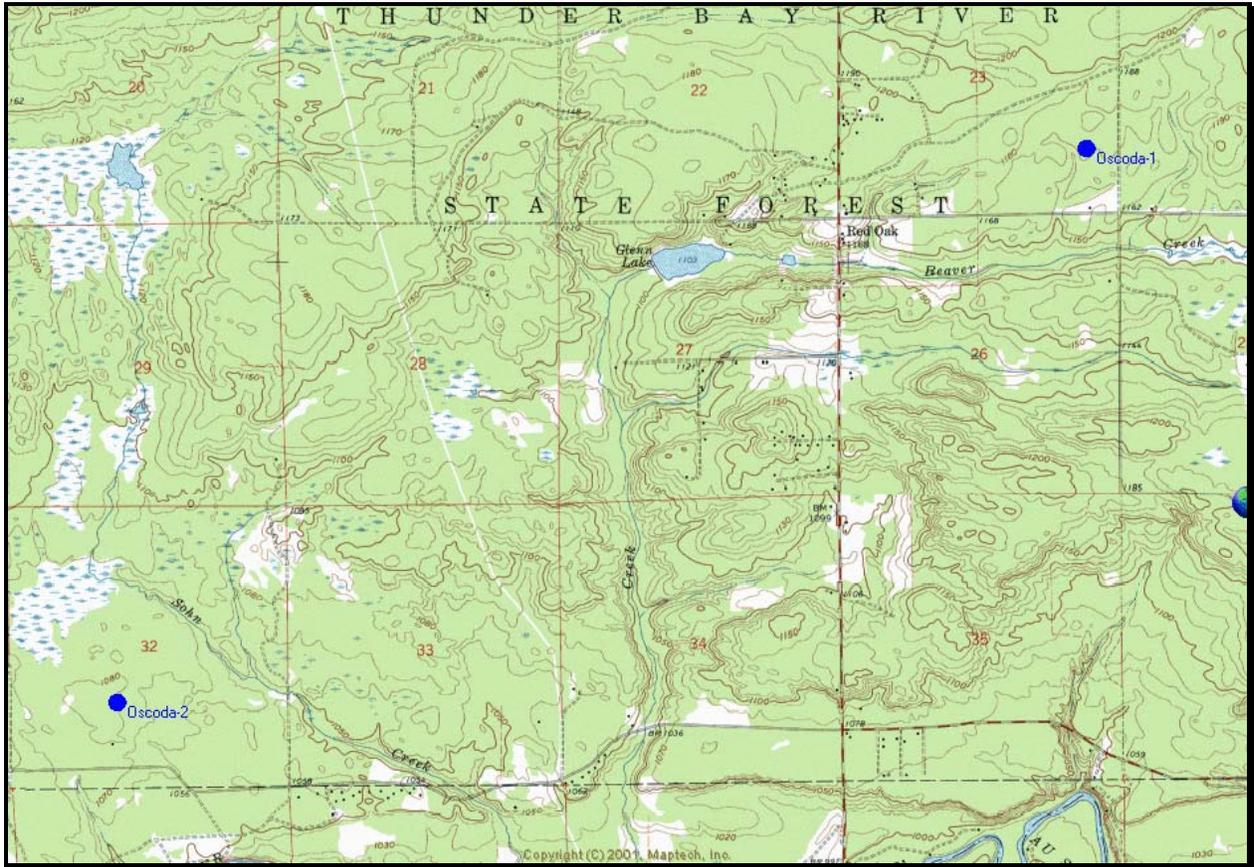
Ogemaw County

Units OG-13 through OG-19 and OG-6



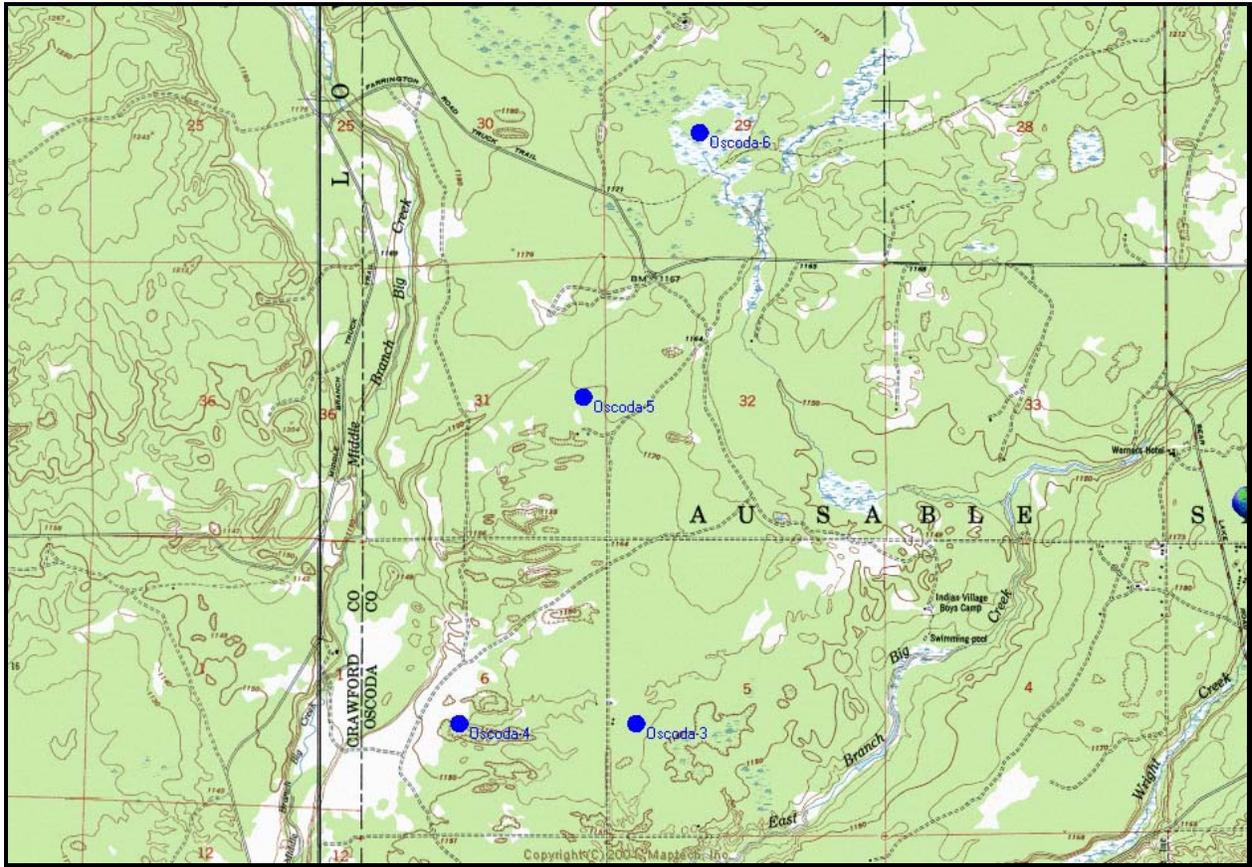
Oscoda County

Units OS-1 and OS-2



Oscoda County

Units OS-3 through OS-6



Presque Isle County

Unit PI-1



APPENDIX G: RISK/MANAGEMENT POTENTIAL EVALUATORS

Risk Evaluator

Kirtland's Warbler Lands - Management Unit Risk Evaluation				
County:				Acq. Units
Management Unit:				
Latitude:				
Longitude:				
Management Unit Acres:				
This area classifies as a LOW Risk Area.	Available Points	Assigned Points	Element Weighted Value	Calculated Point Summary
				0
Fuel Conditions			10	0
Fire Regime I	3		Select the most appropriate Fire Regime	
Fire Regime II	5			
Fire Regime III	4			
Fire Regime IV	3			
Fire Regime V	2			
Condition Class 1	1		Select the most appropriate Condition Class	
Condition Class 2	3			
Condition Class 3	5			
Values at Risk			10	0
Distance from Fire Protection				
< 2 miles	1		Select the distance from reviewed site to the fire department location.	
2.1-6.0 miles	3			
6.1+ miles	5			
Infrastructure Factors				
Access/Egress Roads				
No Road	5		Select the most weight restricted road enroute from fire department to site.	
Maximum Weight - 15,000# GVW	3			
Maximum Weight - 26,000# GVW	1			
Maximum Weight - > 26,000# GVW	0			

Surrounding Ownership			10	0
MIDNR borders 100%	1		Select the appropriate border condition.	
MIDNR borders >75%	2			
MIDNR borders >50%	3			
MIDNR borders >25%	4			
Parcel surrounded by non-MIDNR lands	5			
Utilities Presence			3	0
Petroleum Extraction				
Wells present	20		Select whether wells are present or absent.	
No wells present	0			
Powerlines				
Powerlines present (not on boundary)	3		Select whether powerlines are present or absent.	
Powerlines not present on property	0			
Pipelines				
Pipelines present (not on boundary)	3		Select whether pipelines are present or absent.	
Pipelines not present on property	0			
Risk Evaluation Score				0

Management Potential Evaluator

Kirtland's Warbler Lands - Management Unit Potential Evaluation				
County:	0			Acq. Units
Management Unit:	0			0
Latitude:	0.0000			
Longitude:	0.0000			
Management Unit Acres:	0			
This area classifies as having HIGH Management Potential.	Available Points	Assigned Points	Element Weighted Value	Calculated Point Summary
				0
Surrounding Ownership			10	0
MIDNR borders 100%	1	0	Select the appropriate border condition.	
MIDNR borders >75%	2			
MIDNR borders >50%	3			
MIDNR borders >25%	4			
Unit surrounded by non-MIDNR lands	5			
Utilities Presence			5	0
Petroleum Extraction				
Wells present	20	0	Select whether wells are present or absent.	
No wells present	0			
Powerlines				
Powerlines present (not on boundary)	3	0	Select whether powerlines are present or absent.	
Powerlines not present on property	0			
Pipelines				
Pipelines present (not on boundary)	3	0	Select whether pipelines are present or absent.	
Pipelines not present on property	0			
Potential Management Area			5	0
<160 acres	5	0		

160-227 acres	4			
228-295 acres	3			
296-360 acres	2			
>360 acres	1			
Management Potential Score				0