

DRAFT
FIRE MANAGEMENT PLAN

for

Apostle Islands National Lakeshore



United States Department of the Interior
National Park Service
Apostle Islands National Lakeshore
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Draft

FIRE MANAGEMENT PLAN

for

APOSTLE ISLANDS NATIONAL LAKESHORE

Submitted by: _____ Date _____
Biologist
Apostle Islands National Lakeshore

Reviewed by: _____ Date _____
Fire Management Officer
Border Waters Park Group

Concurred by: _____ Date _____
Fire Management Officer
Midwest Regional Office, National Park Service

Approved by: _____ Date _____
Superintendent

Apostle Islands National Lakeshore

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I. INTRODUCTION

Apostle Islands National Lakeshore (“the Park”) is located along Northern Wisconsin’s Lake Superior coast on and adjacent to the Bayfield Peninsula. The Park is approximately 42,160 acres (17,094 hectares) of land area. This includes 21 islands, ranging in size from 3 to 10,000 acres (1.22 to 4070 hectares) and a 12 mile (22.24 kilometer) segment along the mainland shore consisting of 2,565 acres (1043 hectares). (see Figure 1)

1. A. Reasons for Developing This Plan

National Park Service Director’s Order #18 (DO-18) dictates that all NPS units with “vegetation capable of burning will prepare a fire management plan to guide a fire management program that is responsive to the Park’s natural and cultural resource objectives and to safety considerations for park visitors, employees, and developed facilities.”

As the understanding of natural ecosystems increases and scientific knowledge is used to develop management strategies, fire management is assuming a role of greater importance. The implementation of this Fire Management Plan will define levels of protection necessary to ensure safety and protection of facilities and resources, will minimize undesirable environmental impacts of fire management, and will define levels of wildland fire use and prescribed fire to restore and perpetuate natural processes given current understanding of the complex relationships in natural ecosystems. This plan is a detailed program of action to carry out fire management policies and will help achieve resource management objectives as defined in the General Management Plan and further refined in the Resource Management Plan.

2. B. Collaborative Process

This plan was developed to describe how fire will be used as a tool to achieve the goals for land and resource management at the Park. This plan was developed as a collaborative effort by the Resource Management staff, Resource protection staff, and fire Management staff within the NPS. A cooperative agreement is in place with the Chequamegon-Nicolet National Forest.

Nothing in this plan or its implementation is intended to modify, abrogate or otherwise adversely affect tribal reserved rights.

3. C. Policy Implementation

It is NPS policy to allow natural processes to occur to the extent practical while meeting park unit management objects. This overall objective guides the use of wildland fires in parks with significant natural resources.

The Interagency Strategy for Implementation of the Federal Wildland Fire Policy has established that there are three kinds of Wildland Fire. The definitions are as follows:

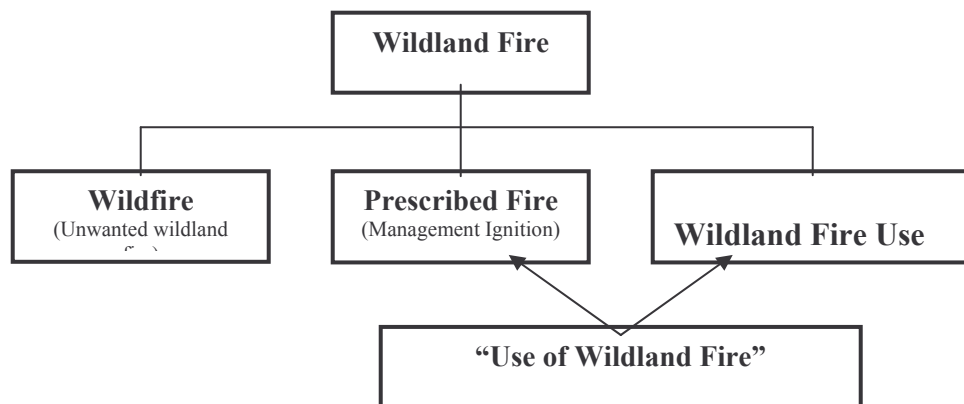
Wildland Fire. Any non-structure fire, that occurs in the wild land. Three distinct types of wildland fire have been defined and include **wildfire**, **wildland fire use** and **prescribed fire**.

Wildfire An unplanned wildfire, including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out.

Wildland Fire Use (WFU) The application of the appropriate management response to naturally ignited wildland fires to accomplish specific resource management objectives in predefined designated areas outlined in Fire Management Plans.

Prescribed Fire Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements (where applicable) must be met, prior to ignition.

The following diagram depicts the relationship between these terms:



The term "Use of Wildland Fire" is not a 4th kind of fire. It is a term that is used to describe the two types of wildland fire that provide resource benefits.

As stated in the Executive Summary of Wildland Fire Management (RM-18 1999): "All ignitions occurring in wildland areas are classified as wildland fires. Prescribed fires are authorized by approved resource and fire management plans and contribute specifically to a park's resource management objectives. Wildland fires are managed with the appropriate management response as directed by the park's fire management plan and analysis of the specific situation. These fires can be managed entirely or in any part for resource benefits or receive suppression actions to minimize burned area due to high values to be protected, threats to life or property, or other social, political, and economic considerations that outweigh potential environmental benefits.

Apostle Islands National Lakeshore

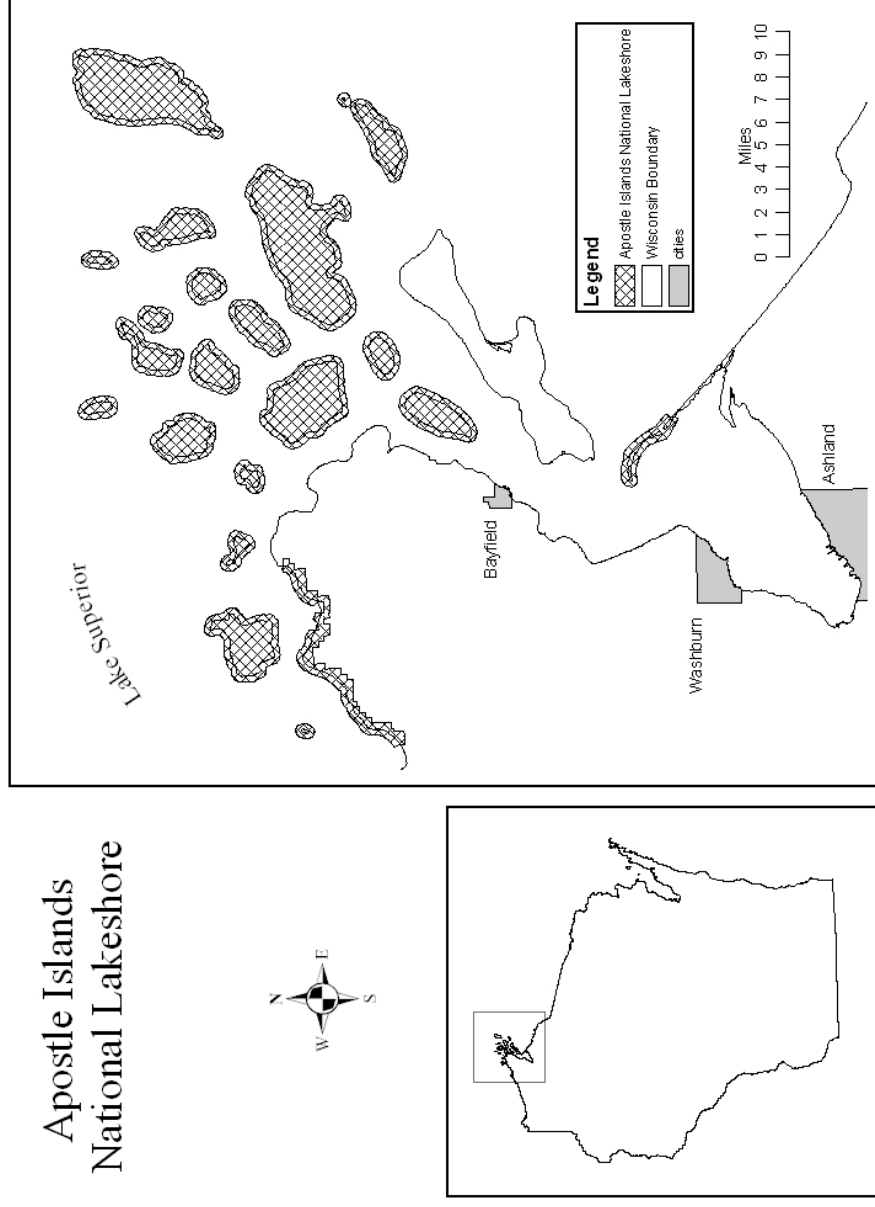


Figure 1. Vicinity Map of Apostle Islands National Lakeshore.

For all fires, if the initial strategy does not accomplish the desired objectives, the Wildland Fire Situation Analysis (WFSa) process will be utilized to develop and select new strategic alternatives.”

The Review and Update of the 1995 Federal Wildland Fire Management Policy (2001) established the underlying direction for NPS fire management programs. Implementation of the Federal Wildland Fire Management Policy is further defined and described in:

- Managing Impacts of Wildfires on Communities and the Environment (2001)
- Protecting People and Sustaining Resources in Fire Adapted Ecosystems-a Cohesive Strategy (2000)
- A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan (2002)

As stipulated in NPS Reference Manual-18 (RM-18 1999), paramount considerations of the Apostle Islands National Lakeshore fire management program include:

- Protection of life, both employee and public
- Protection of facilities and cultural and natural resources
- Perpetuation of natural resources and their associated processes
- Perpetuation of cultural and historic scenes.

4. D. National Environmental Policy Act (NEPA), National Historical Preservation Act (NHPA), and Wilderness Act Requirements

An Environmental Assessment has been prepared for public review and comment in compliance with the National Environmental Policy Act. Compliance with the National Historic Preservation Act is met through review by National Park Service cultural resource managers, historians, and archaeologists and the Wisconsin State Historic Preservation Office (SHPO).

Approximately 80% of the land area of Apostle Islands National Lakeshore was designated as Wilderness in late 2004. Suppression activities within this zone will be conducted in keeping with "minimum requirement" protocols identified in Director's Order #41, Wilderness Preservation and Management. The minimum requirement concept is a two-step process that documents 1) the determination as to whether or not a proposed management action is appropriate or necessary for the administration of the area as wilderness, and does not pose a significant impact to the wilderness resources and character; and, 2) the selection of the management method (tool) that causes the least amount of impact to the physical resources and experiential qualities (character) of wilderness.

5. E. Authorities for Implementing This Plan

The authority for fire management is found in the National Park Service's Organic Act (1916) and is further clarified in the National Parks and Recreation Act (1978). Primary policy guidance for implementing this Plan is contained in Review and Update of the 1995 Federal Wildland Fire Management Policy (2001), Departmental of Interior Manual (620 DM and 910 DM), NPS-77 Natural Resources Management Guideline (1991), Wildland and Prescribed Fire

Management Policy: Implementation Procedures Reference Guide (1998), Director's Order #18 (1998), and NPS Wildland Fire Management Reference Manual (RM-18) (2001b).

II. RELATIONSHIP TO LAND MANAGEMENT PLANNING AND FIRE POLICY

6. A. NPS Management Policies

National Park Service Management Policies 2001 (NPS 2000) states that “Each park with vegetation capable of burning will prepare a fire management plan and will address the need for adequate funding and staffing to support its fire management program. The plan will be designed to guide a program that responds to the park’s natural and cultural resources objectives; provides for safety considerations for park visitors, employees, neighbors, and developed facilities; and addresses potential impacts to public and private property adjacent to the park.”

Fire management in Apostle Islands National Lakeshore is based upon NPS Policies, Director’s Order #18 (DO-18) and the guidance found in Reference Manual-18 (RM-18), Wildland Fire Management (NPS 2001b). Reference Manual-18 identifies fire as the most aggressive natural resources management tool employed by the National Park Service. This guideline also states that all wildland fires are classified as either wildland fires or prescribed fires. Prescribed fires and wildland fire use may be authorized by an approved wildland fire management plan and can be of significant importance in the achievement of the park's resource management goals.

RM-18 identifies considerations to be addressed by park fire management programs. These are:

1. protection of human life, both employee and public,
2. protection of facilities and cultural resources, and
3. perpetuation of natural resources and their associated processes.

7. B. Enabling Legislation

Authorities for establishment and management of Apostle Islands National Lakeshore are found in the following public laws:

- An Act to provide for the establishment of the Apostle Islands National Lakeshore, September 26, 1970, Public Law 91-424 (84 Stat. 880).
- An Act to authorize the inclusion of certain additional lands (Long Island) within the Apostle Islands National Lakeshore, October 17, 1986, Public Law 99-497.

There is no direct reference to fire management in the enabling legislation, but “in order to conserve.... [the] geographic, scenic, and scientific values” of the park, a wildland fire management program is implied. Allowing fire to assume its natural role in park ecosystems is essential to preserving a resource base that is suitable for long-term ecological studies in a protected area, the study of island biogeography (the geographic distribution of organisms) as it applies to this region, and protecting the natural vegetation mosaic that contributes so much to the scenic beauty of the islands.

The Park was established in 1970 to “conserve the geographic, scenic, and scientific values of the Apostle Islands for the benefit, inspiration, education, and enjoyment of the public.” A

General Management Plan (GMP) was completed in 1989, providing guidance on the management of the Park. Over 172,000 people visit the Park annually.

The park is covered primarily with coniferous/northern hardwood forests with smaller areas supporting boreal, pine/oak, hemlock, aspen/birch, and cedar forests. Unique habitats protected in the park include bogs, sand/dune, cliff, and clay bluff communities. It is one of the few protected areas in the Lake Superior Basin that contains old-growth forest remnants. These include prime examples of hemlock, boreal, upland white pine, and yellow birch/cedar old-growth communities.

The Park is extremely valuable as a scientific resource because of the possibility of doing long-term ecological studies without the threat of future human development. Having been occupied for at least two millennia, the Park is rich in cultural resources, as well. Best known are the six historic light stations, whose nine towers have been called, “the nation’s finest collection of lighthouses.” In addition, the Park contains 60 identified archeological sites, along with numerous historic sites whose structures and landscapes relate to farming and settlement, brownstone quarry activity, commercial fishing, and logging. Ethnographic resources include a variety of plants, animals, and sites of traditional importance to the Ojibwa and other Native American groups. Approximately 13,000 museum objects are stored and/or displayed on-site.

8. C. General Management Plan (GMP)

The Apostle Islands National Lakeshore General Management Plan, completed in 1989, states that “Fire will be considered as a tool in the management of forest vegetation and wildlife. Fire management recommendations could include prescribed burns and wildland fire use policies.” General Management Plan goals related to fire management include:

- (1) Study, protect, interpret, and manage the Park’s natural resources in accordance with legislative and executive requirements and the NPS Management Policies.
- (2) Rehabilitate, where appropriate, resources and processes recently altered by human activities. Use natural or simulated natural processes whenever possible.
- (3) Identify, inventory, preserve, protect, and interpret to the public the Park’s cultural resources in accordance with legislative and executive requirements and NPS historic preservation policies.

9. D. Resource Management Plan (RMP)

The Apostle Island National Lakeshore Resource Management Plan (1999) describes several goals that are directly related to the fire management program. These goals are addressed in Section 110 Forest Vegetation, Section 130 Fire Management; Section 200 Archeological Resources, Section 300 Ethnographic Resources, Section 400 Lighthouses, Section 700 Commercial Fisheries, and Section 900 Museum Collections.

Section 110 Forest Vegetation

- Create a buffer zone around the Outer Island old-growth hemlock stand.
- Inventory stumps from the logging era to determine the pre-disturbance distribution and abundance of white pine, hemlock, and cedar.
- Monitor fuels, especially in those areas where prescribed fires are desired.

Section 130 Fire Management;

- Restore fire as a natural component of the Park ecosystems.
- Determine fire histories of the islands and mainland strip so that sound fire management objectives can be developed.
- Determine the climatic influence of Lake Superior on the Park particularly as it affects fire behavior.
- Develop fire prescriptions for this management plan.
- Determine the ecological role of fire in sandscape systems and develop techniques for successful application of fire if needed.

Section 200 Archeological Resources

- Control environmental impacts on archeological sites (wildfire, natural erosion, animal damage, insects, vegetation, acid rain, etc.)

Section 300 Ethnographic Resources

- Safeguard natural and cultural resources while reflecting informed concern for the contemporary peoples and cultures associated with them.

Section 400 Lighthouses

- Control of environmental impacts including wildfire.

Section 700 Commercial Fisheries

- Control of environmental impacts including wildfire.

Section 900 Museum Collection

- Improve storage, environmental controls, and security for museum objects.

10. E. How Fire Management Plan Will Meet GMP and RMP Objectives

The Fire Management Plan can best be described as a specific implementation plan stemming from resource management needs identified in the RMP. Accomplishing fire management objectives will promote the general purpose of NPS resource management to preserve and restore natural ecosystem integrity and to protect cultural resources. The fire management project statement in the RMP describes the basic goals and proposed action for the fire management program.

Develop a Wildland Fire Management Program (APIS-N-130.000)--Description of Activity

Develop a wildland fire management program that meets the resource management needs of the Park. Complete a comprehensive fire management plan that designates fire management units with clear natural resource objectives that are based on the results of Park fire history studies, island climatological data, and fuel loading monitoring. Other important considerations in developing the plan are the gathering of representative fire weather data, the projected effects of fire on Park wildlife and vegetation, and determining fire behavior fuel models that best represents the Park's vegetation.

Implement wildland fire management strategies that will promote a natural fire regime. This may be required in some areas to restore, protect, and propagate the Park's presettlement vegetation, maintain ecological integrity and biodiversity, and mitigate hazardous fuel conditions, reducing the potential for resource damage due to fire. As identified in the FMP, implement fire weather monitoring and short- and long-term fire effects monitoring of prescribed burns necessary for prescribe burn programs. Hire and train fire personnel and acquire resources required for the operational and natural resource monitoring aspects of the fire management program. Form partnerships with, Wisconsin Department of Natural Resources (WDNR), and other State, local, and Federal agencies, Tribal Governments, and private organizations to pool expertise and resources in accomplishing common goals, and to promote an ecosystem management approach to area fire management.

III. WILDLAND FIRE MANAGEMENT STRATEGIES

11. A. General Management Considerations

This Fire Management Plan reflects the Park's recognition of the need for a more comprehensive approach to fire management than the current "suppression-only" strategy. This involves the designation of fire management units to implement wildland fire use, prescribed fire, and non-fire applications programs in combination with suppression to meet resource management objectives.

Desired Conditions for the Park are the presettlement (before 1850) diversity and condition of hemlock/white pine/northern hardwood forests and other known island ecosystems. This is the natural baseline that park managers should strive to emulate and dynamically maintain when fire management action is taken. Initially, prescribed fire and non-fire applications will be used to restore fire to areas where it has been eliminated due to past suppression policies and/or where hazardous fuels conditions have built up so that they threaten valuable natural and cultural resources. Once fire restoration has been accomplished and fuels have been reduced to acceptable levels, wildland fire use will be the primary means of maintaining Park nature fire regimes.

This Fire Management Plan provides guidelines necessary to consistently and professionally direct the management of fire within the Park. The General Management Plan divides the park into three zones: natural, historic, and developed. Primary resource management goals are concerned with two of these three zones. In the natural zone, the principal objective for management is to maintain the primitive character, natural processes, and park infrastructure. In the historic zone, lands are managed for preservation, interpretation, and protection of historic and archaeological resources.

Remote islands in Lake Superior present both opportunities and challenges when it comes to wildland fire use. Most islands are owned by the federal government in their entirety, and are surrounded by a mile or more of water, sharply reducing the odds that a fire will escape onto non-federal lands. While this is a benefit when it comes to wildland fire use, it also means that logistics are far more complicated than logistics elsewhere. If a fire were to start within the interior of some islands, long hours would pass before firefighters could arrive, and the equipment they would arrive with would be minimal. Under severe enough conditions, the fire simply couldn't be safely or effectively fought. The National Park Service will always seek to protect resources within exclusion zones, but it must be acknowledged that under certain circumstances, island logistics will hamper those efforts.

This Fire Management Plan prescribes actions necessary to implement Service-wide fire management policies (DO-18, 1998) and to achieve park resource management objectives.

12. B. Wildland Fire Management Goals

Resource Management Goal: To protect and maintain natural, wilderness, and cultural resources by restoring fire to its natural role in maintaining fire-adapted and fire-initiated

ecosystems of the park and using minimum impact suppression techniques when suppression is necessary.

Fire Management Goals:

1. Protect human life, property, government facilities, and irreplaceable natural and cultural resources from wildfire.
2. Allow fire to assume its natural role as an ecosystem processes, creating a natural mosaic of biologically diverse plant communities and wildlife habitat, and allowing for the development of some rare or extirpated presettlement plant communities.
3. Reduce hazardous fuel conditions to protect natural and cultural resources, and developments.
4. Restore and maintain identified historic scenes.
5. Cooperate and consult with adjacent land owners and land/fire management agencies for an integrated approach to fire management.
6. Develop public programs to explain fire's role in natural ecosystems and for public safety.

13. C. Wildland Fire Management Options

Wildland Fire Suppression

The Park will make every effort to suppress all wildfires using an appropriate management response. The park was established to protect natural and cultural resources including those which may be adversely impacted by fire that exceeds prescriptions in either intensity or spatial area. In recognition of this, park management will choose an appropriate management response to wildland fires. All available park and local firefighting resources will be utilized as necessary to limit damage to values at risk, protect private and public lands in and outside the Park boundary, and provide for firefighter and public safety. Unacceptable resource impacts will be avoided as much as possible through assertive suppression. However, not all wildfires will be suppressed with the same degree of intensity. A full range of initial suppression actions, from direct attack to confinement, are preplanned to meet management objectives of individual units while minimizing the loss of resource values, economic expenditures, and/or the use of critical firefighting resources. Such preplanned actions are based upon stated resource management objectives in defined geographic areas outlined in this fire management plan. Minimum impact suppression tactics/minimum tool required will be utilized throughout the Park.

The Incident Commander (manager of personnel and resources of an operation administered under the Incident Command System) of any wildfire is expected to combine tactics with sensitivity towards park resources and concern for safety of firefighting personnel, park employees, park visitors, and park neighbors threatened by the wildfire.

Wildland fire use

Wildland fire use utilizes fires ignited by lightning that are permitted to burn under specific pre-stated environmental conditions based on management objectives. The goal of this use is to perpetuate natural processes.

Prescribed Fire

Prescribed fires are intentionally ignited under predetermined weather and fuel moisture conditions that permit managers to exert substantial influence over the spread and intensity levels that the fire can achieve. These fires are ignited for purposes of accomplishing resource management objectives. All prescription parameters, ranges, and objectives are clearly stated in an individual project plan for each prescribed fire.

Hazardous fuels management activities using prescribed fire will be undertaken to reduce buildup due to human activity such as prolonged fire suppression or slash as the result of past logging activity. This management action is intended to reduce the risk of fire that could endanger valuable natural and cultural resources, or modern infrastructure. It may also be used to provide a protective buffer around highly valued resources vulnerable to wildland fire such as fire-sensitive species. Particular attention will be paid to reducing fuel accumulation hazards to the six light station complexes, and to other historic structures and cultural sites at risk from wildfire. These projects will be documented with a written plan approved by the park superintendent. Each plan will describe the fuel hazard, the values at risk, the proposed mitigation action with specifications of work to be done and a cost break down associated with the mitigation. The goals for this type of treatment will include the reintroduction of fire into fire-adapted ecosystems. Fuel build up may also be caused by insect infestations, storm damage, or other natural disturbance, but only if there are safety issues or if irreplaceable resources are threatened (e.g., light stations or old-growth forests) will management action be considered in these cases.

Prescribed fire may also be used for ecosystem management to attain resource management objectives: to simulate the fire effects of a given area based on fire history studies; regeneration of fire-adapted species such as red, white, or jack pine; and restoration of presettlement forest types such as white and red pine.

Prescribed fire can be used to maintain identified cultural landscapes but only if it poses little risk to other cultural resources. Non-fire applications will generally be preferred over prescribed fire to maintain identified cultural landscapes because they poses less risk to cultural resources.

Non-Fire Treatments

Mechanical reduction of hazardous fuels may be necessary around high value and sensitive cultural and natural resources, such as maintaining identified cultural landscapes around lighthouse complexes, developed areas, and park infrastructure where prescribed and wildland fire use may be inappropriate. In addition, mechanical fuel reduction treatments may be necessary around park developments and infrastructure where prescribed fire fuel reduction methods are not practical.

14. D. Description of Wildland Fire Management Strategies by Fire Management Unit.

The 42,160 acres (17,094 ha) of Park land area will be divided into two Fire Management Units (FMUs): the Special Use FMU, and the Natural FMU. The Special Use FMU includes the Mainland Unit, and the Natural FMU includes the 21 islands (Figure 2, Fire Management Unit Map). Wildland fire use Exclusion Zones will be designated within the Natural FMU and will address areas of concern relative to specific management issues. Examples of these include cultural resource areas, particularly the six historic light station complexes and other historic structures and cultural sites at risk from wildfire, the old-growth hemlock forest on Outer Island, park buildings and facilities, and use and occupancy properties. Because of the recent wilderness designation, minimum impact philosophy and the use of minimum tools concept will guide all suppression activities in the park, however, all actions undertaken must not compromise firefighter safety.

The Mainland and each island are described in terms of presettlement vegetation present vegetation types, management concerns, priorities, and objectives in Appendix E, Descriptions of the Fire Management Areas. In 1998, preliminary fire fuel loading inventories were conducted on several islands in a variety of Park habitats (Appendix E). More detailed fire effects data will become available through Park monitoring programs and future research. This information will be incorporated in updates to the FMP. Data presented below is from *Flora of the Apostle Islands* by Emmet Judziewicz and Rudy Koch (1993) except where otherwise stated.

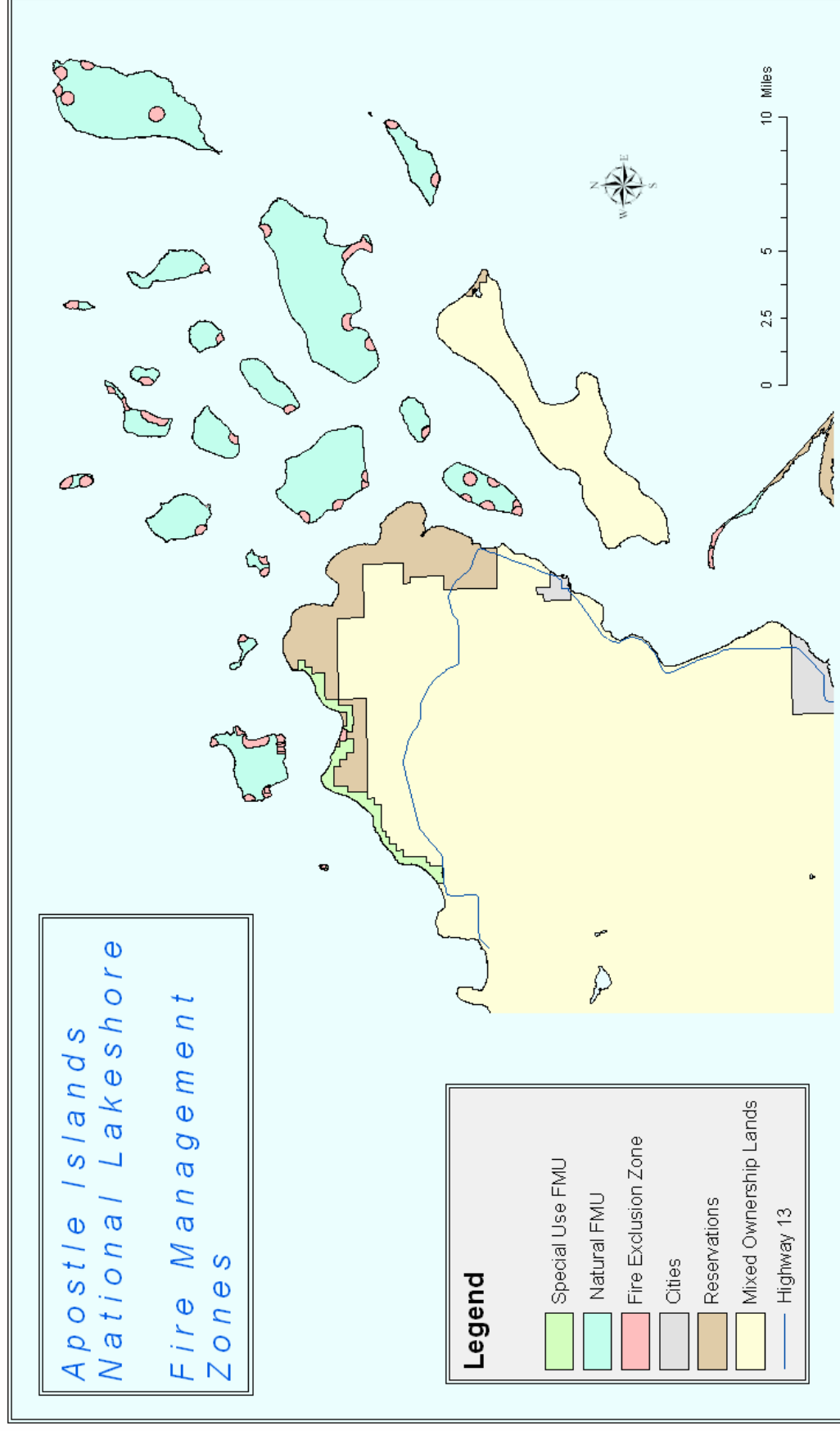


Figure 2 Fire Management Units

1. Natural Fire Management Unit

The Natural FMU is composed of the Park's 21 islands (Figure 2). Areas on the islands excluded from the Natural FMU are illustrated on the FMU map.

This unit includes all the Park islands, which are surrounded by Lake Superior (except for Long Island), a natural fire boundary that prevents escape. They, therefore, can be managed individually for fire. Over 97 percent of the area of all islands is designated in the Natural Zone by the GMP, but some have critical resources that need to be protected from fire, particularly six historic lighthouse complexes and other cultural resources, remnant old-growth hemlock/hardwood forests, park facilities, and use and occupancy holdings. A maximum attempt will be made to allow natural fire to assume its role in maintaining fire-adapted ecosystems. Lightning-caused fires in this natural fire management unit will be allowed to burn if they continue to meet the decision criteria in Figure 5, unless they threaten human life, cultural resources, threatened or endangered species, violate air pollution control laws and regulations, or are not consistent with other resource management objectives. Human-caused fires will be suppressed using the appropriate management response.

a. *Physical and Biotic Characteristics*

1) Vegetation

The records of pollen and charcoal from Stockton Bog and Brander Bog were about 6,000 to 7,000 years long (Swain 1981). During the past 5,000 years, climatic changes have influenced forest composition on the islands. Pollen coring provides information regarding the tree composition of the forest within the seed dispersal range of the studied site. The pollen record from peat deposits showed that pine (mostly white pine) dominated the forest composition, with lesser amounts of hardwoods on Stockton and Otter islands; while birch was the dominant type on Devils Island. Only during the past 500 to 1000 years have hemlock and spruce become important on Stockton and Otter Islands. During this same interval, only spruce became important on Devils Island. The pollen record also showed that logging on Stockton and Otter islands resulted in a marked decrease of pine and hemlock and a corresponding increase of birch, oak, maple and probably aspen. Very little cutting was done on Devils Island, except for the removal of spruce for road construction across the bog and an occasional white pine for local use on the island. The pollen record suggests that these changes may have increased the importance of Sphagnum moss and other bog shrubs and herbs.

In presettlement times (before 1850), about 90 percent of the Apostle Islands were covered by an upland mixed coniferous/hardwood forest dominated by hemlock (*Tsuga canadensis*), white pine (*Pinus strobus*), sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), and white birch (*Betula papyrifera*) (Judziewicz and Koch 1993). Scattered throughout were small stands of red oak (*Quercus rubra*), especially in better drained-locations. In more poorly-drained sites or in places exposed to the prevailing winds where windthrow is a major factor, balsam fir (*Abies balsamea*) and white cedar (*Thuja occidentalis*) were dominant trees. Quaking aspen (*Populus tremuloides*), and largetooth aspen (*Populus grandidentata*), showy mountain-ash (*Sorbus decora*), white

spruce (*Picea glauca*), basswood (*Tilia americana*), and hophornbeam (*Ostrya virginiana*) were minor components of the upland forest (Judziewicz and Koch 1993). Quaking aspen, white birch, and mountain ash are early successional species that came in after natural disturbance including fire, wind and ice storms, and erosional events. Canada yew (*Taxus canadensis*) dominated the presettlement understory on all islands.

With logging, the forest composition changed. First, the large white pines were removed from the 1880's to about 1900 (Judziewicz and Koch 1993). Then the large hemlocks, yellow birch, and sugar maples were cut until nearly all virgin stands were gone by 1950. Often, severe slash fires followed logging and burned large sections of some islands. Finally, logging for a wide range of species continued until the 1960's.

Aspens and white birch increased dramatically in the first decades after logging ceased; the aspens are now mature and in decline. Hemlock is no longer a dominant tree except in a few small, relict stands on Bear, Oak, Outer, and Stockton Islands (Judziewicz and Koch 1993). Some trees are over 400 years old. White pines are limited to mature second-growth stands (50-80 years old) on sandscapes and scattered super-canopy individuals on Outer and Sand and unlogged Devils and North Twin Islands. Some individual trees are over 300 years old. Sugar maple appears to have benefited most from the decline of these species. In well-drained upland second-growth stands (60-80 years old) on many islands, it is thriving and is the only forest tree exhibiting good seedling and sapling recruitment. Sugar maple was present, however, in the presettlement landscape as is evidenced by a relict old-growth stand of sugar maple on Oak Island. White birch, sugar and red maples, balsam fir and white cedar are now the most important tree species in the archipelago.

Habitat changes resulting from vegetation recovery after logging produced a severe irruption of white-tailed deer in the 1940's (Judziewicz and Koch 1993). Heavy deer browsing led to the near extirpation of yew from many Apostle Islands. Yew is still dominant on those islands without a history of deer irruptions including Outer, North Twin, Raspberry, Sand, York, Eagle, and Devils Islands. Islands that had a moderate deer population but still retained dominant yew include Cat, Ironwood, Michigan, and Otter. Fire history may also help explain yew abundance. Yew is much less common on the southern half of Outer Island which was logged and severely burned than on the north end which was logged but not burned. Intense fires wiped out yew plants and left no seed source. Even though second-growth hardwood forests have returned, yew is recovering very slowly in the southern half of the island. Other dominant understory plants in the islands include mountain maple (*Acer spicatum*), beaked-hazelnut (*Corylus cornuta*), skunk currant (*Ribes glandulosum*), and June berries (*Amelanchier spp.*). On larger islands fly honeysuckle (*Lonicera canadensis*) and bush-honeysuckle (*Diervilla lonicera*) are frequent.

Boreal forest is a second upland community in the archipelago. Elements of the boreal forest exist on North Twin, Raspberry, South Twin, York, Rocky, and Sand Islands, but the northern two-thirds of Devils Island has what Judziewicz calls "classic boreal forest"

where white spruce, balsam fir, white cedar, white birch, and aspen are dominant (Judziewicz and Koch 1993).

Sandscapes of the Apostle Islands including tombolos, beaches, and sand spits, are some of the most extensive and diverse on Lake Superior. Their presence is responsible for much of the floristic diversity of the Islands. Vegetation zones associated with sandscapes are beach (devoid of vegetation) active dunes, interdunal hollows (sometimes with ephemeral pools or ponds), stabilized dunes and/or beach ridges (sometimes covered with pine savannas or forest), and, often, a filled-in lake basin covered with bog or alder thicket. Other vegetation communities of the Park are beaver flowages, clayscapes, and rockscapes.

2) Geology/Soils

The area is associated with the southwestern portion of the Canadian shield, a group of ancient lavas that underlie most of northeastern North America. By about 1.2 billion years ago, the present Lake Superior basin had formed as a rift that gradually accumulated lavas. Some of this rock eroded away and was deposited as sand by streams. This sand was lithified into the sandstone that forms the base of nearly all the Apostle Islands. The rock forms outcrop that are seen as shelves and wave-eroded cliffs on the shores of the islands and on the northern shore of the Bayfield Peninsula. Advancing and melting Pleistocene glaciers (3 million to 10,000 years ago) formed and shaped the islands. Glacial till (material of various sizes dropped directly by melting ice) is particularly characteristic of the high reddish cliffs on the western sides of most of the islands and old beach lines from changing glacial lake levels can be seen on Oak, Outer, South Twin, and Rocky Islands. Weathering from precipitation, frost, wind, sun, and wave action continue to erode and sculpt the Park. Long shore currents transport material along coastal margins to form and reshape sand features usually at the southern ends of islands such as spits and tombolos (spits that connect two islands).

Soils on the islands are derived primarily from glacial till (see soils section in Fire EA for types). They hold enough moisture and nutrients to allow mixed hardwood coniferous forests to dominant over much of the Park. White, red and jack pine are dominant only on coastal sand features where rapidly percolating precipitation creates drier conditions or along coastal margins where there is a high level of disturbance from wind and erosion.

3) Aquatic Resources

Lake Superior is the coldest and cleanest of the Great Lakes. The overland drainage area is small compared to its immense size and the lake has a high percentage of forest cover which contributes to the high water quality. Point source pollution occurs primarily from municipalities and Canadian pulp mills around the lake, but they are widely scattered and strong circulation disperses pollutants widely. Airborne contamination is the major source of the most persistent pollutants (Apostle Islands National Lakeshore Resource Management Plan 1989). Lake concentrations are minute; however, biological accumulation in aquatic organisms of these contaminants continues to be a concern. Lake Superior has an extremely slow flushing time for toxins. It takes approximately 200

years for the lake to clear 95% of non-degrading, non-settling pollutants. Fortunately, concentration levels have been decreasing since the use and manufacturing ban of many of these compounds.

Water quality is temporarily degraded locally by strong weather events. Heavy rain and spring runoff may discolor near-shore lake waters, and wave erosion generated from high winds can cause a significant increase in particulate matter in the waters around islands with clay/sand banks.

Other aquatic resources on the Mainland Unit include a creek and two barrier beach/bog complexes. Saxine Creek is located near Meyer's Beach, near the southwest end of the Mainland. The Sand River bog or estuary complex is extensive and includes open wetlands to boggy mats with a large variety of aquatic plant species present. Northeast of the Little Sand Bay dock is a lagoon that is 2-3 acres in size.

Most larger islands have small intermittent streams. Stockton and Outer Islands have more extensive stream systems some of which are impounded by beaver dams. Stockton, Outer, and Michigan Islands have lagoons associated with sandspits. Small wetlands are also present behind or in close proximity of sandspits on Bear, Raspberry, and Rocky Islands. Long Island is actually a barrier spit connected to the mainland. It has several types of wetlands including ridge and swale topography in its northwest end, sphagnum/heath wetland behind the Chequamegon Bayside beach running along most of its length, and extensive sedge meadow habitat on its southeast end. Sphagnum bogs and wetlands associated with poorly drained lowlands are present on several Islands, e.g., Bear, Devils, Sand, South Twin, and Stockton.

4) Air

The air quality of the Park is considered an area of relatively clean air. Under the provisions of the Clean Air Act (42 U.S.C. 7401), the entire park is designated a Class II clean air area. This allows limited development as long as particulate matter, sulfur dioxide, and nitrogen dioxide do not exceed the Class II increments (maximum allowable increases). The air shed of the Park is in an area that meets all primary and secondary national ambient air quality standards. Air quality and visibility are usually excellent, with little evidence of pollution. The distance of the Park from major population centers, the low level of industry in the region, and the relatively low visitation rates all help minimize air pollution. Smoke from wood-burning stoves is occasionally noticeable in local communities, particularly under stable weather conditions such as inversions. There is one major stationary source, a coal and wood fired power plant located in Ashland WI.

5) Wildlife

Apostle Islands National Lakeshore provides limited habitat for game animals and furbearers. There is presently a concentrated black bear population on Stockton Island. Up to 30 bears (2.0+ bears/square mile) have been counted there. Resident black bears occur on the Mainland Unit and Sand Island and transient numbers of bears visit other islands, such as Oak, Basswood, and Long. Bears have recently been seen for the first time on distant islands including Devils, Outer, and North Twin Islands.

Reproducing white-tailed deer populations were probably not present on the Apostle Islands prior to European settlement and logging of the region. Deer numbers increased on the mainland as the result of habitat modification from logging and deer began to colonize some of the islands. In the 1940s and 1950s, extensive hardwood logging and subsequent fires occurred on the islands and deer populations irrupted. By the early 1960s, hunting pressure, starvation, and loss of habitat from development of second-growth forests caused a major decline in deer numbers. Presently, deer occur year-round on Basswood, Oak, Sand, and possibly Stockton and Long Islands. Deer occasionally visit other islands.

Research by Swain (1981) indicates that during presettlement times, most of the islands had a continuous canopy of northern hardwood-hemlock-white pine forest; other islands were dominated by a white cedar-yellow birch-yew forest. Following logging and slash fires (1880-1970), however, beaver became established and colonized all of the available watersheds on Stockton and Outer Islands. With the return of second-growth forests (and bear predation on Stockton Island), beaver populations have dropped dramatically. Smith and Peterson (1991) found that park populations suffered from low fecundity, poor food resources, inadequate watershed supplies, and lodge site instability. No beaver were found on Stockton Island during a 1994 survey or since. Although beaver were probably not an important part of the pre-logged landscape on the islands, their ponds currently provide habitat for wildlife species; most notably, birds, otters, mink, and amphibians. Beaver populations are low and fairly stable on Outer Island.

Although not in large numbers, other game animals and furbearers in the park include waterfowl, ruffed grouse, woodcock, snowshoe hare, otter, mink, fisher, weasel, red fox, and coyote. The Park also provides important habitat for many non-game birds, mammals, amphibians, reptiles, insects, arachnids and other invertebrates.

Over 150 breeding and 200 migratory bird species have been recorded in the park. Eagle and Gull Islands are important nesting grounds for herring gulls and double-crested cormorants. Eagle Island also supports a great blue heron rookery. The Bayfield Peninsula and the Apostle Islands funnel migratory birds in the spring and fall. Migratory birds tend to concentrate in exceptionally high numbers at the Outer Island sand spit and on Long Island. The park provides important breeding bird habitat for neotropical migrants and other northern species.

Consistent with island biogeographic theory (MacArthur and Wilson 1967), the islands have a naturally low diversity and abundance of mammals compared to the mainland. The faunal composition of the Mainland Unit and Long Island (actually a peninsula) is similar to that of the mainland (see Appendix C). At least sixteen species of reptiles and amphibians are known to occur in the Park (see Appendix C). A variety of insects and arachnids are present on the islands but few inventories of these groups have been completed. Forty species of fish live in and around Park waters (see Appendix C).

6) Cultural and Historic Resources

The cultural resources of the Apostle Islands include the sites, structures, objects, and people associated with or representative of many stages of human history in the Great Lakes region: prehistoric and historic aboriginal cultures, early European contact period (fur trade, military, and missionary activity), the post-1850s era of permanent white settlement with its accompanying activities (shipping, commercial fishing, agriculture, logging, brownstone quarrying, tourism, and recreation), and modern Ojibwa life and culture.

The most prominent and frequently visited historic sites in the Park are the six light station complexes and two sites preserving the history of the Great Lakes commercial fishing industry (Manitou Fishing Camp and Hokenson Fishing complex). However, a variety of additional resources are distributed throughout the Park, including structures, archeological sites, cultural landscapes, and ethnographic resources. Fire management planning must consider this rich assemblage of cultural resources contained within the park's backcountry areas, as well as the more widely known sites. In particular, plans must reflect the fact that the park has not been completely surveyed, and additional sites may be identified as time passes.

Surveys conducted so far have identified more than sixty archeological sites on the Apostle Islands. These include both historic and pre-historic sites; many appear to be associated with the prehistoric Woodland and early historic periods. Only about one-quarter of the Park's land area has been archeologically surveyed, and it is possible that there are other sites as yet undiscovered. In those sites that have been investigated, it has been observed that resources of archeological value typically lie close to the surface, rendering them vulnerable to even shallow ground disturbance.

The era of economic development on the islands is represented in the park's backcountry by abandoned brownstone quarries, by the remains of isolated farmsteads and fishing stations, and by dozens of logging campsites, roads, railroad beds, and landings.

Four relict brownstone quarries are within the Park: their massive walls, and their tools and rusting machinery, give evidence of a time when the now-quiet landscape was the scene of industrial activity.

The logging industry is represented by a wide variety of sites. The remains of several logging camps are readily visible on Oak Island. Distinct building foundations are seen on Stockton Island at Trout Point, Quarry Bay, and Anderson Bay. Extensive building ruins and artifact scatters are readily accessible on Bear Island. Outer Island boasts two well-documented camps from different eras.

Other sites illustrate a domestic side to life on the Apostle Islands. On Sand Island a small settlement developed around the 1870s homestead of Francis Shaw. By 1900 the community had a school and post office. Farming, augmented by fishing, continued on the island into the 1940s. During the summer, a second community flourished on the island, comprised of affluent families who built cottages along the south shore. Year-

round occupation of Sand Island finally ended in the 1940s, but a variety of sites and structures bear witness to the community's existence: old fields and orchards, historic roadways, foundations of homes, farm buildings, and even a schoolhouse.

Several other islands also saw episodes of human occupation during the nineteenth and twentieth centuries. Hermit Island held both the cabin of an anti-social recluse, and the lavish mansion of a quarrying magnate. Stone walls, orchards, fields, and foundations mark farmsteads on Basswood Island. Investigation may yet reveal traces of homesteads on Michigan, Bear, and other islands.

The Park's backcountry also contains a variety of ethnographic resources: plants and animals, sites and landscapes of ceremonial, medicinal, or other cultural significance to native peoples. These are elements of continuing traditions, not restricted to some past era, and the need to preserve access to these resources must be considered along with other aspects of resource preservation and visitor use. Identification of these resources requires further consultation with traditionally associated groups.

The park's museum collection includes approximately 13,000 objects, of which approximately 6,000 are displayed in field locations.

7) Threatened and Endangered Species

Apostle Islands National Park provides important habitat to Federally and State listed species and is specifically directed through Federal law and National Park Service policy to protect these species and their habitats.

There are four Federally and/or State listed animal species found in and around the Park. They include piping plover (*Charadrius melodus* - Federally and State endangered), peregrine falcon (*Falco peregrinus* - State endangered), Gray wolf (*Canis lupus* - Federally endangered and State threatened) and the bald eagle (*Haliaeetus leucocephalus* - Federally threatened). Wolves will likely be delisted in the coming years due to increasing populations in Wisconsin and Michigan. The bald eagle was delisted from the Wisconsin state list on August 1, 1997, but it still remains a State species of concern. It is also protected under the Bald Eagle Protection Act (16 USC 668). Canada lynx (*Lynx canadensis*) was listed as a threatened species in 2000. The Park falls within the potential southern range limit of the lynx, but there have been no verified sightings in the park. Lynx is a species of the boreal forest of which there is only a limited amount in the Park.

Reproducing bald eagle populations occur in the Park and are annually monitored in cooperation with the Wisconsin Department of Natural Resources (DNR). In 1998, a pair of piping plovers nested and successfully reared three chicks on Long Island, the first nesting activity in the park since 1983. Successful nesting also occurred in 1999 and 2001; however, the young produced in 1999 did not survive. Unsuccessful nesting occurred in 2002 and no nesting occurred in 2003 and 2004. The Apostle Islands provide important habitat for spring and fall migratory peregrine falcons. There are no eastern timber wolves that live permanently in the Park, however, potential habitat exists that

could be used by visiting packs or individuals. Wolf sign and unconfirmed sightings have been observed within and adjacent to the park.

In addition, the following Wisconsin threatened and endangered species may be seen in the park during spring (April, May, and June) and fall (September and October) migrations: osprey (*Pandion haliaetus*), Forster's tern (*Sterna forsteri*), and common tern (*Sterna hirundo*). Some breeding birds have been identified in the park are Wisconsin species of Special Concern. They include black-throated blue warbler (*Dendroica caerulescens*), Cape May warbler (*Dendroica tigrina*), Connecticut warbler (*Oporornis agilis*), Tennessee warbler (*Vermivora peregrina*), Swainson's thrush (*Catharus ustulatus*), evening grosbeak (*Coccothraustes vespertinus*), and yellow-bellied flycatcher (*Empidonax flaviventris*). The four-toed salamander (*Hemidactylium scutatum*) is a park amphibian listed as a Wisconsin species of Special Concern.

No Federally listed plant species are known to occur in the Apostle Islands National Lakeshore. However, the Park provides important habitat for five State endangered plants: butterwort (*Pinguicula vulgaris*), lake cress (*Armoracia lacustris*), moonwort (*Botrychium lunaria*), mountain cranberry (*Vaccinium vitis-idaea*), and satiny willow (*Salix pellita*). There are also twelve State threatened plants: calypso orchid (*Calypso bulbosa*), beautiful sedge (*Carex concinna*), coast sedge (*Carex exilis*), lenticular sedge (*Carex lenticularis*), Michaux's sedge (*Carex michauxiana*), drooping sedge (*Carex prasina*), broad-leaved twayblade (*Listera convallarioides*), marsh grass-of-Parnassus (*Parnassia palustris*), spike trisetum (*Trisetum spicatum*), northern gooseberry (*Ribes oxycanthoides*), flat-leaved willow (*Salix planifolia*), and plains ragwort (*Senecio indecorus*), and 26 species of concern (see Appendix C) (Judziewicz 1993, 1996).

Regionally rare habitats in the Park include old-growth forest, clay bluff communities, sandstone cliff communities, lagoonal and bog communities, and dunal communities.

The following protective measures will be implemented during fire control, management, or suppression actions:

- All known eagle, and piping plover nests, gray wolf den locations, sensitive plant locations, or habitat important to any other threatened, endangered, & sensitive species in close proximity to prescribed fire units will be addressed during the planning phase to ensure that they are not impacted.
- To reduce noise impacts from over flights or other equipment on sensitive species such as the currently threatened bald eagle, the Fire Management Officer will work with Park Natural Resource staff to determine unit-specific mitigation measures in the operational plans for the fire activity. Active bald eagle nests will be avoided entirely if possible. If it is determined that using aircraft in the vicinity of nesting bald eagles is necessary, takeoffs and landings will be avoided within 1/4 mile (0.4 km) of the nest. Under no circumstances shall aircraft be within 500 feet (150 m) of a nest. Recurring activity (passes, circling, hovering) will remain 1,500 feet (450 m) or more above ground level. Noise impacts will be evaluated as Park managers determine the "appropriate

management response" for a fire. In addition, no human foot traffic should occur within 500 feet of an active nest.

- In the event that the gray wolf is documented in the Lakeshore in the future, no fuel management activities will take place within ½ mile of a wolf den or rendezvous site from March 1 to July 31.
- Any fire that is judged a threat to any active sensitive, threatened, or endangered species den or nest would be suppressed.
- Any potential threats to critical habitat for piping plover on Long island or other designated critical habitat for other species will be considered. No fuel management activities are proposed to take place within piping plover habitat, including the areas designated as critical habitat.
- Any chemicals proposed for use in fire control or suppression activities should be evaluated for potential harm to listed species and used in a manner that would mitigate that harm (e.g., application away from wetlands or water bodies).

8) Real Property

Twenty-one of the 22 Apostle Islands are in the Park and are owned by the Federal Government (Madeline Island is private, state, and tribal lands). There are 12 reservation leases in the park where the original owners retain some rights of occupancy for certain tracts of land even though they have been purchased by the Government. The leases are of two types. Use and occupancy leases allow the original owners to use the tract for a set period of time (10 or 25 year leases are most common). Life estates leases allow the original owners to use the tract for the duration of their lifetime. Life leases occur on Rocky Island (3), Sand Island (3), and Bear Island (1). Use and occupancy leases occur on Sand Island (3). All of the latter will expire by the end of 2006. There are two inholdings in the Islands. The Town of Russell owns 2.0 acres (4.94 ha) on the south end of York Island and Bayfield County owns 1.79 acres (4.42 ha) on the southwest end of Sand Island. Long Island abuts private land on which The Nature Conservancy has a conservation easement.

b. Fire Management Objectives

Strategic Objectives:

- Lightning-caused fires in this FMU are allowed to burn in the unit under prescribed conditions unless they threaten human life, private property, other critical park resources and objectives, escape from the management unit, or violate air pollution control laws and regulations.
- Wildland fires are managed with the appropriate management response as directed by this fire management plan and analysis of the specific situation.
- Prescribed fires may be used in the Natural FMU to accomplish resource management objectives, such as encouraging pine regeneration or creating wildlife habitat, and fuel hazard reduction objectives, removing fuel ladders and downed

woody debris from the sub-canopy of red and white pine stands, or maintaining a cultural landscape.

- Mechanical fuel treatment methods are occasionally used for hazardous fuel reduction in areas where safe and effective prescribed fire treatment is precluded by fuel loads, or is otherwise infeasible.

Measurable Objectives:

- Ensure all wildland fires sustain no injuries to members of the public or to firefighters.
- The initial appropriate management response strategy for wildfires is successful 95% of the time.
- Ensure wildfire, prescribed fire, or wildland fire use fire, does not destroy any administrative structure, nor incur damage to any cultural or historical site.
- Ensure that the suppression of wildfires does not destroy natural or cultural resources, through the use of Minimum Impact Suppression Tactics (MIST).
- Annually review, and modify as necessary, agreements with cooperating agencies and fire departments (see Appendix G, MOUs and Cooperative Agreements).
- Establish or allow for the development of some rare or extirpated presettlement plant communities, such as white pine forests.
- Buffers will be formed around valuable natural and cultural resources, such as the old-growth hemlock stand on Outer Island.
- Restore and maintain cultural landscapes and historical scenes
- Establish a fire effects monitoring program to ensure that objectives are being met, and that unwanted effects are not occurring.

c. Operational Management Considerations

All of the following management constraints are based on resource protection and aesthetic considerations, and can be rescinded in life-threatening situations and with the express approval of the Superintendent.

- All fire management activities will consider safety of personnel and the public as the highest priority.
- Smoke management mitigation procedures for prescribed fire will be followed.
- Minimum Impact Suppression Tactics (MIST) will be employed.
- Protection and mitigation measures for known historic and cultural resource sites in or near the project area must be ensured before a prescribed fire project is initiated and during wildland fire.
- Park neighbors, park visitors and local residents will be notified of all planned and unplanned fire management activities that have the potential to impact them.
- All personnel involved in fire management operations will receive a safety briefing describing known hazards and mitigating actions, current fire season conditions and current and predicted fire weather and behavior.

- Only properly trained and qualified personnel will carry out fire management operations.
- All fire management activities in Wilderness areas will follow relevant regulations.

d. Historic Role of Fire

Fire history is sketchy for the Apostle Islands. Research data available is mostly from Swain (1981, 1986, and 1988) and Swain and Winkler (1983). Information suggests that wildland fire has been present in the islands for at least 7,000 years and has at least affected the vegetation structure on Bear and Stockton Islands (Swain 1988). Even current ecosystems that are not fire-adapted may have been shaped in some way by fire.

Tree-ring dates obtained from fire-scarred and unscarred living trees, or from scarred stumps on Stockton Island indicated that fire frequency varied from seven fires during the past 150 years on the sandy tombolo to only one fire during the past 200 to 300 years on areas with heavy soils (coniferous/northern hardwood community) north of the tombolo (Swain 1988). Tree-ring analysis from stands of hemlock and white pine on Outer, Manitou, Bear, and Devils Islands showed that the interval between perturbations was often 100 to 250 years. These forests consisted of a mosaic of even-aged stands of varying areas that ranged in size from less than a hectare to larger parts of an island. Both windthrow and fire probably contributed to the formation of these stands.

Swain (personal communication 1999) speculated the forest type now represented by the Outer Island old-growth hemlock stand may have been present in this location for 2,500 years or more. Canopy dominant hemlock averaged 359 years of age, with a range of 24 to 36 inches (61 to 91 cm) dbh (diameter breast height).

Fire records for the park exist going back to 1896, although the records prior to 1950 are sketchy (see Table 1). Fires were ignited both from lightning and humans. The largest fire from lightning was 7.5 acres in a 1963 fire on Outer Island. Other lightning fires may have been able to grow larger if they had not been suppressed.

Table 1. Historical record of fires in Apostle Islands National Lakeshore (Park Files 1979).

Date	Island	Cause	Acres Burned
5/1953	Rocky	Lightning	0
8/1963	Outer	Lightning	7.50
8/1970	Hermit	Lightning	0.10
8/17/1975	Otter, NW shoreline	Lightning	0.10
8/18/1975	Sand, NW shoreline	Lightning	0.25
9/13/1976	Hermit, SE shoreline	Lightning	0
8/27/1976	Devils, S shoreline	Lightning	1 tree
7/15/1980	Outer Island	Lightning	.1
8/10/1983	Bear Island	Lightning	.1
9/30/1990	North Twin	Lightning	.1
5/17/1998	Stockton, Presque Isle	Lightning	.5
9/6/1998	Manitou	Lightning	.1
7/27/2000	Mainland	Lightning	.1
7/28/2001	Manitou	Lightning	.1
8/28/2003	Stockton	Lightning	.1
9/23/1896	York (Raspberry Is. log)	Unknown	Large fire
9/26/1896	Sand (Raspberry Is. log)	Unknown	Large fire
10/19/1923	Mainland	Unknown	Large fire
8/9/1930	Outer	Unknown	Large fire
7/24-30/1934	Raspberry (NE & west side)	Unknown	Several small fires
8/20/1936	Outer	Unknown	Large fire
8/16/1934	Stockton	Human	Huge fire
10/14/1943	Oak	Human	approx. 4,000
11/1949	Cat	Campfire	0.25
9/1961	North Twin	Campfire	0.30
9/1969	Stockton	Campfire	6.60
7/31/1975	Michigan, sandspit	Campfire	1.00
9/18/1976	Rocky, NE interior	Human	1.00
9/25/1976	Devils, dump	Human	0
8/1/1978	S. Twin, sandspit	Human	0.30
8/8/1978	Stockton, campground	Human	0
9/20/1979	Raspberry Island	Human	.1
7/7/1989	Sand Island	Human	.1
8/1995	Long	Campfire	1.4
7/30/2000	Basswood	Human	.1

From Bayfield County Press:

- 10/19/1923 Large forest fire on mainland threatens homes and farms in Russell Crossing and Raspberry Valley and destroys Peterson Brothers portable sawmill at Raspberry.
- 8/16/1934 Huge fire on Presque Isle. 59 met to fight it. Berry picker blamed.
- 8/20/1936 Forest fire on Outer – 2 crews from Copper Falls CCC
- 10/14/1943 Forest fire on Oak Island – almost total island. Men and supplies daily on Booth Fisheries tug.

Eleanore Knight's history article in Bayfield County Press

- 6/24/1910 "...the lake has been covered with smoke from the forest fires that are on the south shore."
- 7/5/1910 "...Cornucopia was threatened with destruction by a forest fire."

e. Wildland Fire Management Situation

1) Historical Weather Analysis

Maximum daily mean temperatures vary from 77°F (25°C) in July to 25°F (-4°C) in January, and mean minimums vary from 54°F (12°C) to 7°F (-14°C) for these months. The highest and lowest recorded temperatures are 100.4°F (38°C) and -31°F (-35°C). Precipitation averages about 29 inches (75 cm) annually, including about 79 inches (200 cm) of snow. The growing season is about 120 days. The local climate is moderated by the "maritime" situation of the islands; compared with the adjacent Bayfield Peninsula, winters are warmer, spring arrives later, summers are cooler, and fall lasts longer. The far northern islands, Devils, and Outer, have noticeably cooler climates than ones farther south. Prevailing storm winds that blow from the northwest, north, and northeast, and winter storms are significant factors in determining island vegetation, especially in the northwestern and northern parts of the archipelago (Judziewicz and Koch 1992).

Microclimatic effects are prominent, especially in the spring. During this season, mid-day temperatures in the interior of large, relatively high islands such as Outer may be 18°F (10°C) higher inland than at lake level. Similarly, the Oak Island ranger cabin, situated near a ravine mouth with cold air drainage, consistently has some of the lowest summer morning temperatures in the islands.

In the summer of 2004, a remote automated fire weather station was installed on Oak Island. When sufficient years fire weather data has been compiled, analyses will be run using this data.

2) Fire Season.

The Fire Season is defined by FIREPRO as the cumulative 10-day periods during the year when a park experiences at least 10 unplanned ignitions based on ten years of record

(RM-18, Chapter 17). Although the Park does not meet these criteria at any time of the year, for the purposes of this plan, July through September are considered the fire season. As illustrated in Table 2, fires have occurred from May 1 to November 30. Fires are most likely to occur in late summer or early fall, after a dry summer and a continued warm, dry fall. As leaves fall from hardwood species, fluffy leaf litter accumulates on the forest floor. Fire danger increases under these circumstances if weather remains warm and dry.

Table 2. Monthly Distribution of Recorded Historic Fires between since 1896.

	May	June	July	Aug.	Sept.	Oct.	Nov.
Human-caused			3	7	3		1
Naturally-ignited	2		3	4	5		
Cause Unknown			1	2	2	1	

Lake Superior strongly influences fire weather in the Park. Fires are less likely in the spring and early summer because the melting snow pack generally keeps the litter and duff moist, and because frontal air masses are cooled as they move over cold Lake Superior waters creating cooler temperatures, higher humidity, and frequent occurrences of fog. Occasionally low winter snowfall followed by a long period of warm, dry weather creates high fire danger in the spring, as was the case in 1998. Lake Superior has the opposite effect in late summer and fall. Cooler frontal air is often warmed by the Lake, which has absorbed massive amounts of solar radiation over the summer. Fall air is frequently clear and relatively dry. But fall is also the time of year when high-energy fronts come into the area. They often stall over the Great Lakes region and build in intensity, resulting in tremendous windstorms accompanied by large amounts of precipitation.

3) Fuel Characteristics

Most of the park's vegetation during fire season will fall into National Fire Danger Rating System (NFDRS) fuel models H (short-needle conifer with normal amount of dead wood) or R (hardwood litter, summer) for which Fire Behavior Model (FBM) 8 generally predicts slow, creeping ground fires carried by tightly compacted litter (see Table 3). If fire does get above the ground, birch bark and conifer needles provide potential vehicles for spotting long distances.

In the fall (potentially the highest fire danger if a hot, dry summer is followed by a hot, dry fall), hardwood litter (NFDRS E) is loosely compacted and fire behavior in these areas is best predicted by FBM model 9. If the stand is open and there is a substantial amount of dead grass, FBM 2 may be a better prediction tool in this type. Increased solar radiation and unrestricted wind movement can accelerate the drying of dead and down fuels.

Older short-needle conifer stands, or those damaged by windthrow or insect infestations, generally have large amounts of dead and down wood (NFDRS G). This description applies to old-growth coniferous forests, especially on Raspberry Island, and possibly in

black spruce or cedar swamps. FBM model 10 will be used for most of these areas and predicts generally slow-moving but very hot fires. FBM model 6 will be used in some old-growth coniferous forest such as old-growth hemlock to reflect the well developed shrub component in the understory composed mostly of Canadian yew.

Fires on wetland meadows and sandscapes will be carried by grasses but often have an overstory of shrubs and clumps of fuels that generate higher intensities and firebrands (e.g. *Vaccinium* spp., juniper). These can be modeled by NFDERS C (open pine with grass) and FBM 2, which predicts fast-moving ground fires.

Live fuel flammability in the park is generally limited to conifer species. These species affect fire spread by torching, spotting, and crowning. Organic soils can also burn but are not factored into any of the traditional models. Organic soils add to fuel availability and often pose a mop-up problem.

Table 3 includes vegetation communities and related NFFDRS and BEHAVE Fuel Models and Canadian Fuel Types. Forest composition maps designed by Ventura and He (1993) were used to determine areas for each vegetation type and percentages were calculated to determine vegetation type composition throughout the park. Descriptions of vegetation communities are available in Appendix E.

Table 3. Vegetation Communities and Related NFFDRS, BEHAVE, and Canadian Fuel Types

Vegetation Community	% of Land Area	NFDRS Fuel Model	BEHAVE Fuel Model	FBM Fuel Type
Aspen/birch forests compact litter (spring/summer), fluffy litter (fall)	16.7	R, E	8, 9	D-1
Bog wetlands	1.9		2, 5	
Boreal forests	3.1		6	M-1, M-2
Clearings or open areas	0.3		1, 2	O-1a, b
Northern hardwood hemlock forests compact litter (spring/summer), fluffy litter (fall)	10.8	R, E	8, 9	D-1
Northern hardwood mixed forests compact litter (spring/summer), fluffy litter (fall)	15.8	R, E	8, 9	M-1, M-2
Vegetation Community	% of Land Area	NFDRS Fuel Model	BEHAVE Fuel Model	FBM Fuel Type
Northern hardwood sugar maple forests compact litter (spring/summer), fluffy litter (fall)	21.7	R, E	8, 9	D-1
Oak forests compact litter (spring/summer), fluffy litter (fall)	3.0	R, E	8, 9	D-1
Old-growth conifer forest	21.9	Q, G	6, 10	
Old-growth northern hemlock forest yew understory		Q	6	C-2
Pine forests	0.6	C, U	2, 9	C-5, C-6
Sandscape communities	0.2		2, 5	O-1a, b

4) Fire Regime Alteration

Intensive vegetation surveys leading to fire regime and condition class assessments have not yet been completed for the Park. However, estimates can be made based on general forest type classifications and standard fire regime groups, which are described below.

Fire Regime Group	Frequency (Fire Return Interval)	Severity
I	0-35 years	Low
II	0-35 years	Stand Replacement
III	35-100+ years	Mixed
IV	35-100+ years	Stand Replacement
V	>200 years	Stand Replacement

Approximately 71 percent of the vegetation communities fall into Fire Regime Group V. These include hemlock, white cedar, yellow birch, and red and sugar maple types. Fires in this group are rare but severe. Additionally, fires in the communities listed are dependent on blow-down events, which occur at intervals of 200 to 1400 years. Given this long return interval, vegetation compositions and structures are likely still intact, and the risk of losing key ecosystem components is relatively low.

Approximately 20 percent of the Park communities reside in Fire Regime Group IV. These vegetation communities include paper birch, balsam fir, and quaking aspen. Stand replacement fires occur in these communities every 100-200 years, and depend on droughts and high fuel loadings. The vegetation compositions of these stands are also likely intact, given the long return interval. Thus, the risk of losing key ecosystem components remains relatively low.

Approximately 4 percent of the Park is classified in Fire Regime Group III. These stands include red and white pine and northern red oak. These communities depend on frequent (10-50 years) surface fires to maintain them, with high severity fires being infrequent (150-300 years). In the absence of fire, there is some risk that these communities would lose key ecosystem components. The prescribed fire program at the Park will focus treatment of these areas (Appendix H).

When the process for determining Fire Regime and Condition Class (FRCC) is finalized nationally, the Great Lakes Fire Ecologist will revise the FRCC classifications for Apostle Island National Lakeshore.

5) Control Problems and Dominant Topographic Features.

The main obstacle to wildfire control for the Park is logistics. Because it is primarily a water-based park with many remote islands, there is great difficulty in initially discovering and assessing a fire. Once a management action is decided on, there is an issue of reaching islands in a timely manner with equipment that would normally be readily accessible on a mainland operation. Fortunately, most of the primary cultural resources such as the six lighthouse complexes and major visitor developments are associated with dock facilities where fire fighters and equipment can be quickly loaded on and off boats. The understory of many islands is extremely dense, especially those with undisturbed Canada yew, making travel through island interiors difficult for

firefighters. Aircraft might be the only feasible alternative in remote areas where suppression is necessary because of values at risk.

6) Other Elements of the Fire Environment Affecting Management.

Specific descriptions of each of the islands including fuels, values at risk, and fuel loading inventories can be found in Appendix E

2. Special Use Fire Management Unit

a. Physical and Biotic Characteristics Unique to this FMU

The Mainland Unit is 2,565 acres (1,043 ha) and rises 248 feet (76 m) above the lake level. It is approximately 12 miles (19.3 km) along the Lake Superior shore and varies from 0.3 (0.5 km) to one mile (1.6 km) wide. The Mainland is a narrow strip of land adjacent to private, Russell Township, Bayfield County, and Red Cliff Band of Lake Superior Chippewa Indian lands. Management concerns will focus on boundary issues and visitor access.

1) Vegetation

Refer to section III.D.1.a.1 (p. 15) for a comprehensive discussion of vegetation. Presettlement vegetation was dominated by hemlock, yellow birch, and white cedar with lesser amounts of balsam fir, white pine, and some birch groves. Logging began in the 1890s and continued up until the park was established through the 1970s. Presently the forest is dominated by pole-sized quaking aspen, white birch, sugar maple, balsam fir, and some white spruce. White and red pines are present on the barrier dunes on either side of the outlet of Sand River. Very little old-growth is left except for a few hemlocks and hardwoods in the small but rugged ravines just south of Little Sand Bay. There is a stand of large white cedars just southwest of Sand Point that serves as a winter deer yard. The forest understory is dominated by heavily browsed beaked hazelnut and mountain maple; yew is rare. There are two barrier beach/bog complexes in the Mainland Unit, one northeast of Little Sand Bay dock and the more extensive Sand River bog or estuary complex (Judziewicz and Koch 1993).

2) Geology/Soils

Refer to section III.D.1.a.2 (p. 17) for a comprehensive discussion of geology and soils. The shoreline consists of mostly low clay and sandstone bluffs dissected by small ravines.

3) Aquatic Resources

Refer to section III.D.1.a.3 (p. 17).

4) Air

Refer to section III.D.1.a.4 (p. 18).

5) Wildlife

Refer to section III.D.1.a.5 (p. 18).

6) Cultural and Historic Resources

Refer to section III.D.1.a.6 (p. 20).

7) Threatened and Endangered Species

Refer to section III.D.1.a.7 (p. 21).

8) Real Property

Approximately 70 percent of the land adjacent to the Mainland Unit is private. The remainder is a combination of Bayfield County, Russell Township, and The Red Cliff Band of Lake Superior Chippewa lands. Russell Township owns two inholding on the Mainland Unit (51.42 acres (127.0 ha), and 11.06 acres (27.32 ha)). Part of the Mainland strip is within the Red Cliff Reservation.

b. Fire Management Objectives

Strategic Objectives:

The Special Use FMU will provide intensive protection for human life and property within and outside Park boundaries.

All lightning and human-caused wildland fires originating from within or that threaten the Special Use FMU from outside are suppressed (managed) with the appropriate management response and analysis of the specific situation. Mechanical fuel manipulation with powered hand tools will be used to reduce fuels and accomplish vegetation management objectives.

Measurable Objectives:

- Ensure all wildland fire operations sustain no injuries to members of the public and firefighters.
- Initial appropriate management response strategy for wildfire is successful 97% of the time.
- Ensure wildfire does not destroy any administrative structure, nor incur costly damage to any cultural or historical site.
- Annually review and modify as necessary agreements with neighboring agencies and fire departments.

c. Operational Management Considerations

All of the following management constraints are based on resource protection and aesthetic considerations, and can be rescinded in life-threatening situations and with the express approval of the Superintendent.

- All fire management activities will consider safety of personnel and the public as the highest priority.
- Minimum Impact Suppression Tactics (MIST) will be employed.
- Protection and mitigation measures for known historic and cultural resource sites in or near the project area must be ensured before a prescribed fire project is initiated and during wildland fire.
- Park neighbors, park visitors, and local residents will be notified of all planned and unplanned fire management activities that have the potential to impact them.
- All personnel involved in fire management operations will receive safety briefings describing known hazards and mitigating actions, current fire season conditions and current and predicted fire weather and behavior.

d. Historic Role of Fire

Refer to section III.D.1.d (p. 25).

e. Wildland Fire Management Situation

- 1) Historical Weather Analysis: Refer to section III.D.1.e (p. 27).
- 2) Fire Season: : Refer to section III.D.1.e (p. 27).
- 3) Fuel Characteristics

No fuel loading inventories have been done on the mainland, but those done on islands with northern hardwood mixed forest habitat may be comparable. Refer to Oak and Outer Islands in Appendix E. FBM fuel models represented are 2, 5, 8, and 9.

- 4) Fire regime alteration. Refer to section III.D.1.e (p. 27).
- 5) Control Problems

The primary control problem on the Mainland is that it is a narrow strip of land that has a very complex boundary with multiple ownership interests. Cooperation with adjacent and landowners is crucial to any successful fire management program in this area. Many county roads penetrate the Mainland Area by which fire equipment could gain access. Some of these roads, however, are strictly four-wheel drive roads. Poor roads could be used and improved by track vehicles in the event of a fire. Areas between roads are remote and would be more difficult to reach. Shoreline access is

possible in some places where small boats could beach, but much of the area has steep cliffs or rocky shores.

6) Values

Values at risk include old-growth white cedar groves, the Hokenson Fisheries National Register site (14 structures listed on the List of Classified Structures), the John Nelson cabin and privy, Russell Township Campground, NPS facilities, living quarters, and dock at Little Sand Bay. A description of each islands fuels and values to be protected can be found in Appendix E.

IV. WILDLAND FIRE MANAGEMENT PROGRAM COMPONENTS

15. A. General Implementation Procedures.

The Apostle Islands GMP states: “Fire will be considered as a tool in the management of forest vegetation and wildlife. Fire management recommendations could include prescribed burns and wildland fire use policies.” In light of this statement, the full range of fire management options will be utilized at Apostle Islands. Consequently, appropriate management responses are not automatically focused on limiting fire size. Rather, they will be based on:

- Protection of private property
- Public and firefighter safety
- Cost expenditures commensurate with values to be protected
- Protection of cultural, historic and natural resources from fires
- Limiting fire line construction through use of natural barriers such as lakes, streams and lowlands
- Protection of Park improvements (buildings, campgrounds, etc.) and use and occupancy properties
- Preventing fire spread from the Park onto non-park lands
- Air quality within developed areas near the Park

The Apostle Island National Lakeshore General Management Plan (GMP) and Resource Management Plan (RMP) have identified areas and priorities to be considered when determining the appropriate management response (AMR) to a wildland fire occurrence. The range of appropriate management responses will be based on objectives for the area, relative risk (immediate and external influences), and complexity and defensibility of management boundaries. To assist in determining appropriate management response and strategies/tactics to implement, fire managers will utilize the “appropriate management response” chart found in the Policy and Implementation Procedures chapter of the Wildland and Prescribed Fire Policy Implementation Guide (1998). This chart uses objectives, relative risk, complexity, and defensibility of management boundaries to help determine the range of AMR. The AMR for human caused fires will not include resource benefits as a consideration and these fires will be suppressed.

The Wildland Fire Implementation Plan (WFIP), Stage I, provides the decision framework for selecting the appropriate management response. The Stage I analysis includes the initial fire assessment and the go/no go decision criteria checklist. It documents the current and predicted situation and all appropriate administrative information. It also provides the manager with decision criteria to make the initial decision of whether to manage the fire for resource benefits or to take suppression action. Operational management decisions are described in the WFIP. (Refer to Chapter 4 Policy and Implementation Procedures of the Wildland and Prescribed Fire Policy Implementation Guide.)

A Wildland Fire Implementation Plan (WFIP) will be initiated for all wildland fires. This plan will provide the framework for determining the appropriate management response. The WFIP Stage I: Initial Fire Assessment will be the responsibility of the Incident Commander, the Area FMO, or the Park Fire Coordinator.

There is a requirement to precede through a decision checklist as a part of the Stage I analysis. The park's Special Use FMU only allows for suppression of unplanned ignitions. Subsequently, the Stage I analysis can be considered met at the programmatic level in the FMP.

There are a variety of suppression tactics available for use. Their likelihood of use, however, varies widely and is dependent upon availability of resources, logistics, and whether they are appropriate relative to the need. Fire suppression can rely on aerial attack using both helicopters and fixed-wing craft, both of which could require a landing area. These craft are used either to drop incendiary devices for burn-out operations or to drop retardants or water for suppression purposes. In addition to landing zones, base camps may be required. Heavy equipment such as bulldozers and pumper trucks, are frequently used in suppression and the mop-up phase. At times fire lines may be constructed using explosives that quickly clear vegetation in a linear manner to stop fire spread. Fire lines may also be created using hand crews that remove all vegetation with hand tools, or by wet line techniques which depend upon the application of water or foam. The width of the fire line will vary depending upon the fuels in the area and the intensity, size, and rate of spread of an approaching fire. Hoses and sprinkler systems are both frequently used. One technique, referred to as hydro-mining, involves hosing an area with water under pressure for a length of time. This may be utilized when fires are deep within stumps or are underground.

In a suppression operation, any of the techniques described are possibilities. However, the NPS is mandated by Directors Order 18 to use Minimum Impact Suppression Tactics which attempts to reduce impacts of controlling or suppressing fires. The Wilderness designation requires that lands be managed in a manner that will not adversely impact wilderness values. In addition, the island nature of the park makes some tactics more likely than others due to logistics. These considerations make construction of fire lines with hand crews more likely than with heavy equipment.

Prescribed fire operations are pre-planned and therefore rely more often on natural and man-made barriers, fire line construction with hand crews, or wet lines. Other tactics more likely to be used are foam and sprinkler systems.

16. B. Wildland Fire Suppression

1. Range of Potential Fire Behavior

Due to the lack of complex topography and the marine influence, fires in Apostle Island National Lakeshore are essentially wind-driven. Slowly spreading surface fires with occasional torching are the norm with 20 feet wind speeds below 15 mph. During periods of drought and high winds, short duration crown runs could occur if conifer crown closure and wind speeds are adequate.

Historically, some of the islands have experienced high intensity fires as a result of accumulated logging slash. These fuel conditions do not exist today. These fires occurred on Oak, Outer, and Stockton Islands.

2. Preparedness Actions.

Preparedness includes those things that are done in advance of fire occurrence to ensure the ability of Apostle Islands' fire management organization to initiate effective action, whether that is suppression (using the appropriate management response) or the evaluation and decision process for prescribed fire or wildland fire use. Preparedness activities include: recruitment, training, planning and organization, maintaining fire equipment, and procuring equipment and supplies. The objective of preparedness is to have a well-trained and equipped fire management organization to suppress wildfires, manage wildland fire use fires or apply prescribed fire in a safe, efficient manner. Preparedness activities are covered by normal park operating funds for Staffing Classes I through Staffing Class III. Staffing Classes IV and V are covered by emergency (PWE E11) funding.

a. Fire Prevention

There are six goals to the Park's fire prevention program. They are:

- To reduce the number of human-caused fires.
- To integrate fire prevention messages in interpretive contacts and outreach programs.
- To closely coordinate fire prevention efforts with Wisconsin DNR, USFS, The Bad River and Red Cliff Bands of Lake Superior Chippewa, and adjoining private landowners.
- Provide annual training to appropriate Park employees and volunteers.
- Protect resource values
- Provide for the safety of visitors and park employees

Visitor contact messages and local community programs will contain fire prevention elements to reduce human caused fires in the area. Special efforts will be made when fire danger is extreme such as press releases and radio messages.

Efforts to keep landowners informed of Park plans and activities will be made in regards to this program and during high fire danger. Precautions will be taken to prevent any fire that starts in the Park from escaping onto private and Tribal lands adjacent to the Park.

A Fire Prevention Plan for Apostle Island National Lakeshore is attached as Appendix I.

b. Training and Certification

All personnel involved in wildland fire suppression, prescribed fires, or fire monitoring will meet national standards as determined by the National Wildfire Coordinating Group (NWCG 310-1) and the DOI Incident Qualification System. Park personnel assigned fire management responsibilities and tasks are to meet the minimum training and experience guidelines for the position held. All personnel involved in fire management operations will have their qualifications, training, and experience entered into the Incident Qualification Computer

System (IQCS). Updates to the IQCS system will be made by the Area Fire Management Office with copies provided to the Fire Coordinator for mobilization and dispatch purposes.

Recommendations for training will be made through the Park Fire Coordinator and Area Fire Management Officer. Training nominations will be submitted through the Area Fire Management Office for determination of course availability, prioritization, and funding availability. Nominations for courses will be submitted for those personnel who have met the prerequisites and have identified these in their annual employee Individual Development Plan (IDP). Physical fitness standards for all wildland firefighters will be maintained in accordance with NPS standards.

Annual training will consist of annual firefighter safety refresher training, first aid and other safety training for appropriate individuals.

Identified below are the minimum position needs.

Wildland Fire

- 1 Incident Commander Type IV or V
- 1-2 Firefighter Type I (Squad Boss)
- 2-3 *Firefighter Type II (Faller Type B (FALB))
- 1 *Emergency Medical Technician

Prescribed Fire

- 1 Prescribed Burn Boss II
- 1-2 Firefighter Type I (Squad Boss)
- 2-3 *Firefighter Type II (Faller Type B (FALB))
- 1 Fire Effects Monitor (FEMO)

Note: *Employees can be certified for more than one position.

c. Annual Fire Management Activity Schedule

Prior to and during the fire season, the following preparedness actions will be taken to ensure adequate fire preparedness. The responsible positions for completing the actions are in parentheses.

February 1: Fire training and fire experience records will be updated for all employees. (Chief of Protection, Fire Management Coordinator)

February: All fire supplies and equipment will be inventoried, inspected, and maintained in serviceable condition for immediate use. (Chief of Protection, Fire Management Coordinator, Biologist, Chief of Facility Maintenance)

March 15 - March 31: FIREPRO seasonal employees will be selected (if applicable). PPE, fire packs and other equipment will be issued to permanent employees. (Fire Management Coordinator)

April 1 - April 15: Semi-annual servicing of the engine. (Chief of Facility Maintenance)

April 1 - May 31: All fire-qualified (according to NWCG standards in PMS 310-1) permanent personnel will take the Work Capacity Test and an annual firefighter refresher. Fire-qualified seasonal employees will be complete the Work Capacity Test as they enter on duty; arrangements will be made by their supervisor. (Chief of Protection, Fire Management Coordinator)

April 1: Daily NFDRS querying. Depending upon weather conditions, this may be started at an earlier date. (Fire Management Coordinator and/or Dispatcher)

April - May: Red Cards will be issued to all fire-qualified permanent employees. (Area Fire Management Coordinator)

April - June: Fire training for seasonal employees will be completed including orientation to the engine and other fire pump operations. A second session of the annual wildland fire safety refresher training will also be provided for returning seasonal employees. Red Cards will be issued to seasonal employees by the Fire Management Coordinator.

April 15 - August 31: During the fire season, a roster of personnel qualifications and availability will be maintained. Each employee subject to fire duty will have PPE and initial attack gear available for immediate use.

June -September: Monitor post wildland fire effects in areas that have burned.

August 15 - September 15: A fire training needs assessment will be conducted for the next fire season. (Fire Management Coordinator)

October 31: Daily NFDRS querying or call-up will cease for the season. (Chief of Protection): Supplies and equipment will be inspected, serviced, and inventoried. Daily situation reporting will cease unless very high to extreme fire danger is experienced. (Chief of Facility Maintenance, Fire Management Coordinator)

November 1 - November 30: Semi-annual servicing of the engine unit will be completed. Fire equipment will be winterized as appropriate. (FMC)

November 1 - April 30: A post season "wrap-up" will be conducted to evaluate the previous season and set preparedness/planning goals for next season. On-the-job training and fire courses will be utilized to upgrade the skill levels of the Park staff. (Chief of Protection, Fire Management Coordinator)

d. Fire weather and fire danger.

1) Weather stations

In 2004 Apostle Islands installed a Remote Automated Weather Station (RAWS) on Oak Island. Both National Fire Danger Rating System (NFDRS) and Canadian Forest Fire Danger Rating System (CFFDRS) indices will be calculated using this station. Eventually as a historical weather database is achieved, the park's Staffing Plan and fire weather decision making will be based on this RAWS rather than use of the USFS station. Until then, and as a source of historical weather data, the Park will use the US Forest Service weather station at Washburn (# 470207). This station is at 1260 ft (384 m) elevation, on a flat aspect, in slope class 1, in climate class 3, and calculates NFDRS indexes using fuel model E. Indices from this station can be found at: http://www.fs.fed.us/eacc/predictive_services/data/Wisconsin.htm.

2) National Fire Danger Rating System

The National Fire Danger Rating System (Deeming et al., 1977) indicates the potential for and severity of wildland fire occurrence. The Burning Index (BI) for NFDRS Fuel Model E will be used to indicate fire danger in the Park's initial attack area. Fuel Model E is used because it best represents the majority of the fuels in the Park. This is also the primary fuel model used by the local National Forest.

As fire danger increases, the Park's fire organization's level of preparedness will increase. Preparedness actions that are defined by staffing classes tied to the Burning Index are contained in the Step-up Staffing Plan in Figure 3. The Burning Index ranges in Table 4 were derived from fire weather data obtained from the U.S. Forest Service's Washburn weather station (Station #470207) using the FIREFAMILY program. This station will continue to be used to determine the Burning Index (BI) for the appropriate Staffing Level until weather stations are established in or near the Park.

In addition, Energy Release Component (ERC), and 100 and 1,000 hour fuel moistures will also be tracked as a drought indicator. Ninetieth and 97th percentile thresholds for Fuel Model E are shown in Table 4 below.

Table 4. Percentile Thresholds for NFDRS Fire Danger Indexes in Fuel Model E.

Index	90th	97th
Burning Index (BI)	32	41
Energy Release Component	20	26
Hundred-Hour Fuel Moisture	12%	10%
Thousand-Hour Fuel Moisture	15%	13%

e. Describe step-up staffing plan.

As fire danger increases, the Park fire management organization's level of preparedness will increase. Preparedness actions that are defined by staffing classes tied to NFDRS are contained in the park's Step-up Staffing Plan in Figure 3. Each of the staffing classes in Figure 3 is progressive and includes the previous actions. Weather is recorded daily and tracked during the spring, summer, and fall months. When weather conditions suggest the

potential for fire, weather conditions are regularly checked as are interagency staffing levels.

Approved activities for Emergency preparedness funds (Primary Work Element E11 (PWE E11)) include hiring of emergency temporary firefighters, placing existing staff on extended tours of duty, increasing or initiating special detection operations, and leasing aircraft reconnaissance. All of these actions are aimed at ensuring prompt response by adequate forces should fires occur.

The Park's authority to expend Emergency preparedness funds from PWE E11 is tied to the NFDRS Burning Index (BI), the 90th percentile break point, and the pre-identified expenditures in the Step-up Staffing Plan (Table 5). Authorization to expend PWE E11 beyond the expenditures identified in the step-up plan will be obtained from the Area or Regional Fire Management Officer.

Table 5. Step-up Staffing Plan for Apostle Islands National Lakeshore.

Staffing Class SC	Fuel Model	Burning Index	Step up Actions
SC-1	E	0-11	Park will continue with normal operations. Normal preparedness actions.
SC-2	E	12-23	Park will continue with normal operations. Normal preparedness actions.
SC-3	E	24-36	Staff notified of fire weather conditions. Fire awareness incorporated in public contacts. Record of available staff and locations maintained. Under unusual conditions, the Chief of Protection or Superintendent may upgrade with appropriate justification to SC-4 if a high visitation period such as a holiday or special event is determined to pose exceptional human-caused risk of wildland fire.
SC-4	E	37-41	All actions under SC-3 plus: In consultation with the Area FMO, the Park may open emergency preparedness account. Overtime may be authorized to enhance fire preparedness by firefighters working their days off or after normal working hours in the evening to increase patrols. Off-duty roster kept of trained personnel. Red carded personnel will have PPE available to respond to fires. May supplement Park personnel with outside overhead, crews and equipment as wildfire occurrence increases.
SC-5	E	42+	All actions under SC-4 plus: Additional fire qualified personnel may be on paid standby duty and readily available for suppression.

3. Pre-attack Plan

The Park pre-attack plan is considered a “work in progress,” that is, it is constantly being upgraded as staff time permits utilizing the suggested checklist from Reference Manual -18, chapter 7. Some preparations and procedures are established in the Annual Preparedness Activities section (C.2.c) of this plan. Currently, the pre-attack plan consists of maps showing remote fire cache locations. Appendix E. These documents will be reviewed by the Chief of Protection, FMC, Biologists, and the Area FMO prior to each fire season and revised as necessary. Due to the extensive water area of the park, transportation to fires is generally by boat so these routes are not marked, nor are water sources noted since they are obvious from the base map.

Cache inventories are found in Appendix G.3.

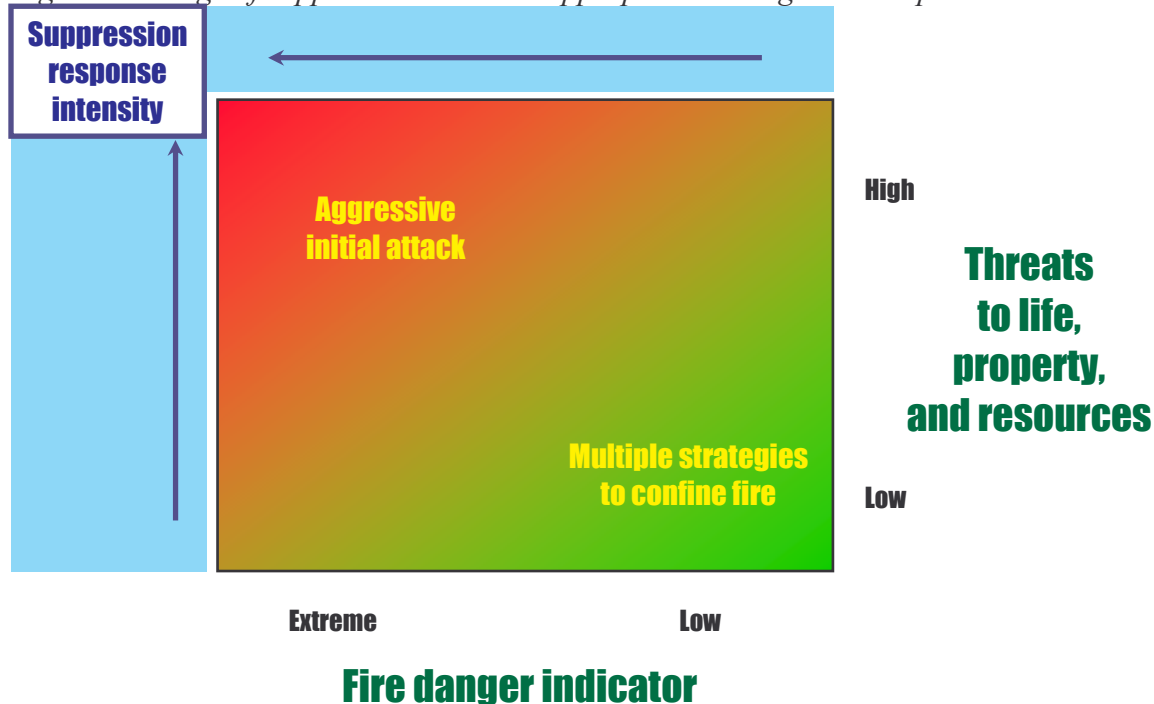
4. Initial Attack

All suppression actions will be governed by consideration for human safety; availability of effective, appropriate equipment; and management objectives and constraints. Current Apostle Islands National Lakeshore goals include appropriate management response by NPS personnel of all fires occurring within the park. In general, the goals can be met most effectively and cost-efficiently by:

- Quickly evaluating each fire occurrence within the Park for geographic location, spread potential, and amount and type of force(s) needed for effective suppression.
- Providing rapid, assertive initial attack for those fires to be suppressed.
- Using appropriate management response methods and tactics designed to efficiently and effectively suppress fires while accomplishing resource management objectives.

The range of suppression-oriented appropriate management response graph (Figure 3) from Chapter 4 of the Wildland and Prescribed Fire Management Policy- Implementation Procedures and Reference Guide, provides an illustration of the range of suppression responses based on threats and fire danger.

Figure 3. Range of suppression-oriented appropriate management responses.



a. Information used to set initial attack priorities.

Whenever fire is reported within Park boundaries, the following steps will be taken:

- Report of the fire to the Apostle Islands National Lakeshore Headquarters.
- Dispatcher or Fire Management Coordinator determination of location, legal description, and land ownership at the occurrence site.
- At least two or more Apostle Islands National Lakeshore personnel will be dispatched to the location of the fire. Personnel dispatched will be qualified (according to NWCG standards in PMS 310-1) and equipped to undertake initial attack action.
- Immediately upon arrival at the fire location, an initial fire size-up (report of the ignition source/cause, fire size, behavior, environmental conditions, fuels, terrain features, existence of special hazards or threats to persons or improvements, and any other factors observed which could affect fire behavior and suppression efforts etc.) will be completed. This information will be reported to Apostle Islands National Lakeshore dispatch. These fire size-up observations will be immediately forwarded to the Fire Management Coordinator.
- Upon determination of actual fire location and based on the information reported following the initial fire size-up, the Fire Management Coordinator and the Biologist (or designees) will develop the appropriate management response, giving consideration to applicable resource management objectives and constraints, together with considerations of personnel safety and economics. Data gathered in the size-up will be utilized by the Fire Management Coordinator and the Biologist to determine an appropriate strategy for managing the fire.

Initial reports of fires will be immediately forwarded to the Chief of Protection. If a wildland fire is located outside of the Park boundary, Wisconsin DNR Forest Fire Control which is the primary fire fighting agency in the State (715-372-8539 ext. 103 [Brule dispatcher] or 715-373-6165, Washburn Office), and/or Chequamegon National Forest, Washburn District, (715-373-2667) will be promptly notified.

If a fire is within the Park boundary, an Incident Commander (IC) will be designated. The Dispatcher will maintain a log of all radio and telephone communications and other pertinent information regarding suppression actions. The fire will be entered in the Shared Applications Computer System (SACS) by the Area FMO.

All wildfires will receive an appropriate management response. The Fire Management Coordinator will assign an Incident Commander and determine the appropriate suppression strategy to be utilized. The Fire Management Coordinator will keep the Chief of Protection, Superintendent and Area FMO updated of the fire situation. The Fire Management Coordinator will coordinate all suppression activity within the park and may request that Park personnel begin initial attack. The goals in initial attack actions are to ensure firefighter and public safety, limit damage to threatened values, minimize the area burned and prevent escape of the fire. All fire personnel will fully comply with personal protective equipment standards and other applicable safety requirements.

An Incident Commander (IC) will be responsible for all actions taken on the fire. The IC will inform the Fire Management Coordinator of the fire situation as soon as possible after arrival on the scene. If the fire behavior and complexity continue to increase, the IC may be replaced by a fully qualified (according to NWCG standards in PMS 310-1) ICT4

or higher and additional support personnel and equipment may be ordered. The Fire Management Coordinator is responsible for the selection of a replacement Incident Commander. If the fire threatens to exceed initial attack capabilities, the Fire Management Committee will be convened and the fire may be declared an extended attack action.

The Fire Management Coordinator/Dispatcher will monitor the Burning Index (BI) daily using data from the U.S. Forest Service's Washburn NFDRS weather station (#470207) and determine staffing levels based on the Park's Step-Up Plan (Figure 3). Whenever a fire is reported on Apostle Islands National Lakeshore lands, forces and equipment dispatched for initial attack will be based on daily Burning Index, fire location, existing and predicted environmental conditions and any other factors pertinent to making sound fire management decisions.

In the event of multiple ignitions, the Chief of Protection or designee will set priorities for use of available personnel and equipment, staffing fires with the highest values at risk first. Additional resources will be ordered through Chequamegon National Forest (local cooperator) as needed, to provide appropriate resources for all wildfires in the shortest possible time.

b. Criteria for appropriate management response

- Public and firefighter safety
- Protection of cultural, historic, and natural resources
- Protection of improvements and private property
- Whether or not the fire is within a Fire Use FMU
- Minimum fire line construction
- Available suppression resources and response times
- Long and short term fire danger

c. Confinement as an initial attack suppression strategy.

All wildfires will receive an initial attack response. Confinement strategy may be selected to maximize firefighter safety, minimize suppression costs, minimize cost plus loss in low valued resources areas, and avoid the possibility of damage to unknown sub-surficial archeological artifacts and to maximize availability of critical suppression and management resources during periods of high danger associated with fire in highly valued resource areas. Confinement can also be a strategic selection through the WFSA process when the fire is expected to exceed initial attack capability or planned management capability. When confinement is selected as initial action, the same management process applies as for wildland fire use decisions. A WFIP will be prepared in stages as the fire or management consideration dictate.

d. Response times

As noted above, access to fires by suppression forces is commonly by boat. Most parts of the park require 45 minutes to an hour to reach under ideal conditions. Aircraft response times vary depending on the resource and the base location. Additional ground resources are available through local agency cooperators with response times running from 1-6 hours for extended attack resources and 12-24 hours for project fire support.

e. Restrictions and Special Concerns

- All fire management activities will consider safety of personnel and the public as the highest priority.
- Minimum Impact Suppression Tactics (MIST) will be employed as discussed in section IV.B.5 of this plan. These tactics will also be utilized in wilderness zones.
- Protection and mitigation measures for known historic and cultural resource sites in or near the project area must be ensured before a prescribed fire project is identified and mitigated during suppression actions.
- Park neighbors, park visitors, and local residents will be notified of all planned and unplanned fire management activities that have the potential to impact them.
- All personnel involved in fire management operations will receive safety briefings describing known hazards and mitigating actions, current fire season conditions and current and predicted fire weather and behavior.
- Only properly trained and qualified personnel will carry out fire management operations.

Due to extensive water resources in the park, the following special restrictions will apply with regard to aerially applied retardant and foam use:

Retardant – No retardant drops within 400 feet of open water.

Foam (aerial delivery) – Aerial delivery of foam requires Park Superintendent approval on a case-by-case basis when public or firefighter safety is threatened or when developments are threatened. When approved, the following guidelines apply:

- Foam concentrate will only be injected into the holding tank after the water pick-up operation has been completed.
- Drops from Beaver, T2 & T3 helicopters – no drops within 200 feet of open water.
- Drops from Scoopers, heavy air tanker or heavy helicopter – no drops within 400 feet of open water.

Foam (ground delivery with motorized pumps):

- No application within 25 feet of open water when using small pumps (Mk 26, Shindawa, etc.)
- No application within 50 feet of open water when using Mk III or equivalent pumps or fire ground engines.
- All foam concentrate used for injection will be located in impermeable containment basins, i.e. visqueen (plastic sheet) spread over rocks or logs to form a catch basin.

Foam (ground delivery with backpack pumps):

- No application within 10 feet of open water.
- All backpack pumps will be filled a minimum of 10 feet from open water. A separate, uncontaminated container must be used to transport water from source to backpack pump. This container must be kept uncontaminated by concentrate.

5. Extended Attack, Large Fire Suppression, and Multiple Fires

Extended attack actions occur when fires have not been contained or controlled by initial attack forces. Extended attack continues until either the transition to a higher level incident management team is completed or the fire has been contained or controlled. A Wildland Fire Situation Analysis (WFSA) must be completed by park staff when a fire cannot be controlled during initial attack, and if the action escalates to incident management team levels, the incoming team will be briefed by the Superintendent (Agency Administrator's Briefing) and current Incident Commander. WFSA procedures are outlined in the Wildland and Prescribed Fire Management Policy Guide (1998). The team will be given a written delegation of authority (see examples in Appendix E) and will have an Agency Administrator's Representative assigned as a staff member to the incoming Incident Commander. The delegation of authority will provide the Agency Administrator's priorities, constraints, and other guidelines prerequisite to effective suppression of the fire. When the team has accomplished its assigned tasks, the fire will be transferred back to the park. A local Incident Commander will be assigned, and a debriefing will be held by the departing team to provide for an orderly transition of command. The Superintendent will conduct a closeout session that will include a performance evaluation of the departing team. The transition Incident Commander will assume command at the agreed upon time. The departing team will then be demobilized.

Procedures for managing the transition to an incident management team are outlined in the Standard Delegation of Authority, Incident Management Teams, and Briefing Package, which are found in the Interagency Standards for Fire and Fire Aviation Operations Manual, also known as the Red Book. Additional procedures are identified in RM-18. Emphasis will be given to actions which maximize personnel safety and the protection of natural and cultural resources. Procedures will also ensure that designated Park personnel attend all planning and strategy sessions and are promptly consulted on all issues which may affect the management of the Park.

Accident prevention in fighting fire is extremely important. Firefighting is hazardous work, generally performed in unfamiliar surroundings and under emergency conditions. Special hazards are almost always present and fatigued workers often suffer from a reduced ability to recognize hazardous conditions and respond quickly and appropriately to them. . It is the responsibility of every incident commander to ensure that safety instructions are given and followed during all suppression actions. Responsibilities of every employee include: to perform only jobs that they are qualified for (according to NWCG standards in PMS 310-1), to wear personal protective equipment at all times, to ensure that adequate water, food, and rest are provided to firefighters so that high standards of safety can be maintained.

Occasions in which two or more fires are ignited can be generally associated with days when high to extreme fire intensity condition exists. Suppression actions taken on multiple fires can quickly deplete Apostle Islands National Lakeshore's fire suppression resources; therefore, initial attack dispatching for multiple fire starts will be prioritized. If qualified personnel are available, at least two individuals will be dispatched to each wildfire reported on days experiencing multiple starts. However, if sufficient qualified personnel are not immediately available, the priority order will govern which fires in which zones will receive the first available personnel resources.

Priority of initial attack on days of multiple fire starts will be:

1. Fires threatening life or property within Park boundaries;
2. Fires starting within the Park which are within one mile of Park boundaries and which have a likely potential to burn across the boundary and onto non-Park lands, use and occupancy lands, or tribal lands.

6. Exceeding Wildland Fire Implementation Plan

When wildland fires cannot be controlled during the initial suppression action or when the appropriate management response in a fire use area has not been successful, the WFIP is considered to have been exceeded. The WFSA is initiated at this stage. Initiation of the WFSA is also necessary when implementation of a prescribed fire plan is not successful and the fire must be suppressed. The following parameters and considerations will be used in WFSA preparation at Apostle Islands National Lakeshore:

Situations that could require selection of a new strategy through the WFSA include but are not limited to:

- Exceeding periodic assessment criteria, i.e. management action points, air quality;
- Unacceptable risk to firefighter safety, natural or cultural resources, improvements;
- Fire leaving or threatening to leave MMA boundary or park boundary;
- Fire exceeds prescribed fire plan;
- Increasing demand on local and/or national fire management situation
- Agency administrator prerogative.

7. Minimum Impact Management

Minimum impact suppression tactics (MIST) or minimum impact management is the policy of the NPS and consistent with the Wilderness Act. All fire management activities within the Park will utilize combinations of strategies, tactics, and equipment that minimize impacts to natural and cultural resources and wilderness values.

The WFSAs and Delegation of Authority (see samples in Appendix E) are the key elements to ensure that minimum impact suppression occurs. Critical natural and cultural resource protection issues will be identified in all WFSAs. Delegations of Authority will contain specific minimum impact suppression requirements. Incident management teams will be informed that their compliance with resource protection and minimum impact suppression requirements will be a primary component of the team's evaluation using sound suppression strategies and tactics.

Delegations of Authority will also identify a Resource Advisor for each incident management team. Resource Advisors will assist teams with identifying appropriate minimum impact suppression activities in daily operational period plans and briefings. Resource Advisors will also conduct reconnaissance of the fire area to identify sensitive resources, observe suppression actions and ensure that minimum impact suppression guidelines are being implemented.

Some examples of minimum impact firefighting include:

- Water will be used instead of fire retardant chemicals in bombers where possible.
- Fire edges will be cold trailed when practical.
- Wetlines, or environmental lines, will be used wherever possible in lieu of handline construction if water and pumps are available. Waterbars will be constructed on handlines on steep slopes.
- Boring with hoses and hydraulic actions will be avoided on shallow soils.
- Fire lines will be kept to the minimum width necessary to allow backfiring or safe blackline to be created. Natural barriers will be used wherever possible to avoid "tunnel effect."
- Fire line explosives instead of heavy equipment will be used if a mineral soil line is needed whenever possible. As a general rule, heavy equipment will not be used in the park and only used in the worst case scenario and with the written approval of the Superintendent.
- Decisions on suppression practices will be made by the Incident Commander. Utilize his/her creativity.
- Minimize tree falling. If necessary to fall trees in visually sensitive areas (i.e., trails, portages, lakeshores), utilize "slant cut" technique to face cut away from view, or re-cut later during rehabilitation activities.
- Archeological sites will be identified prior to a fire and protected wherever possible. Minimize ground disturbance to protect cultural resources.
- Debris will be scattered or removed as prescribed by the Incident Commander.
- All fire lines, spike camps, or other disturbance in visually sensitive areas will be rehabilitated to maintain a natural appearance.
- After the fire emergency is over, transport of personnel, equipment, and trash out of the park will be consistent with national park resource management objectives.

8. Rehabilitation

Refer to Section IV.F for specific Rehabilitation standards.

9. Wildland Fire Documentation, Reports, and Records

The following reports, records, and documentation are required as part of the Apostle Islands National Lakeshore Fire Management Program. Each wildland fire suppression fire documentation package will include the following:

- Individual Fire Report Form (DI-1202)
- Fire Weather Observations
- WIMS forecasts (NFDRS indices and components)
- Situation Reports and fire updates
- Incident Maps
- Wildland Fire Situation Analysis (if appropriate)
- Narrative Summary (if appropriate)

Annual Reports: The Fire Management Coordinator is responsible for preparation of annual reports dealing with fire activity. Such reports will be submitted to the Chief of Protection for approval and will remain on file in the Fire Management or Resource Management Office. Table 6 lists deadlines and staff members responsible for various documentation chores.

Table 6. Wildland Fire Management Records and Reports.

Record/Report	Frequency	Responsibility	Distribution
Cache Inventory and readiness review reports	annual	FMC, Area FMO	APIS
Delegation of Authority & Fire Complexity Analysis	as needed	Superintendent	APIS/IC
DI-1202	each incident	I.C., FMC	APIS/SACS
WFSA	as needed	I.C. & Designated Park Staff	APIS
Fire Atlas	as needed	Chief of Protection	APIS
Fire Danger	daily (season)	FMC	APIS/SACS
Fire Personnel Roster	as needed (season)	FMC	APIS/Area FMO
Fire Prevention Analysis	every 3 yrs.	FMC	APIS
Situation Report	daily (season)	FMC	APIS/SACS
Fire weather	daily (season)	FMC	APIS/WIMS
FIREPRO submission	annual	Chief of Protection/ FMC	Area FMO
Fiscal Records	as needed	Chief of Protection, FMC, Admin. Officer	APIS/Area FMO
FMP	every 5 yrs.	Biologist/ FMC	APIS/Area FMO
FMP review	annual	Biologist/ FMC	APIS/Area FMO
Pre-Season Risk Analysis	annual	FMC	APIS/Area FMO
Red Cards	annual	Area FMO, FMC	each firefighter
Fitness, Training & Experience Records	annual	FMC	APIS/Area FMO
Training Needs Assessment	annual	FMC	APIS/Area FMO
Hazard Fuel Reports	as needed	FMC	Area FMO

17. C. Wildland Fire Use

1. Objective

The primary objective of the wildland fire use (wildland fire use) program is to allow restoration of naturally-ignited fire as an ecological process and natural disturbance agent within Apostle Island National Lakeshore without unduly reducing public and firefighter safety. Fire will be used to reduce the density of vegetation, restore age-class and vegetation type mosaics and reduce flammability. Wildland fire use will only occur in the Natural FMU. No fires will be allowed to enter Fire Exclusion Zones occurring anywhere within the Park.

2. Decision Criteria for Wildland Fire Use

Fires ignited by lightning in Apostle Island National Lakeshore's Natural FMU will be allowed to burn and managed as a wildland fire use fire if they satisfy the Decision Criteria (initial Go/No-Go Decision) contained in the Stage One WFIP as found in Chapter 4 of the Wildland and Prescribed Fire Management Policy--Implementation Procedures and Reference Guide. Appendix J contains the pertinent sections of Chapter 4 from the Reference Guide. Reassessment of the wildland fire use fire is made daily when the fire is actively burning (i.e. spreading) or as determined and documented in Stage II and/or Stage III of the WFIP. Periodic reassessment will be made when the fire is inactive but has not been declared out. Fires ignited by lightning outside of Natural FMU will be suppressed using the appropriate management response according to the procedures in the wildland fire mobilization section of this plan.

Lightning fires that are managed as a wildland fire use fire will be continually monitored and evaluated, using the Periodic Fire Assessment Re-Validation Checklist within the WFIP, from the time of discovery until they are declared out. Lightning ignitions that do not satisfy these decision elements within the Re-validation Checklist will be reclassified as wildfires and an appropriate management response will be taken according to a Wildland Fire Situation Analysis (WFSA). A variety of holding actions are appropriate to keep a fire managed for resource benefits within planned boundaries. The level of holding activity that will be acceptable before a fire is declared a wildfire will be determined on a case-by-case basis and these thresholds documented within the Wildland Fire Implementation Plan. To assist in the decision making and monitoring process weather stations as identified in Section B subsection 2d will be used.

If wildland fire use fires remain within acceptable criteria as determined in the WFIP, some fires may be allowed to burn for weeks or months without direct control or until extinguished by rain or snow. It is important for the public to understand the National Park Service is not letting fires burn indiscriminately, but that fires are managed under strict predetermined criteria. The fire monitoring system described below will ensure that these criteria are met and will keep a close watch on a fire's progress. Managers are allowed a wide range of tactics in managing a wildland fire use fire. One flank of a fire may receive a suppression response to protect values at risk, while other flanks of the fire are allowed to burn.

The standard Decision Criteria Checklist in the Implementation Guide lists detailed explanations of each of the decision elements. Apostle Island National Lakeshore has developed additional

indicators to assist the decision maker in evaluating the Stage I “Go/No-Go” Decision Criteria. These are listed in Figure 5 following each of the standard decision elements:

Figure 4. Decision Criteria Checklist

DECISION CRITERIA CHECKLIST

Is there a threat to life, property, or resources that cannot be mitigated?

- Fire within WILDLAND FIRE USE Fire Management Unit
- Unit (or MMA once established) boundary threatened and available holding resources not able to mitigate
- Threat to life and/or property within or outside the management unit

Are potential effects on cultural and natural resources outside the range of acceptable effects?

- Impacts of fire on natural and cultural resources, the public, & local economies are acceptable
- Energy Release Component below 26

Are relative risk indicators and/or risk assessment results unacceptable to the appropriate Agency Administrator?

- Projected fire perimeter locations are acceptable
- Equipment & personnel available to allow for increase in fire size and complexity
- Local/regional/national fire situation stressing interagency resources

Is there other proximate fire activity that limits or precludes successful management of this fire?

- More than five 10+ acre fires within the park

Are there other Agency Administrator issues that preclude wildland fire use?

- Qualified Fire Use Manager available to manage fire
- Potential size of fires burning within the park is acceptable and manageable
- Short-term fire weather and/or fire behavior are acceptable
- Long-term fire weather and/or fire behavior are acceptable
- Effects of regional drought on fire behavior/size are acceptable
- Smoke dispersal and direction are acceptable

3. Preplanned Implementation Procedures

An off-season workshop will be conducted prior to the start of fire season to review the fire management plan and Wildland and Prescribed Fire Management Policy Implementation

Procedures Reference Guide and go through a mock fire use scenario to refresh staff and invited cooperators roles and responsibilities. The Regional Prescribed Fire Specialist or Area Fire Management Officer will periodically be involved in this workshop to critique and assure compliance with policy.

Interagency agreements may be found in Appendix G, MOUs and Cooperative Agreements.

4. Non-Preplanned Implementation Procedures

All wildland fire use applications will follow the Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide (NIFC 1998). A Wildland Fire Implementation Plan Stage I will be completed on every wildland fire. The Stage II: Short-term Implementation Actions will be completed when it is determined from stage one to retain fire as Fire Use. The need assessment chart for Stage III will always be completed with the Stage II activity.

MMA boundary establishment, Decision Criteria Checklist, Risk Assessment, Complexity Analysis are not pre-planned. Generally, the MMA for a Wildland Fire Use will be the island in question with the exception of the fire exclusion zones. All of these planning items will be detailed at the onset of a wildland fire use project using the timelines established in the Implementation Guide.

a. Periodic Assessment Procedures

Assessment procedures and the Re-validation Checklist found in the Implementation Guide provide the guidance for periodic assessment procedures. Apostle Island National Lakeshore requires daily revalidation while a wildland fire use fire is active (i.e., actively spreading). When a wildland fire use fire becomes inactive (non-spreading) but has not been declared out, re-assessment and revalidation will occur once a week until either the fire becomes active again or is declared out. If revalidation is changed from the required daily to weekly revalidation a justification based on fire behavior will be included in the fire documentation files.

b. Requirements for preparation of Implementation Plans

The Wildland and Prescribed Fire Policy Implementation Guide will be the source and reference for the preparation of all plans and documentation for wildland fire use with the exception of the Apostle Island National Lakeshore wildland fire use Decision Tree.

5. Potential Impacts of Plan Implementation

An Environmental Assessment was completed in conjunction with the development of this Fire Management Plan. The “Finding of No Significant Impact” is found in Appendix D. A summary of the potential impacts from a Wildland Fire are listed below.

Wildland fire use can have both positive and negative impacts. Positive impacts are the benefits to forest development when fire is part of the natural processes which help provide for a balanced

ecosystem. Socially, there is the potential for visitors to witness a natural event not often seen by the public, in relative safety from the water.

Negative impacts for fire use at Apostle Islands would be mostly of a social nature. Smoke impacts to neighboring communities as well as Park visitors are a possibility although their effects are expected to be temporary. Any impact that reduces visitation will have economic impacts to the local communities which rely on tourism. This is expected to be a rare scenario with wildland fire use and, like all other potential negative impacts of wildland fires, could happen from an unwanted fire as well.

Another potential negative impact is to Park staff. Supporting these projects can require a substantial commitment of staff time. Use of outside resources and teams to supplement local staff will help to minimize this impact.

Wildlife will experience no long-term, adverse impacts if wildland fire use prescription elements are followed. Rare, Threatened and Endangered Species will suffer no adverse impacts for the species identified in Appendix C at the time this plan was issued. In addition, fire is likely to have beneficial impacts by increasing early successional forage and creating a mosaic of seral stages which will promote a variety of habitat niches.

Fisheries may experience an immediate post-burn short-term impact from increased soil erosion runoff, and water temperature increases. Generally no actions will be required as the disturbed communities will recover through natural processes, but rehabilitation steps may be taken to reduce erosion. In addition, fire may have beneficial impacts by providing a flush of nutrients into the water, decreasing shading and increasing the algae growth on which some species feed.

Air Quality/Smoke Management will have immediate short-term impacts, typically of an episodic nature, which will require mitigation when critical sites are impacted. When smoke is forecast or observed to be impacting State Highway 13, the Wisconsin Highway Patrol and Department of Transportation will be notified and requested to assist with traffic safety. Also boat navigation around islands could be affected by smoke and haze. Every effort will be made to inform visitors and commercial operators of problem areas using information centers, media, and announcements on marine radio.

Visual and Noise Quality will experience immediate short-term impacts associated with wildland fire management activities and some long-term impacts resulting from changes in the visual appearance of the affected area. The long-term impacts are perception and must be addressed in media and visitor contacts to promote the understanding of fire's role in the ecosystem. In addition, fire is likely to have beneficial impacts by stimulating lush, green vegetation and wildflowers, by maintaining a variety of view sheds, and by promoting a variety of vegetation types for visitors to see and enjoy.

Archeological resources, historical sites and structures may experience long and short-term impacts with the worst case scenario of previously unrecorded resources being consumed or altered by the fire. Mitigation actions will be coordinated with the NPS Midwest Archeological Center and State Historic Preservation Office (SHPO) and protection of known sites. Any

unknown sites discovered during wildland fire management activities will have protection mitigation measure implemented immediately which would include ground disturbance and travel rerouted around the area. The sites exact location will be reported to the Branch Chief, Cultural Resources, and a follow-up determination will be made as to the significance of the resource. In addition, fire may have beneficial impacts by exposing previously unrecorded sites and reducing vegetation whose roots can disturb artifacts.

Economic impact will be short-term associated with visitors wanting to leave the fire area because of perceived or real threat to health and safety. This can be mitigated through public awareness, information dissemination, and cooperation with the local communities for a complete understanding of the management actions that are being taken on each wildland fire.

Visitor Use will experience immediate short-term impacts from possible temporary closures, travel restrictions, and visibility impairments. Mitigation is to minimize the impacts but retain the focus of public safety. This is also the opportunity to deal with visitor concerns by increasing the number of visitor contacts through additional staffing and coordination with all cooperators to assure the information is reaching the impacted groups. The occurrence of a wildland fire in the Park provides a unique opportunity to inform the public of fires role in the ecosystem.

Concession Operations may experience a short-term impact from a temporary closure, travel restriction, and/or visibility impairment. Mitigation will be by information sharing and public contacts with effected user groups as to the duration and magnitude of the impact. Fire may have beneficial impacts by increasing visitation as mentioned above. In addition, concession operations might be contracted to provide support or transportation in case of large fires or evacuations.

6. Staff Responsibilities for Wildland Fire Use Implementation

A Fire Use Manager (FUMA)/Fire Use Management Team (FUMT) must be assigned to wildland fire use actions. The number of personnel required for an incident will vary. Management could range from a simply a Type 2 Fire Use Manager (FUM2) and Fire Effects Monitor (FEMO) for a low complexity wildland fire use fire to a fully staffed Fire Use Management Team (FUMT). Staffing levels will be evaluated daily as part of the Wildland Fire Implementation Plan (WFIP) validation and adjusted as needed based on actual and predicted fire behavior, predicted weather, other fire activity, etc.

Fire Use Manager (FUM1 or FUM2): Currently, Apostle Islands National Lakeshore does not have a qualified FUM1 or FUM2 on staff. Usually the Area FMO will function as the Fire Use Manager, but if he/she is unavailable, a request for a qualified Fire Use Manager will be made from other NPS areas in the region or through the Wisconsin Interagency Coordination Center.

Fire Use Manager/Fire Use Management Team: Should a wildland fire use fire go to Stage III complexity as determined by the WFIP, at a minimum, a Long Term Analyst (LTAN) will be ordered to be onsite within 36 hours to work with the assigned Fire Use Manager I. A full Fire Use Management Team (FUMT) should be considered to

facilitate the information gathering, analysis, logistics, planning, and implementation of the WFIP.

Fire Effects Monitor (FEMO): At least one red carded Fire Effects Monitor will be used to monitor and document fire weather, behavior, fuel consumption, and map location. They will provide feedback to wildland fire use Manager in terms of fire use and resource management objectives. They must be onsite within 36 hours of a WFIP Stage I “GO” decision.

If wildland fire complexity escalates to Stage III of the WFIP, or during multiple Stage I/II fires, the staff of Apostle Islands National Lakeshore will require assistance to manage the fire (Fire Use Manager I (FUMA)) and to complete fire spread modeling and Maximum Manageable Area development (Long Term Fire Analyst (LTAN)). These positions may be ordered separately or as part of a Fire Use Team. However, in the wildland fire use management units, fires may be permitted to burn when the following conditions are met:

- The fire is of normal complexity, as defined by the Prescribed Fire Complexity Analysis (described later in this chapter). More complex wildland fire use or multiple fires may require a Fire Use Manager on-site.
- A qualified FUMA is dispatched and will arrive in the park within 36 hours.

In addition to the positions assigned to a wildland fire use fire, staff responsibilities include:

Superintendent: Fire management in Apostle Island National Lakeshore is the responsibility of the Superintendent, with technical duties and accompanying responsibilities delegated to staff members.

- Is ultimately responsible for any fire occurring in the park.
- Is responsible for making the Go/No Go decision, signing the WFIP and periodic assessment to validate the WFIP decision.
- Declares park closures when needed.
- Will issue a written delegation of authority in the event a Fire Use Management Team is assigned to a wildland fire use fire at Apostle Island National Lakeshore.

Chief of Planning and Resource Management:

- Ensures that a comprehensive fire management program at the park is adequately planned for and implemented.
- Serves as part of the team that prepares the WFIP

Chief of Protection

- With the Area Fire Management Officer evaluates fire activity in terms of public and employee safety and makes recommendations to the Superintendent for closures.
- Patrols to ensure closures are enforced.
- Designs and implements the park evacuation plan at the discretion of the Superintendent.

Park Fire Management Coordinator (FMC):

- Ensures implementation of FMP and coordinates wildland fire and prescribed fire programs.
- Responsible for ensuring that the fire program is managed within RM-18 guidelines.
- Responsible for analyzing fire weather and fire season severity to support fire use decisions, preparing WFIP Stage I and Relative Risk Rating Chart on all candidate wildland fires in coordination with the Area FMO and/or Fire Use Manager.
- May prepare Short-Term Implementation Action, Stage II, for wildland fire use fires.
- Should be part of the team that prepares the WFIP

Area Fire Management Officer (Area FMO):

- Ensures implementation of FMP and coordinates wildland fire and prescribed fire programs.
- Responsible for ensuring that the fire program is managed within RM-18 guidelines.
- Responsible for analyzing fire weather and fire season severity to support fire use decisions, preparing WFIP Stage I and Relative Risk Rating Chart on all candidate wildland fires.
- Provides technical assistance in respect to WFIP planning, staffing assistance in respect to monitoring and advisory assistance in terms of escalating staffing due to increases in complexity and fire behavior.
- Should be immediately notified of potential fire use projects during WFIP Stage I if not on location.
- Provides fire behavior predictions for Stage I and II wildland fire use fires.

Eco-region Fire Ecologist:

- Provides oversight to monitoring program.
- Provides input into MMA and long term risk assessment in accordance with Stage III.

External Resources: Support will be needed for the Park to implement Stage III wildland fire use and many prescribed fires.

- NPS Fire Use Modules: can provide both planning and operational assistance related to wildland fire use and prescribed fires
- Single Resource Fire Use Managers and Long National Fire Use Management Teams: can be ordered to manage fire use incidents

7. Public Information

When wildland fire use projects are implemented, information will be made available to the public to ensure understanding, acceptance, and support. Local media (newspapers, radio and television) will be provided with briefings and photo/interview opportunities and current fire information will be posted on the park website. Visitor information staff and all park employees and volunteers will be kept informed concerning wildland fire use fire status. In addition, local cooperators will be kept informed. If wildland fire use fire operation persists for extended periods and burns substantial acreage, consideration will be given to ordering a fire information officer. See Section X for additional public information procedures.

Appendix G contains a list of key agency, interagency, state, local interested parties, and media outlets that will be notified in the event of a wildland fire use fire.

8. Wildland Fire Plans and Documentation

All designated wildland fire use fires will be documented for the record. The perimeter of the fire will be mapped using Global Positioning System (GPS) or from field reconnaissance. All fire locations will be documented in the park's hard copy "Fire Atlas" as well as being entered into the park's Geographic Information System (GIS). The Fire Use Manager/Incident Commander is responsible for maintaining the following records:

- WFIP and all amendments and revisions
- WFSA (if used)
- Monitoring reports and summaries of findings
- Revalidation and certification documents
- Fiscal reports
- Project maps
- Daily weather records
- Fire behavior predictions
- Smoke emission and transport observations
- DI-1202 Fire Report
- Resource Orders used
- Other information as appropriate for the situation such as photos, video, photo points, etc.

All wildland fire use fire costs will be tracked and documented in the fire record. Costs will include all personnel services, service contracts, aircraft, supplies and equipment procurement.

18. **D. Prescribed Fire**

1. Planning and Documentation

The long-term fuel management program will use prescribed fire, along with non-fire applications, to accomplish hazard fuels management, ecosystem management, and cultural resource management objectives.

Prescribed fires are intentionally ignited under predetermined weather and fuel moisture conditions that permit managers to exert substantial influence over the spread and intensity levels that the fire can achieve. All prescribed fire will follow policy outlined in RM-18, Chapter 10.

Prescribed fires are utilized as a tool to achieve management goals. Prescribed fire will reflect and support resource management objectives to modify some vegetative conditions, maintain others, and simulate natural fire where ignitions have not occurred. In addition, prescribed fire may be used in areas where it is not feasible to manage wildland fire use. Prescribed fire may also be used in conjunction with mechanical hazard fuel reduction in order to remove fuels that accumulate from fuel reduction operations. Prescribed fires for research may also take place when it is determined necessary for accomplishment of research project objectives.

Prescribed fires are authorized in Apostle Islands National Lakeshore in wilderness. These fires may be used where determined by resource management and fire management personnel that prescribed fires are necessary as a substitute for naturally occurring fires. Such actions will attempt to restore fuel loading and vegetative composition within the historic range of natural conditions existing prior to the fire exclusion policy and past logging practices that left unnatural amounts of slash on the forest floor. Any mechanical equipment used would follow guidance for Minimum Impact Suppression Techniques in wilderness.

Cooperation with representatives from the Great Lakes Indian Fish & Wildlife Commission, and Bad River and Red Cliff Reservations would occur in the planning stages of prescribed fires.

Hazard Fuels Management: Hazard fuels management activities using prescribed fire will be undertaken to mitigate unnatural or hazardous fuel conditions due to human activity such as prolonged fire suppression or slash as the result of past logging activity. This management action is intended to reduce the risk of fire that could endanger valuable natural and cultural resources or infrastructure and to reintroduce fire back into systems where it has been excluded. The general goal is to rely on wildland fire use to simulate or recreate the natural fire regime. Prescribed fire may also be used to provide a protective buffer around highly valued resources vulnerable to wildland fire such as old-growth forests and lighthouse complexes. Insect infestations, storm damage, or other natural disturbance may also caused fuel build up, but only if there are safety issues or if irreplaceable resources are threatened (e.g., light stations or sensitive vegetation communities) will management action be considered in these cases.

Ecosystem Management: The Park was established to protect natural and cultural resources including those which may be adversely impacted by wildland fire. In recognition of this, park management will use prescribed fire to simulate the effects of fire in fire-adapted ecosystems. Ecosystem management may also include restoration burns intended to simulate the effects of the natural fire regime for a given area based on fire history studies.

Cultural Resource Management: Prescribed fire may be used in a limited capacity to maintain identified cultural landscapes. It would be used only after determining that this was the best method of accomplishing management objectives and that it did not pose unnecessary risks to the resources.

a. Annual Preparedness Activities

Actions included in the prescribed fire program include: selection and prioritization of projects to be carried out during the year, prescribed fire plans (RM-18 Chapter 10), prescription preparation, documentation and reporting, and prescribed fire critiques. Measures to ensure successful implementation of prescribed burns will include prescribed fire plans approved by a qualified (according to NWCG standards in PMS 310-1) Prescribed Fire Burn Boss (RXB1 or RXB2). A qualified Prescribed Fire Burn Boss will conduct prescribed fires with qualified support personnel present to accomplish objectives. Support personnel will monitor fire behavior and fire effects, control hot spots and fires outside control lines, support ignition needs, and complete initial attack on escape fires. All prescribed fire plans will be approved and signed by the Park Superintendent. Outside support in the form of NPS prescribed fire management

teams, fire use modules, or interagency incident management teams may be requested for support in planning, implementation, or supplemental management stages.

During the initial phases of the prescribed fire program, Park management will be concentrating efforts in the area of hazard fuels reduction. Projects will be added to the hazard fuels system as identified through fuels assessments and proximity to values at risk.

On a parallel track with hazard fuels projects are resource management fire objectives. The two Park fire management units contain resource objectives which will guide the strategy of fire restoration and maintenance.

During October-November of each year, the Superintendent, Chief of Protection, Chief of Planning and Resource Management, Fire Management Coordinator (FMC), Branch Chief, Natural Resources, Branch Chief, Cultural Resources, Biologist, and Area Fire Management Officer will review prescribed fires completed for the year and those proposed for the following fiscal year. These proposals will be jointly developed by the FMC and the Biologists.

Once the proposals have been reviewed and approved by the Superintendent for implementation, prescribed fire plans will be prepared for regional review and approval. By May 1, prescribed fire plans should be approved and ready to implement.

A successful prescribed fire program is one that encompasses all management objectives, fire management objectives (which are more specific to vegetation types), is executed safely, and is kept within approved prescription. The prescribed fire program will initially be designed around the priority need to treat areas with the highest values at risk, followed by treatments which will restore fuel levels to simulate natural processes and accomplish objectives described below.

b. Long-term Prescribed Fire Strategy

Overall, the current NPS policy is directed toward the establishment and maintenance of natural ecosystem processes to the fullest extent possible. It must be remembered that vegetation change over the local landscape has been subjected to recurrent human disturbances since presettlement times.

Therefore, historic fire return intervals, varying fire intensities and size, and burn patterns all contribute to variations in the vegetation mosaic across the landscape. The Park will investigate these patterns to determine if they fall within the natural range of variability. If needed, prescribed fires can be used to adjust vegetative conditions and finally to simulate the processes, as fully as possible, which maintain the natural ecosystems of the early Apostle Islands National Lakeshore landscape.

A tentative long-term prescribed fuels treatment plan has been developed and attached as Appendix H to this plan.

c. Qualifications Needs

Burn Boss (RXB1 or RXB2): A fully qualified (according to NWCG standards in PMS 310-1) individual is required to serve as Park Prescribed Burn Boss II for any prescribed burns conducted within the Park. Training Park personnel or bringing in a qualified person from another area will be necessary. The Biologist will assist the Burn Boss with implementing approved prescribed fire plans including monitoring, organizing, conducting, and evaluating fires. The Burn Boss will report to the Superintendent or representative (i.e., Chief of Planning and Resource Management). Prescribed fire complexity (i.e., normal or complex) is determined by using the worksheet provided in RM-18, Chapter 10, and is a part of each prescribed fire plan.

Ignition Specialist (RXI1 or RXI2): Training Park personnel or bringing in a qualified (according to NWCG standards in PMS 310-1) person from another area will be necessary. The ignition specialist reports to the Burn Boss and functions according to guidelines established in Wildland Fire Qualification System. He/she supervises ignition crew and/or holding resources assigned.

Fire Effects Monitor (FEMO): Training Park personnel such as the Biologist or bringing in a qualified (according to NWCG standards in PMS 310-1) person from another area will be necessary. Individual trained in weather observation, intermediate fire behavior, fire monitoring, and camera operation. The FEMO is supervised by Burn Boss: records and calculates fire monitoring data including fire weather readings, fire behavior, and photo documentation of the burn sequence. He/she also acts as lookout and reports unsafe situations or operations to Burn Boss.

d. Prescribed Fire Monitoring

Monitoring is the key to successful completion of prescribed fires by evaluating accomplishment of the established measurable objectives. Monitoring of fires involves the systematic collection and recording of fuels, topography, weather, air quality, and fire behavior data. Monitoring will follow the protocols outlined in the National Park Service Fire Monitoring Handbook (NPS 2003). Both short and long-term monitoring applicable to a specific burn area will be stated in the prescribed fire plan. Data collected from short-term monitoring will be attached to the fire report along with any narrative done by the monitors.

Each prescribed fire project shall include monitoring and evaluation as part of the project. This monitoring and evaluation must be a continuous activity during the actual burn operation. Its purpose is to ensure that the ongoing fire behavior and weather conditions remain within the prescribed burn plan parameters. The individual responsible for the ongoing fire monitoring/evaluation shall keep the project Burn Boss informed of any and all changes which might result in the fire exceeding the prescribed burn plan parameters. When linked to fire effects monitoring data, this data can be used to refine the prescriptions.

Weather fuel loading and fuel moisture conditions must be monitored closely in prescribed fire units to determine when the prescription criteria are met. Weather data will be assessed prior to

burn implementation so that calculations of fuel moistures, energy release component, ignition component, and Burning Index can be completed. Fuel moisture samples of fine dead fuels and live fuels (if appropriate) may be collected, weighed, oven dried, and percent moisture contents calculated to assist in determining when conditions are consistent with the prepared prescription.

Fire weather will be collected utilizing the Forest Service Washburn River NFDRS station from April 1 through November 1. In addition fire weather will be collected daily at the RAWS installed on Oak Island during the summer season. The Forest Service NFDRS station readings will provide daily information required to calculate the prescribed indices under the National Fire Danger Rating System (NFDRS). The resultant time series data base of fire weather provides management a powerful foundation to assess the significance of current fire danger in comparison to historic trends using FIREFAMILY Plus (Main et al. 1982). Additional fire weather information will be obtained from the National Weather Service office in Duluth, Minnesota using the Internet. Internet addresses are: <http://www.crh.noaa.gov/dlh/duluth.htm> (Duluth Office home page) and <http://www.crh.noaa.gov/dlh/firewx.htm> (fire weather).

In addition, fire weather for prescribed fires will be recorded by the Prescribed Burn Boss or a designee at least two days, and preferably five days, prior to the earliest ignition date of the burn.

The park will use the protocols in the National Park Service Fire Monitoring Handbook (2003) to examine short- and long-term fire effects. Vegetation/fuels plots and photo points will be included as part of the monitoring program to determine if prescribed fire objectives are being met, and if unwanted effects are occurring. (See Chapter VI.) Monitoring data will be archived and reviewed for future refinement of prescriptions and to determine program success.

In addition, monitoring will also be conducted to assess wildland fire use (wildland fire use) fires, whenever practicable, to determine short-term and long-term fire effects. This information will be the bases for determining the achievement of fire management objectives related to wildland fire use.

e. Prescribed Fire Critiques

The Fire Management Committee will critique each prescribed fire. A report detailing the actual fire will accompany any recommendations or changes to the program identified. The report will be submitted to the Superintendent and Area Fire Management Officer for review. A post-season critique of the fire management program, including the prescribed fire program, will be held each year by the Fire Management Committee.

f. Reporting and Documentation

The Burn Boss will prepare a narrative of the fire including preparation, ignition, holding problems, fire behavior analysis; smoke management, and fire effects information (see monitoring protocols in Fire Monitoring Handbook; NPS 2003).

All prescribed burn documentation will be completed by the Prescribed Fire Burn Boss and/or the Fire Management Coordinator. Fire monitors will collect all predetermined information and

complete all necessary forms prior to, during, and after the fire. All records will be archived in the park's fire records and stored in the Resource Management Office and the Park's Central Files for future use and reference.

A record of all costs for the project (i.e., planning, preparation, execution, evaluation, etc.) will be kept by the Burn Boss and recorded on the prescribed fire plan where indicated. Personnel, vehicles, supplies and materials, and miscellaneous costs associated with the fire will be recorded. All financial tracking of projects will be entered electronically along with the accomplishment reports in the NFPORS program, following review by the Chief of Planning and Resource Management.

The Prescribed Fire Burn Boss will prepare a final report on the burn for the Chief of Planning and Resource Management. Information will include a narrative of the burn operation, a determination of whether or not the objectives were accomplished, weather and fire behavior data, a map of the burn area, and photographs of the burn, number of hours worked, and final cost of the project.

Each prescribed fire documentation package will include the following: (again, mention dates and deadlines)

- Documentation of all management decisions concerning the project
- Environmental Assessment
- Prescribed fire plan
- On-site Weather Observations
- Project Maps
- Open Burning Permits
- Spot Weather Forecasts
- Narrative Summary Analyzing Costs, Objectives, etc
- Individual Fire Report Form (DI-1202)

All documents related to each prescribed fire will be kept in a permanent file folder in the Park's central files. An optional copy of this file can be maintained in other offices (i.e., Resources Management Specialist, FMC) if necessary.

g. Historic Fuels Treatments

Prescribed fire has not yet been used at Apostle Islands National Lakeshore in the past.

h. Prescribed Fire Plan

The prescribed fire (burn) plan is a site specific action plan which describes the purpose, objectives, prescription, operational procedures, GO/NO-GO check list, organization chart, contingency actions, monitoring actions, and safety concerns involved in burn preparation and implementation. The treatment area, objectives, constraints, and alternatives will be clearly outlined, and no fire will be ignited unless all prescriptions of the plan are met. Operational guidelines, allowable ranges of fire behavior and allowable ranges in weather conditions shall be

specified in the prescribed burn plan drafted for each prescribed burn project. The factors considered in all prescribed fire plans are described in RM-18, Chapter 10. Prescribed burn plans must be reviewed by a certified Burn Boss and approved by the Superintendent prior to ignition.

Prescribed fires shall be conducted under the direction and control of a Prescribed Fire Burn Boss. The project Burn Boss will be certified for that position according to standards currently utilized by the National Wildfire Coordination Group (PMS 310-1, 2000). All positions required to conduct the fire will be filled with qualified personnel. All personnel listed in the plan must be available for the duration of the burn or it will be postponed.

When all prescription criteria are within the desired ranges, the Prescribed Fire Burn Boss will select an ignition date/dates based on current and predicted weather forecasts and available resources. The Biologist will identify the windows of opportunity and work with the Prescribed Fire Burn Boss to ensure the burn is accomplished within the prescription parameters. All personnel and equipment will be assembled prior to the planned ignition time. A thorough briefing will be conducted stressing personnel assignments, resource placements, contingency actions, and safety concerns and measures to mitigate these concerns. A spot weather forecast will be obtained on the day of ignition, and all prescription elements will be rechecked to determine if all parameters are within the desired ranges. Following the briefing, the Burn Boss will complete and sign the Go/No-Go checklist. Prior to ignition, the Burn Boss will contact the Park and/or Dispatcher and notify that the unit is a "GO". The Park will then contact the appropriate adjoining agencies on the notification list that smoke will soon be in the air. If all prescription criteria meet the planned ranges, a test fire will be ignited to determine on-site fire behavior conditions. If these conditions appear satisfactory and consistent with the plan, the burn will continue. If the test burn indicates the fire behavior to be outside the desired ranges, the test fire will be suppressed and the main burn will be postponed until conditions are more favorable.

2. Exceeding Existing Prescribed Burn Plan

In the event a prescribed fire escapes and can't be controlled within one burning period an ICT3 will be ordered. The Incident Commander Type III will assume control of the fire and take appropriate suppression actions as discussed in the pre-burn briefing and identified in the contingency plan. The Chief of Protection and Fire Management Coordinator will be notified immediately of the current fire status. Once a wildfire declaration has been made, the project cannot return to a prescribed fire designation. For all escaped prescribed fires converted to wildfire status, a Wildland Fire Situation Analysis will be prepared and appropriate resource orders will be placed. If the fire escapes, the Burn Boss normally assumes the Incident Commander (IC) duties if qualified (according to NWCG standards in PMS 310-1) or arranges a resource order through Zone Dispatch. The pre-planned contingency plan then takes effect, which includes strategy for control, pre-ordered resources, and the cost accounting reverts to a PWE-E11. A Wildland Fire Situation Analysis (WFSA) is prepared. The Incident Commander, Biologist, FMC, and the Superintendent (or his/her representative) will prepare the WFSA according to guidelines.

3. Air Quality and Smoke Management

a. Air quality issues

Compliance and Public Information:

National Park Service fire management activities that result in the discharge of air pollutants, (e.g., smoke, carbon monoxide, and other pollutants from fires) are subject to, and must comply with, all applicable Federal, state, interstate, and local air pollution control requirements. These requirements are specified by Section 118 of the Clean Air Act, as amended (42 USC 7418). It is not the primary intent of the Clean Air Act to manage the impacts from natural sources of impairment (i.e., naturally ignited wildland fires). Smoke from these fires is an inevitable by-product. Wisconsin Department of Natural Resources, Environmental Quality-Air Management requires the approval for open burning. Wildland fire use and prescribed fire are allowed as an exception to the ban on open burning if the fire is for “wildlife or forest management purposes where no reasonable alternative exists.” Therefore permits for wildland or prescribed burning are not required within the State of Wisconsin.

Fires are not considered point sources of emissions, but tend to be spatially distributed singular events, and temporary impacts to visibility and visitor enjoyment must be recognized, expected, and managed. This may include temporary closures or warnings during the progress of management approved prescribed fires. Pertinent areas that will demand attention include the communities of Red Cliff, Bayfield, Washburn, and Ashland and State Highway 13 and county road corridors.

Apostle Islands National Lakeshore will comply with Air Quality-Smoke Management Guidelines listed in RM-18, Chapter 14. The fire management program will be in compliance with interstate, state, and local air pollution control regulations, as required by the Clean Air Act. Currently, Wisconsin has not yet developed a state-wide Smoke Management Plan. When a plan is developed, all wildland and prescribed fires will be compliant with that plan.

A copy of the Fire Management Plan or prescribed fire plan will be forwarded to the appropriate authorities, if required by a future Wisconsin Smoke Management Plan. Personnel from Wisconsin DNR Environmental Quality-Air Management Division will be allowed on-site during prescribed fires and wildland fires used for observational purposes if necessary for their agency needs. Prescribed fires will be conducted only on days with acceptable smoke dispersal. Current and predicted weather forecasts along with the National Weather Service Smoke Management Forecast will be utilized along with test fires to determine smoke dispersal. Prescribed burns ignited in proximity to structures will be ignited only after careful considerations are given to levels of visitation and impacts upon visitation and local residents. All prescribed fire plans will have clear objectives and will monitor impacts of smoke on the human and natural environments.

Considerations useful in managing smoke from longer duration fires and informing the public include:

- Develop contingency plans to limit smoke production if the need arises. This may involve suppression on portions of the line.
- Establish and maintain close communication with state air quality regulators regarding status of such fires. The local Wisconsin DNR Air Quality Engineer is located in Superior Wisconsin and can be reached at (715) 392-792-7989.
- Consider the effects of smoke on both air quality and visibility.
- Develop a site-bulletin for dissemination at visitor contact locations, covering the rationale for burning and objectives of the program.
- Issue press releases as a means of informing the public

b. Management Actions

As directed by Chapter 10 of RM-18, all prescribed fire plans must have a Smoke Management section. Specific unit mitigations of smoke affects are addressed within the burn plan and also within the WFIP. Smoke mitigation measure strategies may include:

- Reduce fuels available for combustion by removal, use head-fire ignition with the wind wherever practical;
- Burn at higher fuel moisture of the large (1,000 hr time lag and above) fuels: a 1% increase in 1,000-hr fuel moisture can result in a 3% decrease in particulate emissions. Combine this technique with burning at lower fine fuel moisture;
- Reduce particulate emissions for the fuel consumed by reducing the time period of the smoldering phase; encourage flaming combustion to the extent possible;
- Avoid smoke-sensitive areas, such as highways during heavy traffic periods (i.e., weekends, holidays);
- Avoid burning near smoke sensitive areas when there are strong inversions or very stable high pressure systems are in place;
- The ventilation index will be good or better for adequate smoke dispersion. The National Weather Service in Duluth produces a daily smoke management forecast with their fire weather forecasts during the fire season. These can be found at:
<http://www.crh.noaa.gov/dlh/firewx.htm>.

The selected smoke management strategy(s) must be appropriate for the individual burn prescription and must not conflict with other prescription elements or objectives.

ii. Class I Airsheds

There are no Class I Air sheds within 50 miles (80 km) of Apostle Islands National Lakeshore. The Boundary Waters Canoe Area Wilderness to the northwest in the Superior National Forest,

Minnesota, and Isle Royale National Park, to the northeast in Michigan, are Class I Airsheds approximately 100 miles (160 km) distant from the Park.

iii. Smoke-Sensitive Areas

The following areas are in close proximity to the Park and have the potential to be impacted by smoke from prescribed burns and wildland fire use fires. The Park will make every attempt to mitigate the negative impacts of smoke by following Best Available Control Techniques (BACM) as described by the U.S. Environmental Protection Agency (EPA. 1992).

1. Madeline Island
2. Ashland, Wisconsin
3. Bayfield, Wisconsin
4. Washburn, Wisconsin
5. Bad River Reservation, Wisconsin
6. Red Cliff Reservation, Wisconsin

iii. Smoke Management Restrictions and Procedures

1) National and State Ambient Air Quality Standards

The Clean Air Act requires Environment Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. **Primary standards** set limits to protect public health, including the health of “sensitive” populations such as asthmatics, children, and the elderly. **Secondary standards** set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. State governments must maintain NAAQS but can set more stringent standards.

Smoke from wildland fires could affect the air quality of the entire park and move beyond Park boundaries to affect mainland communities and lake navigation. Fires may emit large amounts of particulate matter, carbon monoxide, carbon dioxide, hydrocarbons, and nitrogen oxides into the air and cause temporary degradation of visibility and health problems for people with respiratory ailments. The amount of pollutants depends on size, intensity, fuel type, fuel moisture, and duration of the fire and atmospheric conditions that affect dispersal such as wind, air pressure, and humidity.

2) Wisconsin Air Quality Standards

As stated previously, Wisconsin does not yet have a Smoke Management Plan (SMP). “The purposes of SMPs are to mitigate the nuisance and public safety hazards (e.g. on roadways and at airports) posed by smoke intrusions into populated areas; to prevent deterioration of air quality and National Ambient Air Quality Standards (NAAQS) violations; and to address visibility impacts in mandatory Class I Federal areas” (EPA. 1998). The NAAQS referred to here are for particulate matter (PM) < 2.5 microns (PM2.5) and particulate matter < 10 microns (PM10).

According to the EPA “Interim Air Quality Policy on Wildland and Prescribed Fires” (April 1998), “strong indications” that a SMP is necessary are the following:

1. Citizens increasingly complain of smoke intrusions;
2. The trend of monitored air quality values is increasing (approaching the daily or annual NAAQS for PM_{2.5} or PM₁₀) because of significant contributions from fires managed for resource benefits;
3. Fires cause or significantly contribute to monitored air quality that is already greater than 85 percent of the daily or annual NAAQS for PM_{2.5} or PM₁₀; or
4. Fires in the area significantly contribute to visibility impairment in mandatory Class I Federal areas.

At this time, these conditions do not present themselves in Wisconsin, due in large part to the short history of PM_{2.5} monitoring throughout the state. When a Smoke Management Plan is developed for Wisconsin, all wildland and prescribed fire operations within the Park will be conducted in compliance with the plan.

1. E. Non-fire Applications

Hazard Fuels Management: Mechanical reduction of hazardous fuels will be implemented around high value and sensitive cultural and natural resources and threatened infrastructure where prescribed fire and wildland fire use would not be appropriate. It could also be used to help maintain fire-adapted ecosystems where fire has been excluded so long that fuels have built up to a point that prescribed fire or wildland fire use may result in inappropriately severe fire.

Cultural Scene Maintenance: Non-fire applications and prescribed fire, in conjunction with each other or alone, will be available as options to maintain identified cultural landscapes and will be appropriately applied on a case by case basis.

1. Mechanical Treatment and Other Applications

The overall fire management program objectives in Apostle Islands National Lakeshore are to support the Park’s mission of protecting and preserving the park’s natural ecosystem processes, wilderness values, and cultural resources. To promote the overall fire management program, park management may use non-fire applications to mitigate hazardous fuel conditions, to maintain cultural landscapes, and reduce fire risk along boundary areas.

The Park will use mechanical removal as the primary non-fire method to reduce fuels. Hand tools will be used in wilderness areas. Non-fire applications shall be conducted under the direction and control of the Planning and Resource Management Division and the Apostle Islands National Lakeshore Fire Management Coordinator.

a. Annual Preparedness Activities

During the initial phases of the non-fire applications program, Park management will be concentrating efforts in the area of hazard fuels reduction and maintaining cultural landscapes. Projects will be added to the hazard fuels system as identified through fuels assessments and proximity to values at risk.

On a parallel track with hazard fuels projects are resource management fire objectives. The two Park fire management units contain resource objectives which will guide the strategy of fire-related restoration and maintenance.

During October-November of each year, the Superintendent, Chief of Planning and Resource Management, FMC, Branch Chief – Cultural Resources, Biologist, and Area Fire Management Officer will review non-fire applications completed for the year and those proposed for the following fiscal year. These proposals will be jointly developed by the FMC and the Biologists.

The FMC, Biologist, and Branch Chief – Cultural Resources will prepare non-fire applications plans. Once the proposals have been put through the Park project review and compliance system, and approved by the Superintendent for implementation, they will be submitted for regional review and approval. By May 1, non-fire applications plans should be approved and ready to implement.

b. Operational Restrictions

Non-fire applications may be conducted to achieve desired fuels modification anytime islands are accessible by boat (usually May through November), but consideration must be given to visitation levels. Preferred time for this activity would be spring and early summer before visitation increases and in the fall, after Labor Day, when visitation decreases substantially.

Operations in wilderness will follow guidelines under Minimum Impact Suppression Tactics.

c. Effects Monitoring

Non-fire applications can be used successfully to ameliorate the prescribed fire and wildland fire use programs to reduce fuels and to transition plant communities toward more desirable composition and structure. Non-fire applications will be used at Apostle Islands National Lakeshore as alternative methods to meet the resource management objectives listed in Section IV, A of this fire management plan. As with prescribed fire, monitoring will be used to measure indicators to determine whether resource management objectives were met.

The park will work with the Fire Ecologist to determine appropriate levels of monitoring to examine short- and long-term fire effects of non-fire applications along with prescribed fire applications. The Voyageurs National Park Fire Effects Monitoring crew will assist in installing, monitoring and rereading monitoring plots for the park. Monitoring type descriptions will be written in cooperation with the Biologist and included as part of the Fire Monitoring Plan.

d. Critiques

The Branch Chief, Cultural Resources, and the Biologist will critique each non-fire application action. A report detailing the actual extent of the action will accompany any recommendations or changes to the program identified. The report will be submitted to the Superintendent and Area Fire Management Officer for review. A post-season critique of the fire management program, including the non-fire applications program, will be held each year by the Fire Management Committee.

e. Cost Accounting

A record of all costs for the project (i.e., planning, preparation, execution, evaluation, etc.) will be kept by the FMC, Branch Chief, Cultural Resources, and Biologist and recorded on the Non-fire Applications Plan where indicated. Personnel, vehicles, supplies and materials, and miscellaneous costs associated with the application will be recorded. All financial tracking of projects will be entered electronically along with the accomplishment reports in the National Fire Plan Operations and Reporting System (NFPORS) program, following review by the Chief of Planning and Resource Management.

f. Reporting and Documentation

The FMC, Branch Chief, Cultural Resources, and Biologist or designee will prepare a final report on the project for the Chief of Planning and Resource Management. Information will include a narrative of the mechanical removal operation, a determination of whether or not the objectives were accomplished, a map and photographs of the treated area, number of hours worked, and final cost of the project.

Each documentation package will include the following:

- Documentation of all management decisions concerning the project
- Environmental Assessment
- Non-fire Applications Plan
- Project Maps
- Narrative Summary Analyzing Costs, Objectives, etc

All documents related to each non-fire application will be kept in a permanent file folder in the Park's central files. An optional copy of this file can be maintained in other offices (i.e., Resources Management Specialist, FMC) if necessary.

g. Annual planned project list.

A fuels treatment plan has been developed for the Park laying out areas of potential prescribed burning in the next five years. Please refer to Appendix H, Five-Year Prescribed Fire and Hazard Fuel Reduction Plan.

2. F. Emergency Rehabilitation and Restoration

Because fire is a vital process that shapes the ecosystem, the effects of fire are generally considered natural and accepted as part of the process. However, fires and suppression activities can result in disturbance that requires mitigation. The most effective rehabilitation measure is careful planning and skilled implementation of minimum impact suppression techniques.

Rehabilitation will only be required where the impacts of the fire itself or of the associated suppression actions are significant and can be mitigated. In no case will action be taken in the name of rehabilitation which further compounds the situation. If the minimum impact suppression actions outlined above are used, then only minimal rehabilitation will be necessary. The location of lines to avoid the need for falling and bucking of trees, use of wet lines and foam, use of streams and other firebreaks, all contribute toward that goal. Park management will play an active role in suppression actions to see that this happens. The Delegation of Authority to Incident Commanders and the Wildland Fire Situation Analysis are key facets in this process.

The overriding philosophy for rehabilitation is that the minimum treatment necessary for the stabilization of the burned area and other impacted areas be used. Specific rehabilitation standards will be identified in individual rehabilitation plans. General guidelines for rehabilitation include:

- Water bars will be installed on fire lines where necessary to prevent erosion.
- Brush and other existing organic material will be moved back onto fire lines.
- All stumps, except oaks, will be flush cut.
- All signs of human activity will be removed (litter, flagging, etc).
- Campsites, helispots and other locations will be restored to natural conditions as much as possible.

Burned areas will not be seeded. Residual seed and sprouting from surviving root stalks will provide natural regeneration. Native seed bearing plants cut along the fire line can be scattered as mulch that guarantees indigenous seed.

Rehabilitation of fire lines and other work to control erosion possibilities will commence as soon as possible, even before the fire may be declared out. This is especially important if existing equipment and personnel still on the fire line are not being fully utilized in mop-up operations

Burned Area Rehabilitation: On April 27, 1998, the Department of Interior approved new policies for Burned Area Rehabilitation (BAR). These policies allow parks to expand the use of BAR funding to mitigate a broad range of threats to natural and cultural resources critical to the NPS mission and protection mandates. Since BAR projects can have a major impact on many aspects of park management, the successful implementation of these policies requires a coordinated interdisciplinary effort among natural and cultural resource managers, fire managers, and visitor services. Guidelines for implementing BAR policies are found in RM-18, Chapter 12.

V. ORGANIZATIONAL AND BUDGETARY PARAMETERS

3. A. Fire Management Responsibilities

This section discusses the responsibility, by specific park staff positions, for implementation of the fire management program and clearly defines the areas of responsibility, provides clear direction and accountability, and furthers the development of the fire management program.

SUPERINTENDENT: As the Agency Administrator, the Superintendent is responsible for implementation of all fire management activities within the park, ensures compliance with Department, Service and Park policies. This person has overall responsibility for development and implementation of the Park's fire management program and will lead the Fire Management Committee. Decisions relating to requests for overhead or additional firefighting personnel and equipment, as well as decisions related to appropriate management responses to wildland fire would be made by the Superintendent. He/she is responsible for periodic assessment signature to certify the continued management of wildland fire use actions is acceptable. This responsibility may be delegated in the Superintendent's absence to someone at the Division Chief level or above in the park.

FIRE MANAGEMENT COMMITTEE: This committee consists of the Park Superintendent, Chief of Planning and Resource Management, Chief of Protection, Area Fire Management Officer, Park Fire Management Coordinator, Branch Chief, Natural Resources, Biologist, Branch Chief, Cultural Resources, and Supervisory Ranger. Other staff personnel may be assigned to the Fire Management Committee at the discretion of the Park Superintendent.

The committee shall meet prior to and following the fire season to determine objectives and needs for fire management for the ensuing year and to coordinate and critique the committee's operation and function and review the Fire Management Plan, making revision as deemed necessary. The team may be convened whenever fire and weather conditions indicate that fire presents a serious problem to the Park's resources. When convened, the committee shall evaluate fire potential, weather and management concerns, and determines an appropriate course of action, using the Fire Management and Resource Management Plans as guidelines and any prepared Wildland Fire Situation Analysis for on going fires.

CHIEF OF PROTECTION: The Chief of Protection (CP) has overall supervisory responsibility for all Park-related emergency operations, including the integration of fire management activities with other emergency operations. The CP reviews and advises the Superintendent on requests for fire emergency assistance, operational activities required for the implementation of this Fire Management Plan, and completeness and correctness of all final fire reports. He/she recommends staff personnel to assist the Fire Management Coordinator with implementation of the Fire Management Plan. Reviews the Fire Management Coordinator's nominations of staff employees to receive fire-related training and designate those employees who are to receive such training.

FIRE MANAGEMENT COORDINATOR: Coordination of the fire program at APIS is a collateral duty function assigned to an appropriate employee. The Fire Management Coordinator

(FMC) coordinates with the Area FMO for the implementation of Fire Management Plan. This responsibility includes serving as the park point of contact for prevention, preparedness, detection, wildland fire, prescribed fire, suppression, monitoring, and post-fire activities involving NPS lands. The FMC coordinates the implementation of this Fire Management Plan with other governmental agencies administering adjacent lands and with local landowners, and develops and implements cooperative fire management agreements with other federal, state, and local agencies and with the local landowners. The FMC coordinates with the Area FMO for submission of budget requests.

He/she is responsible for preparation of fire reports following any wildland fire. The FMC provides input and documentation of experience and training to the Area Fire Management Officer for firefighter qualification and input into the Incident Qualifications Computer System (ICCS). The FMC nominates personnel to receive fire-related training as appropriate.

He/she designates the person to serve as Incident Commander (IC) for initial attack purposes. The FMC may assume the position of IC or designate other personnel to take over that position.

SUPERVISORY RANGER: Supervisory Ranger coordinates, with the Fire Management Coordinator, on all prevention activities and on all wildland fires, prescribed fires, and post-fire activities occurring within the park. He/she maintains equipment and supply caches adequate to undertake initial attack actions on fires occurring on parklands, ensuring that all equipment and supplies are in good working condition. The Supervisory Ranger determines fire qualifications and training needs of all personnel under his/her supervision that are to be made available for fire duties and informs the Fire Management Coordinator of this information.

PLANNING TEAM SPECIALISTS: Biologists develop resource management objectives involving fire's role in the ecosystem; work closely with the FMC to identify priorities for the use of fire as a management tool, including planning, compliance, mitigation, and rehabilitation standards if indicated. The Branch Chief, Cultural Resources also identifies role of prescribed fire for cultural landscape preservation and protection of historic structures. The Biologist and Branch Chief, Cultural Resources can serve as resource advisors on Park fires, including prescribed fires and are responsible for development and implementation of a monitoring program to document fire effects and other ecological variables with investigators working in the Park.

CHIEF OF PLANNING AND RESOURCE MANAGEMENT: The Chief of PRM functions as the Park Public Information Officer. He/she is responsible for contacting the public, drafting notices and press releases, and distributing information about fire ecology and fire management program. The Chief of PRM will function as the Fire Information Officer or appoint one if needed. The Chief of PRM also oversees the Branch Chiefs for cultural and natural resources, and the Biologist. The Supervisory Ranger determines fire qualifications and training needs of all personnel under his/her supervision that are to be made available for fire duties and informs the Fire Management Coordinator of this information.

CHIEF OF EDUCATION AND INTERPRETATION AND STAFF: Chief of Education and Interpretation is responsible for incorporating wildland fire principles and fire ecology in public

contact messages and interpretive programs. The Division provides basic fire program information to park staff and visitors as part of the park information packages and ensures that accurate information is incorporated into park books, brochures and exhibits. Staff may be called on to direct traffic and fill in jobs when qualified (according to NWCG standards in PMS 310-1) such as fire dispatcher. Red-carded individuals will be used in initial attack. The Supervisory Ranger determines fire qualifications and training needs of all personnel under his/her supervision that are to be made available for fire duties and informs the Fire Management Coordinator of this information.

AREA FIRE MANAGEMENT OFFICER: The Area Fire Management Officer (duty stationed at Voyageurs NP) – coordinates fire management activities within the Border Waters Park Group, providing assistance and advice as needed. Reviews and advises the Superintendent on requests for fire emergency assistance, operational activities required for the implementation of the Fire Management Plan, and completeness and accuracy of all final fire reports. Coordinates all prevention, pre-suppression, suppression, monitoring, and post fire activities at the Park. Coordinates the development and execution of short and long range plans for prescribed fires, as well as prepares prescribed fire plans for individual projects. Issues Task Books for red carded personnel, and coordinates fire dispatching and fire training activities within the Border Waters Park Group, providing assistance and advice as needed. Coordinates, prioritizes, and submits all budget and project funding requests for fire program activities. Reviews all prescribed fire plans to ensure policy requirements are met. Coordinates the implementation of Fire Management Plan with other agencies on adjacent land and develops cooperative fire agreements with other federal, state, and local agencies. The Area FMO represents the Park at Wisconsin and Minnesota interagency meetings.

PARK DISPATCHER: The Dispatcher's primary duties include radio and telephone operation, dispatching, record keeping, computer operation, and coordination for field personnel. He/she will assist Public Information Officer with contacting the media and distributing information. The Dispatcher is also responsible for daily fire weather observation and entry in to the Weather Information Management System (WIMS).

CHIEF OF BUSINESS SERVICES AND STAFF: The Chief of Business Services' primary duties include keeping time cards and functioning as Contracting Officer. They oversee procurement of needed equipment and personnel.

CHIEF OF FACILITY MANAGEMENT AND STAFF: Facility Management staff may assist with patrolling Park by vehicle, boat, and on foot, and report location of fires. Red-carded individuals will be used on initial attack. The division maintains fire equipment including the park fire engine. The Supervisory Ranger determines fire qualifications and training needs of all personnel under his/her supervision that are to be made available for fire duties and informs the Fire Management Coordinator of this information.

FIRE INFORMATION OFFICER: The Chief of PRM will serve as or order a qualified Fire Information Officer (FIO) if necessary. The Fire Information Officer will notify and make media releases on local TV and newspapers, and through electronic mail if needed, a park information "hot line" will be installed, and the Fire Information Officer will be update whenever

new fire information is available. The Fire Information Officer will notify and stay in contact with cooperating agencies, as appropriate, about Park fires.

GREAT LAKES ECOREGIONAL FIRE ECOLOGIST:

The fire ecologist assists park Biologists and Area FMO in developing resource management objectives involving fire's role in the ecosystem. He/she works closely with the Area FMO to identify priorities for the use of fire as a management tool, including planning, compliance, mitigation, and rehabilitation standards if indicated. He/she coordinates fire effects monitoring activities and data analysis within the park, is responsible for the monitoring plan and makes recommendations regarding fire effects to the Area FMO.

4. B. Fire Funding

Apostle Islands National Lakeshore FIREPRO budget submissions are updated annually per requirements in RM-18, Chapter 17 and approved by the Superintendent. It is expected that during the life span of this Fire Management Plan, that the currently used FIREPRO Budget Analysis software will be replaced with the Interagency Fire Program Analysis (FPA) budget analysis computer program. This budget tool is under development concurrently with this plan being written. Apostle Islands National Lakeshore along with the U.S. Forest Service, Bureau of Indian Affairs, and U.S. Fish and Wildlife Service has formed the Northern Wisconsin Fire Planning Unit as part of the FPA planning process.

5. C. Fire Management Organization

At Apostle Islands National Lakeshore, fire planning is the responsibility of Planning and Resource Management staff, while implementation, mobilization, and protection is the responsibility of the Protection staff. This reflects the understanding that Fire Management's role is one not only of resource protection but also of ecosystem management.

6. D. Superintendent's Responsibilities

The Superintendent is responsible to periodically assess and certify by signature that continued management of wildland fire use actions is acceptable. The Superintendent may under certain conditions delegate this responsibility to another organizational level.

7. E. Interagency Coordination

Apostle Islands National Lakeshore maintains close coordination with the Area FMO located at Voyageurs National Park and has a General Agreement with the Wisconsin Interagency Fire Council (WIFC) which includes the Department of Natural Resources, and Chequamegon National Forest (2004). The Park is also part of the Wildland Fire Interagency Agreement which includes the Bureau of Land Management, Bureau of Indian Affairs, the National Park Service, the Fish and Wildlife Service, and the U.S. Forest Service (2004). Additional wildland fire cooperation is sought with the Red Cliff Band of Lake Superior Chippewa and the Bad River Band of Lake Superior Chippewa. Agreements and draft agreements may be found in Appendix G, MOUs and Cooperative Agreements.

Key interagency contacts can be found in Appendix G.

8. G. Fire-related Agreements

Multiple national and international agreements and memorandums of understanding (MOUs) exist between land management agencies for wildland fire operations. Copies of these agreements can be found in Chapter 40 of the National Interagency Mobilization Guide (2004). Copies of Local Agreements are found in Appendix G.

In addition to national agreements, some state and local agreements exist between Apostle Islands National Lakeshore and other agencies (See Table 7). Text of agreements may be found in Appendix G, MOUs and Cooperative Agreements.

Table 7. Fire Management Memoranda of Agreement and Cooperative Agreements

Cooperating Entity	Title of Agreement	Comments/Summary
WI DNR, U.S. Fish and Wildlife Service, U.S. Forest Service, Bureau of Indian Affairs, Menominee Tribal Enterprises, Bureau of Land Management	Wisconsin Interagency Fire Council (WIFC) Charter	Establishes WIFC for the fostering of increased interagency cooperation within WI. 2004

VI. MONITORING AND EVALUATION

9. A. Short- and Long-term Monitoring

Prescribed fire can be successfully used to return fire as an ecosystem process and to transition plant communities toward more desirable compositions. Prescribed burning will be used at Apostle Islands National Lakeshore to meet the resource management objectives listed in Section IV of this fire management plan. Monitoring is used to establish quantifiable objectives and then observe and measure the key indicators to evaluate whether these objectives were met. In order to restore fuel loads and plant community structure and composition, fuels and vegetation must be measured to determine if objectives are met. Moreover, monitoring must occur to ensure that unwanted effects are not occurring.

The park will use the protocols in the National Park Service Fire Monitoring Handbook (2003) to examine short- and long-term fire effects. The Voyageurs National Park Fire Effects Monitoring crew will assist in installing, monitoring and rereading monitoring plots for the park. Monitoring type descriptions will be written in cooperation with the Biologist and included as part of the Fire Monitoring Plan. Plot installations will be based on burn priorities and reaching a statistically valid sample size within five years for the priority monitoring types.

Fire effects monitoring will entail both short-term and long-term monitoring. Short-term monitoring examines whether objectives are attained for prescribed fire projects. Long-term monitoring examines the degree to which vegetation is reaching its desired condition.

In addition, monitoring will be conducted to assess wildland fire use (wildland fire use) fires and mechanical fuel treatments, whenever practicable, to determine short-term and long-term effects. This information will be the bases for determining the achievement of fire management objectives related to wildland fire use and mechanical treatments.

10. B. The Fire Monitoring Handbook

The park will use the protocols in the National Park Service Fire Monitoring Handbook (2003) to examine short- and long-term fire effects. The Voyageurs National Park Fire Effects Monitoring crew will assist in installing, monitoring and rereading monitoring plots for the park. Monitoring type descriptions will be written in cooperation with the Biologist and included as part of the Fire Monitoring Plan. Plot installations will be based on burn priorities and reaching a statistically valid sample size within five years for the priority monitoring types.

11. C. Fire Monitoring Plan

The Apostle Islands National Lakeshore Fire Effects Monitoring Plan is an unattached appendix (Appendix F) to this Fire Management Plan.

VII. FIRE RESEARCH

All fires in Apostle Islands National Lakeshore will be managed; hence, there is a need for refined management programs based on scientific information. The fire research and monitoring performed in the park will support the fire management program by providing information which is used for making management decisions. The information needed to plan, reintroduce, monitor, and refine the use of fire in the park will be obtained by several means: participation of park staff with fire management expertise, searching the scientific literature, contracting studies with Universities, requesting assistance from experts and authorities in other NPS units (e.g., Midwest Regional and Ecoregional Fire Ecologists), agencies (e.g., U.S. Forest Service), Fire Use Modules, and academia, and involving independently funded scientists in studies. Much of this information can be obtained through monitoring by the resource management staff; more complex and technical data will require formalized research projects.

12. A. Fire History Studies

Swain (1981, 1986, and 1988) used tree-ring analysis, cut stumps, and forest regeneration patterns of hemlock and pine stands to determine fire return intervals on parts Stockton, Outer, Manitou, Bear, and Devils Islands. Anderson, et. al. (1980, 1982), completed fire history work on Sand and Stockton Islands using tree cores and visible evidence. A comprehensive fire history study needs to be completed for all islands in the Park that are capable of sustaining wildland fire. A fire history study of the Mainland Unit also needs to be completed to be prepared for developing a fire management cooperative agreement with State, local, and Tribal Governments to protect private property, government facilities, and natural and cultural resource values. The role of natural fire (i.e., fire regime-fire return cycle, type, and intensity of fires) needs to be determined within various vegetation types in the Park such as coastal and interior red and white pine forests, sugar maple-yellow birch climax, old-growth hemlock and hemlock-hardwood mix, boreal forests, jack pine-Hill's oak on Long Island, red maple mix, black spruce-tamarack bog forest, and red oak mix.

13. B. Fuel Loading Studies

Preliminary fuel loading studies were conducted in the Park during the summer of 1998. Twelve islands were sampled representing eight of the thirteen Park habitat types. Protocols presented in the *Handbook for Inventorying Downed Woody Material* by James Brown (1974) were used. Additional sampling will be needed in areas where prescribed fire will be used, where heavy fuel loading is suspected, and where cultural and natural resources are at risk. The Park GIS fuel model map needs to be refined by ground-truthing and comparing with fuel loading inventory results.

14. C. Island Climate Studies

Meteorological differences between mainland and island locations need to be determined with particular emphasis on the maritime influence of Lake Superior and the implications for effecting fire weather and fire behavior.

15. D. Reestablish White Pine Stands

Studies to determine the desirability and feasibility of reestablishment of white pine stands in the islands need to be completed. The presettlement vegetation description of many islands indicates white pine as a dominant tree. How stands and individuals were distributed is not clear. White pine is primarily a coastal species today. Logging and subsequent fires eliminated white pine from many areas including island interiors. The only significant white and red pine stands are located on the Stockton Island Tombolo, Devils Island, and Sand Island. Without a seed source and a properly prepared seedbed, the species may not return where it was extirpated even if wildland fire use and prescribed fire programs are in place. Clearing and planting may be necessary to establish upland white pine where natural seed sources are no longer present.

16. E. Hemlock, Pine, and White-cedar Regeneration

Regeneration of pine species is often enhanced by fire or other disturbance. On the other hand, old-growth hemlock and cedar are very susceptible to fire. Studies need to be completed to provide information on how to promote regeneration of these species where they have been adversely affected by human activity and what role fire and other methods should play in accomplishment of that objective.

F. Role of Fire on Sandscape Ecosystems

The role of fire on the various sandscape ecosystems in the Park is not completely understood. Several of the vegetation and tree species found in these areas are often found in areas affected to some degree by fire on mainland areas. However, these communities may also be edaphic, or in existence due to the extremely harsh nature of their location. Studies are needed to refine the relationship of fire with these communities.

For further detailed guidance on research, see RM-18, Chapter 15.

VIII. Public Safety

Because wildfires are dynamic and can be hazardous, they must be given very high priority during certain critical conditions. Employees responsible for and involved in any wildland fire management activity must always consider the safety of human life above all other values. Visitor and employee safety will take priority over fire suppression and monitoring activities. All key fire management personnel are issued the National Wildfire Coordinating Group *Fireline Handbook 410-1*. Consistent, accurate monitoring and evaluation of fire behavior in the Park will provide the basis for developing contingency plans, contacts, and briefings that ensure public and personal safety.

Although Park visitors assume a certain degree of risk and responsibility for their own safety when visiting National Park Service areas, the Park staff will endeavor to identify recognizable threats to the safety and health of persons and for the protection of property. The following are the Park's public safety considerations:

1. Major visitor use occurs at Stockton Island in the Presque Isle area. This is one of the most fire prone areas of the Park. Evacuation would be difficult, especially if high winds are producing rough seas.
2. All islands are remote, especially the outer islands. Cliffs and rugged terrain make boat landings treacherous.
3. Varied topography, dense woods, and thick underbrush make getting around on the islands difficult.
4. Some individuals may approach a wildland fire or a prescribed fire out of curiosity and may attempt suppression action.
5. Certain areas would be closed when the risk to visitors is deemed unacceptable.
6. Any time human life is endangered, all necessary means would be taken to warn or evacuate visitors and private land owners.
7. Visitors may ignore warnings or are unaware of potential dangers and wander through burning areas.
9. a) Visibility on State highways and county roads is of major concern. The Park would take responsibility for requesting assistance from the State Police Office and the Bayfield and Ashland Counties Sheriff's Departments when smoke from wildland or prescribed fires become a danger to motorists or boaters. In the event that the response time from these agencies is delayed and jeopardizes traffic safety, the fire management team would start traffic control on the roadways. This action requires both local agency's' approval.

- b) The Park would notify the Wisconsin Department of Transportation at Superior, Wisconsin (715-392-7947) and request the placement of "smoke hazard" signs on the State highway right-of-ways, when needed.

The public and visitors would receive safety and prevention messages issued during the season through contact with Park Rangers, the website, through posted warning signs at information centers and on bulletin boards, and news briefs submitted to the media through the Park. These contacts would serve as an educational source of information to reduce the number of human caused wildfires that occur in the Park with the objective of minimizing preventable fires and providing for visitor safety.

The Fire Management Coordinator will inform the Chief of Protection and the Superintendent of all fires in the park. The Chief of Protection, Chief of Planning and Resource Management, and the Superintendent will then coordinate public and interagency notifications and implement suppression actions to mitigate the fire's impact within and outside the park. The extent of public notice will depend on the specific fire situation. The following actions should be considered:

- Initial attack/monitoring/burn team members will determine the proximity of visitors and neighbors to the fire, inform them of potential hazards, and aid in their evacuation if necessary.
- When a wildland fire is in progress, information listing location, fire behavior, expected dangers, areas to avoid, and precautions will be posted on Park bulletin boards, the Park web page, and at visitor centers. Interpretative specialists will inform the public of dangers as well as interpret the role of fire in natural areas.
- When the hazards from a wildland fire are high, signs on trails leading into the fire activity area will be posted. Trails, campsites, day use sites, and cabin sites will be closed if deemed necessary by the Fire Management Overhead Team, and as approved by the Superintendent. The Prescribed Burn Boss will ensure that closure and/or informational signs on prescribed fires are properly posted.
- Visitor use will be limited or prevented near wildland fires and potentially affected areas. National Park Service personnel will patrol the perimeter of fires burning along the Park to inform visitors and neighbors about the role of fire in a natural area, explain the risks associated with approaching too close to a fire, and enforce visitor compliance with area closure orders.
- A Wildland Fire Status Summary will be kept by the Park Dispatcher. Crews and teams will be kept informed of the status of ongoing fires by the use of a daily Wildland Fire Status Summary broadcast on the NPS web page after the morning fire weather forecast. This status summary will also be distributed to all Park divisions on a daily basis and posted on the Park web page.
- News articles will be written and released to local newspapers, radio, and television stations as well as posted on the Park web page.
- The Park information line will be updated by the Park Dispatcher whenever new information is available on fires in progress.
- The Fire Management Officer will notify the following agencies of government about fire activities in the Park: Ashland and Bayfield County Sheriffs, Federal Aviation Administration, National Weather Service, MDNR, and Chequamegon National Forest.
- Burned areas will be posted at campsites, day use sites, and trailheads if potential hazards exist. Campsites, day use sites, and trailheads will remain closed until all hazard trees are removed from the vicinity of the site. The public will be informed of hazards and appropriate safety precautions associated with traveling through or camping in burned areas.

- When evacuation of an area is recommended, the Superintendent and the Chief of Protection will be informed immediately.
- When heavy smoke impacts the campgrounds, park personnel will be sent to inform people of the situation and assure them of the safety of remaining where they are.
- When fire is projected to rapidly spread and threaten backcountry sites or trails where campers or hikers are known or strongly suspected to be, a park employee will be dispatched to the area by best possible means to notify visitors of the danger. Such individuals will be knowledgeable of fire behavior and fire safety principles to be able to stay with visitors as long as needed to assist them to safety.
- As part of initial and continuing size-up, the incident commander will determine the proximity to the fire of any visitors or other land users, inform them of potential hazards, and aid in evacuation if needed. If life is threatened, and the parties do not cooperate, law enforcement assistance may be requested through dispatch.
- When needed, information on location, behavior, expected dangers, areas to avoid, and other precautions will be posted on the park website, bulletin boards, at the visitor centers, and local post offices and businesses.
- When the risks from a wildland fire are high, precautionary signs will be posted on trails leading into the fire area. Trails, campsites, and day use sites will be closed if deemed necessary by the Fire Management Committee, and approved by the Superintendent. The Prescribed Fire Burn Boss will ensure that closure and/or informational signs on prescribed burns are properly posted.

A Status Summary (ICS 209) for all fires over 100 acres (247 ha) will be provided to the local Interagency Dispatch Center and the park information officer. Information on the fire activity will be broadcast on the park radio as part of a morning report. The status summary will be distributed to all park divisions on a daily basis. Smoke plume trajectories from large fires will be plotted using computer programs, weather information and onsite monitoring. Expected impacts on off-park communities and roadways will be evaluated and information shared with the respective agencies. If needed, boat or air patrols will be used to monitor smoke plumes.

The Chief of Planning and Resource Management (or appointed Fire Information Officer) will notify and make media releases on local TV and newspapers, the website, and through electronic mail. If needed, a park information "hot line" will be installed, and the Chief of Planning and Resource Management (or appointee) will keep it current as new fire information becomes available. The Chief of Planning and Resource Management will notify and keep informed cooperating agencies and tribes as appropriate, concerning fire activity in the Park.

17. A. Firefighter Safety

Ensuring and maintaining firefighter safety is of the utmost importance and takes precedence over rapid suppression targets or goals. On all actions on wildland fires in Apostle Islands National Lakeshore, the 10 Standard Fire Orders and 18 Situations That Shout Watch Out will be adhered to at all times. In addition, guidance in the Interagency Standards for Fire and Fire Aviation Operations (NFES 2004) will be followed. Failure to maintain communications and to obtain fire behavior predictions and weather forecasts constitute grounds for suppression forces to withdraw from fire lines and re-assess tactics. It will be the responsibility of the incident

commander/burn boss/fire use manager or designee to ensure that all safety measures are implemented and anyone failing to adhere to fire line safety will be removed from the fire.

The incident commander/burn boss will ensure that:

- All firefighters will wear proper personal protective equipment.
- All firefighters have current red cards and are qualified for the positions assigned.
- Communications is possible with all people involved with the fire.
- Any significant change in fire behavior or weather will be communicated immediately to everyone on the fire line.
- All fire shelter deployments and entrapments will be reported.

IX. PUBLIC INFORMATION AND EDUCATION

18. A. Public Information

Good public relations can engender public support and is prerequisite to a successful fire management program. Disseminating information about fire's natural role and effects is an important step in establishing public support for such programs (Stankey 1976, McCool and Stankey 1986). The Park's wildland fire management information program will provide timely, factual, accurate information aimed at a multitude of different audiences.

Prior to fire activities:

- Ecological concepts upon which the wildland fire management program is based will be incorporated into information handouts, selected books written about the park, and wayside and visitor center exhibits.
- The park will work with Eastern National to make sure that relevant, factually accurate sales publications that address fire's role in natural areas are available at its sale outlets in the park.
- The fire management program will be incorporated into appropriate interpretative talks, walks, the park newspaper, the park map and guide, the park camping brochure, site bulletins, bulletin board signs, and temporary exhibits at park visitor centers. Particular attention will be given to these activities when fires are conspicuous from visitor centers and/or local communities.
- Articles will also be written about Apostle Islands' fire management program and released for publication in statewide, regional, and national periodicals.
- The wildland fire management program will be discussed in informal contacts between staff from all divisions and park concessionaires, special use permittees, park neighbors, and park visitors.
- To effectively answer visitor questions, every NPS and concession employee in the park will be made aware of the wildland fire management program and the status of ongoing fires.

During fire activities:

- The Chief of Interpretation and Education will be kept informed daily by the Fire Management Officer of management actions, and the status of fires in the park.
- Information handouts explaining the fire management program will be prepared and periodically updated. During periods when management fires are burning, these handouts will be distributed to visitors at park visitor centers and by NPS field personnel during informal contacts out in the park.
- News articles will be written and released to local newspapers, radio, and television stations.
- Public information outlets for neighboring land management agencies will be provided with fire management information.
- Signs notifying the public about ongoing prescribed natural fires, prescribed burns, and wildfires, area closures, dense smoke, or other special situations will be placed along

roadways, at visitor centers, bulletin boards, boat launching ramps, local marinas, trailheads, campsites, day use sites, cabin sites, and at resorts.

The Superintendent's Office will issue all press releases regarding fire danger levels, closures, special precautions, and prescribed fires to newspapers, radio and television stations. The Chief of Planning and Resource Management, when necessary, will function as Information Officer and provide for effective communication between park personnel, the public, and the media. The fire management program will be incorporated into the park's overall interpretive program and explained when possible and appropriate.

Prior to prescribed fires, the Chief of Protection's Office will inform project personnel on details of the burn. Tribes, landowners, and agencies affected by the prescribed burn will be contacted and the Superintendent will initiate a press release. On the day of the burn, all staff should be notified as to the burn's location and any special safety warnings to pass on to visitors, i.e., caution to watch for smoke on the water, or advice not to hike in the area. Key visitor use or access sites where visitors could likely observe or approach the burn area should have temporary signs indicating a fire is occurring. This provides for public safety and education, and decreases the likelihood that visitors will report or attempt to put out a wildland fire use or prescribed fire accomplishing resource objectives.

Post-season activities will include those tasks necessary to adequately assess how the local public and cooperators received the efforts. This will be accomplished through coordination meetings with neighbors, contacts with local groups, media, and the State Air Quality Engineer. The purpose of this feedback is to revise plans, procedures and educational efforts regarding overall fire management at Apostle Islands National Lakeshore.

Fire prevention and fire education programs need to work harmoniously. The Fire Prevention section of this Plan (V, C, 2, Fire Prevention) addresses specific prevention actions that will take place. The Protection Division and the Interpretation Education Division need to work closely to accomplish these additional guidelines:

- The Park's designated Public Information Officer (and other staff as needed) will be kept informed daily or as often as necessary by the Fire Management Team regarding management actions, the status of active fires, commitment of personnel and resources, etc.
- Timely and accurate information will be provided to the media and Park visitors regarding the status of fire actions and suppression efforts.
- Information handouts explaining the fire management program will be prepared and updated as necessary. During periods when wildland fire use fires are burning, these handouts will be distributed to Park visitors and general public. Bulletin boards, the Visitor Centers, local Chamber of Commerce, and NPS field personnel will all be utilized for distribution.

- Ecological concepts upon which the wildland fire management program is based will be incorporated into information handouts, selected books written about the Park, pertinent wayside and visitor center exhibits, appropriate interpretive walks, site bulletins, talks, slide-illustrated and video taped productions, and other suitable activities in the Park.
- During ongoing fires, news articles will be written and released to local newspapers, radio, and television stations, and the website will be updated as needed.
- As with the Fire Prevention Program, close coordination with the neighboring land management agencies and landowners will be necessary to disseminate information, particularly when fires are burning in the park.
- All Park employees will be made aware of the wildland fire management program and the status of ongoing fires in order to ensure the most effective and accurate responses to visitor questions.
- The parks cooperating association will be requested to provide assistance as available during ongoing fires, mostly in the form of visitor center coverage and production of informational materials. Sales publications addressing fire's role in natural areas will be relevant and accurate. These materials will be available to the public at the Park visitor centers.
- The wildland fire management program will be discussed in informal contacts with all divisions, special use permittees, Park neighbors, and park visitors.
- Initial attack/monitoring/burn team members will determine the proximity of visitors and neighbors to the fire, inform them of potential hazards, and aid in their evacuation if necessary.
- When a wildland fire is in progress, information listing location, fire behavior, expected dangers, areas to avoid, and precautions will be posted on park bulletin boards, the park web page, and at visitor centers. Interpretative specialists will inform the public of dangers as well as interpret the role of fire in natural areas.
- When the hazards from a wildland fire are high, signs on trails leading into the fire activity area will be posted. Trails, campsites, day use sites, and cabin sites will be closed if deemed necessary by the Fire Management Overhead Team, and as approved by the Superintendent. The Prescribed Burn Boss will ensure that closure and/or informational signs on prescribed burns are properly posted.
- Visitor use will be limited or prevented near wildland fires and potentially affected areas. National Park Service personnel will patrol the perimeter of fires burning along the Park to inform visitors and neighbors about the role of fire in a natural area, explain the risks associated with approaching too close to a fire, and enforce visitor compliance with area closure orders.

- A Wildland Fire Status Summary will be kept by the Park Dispatcher. Crews and teams will be kept informed of the status of ongoing fires by the use of a daily Wildland Fire Status Summary broadcast on the NPS web page after the morning fire weather forecast. This status summary will also be distributed to all park divisions on a daily basis and posted on the park web page.
- News articles will be written and released to local newspapers, radio, and television stations as well as posted on the park web page.
- The park information line will be updated by the Park Dispatcher whenever new information is available on fires in progress.
- The Fire Management Officer will notify the following agencies of government about fire activities in the park: Ashland and Bayfield County Sheriffs, Federal Aviation Administration, National Weather Service, MDNR, and Chequamegon National Forest.
- Burned areas will be posted at campsites, day use sites, and trailheads if potential hazards exist. Campsites, day use sites, and trailheads will remain closed until all hazard trees are removed from the vicinity of the site. The public will be informed of hazards and appropriate safety precautions associated with traveling through or camping in burned areas.

The Park may develop a media kit to be given to the media and for educating the public. It will contain detailed information on the physics of fire and fire weather, fire ecology of the area, the Park's fire management program, and fire fighting.

X. PROTECTION OF SENSITIVE RESOURCES

19. A. Archeological/Cultural/Historic Resources

The park's historic structures are highly vulnerable to the risk of fire. The overwhelming majority of them are made from wood. Many are subject to additional risk factors; for example, most fishing cabins are built on piers, potentially allowing a ground fire access beneath the building, while Sand Island's "Plenty Charm" cottage makes extensive use of an early type of plywood, containing highly flammable adhesives. Should a fire ignite at any island structure, limitations on access make effective suppression virtually impossible.

However, the acute vulnerability of one class of resources should not allow the potential impacts of fire on other resource types to escape attention. For example:

- Archeological sites in the archipelago are frequently accompanied by surface scatter; ceramics, glassware, and even metal objects can be damaged if fire exposure is intense enough.
- Cultural landscapes can experience both beneficial and adverse impacts from fire; prescribed burning is a useful tool in maintaining farmstead clearings, but fire can destroy a historic orchard.
- Likewise, fire can have divergent effects on plant communities- such as berry patches and sugar bushes- used by traditionally associated populations.
- While some portions of the Park's museum collection are housed in a controlled storage facility, thousands of artifacts are kept on display in more vulnerable field locations.

The single most important mitigating action to minimize the risk posed to cultural resources by fire will be an assertive, advance fuel-reduction program. Currently, even the well-known lighthouse complexes are adversely impacted by vegetative encroachment, while many lesser-known backcountry sites are on the verge of complete obliteration.

Fuel reduction would entail cyclic clearing of vegetation around designated sites. The radius of clearing would be dependent on the density and composition of the surrounding forest, as well as the vulnerability of the specific site. The jack pine forest encroaching upon the LaPointe Light Station buildings would call for assertive treatment, for example, as would the complex of wooden cabins, filled with irreplaceable museum artifacts, at the Manitou Fish Camp.

To mitigate potential archeological site damage, Park personnel should be trained in identification of the most common types of sites, including lithic scatters, ring structures, and natural dwellings such as caves. Suppression tactics that will be used on islands are less ground disturbing than traditional tactics. Heavy reliance will be placed on water as the primary fire retardant and shorelines and openings as natural fuel breaks. Fires suppressed using the minimum requirement concept by trained Park and local resources present a lower risk of

significant damage to cultural sites. However, any fire suppression activity has a potential to impact sites.

A Resource Advisor should be assigned to all Type I and II incidents and as needed on Type III incidents. The Superintendent, or authorized representative, may determine that an Archeologist should be assigned based on:

- known or suspected site location,
- complexity of known or potential cultural resources, and/or
- complexity of the fire organization.

This requirement will be added to the Delegation of Authority or otherwise communicated to the Incident Commander.

To mitigate potential fire damage for cultural landscapes, areas need to be cleared of ground fuel and encroaching brush. Determining the extent of each cultural landscape is important. Then, a combination of non-fire applications (mechanical removal) and careful use of prescribed fire may be used to reestablish encroached areas and to continue to maintain each cultural landscape. Minimum impact management will be used by trained Park and local resources to lower the risk of significant damage to cultural sites from fire fighting activity.

Identification of ethnographic resources requires consultation with traditionally associated groups. Appropriate tribal representatives will be consulted when fire management activities are deemed to have potential to affect tribal interests, or to impede access to park areas for a significant period of time.

Specific Mitigations

The single most important mitigating action to minimize the risk posed to cultural resources by fire will be an assertive, advanced fuel-reduction program. Currently, even the well-known lighthouse complexes are adversely impacted by vegetative encroachment, while many lesser-known backcountry sites are on the verge of complete obliteration. Many of the Park's cultural resources are highly vulnerable to fire; not only the 158 structures enumerated on the List of Classified structures, but also ruined buildings at logging camps and farmsteads, orchards, and museum objects housed at field locations.

Fuel reduction would entail cyclic clearing of vegetation around designated sites. This would not only lessen the risk of fire spread, but would also lessen mechanical hazards to the resources as well. It should be noted that the unique "Herring King" cottage on Sand Island, made from the remains of a wrecked fishing boat, was crushed by a falling tree in the late 1990s, while the structures of Outer Island's Lullaby Logging Camp, still standing as recently as the early 1990s, have now all but collapsed.

The radius of clearing would be dependent on the density and composition of the surrounding forest, as well as the vulnerability of the specific site. The jack pine forest encroaching upon the LaPointe Light Station buildings would call for assertive treatment, for example, as would the

complex of wooden cabins, filled with irreplaceable museum artifacts, at the Manitou Fish Camp.

Fire management activities that disturb the ground in any way (i.e. fire line construction using hand tools) would use paraprofessional and professional archeologists working in cooperation with firefighters and pre-burn preparation crews to prevent impacts to cultural resources. During a wildfire the highest priorities are safety and controlling the blaze. If fire lines cannot be diverted, unavoidable impacts to cultural resources may occur. In most cases, however, damage can be averted. The following measures would be undertaken to help mitigate impacts on cultural resources under all three of the alternatives during fire suppression, prescribed fire, mechanical treatment, and during rehabilitation activities:

- Fire management staff will coordinate with the park Cultural Resource Specialist during the development of prescribed burn plans in order to determine if archeological investigation is necessary, and consult with Native American tribes.
- Fire management staff will inform park Cultural Resource Specialist of wildfires and suppression activities as soon as possible.
- Park Cultural Resource Specialist will coordinate with fire management staff regarding known cultural resources in prescribed fire units and recommend protective measures. All cultural resources located in or near prescribed fire units will be protected to the extent possible.
- The Cultural Resource Specialist will inform and consult with the State Historical Preservation Officer (SHPO) and Native American tribes, and if necessary, the Advisory Council on Historic Preservation, on forthcoming projects and activities, such as prescribed burns for hazard fuel reduction in the vicinity of historic properties, to ensure compliance with Section 106 of the National Historic Preservation Act (NHPA 1966). In addition, contact will be made if cultural resources are threatened or destroyed during wildland fires.

20. B. Natural Resources

The islands' coniferous/northern hardwood forests are unique in the area. Their maturity and isolation from the mainland have kept deer populations low on several of the islands. On others, deer numbers expanded after logging ceased and forests began to regenerate. On islands unaffected by deer, the development of full-functioning ecosystems with rich herbaceous layers and multiple structured under stories has occurred. Yew is abundant on most islands, unlike mainland forests. The Park is one of the few protected areas in the Lake Superior Basin that contains old-growth forest remnants. They occur on Bear, Outer, North Twin, Raspberry, Devils, and Sand Island and support prime examples of hemlock, boreal, white pine, and yellow birch/cedar old-growth communities. Other unique habitats protected in the Park include bogs, sandscape/dune, cliff, and clay bluff communities.

Mitigation: Mitigating fire damage to natural resources depends on using appropriate prescriptions and providing qualified and adequate personnel for fire monitoring and control when practicing wildland fire use or prescribed fire. Mechanical treatment may be necessary to

modify fuels before these strategies can be employed. High-intensity fire should be kept away from cliff edges where rare plants may be located.

Soil Resource

Fire suppression techniques, such as cutting fire lines down to mineral soil or using heavy equipment like bulldozers, can cause intensive disruption to the surface soil layer. Moreover, NPS policy requires the use of Minimum Impact Suppression Tactics (MIST), which further reduces the area of directly-disturbed ground surface. Tactics relevant to protecting soils include the following:

- Cold trail the fire-edge (a method of controlling a partly-extinguished fire edge) when practical.
- Wetlines or natural breaks will be used wherever possible in lieu of hand line construction if water and pumps are available. Waterbars will be constructed on hand lines on steep slopes.
- Utilize soaker hose or foggers in mop-up. Avoid "boring" and hydraulic action on shallow soils.
- Fire lines will be kept to the minimum width necessary to allow backfiring or safe black line to be created. Utilize natural barriers wherever possible to avoid a "tunnel effect."
- If a mineral soil line is needed, utilize fire line explosives whenever possible instead of a bulldozer.

Water Resources

All alternatives would follow the following special restrictions with regard to aerially applied retardant and foam use (NFES 1256, 1996):

Retardant - No retardant drops within 400 feet (120 m) of open water.

Foam (aerial delivery) - Aerial delivery of foam requires Park Superintendent approval on a case-by-case basis. When approved, the following guidelines apply:

- Foam concentrate will only be injected into the holding tank after the water pick-up operation has been completed.
- Drops from Beaver, T2 and T3 helicopters – no drops within 200 feet (60 m) of open water.
- Drops from Scoopers, heavy air tanker or heavy helicopter – no drops within 400 feet (120 m) of open water.

Foam (ground delivery with motorized pumps):

- No application within 25 feet (8 m) of open water when using small pumps.
- No application within 50 feet (15 m) of open water when using Mk III or equivalent pumps.

- All foam concentrate used for injection will be located in impermeable containment basins, i.e. visqueen (plastic sheet) spread over rocks or logs to form a catch basin.

Foam (ground delivery with backpack pumps)

- No application within 10 feet (3 m) of open water.
- All backpack pumps will be filled a minimum of 10 feet (3 m) from open water. A separate, uncontaminated container must be used to transport water from source to backpack pump. This container must be kept uncontaminated by concentrate.

Threatened, Endangered, and Sensitive Species

- All known eagle, and piping plover nests, gray wolf den locations, sensitive plant locations, or habitat important to any other threatened, endangered, & sensitive species in close proximity to prescribed burn units will be addressed during the planning phase to ensure that they are not impacted.
- To reduce noise impacts from over flights or other equipment on sensitive species such as the currently threatened bald eagle, the Fire Management Officer will work with park Natural Resource staff to determine unit-specific mitigation measures in the operational plans for the fire activity. Active bald eagle nests will be avoided entirely if possible. If it is determined that using aircraft in the vicinity of nesting bald eagles is necessary, takeoffs and landings will be avoided within 1/4 mile (0.4 km) of the nest. Under no circumstances shall aircraft be within 500 feet (150 m) of a nest. Recurring activity (passes, circling, hovering) will remain 1,500 feet (450 m) or more above ground level. Noise impacts will be evaluated as park managers determine the "appropriate management response" for a fire.
- Any fire that is judged a threat to any active sensitive, threatened, or endangered species den or nest would be suppressed.
- Any potential threats to critical habitat for piping plover on Long island or other designated critical habitat for other species will be considered.

Vegetation

- Tracked vehicles should have tires and undercarriage pressure washed before entering islands to reduce the likelihood of accidentally introducing exotic species. This is especially required of vehicles being used from other areas.

Wildlife Species

- Fire management staff will coordinate with Natural Resource management staff to develop prescribed burn plans with sufficient lead time to complete any surveys necessary prior to implantation of any fires.
- Fire management staff will inform the Chief, Protection and Resource Management of wildfire suppression activities as soon

Wilderness

- Stumps will be flush cut, and covered with duff.
- Any cutting of limbs should be done in a manner to reduce visibility from trails or other Visitor Use Areas.
- The use of power tools may be necessary and should be done so in a manner that minimizes the associated noise.

Soundscapes

- Fuel treatments near the campgrounds and developed areas would be restricted to times of low visitor use of the park to minimize and/or eliminate noise impacts on recreationists and visitors.

21. C. Developments, Improvements, and use and occupancyholdings

Developments, improvements, and use and occupancyholdings are identified on maps found in Appendix E.

Mitigation: Protection of these resources will involve:

- Increased prevention awareness in these areas (see Fire Prevention Plan, Appendix I.)
- Priority for initial attack and assertive suppression actions in these areas.
- Emphasis on hazard fuel reduction (both prescribed fire and mechanical treatment).
- Creation of defensible space around buildings

XI. FIRE CRITIQUES AND ANNUAL PLAN REVIEW

This Fire Management Plan will be reviewed and evaluated annually to determine if the objectives have been met and to make necessary revisions. The Park Fire Management Committee will conduct this evaluation. Any problems associated with the guidelines or standards set for fire management, cost effectiveness and suppression will be addressed through revision or addendum and made a part of this plan. The Area Fire Management Officer will review all revisions and make recommendations. The Superintendent will approve all revisions.

Fire reviews will be conducted in accordance with procedures found in RM-18. Each review will be documented and filed with the final fire documentation. The Fire Management Coordinator will retain a file copy.

The Fire Management Committee and cooperators will critique all suppression actions on fires having extended attack and multi-period activities, if appropriate. If the need exists, the Regional Fire Management Officer can be included in such reviews and a national review by the National Fire Management Program Center can be requested.

All entrapment and fire shelter deployments will be reviewed in accordance with NWCG Wildland Fire Entrapment/Fatality Initial Report and Entrapment Investigation Element Matrix.

XII. CONSULTATION AND COORDINATION

The primary duty of the park staff is to carry out the fire management program with emphasis on human safety and prevention of damage to private and public buildings and facilities. Careful planning, good public information and a well-trained staff can provide for a safe and effective fire program.

The Fire Management Coordinator is responsible for coordination and consultation with cooperators regarding fire management activities. This includes involvement with the Midwest Regional Office FMO; Chequamegon National Forest, the Red Cliff Band of Lake Superior Chippewa, the Bad River Band of Lake Superior Chippewa, Wisconsin DNR, the Area FMO stationed in Voyageurs National Park, and local cooperators.

The following individuals were consulted in preparing this Plan:

Ben Holmes, Former Environmental Protection Specialist (Acting FMO), Great Plains

Mike Harnois, Information Management/GIS Specialist, Chequamegon National Forest, Park Falls, WI.

Joyce Zifco, former Fire Management Officer, Washburn District, Chequamegon National Forest

Steve Jakala, former Area Fire Management Officer, Voyageurs National Park

Fred Bird, Midwest Region Fire Management Officer, Omaha, NE

Richard Bahr, former Midwest Region Prescribed Fire Specialist

Jim DeCoster, Midwest Region Fire Ecologist, Midwest Regional Office, Omaha, NE

Cathy Carnes, U.S. Fish and Wildlife Service

Dave Soleim, Border Waters Park Group Fire Management Officer, Voyageurs N.P., Int'l Falls, MN

KellyAnn Gorman, former Great Lakes Ecoregion Fire Ecologist, Voyageurs N.P., Int'l Falls, MN

XIV. APPENDIXES

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APPENDIX B: Definitions and Abbreviations

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1. Descriptions of Individual Islands

2. Preliminary Fuel Loading Inventory for Apostle Islands National Park

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4. Vegetation Community Descriptions

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APPENDIX F: Fire Effects Monitoring Plan

APPENDIX G: Annually Updated Information

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2. Apostle Island Fire Callout Roster

3. Fire Cache Inventories

4. MOUs and Cooperative Agreements

APPENDIX H: Long-Term Prescribed Fire and Hazard Reduction Plan

APPENDIX I: Fire Prevention Plan

APPENDIX J: WFIP Guidance

1. WFIP Instructions

2. Blank Wildland Fire Implementation Plan (WFIP) Format

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APPENDIX B: DEFINITIONS AND ABBREVIATIONS

appropriate management response – Specific actions taken in response to a wildland fire to implement protection and fire use objectives.

Burning Index – A number related to the contribution that fire behavior makes to the amount or effort needed to contain a fire in a specified fuel type within a rating area.

Cusate Foreland - An accretion of sand which has been molded by longshore drift and constructive waves emanating from two different directions.

Confine – Confinement is the strategy employed in appropriate management responses where a fire perimeter is managed by a combination of direct and indirect actions and use of natural topographic features, fuel, and weather factors.

Detection – The act or system of discovering and locating fires.

Dispatcher – A person employed who receives reports of discovery and status of fires, confirms their locations, takes action promptly to provide people and equipment likely to be needed for appropriate management, and sends them to the proper place.

Emergency – Any incident which requires the response of a fire protection organization's operations units and/or support units.

Fire Management Plan (FMP) – A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan.

Fire Management Unit (FMU) – Any land management area definable by objectives, topographic features, access, values-to-be-protected, political boundaries, fuel types, or major fire regimes, etc., that set it apart from management characteristics of an adjacent unit.

Fire Management Area (FMA) – A predefined geographic area within a Fire Management Unit, usually defined by natural boundaries

Fire Occurrence – Number of fires per unit time in a specified area.

Fire Prevention – All activities concerned with minimizing the incidence of wildfires.

Fire Regime – Periodicity and pattern of naturally-occurring fires in a particular area or vegetative type, described in terms of frequency, biological severity, and areal extent.

Hazard Fuel Reduction – Any treatment of a fuel complex defined by kind, arrangement, volume, condition, and location that reduces a special threat of ignition or of suppression difficulty.

Hazardous Fuel Conditions – any arrangement of surface and aerial fuels, including fuel loading, which represents an unacceptable increased threat to resources

Holding Actions - Planned actions required to achieve wildland and prescribed fire management objectives. These actions have specific implementation time frames for fire use actions but can have less sensitive implementation demands for suppression actions. For wildland fires managed for resource benefits, an MMA may not be totally naturally defensible. Specific holding actions are developed to preclude fire from exceeding the MMA. For prescribed fires, these actions are developed to restrict the fire inside the planned burn unit. For suppression actions, holding actions may be implemented to prohibit the fire from crossing containment boundaries. These actions may be implemented as fire lines are established to limit the spread of fire.

List of Classified Structures (LCS) – The National Park Service inventory of all historic structures that are currently on or have been determined eligible for the National Register or that are ineligible for the National Register but have been determined through the planning process to be managed as resources in which the National Park Service maintains a defensible legal interest.

Incident – An occurrence or event, either human-caused or natural phenomena, that requires action by emergency service personnel to prevent or minimize loss of life or damage to property and/or natural resources.

Incident Commander – Individual responsible for the management of all incident operations.

Initial Attack – An aggressive suppression action consistent with firefighter and public safety and values to be protected.

Longshore Drift - The movement of sand and shingle along the coast. Waves usually surge onto a beach at an oblique angle and their swash takes sediment up and along the beach. The backwash usually drains back down the beach at an angle more nearly perpendicular to the coast, taking sediment with it. Thus there is a zig-zag movement of sediment along the coast.

Longshore currents, initiated by waves, also move beach material along the coast. The term littoral drift is synonymous.

Maximum Manageable Area (MMA) - MMA defines the firm limits of management capability to accommodate the social, political, and resource impacts of a wildland fire. Once established as part of an approved plan, the general impact area is fixed and not subject to change. MMAs can be developed as part of the FMP and described as an FMA. They can also be developed as part of the planning and implementation of management actions after a fire has ignited. If they are developed after the ignition, their definition will occur during the Wildland Fire Implementation Plan Stage III process. In the event a fire occurs in a preplanned MMA or FMA and the local unit determines that this MMA is not the best-suited alternative for the present conditions, a new MMA can be developed as part of the Stage III process. Once this occurs, the Stage III MMA becomes the firm limits of the fire and is fixed.

Mitigation Actions - Mitigation actions are considered to be those on-the-ground activities that will serve to increase the defensibility of the MMA; check, direct, or delay the spread of fire; and minimize threats to life, property, and resources. Mitigation actions may include mechanical and physical non-fire tasks, specific fire applications, and limited suppression actions. These actions will be used to construct fire lines, reduce excessive fuel concentrations, reduce vertical fuel continuity, create fuel breaks or barriers around critical or sensitive sites or resources, create “blacklines” through controlled burn-outs, and to limit fire spread and behavior.

National Fire Danger Rating System (NFDRS) – A multiple index scheme designed to provide fire control and land management personnel with a systematic means of assessing various aspects of fire danger on a day-to-day basis.

Natural Ignition – Any fire of natural origin (e.g., lightning, spontaneous combustion, volcanic activity).

Preparedness – Activities that lead to a safe, efficient, and cost-effective fire management program in support of land and resource management objectives through appropriate planning and coordination.

Prescribed Fire – Any fire ignited by management actions to meet specific objectives.

Prescribed Fire Plan – A plan required for each fire application ignited by managers.

Prescription – Measurable criteria that define conditions under which a prescribed fire may be ignited, guide selection of appropriate management response, and indicate other required actions.

Resource Order – A form used by dispatchers, service personnel, and logistics coordinators to document the request, ordering or release of resources, and the tracking of those resources on an incident.

Shared Applications Computer System (SACS) – Fire information and personnel training and experience are entered in this program. It is used by all Department of Interior agencies.

Tombolo - A sandbar or sandspit that connects an island to the mainland or to another island.

Wildland Fire – Any non-structure fire that occurs in the wildland.

Wildland Fire Implementation Plan (WFIP) – A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire being managed for resource benefits.

Wildland Fire Management Program – The full range of activities and functions necessary for planning, preparedness, emergency suppression operations, and emergency rehabilitation of

wildland fires, and prescribed fire operations, including fuels management to reduce risks to public safety and to restore and sustain ecosystem health.

Wildland Fire Situation Analysis (WFSA) – A decision-making process that evaluates alternative management strategies against selected safety, environmental, social, economic, political, and resource management objectives.

Wildland Fire Suppression – An appropriate management response to wildland fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire.

Wildland fire use (wildland fire use) – The management of naturally-ignited wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in Fire Management Plans.

APPENDIX C: SPECIES LISTS

Federally-listed Threatened or Endangered Species

Common Name	Scientific Name	Status
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened
Gray wolf	<i>Canis lupus</i>	Endangered
Piping plover	<i>Charadrius melodus</i>	Endangered
Canada lynx	<i>Lynx canadensis</i>	Threatened

State-listed Threatened, Endangered, or Special Concern Species

22. Threatened or Endangered Plant Species

Common Name	Scientific Name	Status
Butterwort	<i>Pinguicula vulgaris</i>	Endangered
Lake cress	<i>Armoracia lacustris</i>	Endangered
Moonwort	<i>Botrychium lunaria</i>	Endangered
Mountain cranberry	<i>Vaccinium vitis-idaea</i>	Endangered
Satiny willow	<i>Salix pellita</i>	Endangered
Beautiful sedge	<i>Carex concinna</i>	Threatened
Lenticular sedge	<i>Carex lenticularis</i>	Threatened
Michaux's sedge	<i>Carex michauxiana</i>	Threatened
Coast sedge	<i>Carex exilis</i>	Threatened
Drooping sedge	<i>Carex prasina</i>	Threatened
Broad-leaved twayblade	<i>Listera convallarioides</i>	Threatened
Marsh grass-of-Parnassus	<i>Parnassia palustris</i>	Threatened
Calypso orchid	<i>Calypso bulbosa</i>	Threatened
Spike trisetum	<i>Trisetum spicatum</i>	Threatened
Northern gooseberry	<i>Ribes oxycanthoides</i>	Threatened
Flat-leaved willow	<i>Salix planifolia</i>	Threatened
Plains ragwort	<i>Senecio indecorus</i>	Threatened

23. Threatened or Endangered Animal Species

Common Name	Scientific Name	Status
Piping plover	<i>Charadrius melodus</i>	Endangered
Peregrine falcon*	<i>Falco peregrinus</i>	Endangered
Forster's tern*	<i>Sterna forsteri</i>	Endangered
Common tern	<i>Sterna hirunda</i>	Endangered
Osprey*	<i>Pandion haliaetus</i>	Threatened
Red-shouldered hawk*	<i>Buteo lineatus</i>	Threatened

* indicates species recorded during migration.

24. Special Concern Species

Vascular plants occurring in Apostle Islands National Lakeshore and Madeline Island that are listed by the Wisconsin Department of Natural Resources as being of “special concern.”

Common Name	Scientific Name
Dragonmouth	<i>Arethusa bulbosa</i>
Lance-leaved grape-fern	<i>Botrychium lanceolatum</i>
Mingan moonwort	<i>Botrychium minganense</i>
Small grape-fern	<i>Botrychium simplex</i>
Bog reed-grass	<i>Calamagrostis inexpansa</i>
Hair-like sedge	<i>Carex capillaris</i>
Pale sedge	<i>Carex pallescens</i>
Sparse-flowered sedge	<i>Carex tenuiflora</i>
Tufted hairgrass	<i>Deschampsia cespitosa</i>
Common hairgrass	<i>Deschampsia flexuosa</i>
Spreading wood fern	<i>Dryopteris expansa</i>
Robbins spike-rush	<i>Eleocharis robbinsii</i>
Marsh horsetail	<i>Equisetum palustre</i>
Variegated scouring rush	<i>Equisetum variegatum</i>
Woodland cudweed	<i>Gnaphalium sylvaticum</i>
Fir clubmoss	<i>Lycopodium selago</i>
Adder’s tongue	<i>Ophioglossum pusillum</i>
Chilean sweet cicely	<i>Osmorhiza chilensis</i>
Tall white orchid	<i>Platanthera dilatata</i>
Round-leaved orchid	<i>Platanthera orbiculata</i>
Bird’s-eye primrose	<i>Primula mistassinica</i>
Sooty beakrush	<i>Rhynchospora fusca</i>
Plains ragwort	<i>Senecio indecorus</i>
Small purple bladderwort	<i>Utricularia resupinata</i>
White mandarin	<i>Streptopus amplexifolius</i>
Livid sedge	<i>Carex livida</i> var. <i>radiculis</i>
Small yellow water-lily	<i>Nuphar microphyllum</i>
Northern black currant	<i>Ribes hudsonianum</i>
Torrey’s rush	<i>Scirpus torreyii</i>

APPENDIX D: NEPA AND NHPA COMPLIANCE

A Draft Environmental Assessment (Draft EA) has been prepared for this Fire Management Plan (FMP) and is considered an unattached appendix. See Apostle Islands National Lakeshore Fire Management Plan Environmental Assessment (2005), on file at Park headquarters in Bayfield, Wisconsin. The Draft EA found that implementation of this FMP will not produce significant environmental impacts. After the public and agency review periods mandated by the National Environmental Protection Agency (NEPA) have been completed, and if the National Park Service decision-maker concurs with the conclusions of the Draft EA, a Finding of No Significant Impact (FONSI) will become a permanent part of the EA.

With regard to compliance with the National Historic Preservation Act (NHPA), the Wisconsin State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation in Washington, DC, have been kept informed of revisions to this FMP via scoping for the EA and through receipt of copies of the FMP and EA.

APPENDIX E: SUPPLEMENTAL INFORMATION

25. 1. Descriptions of Individual Islands

Basswood Island: This island is 1,917 acres (779 ha) and reaches 188 feet (57 m) in elevation above the lake. It is a narrowly elliptical island that rises abruptly, especially on the west coast, to a domed central plateau. Basswood's presettlement forest was among the most diverse in the archipelago. Hemlock dominated, along with some large coastal white pines near the north and south ends of the island, but red oak, white birch, sugar maple, balsam fir, white cedar, basswood, aspen, and red maple were also important. Presently, most of Basswood island is dominated by sugar maple, white birch, red maple, and red oak, with smaller amounts of balsam fir, quaking aspen (near the coast and in clearings), and relict hemlock groves. The understory is sparsely vegetated with mountain maple, beaked hazelnut, and fly honeysuckle. The island has several farm sites which are rapidly being reclaimed by woods. No weather or fire history data is available specifically for this unit. The presence of red oak and red maple may indicate fire or other disturbance as a factor in forest establishment (Judziewicz and Koch 1993).

No fuel loading inventories have been done on Basswood but those done on islands with northern hardwood mixed forest habitat would be comparable. Refer to Oak and Outer Islands in Table E-1. FBM fuel models 8 and 9 best represent the vegetation on this island.

Values at risk are the NPS dock, individual campsites, and a group campsite. Cultural resources include the Bass Island Brownstone Company Quarry, the McCloud-Brigham Farm, and several other farm sites. While moderately intense fire would do little damage to the quarry, the McCloud-Brigham farm contains wooden structural ruins and an orchard that is vulnerable to fire. Major concerns would be visitor safety and protection of facilities. Relict hemlock stands are natural resource values at risk.

Bear Island: Bear Island is 1,824 acres (741 ha) and rises to 233 feet (71 m) above the lake. The southern and east coasts are high, eroded clay bluffs while the northern and western coasts feature rugged, pine-fringed sandstone cliffs and ledges. Due to prevailing winter winds, the north tip has a stunted, nearly impenetrable forest (krumholtz forest).

The presettlement forest was fairly diverse. The flat, clayey, poorly-drained northern half of the island was dominated by hemlock, white cedar, white pine, and yellow birch. In the better-drained, drumlinoid southern half, hemlock, red oak, white and yellow birch and especially sugar maple were more important. Logging was intense. The northern half is now dominated by pole-sized white cedar, white and yellow birch, and balsam fir, while the southern half is dominated by sugar maple, white birch, red maple, and some red oak. On the summit is a nearly pure sugar maple stand with a dense understory of seedlings and saplings. On the slopes to the north and east of the summit bog is a 37.0 acre (15 ha) teardrop-shaped stand of larger old-growth hemlock-hardwoods estimated to have originated around 1700 A.D. Canada yew is not dominant due to past irruptive deer populations. Mountain maple is common in the understory significance (Judziewicz and Koch 1993).

Tree-ring analysis from stands of hemlock and white pine on Outer, Manitou, Bear, and Devils Islands showed that the interval between fire and other disturbances (e.g., windthrow) was 100 to 250 years (Swain 1988).

There are no NPS facilities on Bear Island.

One inholding lease remains on Bear Island.

Cultural resources at risk include one identified prehistoric archeological site, the Stump-Stalker log cabin, and one of the park's best-preserved historic logging camps. The latter includes standing walls of several log structures. The nearly 300 year old-growth hemlock-hardwoods forest is also a natural resource value at risk.

No fuel loading inventories have been done on Bear but those done on islands with northern hardwood mixed forest habitat would be comparable. Refer to Oak and Outer Islands in Table E-1. FBM fuel models 8 and 9 best represent the vegetation on this island.

Cat Island: Cat Island is 1,352 acres (550 ha) and is 81 feet (25 m) above lake level at its highest point. It is a low, elongated, and poorly drained island. The presettlement forest consisted of large hemlock, white pine, and yellow birch, with smaller amounts of sugar maple, red oak, white cedar, and balsam fir. Logging began in the 1880s and continued until the late 1940s. Presently, the forest is dominated by white cedar, yellow birch, white birch, balsam fir, and sugar maple, the latter exhibiting good regeneration. Very large relict specimens of yellow birch and hemlock are occasionally encountered. Black ash is common in the poorly-drained interior. The understory consists of numerous deadfalls and thickets of mountain maple and Canada yew (Judziewicz and Koch 1993).

Cultural resources include the remains of a logging camp and a fish camp. A shelter cabin and a campsite are the only facilities located on Cat Island. Fire weather and fire history data are not available for this Island.

No fuel loading inventories have been done on Cat but those done on islands with northern hardwood mixed forest habitat would be comparable. Refer to Oak and Outer Islands in Table E-1. FBM fuel models represented are 6, 8, and 9.

Devils Island: Devils Island is 318 acres (230 ha) and raises 58 feet (25 m) above lake level. It contains the best example of boreal forest in the archipelago. Presettlement vegetation was dominated by large white pines, with white and yellow birch and balsam fir occurring. It has been spared extensive logging because of difficulty in access and its status as a lighthouse reservation. The large pines and hemlocks cored by Swain (1986) were all determined to be at least 275 years old. Dominant trees in the northern two-thirds of the island are balsam fir, white cedar, white and black spruce, and white birch, with scattered super-canopy white pines and very few large hemlocks. In interior sites the forest is open and grades into sedge bog, while in coastal locations the stunted, wind-blasted trees form a thick krumholtz community. Common shrubs include velvet-leaved blueberry, creeping snowberry, and Labrador tea; Canada yew is widespread on coastal bluffs but not important inland. In the southern one-third of the island, are

old-growth yellow birch, white birch, balsam fir, and white cedar with a few large sugar maples. Canada yew and mountain maple are dense and dominant here. On the steep banks on the southwestern side of the island are many huge white pines, and in the recent past, a few red pines (Judziewicz and Koch 1993).

Tree-ring analysis from stands of hemlock and white pine on Outer, Manitou, Bear, and Devils Islands showed that the interval between fire and other disturbances (e.g., windthrow), was 100 to 250 years (Swain 1988).

A fuel loading inventory was completed in Devils Island's Boreal habitat in 1998. Refer to Table E-1. FBM fuel models represented are 5, 6, and 8.

Cultural resources at risk include the Devils Island Light Station, consisting of 22 structures and a historic roadway, and one identified archeological site. National Park Service facilities include docks and one campsite, at the south end. Natural resource values at risk include old-growth white pines. Other values include the campsite at the south end of the island.

Eagle Island: Eagle Island is 24 acres (10 ha) and is only 21 feet (6 m) above lake level. It is a plateau of Orienta Sandstone and completely surrounded by cliffs. Deep, dangerous crevices nearly split the island in several places. The interior is forested with mostly pole-sized white birch, white cedar, balsam fir, and a few large yellow birch. Canada yew is dominant in the understory; mountain maple and beaked hazelnut are also common (Judziewicz and Koch 1993). There are no facilities on the island. No fire history data is available for the island.

Eagle Island is a colonial nesting bird sanctuary. Values at risk include breeding herring gulls, cormorants, and great blue herons during nesting season (May-August).

FBM fuel models represented is 6, 8, and 9.

Gull Island: Gull Island is the smallest island in the archipelago, measuring three acres (1 ha) and it is only 3-7 feet (1-2 m) above the lake level. Although Gull Island once had a small mesic forest, it now is covered with scrub red-berried elder, junberries, mountain maple, pin cherry and showy mountain-ash. Turnover rates are high on this island and exotics have made up over 50 percent of what has been collected here (Judziewicz and Koch 1993). There are no facilities on the island. It is unlikely that fire would be sustained even if it managed to get started on the island. No weather or fire history data is available specifically for this unit.

FBM fuel models represented is 2.

Gull Island is a colonial nesting bird sanctuary. Values at risk include breeding herring gulls and cormorants during nesting season (May-August), and the historic Gull Island Light Tower.

Hermit Island: Hermit Island is 743 acres (302 ha) and rises 176 feet (54 m) above the lake level. Presettlement vegetation on the well-drained eastern two-thirds of the island was large white and red pine, with some sugar maple, hemlock, and white birch. The poorly-drained western part had stands of white cedar and balsam fir, while sugar maple and white cedar are

dominant on the southeast shore. Hermit island has had a long history of human disturbance including logging, fires after logging, quarrying, and agriculture. Presently the forest is dominated by white birch, white cedar, balsam fir, sugar maple, yellow birch, red maple, and quaking aspen, with a few pines present along the rocky bluffs and south beach. A small, remnant hemlock-sugar maple-yellow birch stand with some hophornbeam occurs on steep, east-facing slopes inland and about 1 km north of the quarry. The swampy eastern end of the island has thickets of balsam fir, white cedar, and yellow birch in which black ash is an important component. The most common shrubs are mountain maple, beaked hazelnut, and fly honeysuckle. Canada yew is uncommon. South beach and the slopes leading to it are the most xeric part of the island. Here are found white and red pines mixed with red oak and white birch; in the understory, bracken fern, lowbush blueberry, and wintergreen are frequent (Judziewicz and Koch 1993).

No facilities are located on Hermit Island. No fire history data is available.

No fuel loading inventories have been done on Hermit but those done on islands with northern hardwood mixed forest habitat would be comparable. Refer to Oak and Outer Islands in Table E-1. FBM fuel models represented are 8 and 9.

Ironwood Island: Ironwood Island is 659 acres (268 ha) and rises 78 feet (24 m) from the lake level. It is circular and has low clay bluffs on the western, southern, and part of the eastern shores and low sandstone ledges and cliffs on the northern and northeastern shores. Presettlement forest included very large hemlocks as well as abundant white cedar and yellow birch. Presently the forest is dominated by pole-sized balsam fir, white cedar, white and yellow birch, and smaller quantities of sugar maple, red maple, and hemlock; red oak, basswood, and hophornbeam are present but rare. The poorly-drained interior has some black ash. Canada yew is dominant in the understory. Mountain maple is abundant and numerous deadfalls are on the forest floor. Beaked hazelnut and red-berried elder are widespread (Judziewicz and Koch 1993).

Cultural resources at risk include one known archeological site and a logging camp site.

No facilities are located on Ironwood Island. No fire history data is available.

No fuel loading inventories have been done on Ironwood but those done on islands with northern hardwood mixed forest habitat would be comparable. Refer to Oak and Outer Islands in Table E-1. FBM fuel models represented are 8 and 9.

Long Island: Long Island is approximately 500 acres (203 ha) and is only 13-16 feet (4-5 m) above the lake level. It is geomorphically not part of the Apostle Islands but is a long narrow peninsular sand spit. It is presently connected to the mainland at its southeast end in a low wetland area known as the "Cut." This connection occurred during the violent November storm of 1975. Topographically, Long Island consists of a series of open to forested dune ridges and wetland swales. Presettlement vegetation was recorded as a forest of red pine, white pine, white birch, and quaking aspen on the ridges, alternating with alder thickets and sphagnum-sedge bogs in the swales toward the bay side; certainly jack pine and oaks must have also been present. The present forest has changed to the extent that white pine, birch, and aspen are not now dominant.

The ridges of the island have three types of forest: 1) Red pine, commonest on many of the bay side ridges; 2) Hill's or northern pin oak (*Quercus ellipsoidalis*) or Hill's x red hybrid, commonest near the lake side on the eastern side of the island; 3) Jack pine, dominant from the west tip east in the stabilized dune zone just south of the lake side active dunes and dune grassland. All of the forests are quite young, none being much over 100 years. Common understory species in red pine and oak forests include common juniper, huckleberry, lowbush blueberry, and bracken fern. The shaded, acid swales in these stands are dominated by blue-joint, leatherleaf, and fowl manna-grass. The jack pines vary from closed forest to open savanna, and have an understory of common juniper, false-heather, bearberry, common hairgrass, sand cress, three-toothed cinquefoil, and reindeer lichen. An unusual habitat is a series of shrubby swales, dominated by jack pine and willows, in the dune accretion zone near the island's northwest tip. The linear sphagnum-sedge bogs on the bay side of the island proper have a fairly complete bog flora including many sedges, ericads, sweet gale, insectivores, and sweet flag. Scattered throughout these bogs are large white pine and small groves of tamaracks. Near the eastern end of the island, black chokecherry and bog birch are present in their only Park occurrences (Judziewicz and Koch 1993).

Southeast of the old southeast tip of the island, the isthmus becomes a series of low dunes and swales vegetated by a brushy mixture of speckled alder, green ash, white birch, and quaking aspen copses with willows and sweet gale in the sublayer. After about a mile, the dunes flatten out into a broad plain called the "Sand Cut", a wet carex-juncus meadow on the bay side. This is the area where the 1975 storm re-attached the island proper to Chequamegon Point (Judziewicz and Koch 1993). No fire weather or fire history data is available, however, Long Island's forest, grassland, and ericad communities are fire-adapted ecosystems where fire occurrence is expected to be frequent. Sandy soils and intense summer heat further contribute to high fire potential on the island.

The 1998 Fuel loading inventory results in Long Island's Pine forest/oak habitat can be found in Table E-1.

Values at risk include the La Pointe Light Station, which includes 15 structures in 3 discontiguous locations, and the remains of the LeBel family fishery.

Natural resource values at risk include the only examples of a Hill's oak and jack pine forests in the park. However, these communities should benefit from fire as they are adapted to this process. In addition, there are a number of rare and unusual plant species in the sedge-juncus meadow and bog habitat. The island has been invaded by the aggressive exotic purple loosestrife. This plant grows quickly, seeds in rapidly, and has effectively banked millions of seeds in the soil. Fire prepared soil may give this species further competitive advantage over native plants.

Manitou Island: Manitou Island is 1,363 acres (554 ha) and rises 128 feet (39 m) from the lake surface. The presettlement forest of the island was dominated by hemlock, with lesser amounts of white cedar, yellow birch, white birch, and red and sugar maple. The current forest is dominated by white cedar (especially in the north), yellow birch, white birch, sugar maple, balsam fir, hemlock, and red maple. Mature second-growth stands of hemlock-hardwoods occur

in the southwestern half of the island, often with an open, park-like understory. There is also a fine hemlock stand, which Swain dated as originating between 170 and 190 years ago, about midway along the trail from the fishing camp to the northeast beach clearing. Canada yew is significant only in a few places in the understory. The dominant shrubs are mountain maple and beaked hazelnut (Judziewicz and Koch 1993).

Tree-ring analysis from stands of hemlock and white pine on Outer, Manitou, Bear, and Devils Islands showed that the interval between fire and other disturbances (e.g., windthrow) was 100 to 250 years (Swain 1988).

A 1998 fuel loading inventory was done on Manitou's northern hardwood-hemlock habitat (see Table E-1). FBM fuel models represented are 8 and 9.

Cultural resources at risk include the Manitou Fishing Camp (including eight structures and about 2,000 museum objects), several known archeological sites, and one known logging camp site. Natural resource values at risk include the second-growth hemlock-hardwood forests. Other values include the campsite on the west side of the island.

Michigan Island: Michigan Island is 1,578 acres (641 ha) and rises 93 feet (28 m) above the lake level. Most of the island is surrounded by high, steep, eroding clay bluffs. Presettlement forests were dominated by large hemlock, white pine, and yellow birch; white cedar and balsam fir were common as smaller trees, probably in wetter areas. Sugar maple was uncommon. Logging began in 1880; fires followed logging. Presently, the dominant interior forest trees are balsam fir, white birch, yellow birch, and white cedar. Red and sugar maple are occasional in the western half, and a small stand of old-growth hemlock (oldest trees 250+ years), heavily damaged by recent windstorm, occurs near the east tip. Red oak, basswood, and hophornbeam are uncommon. The wet understory contains numerous windthrows, abundant yew, and mountain maple thickets. There is a diverse sandscape-wetland complex on the island's west end (Judziewicz and Koch 1993). No fire history data is available for this Island.

A 1998 fuel loading inventory was done on Michigan's northern hardwood mixed forest habitat (see Table E-1). FBM fuel models represented are 5, 8, and 9.

Cultural resources at risk include the Michigan Island Light Station, comprised of 10 structures and associated landscape elements, a fish camp, a logging site, and seven known archeological sites. Natural resource values at risk include the old-growth hemlock forest and diverse sandscape-wetland areas. Other values include the campsites at the south end of the island.

North Twin: North Twin Island is 175 acres (71 ha) and rises 38 feet (12 m) above the lake level. It is the third smallest of the Apostle Islands and one of the most remote. It is surrounded on most sides by low sandstone cliffs and ledges. Presettlement vegetation was recorded to include white cedar, yellow birch, white birch, and balsam fir with a scattered super-canopy of white pines in the northern one-third. Some of these pines may be as old as 285 years. There is a dense understory of yew. North Twin was never logged. The 1991 survey determined the most common trees to be yellow birch, balsam fir, white birch, showy mountain-ash, sugar maple, pin cherry, and white cedar. Red oak and white spruce are present but there is no

hemlock. The southern tip has had several fires in the past few decades, and in places on the eastern side is dominated by pole-size white birch and balsam fir with a relatively open understory and little yew (Judziewicz and Koch 1993).

The closest fuel inventory habitat would be Devils Island Boreal (see Table E-1). FBM fuel models represented is 6.

Oak Island: Oak Island is 5,078 acres (2,064 ha) and is the highest of the park's islands, rising 479 feet (146 m) above the lake level. Oak is a rugged, pentagonal island with nearly twice the relief of any other in the archipelago. Deep ravines radiate on all sides from the summit plateau, especially in the north and southwest coast drainages. The coastline is mostly clay bluffs which reach spectacular heights on the northernmost point. Sandstone cliffs and ledges occur sporadically along the eastern coast.

Presettlement forests were dominated by hemlock, white pine, and yellow birch, with white and red pine especially on the shallower soils of the southern and eastern shores. The Ojibwe gathered maple sugar on the summit plateau in the mid-1850s. Oak has a long history of logging beginning in 1871 and continuing through the 1950s. Four-fifths of the island burned in 1943 when sparks from a resident's chimney started a fire. Presently the forests have a diverse mix of white birch, sugar maple, red oak, red maple, large-toothed aspen, yellow birch, hemlock, hophornbeam, balsam fir, and basswood. Sugar maple is commonest on the summit plateau and a remnant virgin stand occurs on the north point overlook. White birch is abundant on slopes of all aspects, while red oak prefers southwest-facing slopes. Small, aging groves of aspen are frequent along the southern and eastern shores. In general, conifers are not important, except for hemlock in several ravines and white cedar and balsam fir in poorly-drained woods near the southeastern tip. Most ravines have been badly disturbed by logging and fire, but a few have managed to retain small, but impressive stands of hemlock, yellow birch, and white cedar. The understory is open. Common understory shrubs are beaked hazelnut, fly honeysuckle, and to a lesser extent mountain maple and thimbleberry. Yew density is low due to the recent fire history (Judziewicz and Koch 1993). No fire weather data is available for this Island.

Much of Oak Island is northern hardwood mixed forest habitat. Refer to Table E-1 for the 1998 fuel inventory results. FBM fuel models represented are 8 and 9.

Values at risk include NPS facilities, campgrounds, and living quarters. Cultural resources at risk include several historic logging camps, several archeological sites, and a "sugar bush" held to be of ethnographic significance. Natural resource values at risk include the old-growth plateau sugar maple forest and ravine hemlock-hardwoods forest communities.

Otter Island: Otter Island is 1,333 acres (542 ha) and rises 138 feet (42 m) above lake level. Clay bluffs form the western and southern coast of the island, while northern and northwestern shores have sandstone bluffs, often with a narrow cliff-top fringe of red and white pine, and white spruce. The presettlement forest was diverse and reflects the local name of "Hardwood Island." There were large individuals of hemlock, red oak, and white pine, and smaller trees of white cedar, balsam fir, red maple, white and yellow birch, and basswood. Heavy logging removed most of the large yellow birch and hemlock. Presently the forest is dominated by

yellow birch, sugar maple, and white birch (especially in the far south and east); with pole-sized trees of balsam fir and white cedar especially common near the shores. Moderate size hemlock, red oak, and red maple are found in the northcentral part of the island. Yew is common in the understory. Mountain maple and beaked hazelnut are also common. A five hectare partially open shrub bog with scattered white pine, black spruce, and tamarack occurs near the summit of the island (Judziewicz and Koch 1993). Swain (1981) studied pollen cores from the bog dating back to 500 A.D. and noted three possible episodes of fire.

No fuel loading inventories have been done on Otter but those done on islands with northern hardwood mixed forest habitat would be comparable. Refer to Oak and Outer Islands in Table E-1. FBM fuel models represented are 5, 8, and 9.

Values at risk include the NPS dock facilities and campsite. Cultural resources include a logging camp and one known archeological site. Natural resource values at risk include the old-growth hemlock forest and diverse sandcape-wetland areas.

Outer Island: Outer Island is 8,000 acres (3,252 ha) and rises 268 feet (82 m) above the lake level. It is the most remote Apostle Island and has a number of drumlinoid hills instead of a single summit like most of the other islands. The western and northern coasts have high clay bluffs, the eastern coast sandstone ledges and low cliffs, and a large sand spit is found on the southern tip. The presettlement forest was dominated by large hemlock, white pine, and yellow birch. White cedar and sugar maple were also important, and balsam fir, red oak, white birch, basswood, and red maple were present in lesser quantities. Outer has a long history of intense logging. Extensive severe fires, which broke out as the result of logging, burned nearly the entire southern half of the island. A 1938 aerial photograph shows this southern area to be open brushland with many short railroad spurs; the northern half was still roadless, old-growth hemlock-hardwoods forest. The northern half of the island was selectively cut for yellow birch, sugar maple, and hemlock from 1948 to 1960 (Judziewicz and Koch 1993).

By the mid-1970s, the second-growth forest in the southern half was maturing and was dominated by white and yellow birch, sugar maple, white cedar and quaking aspen with smaller quantities of red maple, balsam fir, showy mountain-ash, large-toothed aspen, red oak, and hemlock. By 1991, quaking aspen was in severe decline due to the maturation of the forest and beaver harvesting, which originally benefited from logging and subsequent fires. Beavers have also declined because of the maturing forests. The difference between the disturbance history between the northern (selectively cut but not burned) and the southern (intensively cut and burned) halves of Outer Island is reflected in the abundance of many common species. In the north, yellow birch, sugar maple, and especially hemlock are much more common as dominant tree species. Canada yew is common and in places dominant and mountain maple more common in the north. Species benefiting from fire or other disturbance are more common in the south. They include white birch, quaking aspen, balsam fir, red oak, and red maple. Yew is less common and beaked hazelnut, fly honeysuckle, and bush-honeysuckle are much more common in the burned south (Judziewicz and Koch 1993).

West of the lighthouse is a 185 acre (75 hectare) stand of hemlock-hardwoods that was never logged because it was included as part of the lighthouse preserve. This is the finest tract of

virgin timber in the archipelago and indeed one of the best in the Great Lakes region. Individuals of hemlock, yellow birch, and sugar maple approach 39 inches (1.0 meter) dbh, and there are scattered super-canopy white pines. Some of the hemlocks are over 330 years old (Swain 1986). Sand point, at the island's south tip, has an impressive sandscape-wetland complex. The rolling dunes have such species as beach grass, common juniper, sand cherry, and beach wormwood. East of the duneland is an even-aged stand of red pines dating from about 1879; to the north is a park-like savanna dominated by white pines, but with red and jack pines also present. The dunes enclose a large wetland, including a shallow lagoon whose southern part borders a very wet sphagnum-sedge mat with all common bog species. Two 4-acre (10 hectare) inland bogs are present with savanna-like stands of old-growth black spruce, white pine, tamarack, and white birch above a shrub layer of ericads, pitcher plant, sundew, and a few sedges. Other wetlands include several small black ash swamps which grade into cedar swamps and alder thickets as well as numerous beaver flowages (Judziewicz and Koch 1993).

Tree-ring analysis from stands of hemlock and white pine on Outer, Manitou, Bear, and Devils Islands showed that the interval between fire and other disturbances (e.g., windthrow) was 100 to 250 years (Swain 1988). In 1998 four habitats were sampled for fuel loading on Outer Island (see Table E-1). FBM fuel models represented are 2, 5, 6, 8, and 9.

Cultural resources at risk include the Outer Island Light Station, comprised of 11 structures and associated landscape elements, the Lullabye Lumber Camp, Schroeder Logging Camp, a fish camp, and traces of a narrow-gauge logging railroad. NPS facilities include a dock and campground. Natural resource values at risk include the lighthouse reserve old-growth hemlock-white pine-hardwoods forest and diverse cliff-sandscape-wetland areas. Other values include the campsite at the south end of the island.

Raspberry Island: Raspberry Island is 295 acres (120 ha) and rises 98 feet (30 m) from the lake level. The island is nearly surrounded by steep clay bluffs. Sandstone outcrops appear only as some low cliffs just north of the lighthouse and along the northeast coast. The presettlement forest was one of moderate-sized white cedar, balsam fir, and white and yellow birch. Logging was limited because the island was a government lighthouse reserve. No commercial logging occurred on Raspberry Island, and outside the immediate area around the lighthouse, the original forest remains intact. These four species continue to be dominant. Scattered throughout the island are also large trees of sugar maple, hemlock, basswood, showy mountain-ash, black ash (in a few wet spots in the northwest corner), and a single large red oak along the sandscape trail. Canada yew dominates the understory. Also there are abundant mountain maple, beaked hazelnut, red-berried elder, and deadfalls in the understory. A small cusped foreland and enclosed bog occurs in the southeastern corner of the island. Another wet thicket behind a low dune covered with speckled alder and tussock sedge is present on the south side of the eastern tip of the island (Judziewicz and Koch 1993). No fire weather or fire history data is available for this Island.

Raspberry is dominated by old-growth coniferous forests. The 1998 fuel inventory results are in Table E-1. FBM fuel models represented are 2, 5, 6, and 10.

Values at risk include the Raspberry Island Light Station National Register site (14 structures listed on the List of Classified Structures) and NPS dock facilities.

Rocky Island: Rocky Island is 1,100 acres (447 ha) and rises 98 feet (30 m) above the lake level. The western, southern, and most of the northern shores have steep clay bluffs. Sandstone outcrops appear only as low ledges along the northern shore west of the isthmus. Two beaches are present. The longer one runs along the east coast and ends as a complex cusped foreland with a filled-in bog behind. The presettlement forest was dominated by large yellow birch, white pine, white cedar, and balsam fir; maples were uncommon. Logging probably began at the turn of the century but peaked from 1928-1931. Presently the island is dominated by pole-size white cedar, white birch, and balsam fir, with yellow birch, sugar maple, and red maple less common, and white pine, showy mountain-ash, red oak, and basswood are all uncommon. Hophornbeam and hemlock are rare. Dense thickets of the dominant shrub mountain maple and numerous deadfalls occupy the understory. Yew is uncommon as the result of past irruptive deer populations. A nearly open two hectare sphagnum-ericad-sedge bog occurs northwest of the dunes; in between there are a few white pines and a single campsite. Several alder thickets are present on Rocky Island (Judziewicz and Koch 1993). No fire weather or fire history data is available for this Island.

No fuel loading inventories have been done on Rocky but those done on islands with northern hardwood mixed forest habitat would be comparable. Refer to Oak and Outer Islands in Table E-1. FBM fuel models represented are 5, 8, and 9.

Cultural resources at risk include the proposed Rocky Island Historic District, which includes the Hadland Fish Camp (two structures), and more than 30 other structures, as well as associated landscape elements. Many of the structures are currently occupied under use-and-occupancy agreements. NPS facilities include living quarters, dock facilities, and group and single campgrounds.

Sand Island: Sand Island is 2,949 acres (1,199 ha) and rises 58 feet (18 m) from the lake surface. It is a large, low, generally swampy island. Five narrow beaches are present. Rocky cliffs and ledges are best developed at Swallow Point, from Lighthouse point to Justice Bay, and from the west end of Lighthouse Bay to the northwest bay. Most of the remainder of the shoreline has low clay banks. The presettlement forest is recorded as balsam fir, birch, sugar maple, and white pine, with cedar, spruce, and hemlock also noted in the township description. On the bases of stump counts and the extant of large trees, Anderson et al. (1982) suggested that a mix of hardwoods and conifers dominated by yellow birch, white pine, white cedar, and hemlock originally covered about 90 percent of the island. The other communities, which still exist in modified form, were a 99 acre (40 ha) white pine-hemlock stand on Lighthouse and Swallow Points, and a pair of black spruce-tamarack swamps totaling about 198 acres (80 ha). Several farms and a community of several dozen people were established on the island. Logging began around the turn of the century and continued until 1975. Every kind of tree was cut. Presently, the most important upland trees are yellow birch, balsam fir, white birch, white cedar, and red maple. Small quantities of sugar maple and hemlock are also present, and basswood and hophornbeam have been reported. Yew and mountain maple are dominant shrubs. This and slash from recent logging and the poorly-drained nature of the island make walking difficult.

Beaked hazelnut, speckled alder, pin cherry, and red-osier dogwood are also important in the shrub layer. The stand on Lighthouse Point consists of white and yellow birch, balsam fir, and red maple, with scattered very large white pines. The two semi-open boggy, sphagnous conifer swamps are dominated by black spruce with smaller amounts of tamarack and white birch. Understory shrubs include leatherleaf, Labrador-tea, lowbush blueberry, bog-laurel, small cranberry, twinflower, creeping snowberry, and mountain-holly. They are surrounded by muddy moles of speckled alder, with white birch, balsam fir, and black ash also common (Judziewicz and Koch 1993).

Fuel loading inventories in 1998 were done on two Sand Island habitats. Results can be found in Table E-1. FBM fuel models represented are 2, 5, 8, and 9.

Cultural resources at risk include the Sand Island Light Station (4 structures and associated landscape elements), Sevona Cabin and Shaw Farm sites (8 structures and associated landscape elements), Camp Stella (10 structures and associated landscape elements), East Bay Community historic area (including, the Wellisch Cabin, Hansen Farm, and schoolhouse ruins), the Noreng Farm, the Campbell-Jensch house, and the West Bay Club complex. Other values at risk include six use and occupancy lease properties; NPS dock facilities, East Bay ranger quarters, and group and single campsites.

South Twin Island: South Twin Island is 360 acres (146 ha) and rises 48 feet (15 m) above the lake level. Except for the prominent cusped foreland on the western end, the shoreline is lined by clay bluffs. A sandstone ledge barely outcrops at the northern tip. The presettlement forest included small yellow and white birches and balsam fir; other species were present, but apparently the trees were not large. The island has been home for commercial fisherman and later the resort and restaurant “Troller’s Home.” Intense logging occurred from 1947 to 1950. Presently the forest is dominated by pole-size white cedar, yellow birch, red maple, balsam fir, and white birch. Sugar maple, hemlock, red oak, basswood, and hophornbeam are uncommon and restricted to the high, well-drained southern tip, where white birch is also dominant. The central and northern portions of the island are poorly-drained and have numerous deadfalls. Mountain maple, beaked hazelnut, and red-berried elder are the commonest shrubs; Canada yew is occasional, reflecting past high deer populations (Judziewicz and Koch 1993). The one hectare sandcape on the island’s western tip has been greatly disturbed by human activity and has many exotics. The abandoned airstrip (built in 1960-1961) is being invaded by quaking aspen, white birch, and white pine. No fire weather or fire history data is available for this Island.

No fuel loading inventories have been done on South Twin but those done on islands with northern hardwood mixed forest habitat would be comparable. Refer to Oak and Outer Islands in Table E-1. FBM fuel models represented are 2, 8, and 9.

Cultural resources include the John Duva log cabin. Other values at risk include the NPS docking facilities, and four campsites.

Stockton Island: Stockton Island is 10,054 acres (4087 ha) and rises 198 feet (60 m) from the lake level. It is the largest island in the park. Low clay bluffs dominate this relatively low

island, with sandstone outcropping in the southwestern corner (as low cliffs); as low ledges on Presque Isle Point; and, most spectacularly, as rugged bluffs (they reach heights of 60 feet) in the northeast. Presettlement forest was dominated by hemlock and yellow birch, with smaller areas of white pine on drier sites, white cedar and balsam fir in boggy areas, and some sugar maple and red maple in well-drained uplands. The island has a long history of human disturbance. Logging began sometime before 1900 and continued into the 1950s when the island was given protection status by the State of Wisconsin. Intense fires burned subsequent to logging. Such an extensive burn occurred in 1934 that the cleared area supported a population of sharp-tailed grouse. Logging-caused fires burned up into the 1950s (Judziewicz and Koch 1993).

Today, hemlock is greatly reduced in importance and occurs mainly as relict groves along the northern shore on steep slopes and in ravines, especially in Brander Bog and Trout Point. There is also a pure coastal stand just northwest of Quarry Point. Yellow birch showed a similar but not quite so drastic decline. White birch is now the dominant tree in many parts of the island, along with sugar and red maple. There is an increased dominance of these species, plus red oak, following logging. Also frequent in the present-day forest are white cedar, balsam fir, and quaking aspen. The latter is especially common in brushy woods northwest of Presque Isle Bay and north and northeast of Quarry Bay. Canada yew was extremely dense on Presque Isle Point forests in 1940; also there was abundant young cedar, hemlock, and mountain-ash. Since then moderate deer populations and fires have reduce yew to negligible importance. Common shrubs today are mountain maple, beaked hazelnut, fly honeysuckle, and bush-honeysuckle (Judziewicz and Koch 1993).

Presque Isle Point is one of the few examples of a double tombolo on the Great Lakes. A triangular lagoon was enclosed by the spits and is today a sedge bog with black spruce, tamarack, white cedar, and alder thicket margins. The Julian Bay beach lake dunes are dominated by beach grass and have all the other common associates of dune communities. At the southern end is a red pine savanna with a "lichen-heath" understory that is the best remaining example of this community type in Wisconsin. Fire has historically been a part of the closed beach ridge pine forest all along the Presque Isle bay; Swain and Winkler (1983) found evidence for nine separate fires during the past two centuries, most recently in 1860, 1880, 1895, and 1925. The west side of the isthmus is a red pine forest used as a 19 site campground. The understory includes lowbush blueberry, huckleberry, and also Bartram's juneberry. The interior of the eastern part of Stockton Island is rich in "perched" bogs. The most prominent of these is Brander Bog, a 247 acre (100 ha) open conifer swamp of white cedar and black spruce. Stockton Island has had a large population of beavers in recent decades, especially in the watersheds draining into Quarry Bay and Julian Bay. These declined with the maturation of the forest and bear predation. The many old flowages harbor numerous wetland species and may be fringed with sweet gale and scattered tamaracks (Judziewicz and Koch 1993). Disturbed, open habitats include an old fishing or lumber camp clearing on the northwestern shore of Presque Isle Bay, the Trout Point logging camp clearing, the disturbed, sandy barrier beach used as a campground at Quarry Bay, and the vicinity of Presque Isle dock and ranger station.

Tree-ring dates obtained from fire-scarred and unscarred living trees or from scarred stumps on Stockton Island indicated a fire frequency of 20-30 years on the sandy tombolo and 200-300 years on areas with heavy soils north of the tombolo (Swain 1988). Numerous white pine and

hemlock stumps indicate that these species were dominant forest types on Stockton's uplands prior to logging (Swain and Winkler 1983). The uplands are now dominant by hardwoods with only minor quantities of hemlock, cedar, and balsam fir.

A 1998 fuel inventory was completed on Stockton's northern hardwood sugar maple habitat (see Table E-1. FBM fuel models represented are 2, 5, 8, and 9.

Cultural resources at risk include the Ashland Brownstone Company Quarry, 4 known logging camps, a fish camp, and several known archeological sites. Other values at risk include the ranger station-contact station complex, living quarters, and NPS dock facilities at Quarry Bay and Presque Isle, group campsites at Quarry Bay, and single campsites at Presque Isle and Trout Point. Natural resource values at risk include relict hemlock groves and rare wetland plant communities.

York Island: York Island is 321 acres (130 ha) and rises 38 feet (12 m) above the lake level. The island is surrounded by low clay bluffs on the southern and eastern sides, and low sandstone ledges on the northern side on both sides of the 0.8 km long isthmus beach. The presettlement vegetation was dominated by white pine and hemlock. The pine may have been cut before the turn of the century. Intense logging for hardwoods occurred in 1974, just prior to acquisition by the National Park Service. The present day forest is an open stand of pole-size white birch, balsam fir, and white cedar, with much smaller amounts of sugar maple, yellow birch, and showy mountain-ash. Hemlock occurs as a small grove just west of the isthmus and as a few trees on the western peninsula. The western peninsula has an open boreal forest of balsam fir, white spruce, white cedar, and white birch and much like the peninsula of Cat Island, there is a boggy central swale with some Labrador tea, bog laurel, and creeping snowberry in the understory. Canada yew is extremely dominant in the forest understory; thickets of mountain maple are also common, especially on the western tip. The northern beach has many common dune species. In back of the dune is a two hectare shrubby willow-alder-sedge marsh. Shrubs present include many willows, speckled alder, red raspberry, skunk currant, and red-osier dogwood (Judziewicz and Koch 1993).

No fuel loading inventories have been done on York but those done on islands with northern hardwood mixed forest habitat would be comparable. Refer to Oak and Outer Islands in Table E-1. FBM fuel models represented are 2, 5, 8, and 9.

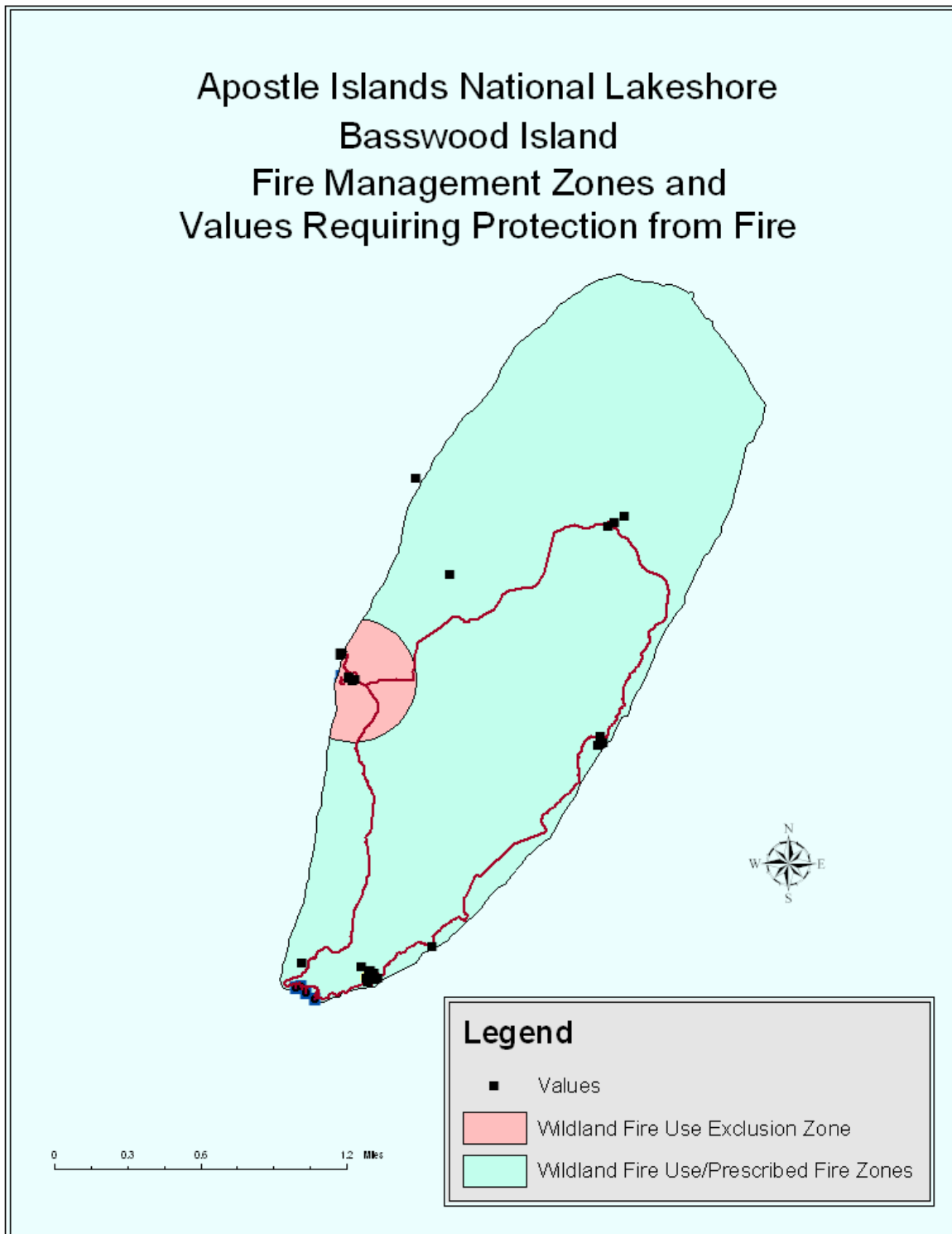
Values at risk include three primitive campsites and an inholding which contains a stone monument to a local youth killed in Vietnam.

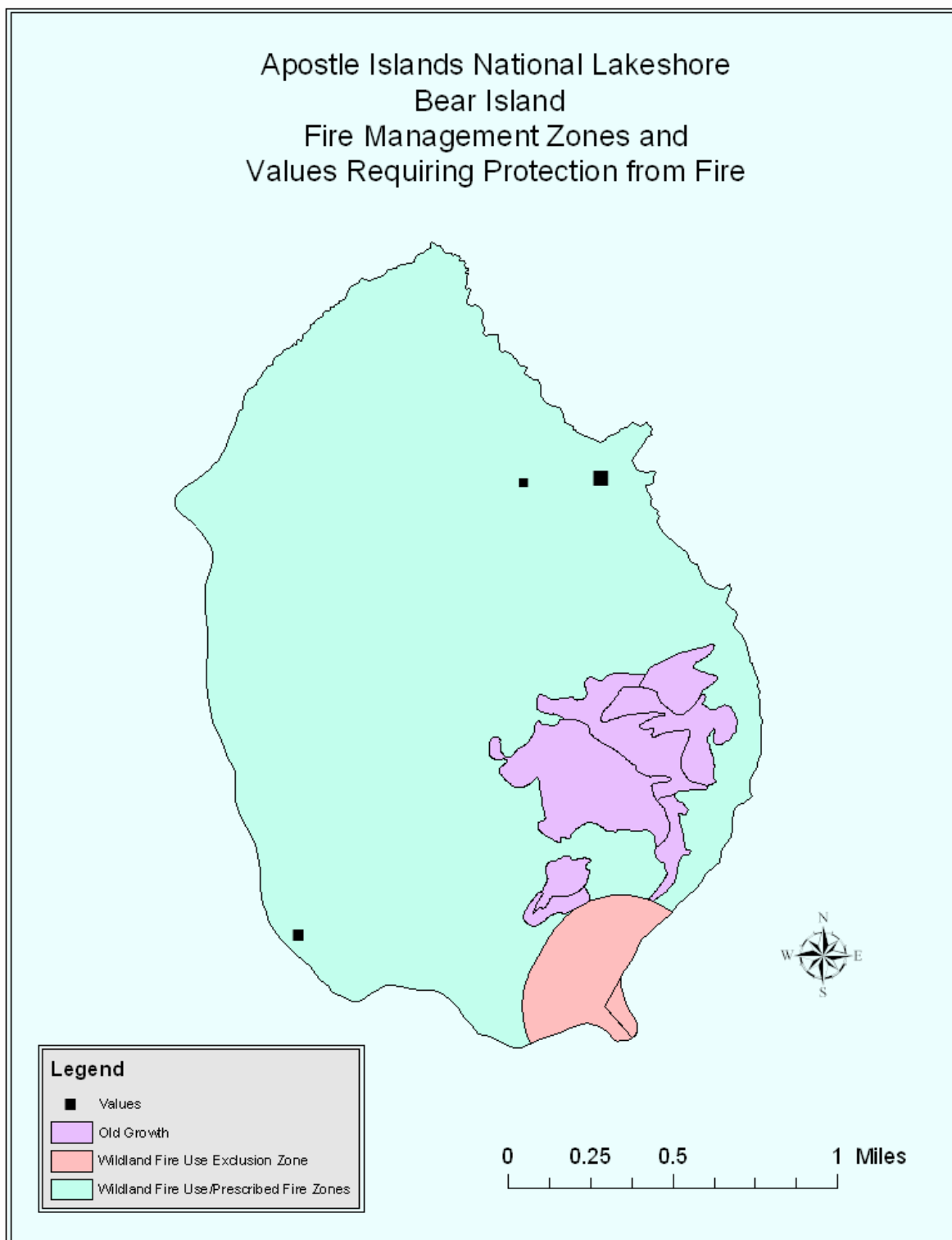
26. **2. Preliminary Fuel Loading Inventory for Apostle Islands National Lakeshore**

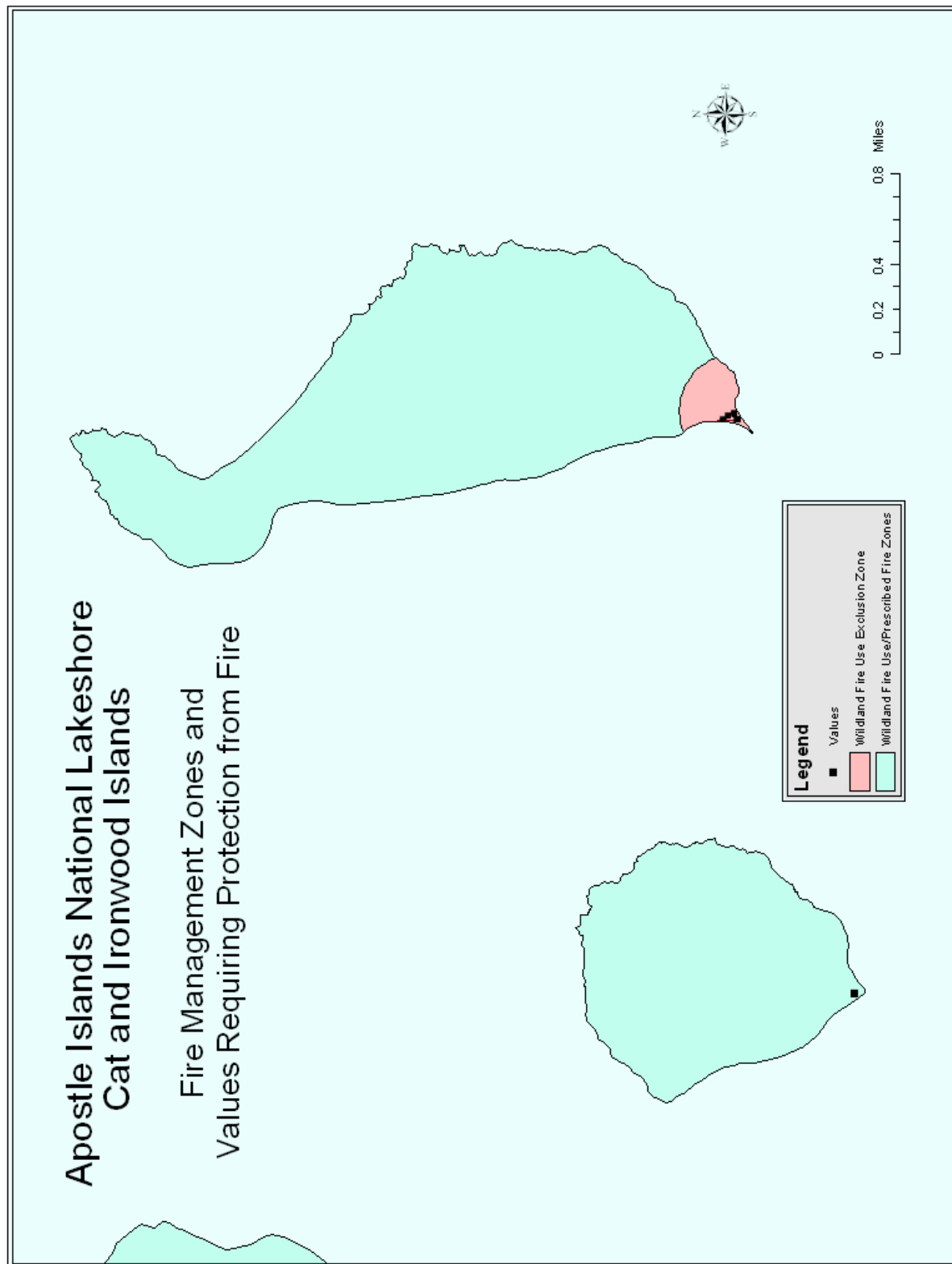
Table E-1 Fuel Loading Inventory

Island	Habitat	Dead and Downed Woody Debris	Litter and Duff
Devils	Boreal	9.7 tons/acre (2.2 kg/m ²)	65.7 tons/acre (14.7 kg/m ²)
Long	Pine Forest (Jack Pine)	5.6 tons/acre (1.2 kg/m ²)	24.8 tons/acre (5.6 kg/m ²)
Manitou	Northern Hardwood Hemlock Forest	12.9 tons/acre (2.9 kg/m ²)	20.7 tons/acre (4.6 kg/m ²)
Michigan	Northern Hardwood Mixed Forest	8.6 tons/acre (1.9 kg/m ²)	19.7 tons/acre (4.4 kg/m ²)
Oak	Northern Hardwood Mixed Forest	12.6 tons/acre (2.8 kg/m ²)	40.3 tons/acre (9.0 kg/m ²)
Outer	Northern Hardwood Mixed Forest	5.3 tons/acre (1.2 kg/m ²)	26.7 tons/acre (6 kg/m ²)
Outer	Northern Hardwood-hemlock	8.6 tons/acre (1.9 kg/m ²)	27.6 tons/acre (6.2 kg/m ²)
Outer	Old-growth Hemlock	13.3 tons/acre (3.0 kg/m ²)	44.6 tons/acre (10.0 kg/m ²)
Outer	Pine Forest (Sandspit)	6.4 tons/acre (1.4 kg/m ²)	27.3 tons/acre (6.1 kg/m ²)
Raspberry	Old-growth Coniferous	10.9 tons/acre (2.4 kg/m ²)	19.1 tons/acre (4.3 kg/m ²)
Sand	Northern Hardwood Mixed Forest	10.0 tons/acre (2.3 kg/m ²)	11.2 tons/acre (2.5 kg/m ²)
Sand	Old-growth Coniferous (White Pine)	42.7 tons/acre (9.6 kg/m ²)	63.2 tons/acre (14.2 kg/m ²)
Stockton	Pine Forest	2.1 tons/acre (0.5 kg/m ²)	16.0 tons/acre (3.6 kg/m ²)
Stockton	Northern Hardwoods Sugar Maple	5.6 tons/acre (1.3 kg/m ²)	16.0 tons/acre (3.6 kg/m ²)

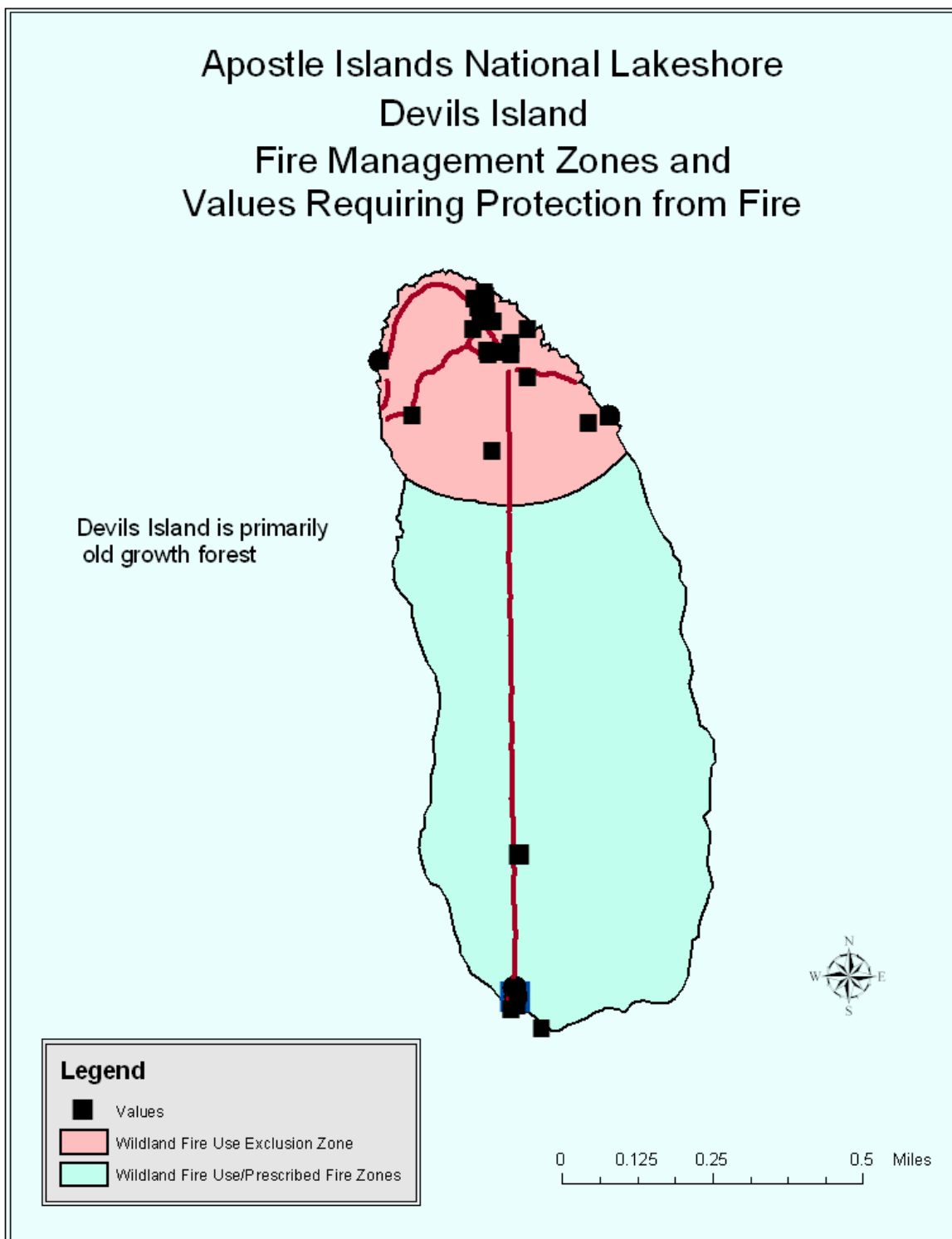
27. Island and Mainland Maps

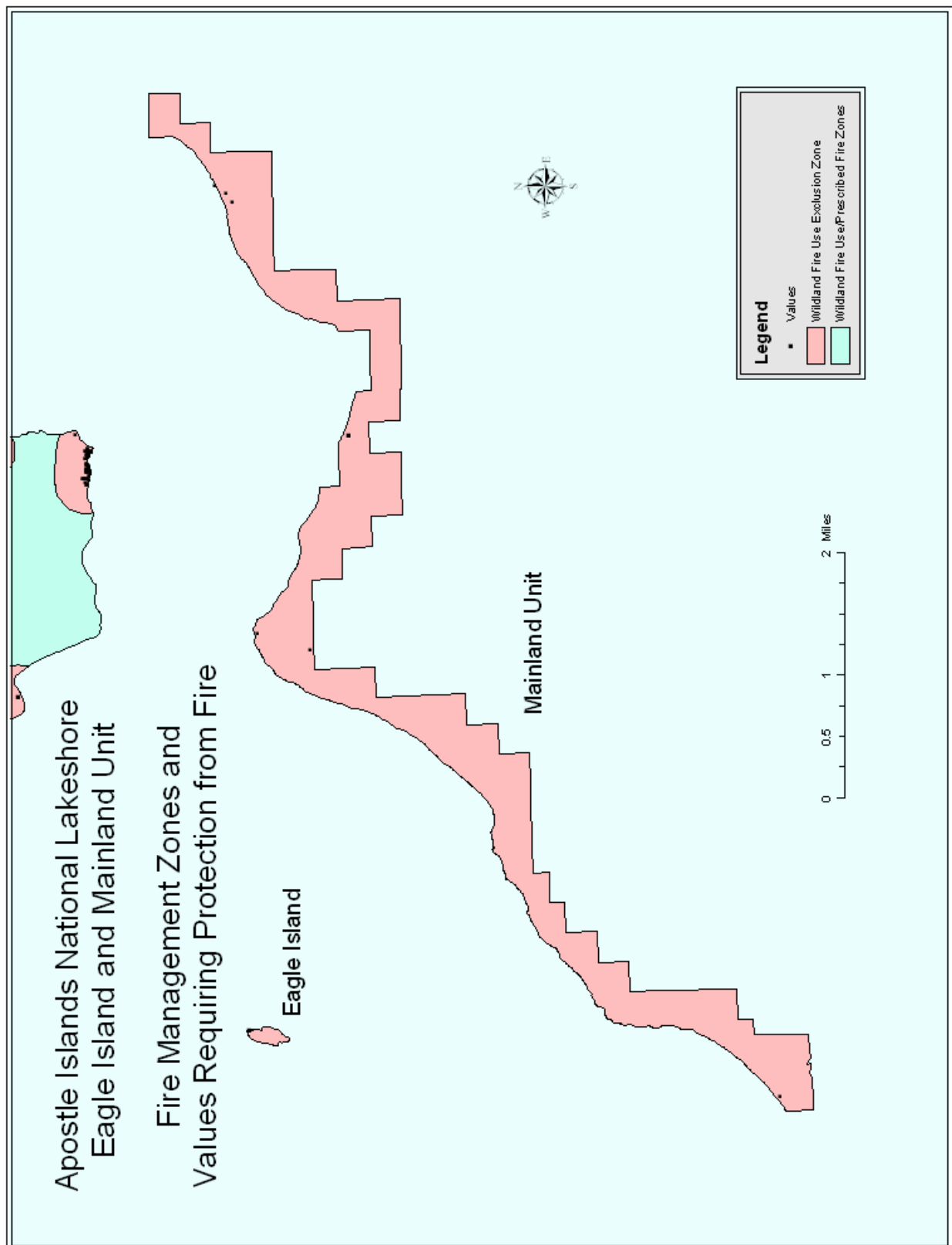


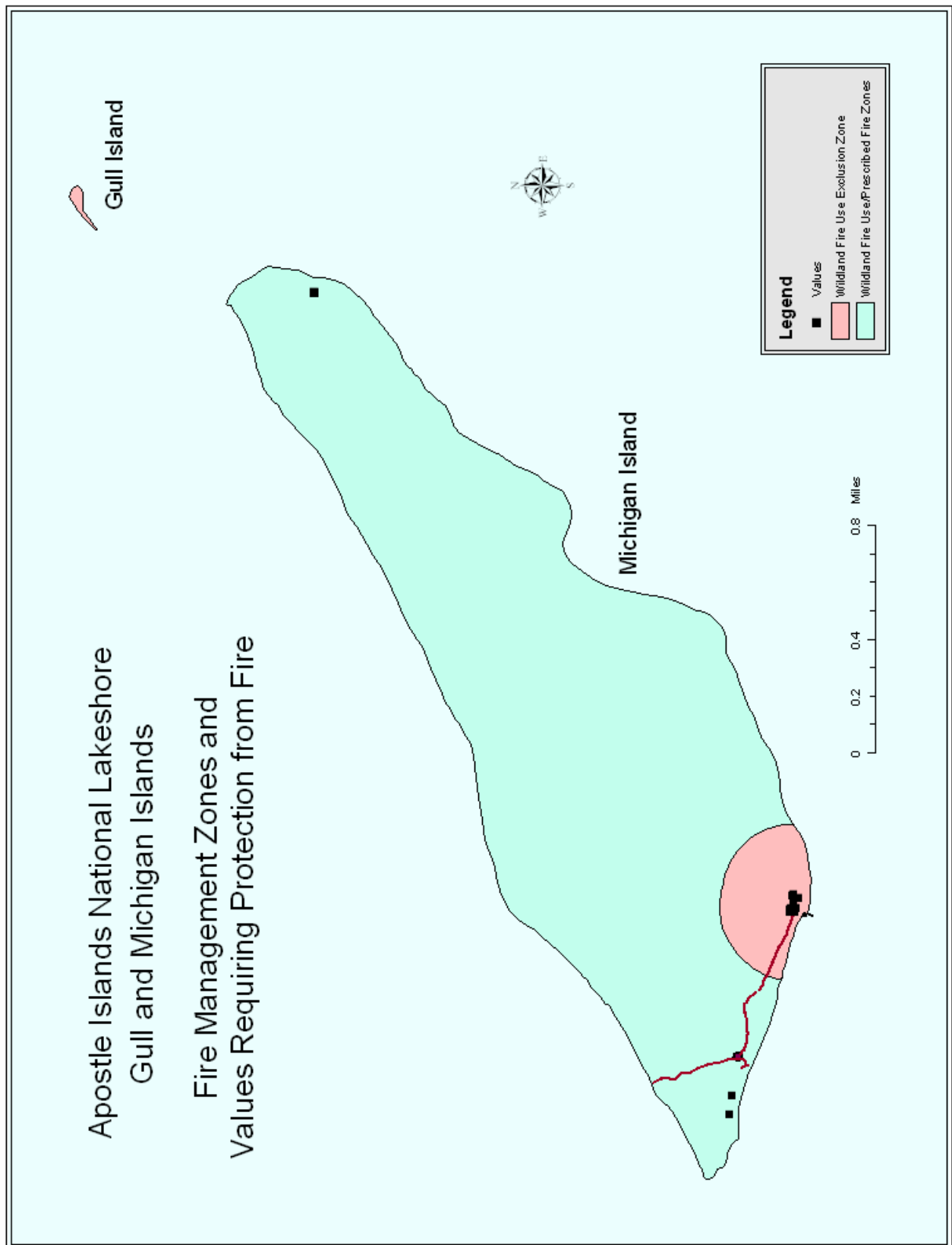


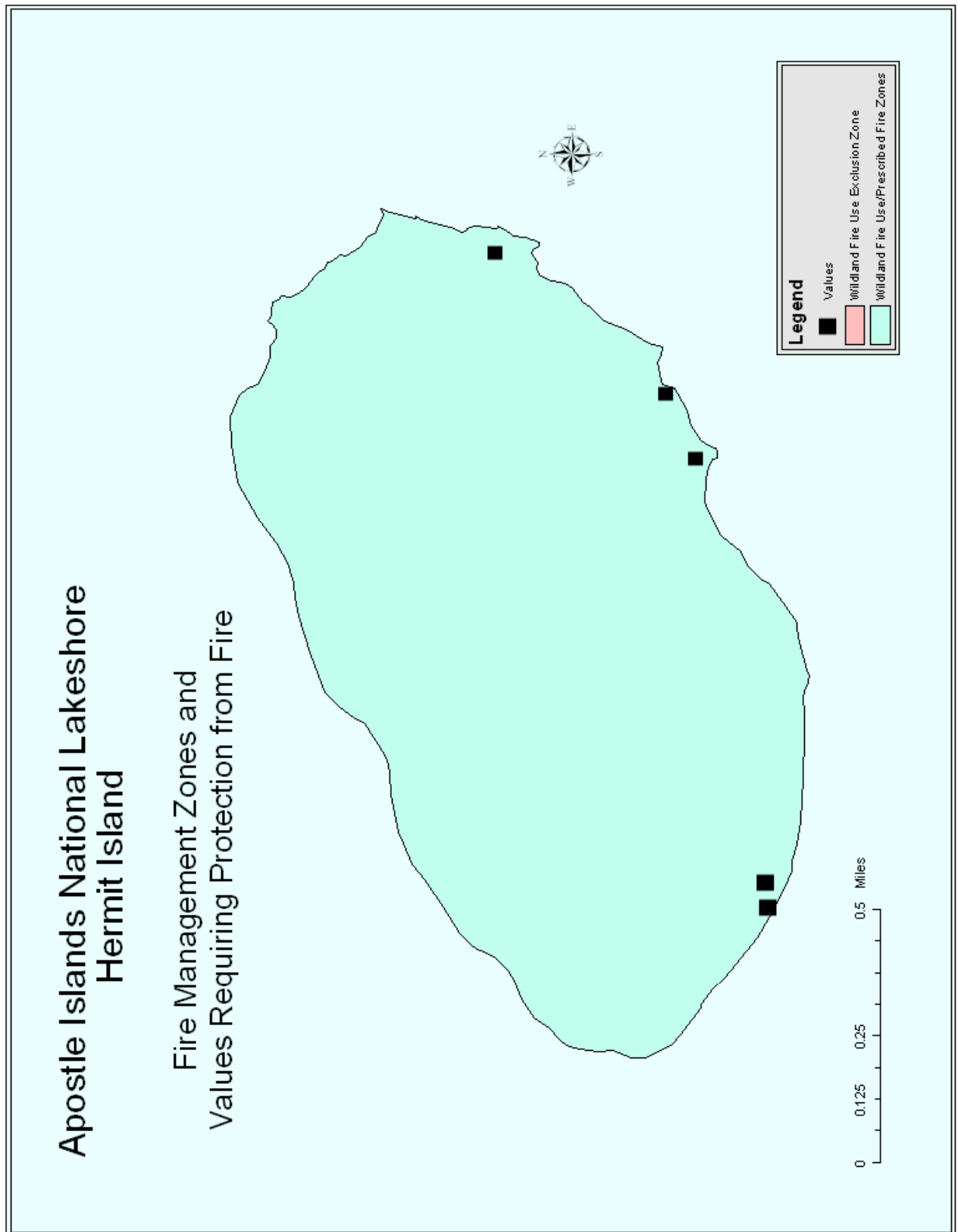


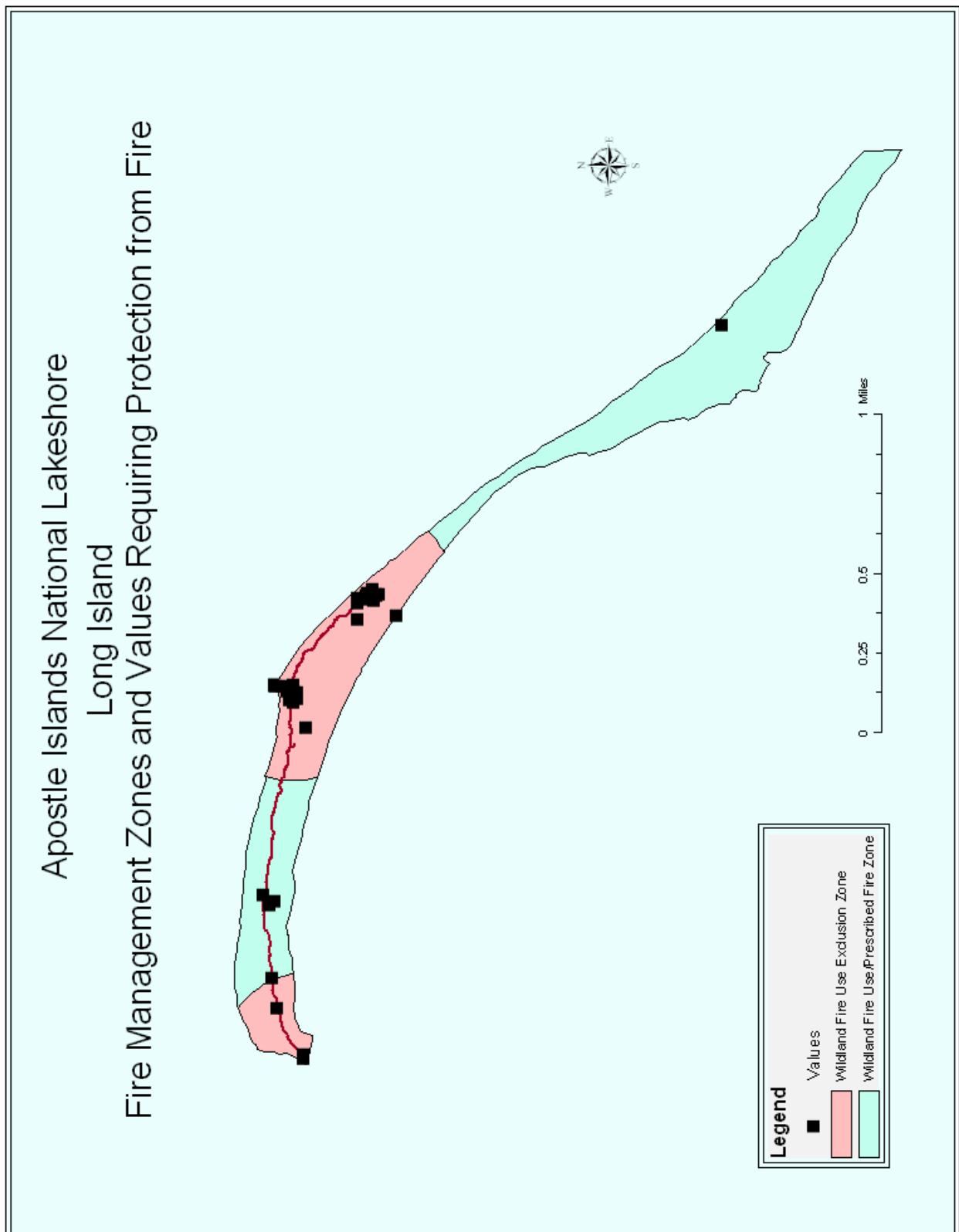
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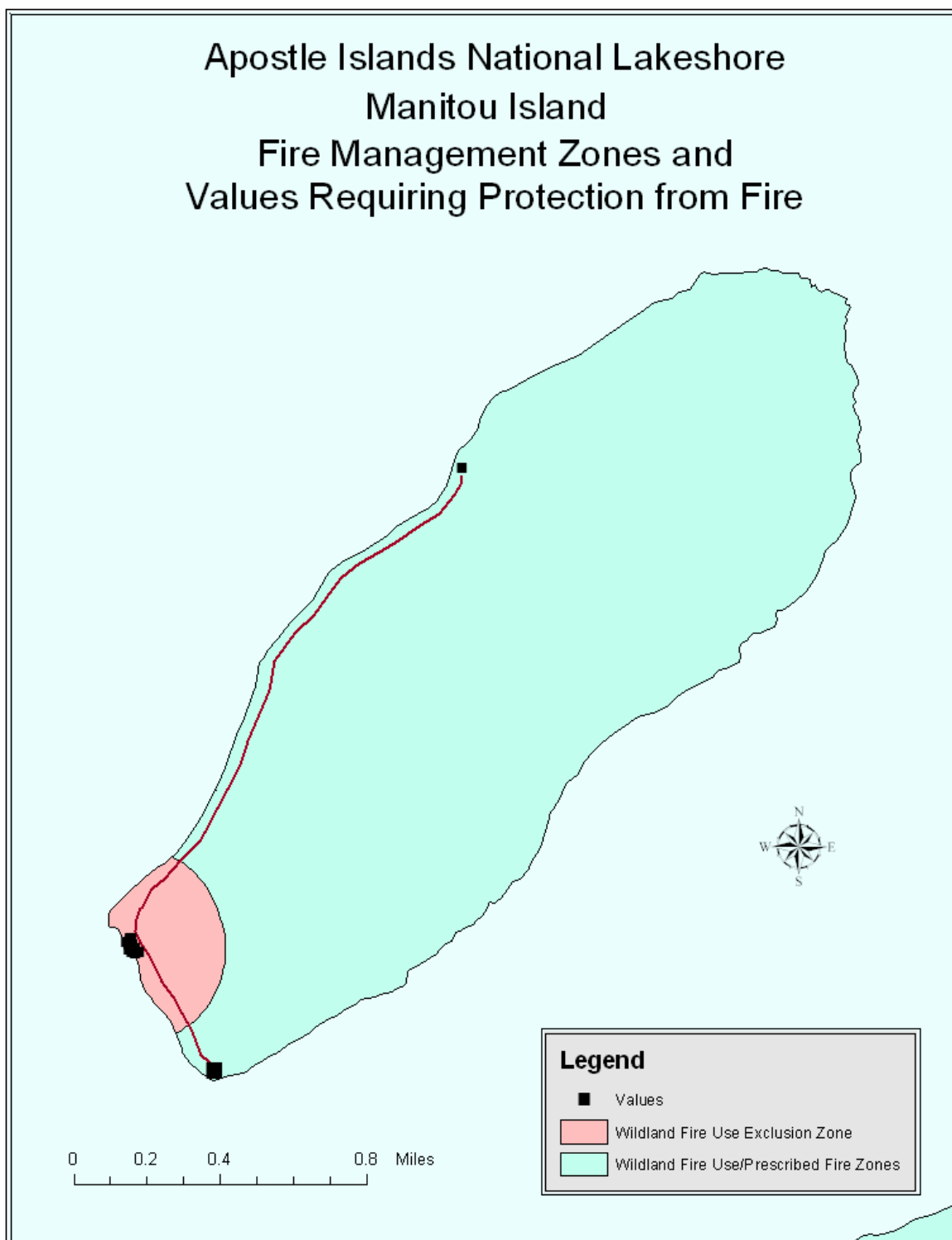


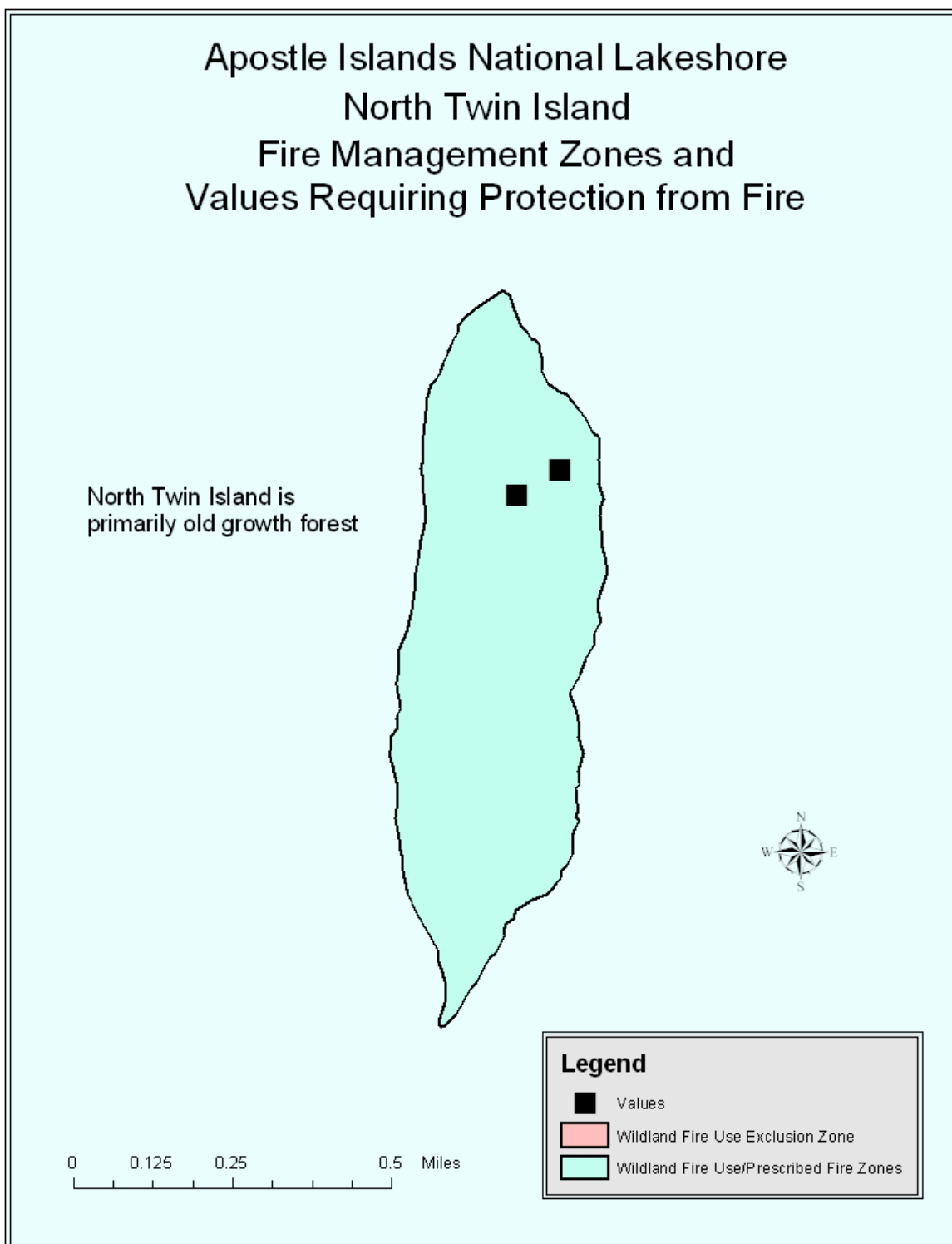


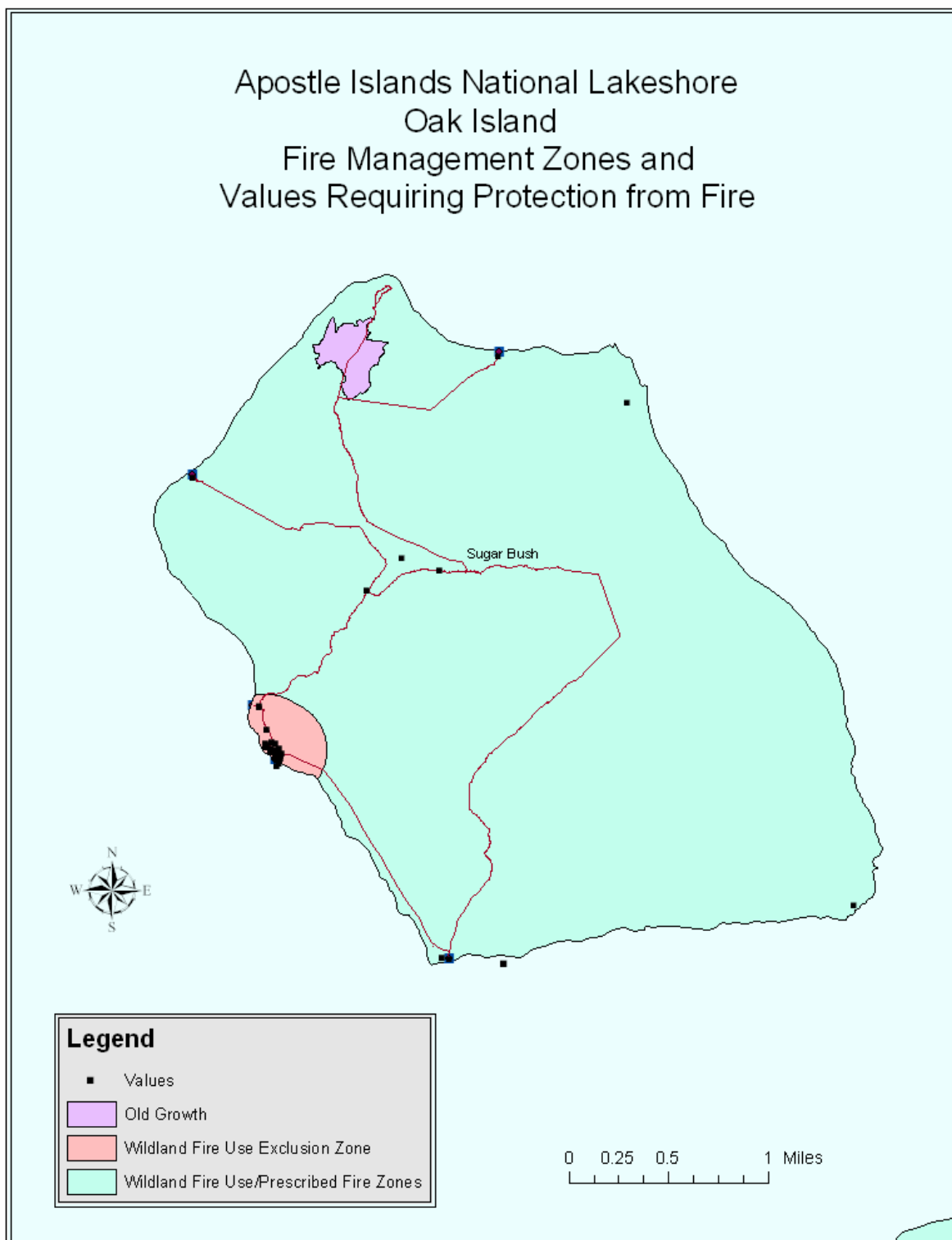


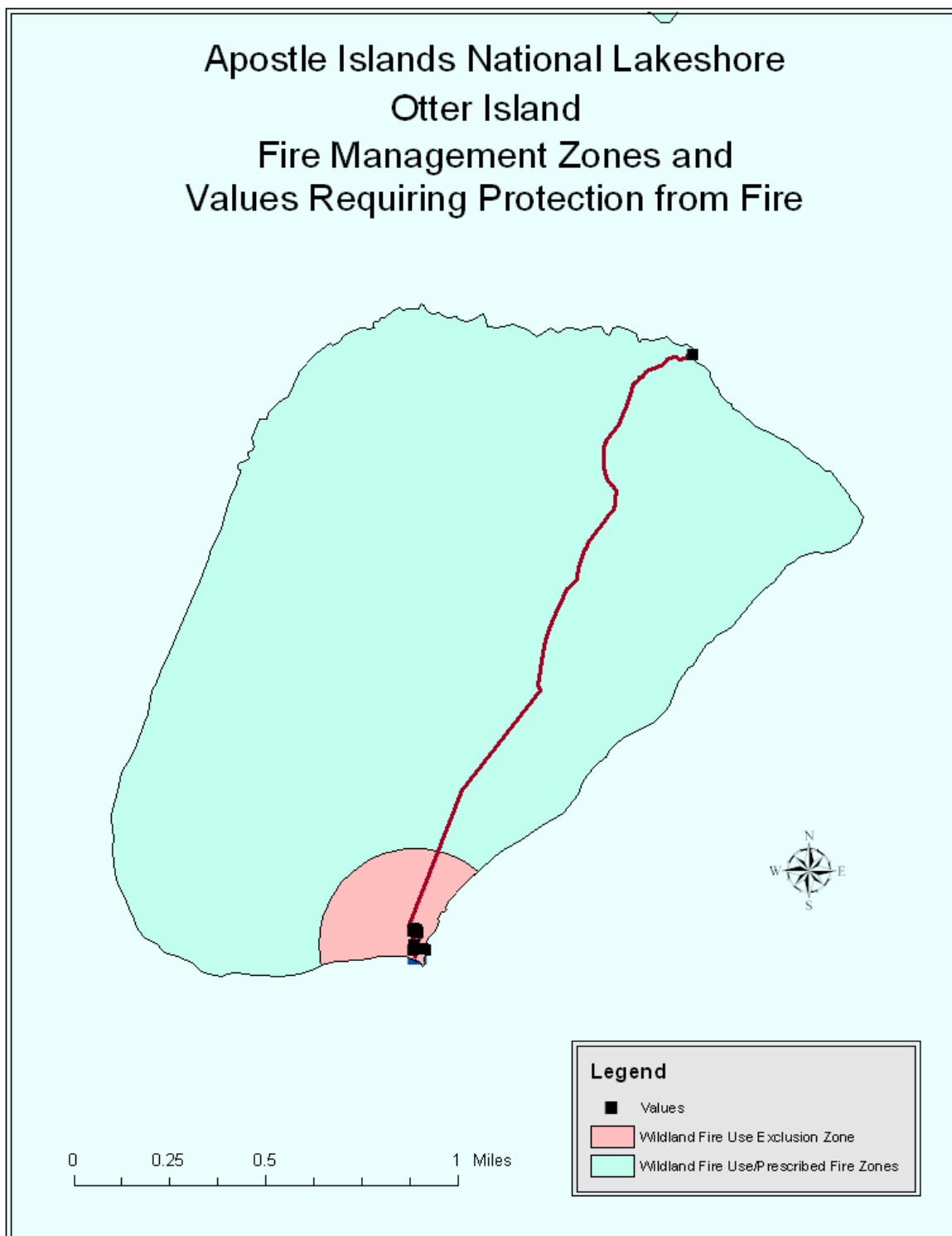


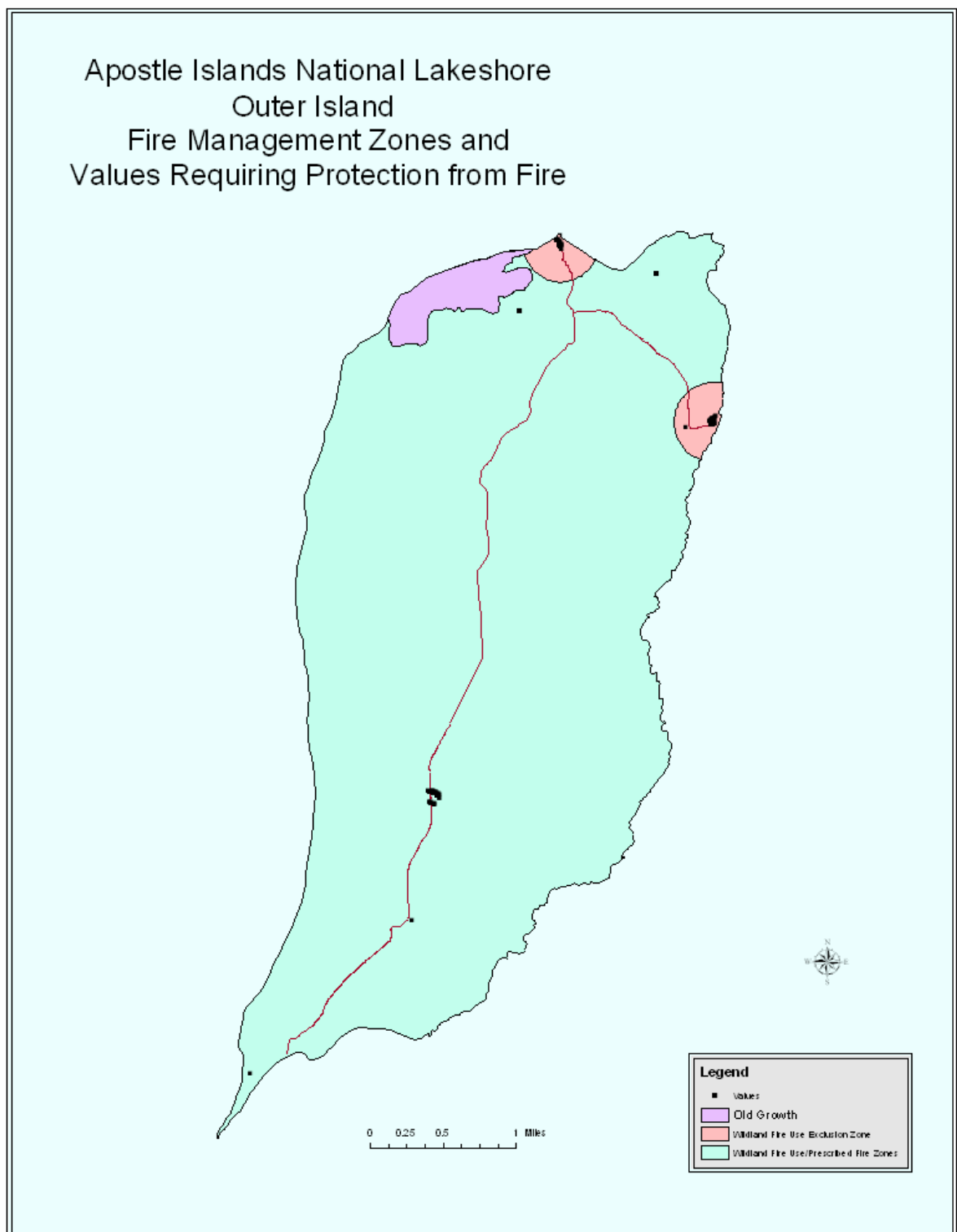




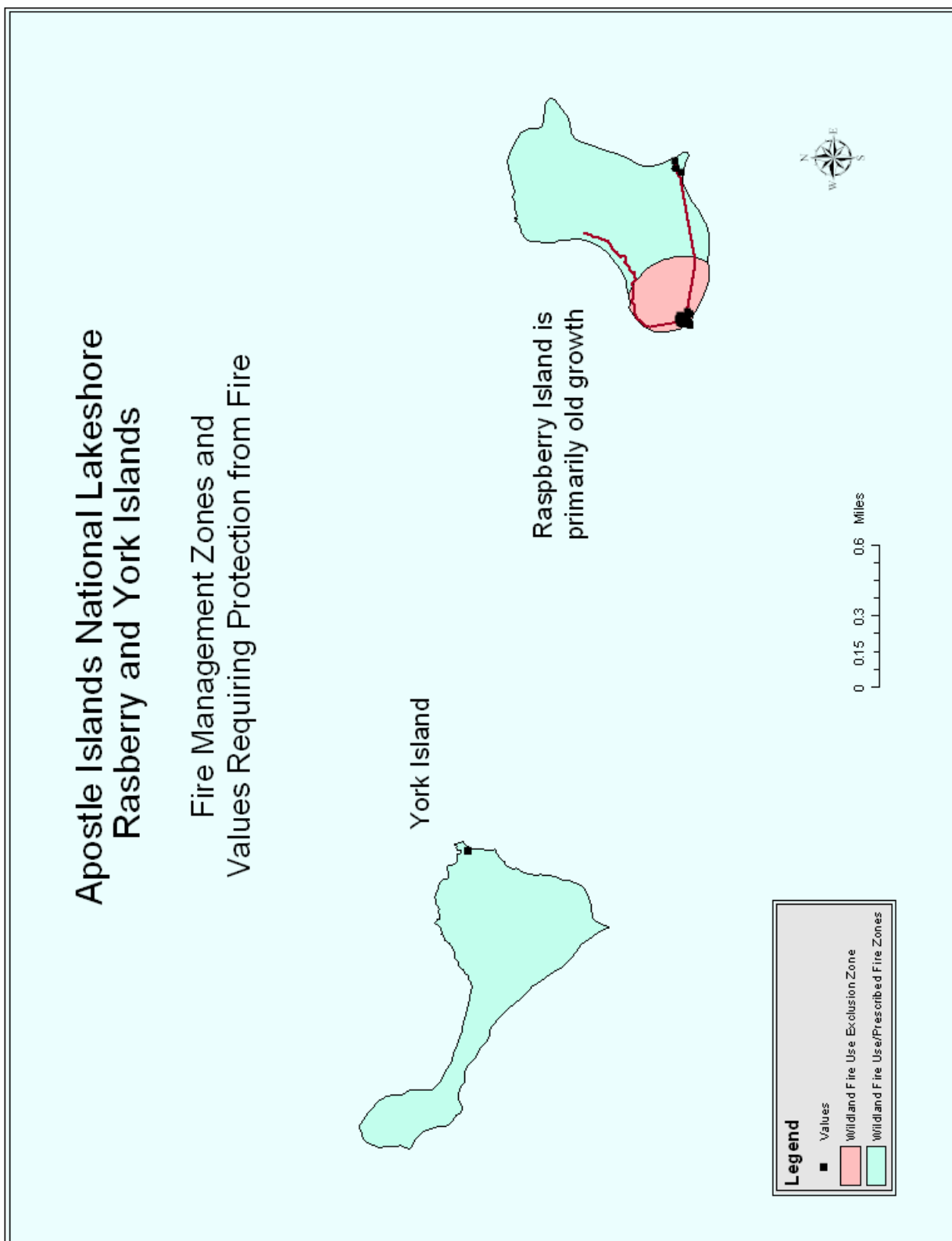


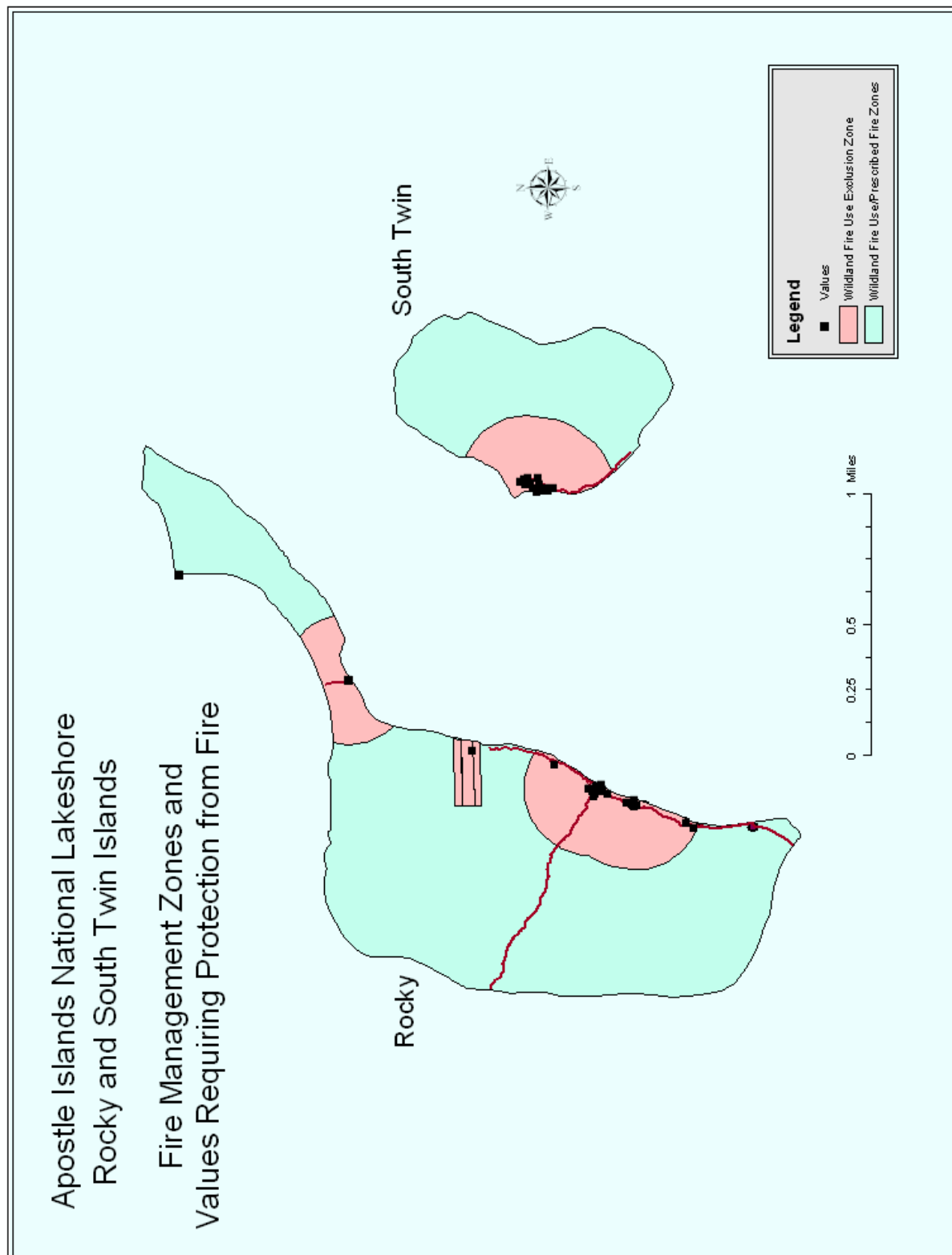




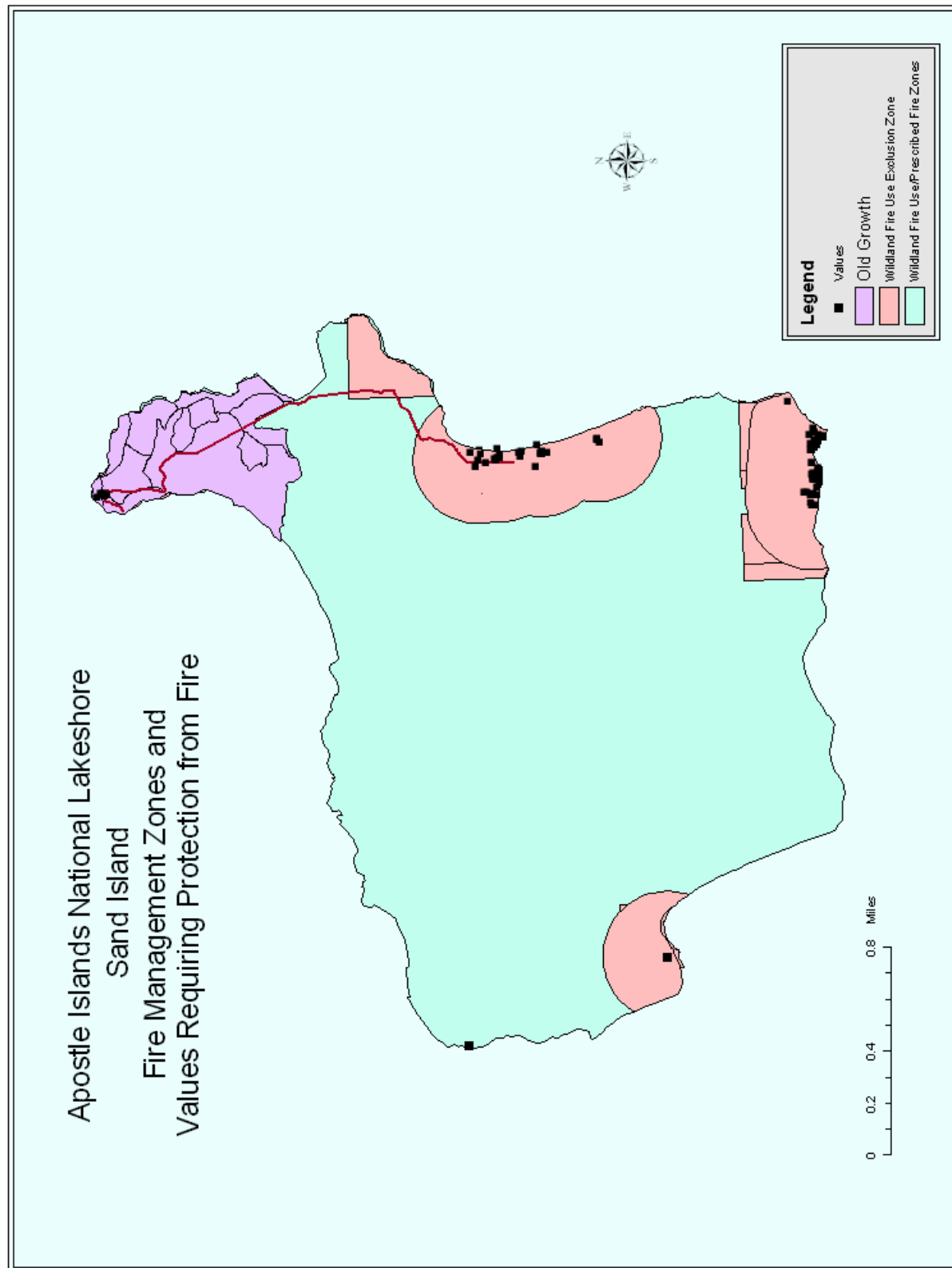


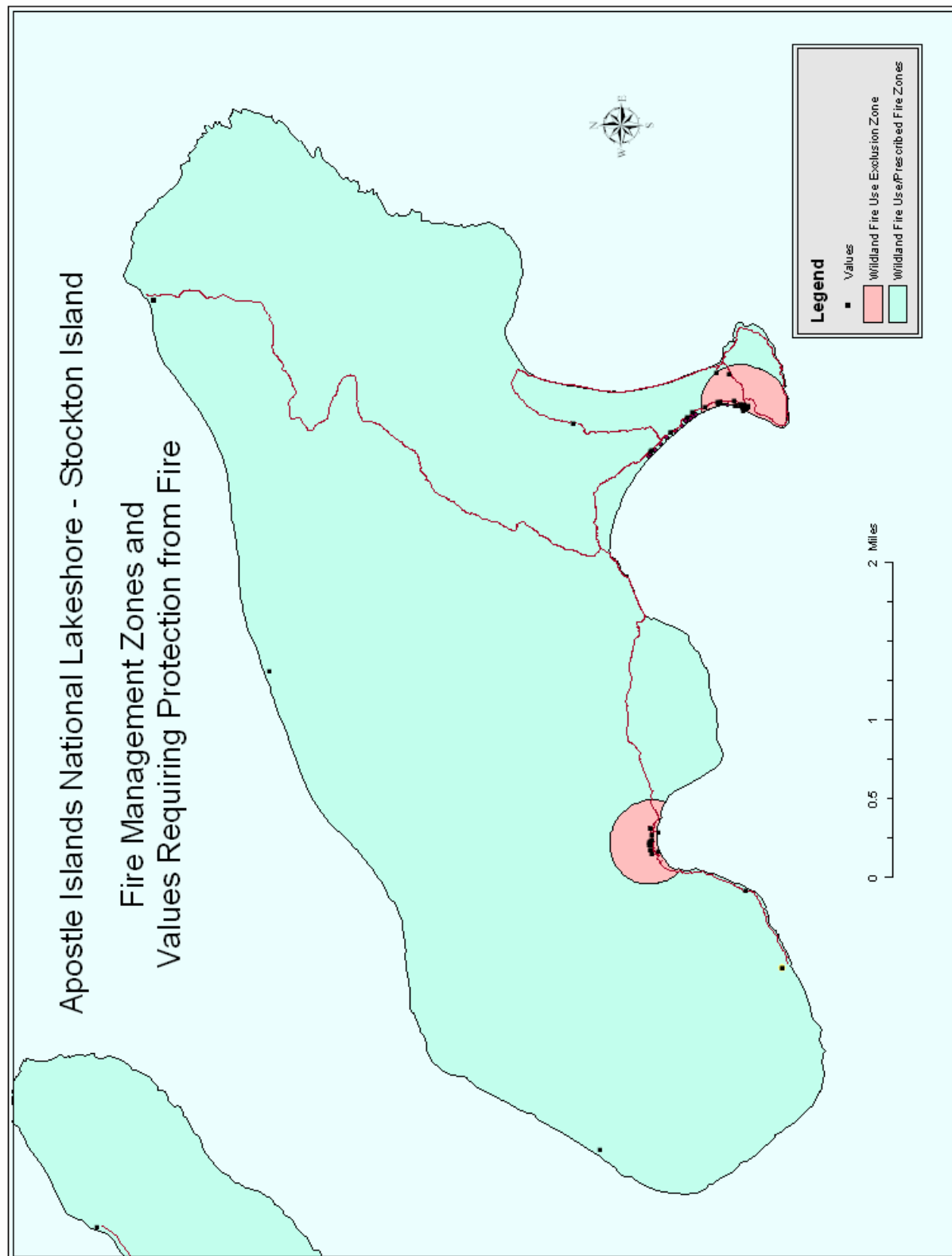
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4. Vegetation Community Descriptions

Aspen/birch forests. Aspen/birch forests (AB) cover 16.7 percent (7014 acres or 17,324 ha) of the Park, and are dominated by quaking aspen (*Populus tremuloides*) and white birch (*Betula papyrifera*). These forests occur in areas which had past human disturbances (logging and associated fires) and in some coastal areas which are subject to windthrow. Aspen forests increased after logging and are now mature and in decline. However, white birch is dominant along the coasts of most the islands.

Bog wetlands. Bog wetlands (BOG), comprise 1.9 percent (798 acres or 1971 ha) of the Park, are found on many of the islands and are often associated with sandscape dune ridges and poorly-drained summit plateaus. Large inland bogs can be found on Devils, Outer, and Stockton Islands.

Boreal forests. Boreal forests (BOREAL) cover 3.1 percent (1302 acres or 3216 ha) of the Park, and are dominated by white spruce (*Picea glauca*), black spruce (*Picea mariana*), balsam fir (*Abies balsamea*), tamarack (*Larix laricina*), white cedar (*Thuja occidentalis*), white birch, and quaking aspen. They can be found on Devils, North Twin, Raspberry, South Twin, York, Rocky, and Sand Islands. (Since we are not sure about the reliability or applicability of these estimates, and we have no information about natural fuel loads I would remove them. I think it would be OK to include them in the table where they appear later in the document, but I would prefer not to give them so much emphasis.)

Clearings or open areas. Clearings or open areas (CLEAR) cover 0.3 percent (126 acres or 311 ha) of the Park, are primarily the result of historic logging, farming, quarrying, and lighthouses. Navigational light stations are on six of the islands. Many clearings are being reclaimed by encroaching vegetation from the surrounding forest. Other areas are kept open for their cultural significance or are the locations of park facilities (i.e., buildings, campsites).

Conifer forests. Conifer forests (CON) cover 21.9 percent (9198 acres or 22,719 ha) of the Park, and are dominated by northern white cedar and are located on the western islands and mainland unit. The understory is well developed.

Northern hardwood hemlock forests. Northern hardwood hemlock forests (NHHE) cover 10.8 percent (4536 acres or 11,204 ha) of the Park, consist of forests dominated by eastern hemlock except on Outer Island where it is classified as old-growth hemlock. Within the Apostles, hemlock is at its northern and close to its northwestern range. This forest type can be found on Bear, Oak, Outer, and Stockton Islands.

Northern hardwood mixed forests. Northern hardwood mixed forests (NHMI), comprise 15.8 percent (6636 acres or 16,391 ha) of the Park, and are dominated by white and yellow birch (*Betula alleghaniensis*), red maple (*Acer rubrum*), and balsam fir (*Abies balsamea*). This forest type is quite variable depending in its successional stage and the species which were selectively logged. The shrub layer usually has many saplings of the dominant trees and ground cover of woody shrubs and ephemerals. On islands that have not had high deer populations on them, there is often a well developed understory of Canada yew (*Taxus canadensis*). 1998 fuel loading

for dead and downed woody debris ranged from 5.3 tons/acre (1.2 kg/m²) on the south end of Outer Island to 12.6 tons/acre (2.8 kg/m²) on Oak Island. Litter and duff ranged from 26.7 tons/acre (6 kg/m²) to 40.3 tons/acre (9.0 kg/m²) for the same islands.

Northern hardwood sugar maple forests. Northern hardwood sugar maple forests (NHSU) cover 21.7 percent (9114 acres or 22,511 ha) of the Park, and are dominated by sugar maple (*Acer saccharum*). The shrub layer is abundant with saplings of sugar maple and appears similar in structure to the NHMI forests.

Oak forests. Oak forests (OAFO) cover 3.0 percent (1260 acres or 3112 ha) of the Park, and are dominated by red oak (*Quercus rubra*) and Hill's oak (*Quercus ellipsoidalis*). This forest is not abundant in the Park and primarily occurs on upland areas and dune ridges on Oak and Long Islands, respectively.

Old-growth conifer forest. Old-growth conifer forest (OGCON) is limited to Devils and Raspberry Islands. They cover 1.4 percent (588 acres or 1452 ha) of the Park. The forest on Devils Island is generally dominated by balsam fir, white cedar, white and black spruce and white birch with a scattered super canopy of white pines (*Pinus strobus*). The Raspberry Island forest is dominated by white cedar, balsam fir, and white and yellow birch, with a well developed understory of Canada yew. Devils and Raspberry Islands were designated as a lighthouse reservation in 1891 and 1864, respectively.

Old-growth northern hemlock forest. Old-growth northern hemlock forest (OGHE) comprising 3.0 percent (1260 acres or 3112 ha) of the Park, is primarily limited a 200 acre stand at the northern end of Outer island. This forest is dominated by hemlock and yellow birch. The understory is well developed and abundant with Canada yew.

Pine forests. Pine forests (PF) comprise 0.6 percent (252 acres or 622 ha) of the Park, are dominated by white pine, red pine (*Pinus resinosa*), and jack pine (*Pinus banksiana*). Pine forests are found on sandy soils and can be found on the Stockton Island tombolo and Long Island. The shrub layer in these forests is generally sparse and the ground cover is scant and patchy. Jack pine, unique for the Park, dominates on the stabilized dunes on the western 1/3 of Long Island.

Sandscape Communities. The Park has a rich assemblage of sandscape features (SASH) including sand spits, cusplate forelands (sandspit molded by longshore drift and waves emanating from two different directions), tombolos (sandspit that connects two islands), a barrier spit (Long Island) and beaches which comprise approximately 0.2 percent (84 acres or 207 ha) of land area. These areas are some of the most diverse lands throughout the Park. They are dominated by dunal vegetation, beach grass (*Ammophila breviligulata*) and beach pea (*Lathyrus japonicus*), as well as a shrub and a forested component of blueberry/huckleberry (*Vaccinium* spp./*Gaylussacia baccata*), speckled alder (*Alnus rugosa*), quaking aspen, and white birch.

36. 5. Wildland fire use Sample Delegation of Authority

Apostle Islands National Lakeshore

DELEGATION OF AUTHORITY

_____ Wildland Fire

_____ (date)

_____ is assigned as the Team Leader for the Fire Use Management Team of the _____ Fire (MN-AIP-0000 ____). You have full authority and responsibility for completing the planning efforts and implementation of the Wildland Fire Implementation Plan within the framework of law, National Park Service policy and this Delegation.

Specific direction includes:

- _____, will be assigned as the Agency Representative.
- _____ will be assigned as the Resource Advisor.
- The Park will retain initial attack and suppression responsibilities.
- Firefighter and public safety is the primary objective and should be included in all planning actions.
- Facility and cultural resource protection areas are identified within the park's Geographic Information System (GIS) and provided in hard copy to the Fire Use Team.
- The Team will develop the Wildland Fire Implementation Plan Stage III for the _____ Fire which will include FARSITE projections.
- MIST tactics and minimal tool requirements will be a consideration.
- All requests for supplies or resources should be placed through the Chief of Protection.
- The Team is responsible to understand local aviation protocols and coordinate aviation activities with the Agency Representative. One aviation resource has been assigned and one Park resource can be scheduled for use.
- Release of the Team will occur when agreed to by the Agency Representative and Fire Use Management Team Leader. Completed Long Term Assessment Plans and all other related documentation will be provided to Apostle Islands National Lakeshore upon release.
- The Team will brief and consult with the Superintendent or designated representative daily.

This Delegation becomes effective at _____ hours on _____, and may be changed or updated as conditions change.

Superintendent, Apostle Islands National Lakeshore

Date

Fire Use Management Team Leader

Date

APPENDIX F: FIRE EFFECTS MONITORING PLAN

A Fire Effects Monitoring Plan will be drafted and become an unattached appendix to this Fire Management Plan. A copy will become available on file at Park headquarters in Bayfield, Wisconsin, and in the Fire Management Office at the Voyageurs National Park headquarters in International Falls, MN.

APPENDIX G: ANNUALLY UPDATED INFORMATION

1. NPS and Interagency Contacts

Due to the sensitive nature of home phone numbers, this page is not inserted in Public Review Copies of this plan.

2. Apostle Island Fire Callout Roster

Due to the sensitive nature of home phone numbers, this page is not inserted in Public Review Copies of this plan.

a. 3. Fire Cache Inventories

Apostle Islands National Lakeshore			
Wildland Fire Cache Individual Station Inventory			
	Little Sand Bay Fire Cache		
Hand Tools	NFES#	Other	Quantity
Axe Double Bit	0015		8
Axe Single Bit			1
Brush Hook			3
Mcleod	0296		7
pick axe			1
Pitchfork			1
Post hole digger			1
Pulaski			30
Pulaski guards plastic			13
Rake, fire (council tool)	1807		11
Shovel - narrow post hole			1
Shovel - Scoop			2
Shovel - Spade long handle	0171		20
Shovel - Spade short handle			2
Chainsaw Equipment			
Chaps			
Files			
Sawyer Helmet			
Spark plugs	0334	CJ6	3
Spark plugs		855, DJ7Y	3
Stihl 044			
Stil gas mix (for 1 gallon mix)	3444		1
Wedge			
Water Delivery			
600 Gallon Fold-Da-Tank			1
3/4 " hose connection			1
3/4" garden hose 6.5' length			1
3/4" wing nut hose connection			1
5 Gallon Fire Foam			
Adapter, 1" NPSH-F to 1" NH-M	0003		1
Adapter, 1.5" NPSH-F to 1.5" NH-M	0007		1
Applicator, water, 2-pieces, 3/4 NH	0720		5
Bleeder Check Valves			
Blizzard wizard, foam nozzle?			1
Collapsible Bucket 3 gal.			3
Coupling, dbl. female, 1" NPSH	0710		1
Coupling, dbl. female, 1.5" NH	0857		1
Coupling, dbl. female, 3/4" plastic			1
Coupling, dbl. male, 1.5" NH	0856		2
Coupling, dbl. male, 2.5" NH			3
Gasket, hose, 1"	0743		3
Gasket, hose, 1.5"	0254		7
Gasket, hose, 2" (white)	0742		100
Gasket, hose, 3/4"	0721		9
Hose Clamps	0046		1
Nozzle, 1" NH			1
Nozzle, 1" NPSH	0138		1
Nozzle, 1.5 NH	0137		12
Nozzle, fire foam 1.5"	0629 or 0628		1
Nozzle, garden hose, brass	0136		3
Nozzle, twin tip, combo, NPSH-F	0024		1
Reducer, 1" NPSH-F to 3/4" NH-M	0733		11
Reducer, 1.5" NH-F to 1" NPSH-M	0010		7
Reducer, 1.5" NH-F to 3/4" NH-M	?		5
Reducer, 2.5" NPSH-F to 1.5" NH-M			2
Sprinkler Kits ~ Heads / Stands	0920		12

Apostle Islands National Lakeshore			
Wildland Fire Cache Individual Station Inventory			
	Little Sand Bay Fire Cache		
Hand Tools	NFES#	Other	Quantity
Tee, 1.5" NH-F x 1.5" NH-M x 1" NPSH-M	0731		15
Tip, nozzle 3/4" (3 gal/min.??)			4
1" hose end attachment			1
Hudson sprayer service nozzle kit		1no. 143-509	10
Tip, nozzle 3/4" w/ shutoff (yellow plastic)			1
Valve, foot, 1.5" NH-F w/ strainer	0212		2
Valve, shut off, ball, 3/4" NH	0738		17
Valve, wye, gated 1.5 NH	0231		6
Wrench, Spanner	0234		15
Wye, plain 3/4 x 3/4 x 3/4	0739		22
Water Pumps			
1.5 hose gasket			15
Backpack bladder (Eagle Gear)			1
Backpack bladder straps			approx. 6
Backpack pump - hoses			9
Backpack pump bladder			1
Backpack Pump complete			15
Backpack pump nozzles			6
Draft Hose Ft./ Strainer			
Fire pump gas line	0113		1
Homelite 2" gasket (suction line)		51036	97
Homelite gasket		18108	
Homelite pump			6
Large 18hp pumps			2
Mark 3			1
Mark 3 gas fitting			1
Mark 3 Hand Primer			1
Old engine pump w/tank			1
Pump Kits			
Waterous Floto-Pump			1
1.5" hand primer pump (wildfire-pacific)			1
Water Hose			
1" NPSH x 100'	???		4
1.5" NH x 100'	??		17
3/4" Garden x 50'	1016		17
Hose pack large red			6
Suction, 1.5 NH x 10'			1
Suction, 1.5 NH x 10ft. (labeled mark III)			1
Suction, 1.5 NH x 8'			1
Suction, 1.5 NPSH x 10ft. (red) w/ 1.5NH-M	??		1
Personal Equipment / Gear			
Air mattress			1
Back pack harness			3
Batteries, AA			120
Batteries, size D			36
Belt pack			2
Bivy sack			1
Canteen holder			25
Canteen -metal tops			10
Canteen -plastic tops			approx. 70
Carabineers			3
Comfort Masks 3M			10
Compass	1814		6
Ear Protection Disposable Plugs	1027		25pr.
Family traveler large tent w/ polls			1
Fire shelter carrying case			2

Apostle Islands National Lakeshore			
Wildland Fire Cache Individual Station Inventory			
	Little Sand Bay Fire Cache		
Hand Tools	NFES#	Other	Quantity
Fire shelter chest harness			2
Fire Shelter, opened & refolded			7
Fire Shelter, training only			2
First Aid Kit, 10 person belt	1143		1
First Aid Kit, pocket	0067		25
Foam Sleeping Pads			7
Goggle replacement lenses			12
Goggles			15
Head Lamp	0713		4
Headset, Ear Protection Muffs	1028		4
Helmet	0921 & 0109		15
Helmet adjustable size harness			1
Helmet chin straps			approx. 20
Helmet, w/ ear protection muffs			1
Insect Repellent			
Lightstick			1
MREs			6
Packs, personal gear (red)	1855		22
Packsack (green)	0744		10
Plastic ground cloths			3
Radio chest harness			1
Sleeping bags			8
Tent stakes metal	0825		12
Tent stakes plastic			6
Tents			7
Tents bags	0281		11
Therma Rest Sleeping Pads			6
Web Gear fire line packs *complete*			12
include: headlamp, helmet, goggles, pocket first-aid			
compass, facemask, insect repellent,			
MRE, water bottles @4, fire shelter			
Clothing			
Brush coats		S	
		M	
		L	5
		XL	1
		XXL	1
Shirts		S	5
		M	11
		L	11
		XL	11
Face/Neck shrouds			6
Gloves, Leather		XS	11
		S	8
		M	9
		L	6
		XL	
Jump suite		LL	1
Pants (old style) waist size		28	1
		30	4
		32	6
		34	18
		36	3
		38	5

Apostle Islands National Lakeshore			
Wildland Fire Cache Individual Station Inventory			
	Little Sand Bay Fire Cache		
Hand Tools	NFES#	Other	Quantity
		W-10	2
		W-12	3
Pants (new style) waist size, length		28-32, 30	4
		28-32, 34	3
		30-34, 30	2
		30-34, 34	4
		32-36, 30	
		32-36, 34	7
		34-38, 30	3
		34-38, 34	
		36-40, 30	2
		36-40, 34	4
		38-42, 30	
		38-42, 34	4
Gas / Oil supplies , flammables			
air filters			3
Drip Torch			1
Fuel MSR Bottle 22fl oz			8
Fusee			approx. 112
Funnel, Coleman			1
Funnel, yellow plastic			1
Gas can, just right safety can, 1 gal			2
Gas can, just right safety can, 5 gal			2
Gas can 2.5 gal. chainsaw gas/oil combo			1
Gas can, rectangle, 5 gal.			2
Oil, 2 cycle, mix for 1 GL	3444		1
Purging fluid cans			6
Other			
Hudson gas caps		152-262	2
Work Capacity Test weighted vest			2
Ribbon, flagging- blue	0455		4
Ribbon, flagging- yellow/black			2
Ribbon, orange			1
Ribbon, flagging- red	0456		5
Tools			
1" socket			1
5/8 comb wrench			3
Air gun "L" connections			10
Air gun "pop" connections			12
Chain saw wrench- tool			10
Crescent wrench			4
File guide, pulaski			1
File, bastard			6
Hammer			1
Handle, file	0358		6
Pipe thread compound paste 4oz.			1
Pipe thread tape			1
Pliers			3
Scraper razor			1
Screwdriver - reg.			1
Spark plug gap tester			1
Wedges-steel small (for handles)	0432		4
Wedges-wood (for handles)	0433		45
Cord spool			1
Hose clamps (small) assortment			assortment box

Apostle Islands National Lakeshore			
Wildland Fire Cache Individual Station Inventory			
NPS APIS WILDLAND FIRE ENGINE			
DRIVERS SIDE FRONT COMPARTMENT			
First Aid Kit, 10 person belt	1143		1
Belt weather kit			1
First Aid Kit, small box			1
Rope, throw-bag (small)			1
Chemical protecting glove set			4
Chemical protecting suite set			2
Headset, Ear protection muffs	1028		1
Rope, Res-Q-Disk			1
Wrench, spanner	0234		1
Flagging			
pink "route"			1
yellow			1
orange			1
green			1
Batteries AA			72
Ear protection, sets			10
EMS jump kit			1
DRIVERS SIDE MIDDLE COMPARTMENT			
Chaps - green			2
Chaps - orange			2
Puring fluid			1
Fusees			17
extra chainsaw chain			1
chainsaw file w/ handle			1
Tool kit			1
oil mix bottle			2
Helmet w/ face shield & ears			1
gloves			1
axe, single bit			1
gas can 2.5 gal. chainsaw mix			1
chainsaw Stihl 036			1
wedges, felling			6
spill rags			7
DRIVERS SIDE REAR COMPARTMENT			
Adapter, 1.5" NPSH-F to 1.5" NH-M	0007		1
Coupling, dbl. female, 1" NPSH	0710		1
Coupling, dbl. female, 1.5" NH	0857		2
Coupling, dbl. male, 1" NPSH			1
Coupling, dbl. male, 1.5" NH	0856		1
Nozzle, 1" NPSH	0138		1
Nozzle, 1.5 NH	0137		3
Nozzle, twin tip, combo, NPSH-F	0024		2
1NPSH to 1.5 NH			1
Reducer, 1.5" NH-F to 1" NPSH-M	0010		4
Reducer, 2.5" NH to 1.5" NH			1
Tee, 1" NPSH-F x 1" NPSH-M x 1" NPSH-M			1
Wye, plain 3/4 x 3/4 x 3/4	0739		4
1.5 NH shut off valve			1
1.5 NH hose x 100'			5
1" NPSH hose x 100'			3
Wye, gated 1" NPSH			2
Wye, gated 1.5" NH			2
Valve, twist knob, 1.5"			1
Back Left Compartment			
hose, suction, 1.5" NH x 10'			2
1.5" foot valve w/ strainer			1
Wrench, spanner			1
clamp, hose			1
Back bed of truck			
drip torch			1

Apostle Islands National Lakeshore			
Wildland Fire Cache Individual Station Inventory			
NPS APIS WILDLAND FIRE ENGINE			
spooled 1" hose x ??'			1
Nozzle, 1"NPSH			1
Passenger side rear compartment			
MRE's			6
bucket, collapsible 3 gal			1
Drinking water cooler, 5 gal			1
Passenger middle compartment			
Gas line	0113		1
Fire shelters			3
tee, 1.5" NH-F x 1.5" NH-M x 1" NPSH-M			1
Wye, 3/4"			2
nozzle, adjustable 3/4"			2
tip nozzle, 3/4"			2
1 NPSH to 3/4" NH			3
Valve, shut off, ball, 3/4" NH			5
Applicator, water, 2-pieces, 3/4" NH			3
garden hose 3/4" x 50'			3
rug sack, green			1
line packs, yellow			3
Tool Compartment			
shovel, spade			3
Pulaski			2
pick/shovel comb tool			2
Back pack bladder pumps			2
Passenger Front compartment			
helmet			1
Headset, Ear protection muffs			2
Ear protection, sets			5
duck tape			1
packing tape			1
head lamp			1
goggles			2
first aid kit, personal			1
Batteries AA			24
water bottles			2
Fire shelters			1
wheel chocks			2
Bolt cutters			1
Filter, A/C cartridge, Brigs & Stratton		3940185, E-51 JECA	1
Filter, Air, motorcraft FA1632			1
Filter, oil, Brigs & Stratton (for pump)		491056	4
Filter, fuel, Wix		33032	1
Spark plugs, champion		RJ19LM	8
oil, 10W30			2
Tool Box-			
Phillips screwdriver			4
Regular screwdriver			3
Pliers			2
Crescent wrench			1
Catpaw			1
Bastard file			1
Wrench set			1

Apostle Islands National Lakeshore			
Wildland Fire Cache Individual Station Inventory			
	Roys Point Fire Cache		
	NFES#	Other	Quantity
Web gear fire line packs *complete*			2
pulaski			5
Brush hook			1
Hose, 1" x 50'			
gloves			
s			
m			1
l			
xl			
nozzle, 2" HN			2
spark plug, champion		849 CJ6	2
gaskets, 2"			4
chainsaw file			1
reducer, 2" to 1"			
goggles			2
therma rest			1
sleeping bag			1
back pack pump			4
head lamps			12
bag, personal gear (pako's)			
hose bag (red)			
hose , 1.5 NH			1

b. 4. MOUs and Cooperative Agreements

[Blank Page, Insert copies of MOU's and Agreements here]

03/01

**FOREST SERVICE INTER-AGENCY AGREEMENT No. 01-IA-11091313-010
NATIONAL PARK SERVICE GENERAL AGREEMENT No. GA6140-B-0008**

**BETWEEN
UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
APOSTLE ISLANDS NATIONAL LAKESHORE
AND
UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
CHEQUAMEGON-NICOLET NATIONAL FOREST
FOR
WILDLAND FIRE MANAGEMENT COOPERATION**

This Forest Service Inter-Agency Agreement and National Park Service General Agreement is made and entered into by and between the United States Department of the Interior, National Park Service, Apostle Islands National Lakeshore, hereafter referred to as the NPS, and the United States Department of Agriculture, Forest Service, Chequamegon-Nicolet National Forest, hereafter referred to as the FS. Processing and tracking of activities under this agreement will be done utilizing national Interagency Command System (ICS) resource ordering and tracking protocols, and coordinated through the Chequamegon-Nicolet National Forest Central Dispatch Office, hereafter referred to as CNF Dispatch.

I. PURPOSE AND AUTHORITY: The purpose of this agreement is to more efficiently and effectively meet wildland fire management program responsibilities of both the Apostle Islands National Lakeshore and the Chequamegon-Nicolet National Forest (primarily the Washburn District). Mutual benefits are as follows:

NPS employees will gain needed experience, will have access to increased training for future fire assignments, will receive input on fire management plans, prescribed burn plans and other fire management program activities. FS personnel will gain support and personnel from the NPS to work on prescribed burning, prevention, suppression and other wildland fire management program activities.

The following list represents the authority for this agreement:

Protection Act of 1922 (16 USC 594)
Memorandum of Understanding between US Dept. of the Interior and the Dept. of Agriculture dated January 28, 1943
Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66; 42 USC 1856a)
Economy Act of June 30, 1932 (47 Stat. 417; 31 USC 1535) as amended
Federal Land Policy and Management Act of 1976 (43 USC 1702)
National Park Service Organic Act of August 1916 (16 USC 1)

Forest Service Agreement No. 01-IA-11091313-010
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Disaster Relief Act of 1974 (42 USC 1521)
Cooperative Forestry Assistance Act of 1978 (PL 95-313, 92 Stat. 365 as amended; 16 USC 2101 (note) 2101-2103, 2103a, 2103b, 2104-2105)
Interagency Agreement for Fire Management (Forest Service number 97-SIA-004; NPS number 1443-IA9560-97-002) signed in 1997 and amended in 1999

II. THE NPS SHALL:

1. Be responsible for wildland fire management activities within the Apostle Islands National Lakeshore administrative boundary.
2. Provide resources including firefighters and equipment, as available, to the FS. Specific procedures and contacts will be documented in the annual operating plan, to the extent possible.
3. Utilize CNF dispatch to fill resource orders issued by the Eastern Area Coordination Center. The desired method of notifying the FS of available resources and contacts will be documented in an annual operating plan.
4. Request incident management resources and non-emergency resources through CNF Dispatch. Resources ordered will be requested using a Resource Order (ICS form 259). Resources will be the responsibility of the NPS until demobilization through CNF Dispatch.
5. Provide radios or frequencies for use by FS personnel while working on NPS projects. Exceptions to this will be outlined in the annual operating plan developed in conjunction with this agreement.

III. THE FOREST SERVICE SHALL:

1. Be responsible for wildland fire activities on lands under FS jurisdiction and other areas as authorized by various agreements with local, state, other federal, and tribal agreements.
2. Provide resources, as available, for wildland fire management activities to the NPS. Personnel and equipment to be used for a planned activity will be documented on an annual operating plan to the extent possible. Specific procedures and contacts will be documented in the annual operating plan.
3. Request NPS resources for wildland fire management activities through NPS Superintendent or his designate. Resources will be requested using a resource order, issued by the CNF dispatch, and will be the responsibility of the FS until they are demobilized to the NPS.
4. Provide radios or frequencies for use by NPS personnel while working on FS projects. Exceptions to this will be outlined in the annual operating plan developed in conjunction with this agreement.
5. Utilize CNF dispatch to serve as the local dispatch office for mobilization of NPS resources through the Eastern Area Coordination Center.

Forest Service Agreement No. 01-IA-11091313-010
National Park Service Agreement No. GA6140-B-0008

IV. IT IS MUTUALLY AGREED AND UNDERSTOOD BY AND BETWEEN THE PARTIES THAT:

1. SPECIAL PROVISIONS. Both agencies agree to the following special provisions:
 - a. Both parties will develop an annual operating plan associated with this agreement.
 - b. NPS and the FS will exchange Park and Forest fire management plans including fire resource information on available personnel, equipment, and supplies.
 - c. NPS and FS will retain total authority and responsibility for wildland fire management activities under their jurisdiction. All cooperative actions and activities under this agreement will adhere to the Federal Wildland Fire Policy (12/95) and the National Incident Command System.
 - d. Upon request, either party may render assistance to the other in any wildland fire management activity, when feasible, and when such action shall not leave areas in its own protection unit unduly exposed to fire danger.
 - e. When a request for assistance for conducting a prescribed burn is made, the requesting party shall provide a copy of the Prescribed Burn Plan to the principle contacts listed in Clause 7.
 - f. Both parties will cooperate on scheduling and administering the Work Capacity Test (WCT). Each party will allow employees of NPS or FS to participate as space or slots permit. Details related to notification and special requirements will be included in the annual operating plan.
 - g. Each agency will use the National Wildfire Coordinating Group work/rest guidelines and recognize that an Incident Commander or Burn Boss has the authority to modify those guidelines, if necessary.
 - h. A system of communication will be developed and documented in the annual operating plan where notice of upcoming fire training is shared. This could include both national and local sessions such as faller certification, S130, S190, etc.
 - i. Both agencies will share fire cache/fire supply inventories and locations and will make use of each other's equipment upon request. Replacement and/or refurbishment will be the responsibility of the requesting agency.

2. MODIFICATION. Modifications within the scope of the instrument shall be made by mutual consent of the parties, by the issuance of a written modification, signed and dated by both parties, prior to any changes being performed. Each agency is not obligated to fund any changes not properly approved in advance.

3. TERMINATION. Either party, by advance written notice of 30 days, may terminate the instrument in whole, or in part, at any time before the date of expiration. Neither party shall incur any new obligations for the terminated portion of the instrument after the effective date and shall cancel as many obligations as possible. Full credit shall be allowed for each Party's expenses and all non-cancelable obligations properly incurred up to the effective date of termination.

4. OBLIGATIONS. Nothing herein shall be considered as obligating the FS or the NPS to expend or as involving the United States in any contract or other obligations for the future payment of money in excess of funding approved and made available for payment under this instrument and modifications thereto.

Forest Service Agreement No. 01-IA-11091313-010
National Park Service Agreement No. GA6140-B-0008

5. **COMPLETION DATE.** This instrument is executed as of the date of last signature and, unless sooner terminated, is effective through September 30, 2006, at which time it will expire unless renewed.

6. **PRINCIPAL CONTACTS.** The principal contacts for this instrument are:
- Phil Freeman, Operations Team Leader, Washburn District, Chequamegon-Nicolet NF, PO Box 578, Washburn, WI. 54891, 715-373-2667
 - Joyce Zifko, Washburn District Fire Management Officer, Chequamegon-Nicolet, PO Box 578, Washburn, WI 54891, 715-373-2667
 - Greg D. Zeman, Chief of Resource Management, Apostle Islands National Lakeshore, Route 1 Box 4, Bayfield, WI 54814, 715-779-3798 ext. 201.
 - John Pavkovich, Fire Management Officer, Apostle Islands National Lakeshore, Route 1 Box 4, Bayfield, Wisconsin 54814, 715-779-3459.
 - Steve Radaj, Chequamegon-Nicolet National Forest Dispatch Manager, 8831 Hatchery Road, Woodruff, WI 54568, 715-358-6863.
 - Steve Holdsambeck, Chequamegon-Nicolet National Forest Fire Management Officer, 68 So. Stevens St., Rhinelander, WI 54501, 715-362-1341.

7. **AVAILABILITY OF FUNDS FOR THE NEXT FISCAL YEAR.** The FS and NPS obligation for performance of this instrument is contingent upon the availability of appropriated funds from which services can be provided. No legal liability on the part of the FS or the NPS for any service, may arise for performance under this instrument, until funds are made available to either agency for performance or until the grantee/cooperator receives notice of availability to be confirmed in a written modification by the FS.

8. **BILLING.** Cross billing for wildfire suppression between the two Federal agencies will not occur. Both the NPS and FS agree that reimbursement for prescribed fire and other non-emergency fire management activities will not take place as part of this agreement. The 1997 (amended in 1999) National Interagency Fire Management Agreement states that Interior Bureaus and the FS agree not to reimburse each other for hazardous fuel reduction operations unless there is no opportunity for reciprocal service to achieve targets. At this time, no reimbursement between the two agencies will take place. The annual operating plan will describe specific projects to be accomplished during the fiscal year in question.

9. **CIVIL RIGHTS.** During the performance of this agreement, the participants agree to abide by the terms of USDI-Civil Rights Assurance Certification, non-discrimination and will not discriminate against any person because of race, color, religion, sex, or national origin.

10. **OFFICIALS NOT TO BENEFIT.** No member or delegate to Congress, or resident Commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise

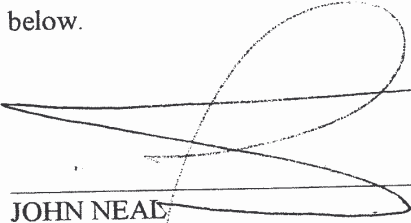
Forest Service Agreement No. 01-IA-11091313-010
National Park Service Agreement No. GA6140-B-0008

therefrom, but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.


11. PROMOTIONS. The FS or NPS shall not publicize, or otherwise circulate, promotional material (such as advertisements, brochures, press releases, speeches, still and motion pictures, articles, manuscripts or other publications) which states or implies Governmental, Departmental, bureau or Government employee endorsement of a product, service, or position which they represent.

12. PUBLIC INFORMATION RELEASE. The FS and NPS must obtain prior approval for any public information releases which refer to the Department of the Interior, Department of Agriculture, any bureau, National Forest, park unit, or employee (by name or title) or this agreement. The specific text, layout, photographs, etc., of the proposed release must be submitted with the request for approval.

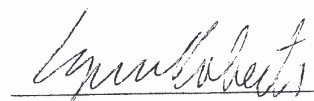
IN WITNESS WHEREOF, the parties hereto have executed this agreement as of the last date written below.


JOHN NEAL
Superintendent
Apostle Islands National Lakeshore

03-08-01
Date


Linda Gordon, Contracting Officer
Apostle Islands National Lakeshore

3/9/01
Date


LYNN ROBERTS
Forest Supervisor
Chequamegon-Nicolet National Forest

3/24/01
Date

Job Code: _____ \$ _____ Completion Date: _____

Concurrence: Fiscal _____ Procurement DCD Agreement DCD

APPENDIX H: LONG-TERM PRESCRIBED FIRE AND HAZARD REDUCTION PLAN

FIVE-YEAR PRESCRIBED FIRE AND HAZARD FUEL REDUCTION PLAN

A. Multi-year Prescribed Fire Schedule

This will be the first attempt to start a prescribed fire program at the Park. Fire history data is still limited for many islands but there are areas where fire history is known and/or there exists classic fire-adapted ecosystems. This plan will identify three such areas where fire should be reintroduced to maintain these ecosystems and to reduce hazardous fuel buildup. Park fire policy has been to suppress all fires in the park and this has had the effect of reducing the fire frequency in most areas.

1. Tombolo on Stockton Island

Background: Swain and Winkler (1983) found evidence for nine separate fires on the sandy soils of the Stockton Island tombolo during the past two centuries. The most recent ones include fires in 1860, 1880, 1895, and 1925. From this, they determined a fire frequency of 20-30 years. However, this must be interpreted cautiously because the authors did not attempt to identify whether these fires were caused by lightning or humans. It was historically a common practice to burn harvested areas to remove debris during the logging era and logging did occur on the island.

High fire danger was created in 1998 after a low snowfall winter; followed by a warm, dry spring. A lightning strike started a low-intensity ground fire on the tombolo in May of that year, but it was quickly put out because of the total suppression policy of the Park, limiting the burn to less than 0.5 acres (1.2 ha). Allowing this fire to burn a larger area would have been desirable from a resource management standpoint because it would have burned underbrush and pine needle duff creating conditions to allow red and white pine to regenerate and it would have revitalized ericaceous species such as huckleberry and blueberry. This would have also improved habitat for black bears because larger berry crops are produced after a fire. With the exception of 1998, fire has been kept out of the tombolo for over 75 years, about the same time that total fire suppression policy was first implemented on public land. In 1998, a fuel loading inventory was completed in the Stockton pine forest. It had 2.1 tons/acre (0.5 kg/m²) for dead and downed woody debris and 16.0 tons/acre (3.6 kg/m²) for litter and duff.

The tombolo is a high visitor use area with 19 campsites, a visitor contact station, ranger station and quarters, as well as outhouse, garbage collection centers, boardwalks, and a dock. Because of the close proximity of an ecological community that could benefit from fire to such an area, it would be advantageous to have the option to use prescribed fire, and wildland fire use during non-peak visitor use periods.

Location: There are approximately 100 acres of pine and pine savannah forested areas with ericad understories that would be targeted for reintroduction of fire into the system (see map).

Fire and Resource Management Objectives:

Desired Conditions are to allow fire to assume its natural role to benefit the pine and pine savanna ecosystems in the area. It is hoped that once fire is reestablished and any accumulated fuels reduced, that wildland fire use could be relied on to maintain the system. However, if this is not feasible due to high use, prescribed fire would be used. Fire prescriptions will be designed to produce low-intensity ground fires. Fire management objectives are:

- A. To burn 50-70% of the underbrush and pine needle litter
- B. Convert 15% of area to bare mineral soil

If met, these fire management objectives should promote the following resource management objectives.

1. Red and white pine regeneration
2. Reduce any hazardous fuel build up
3. Revitalization of ericad species such as huckleberry and blueberry to provide improved habitat for black bears and other species that utilize berries for food. In addition, Ojibwa people have used this area in the past to harvest berries.

Timing: It is proposed that one 25-acre area of the tombolo be burned each year. Monitoring plots should be in place before ignition and the fire effects of the burns evaluated to determine the effectiveness in achieving resource management objectives. Prescribed fires should be set during the fall of the year, after Labor Day, when most visitors are gone. Temperatures should be cooler and day length shorter at this time of year so that fires would be easier to control. Occasionally, spring conditions, before visitors arrive, are ideal for prescribed burning, as was the case in 1998 and all effort should be made to take advantage of this. However, such conditions are rare at this time of year because of Lake Superior's influence on the area's climate.

Interagency Project Planning: Full cooperation will be sought with Chequamegon National Forest Washburn District staff which has extensive experience with a prescribed fire program of their own. A qualified Prescribed Fire Burn Boss who can act as Incident Commander will conduct prescribed fires with qualified support personnel present to accomplish objectives. Support personnel will include a Fire Behavior and Fire Effects Monitor, personnel to control hot spots and fires outside control lines, Ignition Specialists, and fire fighters to complete initial attack on escape fires. A prescribed fire plan will be written by the Park Fire Management Committee and Forest Service personnel. It will be approved and signed by the Park Superintendent. Outside support in the form of NPS prescribed fire management team or interagency incident management team will be requested for support in planning, implementation, or supplemental management stages.

Mitigation: The tombolo contains 19 individual campsites, a ranger station, living quarters, and other structures associated with the campground complex. Great care must be taken when executing a prescribed fire in this area. Conditions need to be ideal for controlling and maintaining a low-intensity ground fire. Extra personnel should be used to assure the fire does not escape. Fire weather monitors need to be vigilant to possible changing of weather conditions.

2. Pine/Oak forest on Long Island

Background: Long Island is entirely sand. It is a narrow barrier spit rather than an island and in the southeast, it abuts to land that is not federally owned. It has a classic fire-dependant Jack pine/white pine/pin oak forest on much of the northwest half. The forest is still young, approximately 80 years old, and may not need any intervention from prescribed fire. However, an evaluation should be done to determine if prescribed fire is needed to restore the nature fire regime and whether it would produce beneficial resource management effects.

A visitor-started fire burned across the width of the island in August 1995. Before rangers could respond to suppress it, the fire had reached the far shore and went out.

B. Hazard Fuels Reduction Areas and Schedule

The Park contains six historic lighthouse complexes and several old farmsteads that need to be considered when implementing a fire management program. Mitigation action to protect and maintain these sites may be necessary. Mechanical removal of vegetation is proposed to help reduce the risk of damage from a wildland fire.

< Lighthouse Complexes

The lighthouse complexes are the highest priorities for mitigating risk from wildland fire. They are located on Sand, Devils, Raspberry, Michigan, Outer, and Long Islands. Brush and encroaching forests have reduced the original complex areas. Fire management goal is to increase fire break distance so that wildland fire can not reach historic buildings. Cultural resource management goal would be to restore the cultural landscapes as closely as possible to their historic appearance.

Schedule: It is proposed that mechanical treatment be completed at one lighthouse complex each year for the next five years. Priority of treatment is determined by assessment of potential hazard. Acreage to be treated is anticipated to range from 2 to 10 acres per site but will vary at each individual location due to differences in topography, fuel type, and dispersal of structures.

Year one - Long Island – all three locations
Year two - Raspberry Island
Year three - Outer Island
Year four - Michigan Island and Sand Island
Year five - Devils Island

Timing: Treatment should be done during the spring or fall when visitation is low.

Interagency Project Planning: A fuels management (mechanical removal) plan will be written by the Park Fire Management Committee. It will be approved and signed by the Park Superintendent. Outside support from the NPS prescribed fire management module, sprite crew or other programs will be requested for support in implementing any large scale mechanical remove program.

< **McCloud/Brigham Farm, Basswood Island and Noreng Farm, Sand Island**

Carefully administered Prescribed Fire and/or Mechanical removal of vegetation within the original farm areas would protect the remains of the farm stead from wildland fire and maintain the cultural landscape of the farms. Treatment should be accomplished within the life of this plan.

Timing: Treatment should be done during the spring or fall when visitation is low.

Interagency Project Planning: A fuels management (prescribed fire and/or mechanical removal) plan will be written by the Park Fire Management Committee. It will be approved and signed by the Park Superintendent. Outside support from the NPS prescribed fire management module, spite crew or other programs will be requested for support in implementing any large scale mechanical remove program. management team will be requested for support in planning, implementation, or supplemental management stages.

Additional Sites That Will Be Evaluated for Fuel Reduction Include:

Manitou Fish Camp, Manitou Island

West Bay Club, Sand Island

Rocky Island Fishing Settlement (including Hadland Fish Camp)

East Bay Settlement (including “Plenty Charm” cottage and Hansen Farmstead.)

APPENDIX I. FIRE PREVENTION PLAN

Fire prevention emphasis for Apostle Islands National Lakeshore Park is based on an analysis of fire risk, fire hazard and values at risk in the Park. Fire risk is based on occurrence of 21 wildland fires from 1975 to 2004 (Table I-1).

Table I-1 Fire Occurrence 1974-2004

Date	Location	Cause	Size (acres)
7/31/1975	Michigan, sandspit	campfire	1.00
8/17/1975	Otter, NW shoreline	lightning	.1
8/18/1975	Sand, NW shoreline	lightning	0.25
9/18/1976	Rocky, NE interior	human	1.00
9/13/1976	Hermit, SE shoreline	lightning	.1
9/25/1976	Devils, dump	human	.1
8/27/1976	Devils, S shoreline	lightning	.1
8/1/1978	S. Twin, sandspit	human	0.30
8/8/1978	Stockton, campground	human	.1
9/20/1979	Raspberry Island	human	.1
7/15/1980	Outer Island	lightning	.1
8/10/1983	Bear Island	lightning	.1
7/7/1989	Sand Island	human	.1
9/30/1990	North Twin	lightning	.1
8/1995	Long	campfire	1.4
5/17/1998	Stockton, Presque Isle	lightning	.5
9/6/1998	Manitou	lightning	.1
7/30/2000	Basswood	human	.1
7/27/2000	Mainland	lightning	.1
7/28/2001	Manitou	lightning	.1
8/28/2003	Stockton	lightning	.1

1. Fire Risk Analysis

Risk is defined as any heat source or human ignition which can start a wildland fire.

An analysis of the fire occurrence history in Apostle Islands National Lakeshore 1974 – 2004 reveals that of the 21 fires recorded human caused fires made up 43% of the wildland fires and lightning caused fires made up 57%. Anecdotal evidence indicates that human caused fires are primarily limited to Parks and near developed campsites. These fires are almost entirely the result of escaped campfires, either from designated camping sites or from traditional used areas.

1. Fire Hazard Analysis

Hazard is defined as the fuels and topography on which a fire will spread.

Human caused are infrequent in the Park, with an average of less than one fire every 3 years. The total acreage burned by wildland fires under 5 acres over the past 30 years. This is due to several factors, including fuels, climate, lack of ignitions and quick access by suppression forces when fires do occur.

2. Values Analysis

Values are defined as areas where the losses from wildland fire would be unacceptable.

As stated in Section X, primary values areas of concern are the developments, infrastructure, use and occupancy holding and archeological, cultural and historic resources in the Park. These areas are predominantly found within the area of increased human fire occurrence along water travel routes.

3. Fire Prevention Activities:

Strategies for fire prevention at Apostle Islands will be a mix of engineering, education, and enforcement.

- a. Engineering is the process of reducing risks and hazards by shielding or removing heat sources or by removing fuels.

Hazard fuel reduction through prescribed burning and mechanical treatments are the primary means of using engineering in fire prevention. As stated in Section IV, prescribed fire may be used in treating pine stands with moderate to high hazard fuels in low to moderate value areas; while mechanical treatments are the primary means to treat moderate to high hazard fuels in moderate to high value areas.

- b. Education emphasizes the need to inform the public of the importance of wildland fire prevention. Activities will include:
 - Pertinent signs, posters, and notices will be posted on park bulletin boards, and at visitor centers, developed campsites and day use sites, and neighboring resorts.
 - Pertinent messages will be included in park publications, such as the park folder and newspaper, camping and hiking brochures, nature trail guides, on the park website, and a site bulletin describing Apostle Islands' wildland fire management program, and news releases to local and regional media.

- Pertinent messages will be included in visitor center exhibits, lightning caused wildland fires (not including those managed for resource benefit) interpretative talks, and NPS and concession orientations for new and returning employees.
 - Pertinent messages will be included in informal contacts between uniformed NPS employees and park visitors and neighbors.
 - Pertinent messages will be included in informal contacts between concession/commercial use license employees and park visitors and neighbors.
- c. Enforcement of rules and regulations pertaining to fire will be assertive as fire danger increases. Burning restrictions are coordinated with the other adjacent land management agencies through the use standardized regulations. Other enforcement activities include:
- Wood fires will be restricted to metal fire grills at developed campsites and day use sites.
 - Prior to the high visitor use period, Facility Maintenance personnel will clear the area around each fire grill of encroaching vegetation, and branches overhanging fire grills will be limbed.
 - Patrols by park rangers, particularly during the evening, will enforce compliance with the policy of restricting wood fires to developed sites and with any open burning restrictions that may be in effect due to high fire danger.
 - Local power companies will check power lines for tree clearance and will correct deficiencies.
 - Any restrictions deemed necessary during periods of extreme fire danger will be publicized on radio and television, and in local newspapers.
 - Formal annual fire/safety building inspections will be conducted by the park's Safety Officer. The Chief Park Ranger and the Facility Manager will clear up any hazards identified during such inspections as soon as possible.

APPENDIX J: WFIP GUIDANCE

c. 1. WFIP Instructions

Wildland Fire Planning and Assessment

A Wildland Fire Implementation Plan (WFIP) will be initiated for all wildland fires. However, only the most complex fires being managed for resource benefits will require completion of all parts of a WFIP. The full WFIP consists of three distinct stages (Stage I - III in the figure). For an estimated 90+% of all wildland fires, information needed for WFIP stage I decision analysis is contained in the FMP. When wildland fires occur, pre-planned descriptions in the FMP in combination with the Fire Situation guide Stage I decisions.

Progressive development of these stages will occur for wildland fires managed for resource benefits or where initial attack is not the selected response. Objectives, fire location, cause, conditions of fuel continuity, current fire activity, fire location, predicted weather and fire behavior conditions, and risk assessment results will indicate when various WFIP Stages must be completed. Most wildland fires will require completion of only Stage I and part of Stage II information during their management. As resource benefits become more important as strategic decision factors, additional planning and documentation requirements (additional WFIP Stages) are involved.

The following table (Table J-1) shows critical components of each stage of WFIP completion, requirement status, and completion timeframes. The following sections describe each WFIP stage in detail.

Table J-1. WFIP implementation stages, requirement status, and completion timeframes.

Requirement status key:

- 1 = mandatory
- 2 = mandatory, but can be preplanned
- 3 = optional
- 4 = completed if Stage II or Periodic Fire Assessment, Part 2 indicate need.
- 5 = completed if fire exceeds management capabilities
- 6 = completed if Periodic Fire Assessment, Part 1 indicates need

WFIP Stage	Planning and Assessment Element	Requirement Status			Maximum completion timeframe
		Initial Attack	Suppression-oriented appropriate management	Fire use actions	
WFIP Stage I: Initial Fire Assessment	Fire Situation	1	1	1	As soon as possible
	Decision Criteria Checklist (Initial GO-NO-GO Decision)	3	1	1	2 hours after first fire detection
WFIP Stage II: Short-term Implementation Actions	Short-Term Fire Behavior Predictions and Risk Assessment	3	1	1	24 hours after Stage I completion
	Short-term Implementation Actions	2	1	1	
	Complexity Analysis	3	1	1	
	Stage III Need Assessment Chart	NA	1	1	
WFIP Stage III: Long-Term Implementation Actions	MMA Definition	3	4	4	Within 24 hours after Stage II or Periodic Fire Assessment indicates need
	Fire Behavior Predictions	3	4	4	
	Long-Term Risk Assessment	3	4	4	
	Long-term Implementation Actions	3	4	4	
Periodic Fire Assessment	Part 1: Re-validation	NA	1	1	On assigned frequency
	Part 2: Stage III Need Assessment Chart	NA	1	1	
WFSA		5	5	6	Before implementing new strategy

A standard Wildland Fire Implementation Plan form has been developed. Since the WFIP will be prepared progressively (by Stages), specific forms and formats will apply to each individual Stage. As each stage is prepared, it will be attached to previous stages until completed or management of the fire accomplishes the objectives. When the complete WFIP has been developed, it will be a highly specific operational management plan and include all of the following elements:

WFIP Stage I: Initial Fire Assessment

- ☐ Fire name
- ☐ Fire number
- ☐ Jurisdiction(s)
- ☐ Administrative unit(s)
- ☐ Geographic Area(s)
- ☐ Management Code(s)
- ☐ Start date/time
- ☐ Discovery date/time
- ☐ Current size
- ☐ Location
- ☐ Cause
- ☐ Fuel model(s)/conditions
- ☐ Current weather
- ☐ Forecasted weather
- ☐ Current fire behavior
- ☐ Forecasted fire behavior
- ☐ Availability of resources
- ☐ Decision criteria checklist
- ☐ Recommended response action

WFIP Stage II: Short-Term Implementation Actions

- ☐ Short-term fire behavior predictions for different scenarios
- ☐ Risk assessment (may vary in detail and range from relative risk rating to quantitative analysis results)
- ☐ Short-term implementation actions (this section includes the following information)
 - ❖ Objectives and desired effects
 - ❖ Safety considerations
 - ❖ External concerns
 - ❖ Environmental concerns
 - ❖ Threats
 - ❖ Short-term implementation actions (include description of action and expected duration)
 - ❖ Estimated costs
- ☐ Complexity Rating Worksheet
- ☐ Stage III need assessment chart

WFIP Stage III: Long-Term Implementation Actions

- ❑ Objectives and Risk Assessment Considerations
 - ❖ Natural and Cultural resource objectives and constraints/considerations
- ❑ MMA Definition and Maps
- ❑ Fire Projections and Map
- ❑ Weather Season/Drought Discussion and Prognosis
- ❑ Long-Term Risk Assessment (describe techniques and outputs, include maps as appropriate)
- ❑ Probability of Success and Consequences of Failure
- ❑ Threats
 - ❖ Threats to MMA
 - ❖ Threats to Public Use and Firefighter Safety
 - ❖ Smoke dispersion and effects
 - ❖ Other
- ❑ Monitoring Actions (types of actions, frequency, and duration)
- ❑ Holding Actions (describe holding actions, management action points that initiate these actions, and key to map if necessary)
- ❑ Resources needed to manage the fire
- ❑ Estimated costs of long-term implementation actions
- ❑ Contingency Actions (describe contingency actions, management action points that initiate them, and resources needed)
- ❑ Information Plan
- ❑ Post-burn evaluation
- ❑ Signatures and Date

Periodic Fire Assessment

- ❑ Part 1: Re-validation
- ❑ Part 2, Stage III Need Assessment Chart
- ❑ Signature Page Detailed Description - Wildland Fire Implementation Procedures

Wildland Fire Implementation Plan - Stage I: Initial Fire Assessment

Summary:

Purpose:

This is the preliminary stage of the WFIP and establishes documentation groundwork for further stages. It is both an information gathering stage and decision-making stage. This information provides location, fire cause, administrative information, fuel conditions, weather, and fire behavior situation. It consists of the Fire Situation, Initial GO/NO-GO Decision Criteria Checklist, and Recommended Response Action. It aids Agency Administrators in making the initial decision to manage a fire for resource benefits or to suppress by providing location of fire (FMP suppression or fire use unit), cause of fire (human or

	natural caused), and validation of fire use decision (GO/NO-GO decision).
Information Source:	Initial fire size-up information, staff completion of Decision Criteria Checklist, and staff development of Recommend Response Action.
Estimated Completion Time:	Fire Situation \leq .25 hours Initial GO/NO-GO Decision \leq .5 hour

The WFIP Stage I represents the Initial Fire Assessment step. It is necessary to establish the foundation information critical to manage the fire. It documents the current and predicted situation, documents all appropriate administrative information, and aids managers by providing them with decision criteria to make the initial decision whether to continue management of the fire for resource benefits or to take suppression action. It also provides the manager with a recommended response action. Stage I consists of two specific components: Fire Situation, and Initial GO/NO-GO Decision.

Fire Situation

The Fire Situation consists of two pages of information. These pages are shown in reduced format on the following page. The information needed for this step comes directly from the initial fire assessment or size-up. This information will be recorded and can be transferred, as needed, to later planning stages or to the WFSA. Necessary information consists of: fire name, fire number, jurisdiction(s), administrative unit(s), geographic area, management code, start date/time, discovery date/time, current date/time, current size, location, fuel model/conditions, weather, fire behavior, and availability of resources. Of particular importance are two items: fire management unit (from FMP), and cause.

Decision Criteria Checklist (Initial GO/NO-GO Decision)

The Decision Criteria Checklist provides the Agency Administrator with standard evaluation criteria to determine if the current wildland fire meets criteria to be managed for resource benefits. The standard criteria have been developed by experienced representatives from Federal wildland fire management agencies. These criteria assess threats from the fire, potential effects of the fire, risk from the fire, effects of other fire activity on management capability, and allow the Agency Administrator to evaluate other, possibly unforeseen or unanticipated, issues.

To complete the checklist, the Agency Administrator evaluates the criteria, based on input from his/her staff, and determines if the fire should receive an appropriate management response to achieve resource benefits or a suppression-oriented response. A "Yes" response to any of the five elements indicates that management should consider a suppression-oriented appropriate management response. All "No" answers to the decision elements indicate that the fire is a viable candidate to be managed for resource benefits.

Detailed explanations of decision elements are:

- ❑ The first decision element provides an indication of the degree of risk of identified threats to life, property, and resources. If identified threats cannot be adequately mitigated (i.e., "yes" answer), an indication of the seriousness of the threat(s) is provided. It further indicates that managing the fire for resource benefits has potential flaws due to fire location and strong consequences of failure.
- ❑ The second decision element relates to objectives for wildland fire management as stated in the FMP. Potential outcomes will be closely correlated with burning conditions and fire behavior. Objectives and constraints will encompass safety, cost, and effects on natural and cultural resources, as applicable.
- ❑ The third decision element involves risk assessment for the fire. Since the decision to suppress or manage the fire is time constrained (2 hour decision space), it may not be possible to complete a long-term assessment of risk. In lieu of the quantitative long-term risk assessment such as Rare Event Risk Assessment Process (RERAP), a qualitative assessment process has been devised to provide the Agency Administrator with a quick and fairly comprehensive assessment of the "relative risk" of the fire. This indicator can be completed in a matter of minutes and will provide information for the Agency Administrator to answer the third decision element of the checklist. The Wildland Fire Relative Risk Rating chart is shown in the following figure (Figure J-1).

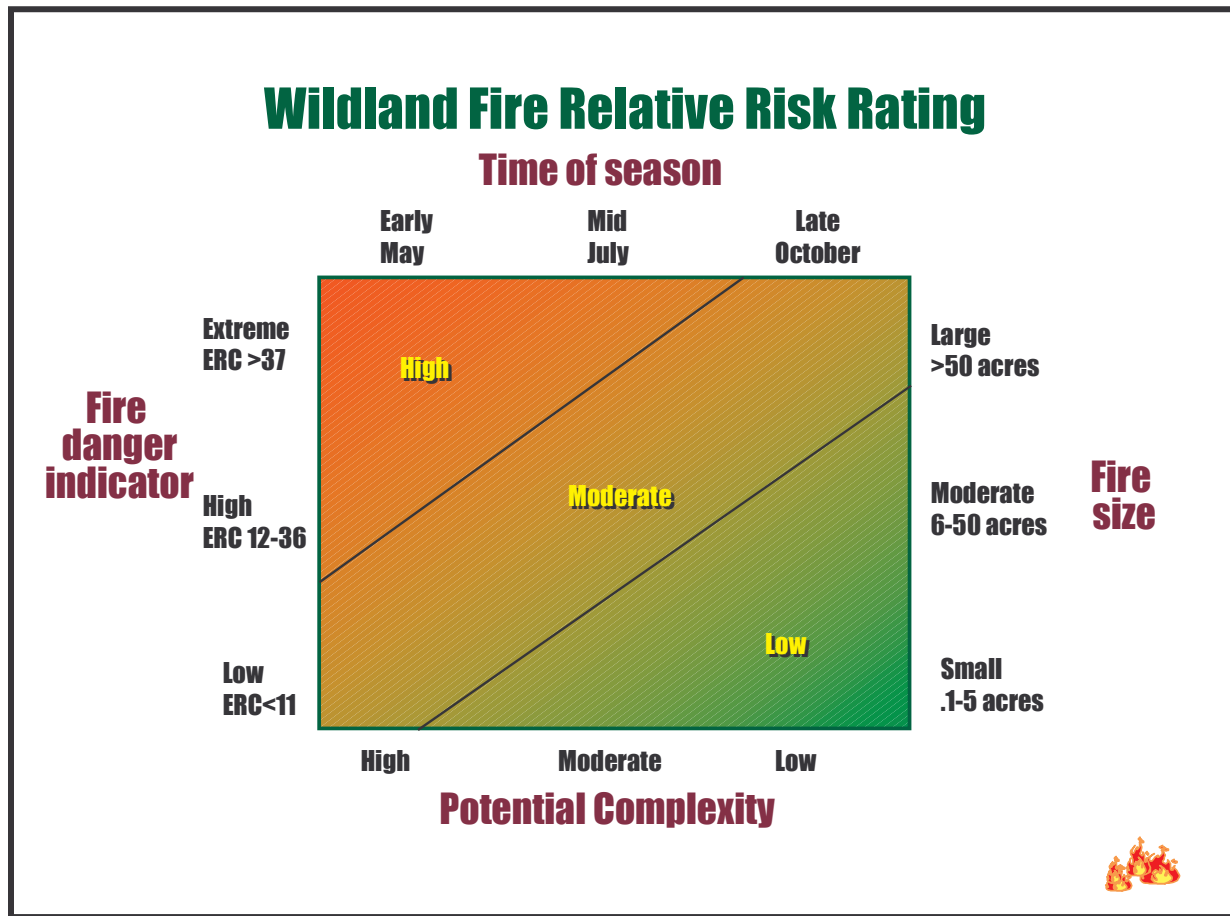


Figure J-1 . Wildland fire relative risk rating chart adapted for APIS indicators.

To use this chart, assessments must be made of four variables. The appropriate fire danger indicator can be derived from components or indexes from the National Fire Danger Rating System (NFDRS) outputs. Local fire staff determines the appropriate indicator to use for this variable and develop the numerical value ranges (the NFDRS firefighter pocket card can be used to provide a rapid assessment for this variable - see Figure J-2 and explanation).

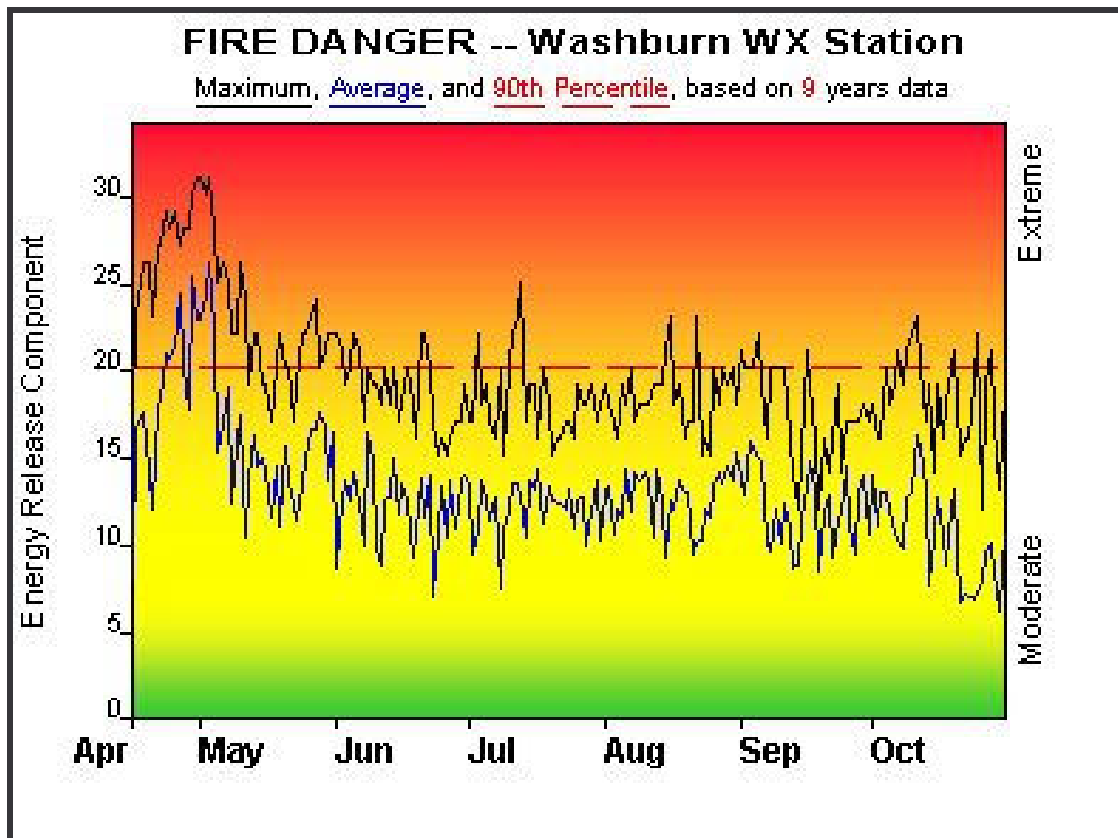


Figure J-2. NFDRS firefighter pocket card from the Washburn Fire weather station.

The final chart then provides a quick visual reference that can be formatted as a pocket card. The information revealed by this card can be used as the source of input for the decision criteria checklist, or for other input information described in later WFIP stages.

Continuing with the relative risk chart, the time of season is an indicator of the potential duration of newly-ignited fires. The earlier in the season, the longer the potential duration of the fire. The fire size represents the current fire size and should be available from the Fire Situation information. Potential complexity is an estimate of complexity. If time and sufficient information are available to complete the full Wildland and Prescribed Fire Complexity Rating, then the result of that analysis can provide this information. If sufficient time and information are not available, then complexity must be estimated by local fire staff and used for this variable. Complexity can be identified in advance of a fire (pre-planned MMAs designated in the Fire Management Plan and complexity confirmed daily for each MMA).

To obtain the relative risk rating, connect the top and bottom variables with a single line, then connect the left and right variables with a single line. Determine the relative risk of this fire

at the intersection of the two lines. Use the relative risk as input information for the Decision Criteria Checklist. Neither a high or low rating necessarily predispose a "yes" or "no" answer. They provide an indication, but the Agency Administrator must still decide what level of risk is acceptable.

- ❑ The fourth decision element gives an indication of other local and regional fire activity, commitments of unit and cooperator resources, and availability to fill special skill positions from local resources for this fire. If current fire activity precludes the ability to manage fire with adequate resources and skill mixtures, then the response to this element will be "Yes" and a suppression-oriented suppression response is indicated.
- ❑ The final decision element allows Agency Administrator discretion in the event there are other issues which were unknown to fire staff which need to be considered when making the decision to manage the fire for resource benefits.

Once the Decision Criteria Checklist is complete, managers can determine whether to initiate actions to manage the fire for resource benefits or to initiate a suppression response. At the bottom of the Decision Criteria Checklist is a check box for the recommended response action (suppression or other appropriate management response) followed by the Agency Administrator's (or other delegated individual's) signature and date. This will complete the WFIP Stage I.

Wildland Fire Management Plan - Stage II: Short-Term Implementation Actions

Summary:

Purpose:	This stage will provide managers and staff with information to initiate and continue management of the wildland fire for resource benefits. It includes validation of short-term implementation actions as a decision. This stage will provide predictions of where the fire may go, how intense it may burn, how fast it may spread, what the necessary short-term management actions are, what the full complexity is, and if long-term management actions need to be addressed immediately.
Information Source:	<p>Fire behavior prediction = generated through the Fire Behavior Prediction System (FBMS) using the BEHAVE system to obtain predictions of fire intensity and rate of spread based on fuel model, wind, topography, and fuel moisture conditions.</p> <p>Risk assessment = a variety of techniques can provide specific estimates of degree of risk. Example products may include: probability of fire reaching MMA (if MMA location is known from FMP), probability of a season-ending event, description or map of predicted fire perimeters. The minimum risk assessment required is a relative risk chart output.</p>

**Estimated Completion
Time:**

Short-term implementation actions = developed from staff input, predicted fire behavior, risk assessment, fuel types, fuel continuity, overall objectives. Represents tactical implementation actions.

Complexity analysis = developed from staff input and review of standard complexity elements.

Stage III need assessment chart = determined from completion of relative risk, complexity rating, fire behavior predictions, and Fire Situation (Stage I).

Fire Behavior Prediction \leq 2 hours

Risk assessment \leq 24 hours

Short-term implementation actions \leq 24 hours

Complexity Analysis \leq .5 hour

Stage III Need Assessment Chart \leq .5 hour

The WFIP Stage II, Short-Term Implementation Actions, represents the initiation of management for resource benefits. During this stage, the potential fire behavior is calculated; uncertainty is reduced by assessing risk of the fire, how quickly it could spread, and how intense the fire may burn; fire complexity; necessary immediate and short-term management actions and resources; and evaluation of the need to move directly to the Stage III section.

Fire Behavior Predictions and Risk Assessment

Short-term fire behavior predictions are vital to initial implementation actions because they provide:

- ☐ estimates of fire size and shape at a given time,
- ☐ models of management alternatives,
- ☐ determinations of resource needs, production rates, and requirements,
- ☐ placement of resources,
- ☐ estimates of behavior under differential weather patterns,
- ☐ estimates of ignition patterns, including spotting,
- ☐ modeling for contingency action planning,
- ☐ developing prescriptions through historical weather records,
- ☐ verifying prediction outputs

The sum total of these efforts can be information on where the fire may go, how fast it may travel, and how intensely it will burn. This will support decisions on initial actions, resource needs, and the overall decisions concerning the appropriate management response.

For this stage, risk assessment can be quickly assessed. However, if the unit has the capability to complete full long-term risk assessments through the use of RERAP or FARSITE, it is strongly encouraged that they do so. This will provide the best information available. In the event such

quantitative methods cannot be completed in a timely manner, the relative risk chart can be used to obtain a subjective assessment of the risk.

Short-Term Implementation Actions

The Short-term Implementation Actions section describes what the initial or immediate implementation actions will be. These actions can vary significantly, depending upon specific circumstances of the particular fire. In cases where the fire may be fuel-limited, surrounded by sparse fuels or natural barriers with only limited spread potential, monitoring may be specified as the necessary implementation actions. In other cases, monitoring plus some form of limited mitigation actions may be necessary. In still other cases, fuel types in which the fire is burning may require immediate actions to delay, check, or direct the spread of fire.

Page one covers:

- ☐ Objectives and Desired Effects
- ☐ Safety Considerations
- ☐ External Concerns
- ☐ Environmental Concerns

Page two covers:

- ☐ Threats
- ☐ Short-Term Implementation Actions
- ☐ Estimated Costs
- ☐ Signatures

Complexity Analysis

A Wildland and Prescribed Fire Complexity Analysis has been developed to aid in evaluating the overall complexity of specific fires. This analysis incorporates an assigned numeric complexity value for specific complexity elements that are weighted in their contribution to overall complexity. The weighted value is multiplied times the numeric value to provide a total element rating. Then all total values are added to generate the summed complexity numeric value. Breakpoint values are provided for low, moderate, and high complexity.

Complexity elements that have been established include:

- ☐ Safety
- ☐ Threats to boundaries
- ☐ Fuels and fire behavior
- ☐ Objectives
- ☐ Management organization
- ☐ Improvements to be protected
- ☐ Natural, cultural, and social values to be protected
- ☐ Air quality values to be protected

- ☐ Logistics
- ☐ Political concerns
- ☐ Tactical concerns
- ☐ Interagency coordination

In addition to the checklist, a guide to numeric values has been prepared. This guide gives example scenarios for numeric ratings of 1, 3, and 5 points for all complexity elements.

Stage III Need Assessment Chart

This assessment chart provides the Agency Administrator and staff with an aid to determine if the Stage III, Long-Term Assessment and Implementation Actions need to be developed, documented, and implemented immediately, or if the fire can be managed through the established short-term implementation actions until indicated otherwise by the Periodic Fire Assessment. For many wildland fires, fuel continuity and spread potential will be low. In other situations, environmental conditions will preclude active burning and spread. For instances such as these, immediate completion of Stage III of the WFIP will not need to occur until specific thresholds are reached. These thresholds are assessed subjectively on this chart or through the continued assessment provided by the Periodic Fire Assessment.

The Stage III Need Assessment Chart (Figure J-3) will help Agency Administrators prioritize planning needs for multiple fires and ensure that those having the greatest need will receive the necessary planning in response to management capability and time constraints.

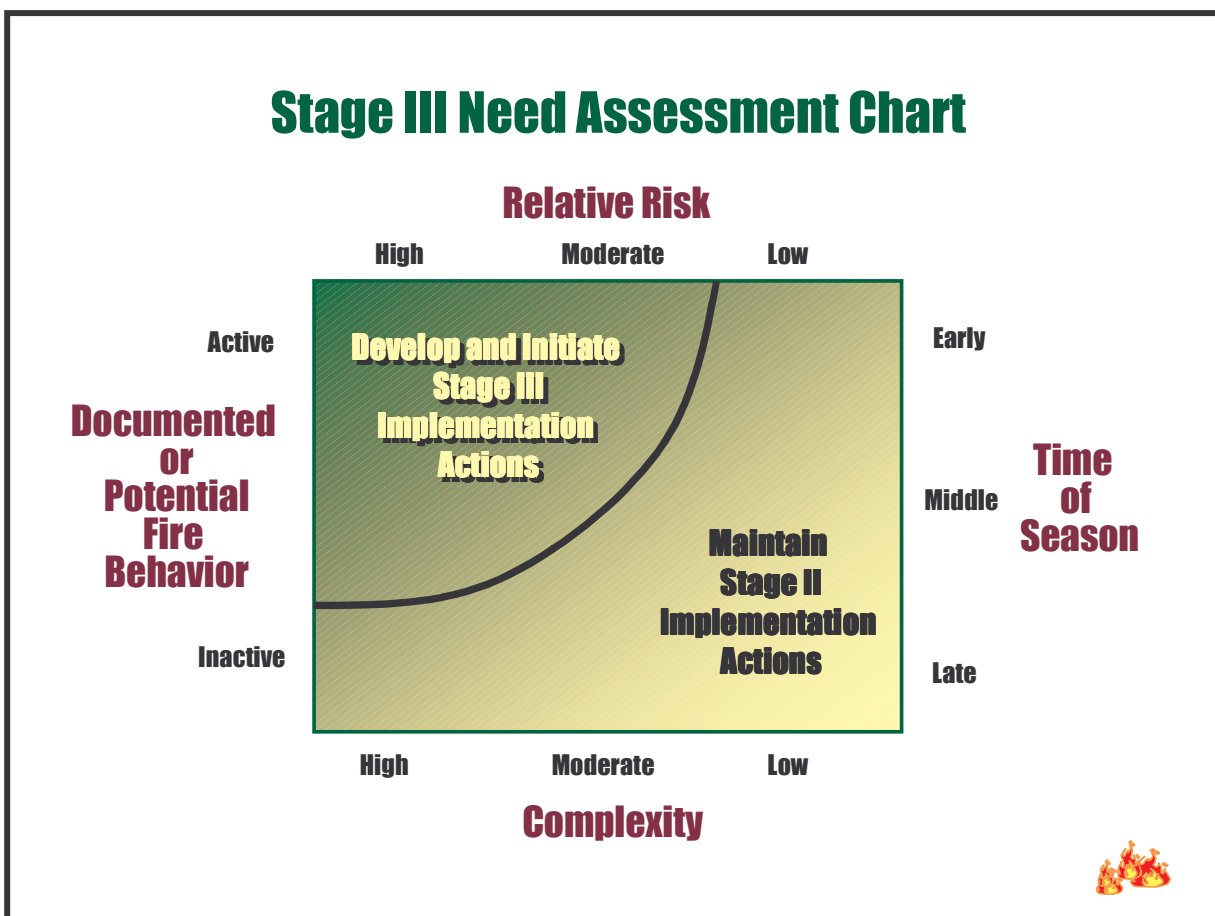


Figure J-3. Stage III Need Assessment Chart (prepared as part of WFIP Stage II).

To complete the assessment, local fire staff evaluate the criteria and determine if the fire warrants completion of the long-term implementation actions (Stage III) at this time or if Stage II implementation directions are adequate (if Stage II actions continue, the Periodic Fire Assessment will determine if and when Stage III will be prepared). To obtain the need indication, connect the top and bottom variables with a single line and then connect the left and right variables with a single line. Where the line crosses indicates the need for WFIP Stage III. The appropriate need is read directly off the chart.

3. Wildland Fire Implementation Plan - Stage III: Long-Term Assessment and Implementation Actions

Summary:

Purpose:

To supplement the Fire Management Plan by providing the full long-term implementation actions necessary to manage the wildland fire to accomplish identified objectives. This stage will provide a definition of the ultimate acceptable geographic size of the fire (represented by the MMA). It will consider long-term fire

	behavior predictions and long-term risk assessment. It will assess the likelihood of the fire reaching the MMA perimeter, and will document those operational management actions necessary to manage long duration fires that will need mitigating measures to strengthen and defend the MMA.
Information Source:	Staff development from local expertise, experience, knowledge, maps, monitoring data, fire behavior predictions, risk assessment, and operational evaluation and identification of tactics and resources. MMA = staff negotiated and developed from objectives, maps, on-the-ground evaluation, aerial observation, monitoring, etc. Risk assessment can be obtained from RERAP, FARSITE, or BEHAVE, or a combination of some or all these techniques.
Estimated Completion Time:	MMA determination ≤ 24 hours Long-term risk assessment ≤ 24 hours (unless FARSITE or other assessment process requires more time) Long-term implementation actions ≤ 24 hours

This stage represents completion of long-term implementation actions necessary to successfully accomplish the desired objectives. The WFIP has been progressively developed throughout all stages; this represents the final stage. It presents tactical implementation information and will be attached to information developed in previous stages.

This stage details operational activities and documents the planning completed to ensure adequate mitigation actions have been developed. These actions will provide the best protection against fire activity exceeding acceptable limits. **Mitigation actions are those on-the-ground activities that will serve to increase the defensibility of the MMA , check, direct, or delay the spread of fire, and minimize threats to life, property, and resources.** Mitigation actions may include mechanical and physical non-fire tasks and specific fire applications. Their purpose is to construct fire lines, reduce excessive fuel concentrations, reduce vertical fuel continuity, create fuel breaks or barriers around critical or sensitive sites or resources, create "blacklines" through controlled burnouts, and limited suppression actions to limit fire spread and behavior.

Completion of this stage is determined (triggered) by either the Stage III Need Assessment Chart (WFIP Stage II) or through the Periodic Fire Assessment, Part 2 Stage III Need Assessment Chart. Once Stage III has been completed, the full WFIP will have been developed.

Maximum Manageable Area (MMA) Determination

All wildland fires being managed under appropriate management response strategies requiring WFIP Stage I, II, and III (meaning those fires where the WFIP planning has progressed to Stage III) will have a defined Maximum Manageable Area (MMA). This is to ensure that there is a

clear and common understanding of the authorized size and location of the fire among Agency Administrators and cooperators.

The maximum manageable area delineates the ultimate acceptable size for a given wildland fire managed for resource benefits. It provides for closely directed fire management application in a specific area defined by resource objectives, fire and weather prescription elements, social needs, political considerations, and management capability.

All Maximum Manageable Areas will:

- ❑ be based on pre-determined MMAs identified in the Fire Management Plan or be developed as part of Stage III of the Wildland Fire Implementation Plan.
- ❑ be fixed and not subject to change once established and approved by the Agency Administrator.
- ❑ serve as a definition of firm limits of management capability to accommodate the social, political, and resource impacts for all wildland fire managed for resource benefits.

***NOTE:** The complex nature of fires and land management precludes the ability of managers to write a set of guidelines or directions that cover all potential situations. Past experiences and recognition of future potential situations require the following consideration regarding the rigid nature of drawing lines on a map.*

There may be isolated cases where formal implementation of the WFSA process because a wildland fire exceeded an established MMA is not prudent or logical. In these situations, experience may indicate that the MMA will be exceeded by the specific wildland fire on a very small or non-threatening scale. Management options in this situation include:

- ❖ *Constraining the fire spread to the small or non-threatening overrun of the original acceptable area using available holding forces currently in use, and identified in the Wildland Fire Implementation Plan, Stage II or III. This return must be accomplished within two burning periods.*
- ❖ *In the case of relatively long range spotting, treat an isolated spot generated by this natural process as a separate fire. Determine appropriate management action for this new ignition separately from the original wildland fire, based on criteria specific to this fire.*

If the Agency Administrator and Fire Management Officer determine that the fire cannot continue to be managed within its original approved boundary, a WFSA will be utilized to select a new strategic alternative and appropriate management response.

Long-Term Risk Assessment

Decision-making associated with managing wildland fire for resource benefits can have critical impacts. It is important to make the highest quality informed decisions as possible. Decision-

making is facilitated by factual information and prediction of outcomes or consequences of the decision. Of particular importance is the ability to assess the degree of risk presented by the particular wildland fire.

An array of decision-making support aids is available to support wildland and prescribed fire risk assessment. The use of technological tools is appropriate when a specific tool can give the decision-maker information that reduces uncertainty associated with possible outcomes of the decision, reduces the risk of undesirable outcomes, and facilitates the best decision possible.

The choice of technique will depend on the information needed and the state of knowledge regarding that subject area. Techniques may range from a subjective, descriptive comparison to a very objective in-depth analysis using sophisticated mathematical models.

The importance of risk assessment is reinforced through the Guiding Principles from the Fire Policy Review Recommendations that state, "Sound risk management is a foundation for all fire management activities," and "Fire management plans are based on the best available science."

Technological advances in fire behavior prediction, fire spread estimation, fire effects prediction, smoke production and dispersal, rare event assessment, and fire area simulation now make it possible to obtain better information, reduce uncertainty, assess potential fire outcomes, evaluate consequences of failure, and determine probabilities of success more effectively than ever before. Using this type of information in decision-making promotes better management decisions and ultimately, more desirable outcomes. As new technology becomes available for application in management situations, it must be utilized to improve operational actions to the greatest degree possible.

Specific assessment products useful in evaluating risk include:

- ❑ Probability of the fire reaching the MMA perimeter,
- ❑ Probability of a season-ending weather event,
- ❑ Indications of where the fire may spread, or total area that may be burned by the fire,
- ❑ How fast the fire will travel,
- ❑ How soon the fire may reach critical sites or the MMA perimeter,
- ❑ Indications of how the fire may burn; predictions of intensity and severity,
- ❑ Fuel conditions, moisture conditions, departures from average conditions,
- ❑ Fire dynamics - indicators of potential rapid escalation in fire behavior,
- ❑ Analysis of fire danger indicators, comparison with 10 years statistics,
- ❑ Fire history reviews, records of past fires in terms of area burned and type of fires (i.e., low - moderate intensity, surface fire, stand replacement, etc.),
- ❑ Predictions of the range of potential fire effects on natural and cultural resources,
- ❑ Probability of adverse smoke events and dispersal.

No mandatory requirements exist for risk assessment. Units are encouraged to acquire and utilize available long-term risk assessment techniques such as the Rare Event Risk Assessment Process [RERAP], and Fire Area Simulator [FARSITE]. As the quality of risk assessment increases, the

quality of subsequent decisions and probability of desirable outcomes will increase. Units should strive for the highest quality decisions possible.

No interagency standards exist for the configuration of teams responsible for preparation of Wildland Fire Implementation Plans, the duration of time that they must be in place, and what products they must create. For more complex situation, formalized teams may make the most significant contribution in support of local units and management of the fire. These teams may be developed locally from unit and cooperator personnel or be a formal, established team obtained through the established resource ordering process. Teams must include a leader (Fire Use Manager or higher qualification with fire use experience), a fire behavior specialist (preferably RXFA), and other specialists as needed to support tactical operations, planning, and logistical support needs. In any case, the capability to predict fire behavior and assess risk is critical. This capability can be fulfilled in most situations by a Prescribed Fire Behavior Analyst (RXFA) or Fire Behavior Analyst (FBAN). But, these positions have somewhat different training, experience backgrounds, and slightly different capabilities. Prescribed Fire Behavior Analysts are significantly important in predicting the potential area and extent of burning, assessing long-term risk, and validating the maximum manageable area (MMA). An FBAN can best provide fire behavior predictions, access weather observations and forecasts, assess short-term risk, and predict the potential area and extent of burning. The RXFA position will be most effective for long-term planning as needed for wildland fires managed for resource benefits while the FBAN will be markedly important for short-term predictions with special emphasis on interrelationships between safety and tactical implementation actions.

Estimates of fire behavior and risk are prerequisite to successful preparation of a Wildland Fire Implementation Plan. A complete review of MMAs, input regarding fire potential, potential risk, and extended fire behavior predictions for comparisons of expected and experienced severe fire scenarios is required. During Stage I and II, either Prescribed Fire Behavior Analyst or Fire Behavior Analyst positions can be utilized to provide the necessary information. Long-term risk assessment can be conducted through use of the RERAP or FARSITE programs in Stage II, and must be done in Stage III unless not physically possible. During this process, a qualified RXFA [or FBAN who has successfully completed S-492, Long-Term Risk Assessment, and S-493, Fire Area Simulator (FARSITE)] is required. An RXFA does not have to remain continually involved with the wildland fire after completion of the WFIP. The local fire staff or Fire Use Manager (FUMA) will determine the necessary level of involvement of the RXFA during implementation activities.

As WFIP Stage III is prepared, the information will be attached to Stage I and II information to complete the WFIP. In the event that the fire has been burning for a relatively long duration and information contained in Stages I and II is no longer current, it will be updated or replaced during preparation of WFIP Stage III.

Periodic Fire Assessment

Summary:

Purpose:	This step provides a process to evaluate the continued capability of the local unit to manage the fire for resource benefits, and to determine if the fire is escalating in complexity and operational needs. If the assessment shows inadequate capability to continue to manage the fire, an indication is given to proceed to development of a WFSA. If complexity and operational needs are escalating, the assessment indicates the need to fully define a MMA, develop long-term fire behavior predictions, conduct long-term risk assessment procedures, and define detailed long-term implementation actions (WFIP - Stage III). This assessment is completed as frequently as specified by the local unit (within maximum assessment frequency guidelines provided below in the procedural description).
Information Source:	Fire monitoring information, risk assessment results, current fire activity, fire location, fire size, fire danger indicators, time period of fire season, fire behavior and weather forecasts, and staff input.
Estimated Completion Time:	Part 1: Re-validation \leq .5 hour Part 2: Stage III need \leq .5 hour

For each wildland fire use action, the Agency Administrator (or delegated individual) is required to periodically affirm the capability to continue management of the fire. This stage is intended to prevent the unchecked escalation of an individual fire situation or the total fire management situation without evaluation and adequate planning. A checklist of information must be completed that accomplishes two purposes. First, this checklist affirms the appropriateness of continued management of the fire for resource benefits. Second, this checklist confirms the decision pertaining to the need to develop and document the WFIP - Stage III. The Periodic Fire Assessment consists of three components: a re-validation of the appropriateness of continued management for resource benefits, an assessment of the need to escalate from WFIP Stage II to Stage III, and a signature table that affirms the Agency Administrator's concurrence.

For Part 1, local fire staff review and complete the assessment checklist. Once this form is initially completed, it does not have to be re-done, but it **must be reviewed and affirmed on the specified assessment frequency**. The local unit must note the valid dates and the frequency of the assessment on the form. The valid dates are the inclusive dates where the checklist has re-validated continued management of the fire. The "valid date(s)" box on page 1 can be inclusive of those dates where the assessment remains valid, as indicated by the dated signature. When any decision elements change from "No" to "Yes", a new checklist must be completed for documentation purposes. The assessment frequency is how often the assessment will be reviewed. This frequency can be daily, but if the unit desires it can be less frequent than a daily requirement.

Recommendations for assessment frequency include:

- ☐ grass fuel types = daily
- ☐ shrub and timber types = every 1 - 5 days
- ☐ Alaska area = every 1 - 10 days

These are recommendations for monitoring and assessment frequency but local units can determine what best meets their needs (that selected frequency, if different than the recommended frequency, must be documented with an associated rationale). However, to ensure that unchecked and unknown escalation of an individual fire situation or the total fire management situation does not occur, continued monitoring and assessment is mandatory. This must occur to facilitate continual evaluation and timely planning.

When units establish a monitoring and assessment frequency, they should consider developing a "step-up" frequency based on fire size or levels of fire activity. Then, as an individual fire gets larger, or becomes more active, the monitoring and assessment frequency can correspondingly increase. Conversely, as fire activity lessens and fire size increases become less common, monitoring and assessment can "step-down" and become less frequent. **Units must identify standards and rationale for establishing assessment frequency, especially "step-up" and "step-down" actions.** If fire size is used as a determinant, then past burning rates and areas should be used to formulate standards. If fire activity is used, then levels of burning (acres per day, etc.) should form the basis. In either case, the determinants must be definable and justifiable.

When completing Part 1 of this checklist, a "Yes" answer to one or more decision elements indicates inability to continue management of the fire within defined limits of the current response. This triggers preparation of the Wildland Fire Situation Analysis to guide selection of a different appropriate management response alternative.

The Periodic Fire Assessment, Part 2, is a process that validates the level of implementation actions. It must be completed periodically for all wildland fires managed for resource benefits where Stage III has not yet been completed. When completing Part 2 of this checklist, if the chart indicates that WFIP Stage III is needed, it must be prepared within 24 hours. The purpose of this chart is to aid managers in assessing the need to complete detailed, long-term assessment and implementation plans for the particular fire. It guides managers in determining if the particular fire is presenting concerns that warrant more detailed planning and preparation for mitigation actions. The Stage III Need Assessment Chart can also guide Agency Administrators in setting priorities for planning needs for multiple fires and ensuring that those fires having the greatest need will have the necessary planning done within the framework of management capabilities and time constraints.

For many wildland fires, fuel continuity and spread potential will be low. In other situations, environmental conditions will preclude active burning and spread. For instances such as these, completion of WFIP Stage III may not be warranted until specific thresholds are reached. It must be noted that Agency Administrators and staff have the prerogative to complete WFIP Stage III for any or all wildland fires.

The Part 1 checklist essentially consists of the same decision elements present in the Decision Criteria Checklist. However, at this point in the process it is necessary to periodically review management capability. In order to accomplish this, one additional decision element has been added, "Do expected management needs for this fire exceed known capabilities?"

The Wildland Fire Relative Risk Rating Chart and NFDRS Firefighter Pocket Card are again useful in determining answers to specific criteria. The additional decision element in this checklist is related to management and organizational capabilities. If supervisory and tactical needs for this fire exceed known capabilities, then movement to the WFSA is warranted.

Part 2 of this assessment consists of the same chart utilized in the final assessment in Stage II (Stage III Need Assessment Chart). This chart is presented as a full-size figure in the Appendix and on page 51. The chart evaluates the following variables:

- ❑ Complexity - determined from the Wildland and Prescribed Fire Complexity Rating, includes review of objectives and type of fire behavior required to achieve those objectives (i.e., low intensity, surface fire, high intensity, stand replacement burning, etc.),
- ❑ Time of the fire season - this element is important in determining whether or not Stage III should be completed immediately. Using the figure showing generalized fire season dynamics (Figure J-5), local staff can determine if they are at a point in time where the potential maximum fire behavior has not occurred, or if they have passed that point. The closer the time of season is to that potential maximum, the greater the need to prepare Stage III.

The generalized information in Figure J-5 is drawn from Williams and Rothermel (1992) (Figure 8) which shows a comparison of expected fire behavior over a period of increasing fire danger. In utilizing Figure J-5, local staff should orient their specific fire season timeframes along the x axis and determine where they currently are. For example, some western fire seasons will persist from May to October so the x axis represents a period of several months.

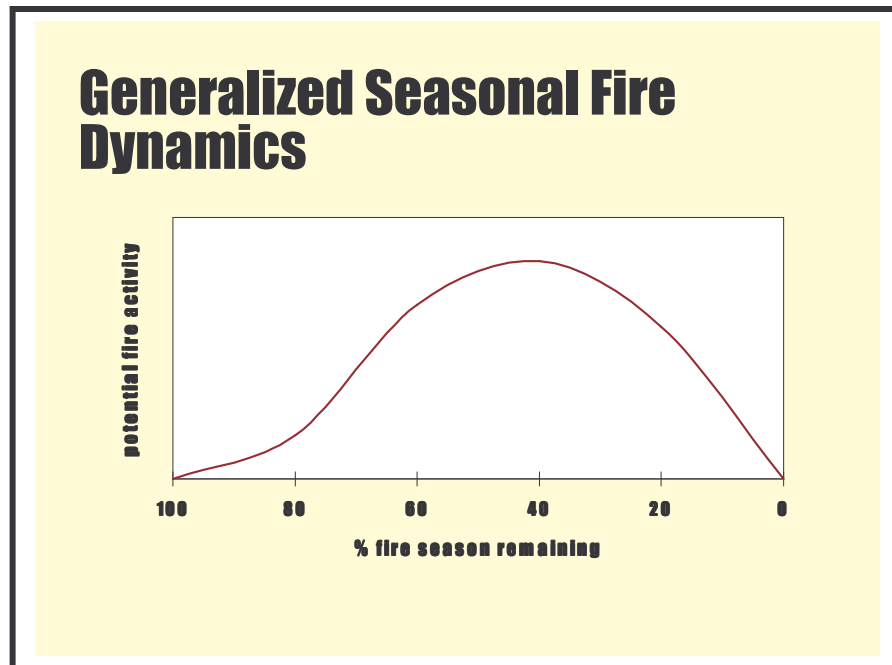


Figure J-5. Generalized seasonal fire dynamics.

The remaining variables addressed by the Stage III Need Assessment Chart include:

- ❑ Relative risk - can be determined from the Wildland Fire Relative Risk Rating chart or from long-term risk assessment procedures such as RERAP or FARSITE.
- ❑ Fire behavior - determined from short-term and long-term fire behavior predictions and forecasts

The Agency Administrator or designated individual must sign the Periodic Fire Assessment Signature Page on the specified assessment frequency for the time period encompassed by the valid dates. The Periodic Fire Assessment signature authority can be re-delegated to specific positions as appropriate. Agency Administrators can delegate, in writing, the revalidation authority to other designated individuals. This permits the delegated individual to affirm that management capability exists to continue to manage the fire for resource benefit. If or when fire conditions or complexity levels escalate, Periodic Fire Assessment signature authority will automatically and immediately revert to the Agency Administrator who made the initial delegation of authority. For a particular fire, the responsible Agency Administrator can make the decision regarding delegation of this authority.

d. 2. Blank Wildland Fire Implementation Plan (WFIP) Format

Fire Name	
Fire Number	

<i>Documentation Product</i>	<i>Product Needed</i>	<i>Product Completed</i>
WFIP - Stage I: Initial Fire Assessment		
Fire Situation	<input type="checkbox"/>	<input type="checkbox"/>
Initial GO/NO-GO Decision	<input type="checkbox"/>	<input type="checkbox"/>
WFIP - Stage II: Short-Term Implementation Actions		
Short-Term Fire Behavior Predictions And Risk Assessment	<input type="checkbox"/>	<input type="checkbox"/>
Short-term Implementation Actions	<input type="checkbox"/>	<input type="checkbox"/>
Complexity Analysis	<input type="checkbox"/>	<input type="checkbox"/>
Stage III Need Assessment Chart	<input type="checkbox"/>	<input type="checkbox"/>
WFIP - Stage III: Long-Term Implementation Actions	<input type="checkbox"/>	<input type="checkbox"/>
Periodic Fire Assessment		
Part 1, Re-validation	<input type="checkbox"/>	<input type="checkbox"/>
Part 2, Stage III Need Assessment	<input type="checkbox"/>	<input type="checkbox"/>
Wildland Fire Situation Analysis	<input type="checkbox"/>	<input type="checkbox"/>

Wildland Fire Implementation Plan - Stage I

FIRE SITUATION

Fire Name	
Fire Number	
Jurisdiction(s)	
Administrative Unit(s)	
FMP Unit(s)	
Geographic Area	
Management Code	
Start Date/Time	
Discovery Date/Time	
Current Date/Time	
Current Size	
Location:	T. R. Sec. Sub.
Legal Description(s)	
Latitude	
Longitude	
UTM:	
County:	
Local Description	
Cause	

Wildland Fire Implementation Plan - Stage I

Fuel Model/ Conditions	
Weather:	
Current	
Predicted	
Fire Behavior:	
Current	
Predicted	
Availability of Resources	

Wildland Fire Implementation Plan - Stage I

DECISION CRITERIA CHECKLIST

Decision Element

Is there a threat to life, property, or resources that cannot be mitigated?

Are potential effects on cultural and natural resources outside the range of acceptable effects?

Are relative risk indicators and/or risk assessment results unacceptable to the appropriate Agency Administrator?

Is there other proximate fire activity that limits or precludes successful management of this fire?

Are there other Agency Administrator issues that preclude wildland fire use?

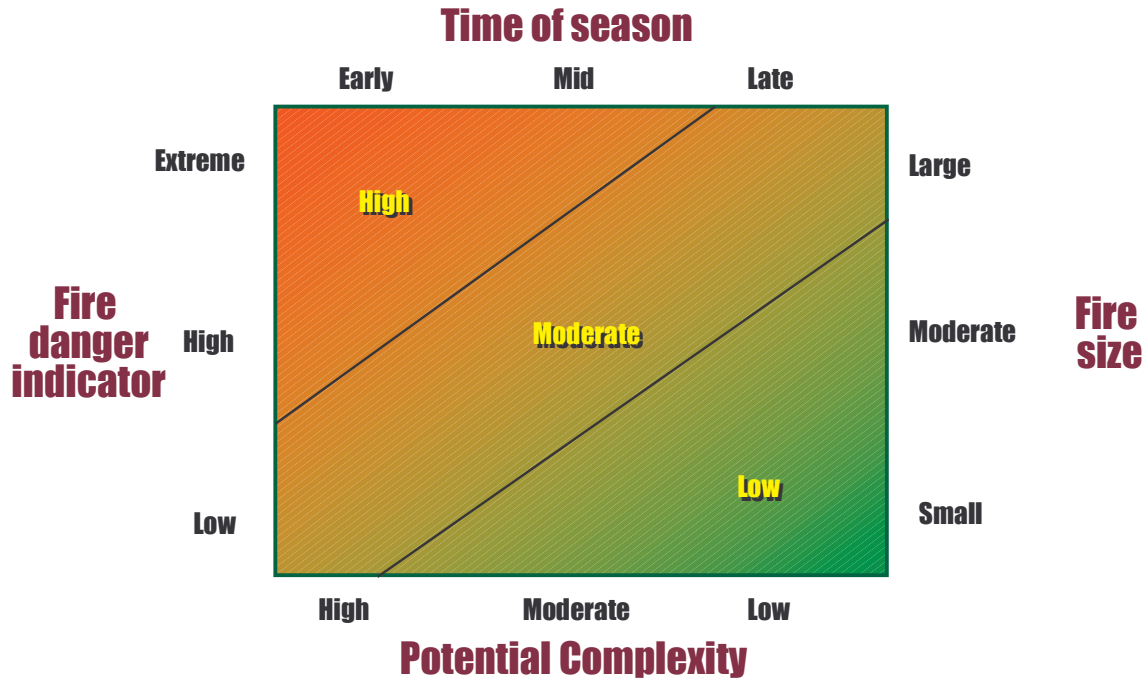
Yes	No

The Decision Criteria Checklist is a process to assess whether or not the situation warrants continued wildland fire use implementation. A “Yes” response to any element on the checklist indicates that the appropriate management response should be suppression-oriented.

Recommended Response Action (check appropriate box)	NO-GO (Initial attack/suppression action)	
	GO (Other appropriate management response)	

Signature _____ Date _____

Wildland Fire Relative Risk Rating



Determination of Relative Risk Rating for Wildland Fires. To obtain relative risk, connect lines between the top and bottom variables and the left and right hand variables. Where these lines cross represents the relative risk for this specific fire.

Wildland Fire Implementation Plan - Stage II

SHORT-TERM IMPLEMENTATION ACTION

Attach Stage I information.

Action Items

Objectives and Desired
Effects

Information specific to this fire

Safety Considerations

External Concerns

Environmental Concerns

Wildland Fire Implementation Plan - Stage II

Threats

--

Short-Term Actions
(describe)

--

Estimated Costs

--

Signature

--

Title/date

--

Wildland Fire Implementation Plan - Stage II

WILDLAND AND PRESCRIBED FIRE COMPLEXITY RATING WORKSHEET

<i>Complexity element</i>	<i>Weighting factor</i>	<i>Complexity value</i>	<i>Total points</i>
Safety	5		
Threats to boundaries	5		
Fuels and fire behavior	5		
Objectives	4		
Management organization	4		
Improvements	3		
Natural, cultural, social values	3		
Air quality values	3		
Logistics	3		
Political concerns	2		
Tactical operations	2		
Interagency coordination	1		

Total complexity points **e.**

f.
Complexity Rating (circle) **g.** L M H

Complexity Value Breakpoints: *Low* 40 - 90
Moderate 91 - 140
High 141 - 200

The Wildland and Prescribed Fire Complexity Analysis provides a method to assess the complexity of both wildland and prescribed fires. The analysis incorporates an assigned numeric rating complexity value for specific complexity elements that are weighted in their contribution to overall complexity. The weighted value is multiplied times the numeric rating value to provide a value for that item. Then all values are added to generate the total complexity value. Breakpoint values are provided for low, moderate, and high complexity values.

The complexity analysis worksheet is accompanied by a guide to numeric values for each complexity element shown, provided on the following pages.

Wildland Fire Implementation Plan - Stage II

Wildland and Prescribed Fire Complexity Rating Worksheet Numeric Rating Guide

COMPLEXITY ELEMENT	GUIDE TO NUMERIC RATING		
	1	3	5
Safety	Safety issues are easily identifiable and mitigated	<ul style="list-style-type: none"> • Number of significant issues have been identified • All safety hazards have been identified on the LCES worksheet and mitigated 	<ul style="list-style-type: none"> • SOF1 or SOF2 required • Complex safety issues exist
Threats to Boundaries	<ul style="list-style-type: none"> • Low threat to boundaries • POI<50% • Boundaries naturally defensible 	<ul style="list-style-type: none"> • Moderate threat to boundaries • 50<POI<70% • Moderate risk of slopover or spot fires • Boundaries need mitigation actions for support to strengthen fuel breaks, lines, etc. 	<ul style="list-style-type: none"> • High threat to boundaries • POI>70% • High risk of slopover or spot fires • Mitigation actions necessary to compensate for continuous fuels
Fuels/Fire Behavior	<ul style="list-style-type: none"> • Low variability in slope & aspect • Weather uniform and predictable • Surface fuels (grass, needles) only • Grass/shrub, or early seral forest communities • Short duration fire • No drought indicated 	<ul style="list-style-type: none"> • Moderate variability in slope & aspect • Weather variable but predictable • Ladder fuels and torching • Fuel types/loads variable • Dense, tall shrub or mid-seral forest communities • Moderate duration fire • Drought index indicates normal conditions to moderate drought; expected to worsen 	<ul style="list-style-type: none"> • High variability in slope & aspect • Weather variable and difficult to predict • Extreme fire behavior • Fuel types/loads highly variable • Late seral forest communities or long-return interval fire regimes • Altered fire regime, hazardous fuel /stand density conditions • Potentially long duration fire • Drought index indicates severe drought; expected to continue

Wildland Fire Implementation Plan - Stage II

COMPLEXITY ELEMENT	GUIDE TO NUMERIC RATING		
	1	3	5
Objectives	<ul style="list-style-type: none"> • Maintenance objectives • Prescriptions broad • Easily achieved objectives 	<ul style="list-style-type: none"> • Restoration objectives • Reduction of both live and dead fuels • Moderate to substantial changes in two or more strata of vegetation • Objectives judged to be moderately hard to achieve • Objectives may require moderately intense fire behavior 	<ul style="list-style-type: none"> • Restoration objectives in altered fuel situations • Precise treatment of fuels and multiple ecological objectives • Major change in the structure of 2 or more vegetative strata • Conflicts between objectives and constraints • Requires a high intensity fire or a combination of fire intensities that is difficult to achieve
Management Organization	<ul style="list-style-type: none"> • Span of control held to 3 • Single resource incident or project 	<ul style="list-style-type: none"> • Span of control held to 4 • Multiple resource incident or project • Short-term commitment of specialized resources 	<ul style="list-style-type: none"> • Span of control greater than 4 • Multiple branch, divisions or groups • Specialized resources needed to accomplish objectives • Organized management team (FUMT, IMT)
Improvements to be Protected	<ul style="list-style-type: none"> • No risk to people or property within or adjacent to fire 	<ul style="list-style-type: none"> • Several values to be protected • Mitigation through planning and/or preparations is adequate • May require some commitment of specialized resources 	<ul style="list-style-type: none"> • Numerous values and/or high values to be protected • Severe damage likely without significant commitment of specialized resources with appropriate skill levels
Natural, Cultural, and Social Values to be Protected	<ul style="list-style-type: none"> • No risk to natural, cultural, and/or social resources within or adjacent to fire 	<ul style="list-style-type: none"> • Several values to be protected • Mitigation through planning and/or preparations is adequate • May require some commitment of 	<ul style="list-style-type: none"> • Numerous values and/or high values to be protected • Severe damage likely without significant commitment of specialized resources

Wildland Fire Implementation Plan - Stage II

		specialized resources	with appropriate skill levels
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Wildland Fire Implementation Plan - Stage II

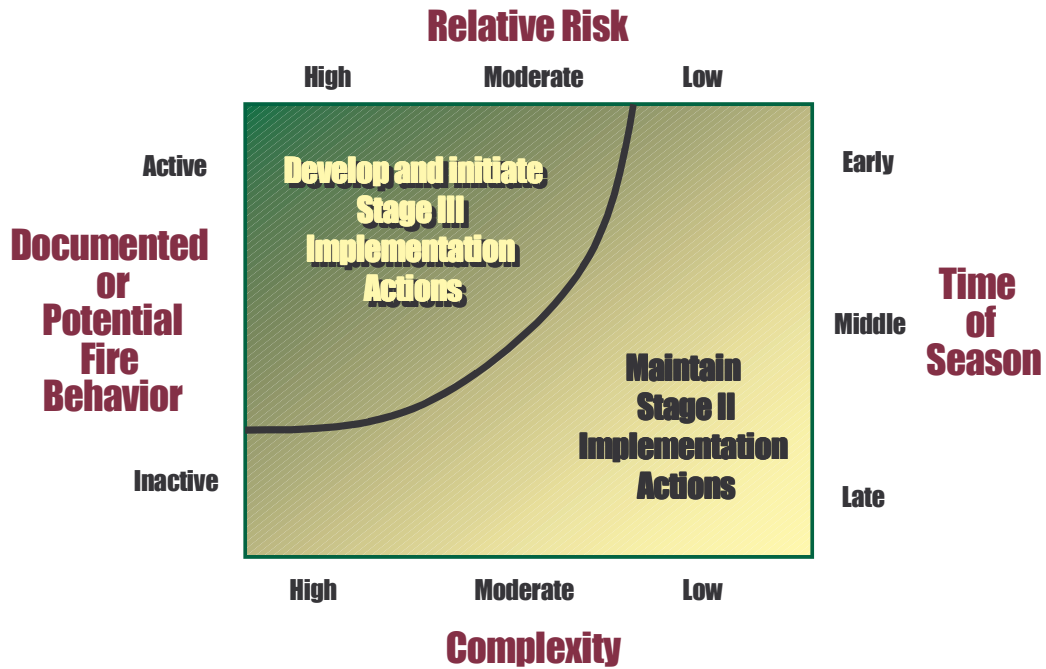
COMPLEXITY ELEMENT	GUIDE TO NUMERIC RATING		
	1	3	5
Air Quality Values to be Protected	<ul style="list-style-type: none"> • Few smoke sensitive areas near fire • Smoke produced for less than 1 burning period • Air quality agencies generally require only initial notification and/or permitting • No potential for scheduling conflicts with cooperators 	<ul style="list-style-type: none"> • Multiple smoke sensitive areas, but smoke impact mitigated in plan • Smoke produced for 2-4 burning periods • Daily burning bans are sometimes enacted during the burn season • Infrequent consultation with air quality agencies is needed • Low potential for scheduling conflicts with cooperators 	<ul style="list-style-type: none"> • Multiple smoke sensitive areas with complex mitigation actions required • Health or visibility complaints likely • Smoke produced for greater than 4 burning periods • Multi-day burning bans are often enacted during the burn season • Smoke sensitive class 1 airsheds • Violation of state and federal health standards possible • Frequent consultation with air quality agencies is needed • High potential for scheduling conflicts with cooperators
Logistics	<ul style="list-style-type: none"> • Easy access • Duration of fire support is less than 4 days 	<ul style="list-style-type: none"> • Difficult access • Duration of fire support between 4 and 10 days • Logistical position assigned • Anticipated difficulty in obtaining resources 	<ul style="list-style-type: none"> • No vehicle access • Duration of support is greater than 10 days • Multiple logistical positions assigned • Remote camps and support necessary
Political Concerns	<ul style="list-style-type: none"> • No impact on neighbors or visitors • No controversy • No media interest 	<ul style="list-style-type: none"> • Some impact on neighbors or visitors • Some controversy, but mitigated • Press release issued, but no media activity during operations 	<ul style="list-style-type: none"> • High impact on neighbors or visitors • High internal or external interest and concern • Media present during operations

Wildland Fire Implementation Plan - Stage II

COMPLEXITY ELEMENT	GUIDE TO NUMERIC RATING		
	1	3	5
Tactical Operations	<ul style="list-style-type: none"> • No ignition or simple ignition patterns • Single ignition method used • Holding requirements minimal 	<ul style="list-style-type: none"> • Multiple firing methods and/or sequences • Use of specialized ignition methods (i.e. terra-torch, Premo Mark III) • Resources required for up to one week • Holding actions to check, direct, or delay fire spread 	<ul style="list-style-type: none"> • Complex firing patterns highly dependent upon local conditions • Simultaneous use of multiple firing methods and/or sequences • Simultaneous ground and aerial ignition • Use of heli-torch • Resources required for over 1 week • Multiple mitigation actions at variable temporal and spatial points identified. Success of actions critical to accomplishment of objectives • Aerial support for mitigation actions desirable/necessary
Interagency Coordination	<ul style="list-style-type: none"> • Cooperators not involved in operations • No concerns 	<ul style="list-style-type: none"> • Simple joint-jurisdiction fires • Some competition for resources • Some concerns 	<ul style="list-style-type: none"> • Complex multi-jurisdictional fires • High competition for resources • High concerns

Stage III Need Assessment Chart

Stage III Need Assessment Chart



To obtain the need indication, connect the top and bottom variables with a single line and then connect the left and right variables with a single line. Where the line crosses indicates the need for WFIP Stage III. The appropriate need is read directly off the chart.

Wildland Fire Implementation Plan - Stage III

Stage III: Long-Term Implementation Actions

Attach Stage I and Stage II information. Update and/or revise Stage I and II as necessary.

Objectives and Risk Assessment Considerations

Natural and Cultural Resource
Objectives and Constraints/
Considerations

Maximum Manageable Area (MMA)

Acres in MMA:

Attach Map of MMA

Fire Projections, Weather, and Map

Projected Fire Area Under Expected Weather Conditions

For date:

Area:

Projected Fire Area Under Experienced Severe Weather
Conditions

For date:

Area:

Wildland Fire Implementation Plan - Stage III

Weather Season/Drought:
Discussion and Prognosis

Long-Term Risk Assessment and Map (if applicable)

Risk Assessment (Describe
techniques utilized and
outputs, include maps as
appropriate)

Probability of Success

Describe Probability of
Success

Wildland Fire Implementation Plan - Stage III

Threats

Threats to MMA

--

Threats to Public Use and
Firefighter Safety

--

Smoke Dispersion and Effects

--

Other

--

Monitoring Actions

Wildland Fire Implementation Plan - Stage III

Describe Monitoring Actions,
Frequency, Duration

Holding Actions

Describe Holding Actions,
Management Action Points
that initiate these actions, and
Key to Map if necessary

Resources Needed to Manage the Fire

Describe resources necessary
to accomplish ignition,
holding, and monitoring
actions

Estimated Costs of Managing the Fire

Describes costs in terms of
resources needed, projected
duration, etc.

Wildland Fire Implementation Plan - Stage III

Contingency Actions

Describe Contingency actions, management action points that initiate them, resources needed, etc.

Wildland Fire Implementation Plan - Stage III

Information Plan
Describe Information Plan,
Contacts, Responsibilities, etc.

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Post-burn Evaluation
Describe post-burn evaluation
procedures, resource
requirements, costs, duration,
etc.

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Signatures
Include signatures/titles/ dates
for preparing, approving, and
any concurring individuals

PERIODIC FIRE ASSESSMENT, INSTRUCTIONS

The Periodic Fire Assessment is a process to prevent the unchecked escalation of an individual fire situation or the total fire management situation without evaluation and adequate planning. Part 1 evaluates the capability to continue implementation of the appropriate management response to this fire for achieving resource benefits for a specified period following the assessment i.e., the next 24 hour period or longer, depending upon fire weather and fire behavior forecasts or other anticipated conditions. This assessment will be completed and periodically reviewed for validity. The "assessment frequency" box on page 1 specifies the frequency of assessing the particular fire. Assessment frequencies will be set by the local unit but are recommended to range from every day to every ten (10) days depending on the fuel type and geographic location of the fire. Recommendations for minimum assessment frequency include the following: Grass fuel types = daily; shrub and timber fuel types = every 1 – 5 days; Alaska = every 1 – 10 days.

The "valid date(s)" box is inclusive of those dates where the assessment remains valid, as indicated by the dated signature. When any decision elements change from "No" to "Yes", a new checklist must be completed for documentation purposes. A "Yes" response to any element on the Part 1 checklist indicates that the selected appropriate management response is not accomplishing or will not accomplish desired objectives and that a new strategic alternative should be developed immediately through the use of a Wildland Fire Situation Analysis (WFSA).

The Periodic Fire Assessment, Part 2 is a process that must be completed periodically for all wildland fires managed for resource benefits that do not have a completed WFIP Stage III. For isolated ignitions in fuel-limited situations, Part 2 does not have to be completed. When completing Part 2 of this checklist, if the chart indicates that WFIP Stage III is needed, it must be prepared within 24 hours.

When units establish monitoring and assessment frequency, it may be appropriate to develop a "step-up" system based on fire size or levels of fire activity. Then, as an individual fire gets larger or becomes more active, the monitoring and assessment frequency can correspondingly increase. Conversely, as fire activity lessens and fire size increases become less common, monitoring and assessment can "step-down" and become less frequent. Units must identify standards and rationale for establishing assessment frequency, especially "step-up" and "step-down" actions. If fire size is used as a determinant, then past burning rates should be used to formulate standards. If fire activity is used, then levels of burning (acres per day, etc.) must be definable and justifiable.

The Agency Administrator or delegated individual must sign the Signature Page on the specified assessment frequency.

PERIODIC FIRE ASSESSMENT
PART 1: RE-VALIDATION CHECKLIST

Decision Element

Is there a threat to life, property, or resources that cannot be mitigated?

Are potential effects on cultural and natural resources outside the range of acceptable effects?

Are relative risk indicators and/or risk assessment results unacceptable to the appropriate Agency Administrator?

Is there other proximate fire activity that limits or precludes successful management of this fire?

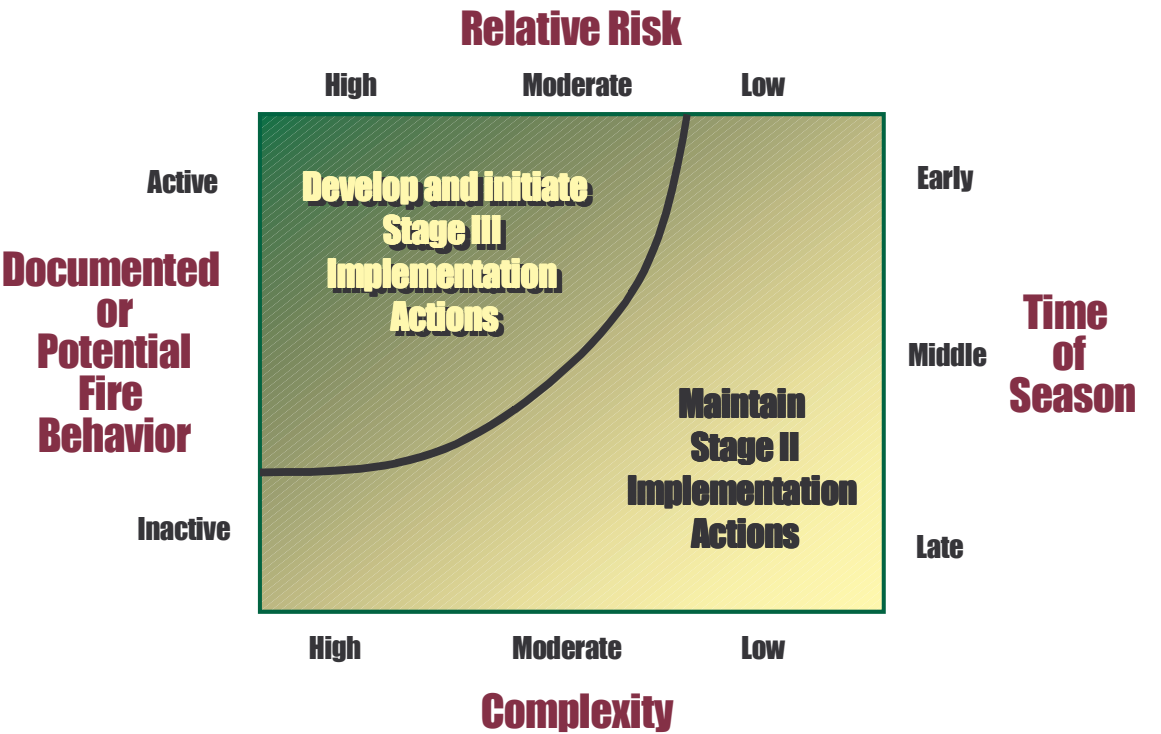
Are there other Agency Administrator issues that preclude wildland fire use?

Do expected management needs for this fire exceed known capabilities?

Yes	No

PERIODIC FIRE ASSESSMENT
PART 2: STAGE III NEED ASSESSMENT CHART

Stage III Need Assessment Chart



Periodic Fire Assessment

PERIODIC FIRE ASSESSMENT

SIGNATURE TABLE

[illegible]

