



# **Environmental Assessment**

## **Pictured Rocks National Lakeshore Wildland Fire Management Plan**



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## I. Abstract and Summary

The purpose of this environmental assessment is to consider the impacts of implementing various long- term fire and fuel management alternatives in Pictured Rocks National Lakeshore (hereinafter also called the lakeshore or Pictured Rocks). Each alternative presents a different path for the fire program. Alternatives A and C do not allow for use of prescribed fire, while alternative B addresses the lakeshore's goal of restoring and maintaining fire as a key ecosystem process while minimizing the threat to lives, property, cultural, and natural resources.

In addition to providing information required by law and the 2001 Federal Fire Policy, this environmental assessment will respond to the primary issues of concern that were raised during a series of internal and public scoping sessions.

This assessment analyzes three alternatives developed by an interdisciplinary planning team:

- Alternative A – No Action (Current Program)
- Alternative B – Allow Prescribed Fire
- Alternative C – No Prescribed Fire

After careful consideration of the three alternatives, the lakeshore is proposing a preferred alternative: **Alternative B – Allow Prescribed Fire**. This alternative balances lakeshore objectives with issues of concern, and is the environmentally preferred alternative. This alternative applies a range of fire management tools: wildland fire suppression (suppression of unwanted ignitions), prescribed fire (management ignited fires), and mechanical fuel reduction. Alternative B proposes levels of fire management activity that will result in meaningful restoration and maintenance of fire as a natural process in lakeshore ecosystems. Under the National Park Service (NPS) Organic Act and the General Authorities Act, as amended, the NPS may not allow the impairment of lakeshore resources and values except as authorized specifically by Congress (NPS 2001a). Impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of lakeshore resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Lakeshore managers have examined each potential impact of the preferred alternative and determined that the combination of actions provided for in this environmental assessment will not result in the impairment of any lakeshore resources and values.

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## II. INTRODUCTION

### Setting

Pictured Rocks National Lakeshore is in the north-central section of the Upper Peninsula of Michigan along the south shore of Lake Superior. The Hiawatha National Forest, Seney National Wildlife Refuge, Grand Island National Recreation Area, and numerous state forests and parks are located near the national lakeshore. Pictured Rocks National Lakeshore encompasses the 42 miles of Lake Superior shoreline between the communities of Munising and Grand Marais (see Figure 1, vicinity map).

The lakeshore is known for the multicolored sandstone cliffs that attain a height of almost 200 feet (the Pictured Rocks) along the lakeshore in the western portion of the lakeshore. The eastern portion of the lakeshore is dominated by the perched Grand Sable Dunes. The dunes have become a major lakeshore attraction, and are a rare occurrence in the Great Lakes region. The dunes support uncommon plant species as well as unique vegetation communities.

Numerous waterfalls cascade over the Pictured Rocks and an inland escarpment. Lake Superior and the inland lakes accommodate boating, fishing, swimming, and backcountry recreation. The lakeshore has a variety of cultural resources that depict the maritime, iron, logging, and Native American histories of the area.

Pictured Rocks National Lakeshore was established October 15, 1966, by Public Law (PL) 89-668 to “preserve for the benefit, inspiration, education, recreational use, and enjoyment of the public, a significant portion of the diminishing shoreline of the United States and its related geographic and scientific features.” The national lakeshore currently encompasses 73,235 acres.

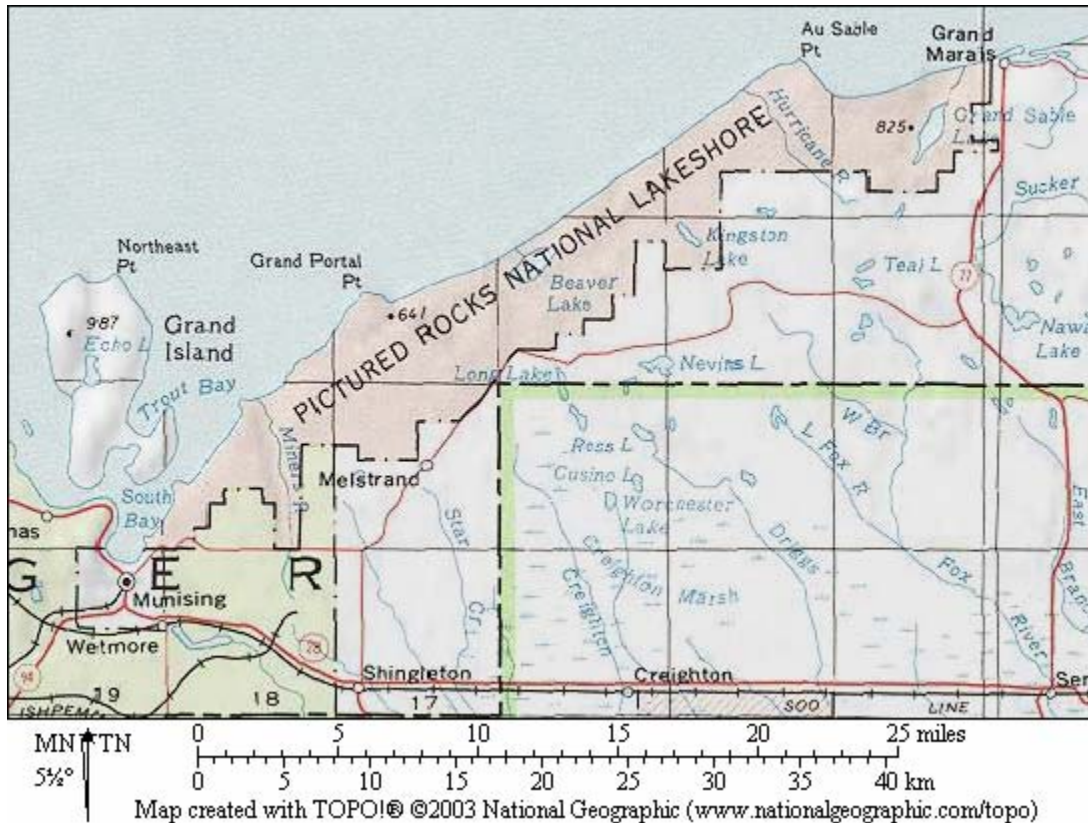
The enabling legislation established a shoreline zone and a separate inland buffer zone within the lakeshore. The shoreline zone (33,929 acres, all in federal ownership) is to be managed to preserve its scenery and outstanding natural features. The inland buffer zone (39,306 acres, a mixture of private and governmental ownership) was established to:

“...stabilize and protect the existing character and uses of the lands, waters, and other properties within such zone for the purpose of preserving the setting of the shoreline and lakes, protecting its watershed and streams, and providing for the fullest economic utilization of the renewable resources through sustained yield timber management and other resource management compatible with the purposes of this Act.”

The Forestland Group, Limited Liability Corporation, (17,500 acres) and the State of Michigan (13,912 acres) own most of the land in the inland buffer zone. The remaining land in the inland buffer zone is owned by private landowners (6,084 acres), or by the NPS (1,810 acres). Alger County, Burt Township, and the City of Munising maintain the authority to regulate land use on all private lands in the inland buffer zone.



**Figure 1, Vicinity map of Pictured Rocks National Lakeshore**



## Purpose and Need

As stated above, Pictured Rocks National Lakeshore was established October 15, 1966, by Public Law (PL) 89-668 to "... preserve for the benefit, inspiration, education, recreational use, and enjoyment of the public, a significant portion of the diminishing shoreline of the United States and its related geographic and scientific features."

The NPS Director's Order 18 (NPS 2003) requires that "All NPS units with vegetation that can sustain fire must have a Fire Management Plan." It further states that, "The overall resource management objectives for an NPS unit must guide Fire Management Plans. The resource management objectives will determine whether and how fire will be managed." To ensure that the protocols described in the Fire Management Plan (FMP) would address effects on natural and cultural resources, Director's Order 18 requires that the FMP be compliant with the National Environment Policy Act.

There are many acres of land within Pictured Rocks that are burnable and would benefit from periodic prescribed fires. Vegetation that can sustain fire includes mixed conifer and deciduous

forests, abandoned agricultural fields, bogs and wetlands. In addition, the use of prescribed fire as a resource management tool may play an important role in meeting vegetation management objectives, reducing or eliminating hazardous fuels, as well as a tool for controlling or managing invasive exotic species, and altering vegetation composition and structure.

It is the policy of the National Park Service to allow natural processes to occur to the extent practical while meeting the lakeshore management objectives. NPS Management Policies (NPS 2000a) state, "Wildland fire may contribute to or hinder the achievement of park management objectives. Therefore, park fire management programs will be designed to meet park resource management objectives while ensuring that firefighter and public safety are not compromised". Specific guidance on wildland fire is further outlined in DO-18, (NPS 2003) and attendant Reference Manual, RM-18, (NPS 2004) for the National Park Service, as well as "The Wildland and Prescribed Fire Management Policy: Implementation and Reference Guide" (NIFC 1998a).

The 2003 Pictured Rocks Resource Management Plan specifies, in part, one of its goals as:

“...Preserve or restore natural ecosystem processes and native species; ensure survival of threatened and endangered species through habitat protection and restoration by such means as prescribed fire.”

The Resource Management Plan anticipates the possibility of using prescribed fire as a tool for managing habitat for endangered species. This environmental assessment will also evaluate the use of fire for managing and maintaining the natural systems dependent on fire, whether they directly benefit a threatened or endangered species population or not. It will also consider the use of fire for hazard fuel reduction.

One of the main benefits of developing a new Fire Management Plan will be to bring Pictured Rocks into full compliance with all of the provisions of DO-18. Responding to direction provided by the documents mentioned above, the lakeshore's fire and fuels management program has six primary goals. These goals are programmatic in direction and are intended to provide safe and effective implementation of the fire management plan.

**Goal 1:** Make firefighter and public safety the highest priority of every fire management activity.

**Goal 2:** Suppress all wildfires regardless of ignition source to protect the public, private property, and natural and cultural resources of the lakeshore.

**Goal 3:** Manage wildland fires in concert with federal, state, and local air quality regulations.

**Goal 4:** Facilitate reciprocal fire management activities through the development and maintenance of cooperative agreements and working relationships with pertinent fire management entities.

**Goal 5:** Reduce wildland fire hazard around developed areas and areas adjacent to cultural and historic sites.

**Goal 6:** Use prescribed fire as a method of restoring and maintaining the cultural and natural landscape to meet resource objectives of the lakeshore.

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## **III. SCOPING AND IMPACT TOPICS**

### **Scoping**

The National Environmental Policy Act (NEPA) (83 Stat. 852, 42 U.S.C. 4321 *et seq.*, as amended) requires federal agencies to solicit input from potentially affected interests prior to making decisions on proposed actions that may affect the environment. An initial list of scoping issues for this environmental assessment was developed from input by national lakeshore staff and a U.S. Geological Survey research ecologist, and from the 2001 scoping process for the General Management Plan revision. This list was mailed to federal, state, local and tribal officials, cooperating fire agencies, and corporate and private inland buffer zone landowners with a letter requesting their input on issues that need to be addressed in the environmental assessment.

Based on the above scoping process, several general issues have been identified and will be addressed in the environmental assessment. These issues include:

- The potential to use prescribed fire for restoration of natural ecosystem processes and vegetation conditions, especially the fire-dependent jack and red pine forests.
- The potential threat of fire escaping to surrounding state, corporate and private lands.
- The effects of fire and fire suppression activities on rare plant communities and wildlife.
- Fire and suppression impacts on cultural, ethnographic, archeological, and historic resources.
- Potentially increased fuel loads resulting from logging in the inland buffer zone.
- Potential impacts to air quality from prescribed fire.

### **Impact Topics Included in this Environmental Assessment**

Impact topics allow comparison of the environmental consequences of implementing each alternative. Some impact topics are mandated for inclusion in an environmental assessment and others are derived from concerns expressed during the scoping process. A brief rationale for the inclusion of each impact topic is provided below.

#### **Soils and Topography**

The actions proposed in the alternatives may result in short-term disturbance of soils in areas where there are fire events. Erosion potential is considered low due to the relatively level topography and degree of vegetation cover. However, this issue will be addressed in this environmental assessment.

## **Water Resources**

National Park Service policies require protection of water resources consistent with the Federal Water Pollution Control Act (33 U.S.C. *et seq.* as amended by the Clean Water Act, P.L. 95-217). The quality of the water in inland lakes, rivers, and streams is directly related to the condition of the watersheds they drain. The headwaters of most of the rivers and creeks in the shoreline zone are either in the inland buffer zone or outside the lakeshore boundary. All rivers and streams in the lakeshore flow into Lake Superior, a prominent water resource in the lakeshore. Erosion-inducing activities in these areas can affect the quality of the national lakeshore's water bodies. These issues will be addressed in this environmental assessment.

## **Vegetation**

Implementation of the actions identified in the alternatives will result in changes in vegetation communities within the lakeshore. This topic will be analyzed in the environmental assessment.

## **Wildlife**

Implementation of the actions identified in the alternatives have the potential to affect wildlife directly, such as changes in behavior and mortality from the fire, and indirectly by altering the habitat. This topic will be analyzed in the environmental assessment.

## **Federal and State Protected Species**

The Endangered Species Act of 1973, as amended, (87 Stat. 884, 16 U.S.C 1531 *et seq.*) requires that federal agencies protect federally listed threatened and endangered species and their habitats. Potential impacts of all federal actions on these species must be disclosed. NPS management policies (NPS 2000a) also require assessment of impacts to certain state-listed rare, candidate, declining, and sensitive species. Nine plant species listed as threatened or endangered by the State of Michigan and one federally listed threatened plant species are present in the lakeshore. Habitat for four federally listed endangered wildlife species is also found within the lakeshore. Therefore, impacts on threatened and endangered species will be addressed in this environmental assessment.

## **Cultural Resources**

Section 106 of the National Historic Preservation Act, as amended in 1992 (80 Stat. 915, 16 U.S.C. 470 *et seq.*), and the NPS Cultural Resource Management Guidelines and Policies require the consideration of impacts on cultural resources listed, or eligible for listing, on the National Register of Historic Places. Over thirty archeological sites are known in the park and extensive surveys are yet to be completed. Two sites within the national lakeshore are listed on the

National Register: the Au Sable Light Station and the Schoolcraft Iron Furnace ruins. The former Sand Point Coast Guard Station, associated Smuck residence, and the former Grand Marais Coast Guard Station and quarters are included on the NPS List of Classified Structures and are being evaluated for National Register status. Since the alternatives in this environmental assessment consider strategies to use fire as a tool to restore the cultural landscape and to protect known cultural resources from adverse effects of fire, impacts to cultural resources will be analyzed.

### **Air Quality**

The Clean Air Act (69 Stat. 322, 42 U.S.C. 7401 et seq., as amended) stipulates that federal land managers have an affirmative responsibility to protect a park's air quality from pollution. Pictured Rocks is designated a Class II area under the Clean Air Act and meets national ambient air quality standards for specified pollutants. Air quality would be affected to various degrees by smoke and particulates generated by fire events within the national lakeshore. Therefore, direct, indirect, and cumulative air quality impacts are analyzed in this environmental assessment.

### **Visitor Use**

Providing for visitor use and enjoyment is a fundamental purpose of the National Park Service. Actions proposed in the alternatives could temporarily affect visitor access, safety, recreational opportunities, and the scenic character of the area. This topic will be included in the environmental assessment.

### **Wilderness Resources**

Although no designated wilderness has been established within the lakeshore, the Pictured Rocks National Lakeshore General Management Plan (GMP) includes a wilderness suitability study, as called for in the Wilderness Act of 1964 (78 Stat. 890, 16 U.S.C 1271-1136). The GMP preferred alternative proposes 11,739 acres in the Beaver Basin area of the shoreline zone for wilderness designation. Pending approval or disapproval by Congress, areas proposed for wilderness designation must be managed to retain their wilderness character. Fire suppression activities conducted within proposed wilderness must be consistent with the "minimum requirement" concept identified in NPS Director's Order 41, Wilderness Preservation and Management. Therefore, wilderness resources will be addressed as an impact topic.

### **Park Facilities and Operations**

Severe fires can directly and indirectly affect operations and threaten facilities at the lakeshore. Since the alternative actions proposed in this plan could affect staffing, emergency response, and operational efficiency during fire events, this topic will be included in the assessment.

## **Employee and Visitor Safety**

Fires can be hazardous, even life threatening, to humans. Current federal fire management policies emphasize that firefighter and public safety is the first priority; all FMP's must reflect this commitment (NIFC, 1998b). The environmental assessment will consider the impact of proposed alternatives on employee and visitor safety.

## **Impact Topics Considered but Dropped from Further Analysis**

Some impact topics that are commonly considered were not relevant to this planning process or will not be substantially affected by any of the alternatives. The reasons for dropping these topics from consideration follow.

### **Wetlands**

Executive Order 11990 ensures that the natural and beneficial values of wetlands will be preserved and enhanced. Although there are wetlands in the national lakeshore, the potential for fire in such areas is low. Since there is no indication that wetlands would be affected by the proposed alternatives, this topic is not included for analysis.

### **Environmental Justice**

Executive Order 12898 requires federal agencies to identify and address disproportionately high and adverse health effects on minority and low-income populations, and to ensure that federal programs do not discriminate on the basis of race, color, or national origin. Executive Order 13045 requires federal actions and policies to identify and address disproportionately adverse risks to the health and safety of children. None of the actions proposed in this plan would disproportionately affect minorities, children, or economically disadvantaged populations, so this topic is not being analyzed.

### **Prime or Unique Farmland**

There is no prime or unique farmland within the lakeshore boundaries. This issue will not be further discussed in this document.

### **Socioeconomics**

All of the existing associations and effects, both social and economic, on the region and communities will remain unchanged with the adopting any of the alternatives presented in this environmental assessment. The effects of adopting a new fire management plan at Pictured Rocks are not likely to have any effect on the socioeconomics of the region. This topic will not be discussed further in this document.

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## **IV. ALTERNATIVES**

The alternatives presented in this document were developed according to requirements of the National Environmental Policy Act (NEPA). The best available science and information was applied to describe the effects of the alternatives.

The alternatives presented are programmatic in nature, and not site specific, with the exception of the application of prescribed fire. Since virtually all of the vegetated lands within the lakeshore are potentially subject to the effects of naturally occurring fire, and since the exact locations where those events might occur are unknown, the alternatives and the analysis of effects found in Chapter VI apply to all vegetated parklands.

Land that can sustain fire at Pictured Rocks is covered with vegetation that consists of mixed conifer and deciduous forests, abandoned agricultural fields, bogs, and wetlands. The use of prescribed fire as a resource management tool may play an important role in meeting Pictured Rocks vegetation management objectives, reducing or eliminating hazardous fuels, and as a tool for controlling or managing invasive exotic species.

Prescribed fire use may positively contribute to the achievement of Pictured Rocks' resource management objectives. The proposed FMP will be designed around these objectives and the various management zones of the lakeshore. Specific guidance on wildland fire is further outlined in DO-18 (NPS 2003), and its attendant Reference Manual, RM-18, (NPS 2004) for the National Park Service, as well as "The Wildland and Prescribed Fire Management Policy: Implementation and Reference Guide" (NIFC 1998a).

With this in mind, three alternatives were considered.

### **Alternative A: No Action Alternative**

The fire management program would continue to operate in the absence of a current Fire Management Plan. All wildland fires would be suppressed. The new requirements and provisions under DO-18 would not be adopted.

The no action alternative would continue with the existing fire management program in the absence of an approved up-to-date fire management plan. No prescribed fires would be allowed. All hazard fuel reduction projects would be accomplished by mowing and brush hogs, hand clearing, and removal. Brush and slash piles would be cut and loaded onto trucks and hauled away. Herbicide treatments and mechanical removal of exotic plant species would continue on an as needed basis. Cultural resources would be identified prior to fire management program activities and impacts to these resources would be mitigated or minimized. Lakeshore personnel, cooperating agencies, and cooperating volunteer firefighters from surrounding communities,



would immediately suppress all wildfires. Fire fighting techniques, methods, and tactics used in the proposed wilderness areas would be limited to those outlined in DO-18 Chapter 9, exhibit 5, Minimum Impact Suppression Tactics (MIST) guidelines.

### **Alternative B: Preferred Alternative (environmentally preferred alternative)**

A new FMP would be developed under the guidance of DO-18, and prescribed fires would be allowed. All wildland fires would be suppressed. The new requirements and provisions under DO-18 would be adopted.

A new Fire Management Plan would be developed under the guidance of DO-18. It would modify current management activities to allow prescribed fires for hazard fuel reduction and forest restoration in two defined areas of upland mixed pine (see figure 2, potential pine restoration prescribed fire locations). The Miners Beach unit consists of 221 acres and the Twelvemile Beach unit consists of 739 acres. The majority of hazard fuel reduction projects would continue to be accomplished by hand cutting, mowing, brush hog, and removal. Herbicide treatments and mechanical removal of exotic plant species would continue on an as needed basis. Cultural resources would be identified prior to fire management program activities and impacts to these resources would be mitigated or minimized. All wildland fires would be immediately suppressed by lakeshore personnel, cooperating agencies, and cooperating volunteer firefighters from surrounding communities. Fire fighting techniques, methods, and tactics used in the proposed wilderness areas would be limited to those outlined in DO-18 Chapter 9, exhibit 5, Minimum Impact Suppression Tactics (MIST) Guidelines.

### **Alternative C**

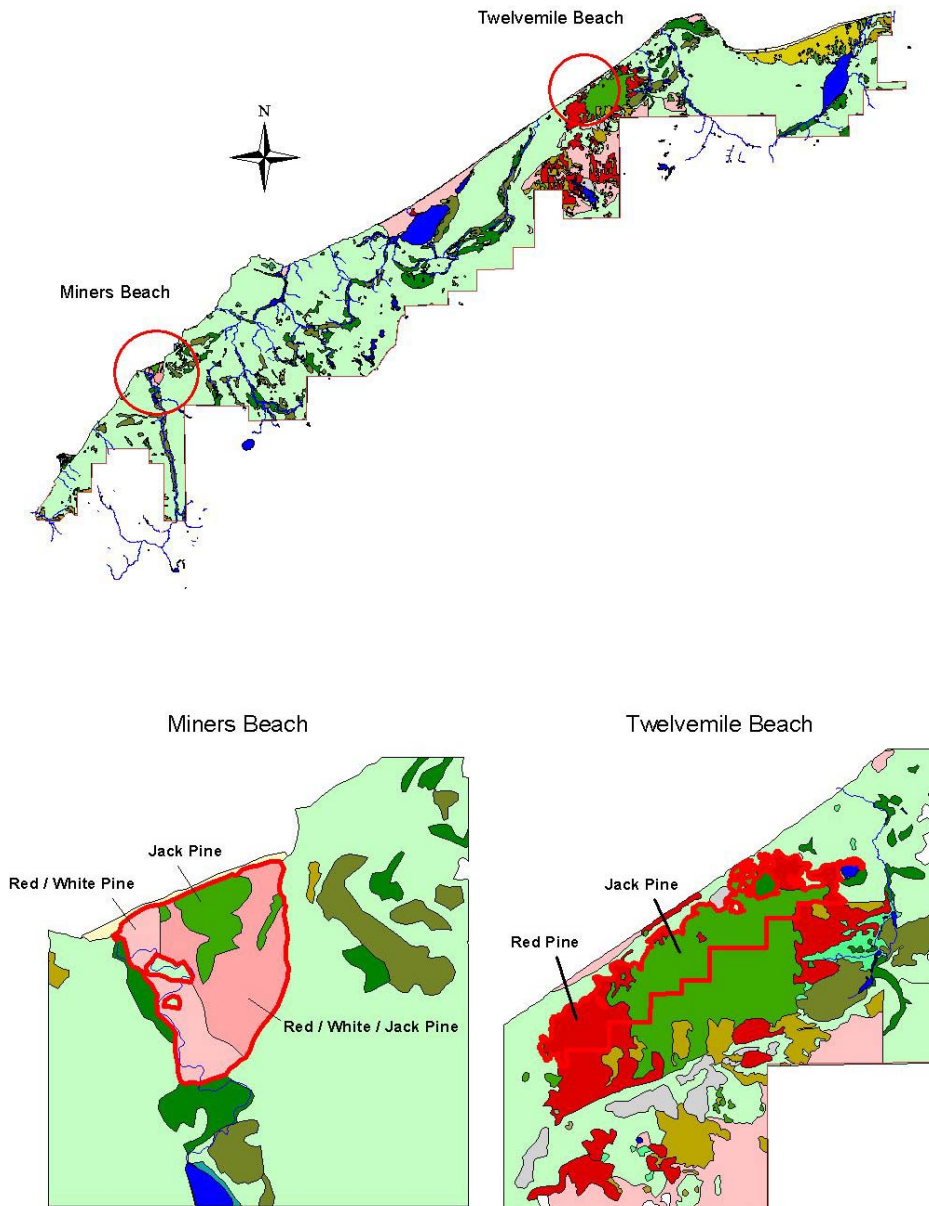
A new FMP would be developed under the guidance of DO-18. No prescribed fires would be allowed. All wildland fires would be suppressed. The new requirements and provisions under DO-18 would be adopted.

Alternative C would essentially continue with an almost identical fire management program as with the existing FMP. A new Fire Management Plan would formalize the current management activities and adopt DO-18 requirements and provisions. No prescribed fires would be allowed, and all hazard fuel reduction projects would be accomplished mowing, brush hog, hand cutting, and removal. All slash and brush piles would be cut and removed. Herbicide treatments and mechanical removal of exotic plant species would continue on an as needed basis. Cultural resources would be identified prior to fire management program activities and impacts to these resources would be mitigated or minimized. Lakeshore personnel, cooperating agencies, and cooperating volunteer firefighters from local communities, would immediately suppress all wildland fires. Fire fighting techniques, methods, and tactics used in the proposed wilderness areas would be limited to those outlined in DO-18 Chapter 9, exhibit 5, Minimum Impact Suppression Tactics (MIST) Guidelines.

## Alternatives considered and rejected

One alternative briefly considered but rejected included the wildland fire use: the use of naturally- ignited fires to accomplish resource management projects. The nature of wildland fires makes them unpredictable and particularly destructive. They routinely occur in areas that may not benefit from fire and, at Pictured Rocks, could affect valuable private property and buildings as well as NPS property. Pictured Rocks is a relatively small park and its backcountry is not remote. There are no completely inaccessible areas that could safely burn in an uncontrolled manner. Because of these safety, private property, and resource management considerations, the use of wildland fires as a resource management tool was not considered further.

**Figure 2, Potential Pine Restoration Prescribed Fire Locations**



## Elements Common to all Alternatives

Some of the important elements that are a part of all of the alternatives are continued visitor and employee safety considerations, and the continued the use of mechanical (cutting, chopping) removal of hazard fuel, especially around lakeshore buildings, visitor use areas, historic resources, vulnerable cultural sites, and maintenance areas. Resource managers will use herbicides and mechanical removal for exotic vegetation control. Cultural resources would be identified prior to fire management program activities and impacts to these resources would be mitigated or minimized as required in NPS-28 (NPS 1998). None of the three alternatives proposes wildland fire use to further resource management goals, and close cooperation with local and state fire officials will continue in wildland fire fighting with all alternatives. Fire fighting techniques, methods, and tactics used in the proposed wilderness areas will be limited to those outlined in DO-18 Chapter 9, exhibit 5, Minimum Impact Suppression Tactics (MIST) Guidelines.

## Comparison of Alternatives

Two major differences found in the three alternatives are the full adoption of the provisions of DO-18 and the use of prescribed fire for ecological restoration and reducing hazard fuel loads. These major differences and similarities among alternatives are outlined in Table 1.

**Table 1, Alternatives**

	Herbicide exotic vegetation control and hazard fuels management	Mechanical exotic vegetation control and hazard fuels management	Allow prescribed fire	Allow wildland fire use	Comply with new provisions of DO-18
Alternative A	Yes	Yes	No	No	No
Alternative B	Yes	Yes	Yes	No	Yes
Alternative C	Yes	Yes	No	No	Yes

## Mechanical Fuel Reduction Projects (all alternatives)

In some areas of the Lakeshore under all alternatives, fuels would be reduced through direct removal. Typically, this would entail cutting the excess fuel on the project site and removing it from the site for chipping and/or disposal. Some fuels may be chipped and left on site. Mechanical projects may include the removal of some live shrubs and smaller trees that would otherwise provide ladders for fire to move into larger tree canopies. Mechanical treatments would typically be used within 200 feet of structures, campgrounds, and day use areas and along Lakeshore boundaries to provide a fire-safe zone between developments and the surrounding wildlands. To maintain their effectiveness, mechanically treated areas that would serve as reduced fuel buffers would require re-treatment every 5-10 years in shrub and forest vegetation.

As part of planning for mechanical projects, individual sites would be assessed by qualified lakeshore staff for the presence of special status species and for significant cultural resources. Site specific recommendations for protection of sensitive resources would be incorporated into project planning and implementation, and the project would proceed if there were a determination of no adverse affect of special status species or on significant cultural resources.

Should “adverse effect” or “incidental take” of any threatened or endangered species be expected by implementation of site specific projects, supplemental environmental compliance would be pursued.

### **Wildfire Suppression (all alternatives)**

Wildfire suppression would occur under all alternatives. Suppression includes the full range of tactics that may range from aggressive initial attack to confinement of the fire. All suppression actions would follow Minimum Impact Suppression Tactics (MIST) and would be followed up with appropriate burned area emergency rehabilitation of firelines and other effects of the suppression action.

Expected sizes of suppression projects would be extremely small for the large majority of ignitions (<0.1 acre). When determining suppression tactics, collateral damage to lakeshore resources as a result of the proposed suppression action would be considered. Least cost or minimum acres would not be the sole determining factors in choosing tactics. Considering public and firefighter safety first, tactics selected would be those that create the least collateral damage.

Suppression actions are considered “emergency actions” under NEPA and are exempt from requirements prior to implementation. In these circumstances, issues of life safety for firefighters and the public take precedence over all other resource values (NPS Directors Order-12).

### **Prescribed Fire Projects (alternative B)**

Prescribed fire projects would be allowed only under Alternative B and range from 0.5 to 10 acres. Projects under Alternative B would attempt to simulate, to the extent feasible, the scale and pattern of natural fire events.

Individual project size would vary based on weather, fuel load, controllability factors, expected smoke production, and proximity to lakeshore boundaries, developments, and smoke sensitive areas. All projects that include fire would be managed in accordance with applicable laws and regulations.

As part of planning for prescribed fire projects, individual sites would be assessed by qualified lakeshore staff for the presence of special status species and for significant cultural resources. Site specific recommendations for protection of sensitive resources would be incorporated into project planning and implementation, and the project would proceed if there were a determination of no adverse affect of special status species or on significant cultural resources.

A prescribed fire plan would be written for every prescribed fire following policy in Reference Manual 18, Chapter 10. All prescribed fires will be performed by personnel meeting National Wildfire coordinating Group (NWCG) guidelines.

Should “adverse effect” or “incidental take” of any threatened or endangered species be expected by implementation of site specific projects, supplemental environmental compliance would be pursued.

## **Environmentally Preferred Alternative**

The environmentally preferred alternative is the alternative that will best promote the national environmental policy expressed in NEPA (Sec. 101 (b)). This includes alternatives that meet the following goals:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
- Ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.
- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.
- Preserve important historic, cultural, and natural aspects of our national heritage.
- Maintain, wherever possible, an environment that supports diversity and variety of individual choice.
- Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life’s amenities to enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The environmentally preferred alternative causes the least damage to the biological and physical environment and best protects, preserves, and enhances historic, cultural, and natural resources. In the NPS, the No Action alternative may also be considered in identifying the environmentally preferred alternative. All alternatives presented in this document, including the No Action alternative, meet all goals outlined in NEPA (Sec. 101 (b)). Generally, the difference in alternatives is measured in the degree to which each meets the goals.

All alternatives meet the first and second goals listed above equally well. The use of prescribed fire tends to reduce, but not eliminate, the use of herbicide and mechanical removal treatments, and its use tends to attain the widest range of beneficial uses of the environment without degradation. Therefore, using prescribed fire is preferable to not using prescribed fire in meeting the third goal of NEPA. In addition, by reducing the need to use herbicides, which tend to affect native species as well as exotic vegetation, the reintroduction of fire supports diversity and enhances the quality of renewable resources, objectives found in the fourth and fifth goals of NEPA (Sec. 101 (b)). Alternative B is the only alternative that allows the use of prescribed fire as a tool for resource management. Because of this, Alternative B is considered the environmentally preferred alternative. Alternative B is also the Pictured Rocks preferred alternative.

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## **V. AFFECTED ENVIRONMENT**

### **Soils and Topography**

Topography of the lakeshore is generally low relief but contains some dramatic variations. Along the western third of the national lakeshore, the gently rolling terrain is terminated in 200 foot bedrock cliffs adjacent to Lake Superior. The eastern two-thirds of the shoreline zone are characterized by sand beaches, low bluffs, and terraces. Cambrian and early Ordovician sandstones and limestones underlie the surface of the lakeshore at a shallow depth. Most of the surface is covered with debris associated with repeated glaciations during the Pleistocene. Exposed bedrock is most common adjacent to the Pictured Rocks cliffs and the drainages that penetrate them.

As with all soils, the soils of Pictured Rocks reflect the area's geologic background, topography, climate, and vegetation. The two dominant soil-forming elements are parent material and drainage conditions. At Pictured Rocks, soil types can be grouped together as follows: upland loams, plains sands, sandy loams and sands, upland stony loams and sands, lakeshore soils, swamp and wetland soils, and organic soils.

Most of these soils are fairly recent undeveloped soils, and none are considered deep or well suited for agricultural purposes. They are well suited for the northern hardwood/hemlock/white pine communities that occur naturally in the region. There is no prime farmland within Pictured Rocks.

### **Water Resources**

Lake Superior is the major water body in the area and forms the northern border of Pictured Rocks National Lakeshore. It is relatively shallow near the Pictured Rocks shoreline, and in recent times the lake level has varied on the order of several feet due to changes in precipitation and evaporation.

Prominent inland lakes include Grand Sable, Beaver, Little Beaver, Chapel, Little Chapel, Miners, Trappers, Legion, Kingston, and the Shoe Lakes. These lakes range in size from 762 acre Beaver Lake to 10 acre Miners Lake. Most of the inland lakes, with the exception of Grand Sable Lake and Chapel Lake, are quite shallow (3 to 6 m, 10 to 20 feet in depth), but have lengthy flow-through rate times. The intensive logging in the area and recurrent fires may have caused erosion and nutrient deposition in the lakes. These inland lakes vary considerably in their water chemistry, but many can be classified as productive, brown, alkaline water lakes.

The rivers and streams that flow to Lake Superior through Pictured Rocks are generally short and have relatively steep gradients. The steep gradient includes waterfalls that are popular with

visitors. Especially noticeable at many of the waterfalls is the brown color of the water due to humic acids that originate from the wetlands in the headwaters. The discharge (rate of flow) of the streams is highest in the late spring and early summer following snowmelt. In addition, these streams are very responsive to rainfall, and will rise immediately following a significant rain. The substrates of the streams are variously composed of cobble/gravel, sand, and bedrock. The substrate in depositional areas along the banks and upstream from beaver dams is mud/silt. Most pools are formed by the force of water flowing over trees that have fallen into the streams, but some are lateral scour pools that form in the bends of the streams. Cobble/gravel habitats are common and provide habitat for diverse benthic invertebrate populations.

The quality of water of the inland lakes, rivers, and streams is directly related to the watersheds they drain. The majority of the shoreline zone's rivers and creeks have headwaters that occur in the inland buffer zone and the surrounding region, and are of moderately good to good water quality.

Beaver activity is present on all but the smallest creeks. Their dam building is common in the wetland headwaters of the streams, but dam building occurs further downstream on the larger streams as well. Beaver ponds open the forest, adding a warmer, slower gradient, and finer substrate environment for aquatic life.

## Vegetation

The lakeshore is in a transitional area between climates that foster deciduous forest to the south and that support primarily conifer forests to the north. The moderate to well-drained upland sites are vegetated with northern hardwoods while the low-lying wetlands are characterized by boreal forests (see figure 3, vegetation types). Dominant species in the deciduous woodlands (about 80% of the national lakeshore) include American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), red maple (*A. rubrum*), yellow birch (*Betula allegheniensis*), eastern hemlock (*Tsuga canadensis*), and eastern white pine (*Pinus strobus*). On coarse outwash and coastal sands (about 10% of the national lakeshore), red pine (*P. resinosa*), white pine and jack pine (*P. banksiana*) are dominant. Successional stands within these soils contain considerable amounts of paper birch (*Betula papyrifera*) and trembling aspen (*Populus tremuloides*). Scattered small patches of wetter habitat occur on upland benches and in poorly drained topographic lows (about 10% of the national lakeshore). These contain boreal forest elements such as black spruce (*Picea mariana*), white spruce (*P. glauca*), northern white cedar (*Thuja occidentalis*), and tamarack (*Larix laricina*).

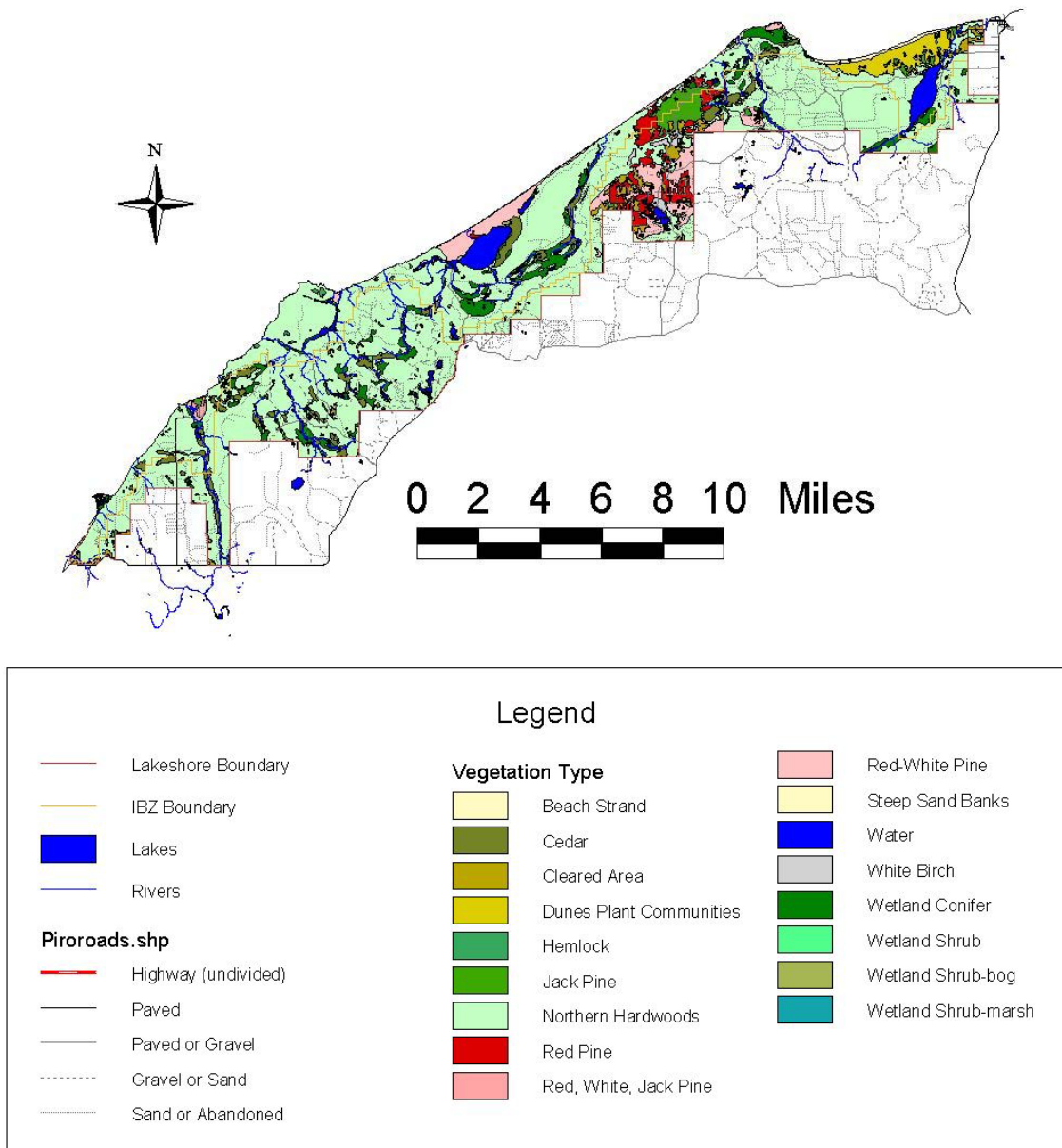
Bogs also occur within Pictured Rocks and are usually filled-in lakebeds with a sphagnum base. These bogs are dominated by distinctive bog vegetation including bog laurel (*Kalmia polifolia*), and cranberries (*Vaccinium macrocarpon*, *V. oxycoccos*). Several species of orchids are found throughout the bogs.

Forests of Pictured Rocks have undergone significant changes due to logging and to land clearing for agricultural purposes. Logging, exotic disease (e.g., Dutch elm disease), and repeated wildland fires have contributed to change. Cutting of pine began in the mid-1880's and continued into the early 1900's. Several fires in previously cut slash burned over some of the

pineland areas. It is assumed that the open "stump prairie" of the Kingston Plains, dominated by hairgrass (*Deschampsia flexuosa*), poverty oats grass, (*Danthonia spicatum*) and reindeer lichen (*Cladina rangiferina*), is a result of these large fire events.

Commercial logging is not currently allowed in the shoreline zone of Pictured Rocks. However, the lakeshore's enabling legislation provides for sustained yield timber management in the inland buffer zone. The State of Michigan, The Forestland Group, LLC, and private landowners regularly harvest substantial amounts of timber from their respective holdings within the inland buffer zone.

**Figure 3, Vegetation Types of Pictured Rocks National Lakeshore**





## Wildlife

The lakeshore supports many wildlife species. Black bear (*Ursus americanus*) and white-tailed deer (*Odocoileus virginianus*) are common and are the primary large game species for Upper Peninsula hunters. Hunting is allowed within the lakeshore boundaries. Other mammals found at Pictured Rocks include red fox (*Vulpes vulpes*), bobcat (*Lynx rufus*), mink (*Mustela vison*), porcupine (*Erethizon dorsatum*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), otter (*Lontra canadensis*), marten (*Martes americana*), fisher (*Martes pennanti*), skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), snowshoe hare (*Lepus americanus*), badger (*Taxidea taxus*), and eastern chipmunk (*Tamias striatus*). Moose (*Alces alces*) are uncommon in the Upper Peninsula due to the meningial worm transmitted from deer and are rarely seen in the lakeshore.

About 171 species of birds have been observed in the lakeshore. Common species include ruffed grouse (*Bonasa umbellus*), wading birds and waterfowl such as great blue heron (*Ardea herodias*), and several species of geese, ducks, mergansers, grebes, gulls and shorebirds. Common loons (*Gavia immer*) are frequent visitors, but are not known to nest within the lakeshore. Other common avian species include turkey vulture (*Cathartes aura*), several species of woodpeckers and sapsuckers, and a large variety of songbirds. Several species of raptors are found within the lakeshore. These species include bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), merlin (*Falco columbarius*), osprey (*Pandion haliaetus*), northern goshawk (*Accipiter gentilis*), northern harrier (*Circus cyaneus*), sharp-shinned hawk (*Accipiter striatus*), red-tailed hawk (*Buteo jamaicensis*), barred owl (*Strix varia*), and other hawk and owl species.

Only 21 reptile and amphibian species are known to exist within the lakeshore. Among species present are the state-listed wood turtle (*Clemmys insculpta*), American toad (*Bufo americanus*), spotted salamander (*Ambystoma maculatum*), spring peeper (*Hyla crucifer*), leopard frog (*Rana pipiens*), painted turtle (*Chrysemys picta*), snapping turtle (*Chelydra serpentina*), eastern garter snake (*Thamnophis sirtalis*), and northern water snake (*Nerodia sipedon*).

The waters of Pictured Rocks are relatively sterile and unproductive in terms of sustaining large biomasses of fish and associated communities. They do support populations of cool water game fish and trout, and can supply a limited amount of fish for angler consumption. Major cool water game species include smallmouth bass (*Micropterus dolomieu*), northern pike (*Esox lucius*), walleye (*Stizostedion vitreum*), yellow perch (*Perca flavescens*), and non-native smelt (*Osmerus mordax*). Typical trout species found in Pictured Rocks are brook trout (*Salvelinus fontinalis*), lake trout (*Salvelinus namaycush*), and non-native rainbow trout or "steelhead" (*Salmo gairdneri*). There are other non-game species such as various suckers, minnows, darters, sculpins, dace, and sunfish. About 53 species of fish are present in lakeshore waters, including the nearshore waters of Lake Superior.

An extensive description of the biotic and abiotic natural features associated with the area can be found in the national lakeshore's *Resource Management Plan* (NPS 2000b).

## Species of Concern

Habitat for four federally threatened species is found within the lakeshore boundary - gray wolf (*Canis lupus*), bald eagle, Pitcher's thistle (*Cirsium pitcheri*), and Canada lynx (*Lynx canadensis*) - and one endangered species, piping plover (*Charadrius melodus*). All species except Canada lynx have been documented in the national lakeshore. Previous consultation with the U.S. Fish and Wildlife Service has indicated that effects determination for these listed species and piping plover critical habitat would satisfy requirements of the Endangered Species Act of 1973, as amended, (87 Stat. 884, 16 U.S.C. 1531 *et seq.*).

Critical habitat for piping plover is designated for approximately 0.75 miles of Lake Superior beach within and adjacent to NPS-owned lands near Grand Marais (USFWS 2001). Pictured Rocks National Lakeshore owns approximately 200 feet of this beach. This segment of designated critical habitat provides specific habitat requirements for piping plover; the beach width is more than 20 feet, there is protective cover for nests and chicks, and the distance to the treeline is more than 165 feet. Additionally, all pets must be on a 6-foot leash and all terrain vehicle use is prohibited within the lakeshore.

Piping plover currently nest in the Grand Marais area, but have not nested on land owned by the lakeshore for more than 10 years. Piping plovers, however, are observed almost annually foraging on lakeshore-owned shoreline (Christie Deloria, USFWS, pers. comm.). A study (Nordstrom 1990) identified little suitable plover habitat in the lakeshore, except on the beach north of the Grand Marais Maritime Museum. The National Park Service cooperates with the U.S. Fish and Wildlife Service and Michigan Piping Plover Recovery Team in enforcement, education, and protection efforts.

The eastern half of the lakeshore contained a portion of the home range of one of the last known wolf packs in the Upper Peninsula before extirpation programs ended (Stebler 1944 and 1951). The Beaver Basin deer yard was an important winter hunting area in that home range, but the habitat declined in the 1960s and 1970s due to overbrowsing exacerbated by supplemental feeding (Robinson et. al. 1982, Jensen 1982). At this time, few if any deer winter in Beaver Basin, even though the cedar browse is returning. Daues (1991) reported seeing a wolf track in Beaver Basin, and in the years since wolf sightings and track or scat evidence in and near the national lakeshore are observed occasionally from spring to autumn. Tracking and telemetry by the Michigan DNR to date indicates wolves generally remain south of the lakeshore in winter, and the potential for a pair of wolves to reestablish a home range including the national lakeshore is unknown, due to habitat changes, current and proposed development, and recreational use. In 1997, a study was initiated to determine wolf habitat use and movements in the lakeshore area. Wolf use of the lakeshore was not observed, with the nearest monitored pack located in and near Seney National Wildlife Refuge. Because of the continued increase in wolf abundance in the Great Lakes region, the status of wolves was reduced to threatened by the U.S. Fish and Wildlife Service (USFWS 2003a). There were about 321 wolves in Michigan during winter 2002-2003.

There are three known active bald eagle nest territories in the lakeshore. Each nest territory contained young in 2003. One of these nests has been in continuous use since the late 1980s. Protection of these sites is a high priority, and fortunately all three are located in relatively

disturbance-free areas of the national lakeshore. One nest is just south of Beaver Lake, one at the southwest end of Grand Sable Lake, and one approximately 0.25 miles inland from Au Sable Point. Bowerman (1991) has conducted extensive studies of organochlorine toxin levels in eagles around the Great Lakes. Eagles in the lakeshore have undergone limited study. Bioaccumulation of these toxins is believed to have threatened survival of eagles nesting near Lake Superior, but bioaccumulation rates have been declining and the population is increasing to the point that it is being considered for delisting. Continued monitoring and protection of the territories is a resource management goal for the lakeshore.

The only U.S. population of federally threatened Pitcher's thistle on Lake Superior is in the Grand Sable Dunes of Pictured Rocks. Pitcher's thistle is a monocarpic perennial endemic to Great Lakes shorelines that requires both episodes of disturbance and periods of relative stability. Seedlings, established on bare sand, mature into rosettes that persist 5 to 10 years. Rosettes produce an adult flowering stalk that blooms, sets seed, and dies. A demographic study followed cohorts of thistle through their 5 to 10 year life cycles in varying geomorphic settings in the lakeshore (McEachern 1992). The lakeshore has implemented a strategy to contain invasive exotic plant species in the Grand Sable Dunes to protect Pitcher's thistle habitat. A recently funded Exotic Plant Management Team for the Great Lakes National Parks will continue this project. The lakeshore is seeking funding for a current Pitcher's thistle population assessment and to develop a management strategy in cooperation with the U.S. Fish and Wildlife Service's *Pitcher's Thistle Recovery Plan* (USFWS 2002).

Canada lynx are rare in Michigan. Lynx have not been documented at the lakeshore since its establishment in 1966. Historic records do not suggest lynx have been present in the lakeshore since at least 1940 (Beyer et. al. 2001). Lynx habitat is primarily dominated by coniferous forests that produce adequate numbers of snowshoe hares, includes mature forests needed for den sites, and includes a mixture of forest age classes dominated by early successional stands (Ruggiero et. al. 2000). In the Great Lakes area and the northeastern United States, lynx habitat is forest that is a mix of conifers and hardwoods. The lakeshore provides minimal habitat for lynx, with less than 10% of forest cover in mature coniferous forest types. The lakeshore also does not support a significant population of snowshoe hares.

Recent tracking surveys focusing on small mammals have not documented lynx within or adjacent to the lakeshore. The neighboring Hiawatha National Forest completed a two-year lynx study using hair snares in 2001-2002 with no positive occurrences (Kevin Doran, USFS Hiawatha NF, pers. comm.). One lynx was positively identified by the Michigan Department of Natural Resources in the eastern upper peninsula of Michigan in the fall of 2003 (Sherry MacKinnon, Michigan DNR, pers. comm.). This single occurrence was documented approximately 80 miles southeast of the lakeshore.

State-listed mammalian and avian species documented in the lakeshore include the moose, northern goshawk, red-shouldered hawk (*Buteo lineatus*), Cerulean warbler (*Dendroica cerulea*), least shrew (*Cryptotis parva*), common loon, merlin, peregrine falcon, and osprey. Table VI lists all state and federally listed species documented at Pictured Rocks.

**Table 2, Federal and State Species of Special Concern - Pictured Rocks National Lakeshore**

<i>Scientific Name</i>	Common Name	Federal Threatened	Federal Endangered	State Threatened	State Endangered	State Species of Concern
<i>Accipiter gentilis</i>	northern goshawk					X
<i>Alces alces</i>	moose					X
<i>Botrychium acuminatum</i>	acute-leaved moonwort				X	
<i>Botrychium campestre</i>	prairie moonwort, dunewort			X		
<i>Botrychium hesperium</i>	western moonwort			X		
<i>Botrychium mormo</i>	goblin moonwort			X		
<i>Buteo lineatus</i>	red-shouldered hawk			X		
<i>Callitriche hermaphroditica</i>	autumnal water-starwort					X
<i>Calypso bulbosa</i>	calypso or fairyslipper			X		
<i>Canis lupus</i>	gray wolf	X		X		
<i>Charadrius melodus</i>	piping plover		X		X	
<i>Clemmys insculpta</i>	wood turtle					X
<i>Cirsium pitcheri</i>	Pitcher's thistle	X		X		
<i>Crataegus douglasii</i>	Douglas hawthorn					X
<i>Cryptogramma stelleri</i>	slender cliff-break					X
<i>Cypripedium arietnum</i>	ram's head lady slipper					X
<i>Cryptotis parva</i>	cerulean warbler					X
<i>Dendroica cerulea</i>	least shrew			X		
<i>Elymus glaucus</i>	blue wild-rye					X
<i>Elymus mollis</i>	American dune wild rye					X
<i>Empetrum nigrum</i>	black crowberry			X		
<i>Falco columbarius</i>	merlin			X		
<i>Falco peregrinus</i>	peregrine falcon				X	
<i>Gavia immer</i>	common loon			X		
<i>Haliaeetus leucocephalus</i>	bald eagle	X		X		
<i>Listera auriculata</i>	auricled twayblade					X
<i>Myriophyllum alterniflorum</i>	alternate-leaved water-milfoil					X
<i>Myriophyllum farwellii</i>	Farwell's watermilfoil			X		
<i>Pandion haliaetus</i>	osprey			X		
<i>Pinguicula vulgaris</i>	butterwort					X
<i>Potamogeton confervoides</i>	alga pondweed					X
<i>Stellaria longipes</i>	stitchwort					X
<i>Tanacetum huronense</i>	Lake Huron tansy			X		
<i>Trumertropis huroniana</i>	Lake Huron locust			X		
<i>Trisetum spicatum</i>	downy oat-grass					X
<i>Vaccinium cespitosum</i>	dwarf bilberry			X		

## **Air Quality**

An assessment during the 1990's, based on lichen flora and elemental analysis, suggested that air quality in the vicinity of Pictured Rocks is generally good (Wetmore 1988). Although large-scale heavy industry is quite distant from the lakeshore, some long range/global atmospheric transport of pollutants to the Pictured Rocks area has been documented, and acid deposition in the central Upper Peninsula is a well-established phenomenon. However, no baseline information exists on any ambient air quality parameter within the boundaries of Pictured Rocks. There is an ozone monitoring station at Marquette, Michigan, 75 km (45 miles) to the west.

There are several small-scale sources of air pollution in the vicinity of the lakeshore. The most significant of these is the Kimberly-Clark Corp. paper mill within the city limits of Munising. Impacts of the emissions from this operation on lakeshore resources are generally unknown. In Alger and Luce Counties, the three Tier 1 source categories are Off Highway-Non Road Gasoline, 2-stroke Gasoline, and Open Burning-Forest and Wildfires. These counties are not listed on the Michigan Air Quality Priority 1 or priority 2 lists, and are not subject to any additional Michigan air quality regulations related to open burning.

## **Cultural and Archeological Resource Values**

### **Archeological Resources**

Various studies have examined and evaluated archeological resources in Pictured Rocks National Lakeshore. A survey of the lakeshore's shoreline zone and the mouths of its rivers, entitled "Final Report: An Archaeological Survey of the Pictured Rocks Lakeshore," was conducted under contract by Jeffrey P. Briggs of the University of Michigan in 1968. In 1979, NPS Denver Service Center personnel conducted an intensive archeological recovery effort centered on the Munising Falls area, where a parking area, comfort station, and visitor center were to be constructed.

During the 1980's and early 1990's, archeological surveys by NPS Midwest Archeological Center personnel concentrating on proposed construction sites and restoration efforts at the Au Sable Light Station. Bruce A. Jones (1993) published these surveys, as well as previous archeological work in the national lakeshore.

There are 38 recorded archeological sites in the national lakeshore; most of these are associated with Woodland and Archaic period seasonal habitation sites. Most of the known sites are near today's national lakeshore developed areas. Artifacts associated with the known sites include fire-cracked rock, bi-polar cores, chert and quartz flakes, grit-tempered shards, and other lithic scatter. Much of this material has been recovered at short-term hunting or fishing camps apparently used by Native Americans traveling up and down the lake. Sites are rarely found in the inland upland areas. Archeological resources in the proposed wilderness area are comprised of 15 state-registered pre-historic habitation, hunting camps, and historic camps associated with turn-of-the-century through 1970's use by local residents and loggers. The most notable logging

era resource still visible is the remnants of an early 1900's logging dam constructed at the mouth of Beaver Creek. Almost all of the known sites are subsurface.

Archeological and historic resources in the national lakeshore reflect all periods of human occupation from the early hunters and fishers to historic iron and timber industry operations and sailors. Archeological sites in the national lakeshore are primarily associated with early hunting and fishing camps. Historic sites are primarily related to the iron industry (furnace/smelter ruins and charcoal kilns), timber industry (logging railroads, roads, and camps), maritime industry (shipwrecks and coast guard structures), and small family farming operations.

### **Ethnographic Resources**

The Ojibway, also known as Ojibwa, Chippewa or Anishnabe, have cultural affiliation with the lands of Pictured Rocks. Although the lakeshore and its surrounding areas may have been visited or used occasionally by traveling parties, warriors, or refugees belonging to other ethnic groups, the area remained under Ojibway control until 1820, when the first land cession treaty was signed by leaders of the local bands and representatives of the U.S. Government.

Six Ojibway tribes may rightfully claim cultural affiliation with the lands in the lakeshore: the Sault Ste. Marie Tribe of Chippewa Indians, Michigan; the Bay Mills Community, Michigan; the Bad River Band of Lake Superior Chippewa, Wisconsin; the Red Cliff Band of Lake Superior Chippewa, Wisconsin; the Garden River Band, Ontario; and the Manitoulin Island Community of Ojibway, Ottawa, Ontario. There are at least five other Ojibway bands whose lands are on or near the north banks of the St. Mary's River and north shore of Lake Superior and have close ties with the Garden River and Sault Ste. Marie Ojibway. These are the Batchewana Band, Thessalon Band, Serpent Band, Sagamak Nishnaabek Band, and White Fish Lake Band. Lands within the boundaries of the lakeshore are believed to have been and continue to be of spiritual and religious significance to the Chippewa.

The Grand Sable Dunes were and continue to be considered a sacred place. A Euro-American visitor in 1835 reported finding an Indian burial/spirit house and a probable vision quest site on the dunes. Other areas in the lakeshore of interest to American Indians are Lake Superior, the Pictured Rocks, and high prominences such as Miners Castle. Portions of the forested areas are also important for the variety of game and plant species they offer. Former burial grounds are on Sand Point and at the end of City Limits Road in Munising.

The proposed wilderness area encompasses portions of a regional landscape identified as culturally important to several Native American groups. The waters of Little Beaver and Beaver Lakes and their environs are of special importance to the Ojibwa of the region. A report of Traditional Ojibway Resources in the Western Great Lakes (Zedeño et al. 2001), conducted by the University of Arizona at Tucson, discusses in detail the importance of the lakeshore landscape including that of the proposed wilderness area to the Ojibwa people. Additionally, high cliffs, rock promontories, creek mouths, and other natural features are also important to the Ojibwa cosmology.

## Historic Properties

The following two historic properties in the lakeshore are listed in the National Register of Historic Places; both encompass significant archeological components.

- Au Sable Light Station, listed on May 23, 1978, under National Register criteria A (for its association with events that have made a significant contribution to the broad patterns of American history) and C (for its significant architectural characteristics). It also contains an archeological site.
- Schoolcraft Furnace Site, listed on December 28, 1977, under national register criterion A. It also contains an archeological site.

The following two historic properties in the national lakeshore have been determined eligible for listing on the National Register of Historic Places:

- The Grand Marais Coast Guard Station, determined eligible for listing by the Michigan State Historic Preservation Officer (SHPO) on November 15, 1990, under criteria A and C.
- The Munising (Sand Point) Coast Guard Station, determined eligible for listing by the Michigan State Historic Preservation Officer on January 27, 1999, under criteria A and C.

The List of Classified Structures is a computerized, evaluated inventory of all historic and prehistoric structures having historical, architectural, or engineering significance. The following structures have been placed on the List of Classified Structures for the lakeshore:

- Munising (Sand Point) Life Saving Station
- Munising (Sand Pt) Life Saving Station Flag Pole
- Munising (Sand Pt) Life Saving Stat Sidewalk System
- Munising (Sand Pt) Life Saving Stat Perimeter Wall
- Munising (Sand Pt) Life Saving Station Oil House
- Munising Life Saving Stat Boathouse & Launchway
- Munising (Sand Point) Life Saving Station Dock
- Au Sable Head Keeper's Residence
- Au Sable Sidewalk System
- Au Sable Flagpole & Flagpole Pad
- Au Sable Lighthouse Tower
- Au Sable Double Keeper's Quarters
- Au Sable Metal Oil House
- Au Sable Brick Kerosene Shed
- Au Sable Brick Privy #1
- Au Sable Brick Privy #2
- Au Sable Fog Signal House
- Au Sable Boathouse
- Au Sable Seawall Ruin
- Au Sable Cistern
- Au Sable Garage
- Coast Guard Road

- Grand Marais USCG Lifeboat Station Dwelling
- Grand Marais USCG Station Quarters
- Grand Marais USCG Lifeboat Station Flag Signal Tower
- Grand Marais USCG Lifeboat Sidewalk System
- Grand Marais USCG Lifeboat Concrete Border Wall
- Grand Marais Harbor of Refuge
- Smuck Residence
- Smuck Garage
- Smuck Shed
- Schoolcraft Furnace Site
- Kiln Remains

Except for the blast furnace kilns and brick privies, most of the historic properties listed or eligible for listing on the National Register of Historic places are being actively used for interpretive, residential, administrative, or storage purposes. As a result, they (including the privies) exist in largely occupied settings, being maintained with mowed lawns and cleared areas. Hazard fuels surrounding these historic buildings and all other buildings in use are actively maintained in a fire safe condition at all times of the year. Maintenance is performed to NPS standards and damage to historic features as a result of maintenance is incidental and highly unlikely. The adoption of any of the alternatives in this environmental assessment would not affect the performance of these maintenance activities.

The historic blast furnace kilns exist as stone remnants and are not likely to be affected by low intensity surface fires. Although there are a few other abandoned buildings located in the proposed wilderness study area at Pictured Rocks, these are scheduled for removal. Only an uncontrollable catastrophic regional fire has the potential to damage any of the historic properties at Pictured Rocks. Because of this, historic properties at Pictured Rocks will not be discussed further in this environmental assessment.

### **Cultural Landscapes**

There are no cultural landscapes designated with the Lakeshore, but several landscapes will be evaluated as funding becomes available. These landscapes are associated with historic farmlands, a former U.S. Lighthouse Service lighthouse, and U.S. Coast Guard Life Saving Stations.

### **Visitor Use**

The Lake Superior shoreline is the focus of nearly all visitation to the lakeshore. The dramatic land-water interface is a draw to visitors not only for active forms of recreation, but also for more contemplative forms. This demand results in recreational pressure not found at nearby inland recreation sites.

Most visitors to the lakeshore come in two seasons, winter and summer. The late snowmelt in spring and limited all weather roadway access to the shoreline limits visitor access to much of



the lakeshore. Visitation begins to increase in late spring, and peaks in July and August, which account for approximately 50 percent of the lakeshore's total visitation. The fall colors attract visitors for a short time, but the unpredictable and often cold, rainy or snowy weather after Labor Day through November discourages high levels of visitors. However, backpacking, hunting, and fishing are important spring and fall activities in the lakeshore. The lakeshore's enabling legislation authorizes hunting on lakeshore lands in compliance with State of Michigan regulations.

While the majority of visitors are drive-through day users who limit their visit to automobile-accessible points of interest, hiking and backpacking are also very popular. The lakeshore has 111 miles of trails including 43 miles of the North Country National Scenic Trail traversing the entire length of the lakeshore, 46 miles of day use and backcountry trails, and 22 miles of ski trails. Thirteen backcountry campsites and eight group backcountry sites are available, in addition to three drive-in campgrounds

Many summer activities are water-related. Sand Point Beach (on Lake Superior) and Grand Sable Lake are commonly used by swimmers and provide for easy vehicle access. Most other shoreline access is by foot or boat. Recreational motor boaters are common along the length of the lakeshore in Lake Superior. Sea kayaking along the shore has rapidly grown in popularity since 1990. Fishing, boating, and canoeing on many of the lakeshore's inland lakes are also popular, primarily at Little Beaver, Beaver, and Grand Sable Lakes. The popularity of the Pictured Rocks backcountry is largely attributable to its proximity to Lake Superior. Mosquito and Chapel beaches are very popular backcountry and day use areas.

Winter activities at Pictured Rocks include snowmobiling, cross-country skiing, snowshoeing, and winter camping. Snowmobiling in the lakeshore is restricted to roadways and a single designated snowmobile route. Abundant snowfall and lake-induced mild temperatures make conditions ideal for these winter activities.

## **Wilderness Resources**

The wilderness area proposed in the lakeshore's General Management Plan consists of 11,739 acres in the Beaver Basin (see figure 4, wilderness map). The area is centered on 761-acre Beaver Lake. Although altered by logging in historic times, Beaver Basin represents a significant area that has returned to mostly natural conditions. There is some evidence of historic use as a corporate retreat in the Beaver Lake area, but the overall area exhibits a natural and pristine character.

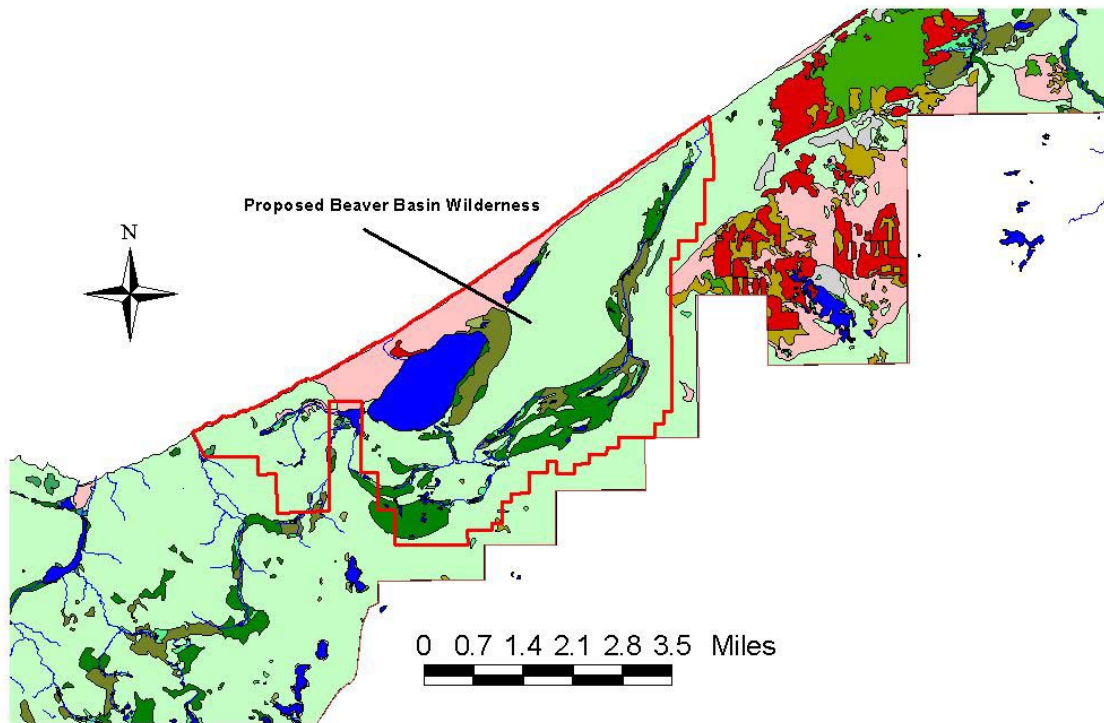
The Beaver Basin was formed in eroded sands by meltwater channeling to an outlet of ancient Lake Minong following a glacial ice sheet retreat circa 10,000 B.P. The basin opens to Lake Superior, which defines the area's northern boundary. Dissected uplands bound the Beaver Basin on the west, and a series of escarpments representing a face of the meltwater channel (the Beaver Basin escarpment) essentially define the northeast, east, and southern boundaries of the wilderness lands.

The dominant vegetative cover type of the study area is maple/beech with interspersed coniferous (spruce and fir) forest in wetter areas and pockets of white pine and hemlock on drier soils. Although logged during the first 60 years of the 1900's, in many areas the forest is regaining old-growth characteristics. The remainder of the forest is maturing and will likely become old growth. Non-native invasive plant species are not widespread, and efforts to control these species are underway.

The proposed wilderness area contains a network of maintained hiking trails emanating from the Little Beaver Lake and Beaver Basin overlook parking areas. About 23 miles of hiking trails are included in this area, including 9 miles of the North Country National Scenic Trail. Many of these trails were originally rough four-wheel drive logging access roads prior to the establishment of the lakeshore. These former two-tracks have largely grown in with native vegetation, presenting today the appearance of a trail. In addition, the area also includes 10 backcountry campgrounds, three of which are group campgrounds. A developed area adjacent to Little Beaver Lake includes a drive-in campground and backpacker parking area (20-vehicle capacity) providing a portal to this section of the lakeshore's backcountry.

Most recreation use of the area occurs from Memorial Day to Labor Day, consisting of overnight backpacking and day hiking. Fishing for trout in Lowney and Sevenmile Creeks is popular with anglers in the spring through fall. Fishing on Beaver Lake is popular throughout the year, especially during the spring and fall seasons. Motorized watercraft use (10-hp limit) is currently permitted on the interconnected Beaver and Little Beaver Lakes, but is proposed to be regulated to electric motors only. Non-maintained two-track (former logging) roads currently open to the public in the Sevenmile Creek area provides limited vehicular access combined with non-maintained trails to the to the mouth of the creek to fish for salmon and trout species. Hike-in fishing occurs infrequently on Trapper's Lake. Hunting for ruffed grouse, migratory waterfowl, white-tailed deer, and black bear occurs throughout the Beaver Basin as permitted by the lakeshore's enabling legislation.

**Figure 4, Proposed Wilderness at Pictured Rocks National Lakeshore**



## **Lakeshore Facilities and Operations**

Pictured Rocks National Lakeshore is administered by a superintendent with the assistance of five division chiefs. Because of the orientation of the lakeshore, operations are split between two districts, the east (Grand Marais) and west (Munising) districts. There are maintenance facilities, housing, and administrative offices in both districts.

NPS-owned facilities serving visitors and supporting management operations are centered in the Munising area in the west district and in the Grand Marais area in the east district of the national lakeshore. Visitor service facilities include four information centers (one of which is shared with the Forest Service in Munising), a museum, a maritime exhibit, and wayside exhibits. The National Park Service manages roads to and trails at principal attractions at Munising Falls, Miners Castle and Beach, AuSable Lightstation, and Sable Falls.

Three drive-in campgrounds are in the central core of the lakeshore, and a system of backcountry campgrounds is in place throughout the lakeshore. These campgrounds are connected by a system of trails including a segment of the North Country National Scenic Trail.

Except for the Munising maintenance facility, operations functions are housed in historic structures that are being adaptively used. Staff in the west district are housed in four separate locations (Sand Point, Munising Range Light, visitor information center, and the maintenance facility). Emergency response time is good throughout the national lakeshore in areas served by paved portions of County Road H-58. Because sand and gravel roads dictate slower speeds for safety reasons, the remainder of the national lakeshore has a somewhat slower emergency response time.

## **Employee and Visitor Safety**

Fire can be extremely hazardous and with all wildfires at Pictured Rocks employee and visitor safety have been given the highest priority. Employees responsible for fire management action never subordinate employee and visitor safety. Visitor and employee safety take the highest priority during fire suppression and monitoring activities. The superintendent may close all or a portion of the lakeshore (including roads and trails) when wildland fire poses a threat to public safety. The superintendent has the authority to close the lakeshore (or areas of the lakeshore) due to high fire danger.

All employees who work on fire related activities, and those who are on “standby” status for fire fighting activities are trained, tested, and “red carded” according to current national standards. 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 lakeshore provides the basis for developing contingency plans, contacts, and briefings that ensure public and personnel safety.

The lakeshore notifies visitors of all fire activity through existing communication channels. A fire activity report is updated as significant changes occur to inform the lakeshore personnel of current conditions and potential fire threat. Areas of fire activity are clearly noted with signs at visitor centers and lakeshore bulletin boards. Residents adjacent to the lakeshore are notified in advance by law enforcement personnel if fire poses a threat to burn outside the lakeshore's boundaries.

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## VI. ENVIRONMENTAL CONSEQUENCES

This section describes the environmental consequences and effects associated with the three alternatives. It is organized by Impact Topic, which distill the issues and concerns into distinct topics for discussion analysis. These topics focus on the presentation of cultural and environmental consequences, and allow a standardized comparison between alternatives based on the most relevant topics.

To the extent possible, the direct, indirect, short-term, long-term, beneficial and adverse impacts of each alternative are described for each resource. Cumulative impacts are discussed in the context of the definition given in 40 CFR 1508.7. Effects determination for species of concern meets requirements of the Endangered Species Act of 1973, as amended.

### Impairment Analysis

The *National Park Service Management Policies* (NPS 2000a) require analysis of potential effects to determine whether actions would impair the lakeshore resources or values. The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values and to prevent impairment of those resources. The enabling legislation, as amended, further mandates resource protection. National Park Service managers must always seek ways to avoid, or to minimize to the greatest degree practicable, actions that would adversely affect park resources and values (NPS Management Policies, 2000, Section 1.4 Park Management).

These laws give the National Park Service the management discretion to allow impacts to lakeshore resources and values when necessary and appropriate to fulfill the purposes of the lakeshore, so long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the National Park Service the management discretion to allow certain impacts within National Park Service units, that discretion is limited by the statutory requirement that the National Park Service must leave lakeshore resources and values unimpaired, unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of lakeshore resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any lakeshore resource or value may constitute an impairment. Impairment may result from National Park Service activities in managing the lakeshore, from visitor activities, or from activities undertaken by concessionaires, contractors, and others operating in the lakeshore. Impairment of lakeshore resources can also occur from activities occurring outside lakeshore boundaries. An impact would be more likely to constitute an impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore,
- Key to the natural or cultural integrity of the lakeshore or to opportunities for enjoyment of the lakeshore, or
- Identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents.

## **Cumulative Impacts**

The Council on Environmental Quality regulations, which implement NEPA, requires assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7). Cumulative impacts are considered for both the no-action and proposed action alternatives. Cumulative impacts were determined by combining the impacts of action alternatives with potential other past, present, and reasonably foreseeable future actions.

## **Intensity, Duration, and Type of Impact**

Evaluation of alternatives takes into account whether the impacts would be negligible, minor, moderate, or major. Minor is barely detectable, moderate is clearly detectable, and major is a substantial alteration of current conditions. Duration of impacts is evaluated based on the short-term or long-term nature of the effects of the alternative and associated changes on existing conditions. Type of impact refers to the beneficial or adverse consequences of implementing a given alternative. More exact interpretations of intensity, duration, and type of impact are given for each resource area examined. Professional judgment is used to reach reasonable conclusions as to the intensity and duration of potential impacts.

## **Soils and Topography**

### **Methodology**

The analysis is focused on the protection of the soils and topographic resources within the boundaries of the lakeshore during the implementation of on the ground actions described in the proposed Fire Management Plan and the alternatives, as well as the effects following those on the ground activities. The NPS based this impact analysis and conclusions on the review of existing literature and lakeshore studies, information provided by experts within the NPS and other agencies, and professional judgments.

Topographical features are extremely important to the lakeshore, but are not likely to be affected in any manner by fire or proposed management activities related to fire. Because of this, no further discussion of the effects of fire, or the management activities associated with fire, on topographic features will be discussed in this document. The further discussion of the effects of fire and proposed management activities associated with fire on topography and soils will be limited to soils.

In addition to damage by the indirect affect of fire and heat during a fire, the soils of Pictured Rocks may be physically or otherwise directly affected in three distinct fire management operations under the three alternatives.

- Activities to remove hazard fuels.
- Prescribed fire activities.
- Activities to contain and extinguish wildfires
- Direct impacts of fire.

The impact thresholds used for describing the effects on soils and topography by implementing the proposed FMP and the alternatives are as follows:

Negligible Soils would not be affected or the effects to soils would be below or at the lower levels of detection. Any effects to soil productivity or fertility would be slight and no long-term effects to soils would occur.

Minor The effects to soils would be detectable. Effects to soil productivity or fertility would be small, as would the area affected. If mitigation were needed to offset adverse effects, it would be relatively simple to implement and would likely be successful.

Moderate The effect on soil productivity or fertility would be readily apparent, likely long-term, and result in a change to the soil character over a relatively wide area. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.

Major The effect on soil productivity or fertility would be readily apparent, long-term, and substantially change the character of the soils over a large area in and out of the lakeshore. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.

Impairment A major, adverse impact to a resource or value whose conservation is: (1) necessary to fulfill specific purposes identified in the enabling legislation of Pictured Rocks, (2) key to the natural or cultural integrity of the lakeshore, or (3) identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents.

Duration Short-term - recovers in less than three years. Long-term - takes more than three years to recover.

## **Impacts Common to All Alternatives**

Pictured Rocks would continue to remove hazard fuel by hand and mechanical means, especially in those areas where there are important cultural resources, recreational facilities, or buildings. Generally, these activities occur during the spring and fall when additional workers are available to assist in this heavily labor-intensive work. This practical timing tends to limit the actual impact to soils, which are more vulnerable to damage or compaction if they are wet. Some measurable damage to soils may occur when fuels removal work occurs in or near wet areas, such as near a lake or pond. However, hazard fuels tend to grow and accumulate in dryer areas or become hazardous during dry periods, so there is little potential for damage to soils during removal activities.

Mechanical thinning has the potential to compact soil through the use of equipment. Minor and localized soil compaction could result from thinning activities. However, mechanical treatments are expected to be of short duration, and off-road vehicle use is generally avoided when possible, which minimizes compaction. Other specific hazard fuel reduction activities that are potentially damaging to soils include hand chopping and cutting, dragging brush and timber, and vehicular churning.

All wildland fires would be suppressed under all alternatives. Low intensity fires are typical in this area and damage to soils is usually either minor or negligible. High intensity wildfires can cause soil sterility or cause soils to become hydrophobic. Such fires would only occur under severe droughts. The removal of hazard fuels further limits soil damage by limiting fuel availability and, therefore, a fire's intensity and duration. Such a limited intensity fire can benefit the soils by returning nutrients, in the form of ash, back to the soil. Following large severe fires, the vegetative community may be dramatically changed, opening large tracts of mostly denuded soil. However, the natural revegetation process, beginning with the rapid emergence of grasses and forbs, is expected to limit the possibility of sheet flow and rill erosion within weeks following a large fire. Given the low likelihood of high intensity wildfires, such erosion potential is expected to be of very short duration and localized.

Damage to soil as a result of wildland fire fighting usually results from cutting firelines, either by hand or with machines (bulldozers) and by vehicular compaction and churning. Fireline construction would result in soil disturbance and could lead to increased erosion, especially in steeply sloped areas within the lakeshore. To avoid these potential impacts, firelines would be located outside of highly erosive areas, steep slopes, and other sensitive areas when possible. Following fire suppression activities, rehabilitation of disturbed sites would occur as quickly as possible. Firelines would be re-contoured, and water bars constructed if necessary.

Hand cutting firelines tends to be less damaging than mechanical means because the line is usually cut (or rather scraped) only to the "mineral soil." Mechanically cut firelines can be established relatively quickly, but tend to be less discriminate, sometimes digging deeply into mineral soils. Mechanically cut firelines will be avoided unless human safety or important resources are in danger.



Throughout Pictured Rocks, only the Minimum Impact Suppression Tactics (MIST) prescribed in DO-18, Chapter 9, would be utilized. These include the use of procedures, tools, and equipment having the least impact on the environment. These may include using water as a fire fighting tool or in establishing “wet lines,” using a “cold trail” line, allowing a fire to burn to a natural or manmade barrier, use of a gunnysack or “swatter,” and hand cutting firelines to the minimum width and depth.

Mechanical means of fire fighting in the proposed wilderness area would be held to a minimum, such as using chainsaws for cutting only dangerous snags or other hazards to firefighters, using natural breaks in topography for firebreaks, or using natural openings for helicopter landing areas. A complete list of approved wilderness fire fighting activities can be found in DO-18, Chapter 9.

There have been adverse soil impacts (soil erosion) from past timber practices, road building, and agriculture, as well as past wildland fires and suppression efforts. However, the additional impacts to soils as a result of the adoption of any alternative are expected to be very small and inconsequential in terms of cumulative effects.

### **Alternative A (No Action)**

Alternative A leaves the current FMP in place unchanged.

With Alternative A, the impacts to soils and topography are expected to be minor and of short-term duration. With the use of MIST techniques, negative impacts to soils within the wilderness areas are expected to be negligible to minor and of short-term duration. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore, key to the natural or cultural integrity of the lakeshore or to opportunities for enjoyment of the lakeshore, or identified as a goal in the lakeshore’s general management plan or other relevant NPS planning documents. This alternative will not impair lakeshore soils and topographic resources, but would not be in compliance with new provisions of DO-18.

### **Alternative B (Allow Prescribed Fire/Preferred Alternative)**

Alternative B maintains much of the current resource management actions related to hazard fuel management and wildland fire. However, this alternative includes the possibility of the use of prescribed fire. The two areas within the lakeshore that prescribed fire may be used are the Miners area in the west region of the lakeshore of about 221 acres, and the Twelvemile Beach area on the eastern half of the lakeshore of about 739 acres (see figure 2, page 12, fire management units map). Each contain a fairly well defined area consisting of upland mixed pine, and may benefit from prescribed fire in the future.

One benefit to soils of prescribed fire is the return of nutrients in the form of ash. The fertilizing effects of ash can provide an important source of nutrients for emerging vegetation in the area of the prescribed fire. In addition to increasing nitrification of the soils, raising pH, and increasing minerals and salt amounts in the soil, the ash and charcoal residue resulting from incomplete combustion aids in soil buildup and soil enrichment by being added as organic matter to the soil profile. The added material works in combination with dead and dying root systems to make the soil more porous, better able to retain water, and less compact while increasing needed sites and surface areas for essential microorganisms, mycorrhiza, and roots (Vogl, 1979).

Activities associated with the preparation of prescribed fire would generally avoid soil disturbance. Prescribed fire boundaries would take advantage of natural and existing human barriers. In areas where this is not possible, fuels loads would be mechanically reduced or “wet-lines” would be used. The planning process would allow for the identification of fragile resources, such as wet soils or archeological sites.

The impacts to soils and topography for Alternative B is expected to be minor and of short-term duration. With the use of MIST techniques, negative impacts to soils within the wilderness areas is expected to be negligible to minor and of short-term duration. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore, key to the natural or cultural integrity of the lakeshore or to opportunities for enjoyment of the lakeshore, or identified as a goal in the lakeshore’s general management plan or other relevant National Park Service planning documents. This alternative will not impair lakeshore soils and topographic resources, and would be in compliance with the provisions of DO-18.

### **Alternative C (No Prescribed Fire)**

Alternative C maintains much of the current resource management actions related to hazard fuel management and wildland fire.

The impacts to soils and topography for Alternative C are expected to be minor and short-term duration. With the use of MIST techniques, negative impacts to soils within the wilderness areas is expected to be negligible to minor and of short-term duration. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore, key to the natural or cultural integrity of the lakeshore or to opportunities for enjoyment of the lakeshore, or identified as a goal in the lakeshore’s general management plan or other relevant National Park Service planning documents. This alternative will not impair lakeshore soils and topographic resources, and would be in compliance with the provisions of DO-18.

## Water Resources

### Methodology

The analysis is focused on the protection of the water resources within the boundaries of the lakeshore during the implementation of on the ground actions described in the proposed Fire Management Plan and the alternatives, as well as the effects following those on the ground activities. The NPS based this impact analysis and conclusions on the review of existing literature and lakeshore studies, information provided by experts within the National Park Service and other agencies, and professional judgments.

The groundwater resources of the national lakeshore are a very important resource to Pictured Rocks and the surrounding communities. However, there is virtually no possibility that any fire or fire related management activities of the lakeshore or fires will have any effect on these critical aquifers, and will not be discussed further in this section. Only surface water resources will be discussed in the alternatives analysis section below.

The impact thresholds used for describing the effects on water resources by implementing the proposed FMP and the alternatives follows:

<u>Negligible</u>	Water quality would not be affected or changes would be either non-detectable or, if detected, would have effects that would be considered slight, local, and short-term.
<u>Minor</u>	Changes in water quality or hydrology would be measurable, although the changes would be small, likely short-term, and the effects would be localized. No mitigation measure associated with water quality or hydrology would be necessary.
<u>Moderate</u>	Changes in water quality or hydrology would be measurable and long-term, but would be relatively local. Mitigation measures associated with water quality or hydrology would be necessary and the measures would likely succeed.
<u>Major</u>	Changes in water quality or hydrology would be readily measurable, would have substantial consequences, and would be noticed on a regional scale. Mitigation measures would be necessary and their success would not be guaranteed.
<u>Impairment</u>	A major, adverse impact to the water quality that would directly affect a resource whose conservation is: (1) necessary to fulfill specific purposes identified in the enabling legislation of Pictured Rocks National Lakeshore, (2) key to the natural or cultural integrity of the lakeshore, or (3) identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents.

Duration      Short-term - following treatment, recovery will take less than one year. Long-term - following treatment, recovery will take longer than one year.

### **Impacts Common to All Alternatives**

A large portion of the impact to surface water from fire management activities is closely related to the condition of the soils at the conclusion of the activity. Soils that are denuded, either by intense fire or by building firelines, have the potential to damage water quality by runoff erosion and siltation. Disturbance by heavy vehicle tires, which breaks up the soil surface thus making soil particles easy to move, creates a similar runoff erosion problem. Although the potential for erosion and siltation diminishes with time, it can take up to several months for new vegetation to replace the removed vegetation, depending on the intensity of the fire or the depth of the mechanical soil disturbance.

Potential exists for negatively affecting surface water (and to a much smaller degree, subsurface water) from chemical pollution through the inadvertent application of fire retardant or slurry during fire fighting activities or spilling at mixing and loading areas. Another potential problem is spilling petroleum products and fuels during hazard fuel reduction activities or wildland fire fighting. Although this kind of pollution is routinely considered and controlled at normal fueling stations during routine operations, it can be easily forgotten or ignored during the tension and excitement associated with wildland fire fighting activities.

Wildfires will be suppressed. Consequently, fire-fighting activities with the potential to impact soils and thus water resources include building firelines, operating machinery, mechanical thinning, use of fire retardants and foams during suppression activities, thinning, and fireline construction. These activities can result in an increase in soil erosion due to vegetation removal and exposure of mineral soil. Soil runoff following fire can lead to a temporary increase in turbidity and sedimentation in rivers as soil washes into water bodies following rains. Soil loss is most likely in steeply sloped areas or in areas such as river bottoms, which are subject to flooding.

Fire retardants and foams used in fire fighting have the potential to pollute water systems. Use of retardants and foam require lakeshore Superintendent approval on a case-by-case basis. When approved, the following guidelines apply to aerially-applied retardant and different types of foam suppressant use:

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

Foam (aerial delivery):

- Foam concentrate will only be injected into the holding tank after the water pick-up operation has been completed.
- Drops from 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.
- No application within 50 feet 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 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.

Hazard fuels management would continue to be accomplished by hand cutting, mowing, brush hog, and removal. In the wilderness areas, hazard fuel reduction projects in areas around designated camping areas and trails would be accomplished without motorized equipment. Herbicide treatments and mechanical removal of exotic plant species would also continue on an as needed basis.

Mitigation measures employed during fire management activities to minimize impacts to soil, described in the previous section, would help to protect water resources. Other measures such as no fireline construction in the floodplain and wetlands and no fire retardant use within or immediately adjacent to water resources would also be employed.

Following large severe fires, the vegetative community may be dramatically changed, opening large tracts of mostly denuded soil. However, the natural revegetation process, beginning with the rapid emergence of grasses and forbs, is expected to limit the possibility of sheet flow and rill erosion within weeks following a large fire.

Water quality and quantity found at Pictured Rocks of has probably been altered by past logging, agriculture, and road building adjacent to and within the lakeshore. Upstream human activities, past and present, within watershed have also likely affected the water within the lakeshore. Hazard fuel removal, forest thinning, prescribed fire, wildland fires, and wildland fire suppression activities would have minor impacts on surface waters. Impacts from adopting any of the following alternatives are expected to be small and short-lived, and are largely inconsequential in terms of cumulative effects.

### **Alternative A (No Action)**

Alternative A leaves the current FMP in place unchanged.

The effects on surface water quality under Alternative A are expected to be negligible to minor, and of short duration. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore, key to the natural or cultural integrity of the lakeshore or to opportunities for enjoyment of the lakeshore, or identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents. This alternative will not impair lakeshore water resources, but would not be in compliance with the provisions of DO-18.

### **Alternative B (Allow Prescribed Fire/Preferred Alternative)**

Alternative B maintains much of the current resource management actions related to hazard fuel management and wildland fire. The biggest on the ground change in managing fire under the proposed new FMP would be the possible introduction of prescribed fires in the relatively small portions of the lakeshore in the Miners area in the west region of the lakeshore, and the Twelvemile Beach area in the east region of the lakeshore. In the majority of the lakeshore, mechanical removal of hazard fuels would continue. The new FMP would adopt all of the requirements and provisions of DO-18.

Preparation activities for prescribed fires have the potential to damage soils and increase the potential for runoff events and thus for impacting surface water. Any potentially soil-disturbing activity may accelerate runoff in the event of heavy rain, and efforts will be made to limit soil-disturbing activities. Firelines will utilize natural terrain (ridge tops, rock outcrops, streams, lakes) and manmade (roads, previous firelines) as fire boundaries where possible, limiting the area disturbed by cut firelines. "Wet-lines" will be used where practical. Impacts to water resources on the lakeshore from prescribed fire would be minor and transitory, because fires will not be of a size and intensity to seriously affect these resources.

In areas where prescribed fire is used for hazard fuel reduction, the intensity of the fire is expected to be quite low and not typically intense enough to completely remove or denude large areas. Prescribed fires can and do produce a somewhat mosaic of burned and unburned areas, where the intensity of the fire has not destroyed larger brushy species or trees. Sprouting of brushy species and rapid regrowth of grass species in prescribed burn areas should limit sheet and rill erosion.

The effects on surface water quality under Alternative B are expected to be negligible to minor and of short duration. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore, key to the natural or cultural integrity of the lakeshore or to opportunities for enjoyment of the lakeshore, or identified as a goal in the lakeshore's general management plan or other relevant National Park Service

planning documents. This alternative will not impair lakeshore water resources, and would be in compliance with the provisions of DO-18.

### **Alternative C (No Prescribed Fire)**

Alternative C maintains much of the current resource management actions related to hazard fuel management and wildland fire.

The effects on surface water quality under Alternative C are expected to be negligible to minor, and of short duration. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore, key to the natural or cultural integrity of the lakeshore or to opportunities for enjoyment of the lakeshore, or identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents. This alternative will not impair lakeshore water resources, and would be in compliance with the provisions of DO-18.

## **Vegetation**

### **Methodology**

The analysis is focused on the protection of the vegetative resources within the boundaries of the lakeshore during the implementation of on the ground actions described in the proposed Fire Management Plan and the alternatives, as well as the effects following those on the ground activities. The NPS based this impact analysis and conclusions on the review of existing literature and lakeshore studies, information provided by experts within the National Park Service and other agencies, and professional judgments.

The impact thresholds used for describing the effects on vegetation by implementing the proposed FMP and the alternatives are as follows:

- |                   |   |
|-------------------|---|
| <u>Negligible</u> | No vegetation would be affected or changes would be below levels of detection.  |
| <u>Minor</u>      | The alternative would cause small changes in plant community. Plant community composition and structure would be within the historic range of variability. There would be little invasion of exotic plants.         |
| <u>Moderate</u>   | The alternative would cause moderate changes in plant community. Plant community composition and structure would be within historic range of variability. There would be noticeable increase in exotic plants.      |
| <u>Major</u>      | The alternative would cause large changes in plant communities. Plant community composition and structure would be outside the historic range of variability. There would be substantial increase in exotic plants. |

Impairment The impacts to the lakeshore's vegetation resources are affected to the extent that: (1) opportunities for using the lakeshore resources or enjoying the lakeshore are significantly diminished, or the vegetation resources are affected to the point of permanent or near permanent variance with the specific purposes identified in the enabling legislation of Pictured Rocks National Lakeshore, (2) key to the natural or cultural integrity of the lakeshore, or (3) identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents.

Duration Short-term - recovery or condition improvement in less than five years. Long-term - takes more than five years to recover or improve.

### **Impacts Common to All Alternatives**

Fire fighting activities such as off-road vehicle use and fireline construction could inadvertently damage or destroy individuals or communities of plants. Areas of known susceptible populations near fire fighting activities will be identified by lakeshore staff and avoided by suppression crews if possible.

Hazard fuels management would continue to be accomplished by hand cutting, mowing, brush hog, and removal. In the wilderness areas, hazard fuel reduction projects in areas around designated camping areas and trails would be accomplished without motorized equipment.

Suppression activities that result in soil disturbance (firelines) tend to make those areas more susceptible to noxious weed infestation. If large areas of soil disturbance occur during suppression activities, they will be seeded with native grasses and forbs to promote the establishment of native species and limit establishment of noxious weeds. Herbicide treatments and mechanical removal of exotic plant species would continue on an as needed basis.

As with any natural forested system, there is a small chance that a catastrophic fire may occur during some future extended hot and dry period. Such a fire would occur in spite of the adoption of any alternative, and not because of it, and would therefore not constitute an effect of the proposed action.

### **Alternative A (No Action)**

Alternative A leaves the current FMP in place unchanged.

With full fire suppression native fire-adapted and fire-dependant plant species, such as Jack pine and red pine found in the in the Miners area and Twelvemile Beach area, may be supplanted by species not dependent on natural fires for regeneration. Although these species are somewhat long lived and tend to dominate an area once established, without the occasional fire necessary for regeneration these species may be out-competed by other species on these sites.



The duration of the effects of Alternative A is expected to range from short-term (less than five years) with the reestablishment of native vegetation in burned areas or areas disturbed by hazard fuel reduction and fire fighting activities, to long-term (greater than five years) as a result of complete fire suppression in areas of native fire dependent/fire adapted species, where the plants are eventually replaced by non-fire adapted species. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant NPS planning documents. This alternative will not impair lakeshore vegetation resources, but would not be in compliance with the provisions of DO-18.

### **Alternative B (Allow Prescribed Fire/Preferred Alternative)**

Alternative B maintains much of the current resource management actions related to hazard fuel management and wildland fire. All wildfires would continue to be suppressed. The major difference in vegetation resource management operations would be the opportunity to use prescribed fire for hazard fuel reduction and vegetation regeneration in the Miners area and Twelvemile Beach area. The new FMP would adopt all of the requirements and provisions of DO-18.

The Miners and Twelvemile Beach areas are characterized by an upland mixed pine vegetation type, and are dominated by three pine species: red pine, white pine, and Jack pine. The red and jack pines, in particular, are dependent on recurring fire to ensure their natural regeneration. The natural fire frequency to assure regeneration of red pine is estimated to be between 100 and 200 years (Bergeron and Brisson 1990), so the immediate application of fire in red pine areas may not be necessary. Jack pine in the Lake States has natural fire frequency of less than 50 years (Heinselman 1973, Carroll and Bliss 1982), indicating prescribed fire may be required to mimic the natural fire regime. Loope (1991) indicated that isolated pockets of pine, such as the Jack pine near Miners Beach, have on average not burned for 87 years. However, sites visits by the Great Lakes fire ecologist have indicated that the areas are not in jeopardy of converting to other vegetation types in the near future, and do not have a hazardous build up of fuels (KellyAnn Gorman, pers. comm). The areas should be monitored to determine future management direction.

Pictured Rocks staff believes that future prescribed fire use in the above mentioned areas may be beneficial to pineland vegetation and useful for hazard fuel reduction. At the same time, fuel management, using both mechanical means and prescribed fire, can reduce the risk of wildland fires to the cultural and historic resources and NPS infrastructure at Pictured Rocks. Generally, however, in the absence of widespread wildland or prescribed fires, very few short-term or long-term effects on vegetation would be evident in the majority of the lakeshore

The duration of the effects of this alternative is expected to range from short-term (less than five years) with the reestablishment of native vegetation in burned areas or areas disturbed by hazard fuel reduction activities or fire fighting. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in

the lakeshore's general management plan or other relevant NSP planning documents. This alternative will not impair lakeshore vegetation resources, and would be in compliance with the provisions of DO-18.

### **Alternative C (No Prescribed Fire)**

Alternative C maintains much of the current resource management actions related to hazard fuel management and wildland fire.

With full fire suppression native fire-adapted and fire-dependant plant species, such as jack pine and red pine found in the in the Miners area and Twelvemile Beach area, may be supplanted by species not dependent on natural fires for regeneration. Although these species are somewhat long lived and tend to dominate an area once established, without the occasional fire necessary for regeneration these species may be out-competed by other species on these sites.

The duration of the effects of Alternative C is expected to range from short-term (less than five years) with the reestablishment of native vegetation in burned areas or areas disturbed by hazard fuel reduction and fire fighting activities, to long-term (greater than five years) as a result of complete fire suppression in areas of native fire dependent/fire adapted species, where the plants are eventually replaced by non-fire adapted species. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant NPS planning documents. This alternative will not impair lakeshore vegetation resources, and would be in compliance with the provisions of DO-18.

## **Wildlife**

### **Methodology**

The analysis is focused on the protection of the wildlife resources within the boundaries of the lakeshore during the implementation of on the ground actions described in the proposed Fire Management Plan and the alternatives, as well as the effects following those on the ground activities. The NPS based this impact analysis and conclusions on the review of existing literature and lakeshore studies, information provided by experts within the National Park Service and other agencies, and professional judgments.

The impact thresholds used for describing the effects on wildlife by implementing the proposed FMP and the alternatives follows:

Negligible Wildlife would not be affected or the effects would be at or below the level of detection, would be short-term, and the changes would be so slight that they would not be of any measurable or perceptible consequence to the wildlife species' population.

<u>Minor</u>	Effects to wildlife would be detectable, although the effects would be localized, and would be small and of little consequence to the species population. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
<u>Moderate</u>	Effects to wildlife would be readily detectable, long-term and localized, with consequences at the population level. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
<u>Major</u>	Effects to wildlife would be obvious, long-term, and would have substantial consequences to wildlife populations in the region. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.
<u>Impairment</u>	A major, adverse impact to wildlife values or habitat whose conservation is: (1) necessary to fulfill specific purposes identified in the enabling legislation of Pictured Rocks National Lakeshore, (2) key to the natural or cultural integrity of the lakeshore, or (3) identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents.
<u>Duration</u>	Short-term - recovers in less than three years. Long-term - takes more than three years to recover.

### **Impacts Common to All Alternatives**

Hazard fuels management would continue to be accomplished by hand cutting, mowing, brush hog, and removal. In the wilderness areas, hazard fuel reduction projects in areas around designated camping areas and trails would be accomplished without motorized equipment. Herbicide treatments and mechanical removal of exotic plant species would also continue on an as needed basis.

Most terrestrial wildlife can and will simply escape from the immediate area of a fire without harm during a wildland fire event. A small number of animals, especially the less mobile species such as salamanders, turtles, and ground dwelling insects, or those that are nesting on or near the ground, may be subject to direct mortality from wildland fires and to a smaller extent from fire suppression activities. Most wildland fires in and around Pictured Rocks tend to be slow moving and very limited in area, making escape easy and typical for wildlife. Overall, any direct mortality would be inconsequential in terms of the viability of wildlife populations. Fires also tend to provide a pulse of readily available nutrients for plant growth, as well as temporarily improving the quality of that growth for wildlife including more nutrients and protein and less lignin and crude fiber (Hunter, 1990).

All wildland fires would be aggressively extinguished, further limiting the area of hazard to wildlife. Many wildlife species tend to vacate an area where human activity is occurring, and fire-fighting activities are no exception. In addition, the expected use of mechanical methods for hazard fuel reduction would cause a relatively negligible amount of direct mortality to wildlife.

The health of the fisheries in the lakeshore is directly related to the quality of the water in which they live. Water quality could be and temporarily degraded during and following a fire, directly affecting the fish that live in the water. Soils that are denuded, either by intense fire or by building firelines, have the potential to damage water quality by runoff erosion and siltation. Disturbance by heavy vehicle tires, which breaks up the soil surface thus making soil particles easy to move, creates a similar runoff erosion problem. Although the potential for erosion and siltation diminishes with time as new vegetation replaces that vegetation removed, this can take up to several months depending on the intensity of the fire or the depth of the mechanical soil disturbance.

Wildland firefighters at Pictured Rocks will utilize Minimum Impact Suppression Tactics (MIST), which are designed to minimize environmental impact. It includes the use of minimum impact techniques that lessen impact to soils such as allowing a fire to burn to a natural barrier, using cold trail lines, and using wet-lines instead of constructed lines. Using these techniques will be less damaging to the soils and will result in less runoff into surface water.

Another potential for negatively affecting surface water and the associated fisheries, is chemical pollution through the inadvertent application of fire retardant or slurry during fire fighting activities or spilling at mixing and loading areas. Short-term toxicity tests have showed that both fire retardant and foam suppressant chemicals are toxic to some aquatic organisms, including algae, aquatic invertebrates, and fish (Hamilton, et al., 1996). The primary toxin in retardants is ammonia, while in foam suppressants it is the surfactant.

Because of this toxicity to aquatic species, no aerial retardant or foam drops from fixed-wing aircraft will be made within 400 feet of open water or within 200 feet of open water from rotary wing aircraft. No drops of water from Scoopers, heavy air tankers, or heavy helicopters, within 400 feet of open water will be made. Ground applications of foam or retardant, when using small pumps, will not be made within 25 feet of open water or within 50 feet of open water when using Mk III or equivalent pumps. When using backpack pumps, foam or retardant will not be applied within 10 feet of open water.

Potential exists for soil and surface water pollution from spilling petroleum products, fuels, and foam concentrate during hazard fuel reduction activities or wildland fire fighting. Although this kind of pollution is routinely considered and controlled at normal fueling stations during routine operations, it can be easily forgotten or ignored during the tension and excitement associated with wildland fire fighting activities. All refueling and retardant/foam stations will be operated with care and in an organized manner to limit spills. All foam concentrate used for injection will be located in impermeable containment basins such as visqueen (plastic sheet) spread over rocks or logs to form a catch basin. A separate, uncontaminated container must be used to transport water from source to backpack pumps. This container must be kept uncontaminated by concentrate.

Suppression of natural fire regimes within the region of the lakeshore, along with agricultural practices, timber harvest, and past development on lakeshore and adjacent private and public lands, have led to altered wildlife habitat. Mechanical hazard fuel removal and fire suppression may result in minor, short-term disturbance and displacement of wildlife but minimal overall loss

of wildlife habitat. Pressure on wildlife habitat off the lakeshore will likely continue, making lakeshore lands a potential refuge for some species. The adoption of any alternative is expected to be inconsequential in terms of the overall population of wildlife species or habitat and will have no cumulative effects.

### **Alternative A (No Action)**

Alternative A leaves the current FMP in place unchanged.

By complying with procedures presented in impacts common to all alternatives for wildlife, firefighters can avoid adverse effects on the lakeshore's soils and aquatic ecosystems. Impacts to wildlife within the lakeshore are expected to be negligible to minor and be of short duration. The effects of adopting Alternative A will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant NPS planning documents. This alternative will not impair lakeshore wildlife resources, but would not be in compliance with the provisions of DO-18.

### **Alternative B (Allow Prescribed Fire/Preferred Alternative)**

Alternative B maintains much of the current resource management actions related to hazard fuel management and wildland fire. All wildfires would continue to be suppressed. The major difference in resource management operations would be the opportunity to use prescribed fire for hazard fuel reduction and vegetation regeneration in the Miners area and Twelvemile Beach area. The new FMP would adopt all of the requirements and provisions of DO-18.

By complying with procedures presented in impacts common to all alternatives for wildlife, firefighters can avoid adverse effects on the lakeshore's soils and aquatic ecosystems. Impacts to wildlife within the lakeshore are expected to be negligible to minor and be of short duration. The effects of adopting Alternative B will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant NPS planning documents. This alternative will not impair lakeshore wildlife resources, and would be in compliance with the provisions of DO-18.

### **Alternative C (No Prescribed Fire)**

Alternative C maintains much of the current resource management actions related to hazard fuel management and wildland fire.

By complying with procedures presented in impacts common to all alternatives for wildlife, firefighters can avoid adverse effects on the lakeshore's soils and aquatic ecosystems. Impacts to wildlife within the lakeshore are expected to be negligible to minor and be of short duration. The effects of adopting Alternative C will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or

other relevant NPS planning documents. This alternative will not impair lakeshore wildlife resources, and would be in compliance with the provisions of DO-18.

## **Species of Concern (Rare, Threatened and Endangered species)**

### **Methodology**

The analysis is focused on the protection of the species of concern within the boundaries of the lakeshore during the implementation of on the ground actions described in the proposed Fire Management Plan and the alternatives, as well as the effects following those on the ground activities. The NPS based impact analysis and conclusions on review of existing literature and lakeshore studies, information provided by experts within the National Park Service and other agencies, and professional judgments.

The impact thresholds used for describing the effects, adhering to NEPA standards, on species of concern by implementing the proposed FMP and the alternative follows.

Negligible An action that would not affect any individuals of a sensitive species or their habitat within Pictured Rocks National Lakeshore.

Minor An action that would affect a few individuals of sensitive species or have very localized impacts upon their habitat within Pictured Rocks National Lakeshore. The change would require considerable scientific effort to measure and have barely perceptible consequences to the species or habitat function.

Moderate An action that would cause measurable effects on: (1) a relatively moderate number of individuals within a sensitive species population, (2) the existing dynamics between multiple species (e.g., predator-prey, herbivore-forage, vegetation structure-wildlife breeding habitat), or (3) a relatively large habitat area or important habitat attributes within Pictured Rocks National Lakeshore. A sensitive species population or habitat might deviate from normal levels under existing conditions, but would remain indefinitely viable within the lakeshore.

Major An action that would have drastic and permanent consequences for a sensitive species population, dynamics between multiple species, or almost all available critical or unique habitat area within Pictured Rocks National Lakeshore. A sensitive species population or its habitat would be permanently altered from normal levels under existing conditions, and the species would be at risk of extirpation from the lakeshore.

Impairment A major, adverse impact to protected wildlife values or habitat whose conservation is: (1) necessary to fulfill specific purposes identified in the enabling legislation of Pictured Rocks National Lakeshore, (2) key to the natural or cultural integrity of the lakeshore, or (3) identified as a goal in the lakeshore's

general management plan or other relevant National Park Service planning documents.

Duration Short-term - recovers in less than two years. Long-term - takes more than two years to recover

The impact thresholds used for describing the effects, adhering to ESA standards, on species of concern by implementing the proposed FMP and the alternatives follows.

No effect The appropriate conclusion when the proposed action will not affect a listed species or designated critical habitat.

May effect but is not likely to adversely affect The appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial.

Is likely to adversely affect The appropriate finding if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or beneficial.

### **Impacts Common to All Alternatives**

There are 23 state of Michigan listed plant species of concern, including one federally listed threatened plant, and 10 state of Michigan listed wildlife species of concern, including 2 federally listed threatened and 1 federally listed endangered, that occur at Pictured Rocks. Fire fighting activities such as off-road vehicle use and fireline construction could inadvertently damage or destroy individuals or populations, or habitats. Areas of known populations near fire fighting activities will be identified by lakeshore staff and avoided by suppression crews if possible. Park staff will also work closely with fire crews to assist in identifying any previously unidentified susceptible populations.

Hazard fuels management would primarily continue to be accomplished by hand cutting, mowing, brush hog, and removal. In the wilderness areas, hazard fuel reduction projects in areas around designated camping areas and trails would be accomplished without motorized equipment. Herbicide treatments and mechanical removal of exotic plant species would also continue on an as needed basis.

Piping plover utilize sand beach separated from any significant burnable area at Pictured Rocks. **There will be no effect on piping plover or critical habitat by implementation of any of the proposed alternatives.**

Gray wolf sign and sightings in and around the lakeshore are not uncommon, although no established packs are known to occupy the lakeshore area. Transient animals visit the area at least during snow-free seasons. Because of the transient nature of these wolves, it is unlikely

that they would be adversely affected by fire management activities at Pictured Rocks. **There will be no effect on gray wolf by implementation of any of the proposed alternatives.**

Bald eagles nest within the lakeshore in three identified nest territories. Large fires that occur near nesting trees during the nesting season could affect bald eagles or even kill eggs and fledglings. In addition, human activity such as fire fighting or hazard fuel reduction projects could also disturb nesting birds and interrupt breeding. Firefighters and other workers would be apprised of the location of nesting pairs, and care would be taken to avoid these areas. No nests are in areas considered for prescribed fire, and hazard fuels reduction operations are not likely to be necessary near nests. **There will be no effect on bald eagle by implementation of any of the proposed alternatives.**

Pitcher's thistle occupies limited, open, and sparsely vegetated habitat within the Grand Sable Dunes. Fire occurrence in the dunes is exceptionally rare, and no prescribed fire is planned in the vicinity. The jack pine pockets of forest in the dunes are unique in that they did not originate from fire and support a moist, mossy forest floor due to moisture available from Lake Superior. Likelihood of fire affecting Pitcher's thistle is very low. **There will be no effect on Pitcher's thistle by implementation of any of the proposed alternatives.**

Critical habitat for Canada lynx has not been identified at this time, but limited habitat for lynx occurs at Pictured Rocks. Lynx have not been documented at the lakeshore since its establishment in 1966 and historic records do not suggest lynx have been present in the lakeshore since at least 1940 (Beyer et. al. 2001). **There will be no effect on Canada lynx by implementation of any of the proposed alternatives.**

Suppression of natural fire regimes within the region of the lakeshore, along with agricultural practices, timber harvest, and past development on lakeshore and adjacent private and public lands, have led to altered wildlife habitat. Mechanical hazard fuel removal and fire suppression may result in minor, short-term disturbance and displacement species of concern but minimal overall loss of habitat for species of concern. Pressure on species of concern off the lakeshore will likely continue, making lakeshore lands a potential refuge for some species. The adoption of any alternative is expected to be inconsequential in terms of the overall population of species of concern or habitat and will have no cumulative effects.

### **Alternative A (No Action)**

Alternative A leaves the current FMP in place unchanged.

Alternative A would have negligible adverse impacts on the lakeshore's species of concern. Impacts to all wildlife within the lakeshore are expected to be negligible to minor and be of short duration. Although individuals of several species may be inadvertently killed during wildland fire events, these deaths would be in spite of the FMP and not a result of the activities of the plan. No populations of federal or state listed species or their habitat will be adversely affected by this alternative.



The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents. This alternative will not impair lakeshore species of concern, but would not be in compliance with the provisions of DO-18.

### **Alternative B (Allow Prescribed Fire/Preferred Alternative)**

Alternative B maintains much of the current resource management actions related to hazard fuel management and wildland fire. All wild fires would continue to be suppressed. The major difference in resource management operations would be the opportunity to use prescribed fire for hazard fuel reduction and vegetation regeneration in the Miners area and Twelvemile Beach area. The new FMP would adopt all of the requirements and provisions of DO-18.

Prescribed fires will be limited to the Miners and Twelvemile Beach areas. These areas are not currently used by bald eagles for nesting or frequented by other listed wildlife species, and do not support most of the plant species of concern. The state listed dwarf bilberry may be located within the areas proposed for prescribed fire. If dwarf bilberry plants are identified during preparations for prescribed fires, these plants will be marked and protected.

Alternative B would have negligible adverse impacts on the lakeshore's species of concern. Impacts to all wildlife within the lakeshore are expected to be negligible to minor and be of short duration. Although individuals of several species may be inadvertently killed during wildland fire events, these deaths would be in spite of the FMP and not a result of the activities of the plan. No populations of federal or state listed species or their habitat will be adversely affected by this alternative.

The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents. This alternative will not impair lakeshore species of concern, and would be in compliance with the provisions of DO-18.

### **Alternative C (No Prescribed Fire)**

Alternative C maintains much of the current resource management actions related to hazard fuel management and wildland fire, but develops a new updated FMP that adopts all of the requirements and provisions of DO-18.

Alternative C would have negligible adverse impacts on the lakeshore's species of concern. Impacts to all wildlife within the lakeshore are expected to be negligible to minor and be of short duration. Although individuals of several species may be inadvertently killed during wildland fire events, these deaths would be in spite of the FMP and not a result of the activities of the plan. No

populations of federal or state listed species or their habitat will be adversely affected by this alternative.

The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents. This alternative will not impair lakeshore special status species resources, and would be in compliance with the provisions of DO-18.

## **Cultural and Archeological Resources**

### **Methodology**

The analysis is focused on the protection of cultural and ethnographic resources within the boundaries of the lakeshore during the implementation of on the ground actions described in the proposed Fire Management Plan and the alternatives, as well as the effects following those on the ground activities. The NPS based this impact analysis and conclusions on the review of existing literature and lakeshore studies, information provided by experts within the NPS and other agencies, and professional judgments.

The basis of the analysis is the understanding that fire management activities have the potential for damaging cultural resources such as archeological sites, artifacts, and historic buildings as well as ethnographic resources and sacred sites and objects such as rock formations. Actions that may significantly improve the cultural landscape of an area may have the potential to damage other valuable cultural resources. This potential damage can occur from the physical activities of controlling fires, such as cutting fire breaks, tire rutting, mowing activities, and felling trees as well as a fire itself. There is also the potential to damage cultural and ethnographic resources during mechanical hazard fuel reduction activities, such as mowing or grubbing woody vegetation. Activities and precautions during the planning of fire management activities can reduce the potential for damaging these important resources.

Because the same actions described in the proposed FMP may have very different effects on different aspects of cultural and ethnographic resources (such as archeological resources versus the cultural landscape for instance), this section is further broken into two separate sections for discussion, Archeological Resources and Ethnographic Resources. Historical Properties were discussed and dismissed from further analysis in the Affected Environment section.

### **Archeological Resources**

The effects of fire on archeological resources are still not well understood or documented. To date, much of the literature on the subject is anecdotal and qualitative rather than based on controlled scientific studies. Generally, buried archeological sites are not damaged during fire events. However, high-severity wildland fires and slash pile burnings can and do damage archeological remains on the ground surface or within 2 inches of the soil surface. In addition,

fireline construction can disrupt and expose subsurface archeological remains, destroying the meaningful context of the material (Seabloom, Saylor, and Ahler, 1991). By actively reducing hazardous fuel levels in the lakeshore, the potential for high-severity wildland fires and, in turn, the potential for harm to archeological resources is reduced.

The impact thresholds used for describing the effects on archeological resources of implementing the proposed FMP and the alternatives follow:

- Negligible Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for §106 would be no adverse effect.
- Minor **Adverse** - disturbance of a site(s) results in little, if any, loss of integrity. The determination of effect for §106 would be no adverse effect. **Beneficial** - maintenance and preservation of a site(s), or the exposure of an undiscovered site(s). The determination of effect for §106 would be no adverse effect.
- Moderate **Adverse** - disturbance of a site(s) results in loss of integrity. The determination of effect for §106 would be adverse effect. A Memorandum of Agreement (MOA) is executed among the NPS and State Historic Preservation Officer/Tribal historic Preservation Officer (SHPO/THPO) and, if necessary, Advisory Council on Historic Preservation (ACHP) per 36 CFR 800.6(b). Mitigation measures in MOA minimize or mitigate adverse impacts and reduce the intensity of impact from major to moderate. **Beneficial** - stabilization of a site(s). The determination of effect §106 would be no adverse effect
- Major **Adverse** - disturbance of a site(s) results in loss of integrity. The determination of effect for §106 would be adverse effect. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the NPS and applicable SHPO/THPO/ACHP are unable to negotiate and execute a MOA in accordance with 36 CFR 800.6(b). **Beneficial** - active intervention to preserve a site(s). The determination of effect for §106 would be no adverse effect.
- Impairment A major, adverse impact to a resource or value whose conservation is: (1) necessary to fulfill specific purposes identified in the enabling legislation of Pictured Rocks National Lakeshore, (2) key to the natural or cultural integrity of the lakeshores, or (3) identified as a goal in the lakeshores general management plan or other relevant National Park Service planning documents.
- Duration Short-term - return to desired condition, or improvement to desired condition takes place in one year or less. Long term - return to desired condition or improvement to desired condition takes place in more than one year but less than 10 years. Permanent - the effects of the action last longer than 10 years or are permanent or nearly permanent.

## **Impacts Common to All Alternatives**

Precautions will be taken during wildland fire suppression activities not to destroy or disturb known archeological resources. The Cultural Resource Management Specialist will be informed of all fire fighting activities, and will advise fire bosses and crew of areas and locations to limit activities such as vehicle use and fireline construction. Wherever feasible, and without compromising public and firefighter safety, known cultural resources will be avoided during wildfire suppression. In the event of a wildfire that threatened human health and safety, it may not be possible to prepare firelines that completely avoid known archeological sites. Site could be impacted directly by the heat of a wildfire. Aggressive wildfire suppression would be minimize the size of the fire, and hence the potential for such damage.

Hazard fuels management would continue to be accomplished by hand cutting, mowing, brush hog, and removal. In the wilderness areas, hazard fuel reduction projects in areas around designated camping areas and trails would be accomplished without motorized equipment. Herbicide treatments and mechanical removal of exotic plant species would also continue on an as needed basis.

Vehicles and equipment will remain on roads in areas of known archeological sites. In the event of the discovery of archeological material by work crews, all soil disturbing work will cease in the immediate area, and the Cultural Resource Management Specialist will be notified of the discovery. Brush hogs and mowers will be operated in a manner that will minimize soil disturbance.

Past wildfire suppression activities may have affected unrecorded cultural resources. Hazard fuel reduction activities could also result in minor impacts to undiscovered sites. However, hazard fuels reductions would also help protect historic sites and buildings from wildland fires. The adoption of any alternative would not result in significant cumulative impacts to cultural, archeological, and ethnographical resources.

### **Alternative A (No Action)**

Alternative A leaves the current FMP in place unchanged.

This alternative would have negligible to minor effects on the lakeshore's archeological resources and be long term. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant NPS planning documents. This alternative will not impair lakeshore archeological resources, but would not be in compliance with the provisions of DO-18.

### **Alternative B (Allow Prescribed Fire/Preferred Alternative)**

Alternative B maintains much of the current resource management actions related to hazard fuel management and wildland fire. All wildland fires would continue to be suppressed. The major difference in resource management operations would be the opportunity to use prescribed fire for hazard fuel reduction and vegetation management in the Miners area and Twelvemile Beach area. The new FMP would adopt all of the requirements and provisions of DO-18.

To eliminate potential damage to known archeological sites during prescribed fire activities, their locations and boundaries would be clearly marked for avoidance, and sites would be monitored during and after completion of fireline construction. Vehicles and heavy equipment would not be allowed near all known archeological sites. Soil disturbing activities and vehicle use with the potential to damage known archeological sites will be limited during preparation and execution of prescribed fires.

The Cultural Resource Management Specialist will be informed of all prescribed fire activities, and will advise supervisors and crews of areas and locations to limit their soil disturbing activities. In the event of the discovery of archeological material by work crews, all soil disturbing work will cease in the immediate area, and the Cultural Resource Management Specialist will be notified of the discovery. Brush hogs and mowers will be operated in a manner that will not disturb soils.

This alternative would have negligible to minor effects on the lakeshore's archeological resources and be long term. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant NPS planning documents. This alternative will not impair lakeshore archeological resources, and would be in compliance with the provisions of DO-18.

### **Alternative C (No Prescribed Fire)**

Alternative C maintains much of the current resource management actions related to hazard fuel management and wildland fire, but develops a new updated FMP that adopts all of the requirements and provisions of DO-18.

This alternative would have negligible to minor effects on the lakeshore's archeological resources and be long term. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents. This alternative will not impair lakeshore archeological resources, and would be in compliance with the provisions of DO-18.

## Ethnographic Resources

The impact thresholds used for describing the effects on ethnographic resources of implementing the proposed FMP and the alternatives follow:

- Negligible Impact(s) would be barely perceptible and would neither alter resource conditions, such as traditional access or site preservation, nor the relationship between the resource and the affiliated group's body of practices and beliefs. The determination of effect on Traditional Cultural Properties (ethnographic resources eligible to be listed in the National Register) for §106 would be *no adverse effect*.
- Minor **Adverse** - impact(s) would be slight but noticeable but would neither appreciably alter resource conditions, such as traditional access or site preservation, nor the relationship between the resource and the affiliated group's body of practices and beliefs. The determination of effect on Traditional Cultural Properties (ethnographic resources eligible to be listed in the National Register) for §106 would be *no adverse effect*. **Beneficial** - would allow access to and/or accommodate a group's traditional practices or beliefs. The determination of effect on Traditional Cultural Properties for §106 would be *no adverse effect*.
- Moderate **Adverse** - Impact(s) would be apparent and would alter resource conditions. Something would interfere with traditional access, site preservation, or the relationship between the resource and the affiliated group's practices and beliefs, even though the group's practices and beliefs would survive. The determination of effect on Traditional Cultural Properties (ethnographic resources eligible to be listed in the National Register) for §106 would be *adverse effect*. **Beneficial** - would facilitate traditional access and/or accommodate a group's practices or beliefs. The determination of effect on Traditional Cultural Properties for §106 would be *no adverse effect*.
- Major **Adverse** - impact(s) would alter resource conditions. Something would block or greatly affect traditional access, site preservation, or the relationship between the resource and the affiliated group's body of practices and beliefs, to the extent that the survival of a group's practices and/or beliefs would be jeopardized. The determination of effect on Traditional Cultural Properties (ethnographic resources eligible to be listed in the National Register) for §106 would be *adverse effect*. **Beneficial** - would encourage traditional access and/or accommodate a group's practices or beliefs. The determination of effect on Traditional Cultural Properties for §106 would be *no adverse effect*.
- Impairment A major, adverse impact to a resource or value whose conservation is: (1) necessary to fulfill specific purposes identified in the enabling legislation of Pictured Rocks National Lakeshore, (2) key to the natural or cultural integrity of the lakeshore, or (3) identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents.

Duration      Short-term - recovers in less than three years. Long-term - takes more than three years to recover.

### **Impacts Common to All Alternatives**

The Grand Sable Dunes are fine drifting sand, sparsely vegetated, and not subject to burning. No fire related activities will occur at the Grand Sable Dunes, and they will not be affected by the adoption of any of the alternatives. Likewise, the Pictured Rocks and Lake Superior are not affected by fire and will not be directly impacted by any of the alternatives. Smoke from wildland and prescribed fires may limit the comfortable use of these areas and, in the event of a hazardous wildland fire situation, they may be closed to the public, including Native Americans. However, these conditions are likely to be temporary, lasting only until the fire has been extinguished.

Some of the high prominences at Pictured Rocks, such as Miners Castle, also hold significance for Native Americans. Many of these areas are vegetated or surrounded by vegetation, and could be subject to the direct effects of wildland fires. In addition, smoke from wildland and prescribed fires may limit the comfortable use of these areas and, in the event of a hazardous wildland fire situation, they may be closed to the public as well. These conditions are also likely to be temporary, lasting only until the fire has been extinguished.

Portions of the forested areas of Pictured Rocks are important to Native Americans for the game they offer and the plants that grow there. These areas could be directly affected by wildland and prescribed fires. Fires have an immediate effect on vegetation and wildlife habitat, and intense fires may render some areas traditionally used by Native Americans temporarily unusable for hunting and gathering activities. However, fires also allow some traditional plant species, such as wild blueberry, to thrive and produce. Wild blueberry is one of the traditionally gathered foods still actively collected by Native Americans in the area.

Likewise, fires modify wildlife habitat and some game species, especially deer, are attracted to the new vegetative growth following a fire. Although a fire may limit the traditional use of an area by Native Americans for short periods, the burned areas tend to recover quickly, and traditional uses can usually be resumed within a few months. Even in areas not burned, smoke from wildland and prescribed fires may limit the comfortable use of these areas as well and, in the event of a hazardous wildland fire situation, they may be closed to the public, including Native Americans. These conditions are also likely to be temporary, lasting only until the fire has been extinguished.

Hazard fuels management would continue to be accomplished by hand cutting, mowing, brush hog, and removal, except in the non-wilderness areas. In the wilderness areas, hazard fuel reduction projects in areas around designated camping areas and trails would be accomplished without motorized equipment. Herbicide treatments and mechanical removal of exotic plant species would also continue on an as needed basis.

Past fire suppression activities may have affected unrecorded cultural resources. Hazard fuel reduction activities could also result in minor impacts to undiscovered sites. However, hazard

fuels reductions would also help protect historic sites and buildings from wildland fires. The adoption of any alternative would not result in significant cumulative impacts to cultural, archeological, and ethnographical resources.

### **Alternative A (No Action)**

Alternative A leaves the current FMP in place unchanged.

This alternative would have negligible to minor effects on the lakeshore's ethnographic resources and be of short duration. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents. This alternative will not impair lakeshore ethnographic resources, but would not be in compliance with the provisions of DO-18.

### **Alternative B (Allow Prescribed Fire/Preferred Alternative)**

Alternative B maintains much of the current resource management actions related to hazard fuel management and wildland fire. All wildfires would continue to be suppressed. The major difference in resource management operations would be the opportunity to use prescribed fire for hazard fuel reduction and vegetation regeneration in the Miners area and Twelvemile Beach area. The new FMP would adopt all of the requirements and provisions of DO-18.

This alternative would have negligible to minor effects, both adverse and beneficial, on the lakeshore's ethnographic resources and be of short duration. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents. This alternative will not impair lakeshore ethnographic resources, and would be in compliance with the provisions of DO-18.

### **Alternative C (No Prescribed Fire)**

Alternative C maintains much of the current resource management actions related to hazard fuel management and wildland fire, but develops a new updated FMP that adopts all of the requirements and provisions of DO-18. All wildfires would be suppressed, and no prescribed fires would be used. Daily resource management activities would be very similar to those of the current FMP.

This alternative would have negligible to minor effects on the lakeshore's ethnographic resources and be of short duration. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific



purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents. This alternative will not impair lakeshore ethnographic resources, and would be in compliance with the provisions of DO-18.

## **Air Quality**

### **Methodology**

Environmental Protection Agency (EPA) Guidelines were used to assess impacts. The EPA Air Quality Policy on Wildland and Prescribed Fires (EPA 1998) integrates two goals: (1) to allow fire to function, as nearly as possible, in its natural role in maintaining healthy wildland ecosystems, and (2) to protect public health and welfare by mitigating the impacts of air pollutant emissions on air quality and visibility.

The combustion of vegetation produces various chemical compounds. These compounds include nitrogen oxides (NO<sub>x</sub>), organic compounds, carbon monoxide, and particulate matter or small particles (PM). The pollutants that affect visibility that derive from vegetative burning are PM<sub>10</sub>, PM<sub>2.5</sub>, nitrates, ozone, organic carbon, and elemental carbon. Ozone, a measurable constituent of "smog" or haze, is not directly produced by fires, but as a byproduct of the chemical reaction of other combustion products (NO<sub>x</sub> and volatile organic compounds or VOC's). About 90 percent of smoke particles from wildland and prescribed fires are PM<sub>10</sub> and about 70 percent are PM<sub>2.5</sub> (MNICS, 2001).

One of the main factors determining the degree of air pollution from wildland fires is smoke dispersion. Smoke dispersion is a function of ventilation, which refers to the process within the atmosphere that mixes and transports smoke away from its source. Ventilation is a function of stability, mixing height, and transport winds. Mixing height is defined as the upper limit of a mixed layer in unstable air, in which upward and downward exchange of air occurs. The transport wind is the arithmetic average (speed and direction) of wind in the mixing layer.

Smoke consists of dispersed airborne solids and liquid particles (aerosols), collectively referred to as particulates, which could remain suspended in the atmosphere for a few days to several weeks. Particulates can reduce haze problems. Regional haze can sometimes result from multiple burn days and/or multiple owners burning within an airshed over too short a period of time to allow for dispersion.

The impact thresholds used for describing the effects on Air Quality of implementing the proposed FMP and the alternatives are as follows:

Negligible No changes would occur or changes in air quality would be below or at the level of detection and, if detected, would have effects that would be considered slight and short-term.

<u>Minor</u>	Changes in air quality would be measurable, although the changes would be small, short-term, and the effects would be localized. No air quality mitigation measures would be necessary.
<u>Moderate</u>	Changes in air quality would be measurable, would have consequences, although the effect would be relatively local. Air quality mitigation measures would be necessary and the measures would likely be successful.
<u>Major</u>	Changes in air quality would be measurable, would have substantial consequences, and be noticed regionally. Air quality mitigation measures would be necessary and the success of the measures could not be guaranteed.
<u>Impairment</u>	A major, adverse impact that directly impairs the air quality affecting any of the resources whose conservation is: (1) necessary to fulfill specific purposes identified in the enabling legislation of Pictured Rocks National Lakeshore (2) key to the natural or cultural integrity of the lakeshore, or (3) identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents.
<u>Duration</u>	Short-term - recovers in seven days or less following a fire event. Long-term - takes more than seven days to recover following a fire event.

### **Impacts Common to All Alternatives**

Hazard fuels management would primarily continue to be accomplished by hand cutting, mowing, brush hog, and removal. In the wilderness areas, hazard fuel reduction projects in areas around designated camping areas and trails would be accomplished without motorized equipment. Herbicide treatments and mechanical removal of exotic plant species would also continue on an as needed basis.

Air quality impacts from wildland fires would be reduced by immediate and aggressive suppression. Over time, the removal of hazard fuels by mechanical means should have the effect of limiting the ignition sources for wildland fires, and thereby reducing the smoke generated by wildland fires. The use of vehicles and gasoline powered hand tools in these operations will have a slight negative effect on air quality, but these effects will be of very short duration (up to one hour following the end of operating the machinery) and be very localized, being confined to the immediate area of the project.

Wildfires will occur under each alternative, and with them the possibility of producing nuisance smoke. Generally, fires at Pictured Rocks are small and last only a few hours. Smoke tends to disperse quickly, and the sparsely inhabited areas are unaffected or only slightly affected. These conditions are expected to continue under all alternatives.

Negligible impacts would occur through exhaust from combustion engines associated with vehicles and equipment associated with wildfire suppression and mechanical treatments.

Existing industry and agricultural practices emit some pollutants and particulate matter, as do automobiles, and other off-lakeshore wildland and prescribed fires. Future wildland fires would also contribute to minor temporary deterioration in air quality and visibility. These effects are expected to be short duration and minor in effect. Adopting any of the alternatives would not result in significant cumulative impacts to air quality.

### **Alternative A (No Action)**

Alternative A leaves the current FMP in place unchanged.

This alternative is expected to have negligible to minor effects on the air quality of Pictured Rocks and the surrounding area and be of short duration. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant NPS planning documents. This alternative will not impair lakeshore air resources, but would not be in compliance with the provisions of DO-18.

### **Alternative B (Allow Prescribed Fire/Preferred Alternative)**

Alternative B maintains much of the current resource management actions related to hazard fuel management and wildland fire. All wildland fires would continue to be suppressed. The major difference in resource management operations would be the opportunity to use prescribed fire for hazard fuel reduction and vegetation regeneration in the Miners area and Twelvemile Beach area. The new FMP would adopt all of the requirements and provisions of DO-18.

The use of prescribed fires in the Miners area and Twelvemile Beach area will produce smoke and therefore have a negative effect on air quality. Pictured Rocks will use the three strategies to manage smoke and reduce negative air quality effects:

Avoidance - Monitoring meteorological conditions when scheduling prescribed fires to prevent smoke from drifting into sensitive receptors, or suspending burning until favorable weather (wind) conditions.

Dilution – Ensuring proper smoke dispersion in smoke-sensitive areas by controlling the rate of smoke emissions or scheduling prescribed fires when weather systems are unstable, not under conditions when a stable high-pressure area is forming with an associated subsidence inversion. An inversion would trap smoke near the ground and not allow smoke to disperse.

Emission Reduction – Utilize techniques to minimize the smoke output per unit area treated. Reducing the number of acres that are burned at one time would reduce the amount of emissions generated by that burn, mechanically reducing the fuel load before hand (e.g. removing firewood, reduces the amount of fuel available and thereby the smoke produced), conducting prescribed fires when fuel moistures are

high can reduce fuel consumption, reducing emission factors by pile burning, or by using certain ignition techniques such as mass ignition.

If weather conditions change unexpectedly during a prescribed fire, and there was a potential for adverse smoke impacts on sensitive receptors, Pictured Rocks would implement a contingency plan including the option for immediate suppression. If prescribed fires were conducted at Pictured Rocks in the next five years, they are expected to cause only minor and temporary air quality impacts. The greatest threat to air quality would be smoke impacts on sensitive receptors (nearby residents). The lack of sensitive receptors near those areas being considered for prescribed fires minimizes this potential air quality impact.

This alternative is expected to have negligible to minor effects on the air quality of Pictured Rocks and the surrounding area and be of short duration. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant NPS planning documents. This alternative will not impair lakeshore air resources, and would be in compliance with the provisions of DO-18.

### **Alternative C (No Prescribed Fire)**

Alternative C maintains much of the current resource management actions related to hazard fuel management and wildland fire, but develops a new updated FMP that adopts all of the requirements and provisions of DO-18.

This alternative is expected to have negligible to minor effects on the air quality of Pictured Rocks and the surrounding area and be of short duration. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant NPS planning documents. This alternative will not impair lakeshore air resources, and would be in compliance with the provisions of DO-18.

## **Visitor Use**

### **Methodology**

The analysis is focused on the effects of the alternatives on visitor use and recreation opportunities within the boundaries of the lakeshore during the implementation of on the ground actions described in the proposed Fire Management Plan and the alternatives as well as the effects following those on the ground activities. The NPS based this impact analysis and conclusions on the review of existing literature and lakeshore studies, information provided by experts within the National Park Service and other agencies, and professional judgments.

The impact thresholds used for describing the effects on visitor use of implementing the proposed FMP and the alternatives are as follows:

<u>Negligible</u>	Visitors would not be affected or changes in visitor use and/or experience would be below or at the level of detection. The visitor would not likely be aware of the effects associated with the alternative.
<u>Minor</u>	Changes in visitor use and/or experience would be detectable, although the changes would be slight and likely short-term. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.
<u>Moderate</u>	Changes in visitor use and/or experience would be readily apparent and likely long-term. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.
<u>Major</u>	Changes in visitor use and/or experience would be readily apparent and have important long-term consequences. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.
<u>Duration</u>	Short-term - recovers in less than one year. Long-term - takes more than one year to recover.

### **Impacts Common to All Alternatives**

The primary disruptions to visitors as a result of any alternative is the temporary closure to the public of areas where mechanical hazard fuel removal operations are occurring, as well as the associated noise and presence of work crews and vehicles in the area. A small amount of hazard fuel reduction activities could occur during the summer season when visitation is high, but the majority of this kind of work occurs during the spring and fall, when visitation is low.

Hazard fuels management would primarily continue to be accomplished by hand cutting, mowing, brush hog, and removal. In the wilderness areas, hazard fuel reduction projects in areas around designated camping areas and trails would be accomplished without motorized equipment. Herbicide treatments and mechanical removal of exotic plant species would also continue on an as needed basis.

Wildfires could potentially disrupt visitors and could require the temporary closures of areas for safety reasons. Wildfires occur primarily in the summer and fall, so emergency closures of areas of the lakeshore as a result of wildfires have the potential to disrupt visitation more than hazard fuel reduction activities. If large, hazardous wildland fires developed or threatened areas of Pictured Rocks, these areas would be closed and remain closed until they were safe. Past experience, however, shows that wildland fires at Pictured Rocks have been very small, short lived, and have not disrupted visitor use to any large degree. Similar conditions are expected to continue under all alternatives.

The establishment of the lakeshore with improved roads and trails provided access for recreation opportunities. Increased population growth has resulted in increased recreational use and some crowding during summer months. Minor visitor use and experience impacts resulting from wildland fires have occurred in the past, but increased recreation use from national population growth and rising long-term national interest in outdoor recreation has been offset by further development of tourist destination opportunities in the region. These long-term enhancements of recreation resources and opportunities offset short-term recreation inconveniences from hazard fuel removal activities, area closures, and smoke. Adopting any alternative would not result in significant cumulative impacts to visitor use.

### **Alternative A (No Action)**

Alternative A leaves the current FMP in place unchanged.

This alternative is expected to have negligible to minor effects on visitor use at Pictured Rocks and the surrounding area and be of short duration. This alternative would not be in compliance with the provisions of DO-18.

### **Alternative B (Allow Prescribed Fire/Preferred Alternative)**

Alternative B maintains much of the current resource management actions related to hazard fuel management and wildland fire. All wildfires would continue to be suppressed. The major difference in resource management operations would be the opportunity to use prescribed fire for hazard fuel reduction and vegetation management in the Miners area and Twelvemile Beach area. The new FMP would adopt all of the requirements and provisions of DO-18.

This alternative includes the possibility of using prescribed fires for hazardous fuel reduction and vegetation management. Preparing an area for prescribed fire includes conducting reconnaissance and surveys of the area (for vulnerable cultural/historical sites and vegetation or wildlife of special concern), establishing firelines, removal or modification of fuels that may threaten resources during a prescribed fire, establishing monitoring plots, and recording environmental conditions. These activities can take several days or weeks to complete, although the closure of an area is not usually necessary during these preparations. The presence of workers and vehicles and the noise associated with them may be disruptive to some individual visitors. During the actual burn phase of a prescribed fire, the designated area and a buffer would be closed to the public.

Usually the closed area of a prescribed fire or wildfire would remain off limits to the public for only a few days. Although both the Miners area and Twelvemile Beach area are adjacent to public picnic and camping areas, any prescribed fires and their preparations would occur during the early spring and late fall when visitation to these areas is limited. Once the fire danger has been secured and public access reestablished, the burned area may serve as an excellent opportunity for future interpretation of the role of fire in mixed pine forests of the area.

This alternative is expected to have negligible to minor effects on visitor use at Pictured Rocks and the surrounding area and be of short duration. This alternative would be in compliance with the provisions of DO-18.

### **Alternative C (No Prescribed Fire)**

Alternative C leaves much of the current resource management actions related to hazard fuel management and wildland fire in place, but develops a new updated FMP that adopts all of the requirements and provisions of DO-18.

This alternative is expected to have negligible to minor effects on visitor use at Pictured Rocks and the surrounding area and be of short duration. This alternative would be in compliance with the provisions of DO-18.

## **Wilderness Resources**

### **Methodology**

This analysis is focused on effects of alternatives on proposed wilderness within the boundaries of the lakeshore during the implementation of on the ground actions described in the proposed Fire Management Plan and the alternatives, as well as the effects following those on the ground activities. Impacts were evaluated qualitatively by examining the letter and spirit of the 1964 Wilderness Act and professional judgment and experience. There was also special emphasis to evaluate the effects of actions on the eligibility criteria for wilderness designation. The NPS based this impact analysis and conclusions on review of existing literature and lakeshore studies, information provided by experts within the National Park Service and other agencies, and professional judgments.

The impact thresholds used for describing the effects on wilderness of implementing the proposed FMP and the alternatives are as follows:

<u>Negligible</u>	A change in the wilderness character would not occur or, if it occurred, would be so small that it would not be of any measurable or perceptible consequence.
<u>Minor</u>	A change in the wilderness character and associated values would occur, but it would be small and, if measurable, would be temporary and highly localized.
<u>Moderate</u>	A change in the wilderness character and associated values would occur. It would be measurable, but localized.
<u>Major</u>	A noticeable change in the wilderness character and associated values would occur. It would be measurable, and would have a substantial or possibly permanent consequence.

Impairment A major, adverse impact that directly impairs the air quality affecting any of the resources whose conservation is: (1) necessary to fulfill specific purposes identified in the enabling legislation of Pictured Rocks National Lakeshore (2) key to the natural or cultural integrity of the lakeshore, or (3) identified as a goal in the lakeshore's general management plan or other relevant National Park Service planning documents.

Duration Short-term - recovers in less than one year. Long-term - takes more than one year to recover.

### **Impacts Common to All Alternatives**

Under all alternatives, wildland fire suppression will take place in the wilderness area. All alternatives would require the use of hand power tools and Minimum Impact Suppression Tactics (MIST) within the wilderness areas to minimize the effect of temporary human disturbances and intrusions. All alternatives would retain the "primeval character" of wilderness, would receive no permanent improvements, and would still appear "to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable" (Section 2(c), Wilderness Act).

Hazard fuels management would continue to be primarily accomplished by hand cutting, mowing, brush hog, and removal. In the wilderness areas, hazard fuel reduction projects in areas around designated camping areas and trails would be accomplished without motorized equipment.

Sounds can carry long distances, and the wilderness area is already subjected to mechanical and engine sounds that detract to some extent from a sense of isolation and solitude wilderness is supposed to engender. Currently wilderness values are diminished to a minor degree by noise from motorized watercraft on Lake Superior and Beaver Lake and vehicles in the Little Beaver Lake Campground. Noise associated with fire suppression activities would probably last no more than a few days. The additional noise of fire suppression activities is expected to be minimal and of short duration.

The wilderness resources at Pictured Rocks have been altered by logging and the establishment of lodges and other buildings in the past. Most of these human intrusions are in the slow process of reverting to natural conditions. Closed roads have become foot trails or overgrown with vegetation, buildings and other human improvements have mostly been removed, and, in general, the area has been returned to a natural state. Hazard fuel reduction activities around backcountry campsites and wildland fire fighting will have no effect on this "re-naturalization" that has occurred since the lakeshore was established. The adoption of any alternative will be negligible in terms of cumulative effects.



### **Alternative A (No Action)**

Alternative A leaves the current FMP in place unchanged.

This alternative is expected to have negligible to minor effects on the wilderness values at Pictured Rocks and be of short duration. All wilderness values of the study area will be retained. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant NPS planning documents. This alternative will not impair lakeshore wilderness resources, but will not be in compliance with the provisions of DO-18.

### **Alternative B (Allow Prescribed Fire/Preferred Alternative)**

Alternative B maintains much of the current resource management actions related to hazard fuel management and wildland fire. All wildfires would be suppressed, including those within any wilderness-designated areas. Prescribed fires could be used, but not within the wilderness study area. The current FMP would be updated or adopt all of the new requirements and provisions of DO-18, and would be fully compliant.

This alternative is expected to have negligible to minor effects on the wilderness values at Pictured Rocks and be of short duration. All wilderness values of the study area will be retained. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant NPS planning documents. This alternative will not impair lakeshore wilderness resources, and will be in compliance with the provisions of DO-18.

### **Alternative C (No Prescribed Fire)**

Alternative C leaves much of the current resource management actions related to hazard fuel management and wildland fire in place, but develops a new updated FMP that adopts all of the requirements and provisions of DO-18.

This alternative is expected to have negligible to minor effects on the wilderness values at Pictured Rocks and be of short duration. All wilderness values of the study area will be retained. The effects of adopting this alternative will not have a major or severe adverse effect upon a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation of the lakeshore or identified as a goal in the lakeshore's general management plan or other relevant NPS planning documents. This alternative will not impair lakeshore wilderness resources, and will be in compliance with the provisions of DO-18.

## Lakeshore Facilities and Operations

### Methodology

The analysis is focused on the effects of the alternatives on the normal lakeshore operations during the implementation of on the ground actions described in the proposed Fire Management Plan and the alternatives, as well as the effects following those on the ground activities. **These resources are not subject to impairment according to NEPA so there are no impact thresholds or determinations of impairment.** The NPS based this analysis and conclusions on the review of existing literature and lakeshore studies, information provided by experts within the National Park Service and other agencies, and professional judgments.

### Impacts Common to All Alternatives

Hazard fuels management would continue to be accomplished by hand cutting, mowing, brush hog, and removal. In the wilderness areas, hazard fuel reduction projects in areas around designated camping areas and trails would be accomplished without motorized equipment. Herbicide treatments and mechanical removal of exotic plant species would also continue on an as needed basis.

One disruption to normal lakeshore operations as a result of any alternative is the temporary closure to the public of areas where mechanical hazard fuel removal operations are occurring. This could result in the need for additional personnel on site to ensure that people stay out of hazardous work areas during the closure of heavily visited or popular areas. Although small number closures could occur during the summer season when visitation is high, the majority of this hazardous fuel reduction work occurs during the spring and fall when visitation is limited. A similar temporary closure of areas as a result of wildland fires and fire fighting activities is more likely during the summer months.

Wildland fires occur primarily in the summer and fall, so emergency closures of areas of the lakeshore as a result of wildfires has the potential to disrupt visitation more than hazard fuel reduction activities. If high intensity wildfires developed at or threatened areas of Pictured Rocks, these areas would be closed and remain closed until they were safe. Rangers would be posted or patrol perimeters of fire areas to ensure the public remained out of the hazardous areas. In addition, personnel normally not assigned to fire fighting would be used on fire crews, delaying work they would normally accomplish.

A greater potential for disruption of lakeshore operation would occur in the event of a large uncontrolled wildfire at or near the lakeshore. In such an event, it is likely that almost all trained and certified lakeshore personnel would be reassigned to fire fighting or to supporting fire fighting activities. Many of the normal activities that occur at the lakeshore could be stopped, and large areas of the lakeshore could be closed altogether. Such a wildland fire would occur in spite of the adoption of any alternative and not a result of it. Past experience shows that wildland fires at Pictured Rocks are very small, short lived, and do not disrupt lakeshore operations to any large degree. Similar conditions are expected to continue under any alternative.

### **Alternative A (No Action)**

Alternative A leaves the current FMP in place unchanged. This alternative would not be in compliance with the provisions of DO-18.

### **Alternative B (Allow Prescribed Fire/Preferred Alternative)**

Alternative B maintains much of the current resource management actions related to hazard fuel management and wildland fire. All wildfires would continue to be suppressed. The major difference in resource management operations would be the opportunity to use prescribed fire for hazard fuel reduction and vegetation management in the Miners area and Twelvemile Beach area. The new FMP would adopt all of the requirements and provisions of DO-18.

Preparation activities for prescribed fires can occur from several weeks to several days prior to when a burn is scheduled. Prescribed fires would occur at Pictured Rocks in early spring or late fall, when visitation is at its lowest level. In addition, preparation for prescribed fires is scheduled work much like scheduled maintenance and not emergent in nature. Because of this, little or no disruption to normal lakeshore operations is expected from preparation activities. During the actual prescribed fire, some additional lakeshore personnel would be assigned to the operation, but specialized assistance from other parks and local fire fighting crews makes reassignments from other duties unnecessary. In addition, any reassignment would last only during the prescribed fire, lasting from several hours to several days. This alternative would be in compliance with the provisions of DO-18.

### **Alternative C (No Prescribed Fire)**

Alternative C maintains much of the current resource management actions related to hazard fuel management and wildland fire, but develops a new updated FMP that adopts all of the requirements and provisions of DO-18. This alternative would be in compliance with the provisions of DO-18.

## **Employee and Visitor Safety**

### **Methodology**

The analysis is focused on the effects of the alternatives on the health and safety of lakeshore staff and visitors at the lakeshore during the implementation of on the ground actions described in the proposed Fire Management Plan and the alternatives, as well as the effects following those on the ground activities. **These resources are not subject to impairment according to NEPA so there are no impact thresholds or determinations of impairment.** Health and safety impacts were qualitatively assessed through determination of activities, equipment use, and environmental conditions that could result in injury. The NPS based this impact analysis and

conclusions on the review of existing literature and lakeshore studies, information provided by experts within the National Park Service and other agencies, and professional judgments.

### **Impacts Common to All Alternatives**

Both wildfires and prescribed fires have the potential to affect human health and safety, though the risk tends to be much lower from prescribed fire. The elongated shape of the lakeshore and the proximity to private and publicly held land means that the possibility of fire escape onto adjacent property is a concern. In the case of a wildland and prescribed fire, smoke is a possible source of potential risk to firefighters and the public. Risks include inhalation as well as the possibility of obscuring visibility on nearby roads. Any fire, whether wildland or a prescribed, presents risks from smoke and flames, and the possibility of injuries from equipment or the use of chemicals and other materials.

Hazard fuels management would continue to be accomplished by hand cutting, mowing, brush hog, and removal, except in the non-wilderness areas. In the wilderness areas, hazard fuel reduction projects in areas around designated camping areas and trails would be accomplished without motorized equipment. Herbicide treatments and mechanical removal of exotic plant species would also continue on an as needed basis.

Factors most likely to adversely impact worker health and safety include activities associated with hazard fuel removal, and wildfire suppression efforts (accidental spills, injuries from the use of fire-fighting equipment and machinery, smoke inhalation, and, in severe cases, injuries from wildland fires). Impacts to the public could include smoke inhalation and in severe cases, injuries from wildland fires. Injuries from the use of hand tools and machinery during hazard fuel removal and from accidental spills of fire retardants and foams are the most likely to adversely impact human health and safety.

Hazard fuel removal and fireline construction can pose safety threats to firefighters during wildland fire fighting. Injuries can occur from the use of equipment as well as from traveling overland to work areas. While each of the crew is trained in the use of equipment, accidental injuries may occur from time to time. Strict adherence to guidelines concerning firefighter accreditation and equipment and procedure safety guidelines will minimize accidents.

Fire retardants used in controlling or extinguishing fires contain about 85 percent water, 10 percent fertilizer, and 5 percent minor ingredients such as corrosion inhibitors and bactericides. Fire suppressant foams are more than 99 percent water. The remaining 1 percent contains surfactants, foaming agents, corrosion inhibitors, and dispersants. All of the wildland fire chemicals used at Pictured Rocks have been tested and meet specific requirements with regard to mammalian toxicity as determined by acute oral and dermal toxicity testing as well as skin and eye irritation tests (USDA, 2001). However, they are strong detergents and can be extremely drying to skin. All currently approved foam concentrates are irritating to the eyes as well. The use of gloves and goggles will be required when mixing and using fire chemicals. In the case of incidental exposure, the application of a topical cream or lotion can alleviate the effects of the retardant, and emergency eyewash supplies will be made available.

Smoke inhalation can pose a threat to human health and safety. Smoke from wildland fires is composed of hundreds of chemicals in gaseous, liquid, and solid forms. The chief inhalation hazard appears to be carbon monoxide (CO), aldehydes, respirable particulate matter with a median diameter of 2.5 micrometers (PM2.5), and total suspended particulate (TSP). Adverse health effects of smoke exposure begin with acute, instantaneous eye and respiratory irritation and shortness of breath, but can develop into headaches, dizziness, and nausea lasting up to several hours. Based on a recent study of firefighter smoke exposure, most smoke exposures were not considered hazardous, but a small percentage routinely exceeded recommended exposure limits for carbon monoxide and respiratory irritants (USDA, 2000). However, firefighters avoid or move away from areas of the heaviest smoke, especially at the head of a moving fire, and approved respirators are supplied to firefighters.

Areas where wildland fires are occurring would be closed to minimize or eliminate public human health and safety concerns resulting from smoke exposure and fire injuries. All alternatives are expected to have negligible to minor effects on the health and safety of lakeshore visitors and employees at Pictured Rocks and be of short duration.

Past suppression efforts have protected lakeshore staff and visitors from the hazardous effects of wildland fires. The hazard fuel reduction activities could result in minor health and safety impacts, but in the long run are designed to improve hazardous conditions and the long-term reduction in hazard conditions and improved safety. The adoption of any alternative would not result in significant cumulative impacts to human health and safety.

### **Alternative A (No Action)**

Alternative A leaves the current FMP in place unchanged. There is no expected increase in fire caused injuries to visitors, employees, and the public. Under Alternative A, fire operations would remain at current levels with intermittent visitor, employee, and general public exposure to ground level smoke particularly during late night and morning periods when smoke plumes collapse, descend and concentrate in low lying areas. Since fire operations would remain at current levels, there would not be an immediate increase in the rate of exposure of fire personnel to hazardous conditions—both fire and smoke. This alternative would not be in compliance with the provisions of DO-18.

### **Alternative B (Allow Prescribed Fire/Preferred Alternative)**

Alternative B maintains much of the current resource management actions related to hazard fuel management and wildland fire. All wildfires would continue to be suppressed. The major difference in resource management operations would be the opportunity to use prescribed fire for hazard fuel reduction and vegetation management in the Miners area and Twelvemile Beach area.

There is no expected increase in fire- caused injuries to visitors, employees, and the public. Introduction of prescribed fire operations could occur which has the potential to increase the exposure of visitors, employees, and the public to ground level smoke particularly during late night and morning periods when smoke plumes collapse, descend and concentrate in low lying areas. Similarly, there could be an increase in the rate of exposure of fire personnel to hazardous conditions—both fire and smoke. However, safety precautions and protection for workers and the public will be employed during prescribed fires. All firefighters will be trained and certified according to NWCG (National Wildfire Coordinating Group) standards, and a qualified ignition specialists and burn boss will be in place for any prescribed fire. All prescribed fires will follow a prescribed fire plan that follows NPS policy (RM-18, Chapter 10). All prescribed fires will have contingency plans for changing weather conditions and erratic fire behavior to ensure the safety of all workers and the public. This alternative would be in compliance with the provisions of DO-18.

### **Alternative C (No Prescribed Fire)**

Alternative C maintains much of the current resource management actions related to hazard fuel management and wildland fire. There is no expected increase in fire caused injuries to visitors, employees, and the public. Under Alternative C, fire operations would remain at current levels with intermittent visitor, employee, and general public exposure to ground level smoke particularly during late night and morning periods when smoke plumes collapse, descend and concentrate in low lying areas. Since fire operations would remain at current levels, there would not be an immediate increase in the rate of exposure of fire personnel to hazardous conditions—both fire and smoke. This alternative would be in compliance with the provisions of DO-18.

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## **VII. CONSULTATION AND COORDINATION**

### **Internal and Public Scoping**

Two internal scoping meetings were held for all employees. One was held in conjunction with a General Management Plan all-employee meeting, and another was held specifically to address the FMP. Letters were mailed to all Inland Buffer Zone landowners providing information relating to the FMP and requested input on any concerns landowner may have related to fire in the lakeshore. Letters were also mailed to local fire departments and volunteer fire departments.

### **Interagency Scoping**

Adjacent land managers were consulted by letter and phone contact. Agencies contacted were: Michigan Department of Natural Resources, Hiawatha National Forest, and Seney National Wildlife Refuge. The U.S. Fish and Wildlife Service was contacted at the onset of the planning process to ensure proper Section 7 consultation. A list of species to consider, received from the USFWS as part of the concurrent General Management Planning, was indicated to be sufficient and used to prepare this document.

### **Cultural Resources and Native American Consultation**

The following letter requesting comments, including a list of scoping issues were sent to tribal chairpersons on Feb 9, 2004.

Dear:

The National Park Service is developing a draft Fire Management Plan for Pictured Rocks National Lakeshore. Located in the Upper Peninsula of Michigan, the national lakeshore was authorized in 1966 for the purposes of preserving a portion of the Great Lakes shoreline for its geographic, scenic, and historic features; providing opportunities for public benefit in recreation, education, enjoyment, and inspiration; and protecting the character and use of the shoreline zone while allowing economic utilization of the inland buffer zone renewable resources. The Fire Management Plan serves as the primary planning document to guide park operations in regard to the use of fire to affect various management goals and objectives for the next five years.

National Park Service policies provide a framework for comment by affiliated tribes on the proposed plan and its potential impacts to cultural resources. The National Park Service is committed to the open and meaningful exchange of knowledge and ideas to enhance: (1) the public's understanding of park resources and values, and the policies and plans that affect them; and (2) the Service's ability to plan and manage the parks by learning from others. Open

exchange requires that the Service seek and employ ways to reach out to and consult with all those who have an interest in the parks.

I wish to consult with your organization, anticipating an interest in the park's cultural resources, proposed NPS actions that might affect those resources, and to provide you with opportunities to learn about and comment on those resources and planned actions. Consultation has been initiated with tribal, state, and local governments; state and tribal historic preservation officers; the Advisory Council on Historic Preservation; other interested federal agencies; traditionally associated peoples; present-day park neighbors; and other interested groups.

The planning group invites your participation along with other members of the Intertribal Fisheries Program in this planning effort. This cultural affiliation with Pictured Rocks National Lakeshore is a significant part of the park's history.

Scoping issues to be addressed by the fire management plan for Pictured Rocks National Lakeshore are included with this letter. Please review this list and provide any comments you may have.

Should you wish to meet personally with a park representative or provide comments, please contact Bruce Leutscher directly by phone at (906) 387-2680 or by email at [bruce\\_leutscher@nps.gov](mailto:bruce_leutscher@nps.gov). Written comments may be mailed to the letterhead address.

We look forward to your comments.

The following tribes received letters:

Bay de Noc Indian Cultural Association

Bay Mills Indian Community of the Sault Ste. Marie Band of Chippewa Indians

Bad River Band of the Lake Superior Tribe of Chippewa Indians

Forest County Potawatomi Community of Wisconsin Potawatomi Indians

Grand Traverse Band of Ottawa and Chippewa Indians of Michigan

Hannahville Indian Community of Wisconsin Potawatomi Indians of Michigan

Ho-Chunk Nation

Keweenaw Bay Indian Community

Lac Courte Oreilles Band of Lake Superior Chippewa Indians

Lac du Flambeau Band of Lake Superior Chippewa Indians

Lac Vieux Desert Band of Lake Superior Chippewa

Little Traverse Bay Bands of Odawa Indians

Menominee Indian Tribe of Wisconsin

Red Cliff Band of Lake Superior Chippewa Indians

Saginaw Chippewa Indian Tribe of Michigan



Sault Ste Marie Tribe of Chippewa Indians  
Stockbridge Munsee Community of Mohican Indians  
St. Croix Chippewa Indians of Wisconsin  
Sokoagon Chippewa Community Mole Lake Band

One written response, from the Lac du Flambeau Band of Lake Superior Chippewa Indians, was received. The tribe indicated that it had no comments related to the FMP.

Phone contact was made with Great Lakes Fish and Wildlife Indian Commission (GLFWIC) biological services director Neil Kmiecek. He indicated that tribes represented by GLIFWC had no comments on the FMP and would not need to review the final FMP. GLIFWC represents the following tribes within the 1842, 1837 and 1854 treaty areas:

Bad River Band of the Lake Superior Tribe of Chippewa Indians  
Red Cliff Band of Lake Superior Chippewa Indians  
St. Croix Chippewa Indians of Wisconsin  
Sokoagon Chippewa Community Mole Lake Band  
Keweenaw Bay Indian Community  
Lac Courte Oreilles Band of Lake Superior Chippewa Indians  
Lac du Flambeau Band of Lake Superior Chippewa Indians  
Lac Vieux Desert Band of Lake Superior Chippewa

Phone contact was made with Tom Gorenflo of the Chippewa/Ottawa Resource Authority (CORA). Mr. Gorenflo indicated tribes located in the lower peninsula of MI have no comment on the FMP. He indicated that PIRO should contact the Bay Mills Indian Community directly and that he would review the draft FMP for the Sault Ste Marie Tribe of Chippewa Indians. A draft FMP and letter were mailed to Mr. Gorenflo, and he indicated that CORA would most likely have no comments. CORA represents the following tribes within the 1836 treaty area:

Bay de Noc Indian Cultural Association  
Bay Mills Indian Community of the Sault Ste. Marie Band of Chippewa Indians  
Grand Traverse Band of Ottawa and Chippewa Indians of Michigan  
Sault Ste Marie Tribe of Chippewa Indians  
Little Traverse Bay Bands of Odawa Indians

Phone contact was made with Bay Mills Indian Community tribal biologist Paul Ripple. He indicated that the tribe had no comments on the FMP.

## **Interdisciplinary Planning Team Members**

Belant, Jerry, Supervisory Biologist, Pictured Rocks National Lakeshore, National Park Service

Bruff, Gregg, Chief of Cultural Resources and Heritage Education, Pictured Rocks National Lakeshore, National Park Service

Gustin, Karen, Superintendent (former), Pictured Rocks National Lakeshore, National Park Service

Hach, Larry, Chief of Visitor Services and Land Management, Pictured Rocks National Lakeshore, National Park Service

Leutscher, Bruce, Biologist, Pictured Rocks National Lakeshore, National Park Service

Northup, Jim, Superintendent, Pictured Rocks National Lakeshore, National Park Service

O'Sullivan, Rod, Environmental Protection Specialist, Midwest Regional Office, National Park Service

Rees, Michael, Natural Resource Specialist, Denver Service Center, National Park Service

Other Agencies:

Michigan Department of Natural Resources, Shingleton Forest Area Office

U.S. Department of Agriculture, Hiawatha National Forest

U.S. Fish and Wildlife Service, Lansing Field Office

U.S. Geologic Service, Munising Biological Station

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