National Park Service
U.S. Department of the Interior

FIRE AND FUELS MANAGEMENT PLANS

Environmental Assessment /Assessment of Effect

July 2005

ALLEGHENY PORTAGE RAILROAD NATIONAL HISTORIC SITE
PENNSYLVANIA

JOHNSTOWN FLOOD NATIONAL MEMORIAL
PENNSYLVANIA

Environmental Assessment
Assessment of Effect
for
FIRE MANAGEMENT PLAN

Allegheny Portage Railroad National Historic Site
And
Johnstown Flood National Memorial

2005

Public Comment
Note to Reviewers and Respondents:

If you wish to comment on this environmental assessment, you may mail comments to the name and address below. This environmental assessment will be on public review for 30 days. Please note that names and addresses of people who comment become part of the public record. If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment. We will make all submissions from organizations, businesses, and individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety.

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INTRODUCTION

Allegheny Portage Railroad National Historic Site

Allegheny Portage Railroad National Historic Site (ALPO) is located in the southwestern portion of the Commonwealth of Pennsylvania in Cambria and Blair Counties. Portions of the Allegheny Portage Railroad are located on both sides of the crest of the Allegheny Front. Drainage east of the Summit flows into the Atlantic Ocean and drainage west of the Summit into the Gulf of Mexico. The Ridge and Valley Physiographic Province topographic features are oriented northeast and southwest. The Allegheny Plateau Province to the west is predominately marked by mountain ridges separated by high, broad plateaus. Approximately 1,261.26 acres of land were set aside by an Act of Congress approved August 31, 1964 (78 Stat. 752) as Public Law 88-456. The legislation was enacted in order to provide for the interpretation and preservation of the remaining portions of the Allegheny Portage Railroad composed of the following: the Skew Arch Bridge, Incline Planes 6, 7, 8, 9 and 10, the Staple Bend Tunnel, and other lands and historic features as deemed necessary to illustrate the significant role of the Allegheny Portage Railroad and the Pennsylvania Mainline Canal in the nation's history. These entities played a vital role in the nation's industrialization in the early nineteenth century. Although the railroad had a short-lived existence from 1834 to 1854, it served as an important link in the Main Line System that connected the cities of Philadelphia and Pittsburg, thereby providing access from the Atlantic Coast to the Ohio and Mississippi Rivers and the expanding markets of the west. In addition, it played a major role in transportation, engineering, and commercial developments. Perhaps most important, it was the first railroad to surmount the then formidable 2, 570 foot high Allegheny Mountain between Hollidaysburg and Johnstown Pennsylvania, significantly reducing the travel time from Philadelphia to Pittsburgh and points west. An engineering marvel, the railroad utilized a series of ten inclined planes in order to overcome the steep grades presented by the mountains. In addition, the Allegheny Portage Railroad pioneered the development and use of the first railroad tunnel in the United States, the use of steel cables, and containerized transport.

In addition to park specific documents, legislation of a broader variety, such as the Historic Sites, Buildings, and Antiquities Act of 1935; and the mandate of the 1916 National Park Service Organic Act to preserve, protect, and interpret cultural and natural resources, are integral to the purposes for which Allegheny Portage Railroad National Historic Site was created.

The following management objectives, as stated in the current General Management Plan (1980), and the Statement for Management (1992) for Allegheny Portage Railroad National Historic Site, constitute the interpretation of the parks authorizing legislation. They state, in part, that the purpose of Allegheny Portage Railroad National Historic Site is to:

- *To use, enhance, and preserve extant cultural and natural resources within the National Park Service units and interpret associated stories that will enable visitors to understand why the Pennsylvania Canal and the Allegheny Portage Railroad were constructed, the technical challenge of building the canal and railroad, and the human experience involved in the events and associated resources*

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- *To identify, conserve, and interpret extant transportation resources and associated stories within the southwestern Pennsylvania region through cooperation with the Southwestern Pennsylvania Heritage Preservation Commission and other organizations to provide an understanding of a nation striving for an integrated transportation network*

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- *To protect and maintain the natural diversity of plants and animals outside of areas managed for primarily cultural resources or developed areas. In areas managed for primarily cultural resources, to protect natural resources through the management of cultural landscapes.*

In addition to the park-wide objectives stated above, a number of corollary management objectives have been developed for separate park units. Those with a potential relationship to the fire management program are stated below.

Staple Bend Tunnel

- *To provide visitors an understanding of regional transportation evolution, related industrial development, and the impacts of these changes through views of the adjacent Conrail line, the mining operation, the presence of pervasive exotic plants, and future related industrial and transportation activities.*

Summit Historical Core

- *To create a representation of the character of the landscape at about 1840, such that visitors understand the spatial relationships between major historic resources, the nature of historic resource utilization (tree-cutting, coal mines, and rock quarries), and experience some sense of the conditions encountered by travelers of the time.*

Greater Summit Area

- *To encourage an atmosphere that is compatible with providing visitors in the Summit historic zone the sense of conditions encountered by travelers at the time.*

Inclined Planes 9 and 10

- *To provide visitors recreational opportunities that will enhance their appreciation of the stories of the railroad, the significance of the geography, and the relationship of natural resources without impairing resource values.*

Inclined Planes 8-10 Corridor

- *To encourage maintenance of the corridor surrounding the portage railroad trace; to compliment the visitor experience of the trace and provide a sense of the travel conditions at the time of the railroad.*

Johnstown Flood National Memorial

Johnstown Flood National Memorial (JOFL) is located in the southwestern portion of the Commonwealth of Pennsylvania in Cambria County. Johnstown Flood National Memorial is situated on the west side of the Allegheny Front on the Allegheny Plateau. Approximately 162.6 acres of land have been set aside by an Act of Congress approved August 31, 1964 (78 Stat. 752) as Public Law 88-456, along with subsequent amendments (88 Stat. 120 April 11, 1992 and P.L. 99-388 August 23, 1986). In addition, P.L. 108-313 of October 13, 2004, provided for the acquisition of additional lands (approximately 24 acres) to the park boundary. The Johnstown Flood National Memorial was legislated in order to commemorate the tragic Johnstown Flood that occurred on May 31, 1889. Torrential rains sent the water level of the South Fork Dam beyond it's water-holding capacity, causing the dam to break and subsequently engulfing downstream Johnstown in a wall of water that resulted in the loss of 2, 209 lives; the greatest natural disaster up to that time in United States history.

In addition to park specific documents, legislation of a broader variety are integral to the purposes for which the Johnstown Flood National Memorial was created. This broader vision is embodied in the Historic Sites, Buildings, and Antiquities Act of 1935 and the mandate of the 1916 National Park Service Organic Act to preserve, protect, and interpret cultural and natural resources,

The following management objectives, as stated in the current General Management Plan (1980), and the Statement for Management (1992) for Johnstown Flood National Memorial, constitute the interpretation of the parks authorizing legislation. They state, in part, that the purpose of Johnstown Flood National Memorial is to:

- *To commemorate and interpret the tragic consequences of the flood, including the devastating loss of life and the destruction of Johnstown.*

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- *To identify, conserve, and interpret flood-related resources in the region through cooperation with the Southwestern Pennsylvania Heritage*

Preservation Commission and other organizations to provide visitors an understanding of the broader stories of transportation, industrialization, capitalization and the consequences of the interplay between development and nature.

- *To protect and maintain the natural diversity of plants and animals outside of areas managed for primarily cultural resources and developed areas*

- *To "maintain the character of the Unger House, spring house, barn-form of the visitor center, and the surrounding landscape on the north abutment area about 1889, to convey to visitors the events at the dam on the fateful day of the flood".*

In addition to the park-wide objectives stated above, a number of corollary management objectives have been developed for park specific areas located in the Memorial. Those with a potential relationship to the fire management program are stated below.

Flood Memorial Boundaries

- *To maintain the character of the Unger House, spring house, barn-form of the visitor center, and the surrounding landscape on the north abutment area at about 1889, to convey to visitors the events at the dam on the fateful day of the flood.*

- *To provide visitors a range of recreational opportunities which will enhance their appreciation of the story of the flood, the significance of geography and the relationship of natural resources, without impairing natural or cultural resource values or the atmosphere of quiet contemplation.*

Greater Memorial Area

- *To encourage preservation of the Lake Conemaugh area and the path of the flood (from key visitor access points) in a way that maintains a visual impression of these areas as they were at the time of the flood (1889) and enhances understanding of the significance of the flood, in cooperation with the Commission and other agencies and organizations.*

Purpose and Need

The purpose of this Environmental Assessment is to ensure that Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial fulfill the requirements of the National Environmental Policy Act of 1969 in the course of implementing the actions described in National Park Service (NPS) Director's Order #18

(DO-18). DO-18 requires that each NPS unit capable of sustaining fire develops a Fire Management Plan (FMP) describing the long-range actions required to prevent destructive wildfires. Neither of the parks has a current and up-to-date fire management plan (FMP). Within this Environmental Assessment, all reasonable alternatives or options for the development of an FMP are explored and the potential impacts of each are described. Analysis of the alternatives outlined in this document will provide a basis for decision-making at the park and regional level and will provide an opportunity for public involvement in the planning process.

Wildland fires occur today through both human-induced and natural means. The proposed fire management plan must be capable of defining the levels of preparedness and attendant procedural actions for wildland fires that provide for human safety and the protection of park resources, both natural and cultural.

Fire is an ecological factor that has forever been present in many North American ecosystems. The lands encompassed by Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial are no exception. Due largely to the absence of fire, the landscape at both of these areas has been modified from that that was existent before the arrival of European settlers. Forests no longer regenerate through the positive effects of fire. Insects and storm damage have impacted present day forests. As a result, many old trees have died as they have senesced; significant fuels have accumulated on the forest floor, and forest composition has been altered. The ignition of hazard fuels in an uncontrolled situation, such as by human occurrence or by lightning could be devastating to the sensitive resources of the park as well as to adjacent lands. In addition, this type of fire poses a real threat to human life.

A variety of fire management activities may be utilized to achieve the protection of park resources. The proposed suitability and implementation of these methods, singularly or in combination, is analyzed in this document. These techniques include: the use of prescribed fire and non –fire (mechanical, manual, and chemical) applications to reduce hazardous fuels; perpetuate the proliferation of native vegetation, and enhance forest and ecosystem health.

The objective for the writing of a fire management plan is to address park issues related to fire management as discussed in the previous paragraph. As previously described, the park must also comply with the requirements of DO-18 and the National Environmental Policy Act in meeting these objectives.

The National Park Service's Management Policy (2001) and Director's Order 18 – Wildland Fire Management, require that each park area with vegetation capable of sustaining fire develop a plan to manage fire on its lands. Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial need to have a comprehensive fire management plan in order to protect natural and cultural resources, as well as the public, employees, and existent park facilities.

This Environmental Assessment has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended; the regulations of the Council on Environmental Quality (CEQ) (40 CFR 1508.9); the NPS *Director's Order 12* and accompanying Handbook, and the National Historic Preservation Act (NHPA) of 1966, as amended (36 CFR 800).

Objectives

Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial are mandated by the National Park Service agency mission to maintain long term protection and preservation for all resources found within their boundaries. The parks have also been tasked to prepare and implement a fire management program that supports this legislative mandate. The objectives of the fire management program that relate directly to the core mission of the parks are:

Allegheny Portage Railroad National Historic Site

1. To preserve and maintain the resources of the Allegheny Portage Railroad to approximate conditions during the 1826-90 period (General Management Plan 1980).

2. To perpetuate natural ecological communities in the park's natural zone, and to enhance the value of these lands as aesthetic buffers around historically significant resources (Resource Management Plan 1998).

3. Conduct a safe and vigorous wildland fire management program with the highest professional and technical standards. (RM-18).

4. Efficiently accomplish resource management objectives through the application and management of prescribed and wildland fires. (RM-18)

Johnstown Flood National Memorial

1. To identify, evaluate, protect, …….the park's cultural resources in a manner consistent with legislative mandates and National Park Service policies. (General Management Plan 1980)

2. To achieve and maintain an overall park environment that compliments the park's historic theme and interpretability (General Management Plan 1980).

3. Conduct a safe and vigorous wildland fire management program with the highest professional and technical standards. (RM-18).

4. Efficiently accomplish resource management objectives through the application and management of prescribed and wildland fires. (RM-18)

Corollary objectives specific to fire management for both parks as mandated through the National Fire Plan (2000) and RM-18 are:

5. Suppress all unscheduled ignitions.

6. Ensure smoke production does not violate state and federal standards; and minimize smoke impacts to park neighbors.

7. Assess and reduce hazardous fuels that pose potential threats to resources to be protected (values at risk).

8. Cooperate with partners and other interested parties on fire management issues.

Scoping Issues and Impact Topics

Issues and concerns affecting this plan were identified by NPS specialists as well as from the input of cooperating and interested parties. Internal scoping was conducted in March 2004, as well as in subsequent discussions. The assembled group of interdisciplinary experts evaluated a variety of different strategies with which to effectively implement a fire management plan for the parks. Discussions relating to the development of a fire management plan for the park were centered upon core management objectives that have been identified in a variety of park management documents and that were discussed in the previous section on objectives.

Neither ALPO nor JOFL have ever had an approved fire management plan nor have they had access to fire management expertise for the purpose of planning fire management activities. As a result, during the internal scoping meeting, a wide variety of issues relating to park management and fire were discussed, many in great detail, by the participants. *The results of the internal scoping process and impact topic development are summarized below.*

Impact Topics Selected for Consideration

- Provide for safety as the paramount objective during all fire management activities, including, safety for firefighters, park visitors, and the adjacent public. This emphasis on safety is mandated by DO-18 and is the highest single priority in any activity involving wildland fire management.

- Comply with state and federal air quality regulations in all fire related actions. Air quality was adopted as an impact topic.

- The protection and preservation of cultural resources and properties is critical to the park mission. As a result, cultural resource protection was adopted as an impact topic and includes historic structures, archeological sites, cultural landscapes, and museum collections.

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- Improve the overall ecological functioning and health of park forests, particularly those that are representative of hardwood forests comprised of oak and mixed oak species. In addition, open fields and successional openings in the park will be evaluated and preserved in relation to their standing within the larger cultural scene as well as for their ability to support and enhance species diversity. The potential exists for impacts, both positive and negative, upon vegetative species in each of these ecosystems. As a result, vegetation was adopted as an impact topic.

- Because the use of prescribed fire and non-fire hazardous fuel reduction to achieve management objectives are new management tools being considered for use in the park, it is important to assess the effect the implementation of these management tools may have on local landowners and adjacent communities. Consequently, the effects of these management practices on local landowners and adjacent communities have been considered as an impact topic.

- The park serves as home to a variety of species of wildlife. Their protection and well-being are important management objectives of the park, thus, the inclusion of wildlife as an impact topic.

- The potential impact of fire management plan alternatives on soils is of concern to park managers and was selected as an impact topic.

- Wetlands are not abundant within the parks, however, they do exist along the riparian zone of the Little Conemaugh River at JOFL and Blair Run Gap and it's tributaries at ALPO. These areas serve as important habitat for birds, wildlife, and vegetative species as well as representing an important part of the parks cultural scene. For these reasons, wetlands and floodplains were selected as impact topics to be included in this assessment.

- Because Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial presently contain species designated as state species of concern, discussions regarding these species were selected as an impact topic.

Impact Topics Dismissed from Further Consideration

The rationale for dismissing specific topics from further consideration is given below.

Prime and Unique Farmlands

In August, 1980, the Council on Environmental Quality (CEQ) directed that federal agencies must assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) as prime or unique. Prime or unique farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. According to the NRCS, there are

no lands contained within either Allegheny Portage Railroad National Historic Site or Johnstown Flood National Memorial that are designated as prime and unique farmlands. None of the management activities proposed by this fire management plan in any way are in derogation of the Farmland Protection and Policy Act which states that "….projects are subject to FPPA requirements if they irreversibly convert farmland (directly or indirectly) to non-agricultural use…" Therefore the topic of prime and unique farmlands was dismissed as an impact topic in this document.

Socioeconomic Environment
The proposed action would neither change local and regional land use nor impact local businesses or other agencies. Implementation of the proposed action, particularly prescribed burning, may require temporary closures of project areas which may, in turn, inconvenience some park visitors. Such closures, however, are likely to be small in size and of very short duration. The impacts to park visitors are regarded as negligible. Therefore, the socioeconomic environment will not be addresses as an impact topic in this document.

Environmental Justice

Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The proposed action would not have disproportionate health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Environmental Justice Guidance (1998). Therefore, environmental justice was dismissed as an impact topic in this document.

ALTERNATIVES CONSIDERED

Overview of Predominant Fire Management Strategies.

The primary goals of fire management are the preservation and protection of human life, property, and resources. In developing a reasonable range of alternatives for implementing a fire management plan, it is important to understand the types of fire strategies that are available to land managers. A discussion of each of the predominant fire management strategies is provided below. Because there are a limited number of strategies available, each alternative may be composed of a combination of strategies as defined in this section.

Wildland fire suppression (aggressive) – This strategy utilizes a variety of tactics in order to achieve control of a wildland fire in the most expeditious manner possible. Primary emphasis is upon limiting the fire to the smallest possible perimeter size. This may entail the use of mechanized equipment (dozers, tractor plows, engines, handcrews, and aerial resources that utilize retardants.

Wildland fire suppression (appropriate management response) – This strategy employs tactics where fire suppression resources utilize opportunities to allow fires to burn into areas where fuels are non-existent or reduced. These areas are typically represented by pre-existing natural and man-made features on the landscape (i.e. streams, trails, roads, railroads right-of-ways, rockslides, riparian areas, or any area with light fuels). This strategy may result in more acreage burned. However, it reduces or precludes the necessity of placing suppression resources in areas where park values at risk may be damaged by their presence, thus preventing a situation where more damage may be caused by suppression efforts than by the effects of the fire itself.

Non-fire treatments – See hazardous fuel reduction

Prescribed fire – Fire intentionally ignited by fire management professionals under specific pre-determined conditions (a *prescription*) in order to meet specific objectives related to hazardous fuels reduction or habitat improvement. A written, approved prescribed fire plan or burn plan is prepared for each separate prescribed fire project application. This burn plan provides the information needed to implement an individual prescribed burn project, and includes measurable criteria, or prescriptions, that define the conditions under which a prescribed fire may be ignited, guides selection of appropriate management responses, and indicates other required actions. Criteria may include safety, economic, public health, environmental, geographic, administrative, social, or legal considerations, each of which is specific to the project being implemented.

A key component of the use of prescribed fire is the requirement of the preparation of a Fire Effects Monitoring Plan. This plan would describe quantifiable fire effects and methods for monitoring vegetation to determine if the desired outcomes were being achieved. If, in the course of implementation of a Fire Management Plan (FMP), Fire Effects Monitoring yields data that reflects negative impacts to the resources of the park, a new plan would be written to reduce or cease the use of prescribed fire within the park (the adaptive management technique).

Prescription – A pre-defined range of environmental variables that must be present in order for a prescribed fire to be implemented. (For example; ambient air temperature, relative humidity, fuel moisture, mixing heights, transport speeds, wind direction, fuel loading).

Hazardous fuel reduction – Hazardous fuel accumulations accrue through a variety of environmental processes. The most common is the natural accumulation of fuels over a long period of time, usually exacerbated by the total suppression of wildland fire. These accumulations can also be created through the cumulative action of such events as wind, insect damage, and ice and snow. Heavy fuel loadings create a significant wildland fire hazard since any fires occurring in these areas burn with intensities and spread rates that often are beyond the capabilities of suppression resources to effectively manage. In addition, fires of this type are much more prone to damage

vegetation, soils, and forest resources through the intense heat they generate and the longer residence times they produce during the life of the fire. Fuel loading can be quantitatively measured and then reduced to safe levels through the use of a variety of techniques. Depending upon location and amount of excess fuel, manual hazard fuel reduction methods or prescribed fire may be utilized effectively, either individually or in combination. In addition, herbicide application may also be a part of the treatment regime. This process is referred to as *integrated fuels management*. For example, an extremely effective tool in the maintenance of some vegetation communities is the manual hazard fuel reduction and removal of excess fuel through hand-cutting, accompanied by application of low intensity prescribed fire. Hazardous fuel accumulations may also be manually cut, piled, and then burned when environmental conditions are favorable for their removal.

Integrated Fuels Management – See above (hazardous fuel reduction).

Chemical treatments – The use of herbicides to kill unwanted vegetation, such as invasive species, is an effective treatment. Herbicide use is often carried out under the guidance of an Integrated Pest Management (IPM) plan; however, there can be a beneficial overlap between IPM and fire management. Chemical treatments are often used as a follow-up to an application of prescribed fire or mechanical cutting in order to eliminate stump and root sprouting that may occur after treatment. For example, the use of prescribed fire to place stress on black locust saplings followed by a treatment of individual stumps with an indicated herbicide is very effective in reducing the proliferation of this species in those areas where the management objective is to maintain open vistas for historic scene preservation.

Herbicides may also be effectively used in broadcast application in order to eliminate selected invasive species. Re-seeding with a desired species is then undertaken, followed by an application of prescribed fire in order to aid and maintain the proliferation of native species. This technique is most commonly used in the restoration of native warm season grass communities that occur in areas where the restoration of historic grass communities is a priority. All use of herbicides will be consistent with the guidelines established in the National Park Service Natural Resource Management Guideline, NPS-77 and the Exotic Plant Team Operations Manual.

Wildland Fire Use – Natural ignitions (lightning) are allowed to burn under prescribed environmental conditions in order to meet park management objectives.

In each of the alternatives that follow, predominant fire management strategies are discussed as they relate to operational implementation of each alternative. Each of the alternatives discussed will address the park's need for fire management preparedness as governed by DO-18.

Alternative I - No-Action (Aggressive fire suppression only)

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Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial currently have no fire management plan (FMP). Since the parks are mandated

by DO-18 to prepare an FMP by December 2004, a fire management plan needs to be prepared in order to incorporate preparedness actions, program requirements, and formats as outlined in DO-18. The sole fire management strategy under this alternative would be to continue to suppress all wildland fire ignitions using the most expeditious means necessary (aggressive fire suppression). Under the no action alternative, the fire management plan would not address any actions for the reduction of the accumulation of hazardous fuels, nor would it permit prescribed fire for resource management purposes. Under the guidance of an already approved plan for management of invasive vegetation, chemical treatments may be used to meet management objectives.

Alternative II – Appropriate Management Response and Integrated Fuels Management (Preferred Alternative)

This alternative would allow for the preparation of a fire management plan that includes wildland fire management preparedness actions as well as detailed procedural actions during wildland fire events. In this alternative, the suppression of all wildland fire ignitions would utilize an appropriate management response. It would also provide a detailed action plan for preparedness and suppression of wildland fires including the mitigation of impacts, safety, and resource protection. The use of prescribed fire, either individually or as a part of an integrated management approach, would be utilized to accomplish the full range of natural and cultural resource management and hazardous fuel reduction goals. All prescribed fires would be planned and approved consistent with the method and format required by RM-18. Wildland fire use would not be permitted.

This alternative would include the use of prescribed fire for the purpose of hazardous fuel reduction. The use of prescribed fire would allow the reduction of hazardous fuels that have accumulated in the absence of naturally occurring fires and decrease the likelihood of a catastrophic wildland fire that potentially presents a danger to human life as well as to park/private resources. In many ecosystems in the eastern United States, normal precipitation patterns and low to normal fuel loadings preclude the potential for serious wildland fires. However, in those years when drought is present, the likelihood of a human – caused wildland fire is increased significantly. This increased potential for fire ignition and spread is intensified by the presence of fuel loadings outside of the normal range. Generally this means that fuel loading for deciduous and mixed deciduous forests is greater than ~16 tons/ acre but <25 tons/ acre. Prescribed fire treatments may be applied on a rotational basis as a means of treatment to remove these excess fuels and enhance ecosystem variability. Prescribed fires whose principal purpose is the reduction of hazardous fuels are generally implemented in such a manner that only ground fuels are consumed, ensuring that little or no ignition occurs in the crown structure of the forest.

In those areas where fuel loading is heavier (26> tons/acre), particularly near structures, manual reduction methods will normally be utilized to reduce fuel loading. Where access is available, fuels will be removed and disposed of by removing them from the site. In those areas where access is limited, piles of cut debris will be constructed for

burning at an opportune time. Generally this occurs during the winter months when the ground is snow covered or wet from winter precipitation, temperatures are low, and winds are minimal.

The use of prescribed fire to achieve resource benefits and cultural scene restoration and preservation will generally be confined to the restoration and maintenance of herbaceous species and native warm-season grasses at selected areas in the park. The presence of native herbaceous plant species, particularly warm season grasses, is an important component of the cultural scene and also serves as important habitat for birds and insects. Treatments with prescribed fire in the early spring on a 1-3 year rotation have been shown to be very effective in propagating many species and increasing the density of existing populations. Studies show that species diversity is also enhanced through the application of prescribed fire. Prescribed fire may also be used to reduce invasive species in those areas where treatment is deemed beneficial.

Forests provide an important historical and natural resource component of the park, preserving the cultural scene of the area and putting the visitor in an appropriate contextual place in the park's story. Promoting the rehabilitation and reproductive success of northern hardwood and remnant oak-hickory forests is a goal identified in the park's resource management plan. One of the broad goals of the National Park Service has been the protection and preservation of natural resource systems. By using prescribed fire to enhance current forest eco-systems, other natural resource benefits would accrue. For example, wildlife habitat would be enhanced through the use of prescribed fire, increasing the number and palatability of various herbs and grasses upon which many species depend for food and forage. As a result, wildlife populations would be benefited.

A description of proposed prescribed burn/ non-fire hazard fuel reduction units proposed under this alternative (5-year plan) is located in Appendix B of this document.

In accordance with Chapter 12 of RM-18, a monitoring plan will be developed and implemented to monitor the vegetation associated with each treatment area, regardless of the treatment method used. This monitoring will allow managers to determine if project objectives have been met and, if not, how the treatment can be altered to meet stated objectives.

Alternative III – Appropriate Management Response and Non-Fire Fuels Management

The fire management program under this alternative would, as in Alternative II, suppress all wildland fire ignitions using the appropriate management response. It also allows for the use of non-fire fuel reduction such as mechanical methods and the use of chemical herbicides, either individually or in combination, to achieve park cultural landscape, natural resource, and fuels management objectives. Prescribed fire would not be used in this alternative.

Alternative IV – Wildland Fire Use

Under this alternative, a full range of available fire management strategies including appropriate management response, wildland fire use (the use of naturally occurring wildland fire ignitions to meet resource management objectives) and prescribed burning would be used. This alternative also allows for the use of mechanical treatments and chemical herbicides.

Alternative V – No Management

Under this alternative, all unscheduled wildland fire ignitions (lightning) would be allowed to burn unimpeded by management actions until objectives were met. Prescribed fire and non-fire hazardous fuel reduction would not be utilized in this alternative.

Alternatives Considered and Rejected

Alternative IV – Wildland Fire Use

This alternative has been considered and rejected because it is not feasible to safely manage a wildland fire to achieve resource benefit with the limited size and staff of ALPO/ JOFL.

Alternative V – No Management

This alternative has been considered and rejected because it could threaten the integrity of ALPO/ JOFL cultural resources and cultural landscapes, and does not ensure the safety of park visitors, employees or surrounding landowners.

Environmentally Preferred Alternative

The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act of 1969 (NEPA), which is guided by the Council on Environmental Quality (CEQ). The CEQ provides direction that "the environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101" (*Forty Most Asked Questions Concerning Council on Environmental Quality's National Environmental Policy Act Regulations*, 1981.)

Section 101 of the National Environmental Policy Act states that "…it is the continuing responsibility of the Federal Government to … (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradations, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our

national heritage and maintain, wherever possible, an environment which supports diversity and variety of individual choice; (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources." The environmentally preferable alternative for this project is based on these national environmental policy goals.

Alternative I - This alternative would aggressively suppress all wildland fires. It would allow for an increased potential of ground disturbing activities during wildland fire suppression operations due to the effects of the use of heavy equipment (bulldozers and tractor plows) used in aggressive suppression activities. Hand line construction by suppression crews also may lead to increased ground disturbance in this alternative. Therefore, this alternative would not result in the same level of protection for natural and cultural resources and the public over the long-term as would occur with the preferred alternative. Consequently, this alternative does not satisfy Provision 4 of NEPA's Section 101.

Alternative II - Appropriate Management Response and Integrated Fuels Management would provide for continued suppression of all unscheduled wildland fire ignitions using the most appropriate management response. This would allow managers to choose a suppression alternative that would minimize ground and vegetation disturbance activities. This alternative would also provide for use of prescribed fire, non-fire methodologies such as mechanical fuel reduction and chemical herbicides, used individually or in combination, to achieve natural resource, cultural landscape and fuel management objectives. The wildland fire suppression operations as utilized in this alternative would ultimately provide for better protection of natural and cultural resources, health and safety of visitors, park neighbors and employees because of their ability to reduce hazardous fuel loadings in a proactive manner *before* a catastrophic wildfire event occurs. In addition, the natural and cultural resource values of the park may be enhanced through the use of prescribed fire as a tool to propagate native warm season grass populations, reduce or remove invasive species, and preserve and enhance the mixed oak and northern hardwood forests in the park. This alternative would best satisfy each of the provisions of the national environmental policy goals.

Alternative III – Appropriate Management Response and Non-Fire Fuels Management would provide the same elements as Alternative II, however this alternative would not allow the use of prescribed fire to achieve natural resource, cultural landscape and fuels management objectives. This alternative excludes one of the potential methods of cultural and natural resource protection that has proven to be successful and at the same time exert a low impact on park resources. Consequently, this alternative does not satisfy provisions 3, 4 and 6 of NEPA's Section 101.

The environmentally preferable alternative is Alternative II – Appropriate Management Response and Integrated Fuels Management because it surpasses Alternative I and Alternative III in realizing the full range of national environmental policy

goals as stated in δ101 of the National Environmental Policy Act. The use of prescribed fire to enhance native herbaceous species such as warm season grass populations, reduce and remove invasive plants, enhance forest habitat, and reduce heavy fuel accumulations provides a clear advantage over the other alternatives that do not utilize techniques that closely replicate natural processes. A rejection of the preferred alternative may result in further degradation of natural resources and add to the accumulation of hazardous fuels. Admittedly, manual methods of hazardous fuel reduction can be effective, but, in and of themselves, they do not offer as many of the advantages that can be attributed to prescribed fire. Careful application of prescribed fire is considerably more cost effective than manual hazardous fuel reduction, and can be applied in a manner that enhances the safety of the crews doing the work. The negative impacts of smoke from prescribed burns cannot be totally eliminated, but it can be minimized through the use of a variety of implementation techniques that relate to time of ignition, ignition pattern used, fuel moisture at the time of the burn, and adherence to the environmental parameters of prescriptions that relate to the height of convection column rise and dispersion of pollutants.

ENVIRONMENTAL CONSEQUENCES

Park managers have reviewed critical cultural and natural resources that may be impacted through the implementation of a fire management plan. Impact topics have been selected on the basis of the significant resources of the park and the potential for beneficial or adverse effects on them by each alternative. Internal Scoping meetings held in the park determined the identified impact topics as having particular relevance for Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial.

Cumulative Impacts

Impacts to cultural and natural resources may be direct, indirect, or cumulative. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later in time or farther removed from the place, but are still reasonably foreseeable.

The Council on Environmental Quality (CEQ), which implements the National Environmental Policy Act, requires assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts were determined by combining the effects of each of the alternatives with other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7). As a result, it was necessary to identify other ongoing or reasonable foreseeable future projects within the Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial area and, if applicable, the surrounding region. Cumulative impacts are considered for all of alternatives.

Impairment of Park Resources or Values

In addition to determining the environmental consequences of the preferred and other alternatives, National Park Service policy (Management Policies, 2001) requires analysis of potential effects to determine whether or not actions would impair park resources.

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. National Park Service managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting park resources and values. However, the laws do give the National Park Service the management discretion to allow limited impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park. This applies as 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 parks, that discretion is limited by the statutory requirement that the National Park Service must leave park 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 park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute impairment. An impact would be more likely to constitute impairment to the extent that it has a moderate or severe adverse effect upon a resource or value whose conservation is:

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

Determinations as to impairment are included for each of the following impact topics under each alternative.

IMPACT SUMMARY

The impacts of implementation of the proposed Alternative for the Fire Management Plan are described and analyzed in this section.

Table 1 Summary Comparison of Impacts

Objective	Alternative I (Beneficial)	Alternative II (Beneficial)	Alternative III (Beneficial)
Provide for firefighter and public safety	Short-term safety would not be affected by the adoption of this alternative.	Firefighter safety in the long term is enhanced through use of mechanical treatments to reduce hazardous fuels, thus reducing the threat of large wildland fires driven by heavy accumulations of those fuels. Benefits are enhanced to the maximum extent possible through use of prescribed fire, mechanical treatments, and chemical use to reduce hazardous fuels. The ability to employ an appropriate management response provides the greatest protection of firefighter and public safety in suppression actions. Wildland fire prevention activities provide for long-term safety.	Firefighter safety in the long term is enhanced, though not to the same extent as in alternative II. In addition, the ability to employ an appropriate management response provides the greatest protection of firefighter and public safety in all suppression actions.
	(Adverse)	**(Adverse)**	**(Adverse)**
	Aggressive fire suppression poses greater risks to personnel than an appropriate management response by placing personnel in situations where fire control actions allow little flexibility for options in the decision-making process. Hazardous fuels may actually increase in the long term creating a greater hazard through the perpetuation of aggressive fire suppression.	Personnel will be exposed to short term impacts of working with power equipment, heavy lifting, and exposure to prescribed fire operations.	Inability to utilize prescribed fire reduces ability to accomplish fuel reduction throughout the park to the maximum extent. As a result, fuel loads may increase, with an increased potential for wildfires. Moderate impacts to risk in the long term for suppression resources.
Air Quality(avoid violation of air quality standards)	**Alternative I (Beneficial)**	**Alternative II (Beneficial)**	**Alternative III (Beneficial)**
	Aggressive suppression may limit the size of wildland fires reducing the amount of smoke produced to low levels in the short term. Because there is no prescribed fire in this alternative, there will be no smoke impacts from that activity.	Because fuels are removed through the combined effects of an integrated program of fuels management, impacts would be short-term and minor to moderate in those areas that have been treated. Generally, more fuels can be treated with this alternative.	Similar to Alternative II, except that not as much fuel is removed due to the lack of the availability of prescribed fire as a management tool. As in alternative I, there will be no smoke impacts from prescribed fire.
	(Adverse)	**(Adverse)**	**(Adverse)**
	Aggressive suppression of fires allows for the gradual build-up of fuels, thus creating the production of longer lasting and higher volume smoke impacts when wildland fires do occur. This may occur at	Short term, minor impacts from smoke produced as a result of prescribed fires will result.	Impacts will still occur, though their effects will be moderate, both in terms of intensity and exposure. Because prescribed fire is not utilized as a management tool to reduce hazard fuels in this alternative, there would be no additional impacts due to smoke

	times when environmental conditions favor stagnation and lack of dispersion.		from prescribed fires; however, this benefit may be offset by the fact that not as much fuel is removed, thus increasing the potential for smoke intensity and duration when wildland fire does occur.
Protect and Preserve Cultural Resources (historic structures, archeological resources, cultural landscapes, collections)	**Alternative I (Beneficial))**	**Alternative II (Beneficial)**	**Alternative III (Beneficial)**
	Historic Structures: Aggressive suppression of wildland fires may protect historic structures from immediate effects of a wildland fire in the short term. This would be accomplished chiefly through the construction of protective fireline and would constitute a moderate beneficial impact. **Archeological Resources**: Aggressive suppression could lead to short term protection and would be achieved largely through reduced potential for a wildland fire impacting the resource area. Minor beneficial impact in the short term. **Cultural Landscapes:** Fireline construction would be used to protect these resources. Minor short-term beneficial impact. **Collections:** Because collections are stored in structures, the impacts would be the same as in the historic structures section.	**Historic Structures:** Moderate long-term beneficial impacts to historic structures from mechanical and prescribed fire treatments would occur. These activities can be carefully planned and executed at appropriate times and locations. The use of appropriate management response in unplanned ignitions reduces the possibility of adverse impacts caused by aggressive suppression activities. This alternative should result in the lowest level of potential adverse impact upon historic structures. **Archeological Resources:** This alternative would have moderate to major beneficial impacts upon archeological resources by allowing suppression resources the flexibility to manage wildland fires in a manner that minimizes exposure to heavy equipment and ground disturbing techniques. Hazardous fuel reduction achieved through a combination of both mechanical treatment and prescribed fire could be tailored to the site specific resource, thus maximizing protection. **Cultural Landscapes:** By utilizing suppression activities that take advantage of natural fuel breaks, more invasive ground disturbance suppression activities are avoided. Prescribed fire is particularly effective in restoration of the historic vegetative character of these landscapes (both field and forest) and helps preserve the open character of the fields as well as enhancing the oak hickory forest types. This alternative provides moderate to major beneficial impacts on cultural landscapes. **Collections:** Because collections are stored in structures, the impacts would be the same as in the historic structures section.	**Historic Structures**: This alternative would provide minor beneficial impacts to historic structures resulting from mechanical treatments. The potential exists for incrementally greater impacts from foot traffic and mechanical devices due to the exclusion of prescribed fire. Use of appropriate suppression response in unplanned ignitions reduces possibility of adverse impacts due to suppression activities. **Archeological Resources**: The alternative would have moderate beneficial impacts upon archeological resources by allowing suppression resources the flexibility to manage wildland fires in a manner that minimizes exposure to heavy equipment and ground disturbing techniques. Hazardous fuel reduction achieved by mechanical treatment could be tailored to the site specific resource, thus allowing for effective protection. **Cultural Landscapes:** By utilizing suppression activities that take advantage of natural fuel breaks, more invasive ground disturbing activities are avoided. Hazard fuel reduction and manual manipulation of forest systems can enhance the cultural scene found in oak hickory forest systems in the short term. This alternative provides minor beneficial impacts on cultural landscapes. **Collections:** Because collections are stored in structures, the impacts would be the same as in the historic structures section.

	(Adverse)	**(Adverse)**	**(Adverse)**
	Historic Structures: This alternative allows the potential for major adverse impacts resulting from aggressive suppression activities. Heavy accumulations of fuel may expose historic structures to the potential for significant long term major impacts as a result of increased fire potential and severity. **Archeological Resources**: Because these types of resources can be damaged seriously from ground-level suppression activities such as fireline construction, moderate long-term impacts could occur. **Cultural Landscapes:** Under this alternative, no pro-active activities would take place to protect these resources in the long-term. Impacts would increase over time due to the build-up of hazardous fuels, thus setting the stage for more destructive wildfires. Impacts would be long-term and moderate to severe. **Collections:** Because collections are stored in structures, the impacts in this alternative would be the same as in the Historic structures section.	**Historic Structures**: Even when appropriate management response strategies are utilized in fire suppression, there is still potential for minor impacts to historic structures in the short term. The use of appropriate management response in unplanned ignitions reduces possibility of adverse impacts caused by aggressive suppression activities. Although negligible, the potential for adverse impacts to historic structures from mechanical and prescribed fire treatments exist. Since these activities can be carefully planned and executed at appropriate times and locations, the potential for adverse impacts is greatly reduced. This alternative should result in the lowest level of potential adverse impact upon historic structures. **Archeological Resources**: Mechanical and prescribed fire operations have the potential to expose these types of resources to the negative effects of weather as well as exposing them to potential predation by relic hunters and artifact seekers. Impacts can be classified as minor and short-term. **Cultural Landscapes**: Short term adverse minor visual impacts could result from the use of this alternative. Generally speaking, areas such as native grass fields would recover and green-up in two weeks or less, while forest areas might take considerably longer to recover from the visual effects of a prescribed burn. This would include the presence of dead trees (snags) and blackened scorch marks on tree trunks. **Collections:** Because collections are stored in structures, the impacts in this alternative would be the same as in the Historic structures section.	**Historic Structures:** In this alternative, there is potential for negligible short-term adverse impacts to historic structures from mechanical treatments, though a potential exists for incrementally greater impacts from foot traffic and mechanical devices with the exclusion of prescribed fire. Use of appropriate suppression response in unplanned ignitions reduces possibility of adverse impacts due to suppression activities. **Archeological Resources**: Mechanical hazard fuel reduction methods have the potential to disturb archeological resources through the cumulative effects of increased foot traffic and mechanized equipment use. Costs for the manual reduction of hazardous fuels are often prohibitive, often resulting in long periods of non-treatment and inactivity. Minor to moderate short to long-term adverse impacts can occur. **Cultural Landscapes:** Greater reliance on invasive mechanical measures (such as mowing) to modify and/ or enhance cultural landscapes increases the potential for damage to resources through impaction of soil. The inability to deliver ecological benefit through processes that enhance understory components of the oak hickory forest system, such as prescribed fire, may cause a reduction in the reproductive capabilities of these important cultural landscapes. Moderate long term adverse impacts may result. **Collections:** Because collections are stored in structures, the impacts in this alternative would be the same as in the Historic structures section.
Vegetation	**Alternative I (Beneficial)**	**Alternative II (Beneficial)**	**Alternative III (Beneficial)**
	Short-term impacts on vegetation would not be effected by the adoption of	This alternative would be beneficial in maintaining viability in the oak hickory forest and	Impacts from mechanical treatments should be short-term and negligible to minor. Selective

	this alternative.	forest understory vegetation. The use of low-intensity prescribed fire, combined with selective cutting of undesired species, and their subsequent treatment with chemicals, is expected to favor oak and hickory reproduction. Open areas in the park would be enhanced through the restoration of native warm season grasses and from changes in patterns of plant succession. Encroaching species would be reduced. Impacts from prescribed fire and mechanical treatments should be short-term and negligible to minor. Use of appropriate management response should reduce potential suppression-related impacts.	cutting of undesired species will favor oak and hickory reproduction, though not to the extent as in Alternative II.
	(Adverse)	**(Adverse)**	**(Adverse)**
	Aggressive suppression activities have the potential to cause local and minor adverse impacts. Oak hickory forests would become decadent with attendant loss of ecological diversity and structure. Long term control of wildland fires would become more difficult due to additional fuel loading. Open areas in the park could become smaller due to processes of vegetative succession. Ecosystem diversity would not be optimized.	The potential for the short-term introduction and proliferation of invasive species is present in this alternative. There is a reduced benefit to those species that are not fire–tolerant.	The potential is greater for adverse impacts due to increased foot and/or machine traffic, if more invasive forms of mechanical reduction are utilized. Use of appropriate management response should reduce potential suppression-related impacts. Oak hickory forests and open areas will not benefit from the use of the restorative benefits of prescribed fire. In addition, some sprouting of unfavorable species will occur.

Adjacent Communities and Landowners	**Alternative I (Beneficial)**	**Alternative II (Beneficial)**	**Alternative III (Beneficial)**
	The implementation of this alternative would have little or no short term affect on park neighbors and adjacent communities since this alternative would be one of continuation of current operations. In the long term, the increased potential for wildland fire, accompanied by public development along the park boundary, could lead to moderate long term benefit through the development of cooperative fire suppression and training in order to meet the increased wildfire risk potential.	Local communities and landowners would accrue moderate long term benefit from the utilization of prescribed fire and hazard reduction in areas along the park boundary. Increased public participation in the protection and perpetuation of park natural and cultural resources as a means to ensure the same benefits for their own lands would result. Positive results of this cooperative protection effort would be directly proportional to the effort expended in program development and implementation at the park level.	The implementation of this alternative offers many of the benefits of both alternatives I and II, without the potential negative effects that can result from prescribed fires that escape control or exceed intensity. This alternative offers minor long term beneficial impacts.
	(Adverse)	**(Adverse)**	**(Adverse)**
	The implementation of this alternative would eventually result in the degradation of park resources to the extent that the potential for a catastrophic wildland fire and subsequent loss of valuable natural and cultural resources could occur, both in and outside of the park. This could directly impact private landowners and the public outside of the park as well as park visitors and constitutes a moderate to major adverse impact.	The potential for a prescribed fire escape and/ or the impacts of an improperly executed prescribed burn could lead the public to question the veracity of implementing this alternative. As a result, this alternative might not be implemented which would result in an increased risk to developments both in and outside of the park, particularly along the boundary where public development is expected to take place in the future. These impacts could be major and long term, but could be mitigated by an effective proactive education effort.	Although, at first glance, this alternative might seem attractive to the general public, a closer examination reveals that its implementation could have long term moderate to major impacts upon park and local community resources. Oak hickory forests would continue to reach a decadent state, and open fields would be reduced in size and vegetative composition. These changes would be accompanied by a general reduction in species composition and diversity of all types. Since these types of changes, over time, occur spatially across landscapes, impacts would most likely have an effect on local communities as well as the park.

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Wildlife	**Alternative I (Beneficial)**	**Alternative II (Beneficial)**	**Alternative III (Beneficial)**
	Lack of prescribed fire and aggressive suppression of wildland fire favors fire intolerant species, particularly those that thrive in non-disturbance ecosystems. Long term minor impacts result.	Increased diversity and abundance of species will occur through an improvement of habitat. This applies to both forest as well as open field systems. An elevation in reproductive rates will result from an increase in nutrient availability and habitat improvement. Long term moderate beneficial impacts result.	Long term minor habitat improvements can be expected, though these may be limited dependent upon funding for hazardous fuel reduction projects. Fire intolerant species will benefit in the short term.

	(Adverse)	**(Adverse)**	**(Adverse)**
	Fuel loading levels will increase exponentially with time. Long term major impacts on wildlife, driven by the accumulation of hazardous fuel loadings, cause wildland fires to exhibit fire behavior and spread rates that are difficult to suppress. As a result, wildland fires will burn with greater intensity and for longer periods of time. Loss of vegetation and the wildlife that utilize it, both as food and for cover, can be expected when this occurs. Wildlife diversity and abundance will remain low in the park.	Some mortality of individuals may occur during prescribed fire operations. These are generally negligible and short term in their impact and isolated in scope.	The major adverse long term impact regarding this alternative is the inability to utilize those management tools, such as prescribed fire, that replicate natural processes and, as a result, produce an increase in wildlife habitat and species diversity. Impacts will not be as dramatic as those in alternative I, but species diversity and abundance will remain at low levels.
Soils	**Alternative I (Beneficial)**	**Alternative II (Beneficial)**	**Alternative III (Beneficial)**
	There will be no soil disturbance in the short term occurring unless and until wildland fires occur. Negligible short term impact.	The use of appropriate management response suppression techniques during wildland fire suppression minimizes impacts to soils through alternative strategies and tactics that minimize such soil disturbance activities such as the use of mechanized equipment and handline construction. In addition, in areas where soils are more prone to damage, this alternative allows for the ability to avoid the area altogether, engaging in fire suppression activities on more favorable ground. Prescribed fire removes hazard fuels and greatly reduces the potential for intense wildland fires that might otherwise have adverse impacts upon soils. The use of prescribed fire enhances native warm season grasses thus protecting soils from erosion and potential deleterious effects of some invasives. The use of prescribed fire also reduces the reliance upon mechanical and manual methods of hazard fuel reduction, thus reducing foot and mechanized equipment	The same as alternative II except that the inability to utilize prescribed fire limits the potential benefits that would otherwise accrue through the implementation of those strategies and tactics. Minor to moderate impacts in the long term.

		impacts on soils. Moderate impacts in the long term..	
	(Adverse)	**(Adverse)**	**(Adverse)**
	The use of aggressive suppression strategies and tactics may cause more disturbances of soils than in the other alternatives. This effect is potentially exacerbated by the suppression-only policy of this alternative that allows fuels to buildup on the soil surface, creating potential for wildland fires that burn with more intensity and for longer periods of time, thus impacting soils in a negative manner. Dependent upon environmental conditions and fireline intensity, moderate to major impacts on soils may occur.	Soil stability may be disturbed in the short term. The removal of some vegetation through the use of prescribed burning can increase the susceptibility of soil to erosion. These effects can be mitigated through seeding and other erosion prevention strategies. Minor impacts overall with the implementation of this alternative.	Due to increased reliance upon hazard fuel removal techniques that require the use of personnel and mechanized equipment, the potential for soil disturbance is increased. Because these techniques may not be able to be implemented in some areas due to limited access, lack of resources needed to accomplish the work, inadequate funding, etc, fuel accumulations may continue to increase over time creating potential for wildland fires that burn with more intensity and for longer periods of time, thus impacting soils in a negative manner. Moderate impacts overall with the implementation of this alternative.
Floodplains And Wetlands	**Alternative I (Beneficial)**	**Alternative II (Beneficial)**	**Alternative III (Beneficial)**
	There might not be disturbance of wetlands and wetland systems in the short term due to the lack of wildland fires. Depending upon fire intensity, location, and time of year, invasive plant populations might not be encouraged to proliferate, since inappropriately placed and timed wildland fires encourage the proliferation of some invasives through site disturbance.	The ability to utilize appropriate management response strategies and tactics in wildland fire suppression largely avoids the unnecessary impacts associated with aggressive fire suppression tactics and strategies. Hazardous fuels may be removed incrementally and at the appropriate time and place for overall ecosystem benefit. In addition, invasive species could be dealt with in the same beneficial manner. Ecosystems may accrue enhanced minor to moderate benefit in the long term.	Same as Alternative II, except that long term ecological benefits are reduced through the inability to utilize prescribed fire as an ecosystem enhancement tool. As a result, only minor short term benefits are likely to accrue.

	(Adverse)	**(Adverse)**	**(Adverse)**
	The use of aggressive wildland fire suppression strategies and tactics can have short to long term minor to moderate negative impacts upon wetlands. This is achieved largely through disturbance caused by fireline construction, both by personnel and mechanized equipment, and through the use of chemical fire retardants and fire suppressants.	The ability to utilize an integrated approach to fire management, allows managers the ability to minimize the negative impacts of suppression activities, prescribed burns, and various non-fire treatments. The use of prescribed fire at the wrong place and/ or the wrong time could result in short term negative impacts on wetlands and floodplains, though these would be minor in nature and would be "repaired" in relatively short time by a healthy ecosystem.	Non-fire fuel and vegetation manipulation techniques, while effective, are difficult to implement across broad ecosystem landscapes, their cost is high, drawdown on personnel resources needed for implementation is high, and effectiveness is often short term and limited unless timely follow-up processes are adhered to. This may not always be possible due to management constraints imposed by budget reductions, lack of personnel, and the lack of appropriate environmental conditions.
Threatened and Endangered Species **(Species of Concern)**	**Alternative I (Beneficial)**	**Alternative II (Beneficial)**	**Alternative III (Beneficial)**
	In the short term, lack of wildland fires would have little or no appreciable impact upon species of concern.	Through the implementation of this alternative, long term ecosystem processes would be enhanced. Benefits would be moderate and would likely occur in the long term.	Long term ecosystem enhancement, on which many species of concern ultimately depend, may be restored on a select basis, though not to the extent as in alternative II.
	(Adverse)	**(Adverse)**	**(Adverse)**
	In the long term, minor to moderate negative impacts could result for many species as a result of the potential damage inflicted by aggressive wildland fire suppression strategies and tactics, spread and proliferation of invasive species, and lack of ecosystem restorative process in both wetland and forest habitats which would indirectly affect some species.	Short term negligible impacts could accrue due to the implementation of some prescribed fire and non-fire treatments; primarily resulting from smoke and the presence of personnel in and around habitat areas. These activities can be mitigated depending upon timing of treatments.	Lack of the ability to use prescribed fire limits the potential for the breadth and scope of ecosystem restoration. The long term loss of wetland and forest habitat may have minor short to long term impacts upon some species.

Impact Analysis

1. Provide for Firefighter and Public Safety

Affected Environment.

Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial do not currently have a Fire Management Plan. However, all National Park Service areas capable of sustaining wildfire are required to have a fire management plan in place by the end of CY 2004. The overriding goal of this plan is to provide for the protection of park resources and provide a safe environment for visitors, park personnel, and adjacent property owners. Safety is always number one!

Methodology.

All available information on wildland fire operations and safety was compiled. Intensity of effects is defined below.

Negligible – Impact barely detectable and not measurable; if detected, would have slight effects.

Minor – Impact measurable but short-term and localized. No mitigation measures would be necessary.

Moderate – Changes in safety would be measurable and would have consequences to personnel and resources. Mitigation measures necessary and likely effective.

Major – Changes in safety would be measurable and would have substantial consequences to resources. Mitigation measures necessary and success of measures not assured.

Cumulative – Impacts, though negligible, add up though time becoming minor to major and may be hazardous and irreversible.

Regulations and Policies.

Current laws and policies require that the following conditions be achieved in the park:

Desired Conditions: Park natural and cultural resources, including visitors, personnel, and adjoining landowners would be protected from unsafe practices emanating from within park boundaries.

Source – NPS DO-18 (2003).

Impacts of Alternative I - No-Action

Impact Analysis

Under the no-action alternative, a fire management plan would be developed that would address safety issues involved with preparedness for wildfires and firefighter training. No hazardous fuel reduction or wildfire prevention would be adopted. Under this alternative the safety of firefighters would be enhanced in the short term due to less exposure to fire. However, there would be a moderate to major long term risk to both the general public and firefighters as a result of the accumulation of fuels that may increase the seriousness of wildfires that occur. While the risk of wildfires is relatively low, should one occur, the present and future accumulations of fuels in some areas is sufficient to seriously jeopardize human life, property, and resources. Firefighters would be forced to aggressively suppress ignitions that might be beyond their effective capability to safely suppress, thus significantly increasing the threat to firefighter and public safety. Overall, this would be a moderate to major adverse impact.

Cumulative Effects

The accumulation of forest fuels over time presents a greater risk to firefighters with this alternative, since firefighters are working under a suppression strategy that dictates aggressive suppression such as line construction and the extinguishing of residual fires, regardless of the intensity and size of the fire. Since many fire suppression agencies outside of the park employ this type of response, the use of this alternative could lead to a continued accumulation of hazardous fuels across the general landscape and, hence greater potential for large fires and increased risk to suppression personnel. Active logging still takes place along areas of the park boundary, resulting in sizeable accumulations of logging debris and woody material, often providing conditions ripe for the ignition and spread of unwanted wildland fires. The inability to create an effective fire-safe buffer devoid of fuel accumulations along the park boundary could contribute to negative impacts upon park resources.

Conclusion

The no-action alternative would have temporary moderate to major impacts on the safety of resources both in the park and outside. The implementation of this alternative would place the safety of some critical park resources, i.e. firefighters, at increased risk; thus making the implementation of this alternative less desirable than any of the other alternatives.

Mitigation

Firefighters engaged in suppression activities will be required to be trained in firefighter safety as dictated through RM-18. Because wildland fires may be burning at high intensity levels, firefighters may have to “back off” from some intense fires and suspend operations until environmental conditions are again favorable for suppression efforts.

Impacts of Alternative II – Preferred Alternative

Impact Analysis

The most beneficial result of the implementation of this alternative is the decreased potential for both the ignition and propagation of wildland fires. Both of these phenomenon are directly related to the amount of fuel that is available to burn in a wildland fire situation. By utilizing a variety of reduction methods, managers will be able to reduce hazardous fuel accumulations over a broad spectrum of environmental conditions. The effectiveness of these reduction activities are enhanced in this alternative by the ability to utilize increasingly low impact reduction methods, such as prescribed fire and herbicides. Effective treatment utilizing this integrated management approach will assist in maintaining fuels in a safe state for an extended period of time (generally 5-10 years per treatment). Although safety is of paramount importance in prescribed fire operations, some risk of injury is possible. Adequate training, planning, and supervision minimize the likelihood of problem occurrences.

Cumulative Effects

The ability of the park to utilize integrated management activities in reducing excess fuel loads, combined with the coordinated efforts of adjacent local agencies such as the Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry, and the local fire departments, would assist in creating an environment where the potential for wildland fires is decreased through cooperative effort. The negative impacts of logging along the park boundary could be reduced through the development of effective buffers along the park boundary where fuels are managed in such way as to provide a barrier to the spread and propagation of wildland fires.

Conclusion

This alternative provides the best opportunity for safety of both park resources and the public of the alternatives considered. Its implementation provides the opportunity for long term protection through joint cooperative fire prevention and suppression that presents only minor risks to park and public resources. Properly implemented programs of hazard fuel reduction, especially those of the interagency variety, greatly decrease the risk to personnel as well as to cultural and natural resources.

Mitigation

Firefighters engaged in suppression activities will be required to be trained in firefighter safety as dictated through RM-18. Since they will also be engaged in hazardous fuel reduction activities, personnel will have to be trained in the use of chainsaws, chippers, brush cutting, and related safety equipment. Prescribed fires can be utilized during those time periods when environmental conditions are favorable to the safety of firefighters and the public and in accordance with the approved prescribed burn plan. For example, prescribed fires would only be used during time periods when exposure to smoke is minimized through the combination of environmental parameters conducive to

smoke dispersion. Herbicides would only be applied by trained and qualified practitioners as outlined in NPS policy (NPS-77).

Impacts of Alternative III – Appropriate Management Response and Non-Fire Fuels Management

Impact Analysis

This alternative provides some of the benefits associated with non-fire reduction of hazardous fuels, but falls short of providing the long-term protection of the preferred alternative. The exclusion of prescribed fire as a tool in this alternative eliminates the ability to reduce fuels in those areas where access is limited, and prevents the follow-up low maintenance benefits of fuel reduction that the preferred alternative provides. As a result, impacts on safety are confined to minor risks, but are extended over a longer period of time than in the preferred alternative.

Cumulative Effects

Similar to the preferred alternative, but the cumulative accumulation of fuels in some areas where manual reduction methods are unable to be used, such as in those areas where access is limited or are reduced due to access problems and/ or restrictions imposed by environmental constraints, may lead to moderate impacts on safety through increased fuel loadings and potentially higher intensity wildfire events.

Conclusion

This alternative provides some of the advantages of the preferred alternative in the short term, but fails to capitalize on the long term benefits of an integrated fuels management treatment program involving the use of prescribed fire. The risk associated with non-fire hazard fuel reduction methods (chainsaws, brush cutters, axes, herbicides), is proportional to the level of experience and training that the personnel involved in these types of activities possess.

Mitigation

Same as alternative II but without prescribed fire.

2. AIR QUALITY

Affected Environment.

Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial are classified as Class II Air Quality areas. A Class II designation indicates the maximum allowable increase in concentrations of pollutants over baseline concentrations of sulfur dioxide and particulate matter, as specified in the 1963 Clean Air Act (42 U.S.C. 7401 *et seq*.). Further, the Clean Air Act provides that the federal land manager has an affirmative responsibility to protect air quality related values

(including visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse pollution impacts.

At the present time, the Pennsylvania Department of Environmental Protection, Bureau of Air Quality, classifies the counties where the parks (Blair and Cambria) are located as being attainment areas for PM10, SO2 (sulfur dioxide), and CO (carbon monoxide). Blair County is listed as being in attainment for PM2.5, while Cambria is listed as a state recommended non-attainment area for PM 2.5. Both Blair and Cambria counties are listed as being marginal non-attainment for 1-hour ozone. For 8-hour ozone only, Blair County is listed as a non-attainment area. Despite these findings, air pollution is a still a potential problem in the parks. Of major concern is the fact that regional pollution sources from the Ohio Valley to the immediate west of the parks are capable of exerting considerable negative impacts on park air quality. Atmospheric deposition has been identified as one of the major problems, a consequence of energy production through the combustion of fossil fuels. This acidic deposition or “acid rain” is a particular concern to ALPO since Cresson Mountain is the highest point east of the coal fired power plants and industries found in Western Pennsylvania and Ohio. Prevailing winds carry the emissions directly to the park. Minor pollution originating inside the parks generally takes the form of auto emissions, wind-blown dust, soil, and smoke from infrequent wildland fires.

Methodology.

All available information on air quality was compiled. Intensity of effects are defined below.

Negligible – Impact barely detectable and not measurable; if detected, would have slight effects.

Minor – Impact measurable but short-term and localized. No mitigation measures would be necessary.

Moderate – Changes in air quality would be measurable and would have consequences to sensitive receptors, but effects are localized. Mitigation measures necessary and likely effective.

Major – Changes in air quality would be measurable and would have substantial consequences to sensitive as well as to non-sensitive receptors. Mitigation measures necessary and success of measures not assured.

Cumulative – Impacts, though negligible, add up though time becoming minor to major and may be irreversible.

Regulations and Policies.

Current laws and policies require that the following conditions be achieved in the park:

Desired Conditions - Air quality related values would be protected from pollution sources emanating from within and outside park boundaries. Park management activities do not violate Federal and State air quality and conformity standards.

Source – Clean Air Act; NPS Organic Act; NPS *Management Policies* (2001).

Impacts of Alternative I - No-Action

Impact Analysis

Under the no-action alternative, wildland fires would be aggressively suppressed with the primary goal of keeping wildland fires to the smallest acreage possible. Direct adverse impacts to air quality from wildland fire under this alternative would include the release of particulates and smoke into the airshed. Since these fires would most likely be the result of heavier than normal accumulations of dead and downed fuel, fire intensity and duration could provide considerable resistance to control for suppression resources. This condition is somewhat mitigated by the fact that, even though areas of excessive hazardous fuel are located in the park, they are generally not continuous, but rather are composed of isolated cells of heavy fuel that are not always interconnected with one another. This fact may give suppression resources the opportunity to isolate heavy fuel accumulations and suppress fires in a more expeditious manner. This would reduce smoke and particulate emissions. Generally, durations of smoke particulates would range from minor to moderate (1-5 days). In most cases, especially those in which drought is not a factor, fires will produce a short term impact. The fire suppression tactics used in this alternative would focus on extinguishing fires as quickly as possible. This would normally minimize smoke production because the total number of acres burned would be kept to a minimum.

Cumulative Effects

Due to the short-term nature of most wildland fires, the cumulative effects on air quality would be localized and minor. This alternative would not contribute to cumulative effects on air quality in the long term. Air quality in the park would continue to be impacted from daily vehicle emissions on park roads and other management activities that utilize power-driven machinery. Outside of the park, backyard trash burning, a common practice in rural and suburban communities, would continue and present a consistent impact on air quality over time. Development along the boundary is expected to accelerate in the future with increased demand for housing and commercial land. At the present time, very little use of prescribed fire occurs in the area, though that is expected to change during the next ten years as the Pennsylvania Department of Environmental Protection, Bureau of Forestry, anticipates using this management practice as a tool to manage forest resources in areas found on private and public lands in the vicinity of the park.

Conclusion

The no-action alternative would have temporary short term (1-4 days) minor to long term (7+ days) moderate impacts on air quality due to the effects of wildland fire. Wildland fire smoke impacts would be minimized in the case of smaller fires that result from the implementation of aggressive suppression tactics. It should be noted that there may be cases where fires, particularly those driven by excess hazardous fuel loadings, may exceed the capabilities of suppression resources to effectively and safely suppress, thus allowing fires to burn with increased intensity and resultant increased smoke production. Despite the potential for adverse impacts in the short term, the adoption of this alternative does not constitute impairment.

Mitigation

During aggressive fire suppression activities, the rapid suppression of fires and the extinguishment of residual smoke during the mop-up phase generally help reduce smoke impacts, particularly during the smoldering phase of combustion often seen during these waning periods of a wildland fire's life cycle.

Impacts of Alternative II – Preferred Alternative

Impact Analysis

Wildland fire suppression, non-fire hazard fuel reduction and prescribed fire would result in minor to moderately adverse, but short term (1-4 days) impacts to air quality. Depending on the tactics of wildland fire suppression used, air quality impacts could be prolonged because tactics would be employed to minimize potential resource damage. As a result, wildland fires could burn longer and consume more total acres. This would lead to minor to moderate smoke impacts of longer duration (5-6 days). Indirect adverse impacts resulting from these emissions could be responsible for reduced visibility along park roads, reductions in visitor use due to the presence of smoke, and odors, and potential health effects to sensitive receptors, including local park residents and the visiting public. These adverse impacts would be short to long term (7+days), localized, and minor. Smoke from prescribed fires is only present during the time period when a prescribed burn is being implemented. This includes those time periods when mop-up activities will be in process and residual smokes will be suppressed and eliminated. Since most prescribed burns at the parks are projected to be small in acreage, a typical burn would last approximately 4-12 hours. Smoke from prescribed fire can be minimized by altering ignition patterns and burning during times of the day when smoke dispersal would be maximized. In spite of these measures, minor to moderate short term impacts could occur.

Cumulative Effects

Because of the relatively short duration of these non-fire fuel reduction and prescribed fire management activities, this alternative would not contribute to the cumulative impacts of air quality over the long-term. Air quality in the parks would continue to be

impacted in the short term with minor impacts from such uses as daily vehicle emissions and other similar management and/ or public activities such as trash or backyard burning. In the long term, adverse impacts would be lessened as accumulations of hazardous fuels were reduced through fuel reduction strategies (manual, mechanical, prescribed fire) both in and outside the park through cooperative efforts with neighbors and sister agencies.

Conclusion

This alternative would have a temporary minor to moderate adverse impact on air quality in those areas where hazardous fuels are being removed, either by non-fire fuel reduction or through prescribed fire. Wildland fire smoke impacts may be increased in the short term through the use of the appropriate management response to fire suppression tactics. In the long term, this same approach allows more fuels to be consumed and may actually reduce the potential for both smoke production and duration. Smoke impacts from prescribed burns are short term, usually from between 4-12 hours, and may be planned for periods of the day when environmental conditions are maximized for smoke dispersion and direction, a major change from most wildland fires resulting from human causes. These types of fires typically result from human activities such as refuse burning, unintentional ignitions resulting from improper use of fire, and even arson, that typically occur during periods of the day/ night when environmental conditions are such that smoke production is increased (higher relative humidity/ greater fuel moistures) and dispersion is reduced (stable atmospheric conditions). The adoption of this alternative does not constitute impairment.

Mitigation

Extinguishment of residual smoke from burning fuels during wildland fire incidents. Coordination with adjacent regulatory agencies before prescribed fire operations. During prescribed fire operations, a variety of techniques may be utilized to reduce the production of smoke emissions and/ or plan for their dispersion:

- Ignitions only implemented when relative humidity is optimized for fuel consumption (less smoke production in a “clean” burn.
- Fuel moistures are relatively low
- Ignition patterns utilized that minimize smoke production (backing fires).
- Mixing heights at least 500 meters or more
- Transport winds greater then 12 mph
- Wind direction away from critical identified targets
- Prescribed burn projects compartmentalized into smaller units, resulting in smaller sections burned with less smoke production.
- Burning during periods of atmospheric instability (daylight hours)

Impacts of Alternative III – Appropriate Management Response and Non-Fire Fuels Management

Impact Analysis

Wildland fire suppression (appropriate management response) and non-fire hazard fuel reduction would cause minor to moderate adverse, but short term impacts to air quality. Depending upon the wildland fire suppression tactics utilized, air quality impacts could be prolonged because tactics would be employed to minimize potential resource damage. As a result, wildland fires could burn longer and consume more total acres, leading to minor to moderate smoke impacts over longer periods of time. This alternative would eliminate smoke from prescribed fires and would rely upon non-fire (manual, mechanical, chemical) methods to reduce hazardous fuel accumulations.

Cumulative Effects

There would be no short term smoke produced from prescribed fires in this alternative. Because of the short duration of most hazard fuel reduction activities, this alternative would not contribute to the cumulative impacts of air quality over the long-term in the strict sense of the activity. But, because prescribed fire is not available as a fuel reduction tool in this alternative, potential for increased fuel loading to occur over time may lead to increased wildland fire activity and smoke production in the future. Air quality in the parks would always be impacted in the short term from daily vehicle emissions and other management activities, both in and outside of the parks, such as trash or backyard burning.

Conclusion

The implementation of this alternative could have a short term minor to moderate adverse impact on air quality in those areas of the parks where non-fire reduction of hazardous fuels is undertaken. Although these methods are an effective means of removing hazardous fuels, they are at the same time a costly, labor intensive treatment that depends upon significant funding for implementation. Funding for these projects may or may not be available. As a consequence, significant amounts of fuel may continue to exist which increases the potential for smoke impacts, both in terms of intensity and duration, when wildland fires do occur in untreated areas. The adoption of this alternative does not constitute impairment.

Mitigation

Extinguishment of residual smoke from burning and smoldering fuels during wildland fire incidents would occur.

3. Protect and Preserve Cultural Resources.

Affected Environment.

Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial contain a wide variety of historic resources both aboveground and below grade.

Between the War of 1812 and the Civil War, the infrastructure of the United States underwent a dramatic transformation. An astonishing array of internal improvements created a vast if imperfectly integrated network of roads, canals, rivers and rail transportation. Canal construction was envisioned as one of the best ways to develop transportation routes to the west, represented by a viable transportation route between Philadelphia and Pittsburgh in the west. The Allegheny Mountain range presented a significant barrier to the perpetuation of this canal system. In response, the Allegheny Portage Railroad was constructed, consisting of a series of inclined planes separated by stretches of level track that allowed canal passengers and freight, and later packet boats themselves, to be hauled over the formerly formidable mountain range to the continuation of the canal on the western side of the mountain range and subsequently on to Pittsburgh and the Ohio River in the west. Allegheny Portage Railroad National Historic Site's structures, objects, archeological sites, archival and manuscript collections, cultural landscapes, and ethnographic resources are the primary tools with which the history of this monumental achievement of engineering is displayed and interpreted.

The South Fork Dam, originally built to provide water to the Johnstown Canal Basin at the western end of the Portage Railroad provided the setting and circumstances for the tragic event that is now commemorated at Johnstown Flood National Memorial. This dam on the South Fork of the Little Conemaugh River was one of the largest earthen dams in the world at the time and the western reservoir that contained it was one of the largest man-made lakes in the United States. The Memorial commemorates the 2, 209 lives lost in the tremendous flood of 1889 and the city that was reduced to shambles by the breakage of the dam. The objects, structures, archeological sites, archival and manuscript collections, cultural landscapes, and ethnographic resources mark the importance of this catastrophe in the history of the United States.

Scattered throughout both of the parks are outlying areas that contain a variety of cultural resources that provide important links to park history and purpose, and contain a variety of resources that will be detailed in the following sections

Historic Structures:

Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial have a total of 28 structures of national significance; 25 of the structures are located at ALPO and 3 at JOFL. In 1992 Allegheny Portage Railroad National Historic Landmark Multiple Property Documentation was initiated by the Pennsylvania Historical

and Museum Commission in a concentrated effort to update National Register documentation for these two parks. This was done primarily in order to identify and evaluate all extant resources related to the operation of the Allegheny Portage Railroad which still retain their integrity. While the Allegheny Portage Railroad and Staple Bend Tunnel are listed as National Historic Landmarks, significant resources within a National Historic Site, they lack adequate National Register/ National Historic Landmark documentation, precise boundaries, and a complete inventory. At Johnstown Flood there still exists the need for complete inventory for National Register documentation, even though the park has been designated a National Historic Landmark through inclusion on a National Park Survey of Historic Sites and Buildings. The National Park Service List of Classified Structures (LCS) has recently been updated and contains 42 classified structures at ALPO and ten at JOFL.

Prominent structures at ALPO are the Lemon House, Staple bend Tunnel, Engine House #6, the Skew Arch Bridge, the Portage Railroad Trace, Inclines 6-10 (and the resources associated with them), and a number of sites such as the Lemon Coal Mine, the Quarry, stone bridges and sleepers associated with the railroad, historic road traces, and other items such as culverts, retaining walls, and sub-surface archeological sites.

JOFL's primary resources consist of the South Fork Dam Ruins, Unger Farm (house, barn, and Springhouse), the lakebed, and various resources associated with the site such as the, spillway and remnants of the old carriage road. The recent acquisition of four structures (P.L. 108-313 of October 13, 2004) including the historic clubhouse, annex, and two cottages of the former South Fork Fishing and Hunting Club, as well as associated acreage contained in the present day Village of Saint Michael, are all currently included in the National District Registry, There are a number of sites, road traces, and structures that are on the NPS List of Classified Structures, but are not presently documented for inclusion on the National Register. Because of the evolutionary nature of the parks cultural resource base, the List of Classified Structures, the cultural landscape and cultural sites inventories, and other appropriate inventories will have to be consulted regularly as they evolve before any management activities are initiated in order to ensure appropriate protection of resources.

Archeological:

Of the thirty-eight known archeological sites at ALPO, none have been evaluated for significance. Twelve are listed in "good" condition, eighteen are "fair", and eight are listed as being in "poor" condition. Documentation is "good" and impacts are mainly "moderate". One structure is experiencing "severe" impacts.

At JOFL there are six known archeological sites. Three are in "good" condition and documentation with "low" impacts, two are listed as being in "fair" condition, and one is listed as being in "poor" condition. None of these sites have been evaluated for significance. The status of archeological sites needs to be evaluated based upon new information such as the archeological reconnaissance at Inclines 6-10 and the Staple Bend Tunnel units of ALPO and the present threat to the lakebed at JOFL.

Cultural Landscapes:

The designation of *cultural landscapes* is crucial to an understanding of the significance of many of the parks resources, particularly when seen in the context of management activity. They are instrumental in exhibiting human interaction with the physical environment. Not just structures, but circulation networks, land use patterns, and even vegetation, which are characteristics of landscapes, exist as visual patterns chronicling the area's history. For example, though bracketed by a modern railway to the southwest and a paved road to the northeast, segments of the former Allegheny Portage Railroad exhibit much of the dense woodland character present at the time of the railroad's construction and are crucial to the understanding of the cultural context of the present day park.

The following cultural landscapes have been identified and earmarked for protection. They have also been identified in park planning documents for further analysis in order to determine historic vegetation patterns and help determine which areas, if any, could have vegetation management activities undertaken as a part of a comprehensive fuels reduction and cultural scene restoration plan.

- The Summit Level at Allegheny Portage Railroad National Historic Site

  The Summit Level at ALPO, including Incline 6, the Lemon House, and the surrounding areas extending down to the Skew Arch Bridge, compose a Cultural Landscape of National Significance. The cultural landscape surrounding the Lemon House has been evaluated and treatment recommendations and a landscape management plan for the immediate vicinity were included in the 1996 addendum to the Lemon House HSR.

- Staple Bend Tunnel at Allegheny Portage Railroad National Historic Site

  The effected environment at the Staple Bend Tunnel is the area described in the National Register of Historic Places Historic District nomination in progress as a 13, 324 foot long remote, forested tract between the villages of Mineral Point and Park Hill in Conemaugh Township. It is comprised of the Staple Bend Tunnel and a well-preserved section of Level 2 of the Allegheny Portage Railroad trace to the north and the upper third of Incline 1 of the railroad to the south. A number of contributing structures are extant along the trace including two segments of a retaining wall, a raceway, two culverts, and a box drain. All were constructed between 1831 and 1832, and all individually retain a high level of integrity. An archeological reconnaissance of the area further identified the remains of 13 structures in three major concentrations.

- The Unger Farm, lakebed, and breached South Fork Dam abutments at Johnstown Flood National Memorial.

- Fourteen acres of land and accompanying structures (historic clubhouse, annex, and two cottages).

Objects (museum collection):

Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial have a museum collection that contains objects from three of the seven collection categories. Objects consist largely of archeological artifacts with fewer historical and archival objects. The park(s) have a total of 76,623 artifacts in the collection. All objects are currently stored at ALPO and are under the curatorial care of the Museum Curator at ALPO.

Properties on the National Register:

See Historic Structures section above.

Methodology.

All available information from the General Management Plan (1980), Resources Management Plan (1998), Schematic Design/ Environmental Assessment, Staple Bend Tunnel Unit, Allegheny Portage Railroad National Historic Site (1997), Statements for Management (ALPO and JOFL) 1992, National Park Service List of Classified Structures (2004) and internal park documents were compiled and used to assess impacts of the projects on cultural resources. The following definitions were used in analyzing effects on cultural resources.

Negligible – The impact is at the lowest levels of detection, barely perceptible and not measurable.

Minor – The impact is slight and localized within a relatively small area of a site or group of sites, but is measurable or perceptible.

Moderate – The impact is measurable and perceptible, but does not diminish the integrity of the affected resource.

Major – The impact is substantial, noticeable and permanent.

Cumulative – Impacts, though negligible, add up though time becoming minor to major and may be irreversible.

Regulations and Policies.

Current laws and policies require that the following conditions be achieved in the park:

Desired Condition: Inventory, protection, preservation and enhancement of cultural resources based upon documented data from appropriate investigation and research. In

terms of prescribed fire and non-fire hazard fuel reduction, this especially applies to historic structures including agricultural and open fields, forests, cemeteries, monuments, and traces of historical conveyance patterns*. In the event of a wildfire requiring suppression, all of the alternatives would call for the protection of cultural resources through an immediate tactical suppression response.*

Source – National Historic Preservation Act; Executive Order 11593; Archeological and Historic Preservation Act; Archeological Resources Protection Act; the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation; Programmatic Memorandum of Agreement Among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); NPS Organic Act; NPS Management Policies.

Impacts of Alternative I – No Action

Impact Analysis

Historic Structures

Under the no-action alternative, protection issues relating to historic structures would only occur when a wildland fire was underway. Protection through a proactive hazardous fuels reduction program would not occur thus potentially creating a minor to moderate adverse impact through the accumulation of hazardous fuels adjacent to historic structures. In the event of a wildland fire, fire lines would be constructed in order to protect structures resulting in a moderate beneficial impact in the short term.

Archeological Resources

The implementation of this alternative would provide no proactive protection for those areas where archeological resources are found or suspected to be. Protection would only occur when a wildland fire was taking place. The use of aggressive wildland fire suppression tactics could have potentially moderate to major adverse impacts upon archeological resources. This fact could be exacerbated by the lack of definitive knowledge of the location and extent of many archeological resources in the park. It is entirely possible that these resources could be subjected to major impacts through inadvertent aggressive techniques of fire suppression.

Cultural Landscapes

Under this alternative, no proactive fire management activities would take place to protect cultural landscapes. In the event of a wildland fire, fire lines would be constructed in order to protect resources. In the short term, this would protect resources in question, but, over the long term, impacts could actually be increased though the additional accumulation of hazardous fuel. As a result, historic forest resources could be subjected to fire intensities that exceed the normal range, thus potentially damaging stand integrity. Areas that are currently open meadows or herbaceous successional

openings would be sustained by continued use of programs such as the agricultural lease program and/or such techniques as mowing and hand trimming. Moderate long term adverse impacts, largely the result of impaction, could result if this alternative were implemented.

Objects

Because collections are stored in structures, the impact of wildland fire would be the same as in the Historic Structures section.

Cumulative Effects

Under this alternative a build-up of hazardous fuels would continue. As a result long term minor to major impacts would accrue over time. The long term potential for development along the park boundary could provide additional ignition sources for wildland fires and, when combined with the increased fuel load within the park, could significantly increase the potential for wildland fires, both in terms of number of fires and in intensity. The resultant increase in the number and size of fires would likely lead to increased suppression and potential damage to cultural resources.

Conclusion

The no-action alternative could result in moderate to major impacts to the integrity of the park's cultural landscapes. Current forests and meadows would continue to change due to natural succession and the potential effects of insects and storm damage. This would lead to a potential loss of some cultural viewsheds particularly those involving the Summit Local Historic Area, Staple bend Tunnel, and the Unger Farm and South Fork Dam and Lakebed, as well as historic road traces, views from scenic overlooks, and from the old Portage Railroad trace. Wildland fire suppression actions could lead to long-term moderate to major adverse effects. The adoption of this alternative could reasonably be expected to lead to the eventual degradation and potential damage to critical cultural resources found in the park.

Mitigation

Minimize impacts from suppression operations through the use of MIST (minimum impact suppression tactics). See Appendix D for specific procedures and techniques.

Impacts of Alternative II – Preferred Alternative

Impact Analysis

Historic Structures

Under this alternative project activities would occur that could have minor to moderate long term beneficial impacts to historic structures. The use of appropriate management

response fire suppression strategies and tactics are designed to minimize impacts by avoiding suppression activities in those locations where damage to historic structures has a high probability of occurrence. Alternatively, this option allows the flexibility to use aggressive suppression in the case of an unplanned ignition that directly threatens an historic structure. Non-fire hazard fuel removal treatments would be designed to reduce hazardous fuel loadings in the vicinity of structures. Prescribed fire would not likely be utilized as a hazardous fuel removal tool in close proximity to some historic structures because of the risk, albeit slight, of potential damage caused by an escape or by fire behavior that exceeds planned parameters. In these cases non-fire methods would be the management tools of choice.

Archeological Resources

The implementation of this alternative could have moderate to major beneficial impacts on archeological resources. This alternative allows suppression resources the flexibility to manage wildland fires in a manner that allows aggressive fire suppression techniques, such as the use of heavy mechanized equipment or hand line construction, to be excluded from areas where archeological resources are located. Appropriate management response techniques of wildland fire suppression allow the protection of important resources while at the same time providing for the suppression of the fire. This is achieved by utilizing roads, trails, streams, railroad lines, and sparse fuel areas as fire breaks. An additional benefit of this method of suppression is that potential hazardous fuels are consumed and thus eliminated. This fact benefits the protection of resources in the long term. Other techniques such as the use of foam and water provide suppression alternatives to traditional ground disturbance type activities and further protect resources from damage. In order to ensure that maximum protection is afforded to cultural resources, every prescribed burn will have a project-specific plan prepared prior to implementation. Included in the plan will be the identification and mitigation of negative impacts through a compliance section specific to that plan. Despite intensive planning efforts, some non-fire and prescribed fire operations have the potential to expose cultural resources to the negative effects of weather as well as exposing them to potential predation by relic hunters and artifact seekers. Generally these negative impacts are classified as minor and are relatively short term. Their impacts may also be mitigated through protection strategies implemented as a part of the parks law enforcement protection program.

Cultural Landscapes

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As with archeological resources, cultural landscapes are afforded the protection of suppression activities that take advantage of natural breaks in fuel, rather than relying on more invasive ground disturbance suppression activities. Open fields and successional openings that comprise an important component of the cultural landscape, are enhanced through the application of prescribed fire. The capabilities of prescribed fire to enhance and propagate native warm season grasses and other herbaceous species are well documented. The use of prescribed fire discourages the introduction of pioneer woody species that, over time, eliminate open fields and attendant vistas.

Prescribed fire also may enhance some forest types found in the park and, in the long term, reduces wildland fire risk by promoting a more fire resistant hardwood forest and reducing hazardous fuels. Some wetland habitats are also improved by prescribed fire and integrated management approaches to vegetation management. Moderate to major beneficial impacts may accrue as a result of the implementation of this alternative. Short term minor adverse impacts could result from the use of this alternative. These adverse impacts generally manifest themselves with a visual presence. Generally speaking, areas such as open meadows and grass fields recover from the implementation of a prescribed fire within a few weeks or less. Forested areas take considerably longer to recover from the visual impacts of a prescribed burn. These include the presence of dead trees (snags) and blackened scorch marks on the trunks of standing trees.

Objects

Because collections are stored in structures, the impact of wildland fire would be the same as in the Historic Structures section.

Cumulative Effects

The impacts on the cultural landscape from proposed projects would afford better long-term protection for cultural resources due to restoration of a lower fire intensity ecosystem in hardwood and mixed hardwood forests, as well as providing for a reduction of hazardous fuels in those systems. At the present time, the potential for development and change in land-use patterns outside of the park boundary, from a primarily industrial and forestry products landscape, to one that is representative of a more urban land use, makes the preservation of cultural landscapes within the park an even more important priority for park management. The potential for wildland fire ignitions is increased through development occurring along the park boundary. Since very little, if any, protective activities relating to pro-active fire suppression are being undertaken in these areas, the potential for risk to cultural resources is significantly increased over time.

Conclusion

This alternative provides the advantage of providing only negligible negative impacts on cultural resources. Wildland fire suppression techniques would be designed to minimize cultural and natural resource impacts. Prescribed fire and non-fire treatments aid in the restoration and maintenance of cultural resources and landscapes for which the park was established. These resources are key components to the natural integrity of the park. In addition, prescribed fires have been documented (Jones et al) as being useful tools in removing heavy vegetation layers from existing archeological and historic sites, thus making their presence known to investigators. This can also have a potentially negative impact through unauthorized public access and looting of sites if not properly protected and managed after discovery. The adoption of this alternative does not constitute impairment.

Mitigation

Minimize impacts from suppression operations through the use of MIST (minimum impact suppression tactics) (See Appendix D). Hazard fuel reduction around historic structures is implemented with hand tools and other methods that are less invasive than methods using mechanical techniques. Through the implementation of appropriate management response fire suppression techniques, low intensity wildland fires would be allowed to burn over the surface of archeological sites where little, if any, damage occurs from the low heat developed in these relatively fast moving surface fires. Standing structures would be protected with water, foam, and other protective treatments that would have negligible, if any, negative effect on cultural resources. The development of accurate maps of cultural resources would allow suppression resources the opportunity to avoid areas of concern in a proactive manner.

As this alternative is implemented, consultation and communication with cooperating agencies; state (Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, State Historic Preservation Office or SHPO); federal (United States Fish and Wildlife Service), and local (Counties of Blair and Cambria) will be maintained throughout the life of the project(s).

A cultural resource professional will be assigned to the planning and implementation phase of each prescribed burn and /or manual reduction effort to help minimize negative impacts to cultural resources.

Impacts of Alternative III – Appropriate Management Response and Non-Fire Fuels Management

Impact Analysis

Historic Structures

Same as Alternative II except for no use of prescribed fire.

Archeological Resources

Because prescribed fire will not be utilized as a management tool in this alternative, there will be a greater reliance on non-fire hazardous fuel reduction. This may lead to an increased threat to archeological resources through the attendant increase in hazardous fuel loading and through increased ground impaction from non-fire manual and mechanical fuel reduction activities. In addition, sites may continue to be covered under layers of vegetation and their presence hidden from the scrutiny of cultural resource professionals. Higher costs may also result from the implementation of this alternative. Impacts from the utilization of appropriate management response suppression techniques will be same as those described in Alternative II.

Cultural Landscapes

The inability to utilize prescribed fire as a restorative and maintenance tool in order to propagate and enhance herbaceous species and warm season grasses may lead to heavier reliance on more invasive measures such as mowing by machinery with an increase in potential for resource damage. Continuation of programs such as those implemented through agricultural leases or scheduled maintenance mowing could provide a similar result, though ecosystem diversity is not enhanced with the implementation of these types of programs. Hardwood forests, particularly those dominated by oaks and other hardwoods, would likely continue to decline over time without the benefits of prescribed fire. Even though excessive hazardous fuel loadings could be removed through non-fire methodologies, overall, the understory components of park forests would not be allowed to benefit from prescribed fire treatments. As a result, natural reproductive capabilities may be reduced and ecosystem viability reduced, an attendant loss of some elements of the cultural landscape could be expected.

Objects

Because collections are stored in structures, the impacts of wildland fire would be the same as in the Historic Structures section.

Cumulative Effects

The implementation of this alternative would moderately contribute to the protection of cultural resources, though not to the extent allowed by Alternative II. In the long term, hazardous fuel loading removal and the potential for damage through these more invasive techniques, even when implemented with great care, could lead to minor impacts as the result of increased foot traffic and equipment. Because these types of projects are expensive, and often require large numbers of personnel for implementation, there is a high probability that implementation may be delayed or foregone altogether due to the realities of increased budget shortfalls and funding constraints. As a result, cultural resources may be placed at minor increased risk over time. The potential for wildland fire ignitions is increased through development occurring along the park boundary. Since very little, if any, proactive activities relating to fire suppression are being undertaken in these areas, the potential for risk to cultural resources is increased.

Conclusion

The removal of encroaching vegetation from the areas surrounding historic structures and archeological resources would have a beneficial long-term impact and would minimize wildland fire intensity. The use of appropriate management response during wildland fires would provide protection of most cultural landscapes, historic structures and archeological sites from the effects of those types of incidents. The lack of ability to use prescribed fire could lead to increased impacts from non-fire reduction of hazardous fuels caused by increased foot traffic, use of mechanized equipment, and the removal of

excess fuels. This could also result in greater project costs. As a result, restoration of some cultural landscapes would not occur, with long term minor to moderate adverse effects occurring in these areas from a lack of treatment. The adoption of this alternative does not constitute impairment.

Mitigation

Minimize impacts from suppression operations through the use of MIST (minimum impact suppression tactics Appendix D). Hazard fuel reduction around historic structures is implemented with hand tools and other methods that are less invasive than methods using mechanical techniques. Through the implementation of appropriate management response fire suppression techniques, low intensity wildland fires would be allowed to burn over the surface of archeological sites where little, if any, damage occurs from the low heat developed in these relatively fast moving surface fires (Jones, et al). Standing structures would be protected with water, foam, and other protective treatments that would have negligible, if any, negative effect on cultural resources. The development of accurate maps of cultural resources would allow suppression resources the opportunity to avoid areas of concern in a proactive manner.

As this alternative is implemented, consultation and communication with cooperating agencies; state (Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, State Historic Preservation Office SHPO); federal (U.S. Fish and Wildlife Service), and local (Counties of Blair and Cambria) will be maintained throughout the life of the project(s).

A cultural resource professional would be assigned to the planning and implementation phase of each hazard fuel reduction effort to help minimize negative impacts to cultural resources.

4. VEGETATION

Affected Environment.

Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial are composed of a variety of habitat types including: northern hardwood forest, beech-maple forest, oak-hickory forest, minor wetlands, open fields and meadows, and landscaped areas around buildings and along roads. According to National Park Service records, ALPO supports over 465 vascular plant species, while JOFL supports 263 species. At the present time, ALPO park vegetation is composed of approximately 89% forest cover, composed largely of second and third growth mixed hardwoods consisting primarily of beech, cherry, oak, maple and early successional species such as black locust and hawthorn. The remaining 11% of the park is composed of open meadows and spaces, abandoned fields in various stages of successive development, shrub land converting to forest, and landscaped areas. Understory vegetation includes plants such as wood ferns, spring ephemerals, spicebush, witch hazel, and striped maple. The open areas vary in size from very small

fragments that cover less than .1 of an acre to larger patches that are more than 60 acres in size. Many of the smaller patches are located along roadways and the old Portage Railroad trace and have a linear shape. These open areas are important to the restoration and maintenance of cultural scenes in both parks, and detailed discussions relevant to their management have been included in a previous section bearing that title.

Approximately 30% of Johnstown Flood National Memorial is forested with maturing mid-successional tree species such as cherry and maple, interdispersed with various species of oaks and hemlocks. Approximately 35% of JOFL land consists of the historic lakebed which was clear cut by the National Park Service during the time period 1989-1991 in order to promote the cultural viewshed. Vegetation of the lakebed is currently being managed to promote the establishment of grasses and forbs, and prevent the reemergence of woody species. The remainder of the park is composed of developed areas and open fields and meadows.

Although there is no history of recorded fire in either of the parks during the stewardship of the National Park Service, there is significant history of fire in the immediate area outside of and adjacent to the park. The Gallitzin District (D-6) of the Pennsylvania Bureau of Forestry reported a total of 215 wildland fires during the period 1999 – 2002 for a total of 991.5 acres, an average of 53.75 fires annually for an average of 4.6 acres per suppression response. The emphasis on fire suppression since the time of the parks establishment has most likely contributed to the conversion of some open areas to forest by preventing fires from outside the park to exert significant influence on park ecosystems. There is extensive evidence that intentionally set fires were used to clear underbrush and trees in the area prior to European settlement. There is also extensive evidence that European settlers used fire as a tool to keep areas clear of overstory vegetation and dense underbrush. In fact, the increase in the use of fire to clear land and the loss of control of some of these fires became so widespread that between 1700 and 1735, the colonial government passed a series of laws against “unreasonable firing of the woods”. Fire was also an integral part of the logging and forestry industry in the area. The use of fire started to decrease in the early to mid 1800’s.

Following the effects of the massive logging activities and uncontrolled fires in the late 1800’s and the early 1900’s, the next major difficulty that exerted a significant impact on the health of park forests was the discovery and spread of the chestnut blight fungus. Virtually all of the mature population of this species was extirpated as a result of this disease. The growing spaces vacated by the chestnut were replaced by a variety of oak species. These species were subsequently impacted by the introduction of a new insect pest, the gypsy moth (*Lymantria dispar*), which has resulted in a loss of oaks in many areas of the park and across the broad landscape in areas surrounding the parks. This is a process that is active and continues to this day. Historically, damage from the gypsy moth (*Lymantria dispar*) has been documented with heavy infestations occurring in 1981, 1982, 1990, and 1991. The frequency and severity of these types of insect infestations has varied historically, and predicting future impacts upon park resources is

problematical and difficult to predict. In addition, outbreaks of the eastern tent caterpillar and the cherry scallop shell moth occurred in 1993, 1994 and 1995.

Another forest insect, the hemlock wooly adelgid has been damaging hemlock stands throughout the State of Pennsylvania. The full impacts of these insect infestations on forest resources in general, and the parks specifically, are largely unknown, but the development of an in-depth monitoring program is expected to provide definitive information relating to preservation of forest resources found within the park.

At the present time park forests are considered to be generally healthy, though they have been and continue to be, subjected to a variety of impacts including storm, wind, and ice damage, lack of the presence of natural occurrence of wildland fire, and insect infestation.

A combination of forests, open fields, and wetlands are distributed, as discussed in the previous several paragraphs, throughout the parks, providing ample opportunities for the invasion of a variety of invasive plant species. Although a complete inventory of invasive species has not been conducted in either park, approximately 90 of the 465 species found in the parks are considered to be non-native. Species causing the greatest impact, based upon the acreage that they cover and their potential to infest relatively undisturbed areas are: Japanese knotweed (*Polygonum sachalinense*), Garlic Mustard (*Alliaria petiolata*), Asian bittersweet (*Celastrus orbiculatus*), Japanese barberry *(Berberis thunberdii*), Honeysuckle Spp. *(Lonicera tatarica, morrowii, bella, and japonica*), multiflora rose (*Rosa multiflora*) and Tree-of-Heaven (*Ailanthus altissima*). The Natural Resource Management Plan for Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial has identified the importance of identifying and locating these invasive species and then developing an effective plan for their control through a program of integrated management activities as identified in the resource management and fire management plans.

The potential exists for extreme weather conditions to impact park natural and cultural resources. High winds associated with winter storms, as well as general winter weather and ice storms, often accompanied by intense periods of ground-soaking moisture, have the potential to uproot trees and break the tops out of many more, potentially damaging cultural and archeological sites. The presence of a large number of dead and downed trees, resulting from insects and diseases as discussed in the previous sections, would also provide for an increased level of fuel loading that can be expected to lead to intensified danger from wildland fire under certain environmental conditions. Environmental conditions that favor the start and propagation of wildland fires are usually manifested by periods of extended drought and drying of forest fuels.

Allegheny Front (ALPO)

The eastern, and also, the largest portion of ALPO, occupies lands from the base of the Allegheny front at the village of Foot of Ten, to the summit of the mountain near Cresson. The historic Allegheny Portage railroad ascended the Allegheny Front in the

valley of Blair Gap Run. This geographical setting is characterized by a small, high gradient mountain stream with some forested floodplain habitat, limited associated wetlands (some associated with artificial impoundments), steep, rocky slopes, and bedrock outcrops. Most of the land in this valley is composed of forested slopes. At the eastern end of the park are a few abandoned farms. Most of the buildings have been removed and old-field succession has advanced to varying degrees. A variety of vegetation types may be found, varying from open robust herbaceous communities to scrubby woodlands composed of species such as black locust (*Robinia pseudoacacia*), black walnut, (*Juglans nigra*) and staghorn sumac (*Rhus typhina*). A wet herbaceous opening occupies an old field along a small tributary to Blair Gap Run, which might have been a small swamp forest at one time, but is now occupied mostly by goldenrod (*Solidago spp*) and reed canarygrass (*Phalaris arundinacea*). The steep north-facing slopes of the Front are vegetated mostly with hemlock (*Tsuga Canadensis*), rhododendron (*Rhododendron maximum*), and rock polypody (*Polypodium virginianum and/ or P. appalachianum).* At the crest of Incline 10 is a relatively level area where heartleaf skullcap (*Scutellaria ovata*) was reported in 1982. This area is forested with young red maple (*Acer rubra*), sugar maple *(A. saccharum*), elm (*Ulmus sp*.), black cherry (*Prunus serotina*) and black walnut (*Juglans nigra*). A few apple trees and a number of exotic weed species indicate a history of disturbance at this site. Herbaceous and shrub species include species such as white snakeroot (*Eupatorium rugosum*), jumpseed (*Polygonum virginicum*), rubus spp*.,* cultivated currant *(Ribes sativum),* broadleaf enchanters nightshade *(Circaea lutetiana*), ground ivy (*Glechoma hederacea*), poison ivy (*Toxicodendron redicans*), Virginia creeper (*Parthenocissus quinquefolia*), common selfheal (*Prunella vulgaris*), Canada avens (*Geum canadense*), spotted ladysthumb (*Polygonum persicaria*), Carolina sedge (*Carex caroliniana*), rosy sedge (*Carex rosea or C. appalachica*), goldenrod (*Solidago rugosa*), Multiflora rose, (*Rosa multiflora*), Hawthorn (*Crataegus sp.),* Canadian clearweed *(Pilea pumila*), Aster spp., rattlesnake weed (*Hieracium venosum*) and dames rocket (*Hesperis matronalis*).

About a mile and a half west of Foot of Ten, west of the Dry Run Road, is a small tributary to Blair Gap Run, old meanders of which are now small, wet meadows. Seepage areas below the railroad grade have very similar vegetation to the meadows. Dominant species in the wetlands are sensitive fern (*Onoclea sensibilis*), Northern spicebush (*Lindera benzoin*), and whitegrass (*Leersia virginica*). The surrounding forest consists of second growth tulip poplar (*Liriodendron tulipfera*), black cherry (*Prunus serotina*), and red maple (*Acer rubrum*), with an admixture of sweet birch (*Betula lenta*), hemlock (*Tsuga canadensis*), basswood or linden (*Tilia Americana*), beech (*Fagus grandifloia*), and sugar maple (*Acer saccharum*).

Above the Allegheny Portage Railroad trace between inclines 8 and 9 is a north-facing slope, the lowest which lies on park property. The forest here is dominated by sugar maple (*Acer saccharum*), red oak (*Quercus rubra*) and beech (*Fagus grandifolia*). The canopy is mature and the understory diversity is quite low (Grund, Bier, et al 2000) and consists mostly of ferns, especially intermediate woodfern (*Dryopteris intermedia*).

The lowest of the three water supply reservoirs, known as the Plane 9 Reservoir, has a narrow band of wetland shrubs located along the southwest shore. Common species in this area include: spotted sandmat (*Euphorbia maculate*), Northern bugleweed (*Lycopus uniflorus*), black medick (*Medicago lupulina*), common plantain (*Plantago major*), green bristlegrass (*Setaria viridis*), Oriental ladysthumb (*Polygonum caespitosum*), and Mexican muhly (*Muhlenbergia mexicana*). Between this open gravelly area and the floodplain forest is a marshy-swampy zone with species such as fringed sedge (*Carex crinita*), crested sedge (*C. cristatella*), blue skullcap (*Scutellaria laterifolia*), woolgrass (*Scirpus cyperinus*), stiff marsh bedstraw (*Galium tinctorium*) and great blue lobelia (*Lobelia siphilitica*).

West of the reservoir is a floodplain forest dominated by sugar maple (*Acer saccharum*), hemlock (*Tsuga canadensis*), and tulip poplar (*Liriodendron tulipfera*). Older, declining species of black locust (*Robinia psudoacacia*) are remnants of an earlier successional stage of this second growth woodland. The shrub layer is thick with northern spicebush (*Lindera benzoin*) and striped maple (*Acer pensylvanicum*) and, to a lesser extent, American witchhazel (*Hamamelis virgniana*). The herbaceous plants are not particularly diverse in this area. Within this woodland lies a complex of stream channels, spring runs and vernal pools. At the east end of this bottomland forest, at the base of the slope, is a small subpopulation of mountain bugbane (*Cimicifuga Americana*), which is discussed at greater length in the Species of Special Concern section. The streams, spring runs, and associated seepages, support species such as Eastern rough sedge (*Carex scabrata*), Shawnee salad (*Hydrophyllum virginianum*), Violets spp. (*Viola spp*)., cuckoo flower (*Cardamine pratensis*), and bog chickweed (*Stellaria alsine*).

At the confluence of Blair Gap Run with the outflow of the Hollidaysburg Reservoir is an area known as the Muleshoe, so-named for the hairpin curve of the old Pennsylvania railroad at this location. One of the biggest threats to the recovery of this habitat area is the invasion of Japanese knotweed (*Polygonum sachalinense*).

At Blair Gap, near the headwaters of Blair gap Run, a number of small tributaries collect in a mesic forest. This forest area has very few alien species, and, though the diversity of this area is not high, the forest is relatively young, and if allowed to continue without substantial disturbance, this natural community will probably recover well from past disturbances. Streamside habitat was composed of such species as Appalachian violet (*Viola appalachiensis*), small white violet (*V. macloskeyi*), marsh blue violet (*V. cucullata*), haberdleaf yellow violet (*V. hastate*), crinkleroot (*Cardamine diphylla*), cuckoo flower (*C. pratensis*), Impatiens sp (*jewelweed*), twisted sedge (*Carex torta*), melic mannagrass (*Glyceria melicaria*), intermediate woodfern (*Dryopteris intermedia*), and New York fern (*Thelypteris noveboracensis*).

In the area known as the Greater Summit Area, the main visitor use area of the park, a second-growth mesic to dry-mesic forest may be found. The most abundant tree species are black cherry (*Prunus serotina*) and red maple (*Acer rubrum*). There are also considerable quantities of sugar maple (*Acer saccharum*), beech (*Fagus granifolia*) and, on the north facing slopes hemlock (*Tsuga canadensis*). The shrub layer is well-

developed and dominated by American witchhazel (*Hamamelis virginiana*) and striped maple (*Acer pensylvanica*). Just to the east of the entrance to the picnic area off of old U.S. Route 22 is an old fire pond that has succeeded to a wet meadow. Typical species in this area are goldenrod (*Solidago spp*), speckled alder (*Alnus rugosa*), numerous species of rushes (*Juncus spp*), and bristly dewberry (*Rubus hispidus*). Open meadows are dominated by a variety of grasses and forbs.

Staple Bend (ALPO)

The Allegheny Portage Railroad passed through a tunnel here just above Incline Number 1, westernmost of the ten inclined planes. The Staple Bend portion of the park includes this tunnel and a corridor containing a portion of the old grade heading west form Mineral Point, and then following a bend in the stream to the south and then into the tunnel. This area has been highly disturbed and heavily invaded by Japanese knotweed (*Polygonum sachalinense*), which is a highly invasive species. On the inside of the bend in the Little Conemaugh River is a disturbed floodplain. Two ponds exist on this floodplain between the hill slope and the railroad tracks paralleling the river. Streams and seeps feeding these ponds arise from acidic abandoned mine drainage and some areas are discolored bright orange from the acid mine drainage. The edges of the pond are swampy with red maple (*Acre rubrum*) and birch (*Betula allegheniensis*). Other wetland vegetation is still present in the area. On the slopes above the wetland, an area that shows the effects of a fire in the past, the tree canopy ranges from open to thinly forested with oak (*Quercus spp*.), red maple (*Acer rubrum*), sassafras (*Sassafras albidum*) and black locust (*Robinia pseudoacacia*). Dense stands of Japanese knotweed (*Polygonum sachalinense*) occupy the middle section of the slope. Characteristic herbaceous species in this dry to dry-mesic woodland include Western brackenfern (*Pteridium aquilinum*), wild sarsaparilla (*Aralia nudicaulis*), aster (*Aster spp*), and rough–stemmed goldenrod (*Solidago rugosa*).

Johnstown Flood National Memorial (JOFL)

The most prominent landscape features surviving from the Johnstown Flood of 1889 are the breached dam abutments and lakebed of the former South Fork Dam. Running through the middle is South Fork, a major tributary to the Little Conemaugh River. A heavy growth of black locust *(Robinia psudoacacia*), sumac, (*Rhus spp*.) striped maple, (*Acer pensylvanicum*) Virginia pine (*Pinus virginiana*), Scotch pine (*Pinus sylvestris*) and a variety of woody shrubs has reclaimed approximately one-third of the lakebed and dam abutments. Trees are reaching heights of 15 to 20 feet with an estimate of over 1000 stems per acre in some areas. Views of the lakebed from the visitor center, dam abutments and Lake Road are being obscured by undergrowth. Additionally, exotic plants such as multiflora rose (*Rosa multiflora*), Tartarian honeysuckle (*Lonicera tatarica*), crown vetch (*Coronilla varia*), and Japanese knotweed (*Polygonum sachalinense)* have invaded disturbed areas. Approximately seven acres of wetlands are found within the boundaries of the lakebed.

The Unger House and JOFL visitor center are surrounded by 30-35 acres of open fields and manicured lawn. The park Statement for Management established as the primary management objective for this area to “maintain the character of the Unger House, spring house, barn-form of the visitor center, and the surrounding landscape on the north abutment area of about 1889, to convey to visitors the events at the dam on the fateful day of the flood”. Since the area at the time of the flood was agricultural, management of the open fields in that configuration are essential to the management of the park and its cultural and natural resources. Vegetation currently consists mostly of grasses, but many forbs, shrubs and pioneer species of trees have become established as well. In addition, a few exotic plants, such as crown vetch (*Coronilla varia*), have begun to establish themselves. The park recognizes the need to develop a comprehensive Cultural Landscape Management Plan and will develop that document in the future in order to establish cultural landscape goals and vegetation management strategies.

Methodology

All available information on vegetation was compiled from the General Management Plan (1980), Resource Management Plan (1998), Lakebed Vegetation Management Plan for the Johnstown Flood National Memorial (1996), Statement for Management, Johnstown Flood National Memorial (1992), Staple Bend Tunnel Unit for Allegheny Portage Railroad National Historic Site (1997), Plant Community Mapping and Surveys for Species of Special Concern (2003) and various other available literature. Predictions about short- and long-term site impacts were based on this information. Intensity of effects is defined below.

Negligible – An action that may cause changes to the vegetation structure, but the change will be so small that it will not be of any measurable or perceptible consequence to the population.

Minor – An action that may cause changes to the vegetation structure, but the change will be small and that if it is measurable, it will be a small and of localized consequence to the population.

Moderate – An action that will cause changes to the vegetation structure, and the change will be measurable and will have a sufficient consequence to the population, but is more localized.

Major – An action that will cause a noticeable amount of change to the vegetation structure, and the change will be measurable and will have a substantial and possible permanent consequence to the population.

Cumulative – Impacts, though negligible, add up though time becoming minor to major and may be irreversible

Source – NPS Organic Act, NPS *Management Policies* (2001), National Environmental Policy Act, Executing Order 13112 Invasive Species

Impacts of Alternative I - No-Action

Impact Analysis

Under the no-action alternative, wildland fires could not be managed to produce desired changes in vegetation; and aggressive suppression activities would be used that may have short term minor adverse impacts on vegetation. Since emphasis in this alternative is on keeping fires to the smallest possible size, suppression methods may be utilized that place those types of activities in areas of sensitive vegetation, such as those where invasives are located. In addition, the use of mechanized equipment and fireline construction techniques that utilize extensive line construction may have obvious negative adverse short term impacts upon vegetation. The timing and intensity of wild land fires might also favor the further development of invasive species. For example, ignitions that occur as the result of human activity may typically in the spring months. This is the time of the year when many types of vegetation are undergoing phenologic changes as a result of their efforts to achieve robust spring growth. In this condition, many types of vegetation are susceptible to the effects of even moderate heat generated by a wildland fire. Unwanted wildland fires, particularly those fueled by excess fuel accumulations during the spring months, can cause extensive mortality in many native species. This allows invasive species on the periphery of the fire to colonize with their often hardy and abundant seed sources. In addition, fires fueled by excess fuels can remove significant amounts of the duff layer, thus laying bare large areas of mineral soil which make the area ripe for the introduction of invasive species. Short to long term moderate adverse impacts may occur as a result of these processes.

Because the reduction of hazardous fuels would not be undertaken, the potential for large or unusually intense fires would be increased with the potential results described in the preceding paragraph.

Due to the aggressive suppression of wildland fires, such areas as open fields at ALPO and the historic lakebed at JOFL would be reduced in size due to the effects of natural succession. At the present time, many fields and the lakebed are kept open through mechanical mowing and other similar processes. While these methods are effective in maintaining current open fields, they are costly, both in terms of time and personnel, and accomplish little to improve native plant propagation (warm season grasses for example) or the promotion of ecosystem diversity. Under this alternative, these areas may be maintained by mowing and/or other similar methods with no change or improvement in species diversity resulting. Long term adverse impacts would be minor to moderate in nature.

Cumulative Effects

The no-action alternative would contribute to long-term changes in the structure of the vegetation. Barring some management practices, such as mowing in open fields, succession in both forested and open areas would continue, unimpeded by disturbance, and the cultural scene would be modified from that described in the desired futures discussion. Wildland fire suppression techniques could cause immediate adverse impacts that would accumulate over time with moderate to long term adverse impacts upon some vegetative communities. As land use patterns change outside the park with increases in development and the disturbance they engender, the potential for the introduction of invasive species is increased with the attendant decline in native species encouraged through the implementation of this alternative.

Conclusion

This alternative would produce minor to moderate adverse vegetation impacts in the short term, and would have long term moderate to major adverse impacts on some vegetation types, particularly those represented by the oak dominated mixed hardwood forest, wetlands, historic lakebed and open grasslands and successional openings.

Mitigation

Current management practices, such as mowing and disking, while effective methods of setting-back succession of open areas are highly invasive and do little to enhance species and habitat diversity.

Impacts of Alternative II – Preferred Alternative

Impact Analysis

Oak species dominated many of the forests in the area of the present day parks of ALPO and JOFL during the Holocene epoch (Abrams 2002). This was primarily the result of the presence of a warmer, drier climate coupled with an elevated level of fire frequency after the glacial retreat. This rise in oak dominance did not transpire independent of other biotic factors. For example, American Indian populations increased throughout the eastern United States, as did their use of fire, land clearing, and other agricultural activities (Whitney 1994). Evidence exists that strongly suggests the existence of frequent (2.8 -14 year fire return interval) fires that occurred in the area of the park during the pre-European settlement period. The predominately hardwood upland oak forest type typically experienced low intensity under story fires. The frequency and extent of Native American burning decreased substantially after European contact. As a result, very little recruitment of new white oak trees took place during the 20th century. Forest canopies closed over previously open grasslands, savannas, and woodlands (Buckner 1983; Deneven 1992; Dobyns 1983; MacCleery 1993, 1995; Pyne 1997). European settlers increased the frequency and extent of burning in the oak hickory forest and mixed pine forest types and shortened fire return

intervals to 2-10 years; many sites were burned annually (Cutter and Guyette 1994, Guyette and Dey 1997, Holmes 1911, Sutherland and Others 1997 and 1995). Others, (Van Lear 1989 and Abrams 1992), have made a strong case for the re-introduction of fire to what were once the oak dominated forests and woodlands of this geographic area. At the present time, The Pennsylvania Bureau of Forestry is embarked upon a program of prescribed fire in select areas with the intent of stimulating the propagation of oak species and improving ecosystem variability in oak forests.

As more shade tolerant species typical of the northern hardwood forest invade present day oak forests, oak trees and other less shade-intolerant companion species cannot thrive and become reproductively unsuccessful. The recent predominance of red maple in oak forests has been shown to prohibit reproduction of oaks (Apfelbaum and Haney 1989). This condition is evident within many of the oak forests in the park. A program of prescribed fire in select areas of oak forest would provide the potential for the creation of more open forest gaps, increased ground forage, and nutrient release to the soil. These are all conditions that are needed in order to support increased woodland/ forest diversity by providing resources needed for a variety of flora and fauna and by creating viable seedbeds necessary for oak reproduction. Other factors will need to be considered as well, for example, the presence of overpopulations of white-tailed deer can also exert significant impacts upon oak regeneration. This is particularly true in Pennsylvania. It is therefore likely that some type of enclosure system would have to be included as a part of the oak restoration process so that new oak seedlings and sprouts would not be destroyed by the overpopulated white-tailed deer in the area.

The beneficial impacts of fire to oak and companion species (hickory, for example) that are relatively fire tolerant would be immediate following a prescribed fire as would also some short term adverse impacts (mortality and/ or weakening) to fire intolerant species. Estimating the duration of these impacts is difficult to quantify because there are a number of factors that are involved, most of which are highly variable. Factors to be considered are the survivability of some mature species that are fire intolerant in their seedling stage, but exhibit resistance to fire in their more mature stages of development; the presence of a viable seed-bank in the soil, the environmental conditions following the fire, the ability or inability to prevent the reduction of seedlings by white-tail deer and the time interval between prescribed fire treatments. Post-burn activities such as invasive species removal and native species planting programs, will also determine the duration of the impacts to vegetation.

The time interval between prescribed fire applications will also exert a significant influence upon the intensity and duration of impacts to vegetation. The generally accepted return interval for oak forests is between 5 –10 years. Weakening and mortality of some fire-tolerant trees can be expected with the return intervals suggested. It can also be expected that most of the desired species will re-sprout following prescribed fire. This is the primary method utilized by many oak species in order to regenerate. Hickory, redbud, and dogwood species in the park also react in this manner as long as they are not top-killed by fire (*http://www.fs.fed.us/database/feis*). A prescribed fire that utilizes low intensity ground fire would not significantly affect larger

trees of these and other species. Long term moderate to major beneficial impacts are expected to occur over time (2-15 years), foreshadowing any minor short term adverse impacts that may occur immediately post burn.

The effect of prescribed fire on populations of native warm season grasses, as well as other native grasses in the park such as Little bluestem (*Andropogon scoparius),* Switchgrass *(Panicum virgatum)* , Orchardgrass (*Dactylis glomerata*), Poverty danthonia (*Danthonia spicata*), Timothy (*Phleum pratense*) and others are well known (Wright, 1982 and internet database located at (*http://www.fs.fed.us/database/feis*). The applications of prescribed fire to representative populations of these species within the parks, particularly during the very early spring when grasses are still in the dormant stage, have proven to be most effective in propagating these species. While mechanical processes such as mowing have been used to keep grasses short, primarily as a means of maintaining the cultural scene in the park, these methods do little to enhance current populations of native warm season grasses and may actually contribute to their decline in the long run. On the opposite side, prescribed burns in the spring have been shown to be very effective in killing cool season grasses, particularly those classified as non-natives such as *Poa pratensis* and *Elymus virginicus* (Hensel 1923, Ehrenreich, 1959, Old 1989). The strategy of applying prescribed fire to selected open field areas on a rotational schedule of between 1-3 years has been proven to be most effective in enhancing native warm season grass populations and in reducing some selected non-natives. In addition, the acreage selected for treatment of this type in the parks is relatively small. The use of prescribed fire as a maintenance tool to promote the growth of grasses and forbs in the historic lakebed at JOFL provides the most environmentally friendly means to prevent woody species invasion of that critical cultural scene of the park. Attention to monitoring will provide important information as it relates to the effectiveness of the prescribed burn program in meeting management objectives. Immediate beneficial impacts on these species will be realized and the long term prognosis for moderate to major benefit is a realistic expectation regarding these species.

The presence of Invasive species is a concern for the parks. A combination of forests, open fields, and wetlands are distributed, as was discussed in the opening discussion of this alternative, throughout the parks, providing ample opportunities for the invasion of a variety of invasive plant species. Species causing the greatest impact, based upon the acreage that they cover and their potential to infest relatively undisturbed areas are: Japanese knotweed (*Polygonum sachalinense*), garlic mustard (*Alliaria petiolata*), Asian bittersweet (*Celastrus orbiculatus*), Japanese barberry *(Berberis thunberdii*), honeysuckle Spp. *(Lonicera tatarica, morrowii, bella, and japonica*), multiflora rose (*Rosa multiflora*) and tree-of-heaven (*Ailanthus altissima*). The ability of these species to quickly colonize areas recently treated after having been subjected to wildland fire, whether a planned ignition (prescribed fire) or otherwise, is a concern for management. Generally speaking, their ability to quickly colonize an area is directly related to the intensity of the fire and the amount of loss of vegetative cover that results. While it is not possible to *directly* control the intensity of a wildland fire, some progress can be made *indirectly* through a gradual reduction in the presence of heavier than normal fuel loading that provides the major impetus for more intense fires. In this respect, the

implementation of this alternative offers distinct advantages over alternative I. Some species, such as tree-of-heaven (*Ailanthus altissima*) and perhaps garlic mustard (*Alliaria petiolata*), may actually proliferate after the presence of any type of fire. Severe disturbance events, such as those manifested in an unwanted wildland fire, can have profound impacts upon natural resources, interrupting the natural succession process. As a result, other resources, both natural and cultural, may be placed at increased risk. This is exacerbated due to the fact that some coniferous species are generally higher in flammability and are more susceptible to the negative effects of ice storms, insects, and wind damage. These elements often combine to create the potential for an increase in fire activity through the accumulation of dead and downed forest fuels above normal levels.

In those areas where access is available, non-fire reduction of dead and down fuels is often the treatment of choice in some forest types. Forest stands in the transitional phase present the most risk regarding wildland fire. This is largely due to the presence of large amounts of fuel, chiefly in the form of snags (standing dead trees) and downed trees and branches. In those areas where relatively pure pine stands are beginning to make the transition to a more mature stand with attendant over story, residual hardwoods in the under story can begin to develop. These areas are the most susceptible to damage from environmental elements. Care will have to be taken not to damage hardwood seedlings and reproduction in the under story when manual hazardous fuel reduction activities are undertaken. Minor, short term adverse impacts can be expected, but these will be quickly overshadowed by the long term major beneficial changes in forest structure and attendant lower fuel loading. Caution must also be taken to preserve those gap openings in the forest canopy that will allow for shade intolerant hardwoods in the under story the opportunity to respond to the sunlight provided by the gap openings in the forest canopy. This also encourages the growth of grasses and forbs in the under story and increases overall site diversity.

Cumulative Effects

This alternative would contribute to desired major long-term beneficial changes in the structure of the vegetation within the parks. The establishment and maintenance of native grasses and forbs, as well as the restoration and maintenance of the remnant oak-hickory forests would help reduce impacts on vegetation from unplanned ignitions and help restore the natural and cultural landscape. The cumulative effect of this process would manifest itself in the preservation of species diversity and cultural viewsheds in the park. This is of particular importance because of gradual development projected to occur along the park boundary within the next several decades and the potential for increased ignition of unwanted wild land fires. Also, the introduction of structures in areas where they were previously not found add to the list of values at risk should a wildland fire ignite in the area.

Conclusion

The use in this alternative of prescribed fire, non-fire hazardous fuel reduction, and appropriate management response in wildland fire suppression situations, provides a range of alternatives that maximize the ability of park managers to manage vegetation in order to promote public safety and enhance resource value. The establishment and maintenance of native grasses and forbs, combined with the restoration and maintenance of the oak dominant forest types are instrumental to the restoration of the parks cultural landscape and to species diversity. Major long term beneficial impacts are expected to result from the implementation of this alternative.

Mitigation

A natural resource management expert will be consulted during planning and development of each of these projects to identify the location of state or federally protected species and define how they will be protected and managed

Non-fire hazard reduction methods (chainsaws/ brush blades, etc) will be used in lieu of other mechanized equipment, particularly in those areas where hardwood seedlings are already present in the forest under story.

Spot treatments of herbicide may be used to eliminate invasive species present in the under story. Their application will be done in accordance with the procedures outlined in management plans concerning the reduction of invasive species.

Impacts of Alternative III – Appropriate Management Response and Non-Fire Fuels Management

Impact Analysis

Under this alternative, impacts would be similar to those outlined in alternative II. Because prescribed fire activities would not be allowed under this alternative, there is potential for increased short term minor to moderate adverse impacts to vegetation and soils resulting from hazardous fuel reduction. This typically manifests itself in the form of increased foot and machine traffic of the personnel and / or equipment involved. Non-fire treatments without prescribed fire are less effective in favoring or discouraging selected species and are could cost more in the long term. Native warm season grasses and forbs would not benefit from the restorative efforts of prescribed fire, thus populations would slowly decrease or likely be replaced by non-native grasses and other species. Invasive species can be managed effectively with non-fire treatments (i.e. hand-pulling/ herbicide), though their application is expensive and requires large investments in personnel and equipment. In addition, herbicide use may be contraindicated by the presence of sensitive species and/ or wetlands.

Cumulative Effects

Because growth adjacent to and along the parks boundaries is projected to occur during the next several decades, the restoration and maintenance of species diversity and cultural viewsheds is a major importance to the parks. Under this alternative, there is potential for minor to moderate loss of native grasses and forbs, and minor to moderate long term loss of some forested and open area cultural viewsheds with the implementation of this alternative.

Conclusion

This use of non-fire hazardous fuel reduction activities in this alternative would have minor to moderate adverse impacts on vegetation. Some areas would not receive treatment due to lack of access for personnel and equipment. The use of appropriate management response techniques during wild land fire suppression incidents would afford an increased level of protection and /or benefit for vegetation since fire managers would be able to prioritize suppression responses in selected areas. Non-fire hazardous fuel reduction treatments would cause minor localized changes to the forest canopy cover as well as to vegetation in the forest under story. The enhancement of existing vegetative communities would not occur to the extent as demonstrated in alternative II; in particular native warm season grasses and other associated flora and fauna. The adoption of this alternative does not constitute impairment.

Mitigation

A natural resource management expert will be consulted during planning and development of each of these projects to identify the location of state or federally protected species and define how they will be protected and managed

Non-fire hazard reduction methods (chainsaws/ brush blades, etc) will be used in lieu of other mechanized equipment, particularly in those areas where hardwood seedlings are already present in the forest under story.

Spot treatments of herbicide may be used to eliminate invasive species present in the under story. Their application will be done in accordance with the procedures outlined in plans that are developed for managing invasive vegetation.

5. Adjacent Communities and Landowners

Affected Environment.

In the forty years that Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial have been under the stewardship of the National Park Service, there have been no formal finalized comprehensive fire management plans developed with the intent to guide direction of fire management activities. During the time period 1964 - 2004, there were no wildland fires detected and/or suppressed on park land,

though there have been a significant number of wildland fires on public and private lands adjacent to the park. For example, between 1999 -2002 the Gallitzin District of the Pennsylvania Bureau of Forestry reported a total of 215 wildfires for a total of 991.5 acres. Perhaps of equal concern, is the growing impact that residential and industrial development may have upon park resources. Growth associated with industrial activities, such as coal mining, railroads and logging, frequently takes place on neighboring private and public property. Railroad use continues adjacent to and, in some cases, on and/ or through park land. Since this particular type of use traditionally results in increased wildland fire ignitions, the potential for a wildland fire starting either within the park or just outside of it, and spreading rapidly onto either park, commercial or private land is greatly increased. As the result of the physical configuration of the park, one that juxtaposes an extensive linear boundary interface with many private, state, and commercial/ industrial landowners, park managers have identified the need to confer with local fire protection organizations, particularly volunteer fire departments, adjacent landowners and the Pennsylvania Department of Conservation, Bureau of Forestry, in order to address basic fire protection mutual aid concerns. As a result of new federal fire policy implemented in 2002, the park has been mandated to prepare a comprehensive fire management plan to govern those activities in the park. In compliance with NEPA regulation, this Environmental Assessment is being completed as a part of that process, and will be included as an Appendix to the Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial Fire Management Plan.

A variety of park management documents have identified natural and cultural resources in the park that require continuing protection. The fire management plan will address the full spectrum of activities that will be used to protect these identified resources. These activities include; the suppression of unwanted wildland fires, the use of prescribed fire and non-fire methodologies to reduce/ remove hazardous fuels, enhance native warm season grasses and associated herbaceous vegetation, protect wetlands, enhance forest sustainability in some forest types, and remove and/ or reduce invasive species.

Because many of these activities will be “new” to park neighbors and the public, it is critical that the rationale for each of the actions discussed in the environmental assessment be clearly defined and presented in such a manner that a clear sense of what is to be accomplished is presented. The goal of this interactive process is to enhance protection efforts for park resources and eliminate potential conflicts that might be based upon a lack of knowledge of management goals, objectives, and procedures. Local fire departments, adjacent landowners, and local communities will be invited to participate, to the extent of their training and background, in the planning and implementation of the park fire management plan. This will not only provide “buy in” from these resources, but it will also enhance overall protection efforts for resources both in an outside of the park. In addition, resource availability and potential project funding may be increased by widening the funding base available across agency lines.

Methodology. All available information on resources needing to be afforded protection, as well as park planning documents such as the General Management Plan, Resource

Management Plan, Statement for Management, and other park documents relating to resources and their protection have been used as resource material for development of this action item. In addition, the use of public comment to assist in gathering information regarding public perception of proposed management actions may be carried out in a variety of ways, including newspaper notices, visitor contacts in the park visitor center, local service clubs and organizations, employee contacts with peers in the local community, and through public notices and meetings. Each park has a different relationship with its constituents, so there is no specific set of actions that must be undertaken. Emphasis should be placed upon effective communication of park goals and objectives, and, to the extent practicable, an explanation of the techniques utilized to meet those objectives and the expected results. The development of cooperative efforts in both planning and implementation of non-fire hazardous fuel reduction, prescribed fire, and fire suppression operations, is undertaken.

Negligible – Impacts barely perceptible or below detection levels.

Minor – Changes in public and interagency support are minor and short-term. Little, if any, mitigation in the form of public meetings or further contacts beyond normal communication would be necessary.

Moderate – Changes in the ability of the park and local resources to protect values at risk are possibly long-term, but localized. Mitigation to offset adverse effects could be necessary, and would likely be successful. This may involve the use of public meetings, forums, and enlistment of other agency representatives in order to clarify programs and treatment methods and ensure joint operations are undertaken to the advantage of both the park and adjacent communities and landowners.

Major – Impacts on park resources may be considerable or require significant effort on the part of park staff, adjacent landowners and other cooperating agencies to mitigate. A portion of the fire management program may have to be set aside for special coordination and education efforts or even suspended pending additional planning and cooperative implementation efforts. Mitigation to offset adverse effects would be necessary as discussed above, but success would not be assured.

Cumulative – Impacts, though negligible in the short term, could add up though time becoming minor to major and may be irreversible.

Regulations and Policies. Current laws and policies require that the following conditions be achieved in the park:

Desired Conditions: Provide maximum protection to cultural and natural resources, both in the park and out, in perpetuity, by employing a wide range of fire management strategies, including developing working relationships with local fire departments, adjacent landowners, the public, and other fire management organizations, in order to maximize protection of resources. Opportunities for cooperative efforts relating to a wide range of fire management issues including, prescribed fire planning and

implementation, hazardous fuel reduction, and educational opportunities, are explored so as to garner public and visitor support of these programs and ensure program implementation achieves the desired protection efforts.

Source – NPS Organic Act, NPS *Management Policies* (2001), National Fire Plan, (2000).

Impacts of Alternative I - No Action

Impact Analysis

Under this alternative the only fire management actions taken would be the development of a fire management plan with emphasis upon the use of aggressive fire suppression as a tool to suppress all unwanted wildland fires. In the short term, the public would have little or no difficulty with this alternative, as they would simply see the continuation of the status quo. However, as time passes and public awareness of the deteriorating condition of park resources, both natural and cultural, and the risk to those resources increases, minor to moderate pressure would be brought to bear on park management to correct deficiencies. Park management would be exposed to increased pressure from park neighbors and local communities to provide protective measures to both private and park land and property from the effects of wild land fire caused, in part, through the deterioration of forest fuels (hazard fuel accumulations). Local fire departments would have a difficult time responding to wildland fires that are driven by heavy fuel accumulations that are currently accruing. When a wildland fire response was required, the potential for damage to park resources would be increased, as would the potential for a fire to spread outside of park boundaries onto adjacent private lands. This would likely be due to the lack of suppression resource availability of local response resources and/ or the potential strain placed upon local fire departments to respond rapidly to fires in the park when activity in their own jurisdictions was requiring immediate attention. Threats to public and private property along the boundary of the park would be placed at increased risk as accumulations of wildland fuels increase within the park. Because cultural landscapes could be altered, park visitors and neighbors might very well question the validity of this management response. It is likely that some type of wildland fire event would eventually occur resulting in loss to either park resources or private property or both.

Cumulative Effects

The no-action alternative could contribute to long-term negative cumulative effects on park resources manifested by the inability to handle a catastrophic wildland fire and a lack of public support for a fire management program that otherwise should prove instrumental in providing a leadership role in preserving and protecting both park and community resources. Adjacent agencies with fire protection responsibilities would not benefit from fuel reduction activities within the park, placing an increased risk for wildland fire on their jurisdictions located along the park boundary. As a result, they would be likely to be unable to respond effectively to fire suppression requests outside of their jurisdictions. Because of the increase in both private and industrial development

along the park boundary, the attendant loss of species in those areas could be compounded by the lack of restorative efforts in the park that favor overall species preservation, enhancement, and diversity.

Conclusion

This alternative could have negligible to minor impacts on park resources in the short term. Over the course of time, impacts could be expected to increase in a minor to moderate fashion, but, this process could be significantly accelerated to the status of a major impact by the presence of precipitating event such as a wildland fire along the boundary or adjacent to a historic structure. The combination of accumulation of hazardous fuels and increase in ignition potential as the result of development along the boundary of the park, are a significant cause for concern. Fire potential may exceed the ability of local fire departments to effectively suppress wildland fire ignitions, primarily due to a lack of cooperative training, planning, and pro-active hazardous fuel reduction activities. Species composition and ecosystem diversity would be reduced, with the potential for the loss of some key ecosystem components. Invasives would likely continue to spread unabated from non-park land onto the park and vice-versa.

Mitigation

The best that could be hoped for with the implementation of this alternative would be for cooperative planning and training between the Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial and adjacent communities and agencies regarding mutual response to wildland fire suppression incidents in an attempt to minimize damage to natural and cultural resources.

Impacts of Alternative II – Preferred Alternative

Impact Analysis

This alternative could be expected to generate considerable interest and public concern in the short term among neighbors, adjacent communities, cooperating agencies and the public. Most of the concern can be attributed to the proposed implementation of prescribed fire. For the last 60 years the public has been effectively informed by “Smokey Bear” that all fire is bad. Not until the last few years has it come to light that the total exclusion of all wild land fires has actually had a negative impact on our environment. This is most easily seen through the unnatural accumulation of dead and down forest fuels that, if left alone, create a situation where the stage is set for a potentially catastrophic wildfire fueled by that abundance of fuel. The positive implementation of this alternative would be expected to quickly dispel much of the public concern about the techniques utilized. By enlisting active participation, during the planning and implementation phases of both prescribed burns and non-fire hazardous fuel reduction activities, local fire departments and the Pennsylvania Bureau of Forestry, would become partners in a successful fire management program. This would greatly assist in developing positive results that would be seen first-hand by the participants and contribute significantly to the beneficial impacts of this alternative. Cooperative

planning and program implementation would benefit local landowners and communities since resources would be shared for all of the involved parties. Realistically, there is always the potential for inappropriate use of mechanized equipment or personnel in the hazardous fuel reduction process. In addition, the use of prescribed fire, even with all of the safety checks built in to the implementation process, presents the potential for an escape outside control lines. As a result, minor to moderate short term adverse impacts could result. A cooperative effort in planning and implementing this phase of the alternative would be instrumental in providing for operations that cover all contingencies, both in the park and out, that may arise during the course of prescribed burning operations or non-fire hazardous fuel reduction projects.

Cumulative Effects

This alternative would not contribute to any long-term negative cumulative effects on adjacent communities and landowners since cooperative efforts in fire prevention, fire suppression, and resource enhancement would be undertaken in partnerships developed as a result of the implementation of this alternative. The potential does exist for long term positive cumulative effects that will accrue to the benefit of the park and its neighbors.

Conclusion

This alternative could have moderate long term beneficial impacts on the manner in which adjacent communities and landowners cooperate with one another in order to ensure the protection of both park and private resources. It is more likely that, as a result of the implementation of this alternative, the long term benefits accrued will enhance all park operations as well as those outside of the park. Cooperative efforts with local fire departments, other agencies, and the public, regarding training, operations, and planning should benefit all fire management operations and lead to increased protection for resources both in the park and out. Proper utilization of this alternative would be likely to offset the negative aspects, no matter how slight the probability, of a prescribed fire that escapes control or that exceeds predicted intensity levels.

Mitigation

The key to the implementation of this alternative is the development of good working relationships with local fire departments, other fire protection agencies, and the public. The development and presentation of quality, proactive education programs about goals and techniques utilized in implementing this alternative is also important to its success. Proactive efforts at public education may be achieved through a variety of techniques including, site bulletins, school and group meetings, visitor center handouts, interpretive talks, cross-training, etc

Impacts of Alternative III – Appropriate Management Response and Non-Fire Fuels Management

Impact Analysis

Under this alternative short term impacts created through implementation strategies could be expected to be about the same as those in alternative I. In the long term the inability to enhance some resources, both in the park and out, (forest, native grasses, etc) through the use of prescribed fire could generate questions from cooperators and the public as to the validity of using this alternative. Because maximum ecological benefit would not be maximized through the implementation of this alternative, some systems, park oak forests for example, would not be enhanced through effective prescribed fire applications. A reliance on non-fire hazardous fuel reduction activity could not be expected to achieve the scope and breadth of results as those described in alternative II.

Cumulative Effects

This alternative would have approximately the same impacts as those in alternative II, except that the potential for long term positive benefit is somewhat reduced since park natural and cultural resources will not be afforded the opportunity to be enhanced through the positive effects of prescribed fire. Depending upon the participation of local fire departments and other agencies, the implementation of this alternative could bring into question the validity of using it as an effective means of preserving park resources. Local communities, adjacent industrial and private landowners would be less likely to be afforded the opportunity to utilize common resource protection strategies with the implementation of this alternative. Species composition, both in and out of the park, could suffer a long-term loss in diversity and critical cultural resources could be placed at increased risk.

Conclusion

The implementation of this alternative appears to offer many of the benefits of both alternatives I and II, without the potential for loss, no matter how slight, that can result from a prescribed fire that escapes control or that exceeds intensity. This alternative could have negligible to minor impacts on the manner in which adjacent communities and landowners work with the park to achieve common fire management goals in the short time. It is more likely that, as a result of the implementation of this alternative, the long term benefits accrued will enhance all park operations in a minor fashion, though not to the extent as outlined in alternative II. Unfortunately, under the auspices of this alternative, species composition and diversity would probably decline, both in and outside of the park. Important cultural resources would also be placed at increased risk due to an inability to utilize a variety of protection strategies in their defense. This would likely comprise a long term moderate adverse impact.

Mitigation

Same as alternative II.

6. Wildlife

Affected Environment.

Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial are home to a variety of animal species. The presence of Pennsylvania State Game lands adjacent to the parks provides good habitat for many common eastern mammalian species including white-tailed deer, skunk, raccoon, opossum, red fox, squirrel, black bear, eastern cottontail, voles, groundhogs and mice. The elusive weasel has also been sighted at Allegheny Portage Railroad National Historic Site (ALPO). Although both parks are presently engaged in developing comprehensive species lists, they are not yet complete, with the exception of avian species.

Inventories of avian species conducted from 1997 – 1999 by researchers from Pennsylvania State University identified a total of 61 species during the migration period. The National Park Service species database, NPSpecies (2001) lists a total of 109 avian species as being found in both of the parks. The most abundant species during the migration periods (April, May, September, October) include the Louisiana water thrush, black-throated green warbler, the magnolia warbler, blue-gray gnatcatcher, brown-headed cowbird, common yellow-throat, the chipping sparrow, northern cardinal and the American goldfinch. The most abundant species during the breeding season (June and July) include the red-eyed vireo, ovenbird, American redstart, scarlet tanager, indigo bunting, wood thrush, black-throated green warbler, chipping sparrow, brown-headed cowbird, blue-headed vireo, black-capped chickadee, and the song sparrow.

Overall, it appears that ALPO and JOFL contain wildlife habitat of relatively low to moderate diversity. This can be primarily attributed to the predominance of relatively singular habitat in each of the parks and the fact that both parks are rather small in size. At ALPO for example, forest habitat and the lack of open areas of significant size is the norm. For example, only about 5% of the park's total acreage is comprised of suitable habitat where grass and forbs predominate. Sixteen percent of the park's land base may be classified as early-successional habitat. Approximately 1% of the park is coniferous forest. This fact underscores the need for preservation and enhancement, where practicable, of those areas where open habitat are presently found. It also supports the need to enhance existing forest habitats that are in danger of losing their limited ecological variability due to natural senescence and neglect. JOFL, a much smaller area occupying only about 162 acres, is dominated by early succession habitat (43%), which is located primarily adjacent to the river. Herbaceous habitat (grass and forbs) accounts for 23% and is composed primarily of open fields located near the park visitor center and on the Unger farm. Approximately 33% of the habitat in JOFL is composed of deciduous forest.

Methodology. Information based upon ALPO/ JOFL Resource Management Plan and other species inventories found in assorted park documents. Predictions about short- and long-term site impacts were based on this information. Intensity of effects is defined below.

Negligible – An action that may cause changes to wildlife, but the change will be so small that it will not be of any measurable or perceptible consequence to the population.

Minor – An action that may cause changes to wildlife, but the change will be small and of a localized consequence to the population.

Moderate – An action that will cause changes to wildlife. The change will be measurable and may have a sufficient consequence to a specific population.

Major – An action that will cause a noticeable amount of change to wildlife. The change will be measurable and will have a substantial and possible permanent consequence to a specific population.

Cumulative – Impacts, though negligible, add up through time becoming minor to major and may impose changes upon wildlife.

Regulations and Policies. Current laws and policies require that the following conditions be achieved in the park:

Desired Conditions: Promote natural wildlife populations, minimize degradation, destruction, or loss of habitat and/ species, encourage species diversity, and maintain wildlife habitat to the maximum extent practicable.

Source – NPS Organic Act, NPS *Management Policies* (2001), COLO Resource Management Plan (1999), General Management Plan (1993).

Impacts of Alternative I - No Action

Impact Analysis

Under this alternative no hazardous fuel reduction activities would take place. The use of aggressive suppression strategies would allow hazard fuel levels to accumulate over time, increasing the potential for long term minor to moderate impacts on forest structure and hence on wildlife. Wildland fires would exhibit fire behavior (greater intensity and duration time) driven by the presence of excess fuels, both on the ground (brush, needles, twigs and logs) and in the form of snags (standing dead trees). The potential for fires to occur in the mid to upper levels of forest structure is increased in those areas where there exists the presence of a well-defined mid-story vegetation layer (composed of either live or dead fuels or both). Although the occurrence of coniferous forests in the parks is relatively small, these forest types also typically support the potential for increased fire behavior. Forest structure in these vegetation types provides a ready-made “fuel ladder” (continuous fuels from the forest floor to the canopy) that

often result in fires that burn with greater intensity and rates of spread. The impacts of these more intense fires are responsible for short to long-term changes in forest stratification and structure. As a result of these changes, wildlife diversity and abundance can be expected to be altered, particularly in the short term. The extent and severity of impacts from a fire are primarily the result of the cumulative effects of overall fire severity, combined with such factors as the uniformity of a burn and its seasonality. If intensive wildland fires burn during the time of the year when nesting is taking place (spring), species such as birds and small mammals are likely to suffer mortality. In addition, reproductive success may be reduced in at least the first, and perhaps more, seasons post-fire because of food reductions from intense spring fires. Those avian species that build their nests in the mid-story and canopy layers of the forest would also be at risk from the impacts of the more intense wildland fires that would result from the implementation of this alternative, since fires of greater intensity would be able to reach the areas where their nests were constructed. As one would expect, most birds leave burning areas to avoid injury from heat, smoke, and flame. Some return almost immediately while it is still burning to take advantage of the altered habitat. Still others abandon burned areas because the habitat no longer provides the structure or the food source(s) that they require to survive and reproduce. Some raptors are attracted to the fire while others move out of the area. Owls seem to prefer the habitat provided by low intensity fires, but avoid areas where high-intensity fires have occurred. It is thought that this is due to the structural changes brought about by high fire intensity. Predators and scavengers are attracted to burned areas because their food is generally more abundant or more exposed than on unburned sites. However, high intensity fires may have negative impacts upon insect the populations, thus causing an attendant decline in the numbers of avian species that depend upon those insects for their food. Conversely, intense fires tend to favor woodpeckers and their kin as these birds are attracted to the large number of standing dead trees that have been killed as a result of the higher fire intensities. These dead trees (snags) provide excellent nesting and feeding opportunities. Their presence ensures a viable supply of nest sites as well as a steady diet of arthropods, a prime food source for many of these species types.

Hardwood forests in the parks, those composed primarily of mature oak/ hickory species, currently exhibit relatively low reproductive capability as evidenced by the lack of seedlings in the understory. The presence of more shade-tolerant species such as beech and maple will eventually lead to changes in forest structure. If allowed to continue unchecked by disturbance, the mast-producing hardwood species that many forms of wildlife prefer in order to sustain their habitat requirements will disappear to be replaced by maple and other shade tolerant species. Species diversity will be lost as white-tailed deer, squirrels, and some avian species abandon the area in order to seek out food resources no longer present. The implementation of this alternative essentially would serve to perpetuate the continuation of the current forest progression away from a viable oak/ hickory presence, eventually leading to a reduction or even loss of some wildlife species that are dependent upon those forest types.

Small mammals, under normal conditions, are generally able to avoid fire by using underground tunnels, pathways under moist litter (whose presence is dependent on the

extent of the fire), stumps, root holes, rocks, and dead logs and woody debris. With the implementation of this alternative, overall fire impacts may restrict or eliminate some escape routes and hiding places by consuming ground litter and logs, thus leading to increased species loss. Small rodents that construct surface-level nests such as rabbits, mice, etc, are more vulnerable to fire –caused mortality than the deeper-nesting species, especially because their nests are constructed of dry, flammable materials (Kaufmann and others 1988). Larger mammals are generally capable of escaping even large, intense fires, and, are often attracted to areas that have just been burned due to the presence of “roasted” hardwood mast and succulent new vegetation in lightly burned areas.

There are very few reports of fire-caused injury (Russell and others 1999) to herpetofauna, even though many of these animals, particularly amphibians, have limited mobility. Since many reptiles and amphibians live in mesic habitats, the potential for these sites to burn, even under intense fires, is less likely than upland sites. Wetlands generally provide refugios for aquatic species, allowing them to carry out such activities as breeding with little or no interruption from fire.

The vulnerability of insects and other invertebrates depends upon the location and timing of the fire. While adult forms can burrow or fly to escape injury, species which have immobile life-stages that take place in surface litter or above-ground plant tissues are more vulnerable. This vulnerability is exacerbated by the more intense fires that may occur with the implementation of this alternative. Above ground micro-sites, such as the un-burned center of a grass clump, can provide protection during all but the most severe fires.

Through the implementation of this alternative, succession of open areas would continue, being held in check only by mechanical methods such as mowing. Mowing (where it can be done and not interfere with cultural scenes and values by leaving mow “lines” and tire tracks and ruts) in or near cultural scenes and/ or resources, does set back succession (a goal in some areas for restoration/ preservation of cultural scenes/ natural systems), however it does not provide many of the benefits that may be attributed to prescribed fire (a management tool that *cannot* be used in this alternative). Generally, mowing allows for the buildup of dead fuels. The presence of these fuel accumulations tend to retard the growth of new vegetation and limit the potential for nutrient recycling. Accumulated fuel and thatch layers usually preclude use by nesting birds because it is theorized that they cannot effectively run on the ground to escape predators or forage for food.

Overall species richness (37%) declines considerably (Fynn et.al. 2002) when sites are mowed. An almost opposite increase in species richness (22%) resulted from the application of prescribed fire (again, this tool *cannot be used* in this alternative*)*.

Cumulative Effects

The no-action alternative could contribute to long-term moderate to major cumulative impacts on wildlife and associated habitat. Since local industrial agricultural use, including logging and mining outside of the park will likely continue and /or be replaced by development along the park boundary (residential and industrial), it is reasonable to assume that some wildlife populations will decline in both number and diversity as a result of shrinkage in suitable habitat occurs outside of the parks.

Conclusion

This alternative could have moderate, and potentially cumulative, impacts on wildlife. Aggressive wildland fire suppression techniques, coupled with a lack of hazardous fuel removal and ecosystem restorative processes such as prescribed fire, may point the way towards adverse impacts on vegetative/ forest structure and wildlife habitat. Open areas and fields will slowly diminish in size, or be maintained through methods such as mowing, thus limiting the potential for many wildlife species to fully utilize these areas to the maximum extent. Wildlife abundance and ecological diversity can be expected to decrease as a result of the attendant loss in wildlife attributes.

Mitigation

None

Impacts of Alternative II – Preferred Alternative

Impact Analysis

Under this alternative the application of a variety of management stratagems may be applied as a means to protect park cultural and natural resources, including wildlife. The implementation of this alternative would include the use of prescribed fire, non-fire hazardous fuel reduction, and mechanical and chemical methods of vegetative manipulation, either individually or in combination, for treatment of habitat restoration, invasive species treatment and hazard fuel reduction. The cumulative effect of these methods could have negligible to minor short term adverse impacts on wildlife, particularly in regard to the mortality of some individuals during prescribed fire operations. The long term impacts would be minor to moderately beneficial for most species. In either case, impacts that result from wildland or prescribed fires depend upon the conditions under which they occur. As was discussed earlier, these impacts on wildlife are generally species specific and are created by wildland fires that are largely dependent upon such factors as overall fire intensity, uniformity (or lack of it), and seasonality of the fire. Wildland fires can occur at almost any time of the year, though they most frequently occur in the geographical region where the parks are located during either the spring (Mar-May) or during the fall (September - November). Fires that occur early in the year are more of a concern as far as wildlife is concerned since these generally impact potential nesting and/ or breeding seasons of many species. In addition, environmental factors may be such that early season wildfires may burn with

more intensity and with greater rates of spread. These conditions may be exacerbated by drought or decreased snowfall during the winter months. Prescribed fires can be planned for almost any time of the year, depending upon the management objectives of the individual treatment. This provides management with opportunities to avoid some of the negative impacts upon wildlife such as those caused by high fire intensity, inappropriate location, or inappropriate timing (times of the year when nesting and/ or breeding is underway, etc).

The implementation of this alternative offers the parks the ability to restore the structure of some forested areas and herbaceous successional openings to conditions that more readily represent systems in ecological balance. This will be accomplished largely through a reduction of accumulations of heavy dead and down fuels and invasive species. As a result, the potential for high-intensity wildland fire events will be reduced. Most wildlife populations will be provided with improved habitat and increased diversity based upon the creation of new microhabitat availability. An advantage attributed to prescribed fire is the fact that it can be planned in well in advance so as to produce fire effects necessary to achieve management objectives, while at the same time minimizing negative impacts. For example, prescribed fires would not be implemented during the time of the year when avian species were nesting and/ or breeding. The same can be said for herpetofauna and mammals. Prescribed fires can be planned and implemented in such a manner that resultant fires are of low intensity and directly impact only those areas that have been selected for treatment. Since only relatively small areas are burned during a treatment, any loss of individuals during prescribed fire operations would be expected to have a negligible impact on the overall diversity and abundance of wildlife. Amphibian populations may decline after accumulations of forest dead and down fuels are removed, either through prescribed burning or through non-fire manual reduction. Since these species depend upon quantities of debris such as logs and other woody material, their removal could have negative impacts upon populations.

Hardwood forests in the parks, those composed primarily of mature oak/ hickory species, currently exhibit relatively low reproductive capability as evidenced by the lack of seedlings in the understory. The presence of more shade-tolerant species such as beech and maple will eventually lead to changes in forest structure. If allowed to continue unchecked by disturbance, the mast-producing hardwood species that many forms of wildlife need in order to sustain their habitat requirements will disappear to be replaced by maple and other shade tolerant species. Species diversity will be lost as white-tailed deer, squirrels, and some avian species abandon the area in order to seek out food resources no longer present. Non-fire and prescribed fire methods can be used to restore and maintain the oak/ hickory hardwood forests in the parks. Prescribed burning of mature, uncut, hardwood stands can help establish oak and hickory regeneration by preparing a seedbed. Acorns and hickory nuts that have been buried, particularly by squirrels and blue jays, are ready, able, and available to germinate. Fire top-kills or eliminates many of the shrubs and small trees that shade the forest floor. In the newly created less shady environment, the acorns and hickory nuts germinate and the new seedlings can begin developing their own root systems. Eventually, the regeneration replaces the canopy trees (Barnes and Van Lear 1998). Non-fire

mechanical methods may also be used to mimic disturbance in these forest types, but their application is limited by such factors as lack of access, impacts of machinery and large numbers of personnel, disposal of debris, etc. Generally these types of activities must also include the use of herbicides to help control potential re-sprouting of unwanted species and/ or invasives. Regardless of the method(s) utilized, measures to protect new hardwood seedlings and reproduction must be taken to preserve them against the predations of such species as white-tailed deer, which are abundant in the area.

The potential exists for the escape of prescribed fires. In the unlikely event of this occurrence, impacts would be identical to those attributed to wildland fires of high intensity as described in alternative I. However, these types of events are unlikely to occur, because prescribed fire pre-planning, as defined in a comprehensive project-specific prescribed burn planning document, provides contingencies for a wide range of potential outcomes. For example, while the impacts from smoke are almost always present, they are usually short-lived and can be mitigated through appropriate smoke management techniques (mixing heights, transport winds, wind direction) as identified in the prescribed burn plan.

The short term modification of habitat resulting from increased human traffic during the implementation phase of non-fire hazard fuel reduction, could negatively impact wildlife habitat. In the long term, a slight increase in diversity and abundance of wildlife would occur through improvement and expansion of habitat managed in this manner.

The improvement of native grass and herbaceous species abundance and diversity in open areas would provide increased cover, nesting areas and food sources for wildlife. Through the implementation of this alternative, succession of open areas would be accomplished through the combined efforts of both mowing and prescribed fire, with the latter representing the preferred method. As was discussed in alternative I, mowing (where it can be done and not interfere with cultural scenes and values by leaving mow “lines” and tire tracks and ruts) in or near cultural scenes and/ or resources, does set back succession (a goal in some areas for restoration/ preservation of cultural scenes/ natural systems), however it does not provide many of the benefits that can be attributed to prescribed burning (nutrient re-cycling, preparation of seedbed, etc). Generally, mowing allows for the buildup of dead fuels. The presence of these fuel accumulations tends to retard the growth of new vegetation and limit the potential for nutrient recycling. Accumulated fuel and thatch layers usually preclude use by nesting birds because it is theorized that they cannot effectively run on the ground to escape predators or forage for food. Overall species richness (37%) declines considerably (Fynn et.al. 2002) when sites are subjected to treatments of mowing only. An almost opposite increase in species richness (22%) resulted from the application of prescribed fire.

Gap openings in the forest canopy that have been maintained or produced through the effects of prescribed fire and non-fire hazardous fuel reduction would provide opportunities for new forbs and succulent growth to occur. As a result, small mammals

and insects that these forbs support can be expected to thrive. The expected increase in populations of forbs, small mammals, and insect diversity will attract a variety of birds and other wildlife to the parks, thus improving overall diversity. In addition, increased reproduction and nutrient availability through habitat improvement can be expected to occur through changes resulting from prescribed fire implementation. Immediately following a prescribed burn, many species of wildlife are actually attracted to the burned area. Predators would more easily find prey due to the removal of vegetative cover and leaf litter. Fire damaged trees would provide new homes for many insect species and thus would attract insectivorous birds (such as woodpeckers, flickers, etc) to the area. Some species however, would avoid burned areas due to the lack of adequate cover to protect them from predators. Generally these impacts would last one growing season as lower level herbaceous species and grasses would regenerate in a relatively short period of time. Long term minor to moderate beneficial impacts would accrue as a result of the implementation of this alternative. In addition, prescribed fire could be used to reduce the potential for stand-replacing wildland fires, thereby protecting existing habitat and the wildlife who currently reside there.

Cumulative Effects

This alternative could contribute to moderate long-term beneficial and cumulative effects on wildlife based upon the ability to use prescribed fire, non-fire hazardous fuel reduction, and less aggressive fire suppression techniques outside of the park on adjacent lands. The implementation of this alternative through cooperating agencies and adjacent landowners would lead to improved protection of resources both within and outside the parks. This is of particular importance since some available wildlife habitat outside of the parks is being slowly developed for new homes and industrial sites. The presence of pristine forest habitat and balanced herbaceous openings is expected to diminish over time.

Conclusion

This alternative would provide negligible to minor short term adverse impacts on wildlife during the implementation phase of non-fire hazardous fuel reduction or prescribed fire projects. However, in the long term cumulative moderate beneficial impacts on wildlife populations and diversity would occur.

Mitigation

During prescribed fire operations, larger animals can easily leave the area of a fire, while small mammals, amphibians, and reptiles can burrow or flee to escape. Ground fires can locally impact non-flying insect populations in the short term, but most non-flying insects can also burrow and survive low intensity prescribed fires. Since prescribed fire burn units are rather small in size and will be burned at different time periods, any loss of individuals during prescribed fire operations would have a negligible short term impact on the overall abundance and diversity of wildlife. The availability of un-burned areas adjacent to burn units will provide ample habitat for any animals

temporarily displaced by prescribed fire. Prescribed fires can be implemented during times of the year when many species are dormant or in a non-nesting mode, thus significantly reducing the potential impact on wildlife populations.

Impacts of Alternative III – Appropriate Management Response and Non-Fire Fuels Management

Impact Analysis

As stated in the evaluation of Alternative I, the lack of ability to use prescribed fire could have minor to moderate adverse impacts on habitat and wildlife. Prescribed fire tends to be the most natural and cost-effective way to restore and maintain both forest structure and open herbaceous and grass fields. The restoration and enhancement of herbaceous species is difficult to achieve through strictly non-fire methods, though some progress towards that goal may be achieved through the manipulation of forest structure, and to a lesser degree open fields (Covington and Moore, 1992) that provide habitat for many wildlife species.

Hardwood forests in the parks, those composed primarily of mature oak/ hickory species, currently exhibit relatively low reproductive capability as evidenced by the lack of seedlings in the understory. The presence of more shade-tolerant species such as beech and maple will eventually lead to changes in forest structure. If allowed to continue unchecked by disturbance, the mast-producing hardwood species that many forms of wildlife need in order to sustain their habitat requirements will disappear to be replaced by maple and other shade tolerant species. Species diversity will be lost as white-tailed deer, squirrels, and some avian species abandon the area in order to seek out food resources no longer present. Non-fire mechanical methods may also be used to mimic disturbance in these forest types, but their application is limited by such factors as lack of access, impacts of machinery and large numbers of personnel, disposal of debris, etc. Generally these types of activities must also include the use of herbicides to help control potential re-sprouting of unwanted species and/ or invasives. Regardless of the method(s) utilized, measures to protect new hardwood seedlings and reproduction must be taken to preserve them against the predations of such species as white-tailed deer, which are abundant in the area.

Cumulative Effects

This alternative could contribute minor negative long-term cumulative effects on wildlife habitat based upon the lack of ability to use prescribed fire. A reliance on non-fire methods of hazardous fuel reduction would probably contribute to a negligible increase in wildlife habitat and population over time. It is also likely that some wildlife species might seek to live outside of the parks where habitat more closely meets their needs. As these habitats transition to areas characterized by industrial and residential development, a further loss of habitat is likely to result in reduction of wildlife diversity and population size both in and outside of the parks.

Conclusion

This alternative would have negligible to moderate adverse impacts impact on wildlife in the long term. Non-fire hazard fuel reduction activities used as a stand-alone process can be utilized to minimize or eliminate negative impacts of undesirable wildland fire; however the lack of ability to use prescribed fire precludes the enhancement of ecosystem diversity and fails to aid reproductive processes in many wildlife species to the maximum extent possible. Despite the fact that this alternative is not as effective as alternative II, its implementation does provide minor opportunities for beneficial impact upon wildlife in the short term.

Mitigation

To the extent practicable, hazardous fuel reduction activities can be undertaken during those times of the year and in those locations where impacts from foot traffic and cutting and removal of materials would be minimized. This typically means that these activities would occur during the non-growing/ reproductive season.

7. SOILS

Affected Environment.

Soils at ALPO are mostly formed from weathering of underlying parent rock, with alluvial soils along streams. For example, the Basher-Monongahela-Purdy association predominates along Blair Gap Run, Redlick Run and Blair Run as well as other streams. These soils are characterized by level and gently sloping, deep, to moderately deep, moderately well-drained to poorly drained soils formed in alluvium derived from shale and sandstone on flood plains and terraces.

The Berks-Brinkerton-Weikert association predominates on gently sloping to vertical steep, deep to shallow, well-drained and poorly drained soils weathered from acid shale and colluviums derived from shale and sandstone, on ridges, on foot slopes, and in small drainage ways.

The Leck Kill-Meckesville-Albrights association can be found on gently sloping to very steep, deep, well-drained to somewhat poorly drained soils weathered from red acid shale and sandstone, on ridges, on foot slopes, and in drainages, both permanent and intermittent.

In those areas dominated by soils formed in material derived from sandstone and quartzite and from sandstone and shale, particularly those areas on steep mountainous areas of the park, the Laidig-Hazleton-Clymer association composed of gently sloping to very steep, deep, well drained soils weathered from acid sandstone, quartzite, and conglomerate is found on broad mountain tops. The Laidig-Hazleton-Buchaanan series is found on mountain ridges and foot slopes, usually adjacent to the previous association.

There are five basic soils found in JOFL; Atkins silt loam, Brinkerton silt loam, Cookport-Ernest sandy loam, Laidig loam and Philo silt loam. Based upon the physical properties and the use characteristics of the soils discussed, they have been organized into three sets; Atkins and Philo, Brinkerton and Laidig, and Cookport-Ernest.

The Atkins and Philo soils comprise approximately 35 acres and were formed in alluvium washed from sandstone shale, and siltstone-derived soils. Both of these soils were located near and slightly elevated above the South Fork River, therefore they are subjected to frequent flooding. The Atkins soils are poorly drained and do not support traffic, except in very dry weather. Although these soils have reasonably favorable nutrient status, the poor drainage can restrict the growth of herbaceous species. The Philo soils are well-drained and have better trafficking characteristics than the Atkins soils. The Philo soils are similar to the Atkins soils in soil nutrient status but the more favorable soil drainage of the Philo soils makes these soils very favorable for terrestrial herbaceous growth.

The Brinkerton and Laidig soils were mapped on about 26 acres. These two soils were formed in colluviums derived from sandstone, shale, and siltstone. Brinkerton soils are generally found at the base of hills and ridges, adjacent to the Atkins and Philo soils. Brinkerton soils are similar to Atkins soils in regard to the seasonal high water table which limits their traffic-bearing capabilities. The Brinkerton soils may be capable of better terrestruial herbaceous growth than the Atkins soils. Laidig soils are well drained and generally found upslope of the Brinkerton soils and, are found on steep slopes (25 – 70% slopes). Laidig soils are capable of good terrestrial herbaceous growth, but care must be taken to protect soil from the effects of erosion.

Cookport-Ernest soils are moderately well-drained and comprise about 13% of the total area. These residum-colluvium soils support terrestrial herbaceous growth in most areas, but the presence of surface stones may limit equipment use and plant establishment.

Methodology. All available information on soils was compiled from the Resource Management Plan (1998), Fire Management Plan DRAFT (1991), Soil Conservation Service General Soil Maps for Blair and Cambria Counties (1980), and Opportunities for Creating herbaceous Communities within the 1889 Lake Conemaugh Shoreline at Johnstown Flood National Memorial (1986), as well as other park documents and studies. Predictions about short- and long-term site impacts were based on this information. Intensity of effects is defined below.

Negligible - Impacts would be below detectable levels and not measurable.

Minor – Changes to character of soils is detectable but short-term and localized. Any mitigation needed to offset adverse effects would be standard and uncomplicated and would be effective.

Moderate – Changes to character of soils readily apparent and long-term over a large portion of park area. Mitigation measures to offset adverse effects would probably be necessary and likely successful.

Major – Impacts to soils characteristics severe or of exceptional benefit over a wide area for the long-term. Mitigation to offset adverse effects would be needed, but its success not assured.

Cumulative – Impacts, though negligible, add up though time becoming minor to major and may be irreversible

Regulations and Policies. Current laws and policies require that the following conditions be achieved in the park:

Desired Condition: Inventory and protection of soil resources, including frequent testing and monitoring of soils, to maintain and enhance the existing condition.

Source – NPS Organic Act, NPS *Management Policies* (2001)

Impacts of Alternative I - No-Action

Impact Analysis

Under the no-action alternative, fire suppression activities could occur that would cause minor to moderate temporary soil stability impacts. Without appropriate vegetative cover, soils could be exposed by wildland fires, thus becoming more susceptible to erosion until grass re-establishes on the site. Invasive species may also be afforded the opportunity to establish themselves after a wildland fire event, particularly one that has exhibited higher fire intensity as is typical of fires manifested by this alternative. Aggressive wildland fire suppression actions could have even more adverse impacts to soils, generally through soil disturbance activities such as line construction and use of mechanized equipment. Actual wildland fire effects can be mitigated by rehabilitating the area with native grass seed soon after the fire. The establishment and maintenance of native grasses and associated forbs have been shown to reduce erosion; however this would be difficult without the use of prescribed fire.

Cumulative Effects

No similar actions.

Conclusion – Aggressive suppression of wildland fires would occur under this alternative. These suppression activities could have temporary minor to moderate impacts on soil stability and thus increase the potential for erosion, unless mitigation were implemented. In the eastern United States, even under severe conditions, soils are unlikely to be damaged seriously by the direct effects of the wildfires themselves (Kozlowski et al, 1991). The adoption of this alternative does not constitute impairment.

Mitigation

Re-seeding and fireline rehabilitation activities could be undertaken as soon as possible after a wildland fire occurrence.

Impacts of Alternative II – Preferred Alternative

Impact Analysis

Under the preferred alternative, activities relating to fire management would occur that could temporarily impact soil stability. Some vegetative cover can be expected to be removed as the result of wildland and prescribed fire activities. As a result, soils can be temporarily exposed to the effects of weather and be more susceptible to erosion until vegetation is re-established. The threat of the introduction and/or spread of pre-existing invasive species is present with the implementation of this alternative, although many species can be effectively treated with prescribed fire, herbicides, hand-pulling, or a combination of treatments. Utilizing the appropriate management response method of wildland fire suppression allows fire managers the opportunity to minimize the impacts associated with suppression activities, primarily through pre-identification and avoidance. Often it is possible to utilize pre-existing breaks in fuel such as trails, streams, roads, etc as natural fuel breaks, eliminating the need to construct fireline. The implementation of minimal ground disturbing methods of line construction such as establishment of wet lines, cold-trailing, and burn-out operations contribute to a significant reduction in soil disturbance. Actual wildland fire effects can be mitigated by rehabilitating the area with native vegetative seed soon after the fire. Prescribed fire impacts can be mitigated by varying the intensity of the fire and burning during the time of year that would facilitate natural re-vegetation. Establishment and maintenance of grasses, both native and non-native, have been shown to reduce erosion. The restoration of oak dominated hardwood forests should likely lead to a more open understory that will support a variety of vegetation types and produce a lighter fuel load in the event of a wildland fire.

Cumulative Effects

No similar actions

Conclusion – Under this alternative fire management activities would occur that could have temporary negligible to minor impacts on soil erosion, most of which could be mitigated. The adoption of this alternative does not constitute impairment.

Mitigation

Wildland fire suppression techniques implemented as a part of the appropriate management response would be designed to protect sensitive soils. This would occur primarily through the avoidance of traditional hand line construction, instead substituting less obtrusive methods such as the use of water and foam to stop fire spread.

Avoidance of sensitive soil areas altogether would contribute to the protection of soil resources. The ability to balance the use of prescribed fire and non-fire treatments would allow managers to mitigate negative impacts effectively, particularly in those areas where access to personnel and equipment is limited and/ or potentially harmful to soil resources.

Any soil series found on steep slopes (>15%), requires careful forest management practices so as to minimize damage. This would best be achieved through total avoidance, or the use of less invasive non-fire methods of fuel reduction. Because the primary soil types of the park are frequently intermixed, any heavy mechanized equipment use associated with hazardous fuel reduction activities would be confined to dry periods of the year so as to minimize any potential damage to the soil.

Prescribed fire could be used in those situations where hazardous fuels could safely be consumed without threatening the integrity of soils. This would generally confine the use of prescribed fire to those areas where moderate to light fuel concentrations (< 15 tons / acre) were located.

Impacts of Alternative III – Appropriate Management Response and Non-Fire Fuels Management

Impact Analysis

As with alternative II, wildland fire suppression actions could be initiated utilizing those strategies and tactics that minimize impacts through the implementation of appropriate management response techniques. Actual wildland fire effects could be mitigated through rehabilitation of the area with native grass seed or other desirable species soon after the fire. Impacts associated with loss of vegetative cover and the potential proliferation of some invasive species is the same as in alternative II where combinations of herbicide and techniques such as hand-pulling can provide effective methods of control. There would be no direct impact on soils from prescribed fire from this alternative; however, the inability to use prescribed fire could lead to the accumulation of increased fuel and additional disturbance to soil resources through the use of increased non-fire treatments.

Cumulative Effects

No similar actions.

Conclusion

This alternative would potentially have temporary negligible to minor impacts on soil erosion. The ability to utilize appropriate management response techniques during fire suppression would largely eliminate activities that contribute to soil erosion. The increase in hazardous fuel reduction necessary to offset the inability to use prescribed fire could lead to increased adverse impacts on soil resources, and would be caused by the cumulative effects of personnel and equipment walking and working on soils.

Mitigation

Same as Alternative II, except no prescribed fire.

8. Floodplains and Wetlands

Affected Environment.

Allegheny Portage Railroad National Historic Site possesses no major aquatic features, though it is bounded by several small streams and also borders several man-made reservoirs. Three public water supply reservoirs border the park; other old fire ponds have been breached and no longer exist, only one pond is known at the ALPO Main Unit, but it is not considered to be a reservoir. At the northwest corner of the Summit Unit of the park, intermittent springs and seeps surface and flow in a northerly direction into Bradley Run in Cambria County. These springs and seeps are intermittent in nature and the extent of their flow through park lands is minimal. Near the northern park boundary, also in the Summit Unit of the park, the headwaters of the Blair Gap Run originate and flows eastward, both in and out of the park, into Blair County. It eventually flows into the Beaverdam Branch of the Juniata River near Hollidaysburg, the Juniata and Susquehanna Rivers and the Chesapeake Bay.

There are three dams located along the Blair Gap Run and its tributaries, outside of park boundaries. Two Altoona water authority reservoirs are located on Blair Gap Run, the Blair Gap Reservoir and the Plane Nine Reservoir. One Hollidaysburg water authority dam, the Hollidaysburg Reservoir (also known as the Muleshoe reservoir) is located near the Muleshoe Curve/ Incline 8 area of the Portage Trace Corridor on a tributary stream, Adams Run.

Recreational use of Blair Gap Run and its tributaries in the park are minimal. Much of this is the result of limited access to the area. Old U.S. Route 22, now known as the Admiral Peary Highway, parallels Blair Gap Run and provides the potential for pollution from both vehicle traffic and from hazardous spills of chemical materials. In addition, illegal trash dumps, as well as logging and mining activities occurring outside of the park boundary remain as potential serious threats to water quality and aquatic life.

The Staple Bend Tunnel Unit, located near the town of Mineral Point in Cambria County, is about seven miles northeast of Johnstown and about 18 miles southwest of the Main Unit of ALPO. This Unit is a linear corridor that parallels the Little Conemaugh

River, though only about one mile of river frontage is included in the park. This body of water is heavily polluted from the impacts of mine discharge that arise from abandoned mines located both in and outside of park boundaries. In addition, logging on lands above the park boundary is likely to have negative impacts upon water quality in this area.

The Pennsylvania Cooperative Fish and Wildlife Research Unit at Pennsylvania State University conducted an aquatic resources inventory for ALPO in 1997 (no survey was done for JOFL). Seven selected sites within the park (6 in the Main Unit Summit Area, Portage Trace Corridor, and Blair Gap Run, and a seventh at the Staple Bend Tunnel Unit) were inventoried for both macro invertebrates and fish species composition. A surprisingly diverse assemblage of macro invertebrates were found at all sites. Fish were present at four of the six sites located in the Main Unit. There were no fish found in the intermittent streams in the park. The study concluded that the water quality and animal communities at Blair Gap Run were in good condition, and represented a functioning aquatic ecosystem despite some mine drainage that enters the upper reaches of Blair Gap Run, both on and off of park lands. No fish were found in the Staple Bend Tunnel area of the park.

The principal aquatic feature at Johnstown Flood National Memorial is the South Fork, a tributary of the Little Conemaugh River, which flows through the park, entering from the south, flowing through the park's historic former lakebed, and then exiting the park to the north on its way to the town of South Fork where it joins with the North Branch to form the Little Conemaugh River. Mine drainage and other pollutants such as raw sewage enter the river upstream from the park. There are also several unnamed feeder streams which flow into the river in or near the park.

According to the United States Fish and Wildlife Service (USFWS), Wetlands Inventory Map (1977), there exits, at both ALPO and JOFL, limited wetland resources of relatively small size. At ALPO, The Blair Run Gap drainage contains a number of documented sites. A total of three Palustrine, open water sites (ponds) may be found at various locations within that section of the park. Floodplain designation has been established for this area as Zone C; area of minimum flood hazard, located above the 500-year floodplain. Potential exists for localized shallow flooding.

The Staple Bend Tunnel Unit contains or is adjacent to five small sites as identified on the USFWS Wetlands Inventory Map. Two sites representative of palustrine open-water systems are located northwest of the tunnel. Along the Little Conemaugh River near Mineral point is a single site representative of a riverine, upper perennial, open water system. A similar site is located on the east side of the river a short distance away. A Palustrine, emergent, saturated, semi-permanent seasonal site is located a short distance west of mineral point. Much of the Staple Bend Unit of the park does not include the floodplain, but the boundary is adjacent to the floodplain at the railroad right-of-way. In those areas where the floodplain is present, it is designated as Flood Zone C; an area of minimal flood hazard, above the 500-year floodplain. There remains a potential for possible localized shallow flooding problems.

At Johnstown Flood National Memorial, two sites representative of the Riverine, upper perennial, open water system, may be found along the present day South Fork in the area of the old lakebed. In this area of the park, the historic former lakebed is being managed for open, herbaceous, wet meadow or wetland. The only exception is along riparian zones where a wooded buffer is being allowed to grow. This area (the lakebed) is designated as Flood Zone B (between the 100 and 500 year floodplain designation)

Methodology. All available information on wetland and floodplains was compiled from the General Management Plan (1980), Resource Management Plan (1998), Surface Water Inventory and Monitoring Program (2003), National Wetlands Inventory Maps (1977), and associated studies and plans relating to wetlands and floodplains. Map locations of wetlands and floodplains were compared with locations of proposed prescribed and non-fire projects to assist in the determination of potential impacts. Predictions about impacts were based on this information. Intensity of impacts is defined below.

Negligible – An action that may change a population or individuals of a species or a natural physical resource, but the change, if measurable, will be so small and localized consequence to the population.

Minor – An action that may change a population or individuals of a species or a natural physical resource; but the change, if measurable, will be a small and localized consequence to the population.

Moderate – An action that will have some change to a population of individuals of a species or a natural physical resource. The change will be measurable and will have a sufficient consequence to the population but is more localized.

Major – An action that will have a noticeable change to a population or individuals of a species or a natural physical resource. The change will be measurable and will have a substantial and possible permanent consequence to the population.

Regulations and Policies. Current laws and policies require that the following conditions be achieved in the park:

Desired Condition: Minimize destruction, loss, or degradation of wetlands and floodplains and preserve their natural and beneficial values.

Source: Clean Water Act; Executive Order 11988 Floodplain Management; Executive Order 11990 Protection of Wetlands; National Park Service Management Policies.

Impacts of Alternative I - No Action

Impact Analysis

This alternative foregoes any activity to manage wildland fire in a pro-active manner, other than those enacted through seasonal preparation and training of response personnel. Because suppression operations are aimed at keeping wildland fire at the smallest possible size, the use of aggressive suppression operations could have minor to moderate localized adverse short term impacts on wetlands. This would primarily occur as a direct result of fireline construction, whether by hand or by mechanized equipment, in or near wetland areas. Use of firefighting foams and chemical suppressant agents can also have negative effects on water quality in wetland areas. These impacts are somewhat self-negating however, as wetland areas typically contain vegetation that is succulent and has inherent fire-resistant tendencies. In addition, environmental conditions in wetland areas generally are not favorable to the spread and propagation of wildland fire. Relative humidity and fuel moistures are typically very high in wetland areas. These factors may work individually or in unison to exert significant dampening influences on the ignition, propagation, and intensity of wildland fires. Though wildland fires may occur in the park, fire history in wetland areas is rare.

Cumulative Effects

As the area around Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial becomes more developed, the presence of wetlands and floodplains in the park provides critical habitat for the plants and animals that live and reproduce in these ecosystems. As a result, any degradation of these resources is to be avoided or minimized since they are at risk outside of the park. The presence of invasives outside of the parks presents a potential threat to park vegetation populations. This process may be accelerated since invasive control activities may not be executed to the same extent outside of park boundaries as they are within the park.

Conclusion – This alternative could have minor to moderate short term to long term impacts on wetlands. The use of aggressive wildland fire suppression in these areas can have detrimental effects on vegetation and the wildlife that utilizes these ecosystems for their habitat.

Mitigation

Areas impacted by wildland fire and suppression operations can be re-seeded with native vegetation as soon as possible after a wildland fire event in order to restore pre-fire conditions. Although it may not be practicable in all cases, avoidance altogether of wetlands during wildland fire suppression operations may be desirable.

Impacts of Alternative II – Preferred Alternative

Impact Analysis

Under this alternative, prescribed fire, non-fire hazardous fuel reduction, and appropriate management response fire suppression activities would occur that could have negligible adverse impacts on wetlands. Prescribed burns and non-fire methods of fuel reduction and vegetation management can be designed to minimize or eliminate impacts to wetland areas, and in fact, may provide minor to moderate benefit to wetlands habitat in the long term. The use of prescribed fire and non-fire techniques allows park managers the opportunity to reduce hazard fuels and manipulate vegetation in wetland environments at the locations and times when impacts are either absent altogether or negligible. For example, some invasive species, crown vetch (*Coronilla varia*) for example, can be reduced in density through the effective use of appropriately timed prescribed burning. Plant species composition changes little with fire. Fire does promote plants with strong vegetative habits such as grasses and sedges. Prescribed fires conducted at the appropriate time of the year, may stimulate dormant buds and create vigorous growth, often exemplified by the growth of new shoots. Removal of litter increases habitat available for seed germination and long dormant achenes in the soil seed bank may germinate. These activities can be planned during advantageous times of the year so as to maximize results while at the same time exerting negligible impacts on nesting birds and other species that inhabit wetland areas. Wildland fire suppression operations utilizing appropriate management response strategy and tactics can be managed to minimize impacts on wetlands. The use of appropriate management response techniques allows fire managers options to avoid areas where fireline suppression activities might do more harm than the effects of the actual wildfire itself.

Cumulative Effects

The preferred alternative could contribute to minor to moderate positive long-term impacts on wetlands and floodplains through the implementation of well planned and executed prescribed burns and other non-fire treatments that benefit wetland ecosystems and habitat, thus protecting and enhancing existing limited wetlands habitat still found in the park, but that are placed under considerable pressure outside of the park primarily due to encroaching industrial development, much of it already pre-existing. For example, acid runoff from old mine activities and the effects of erosion from past logging outside of the park boundary.

Conclusion

This alternative could have negligible to minor impacts on wetlands. The management prescriptions for prescribed fire and non-fire treatments can minimize or eliminate negative impacts on wetlands, while at the same time providing for habitat improvement. Appropriate management response for wildland fire suppression will help minimize, and in most case eliminate altogether adverse impacts on wetland areas.

Mitigation

Same as Alternative I.

Impacts of Alternative III – Appropriate Management Response and Non-Fire Fuels Management

Impact Analysis

Under this alternative activities would occur that could have negligible to minor adverse impacts on wetlands. Although non-fire fuel reduction can be designed to minimize or eliminate impacts to wetland areas, it does not provide the same level of ecological benefit in many species that prescribed fire provides. Since prescribed fire will not be used in this alternative, an increased reliance on non-fire treatments will likely create an elevated potential for disturbance of wetlands. This will typically manifest itself in the form of increased foot travel by suppression and project crews as well as impacts caused by mechanized equipment and/ or the use of mechanical devices and chemicals. Wildland fires and suppression operations could still be managed through the appropriate management response mode to allow management to minimize detrimental effects of suppression operations in sensitive areas. Wildland fire occurrences under this alternative may increase over time, since fuel reduction and vegetation modification will most likely proceed at a slower pace that those identified in alternative I.

Cumulative Effects

Under this alternative, wetlands and floodplains would receive limited protection and enhancement through the implementation of non-fire vegetation and hazard fuel reduction projects, as well as benefiting from appropriate management response strategies when wildland fires do occur. However, the level of benefit and protection would be limited by the inability to utilize prescribed fire as an efficient cost effective tool across the general landscape. The negative effects of pre-existing mining and logging activities outside of the park might very well preclude the effective enhancement of park ecosystems with the implementation of this limited treatment alternative.

Conclusion

This alternative could have negligible to minor adverse impacts on wetlands. An increased reliance on non-fire vegetation and hazard fuel treatments has the potential to lead to more disturbances of wetlands through increased impacts caused by foot travel and the use of mechanized equipment and chemicals. The inability to use such techniques as prescribed fire, a process that replicates natural processes, limits the ability of park management to restore and enhance wetlands vegetation and wildlife.

Mitigation

Management prescriptions for non-fire hazard fuel reduction and vegetation management treatments can be designed to minimize impacts on wetlands. This can be accomplished in a variety of ways, including varying seasonal timing of treatments in order to minimize impacts on vegetation and nesting species, or through avoidance strategies where benefits accrued through a limited treatment protocol would not outweigh the impacts caused by non-fire treatment methods.

9. Threatened and Endangered Species

Affected Environment.

The Western Pennsylvania Conservancy (WPC), at the request of Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial, conducted an extensive species survey of the parks beginning in 2000 and culminating in 2002. According to the information gathered as a result of that survey, Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial contain no federally listed threatened or endangered species. There are, however, a number of species that are found on the Pennsylvania State list and are designated as *species of concern*. At the present time two plant species and one mammal species are listed at ALPO, and one plant species at JOFL. Mountain bugbane (*Cimicifuga Americana*), a vascular plant, presently listed as Pennsylvania Threatened, with a recommendation for downgrade to Pennsylvania Rare status, was documented in five locations either within or in close proximity to the park boundary. Ginseng (*Panax quinquefolius*), listed as a Vulnerable Pennsylvania species, is located in the park at locations known to park personnel in resource management and law enforcement. Two Northern Myotis (*Myotis septentrionalis*) were observed in the Staple Bend Tunnel during a hibernaculum survey in 1997. A variety of other species were also observed in the tunnel at the same time. This occurrence is based upon a single observation and may not represent a continuing use of this site by the species.

During a WPC survey in 2001, a small patch of Appalachian blue violet (*Viola appalachiensis*) was observed at JOFL. This species is listed as Pennsylvania Endangered and its occurrence is limited to a small population at a location known to park personnel in resource management and law enforcement.

Methodology: Impacts to threatened and endangered species were qualitatively assessed by means of literature review of the effects of fire on these species, consultation with biologists and agencies, review of park management documents (such as the ALPO/ JOFL General Management Plan (1980), Resource Management Plan (1998), Staple Bend Tunnel Environmental Assessment (1997), Plant Community Mapping and Surveys for Species of Special Concern (2003) and associated plans and research documents and studies as well as professional judgment.

Negligible – An action that may change a population or individuals of a species or a natural physical resource, but the change, if measurable, will be so small and localized consequence to the population.

Minor – An action that may change a population or individuals of a species or a natural physical resource; but the change, if measurable, will be a small and localized consequence to the population.

Moderate – An action that will have some change to a population of individuals of a species or a natural physical resource. The change will be measurable and will have a sufficient consequence to the population but is more localized.

Major – An action that will have a noticeable change to a population or individuals of a species or a natural physical resource. The change will be measurable and will have a substantial and possible permanent consequence to the population.

Regulations and Policies. Current laws and policies require that the following conditions be achieved in the park:

Desired Condition: Minimize destruction, loss, or degradation of rare and endangered species and preserve their natural habitat to the extent possible.

Source: Endangered Species Act of 1973, as amended (16 USC 1531 et seq.), Bald Eagle Act (16 USC 668), National Park Service Management Policies.

Impacts of Alternative I - No Action

Impact Analysis

This alternative foregoes any activity to manage wildland fire in a pro-active manner, other than those enacted through seasonal preparation and training of response personnel. Because suppression operations are aimed at keeping wildland fires to the smallest possible size, the use of aggressive suppression tactics could have minor to moderate long term localized adverse impacts on listed species. While this alternative could potentially reduce exposure of listed species to just the direct impacts of a wildland fire, the exclusion of all fire from the ecosystem would perpetuate the ongoing, long-term decline in value of park vegetation communities and the accompanying effects on wildlife. Under this alternative, there is the potential for buildup of hazardous fuels through a continued use of a suppression-only fire policy. The increased fuel accumulations that occur over time could fuel wildland fires that burn with greater intensity and whose effects upon forest vegetation could lead to destruction of portions of the herbaceous layer and possibly even the forest canopy itself, markedly changing the structure of forest ecosystems.

Of the state listed species of concern, three, Mountain bugbane (Cimifuega Americana), Ginseng (*Panax quinquefolius*) and the Northern Myotis (*Myotis septentrionalis)* have

been found at ALPO. Appalachian blue violet (*Viola appalachiensis*) was discovered in a portion of JOFL. All of these herbaceous species grow in areas dominated by northern hardwood forest and/ or forests characterized by broad-leaved deciduous species. These types of forests are generally considered to be at increased risk from wildland fire only under the most severe wildland fire environmental conditions. The majority of the time these types of forests are unlikely to be subjected to intense wildland fire activity. This is largely due to the lack of continuous heavy fuels found in this predominantly open forest. However, fuel loading could be expected to increase with the implementation of this alternative and populations may be placed at greater risk in the future as a result. The lack of fire potential is also is a function of a range of environmental conditions, such as fuel moisture (drought), that largely remain at a level that are not conducive to the start and/ or spread of wildland fires.

The Northern Myotis, which thrives on forest ecosystems and depends upon them for its survival, may utilize the Staple Bend Tunnel as habitat. As a result, it could be protected from the effects of wildland fire and associated suppression activity by virtue of its residence inside of the protected tunnel environment. If retardants or foam suppressant used in fire suppression were spilled or misapplied in the vicinity of any of these species, they could conceivably have a direct effect, but it is uncertain whether this would be either a positive or a negative effect. In either case, the likelihood of this occurring is remote since the park has a policy of allowing no chemical retardant or suppressant within 200 yards of any wetland, water or riparian resource (i.e. Blair Gap Run and/ or the Little Conemaugh River). Populations of all the state listed species fall within the range of these protection zones and are therefore afforded maximum protection from the negative impacts of chemical retardants and suppressants. In addition, in these systems wildland fire is largely naturally contraindicated due to the presence of standing water and high relative humidity. It should be pointed out that there is presently no information available regarding the effects of wildland fire on the species discussed, and, since they have been identified as being special concern species within the state of Pennsylvania, every effort should be made to protect these populations from any negative impacts resulting from either fire or fire suppression. In the event of a large-scale, high intensity wildland fire, such as those that manifest themselves during periods of extended drought, and when accompanied by low relative humidity and high winds, direct or indirect adverse impacts to these species could occur as the result of intense heat and/ or severe erosion. This could occur as an adjunct effect to soil exposure as the result of an exceptionally intense fire.

Cumulative Effects

As the areas around Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial become more developed; largely through impacts associated with mining, logging, and other industrial and public development, the presence of ecosystems in the parks that provide critical habitat for the plants and animals that live and reproduce in these ecosystems becomes critical. All of the species discussed in the previous section have been found both in the and outside of the park. The Commonwealth of Pennsylvania has already implemented special protection measures

for these species by virtue of their designation as species of concern at the state level. For example, ginseng (*Panax quinquefolius*), has already been identified as a species that has the potential to decline due to the potential synergistic impacts of various development and commercial collection activity. The Northern Myotis, as well as other similar species, been found near Allegheny Portage Railroad National Historic Site and at sites scattered across portions of Pennsylvania, West Virginia, and Maryland. Other species of concern that so far have not been found within the parks, may exist there as well. Both ALPO and JOFL serve as important, perhaps even critical, repositories for a variety of plant and animal species; and they do so by virtue of the presence of appropriate habitat and environmental conditions found within their legislative boundaries. Any degradation of these species or their habitat is to be avoided or minimized since they have been identified as being at some level of risk.

The introduction of invasive species is also a concern both in and out of the park. This process may be accelerated since invasive control activities may not be executed to the same extent outside of park boundaries as they are within. For example, giant knotweed (*Polygonum sachaliense*) has an extensive infestation, both in the park and outside, at ALPO in the Staple Bend Tunnel Unit. At JOFL, Multiflora rose (*Rosa multiflora*) may be found adjacent to the railroad and sewer line rights-of-way and in the old lakebed area of the park, as well as in other locations near the Unger House and in open fields both in and adjacent the park.

Conclusion – This alternative could have minor to moderate long term impacts on species of concern .The use of aggressive wildland fire suppression in areas where these species are found can have direct impacts upon vegetation and, as a secondary result, on the wildlife that utilizes these ecosystems for their everyday activities.

Mitigation

Under this alternative, the following mitigation measures would be implemented:

- All sensitive plant locations, or any other listed species identified as being at risk due to a wildland fire, would be protected from the effects of those incidents chiefly through avoidance during fire suppression operations.
- Maps of all known locations of species of concern will be made available for all personnel responding to wildland fire incidents.
- Minimum Impact Suppression Tactics (MIST) will be taught at all park fire training sessions.

Impacts of Alternative II – Preferred Alternative

Impact Analysis

Generally, this alternative would have impacts upon species of concern that are best classified as long term, and if successfully implemented, largely beneficial. Through a thoughtful and well-executed program of prescribed fire and the utilization of non-fire

hazardous fuel and invasive species reduction, this alternative would allow park management the opportunity to make marked progress in the direction of restoring vital ecosystem components and allowing the park to closely mimic the natural fire regime that was previously found in the ecosystem. For reasons discussed in the previous alternative, species of concern such as the Northern Myotis would benefit from the restoration of forest ecosystems by allowing more favorable habitat for nesting and hunting activities.

Under this alternative, the proposed five-year plan would be fully implemented. When subjected to the treatments of prescribed fire and non-fire treatments, listed species would likely suffer negligible to minor temporary adverse impacts. These would chiefly take the form of temporary effects of smoke and human presence during the implementation phase of any treatment. In the long term, the implementation of this alternative would likely benefit these species through a reduction in invasives and accompanying increase in native species that provide levels of forage and cover more in keeping with the park ecosystem.

Cumulative Effects

The preferred alternative would contribute to minor to moderate positive long-term impacts on species of concern. This would largely be accomplished through restoration of forest and meadow habitat. It would be largely achieved through the implementation of well planned and executed prescribed burns and other non-fire treatments that benefit meadow and forest ecosystems and the animals that use them. Enhancing the existing limited wetlands habitat that are still found in the park, but that are under considerable pressure outside of the park due to encroaching development, would provide long term benefit to species found in those locations.

Conclusion

This alternative could have negligible to minor impacts on species of concern. The management prescriptions for prescribed fire and non-fire treatments can minimize or eliminate negative impacts on meadows, wetlands and forests, while at the same time providing for habitat improvement. The use of appropriate management response strategies and tactics for wildland fire suppression would help minimize, and in most cases, eliminate adverse impacts on meadow, wetland and forest ecosystems.

Mitigation

- All sensitive plant locations, or any other species of concern identified as being at risk due to a wildland fire, would be protected from the effects of those incidents chiefly through avoidance during fire suppression operations.
- In order to ensure that they are not impacted, all sensitive plant locations, or other listed species identified as being present in or near the close proximity (generally <100 feet) to a prescribed burn unit, would receive mitigation as described in the individual prescribed burn plan prepared for that specific burn.

- Fire management personnel would provide the Chief of Natural Resources and the Prescribed Fire Committee with copies of prescribed burn plans far enough in advance to allow a detailed survey of the area before implementation.
- Fire management staff would inform the Chief of Natural Resources of wildland fire suppression activities as soon as possible.
- Maps of all known locations of species of concern would be made available for all personnel responding to wildland fire incidents.
- Minimum Impact Suppression Tactics (MIST) will be taught at all park and cooperating agency fire training sessions.

Impacts of Alternative III – Appropriate Management Response and Non-Fire Fuels Management

Impact Analysis

Under this alternative activities would occur that could have negligible to minor impacts on species of concern. Although non-fire fuel reductions can be designed to minimize or eliminate impacts to meadows, wetland areas and forest ecosystems, they do not allow for the same level of ecological benefit in many species that the use of prescribed fire allows. Since prescribed fire will not be used in this alternative, an increased reliance on non-fire treatments will likely create an elevated potential for disturbance of forest and meadows ecosystems. This will typically manifest itself in the form of increased foot travel by suppression and project crews as well as impacts caused by mechanized equipment and/ or the use of mechanical devices and chemicals. Wildland fires and suppression operations could still be managed through the appropriate management response mode to allow management to minimize detrimental effects of suppression operations in sensitive areas. Wildland fire occurrences under this alternative may increase over time, since fuel reduction and vegetation modification will most likely proceed at a slower pace that those identified in alternative I.

Cumulative Effects

Under this alternative, meadows, wetlands, floodplains, and forested areas would receive limited protection and enhancement through the implementation of non-fire vegetation and hazard fuel reduction projects, as well as benefit from appropriate management response strategies when wildland fires do occur. However, the level of benefit and protection would be limited, perhaps in a significant manner, by the inability to utilize prescribed fire as an efficient cost effective tool across the general landscape.

Conclusion

This alternative could have negligible to minor impacts on species of concern. An increased reliance on non-fire vegetation and hazard fuel treatments has the potential to lead to more disturbances of ecosystems through increased impacts caused by foot travel and the use of mechanized equipment and chemicals. The inability to use such techniques as prescribed fire, a process that replicates natural processes, limits the

ability of park management to restore and enhance some meadow systems and forest vegetation that support species of concern.

Mitigation

Management prescriptions for non-fire hazard fuel reduction and vegetation management treatments can be designed to minimize impacts on species of concern, chiefly through manipulation of meadow, wetland and forest habitat. This can be accomplished in a variety of ways, including varying the seasonal timing in order to minimize impacts on vegetation or on nesting species, or by avoiding those areas altogether where benefits accrued through a limited treatment protocol would not outweigh the impacts caused by non-fire treatment methods.

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Allegheny Ridge Corporation
Conemaugh Valley Conservancy
Johnstown Area Heritage Association
Juniata Clean Water Partnership

Kiski-Conemaugh River Basin Alliance
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REFERENCES

Abrams, M.D. 1992. **Fire and the Development of Oak Forests**. Bioscience. 42: 346-353.

Abrams, M.D. 1998. **The Red Maple Paradox**. Bioscience 48:355-364.

Abrams, M.D., D.A. Orwig and M.J. Dockry. 1997. **Dendroecology and successional status of two contrasting old-growth oak forests in the Blue Ridge Mountains**, U.S.A. Can. J. For. Res. 27:994-1002.

Anderson, R.C. Laren E. Brown. 1983. **Comparative Effects of fire on Trees in a Midwestern Savannah and Adjacent Forest.** Bulletin of the Torrey Botanical Club 110:1 P87

Aquilani, S. LeBlanc, D. Morrell, T. 2000. **Effects of Prescribed Surface Fires on Ground and Shrub Nesting Neotropical Migratory Birds in a Mature Indiana Oak Forest,** USA, Natural Areas Journal 20:4.

Arnold, D.E., et al. 1997 **Aquatic Resources of the Allegheny Portage Railroad National Historic Site.** Pennsylvania State University, University park, PA. 30 p/

Barden, L.S. 1998. **Bear Oak in Crowder's Mountain State Park, North Carolina: A Species and Ecosystem Falling through the Cracks.** The North Carolina State Park Service internal report.

Blake, John G. 2004. **Effects of Prescribed Burning on Distribution and Abundance of Birds in a Closeed-Canopy Oak-Dominated Forest, Missouri, USA.** Biological Conservation, Volume 121, Issue 4, February 2005, Pages 519-531.

Bowersox, T.W. **Opportunities for Creating Herbaceous Communities within the 1889 Lake Conemaugh Shoreline at Johnstown Flood National Memorial**. The Pennsylvania State University, University park, PA. 1986.

Braun, E.L. 2001. **Deciduous Forests of Eastern North America**. The Blackburn Press, Caldwell New Jersey.

Brose, P; Schuler, T.; Van Lear, D.; Berst, J. 2001. **Bringing fire back: the changing regimes of the Appalachian mixed oak forests.** Journal of Forestry, 99: 30-35.

Brose, P. H., Van Lear, D.H., Keyser, P.D. 1999. **A shelterwood burn technique for regenerating productive upland oak sites in the Piedmont region**. Southern Journal of Applied Forestry, Vol. 23, No. 3, August 1999.

Buckner, E. 1995. **Prehistory of the Southern forest**. Forest farmer July-August: 20-22.

Buckner, E.R. and Turill, N.L. **Fire and Southern Appalachian ecosystem management**. *In* J. Peine, ed., Ecosystem management for sustainability principles and practices. St. Lucie Press, Boca Raton, FL.

Calijouw, Caren. 1996. **Role of Fire in Wetland and Riparian Systems",** National Advanced Resource Technology Center, Fire in Ecosystem Management, Marana, Arizona.

Cooper, R.D.; Van Lear, D.H.; Brose, P.H. 1999. **Oak advanced regeneration following seasonal prescribed fires in mixed hardwood shelterwood stands**. Tenth Biennial Southern Silviculture Research Conference, Shreveport, LA. February 16-18, 1999.

__ 1979. **Classification of Wetlands and Deepwater Habitats of the United States. United States Fish and Wildlife Service, United States Department of the Interior.**

Cottam, G. 1948. **The Physiology of an Oak Woods in Southwestern Wisconsin**. Ecology, 30:271-287.

Covington, W.W. and M.M. Moore. 1992. **Postsettlement changes in natural fire regimes: implications for restoration of old-growth ponderosa pine forests.** In: Kaufmann, Merrill R.; Moir, W.H.; Bassett, Richard L., technical coordinators. Old-growth forests in the southwest and Rocky Mountain regions: Proceedings of a workshop; 1992 March 9-13; Portal, AZ. Gen. Tech. Rep. RM-213. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station: 81-99.

Cutter, B.E.; Guyette, R.P.; 1994. **Fire frequency on an oak-hickory ridge top in the Missouri Ozarks**. American Midland Naturalist. 132: 393-398.

DeGraaf, Richard M.; Scott, Virgil E.; Hamre, R.H.; (and others). **Forest and Rangeland Birds of the United States: Natural History and Habitat Use.** Agriculture Handbook. 688. Washington DC: U.S. Department of Agriculture, Forest Service. 625 p.

Delcourt, H.R. and P.A. Delcourt. 1997**. Pre-Columbian native American use of fire on Southern Appalachian landscapes.** Conservation Biology. Vol. 11, No. 4. pp. 1010-1014.

Denevan, W.M., ed. 1992. **The native population of the Americas in 1492**. 2nd ed. Univ. Wisconsin Press, Madison. 398 pp.

Dobyns, H.F. 1983. **Their Number Became Thinned**. Univ. Tennessee Press, Knoxville. 378 pp.

Ehrenreich, J.H. 1959. **Effect of burning and clipping on growth of a native prairie in Iowa**. Journal of Range Management. 12 pp. 133-137.

Eick, Brian. 1997. **Lakebed Vegetation Management Plan for the Johnstown Flood National Memorial.** Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial. 15p.

Evans, William G. 1971. **The Attraction of Insects to Forest Fires.** In: Proceedings, Tall Timbers conference on ecological animal control by habitat management; 1971 February 25-27; Tallahassee, FL. Number 3. Tallahassee, FL: Tall Timbers Research Station: 115-127.

Eyre, F.H., ed. 1980. **Forest Cover Types of the United States and Canada**. Washington, D.C.: Society of American Foresters Report.

Farley, W.H. 1985. **Soil Survey of Cambria County Pennsylvania.** United States Department of Agriculture, Soil Conservation Service, Washington, D.C.

Fike, Jean. 1999. **Terrestrial and Palustrine Plant Communities of Pennsylvania.** Pennsylvania Natural Diversity Inventory. Pennsylvania Department of Conservation and Natural resources, Bureau of Forestry, Harrisburg, PA. 87p.

Fynn, Richard., Morris, Craig D., and Edwards, Trevor J. 2005. **Effects of Burning and Mowing on Grass and Forb Density.** Grassland Science, School of Applied Environmental Sciences, School of Botany and Zoology, University of KwaZulu-Natal. Abstract. 2 pg.

1980. **Soil Survey of Blair County Pennsylvania.** United States Department of Agriculture, Soil Conservation Service and Pennsylvania State University, College of Agriculture and the Pennsylvania Department of Environmental Resources, State College, Pennsylvania. 137 pp and maps.

Hamel, Paul B., and Buckner, E. R. **How Far Could a Squirrel Travel in the Treetops? A Pre-history of the Southern Forest.** Transactions of the 63rd North American Wildlife and Natural resources Conference; 1998. March 20-25, Orlando, FL. Washington D.C: Wildlife Management Institute: pp 309-315.

Hensel, R.L. 1923. **Recent studies on the effect of burning on grassland vegetation**. Ecology 4: pp. 183-188.

Johnsgard, Paul A. 1990**. Hawks, Eagles, and Falcons**. Washington D.C. Smithsonian Institution Press. 403 p.

Jones, A.T., and K.C. Ryan (editors). 1986. **Wildland Fire in Ecosystems: Effects of Fire on Cultural resources and Archeology.** General Technical Report No. RMRS-

GTR-42-Vol.3. USDA Forest Service, Rocky Mountain Research Station, Fort Collins, Colorado.

Kaufman, Donald W.; Gurtz, Sharon K.; Kaufman, Glennis A.
1988a. **Movements of the Deer Mouse in Response to Prairie Fire**.
Prairie Naturalist. 20(4): 225-229.

Keever, Catherine. 1953**. Composition of Oak-Chestnut Forest**. Ecology, Vol. 34, No. 1:44-54.

Kozlowski, T.T. ;Ahlgren, C.E. 1974. **Fire and Ecosystems.** New York: Academic Press. 542 p.

Kricher, John C. and Morrison, Gordon. 1988. **Eastern Forests**. Houghton Mifflin Company, Boston, Massachusetts.

Ladd, Doug. 1991. **Reexamination of the role of Fire In Missouri Oak Woodlands**. Pp. 67-80 *in* Proceedings of the Oak Woods Management Workshop. Eastern Illinois University, Charleston, IL.

Lyon, L.J., H.S. Crawford, E. Czuhai, R.L. Fredriksen, R.F. Harlow, L.J. Metz, and H.A. Pearson. 1978. **Effects of Fire on Fauna.** National Fire Effects Workshop, Denver, CO. April 1978.

Marquis, David A. 1975. **The Allegheny Hardwood Forests of Pennsylvania.** General Technical Report NE-15. Upper Darby, PA: U.S. Department of Agriculture, Forest Service, Northeast Experiment Station, 32.p.

McCormick, L.H., and T.W. Bowersox. 1996 .**Johnstown Flood National Memorial Lakebed Vegetation Management Recommendations.** The Pennsylvania State University, University Park, PA.

Merkel, E.J. 1981. **Soil Survey of Blair County Pennsylvania.** United States Department of Agriculture, Soil Conservation Service, Washington, D.C.

Murphy, Heather. 1991**. Fires and Imperiled Species**. Women in Natural Resources. 13(2): 11.

National Park Service, **Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial: List of Classified Structures.**

National Park Service, **Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial**: **Resource Management Plan, Update 1998.**

National Park Service, **Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial: General Management Plan Plan, 1980.**

National Park Service**, Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial: Fire Management Plan, (DRAFT)** 1991.

National Park Service, **Invasive Nonnative Plants Field Survey**, **Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial,** 1999.

National Park Service, **Allegheny Portage Railroad National Historic Site: Statement for Management .** 1992.

National Park Service, **Johnstown Flood National Memorial: Statement for Management**. 1992.

Old, S.M. 1969**. Microclimate, Fire and Plant Production on an Illinois Prairie**. Ecology Monogr. 39: pp. 355-384.

Orwig, D.A. and M.D. Abrams 1995. **Dendroecological and ecophysiological analysis of gap environments in mixed-oak understories of northern Virginia.** Functional Ecology 9:799-806.

Panichella, Aimee. **A Draft Environmental Assessment for Removal of Woody Vegetation in the Historic Lake Basin of Johnstown Flood National Memorial, Johnstown, Pennsylvania.**

Pederaon, B.S. 1998. **The Role of Stress in the Mortality of Midwestern Oaks as Indicated by Growth Prior to Death.** Ecology, Jan.1998 79:1 p.79.

Pennsylvania Department of Conservation and Natural Resources, State Forest Management Plan, Soils: Internet source:
http://www.dcnr.state.pa.us/forestry/sfrmp/soils/htm

Pyne, Stephan J. 1982**. Fire in America: A Cultural History of Wildland and Rural Fire.** Princeton University Press, Princeton, N.J. 654 pp.

Regelbrugge, J.C. and D.W. Smith. 1994. **Postfire tree mortality in relation to wildfire severity in mixed oak forests in the Blue Ridge of Virginia.** Northern Journal of Applied Forestry. Vol. 11, No. 3. pp. 90-97.

Russell, Kevin R.; Van Lear, David H.; Guynn, David C., Jr. 1999.
Prescribed Fire Effects on Herpetofauna: Review and Management implications. Wildlife Society Bulletin. 27(2): 374-384.

Schuler, Thomas M.; McClain, W. Russ. 2003. **Fire History of a Ridge and Valley Oak Forest.** Res. Pap. NE-724. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern research Station. 9p.

Schwartz, M., Heim, J. 1996. **Effects of a Prescribed Fire on Degraded Forest Vegetation.** Natural Areas Journal 16:3.

__ 2003. **Surface Water Inventory and Monitoring Program, Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial (DRAFT).**

Sutherland, E.K. 1998. **Restoration of Mixed Oak Forests in Southern Ohio with Prescribed Fire.** Page 29 *in* 21st Tall Timbers Fire Ecology Conference. Fire and Forest Ecology: innovative silviculture and vegetation management, program and abstracts. April 14-16, 1998.Tall Timbers Research Station, Tallahassee, FL.

Turrill, N.L., E.R. Buckner and T.A. Waldrop. 1997. *Pinus Pungens* Lam. (Table Mountain Pine): **A Threatened Species Without Fire,** pages 301-306. In: Proceedings – Fire Effects on Rare and Endangered Species and Habitats Conference, Nov. 13-16, 1995. Coeur d' Alene, Idaho.

U.S. Department of the Interior, Fish and Wildlife Service. **Endangered and Threatened Wildlife and Plants:** August 29, 1992. 50 CFR 17.11 and 17.12. Washington DC. 38 p.

Van Lear, D.H. and T.A. Waldrop. 1989**. History, Use, and Effects of Fire in the Appalachians.** Gen Tech. Rept. SE-54, Southeast. For. Exp. Sta., USDA, Forest Service, Asheville, N.C. 20 pp.

Van Lear, D.H. 2000. **Recent Advances in the Silvicultural Use of Prescribed Fire.** Fire and Forest Ecology, Tall Timbers Fire Ecology Conference Proceedings,. No. 21. Tall Timbers research Station, Tallahassee, FL.

Ware, Stewart. 1992. **Where are All the Hickories in the Piedmont Oak-Hickory Forest?** Castanea 57(1):4-12.

Wendel, G.W. and H.C. Smith. 1986**. Effects of a Prescribed Fire in a Central Appalachian Oak-Hickory stand.** U.S. Dept. of Ag. Report 594. Northeastern Forest Experiment Station.

Western Pennsylvania Conservancy. 2000. **Inventories for Species of Special Concern, Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial,** Cambria and Blair Counties, Pennsylvania. Prepared for the U.S. Department of the Interior, National Park Service.

Western Pennsylvania Conservancy. 2003. **Plant Community Mapping and Surveys for Species of Special Concern at Allegheny Portage Railroad National Historic Site, Johnstown Flood National Memorial, Ft. Necessity National Battlefield, and Friendship Hill National Historic Site. Final Report**

Wright, Henry A., and Arthur Bailey. 1982**. Fire Ecology**. John Wiley and Sons, New York, New York.

Yahner, Richard H. and G. S. Keller. 2000. **Final Report, Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial, Inventory of Bird and Butterfly Diversity at Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial.** 58 p.

APPENDIX A
National Fire Plan
Glossary of Wildland Fire Terms

A

Aerial Fuels: All live and dead vegetation in the forest canopy or above surface fuels, including tree branches, twigs and cones, snags, moss, and high brush.

Aerial Ignition: Ignition of fuels by dropping incendiary devices or materials from aircraft.

Air Tanker: A fixed-wing aircraft equipped to drop fire retardants or suppressants.

Agency: Any federal, state, or county government organization participating with jurisdictional responsibilities.

Anchor Point: An advantageous location, usually a barrier to fire spread, from which to start building a fire line. An anchor point is used to reduce the chance of firefighters being flanked by fire.

Appropriate Management Response (AMR): Specific actions taken in response to a wildland fire in order to implement protection and fire use objectives. AMR allows for a full range of strategies to be applied, from an intense full suppression response to wildland fire use (wildland fire to meet resource objectives).

Aramid: The generic name for a high-strength, flame-resistant synthetic fabric used in the shirts and jeans of firefighters. Nomex, a brand name for aramid fabric, is the term commonly used by firefighters.

Aspect: Direction toward which a slope faces.

B

Backfire: A fire set along the inner edge of a fireline to consume the fuel in the path of a wildfire and/or change the direction of force of the fire's convection column.

Backpack Pump: A portable sprayer with hand-pump, fed from a liquid-filled container fitted with straps, used mainly in fire and pest control. (See also Bladder Bag.)

Bambi Bucket: A collapsible bucket slung below a helicopter. Used to dip water from a variety of sources for fire suppression.

Behave: A system of interactive computer programs for modeling fuel and fire behavior that consists of two systems: BURN and FUEL.

Bladder Bag: A collapsible backpack portable sprayer made of neoprene or high-strength nylon fabric fitted with a pump. (See also Backpack Pump.)

Blow-up: A sudden increase in fire intensity or rate of spread strong enough to prevent direct control or to upset control plans. Blow-ups are often accompanied by violent convection and may have other characteristics of a fire storm. (See Flare-up.)

Brush: A collective term that refers to stands of vegetation dominated by shrubby, woody plants, or low growing trees, usually of a type undesirable for livestock or timber management.

Brush Fire: A fire burning in vegetation that is predominantly shrubs, brush, and scrub growth.

Bucket Drops: The dropping of fire retardants or suppressants from specially designed buckets slung below a helicopter.

Buffer Zones: An area of reduced vegetation that separates wildlands from vulnerable residential or business developments. This barrier is similar to a greenbelt in that it is usually used for another purpose such as agriculture, recreation areas, Parks, or golf courses.

Bump-up Method: A progressive method of building a fire line on a wildfire without changing relative positions in the line. Work is begun with a suitable space between workers. Whenever one worker overtakes another, all workers ahead move one space forward and resume work on the uncompleted part of the line. The last worker does not move ahead until completing his or her space.

Burn Out: Setting fire inside a control line to widen it or consume fuel between the edge of the fire and the control line.

Burning Ban: A declared ban on open air burning within a specified area, usually due to sustained high fire danger.

Burning Conditions: The state of the combined factors of the environment that affect fire behavior in a specified fuel type.

Burning Index: An estimate of the potential difficulty of fire containment as it relates to the flame length at the most rapidly spreading portion of a fire's perimeter.

Burning Period: That part of each 24-hour period when fires spread most rapidly, typically from 10:00 a.m. to sundown.

Campfire: As used to classify the cause of a wildland fire, a fire that was started for cooking or warming that spreads sufficiently from its source to require action by a fire control agency.

Candle or Candling: A single tree or a very small clump of trees that is burning from the bottom up.

Chain: A unit of linear measurement equal to 66 feet.

Closure: Legal restriction, but not necessarily elimination of specified activities such as smoking, camping, or entry that might cause fires in a given area.

Cold Front: The leading edge of a relatively cold air mass that displaces warmer air. The heavier cold air may cause some of the warm air to be lifted. If the lifted air contains enough moisture, the result may be cloudiness, precipitation, and thunderstorms. If both air masses are dry, no clouds may form. Following the passage of a cold front in the Northern Hemisphere, westerly or northwesterly winds of 15 to 30 or more miles per hour often continue for 12 to 24 hours.

Cold Trailing: A method of controlling a partly dead fire edge by carefully inspecting and feeling with the hand for heat to detect any fire, digging out every live spot, and trenching any live edge.

Command Staff: The command staff consists of the information officer, safety officer, and liaison officer. They report directly to the incident commander and may have assistants.

Complex: Two or more individual incidents located in the same general area, which are assigned to a single incident commander or unified command.

Contain a fire: A fuel break around the fire has been completed. This break may include natural barriers or manually and/or mechanically constructed line.

Control a fire: The complete extinguishment of a fire, including spot fires. Fireline has been strengthened so that flare-ups from within the perimeter of the fire will not break through this line.

Control Line: All built or natural fire barriers and treated fire edge used to control a fire.

Cooperating Agency: An agency supplying assistance other than direct suppression, rescue, support, or service functions to the incident control effort; e.g., Red Cross, law enforcement agency, telephone company, etc.

Coyote Tactics: A progressive line construction duty involving self-sufficient crews that build fire line until the end of the operational period, remain at or near the point while off duty, and begin building fire line again the next operational period where they left off.

Creeping Fire: Fire burning with a low flame and spreading slowly.

Crew Boss: A person in supervisory charge of usually 16 to 21 firefighters and responsible for their performance, safety, and welfare.

Crown Fire (Crowning): The movement of fire through the crowns of trees or shrubs more or less independently of the surface fire.

Curing: Drying and browning of herbaceous vegetation or slash.

D

Dead Fuels: Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture (relative humidity and precipitation), dry-bulb temperature, and solar radiation.

Debris Burning: A fire spreading from any fire originally set for the purpose of clearing land or for rubbish, garbage, range, stubble, or meadow burning.

Defensible Space: An area either natural or manmade where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and the loss to life, property, or resources. In practice, "defensible space" is defined as an area a minimum of 30 feet around a structure that is cleared of flammable brush or vegetation.

Deployment: See Fire Shelter Deployment.

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

Direct Attack: Any treatment of burning fuel, such as by wetting, smothering, or chemically quenching the fire or by physically separating burning from unburned fuel.

Dispatch: The implementation of a command decision to move a resource or resources from one place to another.

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

Dispatch Center: A facility from which resources are directly assigned to an incident.

Division: Divisions are used to divide an incident into geographical areas of operation. Divisions are established when the number of resources exceeds the span-of-control of

the operations chief. A division is located with the Incident Command System organization between the branch and the task force/strike team.

Dozer: Any tracked vehicle with a front-mounted blade used for exposing mineral soil.

Dozer Line: Fire line constructed by the front blade of a dozer.

Drip Torch: Hand-held device for igniting fires by dripping flaming liquid fuel on the materials to be burned; consists of a fuel fount, burner arm, and igniter. Fuel used is generally a mixture of diesel and gasoline.

Drop Zone: Target area for air tankers, helitankers, and cargo dropping.

Drought Index: A number representing net effect of evaporation, transpiration, and precipitation in producing cumulative moisture depletion in deep duff or upper soil layers.

Dry Lightning Storm: Thunderstorm in which negligible precipitation reaches the ground. Also called a dry storm.

Duff: The layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, leaves, and immediately above the mineral soil.

E

Energy Release Component (ERC): The computed total heat released per unit area (British thermal units per square foot) within the fire front at the head of a moving fire.

Engine: Any ground vehicle providing specified levels of pumping, water, and hose capacity.

Engine Crew: Firefighters assigned to an engine. The Fireline Handbook defines the minimum crew makeup by engine type.

Entrapment: A situation where personnel are unexpectedly caught in a fire behavior-related, life-threatening position where planned escape routes or safety zones are absent, inadequate, or compromised. An entrapment may or may not include deployment of a fire shelter for its intended purpose. These situations may or may not result in injury. They include "near misses."

Environmental Assessment (EA): EAs were authorized by the National Environmental Policy Act (NEPA) of 1969. They are concise, analytical documents prepared with public participation that determine if an Environmental Impact Statement (EIS) is needed for a

particular project or action. If an EA determines an EIS is not needed, the EA becomes the document allowing agency compliance with NEPA requirements.

Environmental Impact Statement (EIS): EISs were authorized by the National Environmental Policy Act (NEPA) of 1969. Prepared with public participation, they assist decision makers by providing information, analysis, and an array of action alternatives allowing managers to see the probable effects of decisions on the environment. Generally, EISs are written for large-scale actions or geographical areas.

Equilibrium Moisture Content: Moisture content that a fuel particle will attain if exposed for an infinite period in an environment of specified constant temperature and humidity. When a fuel particle reaches equilibrium moisture content, net exchange of moisture between it and the environment is zero.

Escape Route: A preplanned and understood route firefighters take to move to a safety zone or other low-risk area, such as an already burned area, previously constructed safety area, a meadow that won't burn, or natural rocky area that is large enough to take refuge without being burned. When escape routes deviate from a defined physical path, they should be clearly marked (flagged).

Escaped Fire: A fire that has exceeded or is expected to exceed initial attack capabilities or prescription.

Extended Attack Incident: A wildland fire that has not been contained or controlled by initial attack forces, and for which more firefighting resources are arriving, en route, or being ordered by the initial attack incident commander.

Extreme Fire Behavior: "Extreme" implies a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One of more of the following is usually involved: high rate of spread, prolific crowning and/or spotting, presence of fire whirls, and strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment and behave erratically, sometimes dangerously.

F

Faller: A person who fells trees. Also called a sawyer or cutter.

Field Observer: Person responsible to the Situation Unit Leader for collecting and reporting information about an incident obtained from personal observations and interviews.

Fine (Light) Fuels: Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

Fingers of a Fire: The long narrow extensions of a fire projecting from the main body.

Fire Behavior: The manner in which a fire reacts to the influences of fuel, weather, and topography.

Fire Behavior Forecast: Prediction of probable fire behavior, usually prepared by a Fire Behavior Officer, in support of fire suppression or prescribed burning operations.

Fire Behavior Specialist: A person responsible to the Planning Section Chief for establishing a weather data collection system and for developing fire behavior predictions based on fire history, fuel, weather, and topography.

Fire Break: A natural or constructed barrier used to stop or check fires that may occur, or to provide a control line from which to work.

Fire Cache: A supply of fire tools and equipment assembled in planned quantities or standard units at a strategic point for exclusive use in fire suppression.

Fire Crew: An organized group of firefighters under the leadership of a crew leader or other designated official.

Fire Front: The part of a fire within which continuous flaming combustion is taking place. Unless otherwise specified the fire front is assumed to be the leading edge of the fire perimeter. In ground fires, the fire front may be mainly smoldering combustion.

Fire Intensity: A general term relating to the heat energy released by a fire.

Fire Line: A linear fire barrier that is scraped or dug to mineral soil.

Fire Load: The number and size of fires historically experienced on a specified unit over a specified period (usually one day) at a specified index of fire danger.

Fire Management Plan (FMP): A strategic plan that defines a program to manage wildland and prescribed fires, and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational plans such as preparedness plans, preplanned dispatch plans, prescribed fire plans, and prevention plans.

Fire Perimeter: The entire outer edge or boundary of a fire.

Fire Season: 1) Period(s) of the year during which wildland fires are likely to occur, spread, and affect resource values sufficient to warrant organized fire management

activities. 2) A legally enacted time during which burning activities is regulated by state or local authority.

Fire Shelter: An aluminized tent offering protection by means of reflecting radiant heat and providing a volume of breathable air in a fire entrapment situation. Fire shelters should only be used in life-threatening situations, as a last resort.

Fire Shelter Deployment: The removing of a fire shelter from its case and using it as protection against fire.

Fire Storm: Violent convection caused by a large continuous area of intense fire. Often characterized by destructively violent surface indrafts, near and beyond the perimeter, and sometimes by tornado-like whirls.

Fire Triangle: Instructional aid in which the sides of a triangle are used to represent the three factors (oxygen, heat, fuel) necessary for combustion and flame production; removal of any of the three factors causes flame production to cease.

Fire Use Module (Prescribed Fire Module): A team of skilled and mobile personnel dedicated primarily to prescribed fire management. These are national and interagency resources, available throughout the prescribed fire season, that can ignite, hold, and monitor prescribed fires.

Fire Weather: Weather conditions that influence fire ignition, behavior, and suppression.

Fire Weather Watch: A term used by fire weather forecasters to notify using agencies, usually 24 to 72 hours ahead of the event, that current and developing meteorological conditions may evolve into dangerous fire weather.

Fire Whirl: Spinning vortex column of ascending hot air and gases rising from a fire and carrying aloft smoke, debris, and flame. Fire whirls range in size from less than one foot to more than 500 feet in diameter. Large fire whirls have the intensity of a small tornado.

Firefighting Resources: All people and major items of equipment that can or potentially could be assigned to fires.

Flame Height: The average maximum vertical extension of flames at the leading edge of the fire front. Occasional flashes that rise above the general level of flames are not considered. This distance is less than the flame length if flames are tilted due to wind or slope.

Flame Length: The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface); an indicator of fire intensity.

Flaming Front: The zone of a moving fire where the combustion is primarily flaming. Behind this flaming zone combustion is primarily glowing. Light fuels typically have a shallow flaming front, whereas heavy fuels have a deeper front. Also called fire front.

Flanks of a Fire: The parts of a fire's perimeter that are roughly parallel to the main direction of spread.

Flare-up: Any sudden acceleration of fire spread or intensification of a fire. Unlike a blow-up, a flare-up lasts a relatively short time and does not radically change control plans.

Flash Fuels: Fuels such as grass, leaves, draped pine needles, fern, tree moss and some kinds of slash that ignite readily and are consumed rapidly when dry. Also called fine fuels.

Forb: A plant with a soft, rather than permanent woody stem, that is not a grass or grass-like plant.

Fuel: Combustible material. Includes vegetation, such as grass, leaves, ground litter, plants, shrubs and trees that feed a fire. (See Surface Fuels.)

Fuel Bed: An array of fuels usually constructed with specific loading, depth and particle size to meet experimental requirements; also, commonly used to describe the fuel composition in natural settings.

Fuel Loading: The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.

Fuel Model: Simulated fuel complex (or combination of vegetation types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.

Fuel Moisture (Fuel Moisture Content): The quantity of moisture in fuel expressed as a percentage of the weight when thoroughly dried at 212 degrees Fahrenheit.

Fuel Reduction: Manipulation, including combustion, or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control.

Fuel Type: An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

Fusee: A colored flare designed as a railway warning device and widely used to ignite suppression and prescription fires.

G

General Staff: The group of incident management personnel reporting to the incident commander. They may each have a deputy, as needed. Staff consists of operations section chief, planning section chief, logistics section chief, and finance/administration section chief.

Geographic Area: A political boundary designated by the wildland fire protection agencies, where these agencies work together in coordination and effective utilization.

Ground Fuel: All combustible materials below the surface litter, including duff, tree or shrub roots, punchy wood, peat, and sawdust that normally support a glowing combustion without flame.

H

Haines Index: An atmospheric index used to indicate the potential for wildfire growth by measuring the stability and dryness of the air over a fire.

Hand Line: A fireline built with hand tools.

Hazard Reduction: Any treatment of a hazard that reduces the threat of ignition and fire intensity or rate of spread.

Head of a Fire: The side of the fire having the fastest rate of spread.

Heavy Fuels: Fuels of large diameter such as snags, logs, and large limb wood that ignite and are consumed more slowly than flash fuels.

Helibase: The main location within the general incident area for Parking, fueling, maintaining, and loading helicopters. The helibase is usually located at or near the incident base.

Helispot: A temporary landing spot for helicopters.

Helitack: The use of helicopters to transport crews, equipment, and fire retardants or suppressants to the fire line during the initial stages of a fire.

Helitack Crew: A group of firefighters trained in the technical and logistical use of helicopters for fire suppression.

Holding Actions: Planned actions required to achieve wildland prescribed fire management objectives. These actions have specific implementation timeframes for fire

use actions but can have less sensitive implementation demands for suppression actions.

Holding Resources: Firefighting personnel and equipment assigned to do all required fire suppression work following fireline construction but generally not including extensive mop-up.

Hose Lay: Arrangement of connected lengths of fire hose and accessories on the ground, beginning at the first pumping unit and ending at the point of water delivery.

Hotshot Crew: A highly trained fire crew used mainly to build fireline by hand.

Hotspot: A particular active part of a fire.

Hotspotting: Reducing or stopping the spread of fire at points of particularly rapid rate of spread or special threat, generally the first step in prompt control, with emphasis on first priorities.

I

Incident: A human-caused or natural occurrence, such as wildland fire, that requires emergency service action to prevent or reduce the loss of life or damage to property or natural resources.

Incident Action Plan (IAP): Contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period. The plan may be oral or written. When written, the plan may have a number of attachments, including: incident objectives, organization assignment list, division assignment, incident radio communication plan, medical plan, traffic plan, safety plan, and incident map.

Incident Command Post (ICP): Location at which primary command functions are executed. The ICP may be co-located with the incident base or other incident facilities.

Incident Command System (ICS): The combination of facilities, equipment, personnel, procedure and communications operating within a common organizational structure, with responsibility for the management of assigned resources to effectively accomplish stated objectives pertaining to an incident.

Incident Commander: Individual responsible for the management of all incident operations at the incident site.

Incident Management Team: The incident commander and appropriate general or command staff personnel assigned to manage an incident.

Incident Objectives: Statements of guidance and direction necessary for selection of appropriate strategy(ies), and the tactical direction of resources. Incident objectives are based on realistic expectations of what can be accomplished when all allocated resources have been effectively deployed.

Infrared Detection: The use of heat sensing equipment, known as Infrared Scanners, for detection of heat sources that are not visually detectable by the normal surveillance methods of either ground or air patrols.

Initial Attack: The actions taken by the first resources to arrive at a wildfire to protect lives and property, and prevent further extension of the fire.

J

Job Hazard Analysis: This analysis of a project is completed by staff to identify hazards to employees and the public. It identifies hazards, corrective actions, and the required safety equipment to ensure public and employee safety.

Jump Spot: Selected landing area for smokejumpers.

Jump Suit: Approved protection suit worn by smokejumpers.

K

Keech Byram Drought Index (KBDI): Commonly used drought index adapted for fire management applications, with a numerical range from 0 (no moisture deficiency) to 800 (maximum drought).

Knock Down: To reduce the flame or heat on the more vigorously burning parts of a fire edge.

L

Ladder Fuels: Fuels that provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning.

Large Fire: 1) For statistical purposes, a fire burning more than a specified area of land e.g., 300 acres. 2) A fire burning with a size and intensity such that its behavior is determined by interaction between its own convection column and weather conditions above the surface.

Lead Plane: Aircraft with pilot used to make dry runs over the target area to check wind and smoke conditions, topography, and to lead air tankers to targets and supervise their drops.

Light (Fine) Fuels: Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

Lightning Activity Level (LAL): A number, on a scale of 1 to 6, which reflects frequency and character of cloud-to-ground lightning. The scale is exponential, based on powers of 2 (i.e., LAL 3 indicates twice the lightning of LAL 2).

Line Scout: A firefighter who determines the location of a fire line.

Litter: Top layer of the forest, scrubland, or grassland floor, directly above the fermentation layer, composed of loose debris of dead sticks, branches, twigs, and recently fallen leaves or needles, little altered in structure by decomposition.

Live Fuels: Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms, rather than by external weather influences.

M

Micro-Remote Environmental Monitoring System (Micro-REMS): Mobile weather monitoring station. A Micro-REMS usually accompanies an incident meteorologist and ATMU to an incident.

Mineral Soil: Soil layers below the predominantly organic horizons; soil with little combustible material.

Mobilization: The process and procedures used by all organizations, federal, state and local for activating, assembling, and transporting all resources that have been requested to respond to or support an incident.

Modular Airborne Firefighting System (MAFFS): A manufactured unit consisting of five interconnecting tanks, a control pallet, and a nozzle pallet, with a capacity of 3,000 gallons, designed to be rapidly mounted inside an unmodified C-130 (Hercules) cargo aircraft for use in dropping retardant on wildland fires.

Mop-up: To make a fire safe or reduce residual smoke after the fire has been controlled by extinguishing or removing burning material along or near the control line, felling snags, or moving logs so they won't roll downhill.

Multi-Agency Coordination (MAC): A generalized term which describes the functions and activities of representatives of involved agencies and/or jurisdictions who come together to make decisions regarding the prioritizing of incidents, and the sharing and use of critical resources. The MAC organization is not a part of the on-scene ICS and is not involved in developing incident strategy or tactics.

Mutual Aid Agreement: Written agreement between agencies and/or jurisdictions in which they agree to assist one another upon request, by furnishing personnel and equipment.

N

National Environmental Policy Act (NEPA): NEPA is the basic national law for protection of the environment, passed by Congress in 1969. It sets policy and procedures for environmental protection, and authorizes Environmental Impact Statements and Environmental Assessments to be used as analytical tools to help federal managers make decisions.

National Fire Danger Rating System (NFDRS): A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels.

National Wildfire Coordinating Group: A group formed under the direction of the Secretaries of Agriculture and the Interior and comprised of representatives of the U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service, and Association of State Foresters. The group's purpose is to facilitate coordination and effectiveness of wildland fire activities and provide a forum to discuss, recommend action, or resolve issues and problems of substantive nature. NWCG is the certifying body for all courses in the National Fire Curriculum.

Nomex ®: Trade name for a fire resistant synthetic material used in the manufacturing of flight suits, pants, and shirts used by firefighters (see Aramid).

Normal Fire Season: 1) A season when weather, fire danger, and number and distribution of fires are about average. 2) Period of the year that normally comprises the fire season.

O

Operations Branch Director: Person under the direction of the operations section chief who is responsible for implementing that portion of the incident action plan appropriate to the branch.

Operational Period: The period of time scheduled for execution of a given set of tactical actions as specified in the Incident Action Plan. Operational periods can be of various lengths, although usually not more than 24 hours.

Overhead: People assigned to supervisory positions, including incident commanders, command staff, general staff, directors, supervisors, and unit leaders.

P

Pack Test: Used to determine the aerobic capacity of fire suppression and support personnel, and assign physical fitness scores. The test consists of walking a specified distance, with or without a weighted pack, in a predetermined period of time, with altitude corrections.

Paracargo: Anything dropped, or intended for dropping, from an aircraft by parachute, by other retarding devices, or by free fall.

Peak Fire Season: That period of the fire season during which fires are expected to ignite most readily, to burn with greater than average intensity, and to create damages at an unacceptable level.

Personnel Protective Equipment (PPE): All firefighting personnel must be equipped with proper equipment and clothing in order to mitigate the risk of injury from, or exposure to, hazardous conditions encountered while working. PPE includes, but is not limited to: 8-inch high-laced leather boots with lug soles, fire shelter, hard hat with chin strap, goggles, ear plugs, aramid shirts and trousers, leather gloves, and individual first aid kits.

Preparedness: Condition or degree of being ready to cope with a potential fire situation.

Prescribed Fire: Any fire ignited by management actions under certain, predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.

Prescribed Fire Plan (Burn Plan): This document provides the prescribed burn boss information needed to implement an individual prescribed fire project.

Prescription: Measurable criteria that define conditions under which a prescribed fire may be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social, or legal considerations.

Prevention: Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuel hazards.

Project Fire: A fire of such size or complexity that a large organization and prolonged activity is required to suppress it.

Pulaski: A combination chopping and trenching tool, which combines a single-bitted axe-blade with a narrow adze-like trenching blade fitted to a straight handle. Useful for grubbing or trenching in duff and matted roots. Well-balanced for chopping.

R

Radiant Burn: A burn received from a radiant heat source.

Radiant Heat Flux: The amount of heat flowing through a given area in a given time, usually expressed as calories/square centimeter/second.

Rappelling: Technique of landing specifically trained firefighters from hovering helicopters; involves sliding down ropes with the aid of friction-producing devices.

Rate of Spread: The relative activity of a fire in extending its horizontal dimensions. It is expressed as a rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history.

Reburn: The burning of an area that has been previously burned but that contains flammable fuel that ignites when burning conditions are more favorable; an area that has reburned.

Red Card: Fire qualification card issued to fire rated persons showing their training needs and their qualifications to fill specified fire suppression and support positions in a large fire suppression or incident organization.

Red Flag Warning: Term used by fire weather forecasters to alert forecast users to an ongoing or imminent critical fire weather pattern.

Rehabilitation: The activities necessary to repair damage or disturbance caused by wildland fires or the fire suppression activity.

Relative Humidity (RH): The ratio of the amount of moisture in the air, to the maximum amount of moisture that air would contain if it were saturated. The ratio of the actual vapor pressure to the saturated vapor pressure.

Remote Automatic Weather Station (RAWS): An apparatus that automatically acquires, processes, and stores local weather data for later transmission to the GOES Satellite, from which the data is re-transmitted to an earth-receiving station for use in the National Fire Danger Rating System.

Resources: 1) Personnel, equipment, services, and supplies available, or potentially available, for assignment to incidents. 2) The natural resources of an area, such as timber, crass, watershed values, recreation values, and wildlife habitat.

Resource Management Plan (RMP): A document prepared by field office staff with public participation, and approved by field office managers that provides general guidance and direction for land management activities at a field office. The RMP identifies the need for fire in a particular area and for a specific benefit.

Resource Order: An order placed for firefighting or support resources.

Retardant: A substance or chemical agent that reduces the flammability of combustibles.

Run (of a fire): The rapid advance of the head of a fire with a marked change in fire line intensity and rate of spread from that noted before and after the advance.

Running: A rapidly spreading surface fire with a well-defined head.

S

Safety Zone: An area cleared of flammable materials used for escape in the event the line is outflanked, or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety zone close at hand allowing the fuels inside the control line to be consumed before going ahead. Safety zones may also be constructed as integral parts of fuel breaks; they are greatly enlarged areas, which can be used with relative safety by firefighters and their equipment in the event of a blowup in the vicinity.

Scratch Line: An unfinished preliminary fire line hastily established or built as an emergency measure to check the spread of fire.

Severity Funding: Funds provided to increase wildland fire suppression response capability necessitated by abnormal weather patterns, extended drought, or other events causing abnormal increase in the fire potential and/or danger.

Single Resource: An individual, a piece of equipment and its personnel complement, or a crew or team of individuals with an identified work supervisor that can be used on an incident.

Size-up: To evaluate a fire to determine a course of action for fire suppression.

Slash: Debris left after logging, pruning, thinning or brush cutting; includes logs, chips, bark, branches, stumps, and broken understory trees or brush.

Sling Load: Any cargo carried beneath a helicopter and attached by a lead line and swivel.

Slop-over: A fire edge that crosses a control line or natural barrier intended to contain the fire.

Smokejumper: A firefighter who travels to fires by aircraft and parachute.

Smoke Management: Application of fire intensities and meteorological processes to minimize degradation of air quality during prescribed fires.

Smoldering Fire: A fire burning without flame and barely spreading.

Snag: A standing dead tree or part of a dead tree from which at least the smaller branches have fallen.

Spark Arrester: A device installed in a chimney, flue, or exhaust pipe to stop the emission of sparks and burning fragments.

Spot Fire: A fire ignited outside the perimeter of the main fire by flying sparks or embers.

Spot Weather Forecast: A special forecast issued to fit the time, topography, and weather of each specific fire. These forecasts are issued upon request of the user agency and are more detailed, timely, and specific than zone forecasts.

Spotter: In smokejumping, the person responsible for selecting drop targets and supervising all aspects of dropping smokejumpers.

Spotting: Behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire.

Staging Area: Locations set up at an incident where resources can be placed while awaiting a tactical assignment on a three-minute available basis. Staging areas are managed by the operations section.

Strategy: The science and art of command as applied to the overall planning and conduct of an incident.

Strike Team: Specified combinations of the same kind and type of resources, with common communications, and a leader.

Strike Team Leader: Person responsible to a division/group supervisor for performing tactical assignments given to the strike team.

Structure Fire: Fire originating in and burning any part or all of any building, shelter, or other structure.

Suppressant: An agent, such as water or foam, used to extinguish the flaming and glowing phases of combustion when direction applied to burning fuels.

Suppression: All the work of extinguishing or containing a fire, beginning with its discovery.

Surface Fuels: Loose surface litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity; also grasses, forbs, low and medium shrubs, tree seedlings, heavier branchwood, downed logs, and stumps interspersed with or partially replacing the litter.

Swamper: (1) A worker who assists fallers and/or sawyers by clearing away brush, limbs and small trees. Carries fuel, oil, and tools, and watches for dangerous situations. (2) A worker on a dozer crew who pulls winch line, helps maintain equipment, etc., to speed suppression work on a fire.

T

Tactics: Deploying and directing resources on an incident to accomplish the objectives designated by strategy.

Temporary Flight Restrictions (TFR): A restriction requested by an agency and put into effect by the Federal Aviation Administration in the vicinity of an incident, which restricts the operation of nonessential aircraft in the airspace around that incident.

Terra Torch ®: Device for throwing a stream of flaming liquid, used to facilitate rapid ignition during burn out operations on a wildland fire or during a prescribed fire operation.

Test Fire: A small fire ignited within the planned burn unit to determine the characteristic of the prescribed fire, such as fire behavior, detection performance, and control measures.

Timelag: Time needed under specified conditions for a fuel particle to lose about 63 percent of the difference between its initial moisture content and its equilibrium moisture content. If conditions remain unchanged, a fuel will reach 95 percent of its equilibrium moisture content after four timelag periods.

Torching: The ignition and flare-up of a tree or small group of trees, usually from bottom to top.

Two-way Radio: Radio equipment with transmitters in mobile units on the same frequency as the base station, permitting conversation in two directions using the same frequency in turn.

Type: The capability of a firefighting resource in comparison to another type. Type 1 usually means a greater capability due to power, size, or capacity.

U

Uncontrolled Fire: Any fire that threatens to destroy life, property, or natural resources.

Underburn: A fire that consumes surface fuels but not trees or shrubs. (See Surface Fuels.)

V

Vectors: Directions of fire spread as related to rate of spread calculations (in degrees from upslope).

Volunteer Fire Department (VFD): A fire department of which some or all members are unpaid.

W

Water Tender: A ground vehicle capable of transporting specified quantities of water.

Weather Information and Management System (WIMS): An interactive computer system designed to accommodate the weather information needs of all federal and state natural resource management agencies. Provides timely access to weather forecasts, current and historical weather data, the National Fire Danger Rating System (NFDRS), and the National Interagency Fire Management Integrated Database (NIFMID).

Wet Line: A line of water, or water and chemical retardant, sprayed along the ground, that serves as a temporary control line from which to ignite or stop a low-intensity fire.

Wildland Fire: Any non-structure fire, other than prescribed fire, that occurs in the wildland.

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

Wildland Fire Situation Analysis (WFSA): A decision-making process that evaluates alternative suppression strategies against selected environmental, social, political, and economic criteria. Provides a record of decisions.

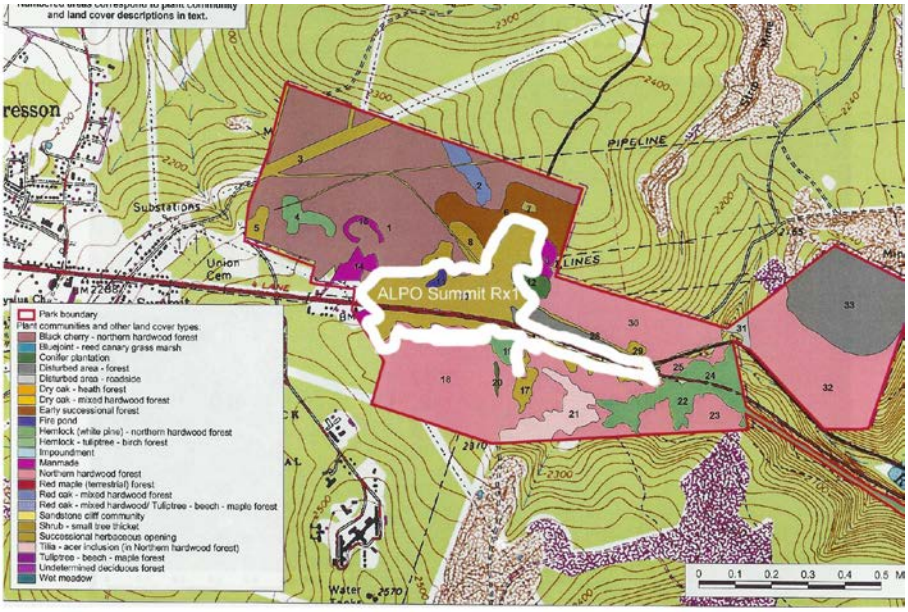
Wildland Fire Use: The management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in Fire Management Plans.

Wildland Urban Interface: The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

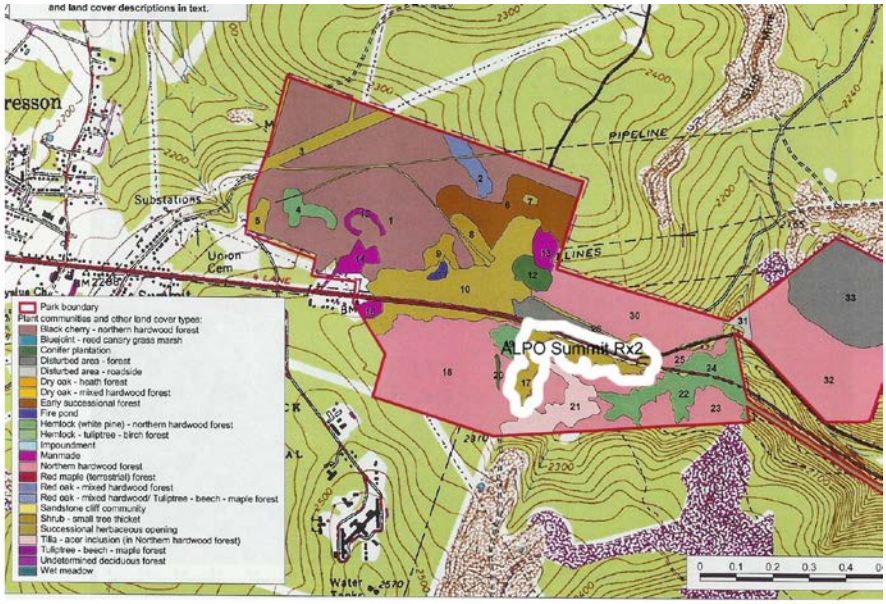
Wind Vectors: Wind directions used to calculate fire behavior.

Appendix B
Prescribed Fire/ Non-Fire Project Unit Location Maps

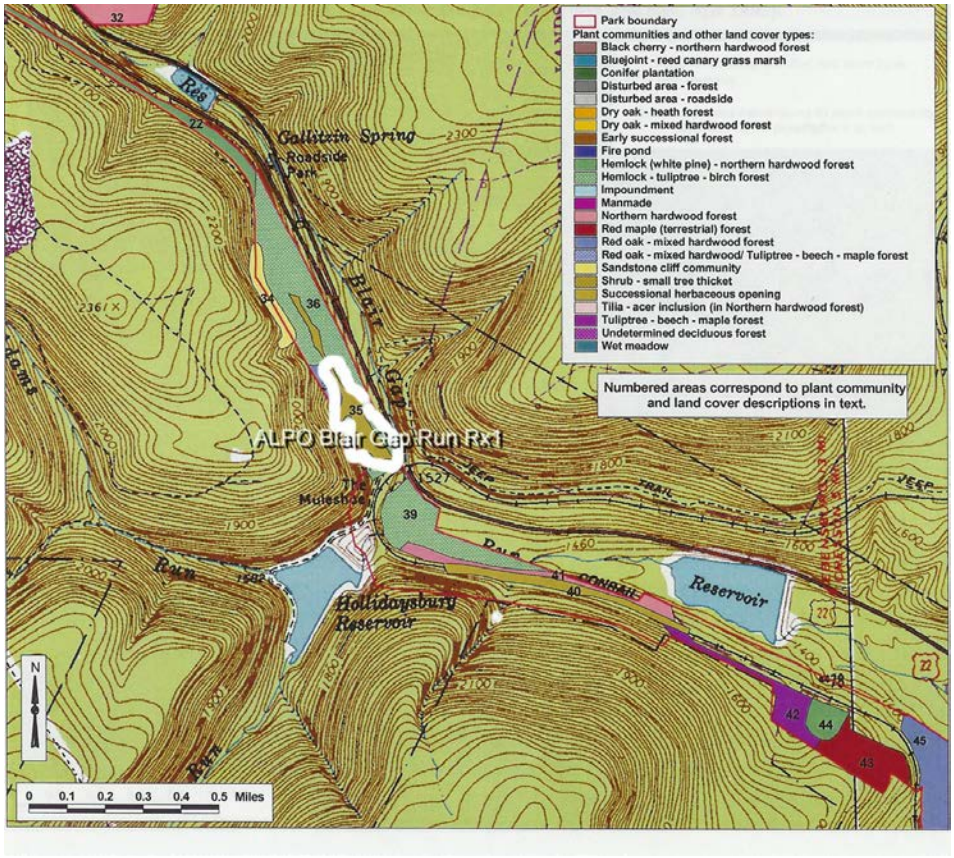
ALPO Summit Rx1



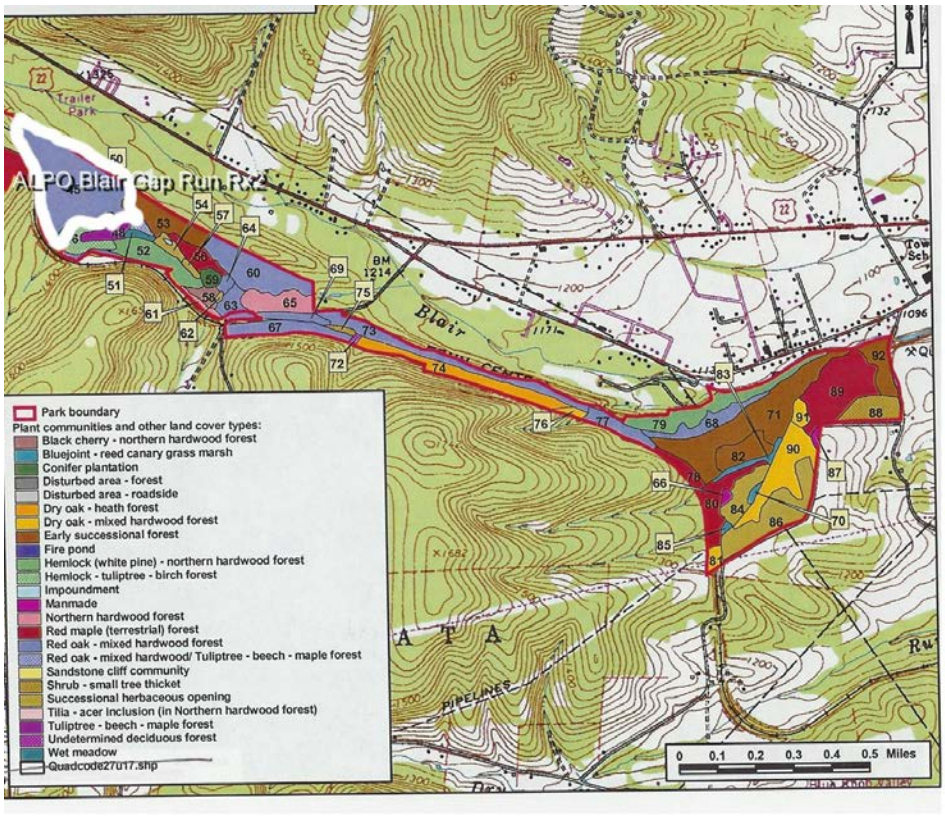
ALPO Summit Rx2



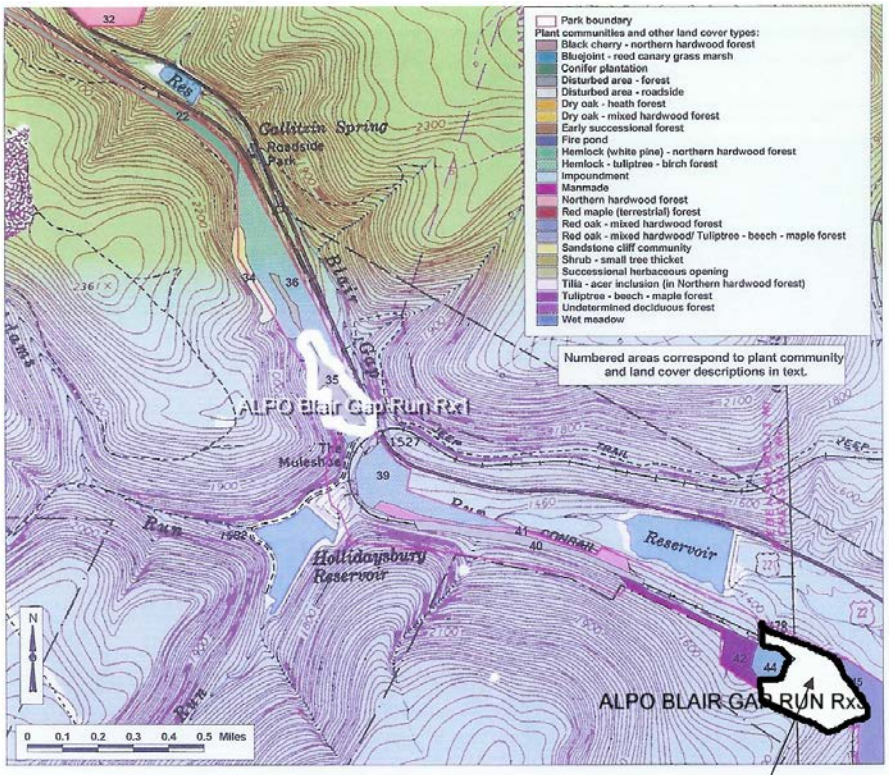
Blair Gap Run Rx1



ALPO Blair Gap Run Rx2

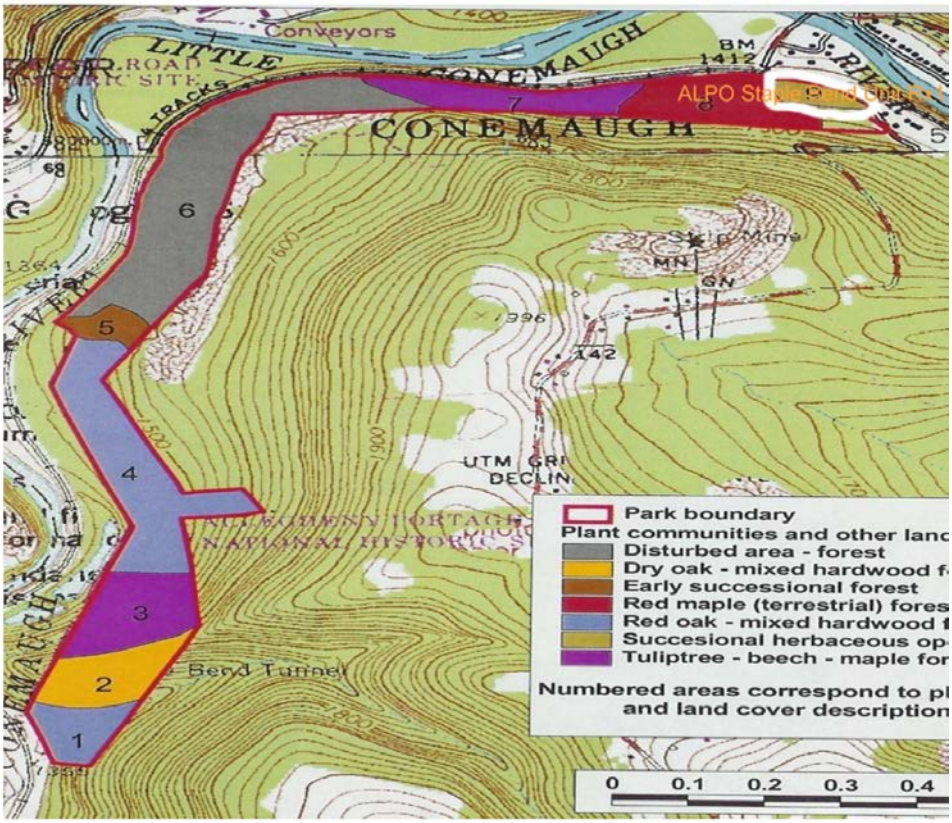


ALPO Blair Gap Run Rx3

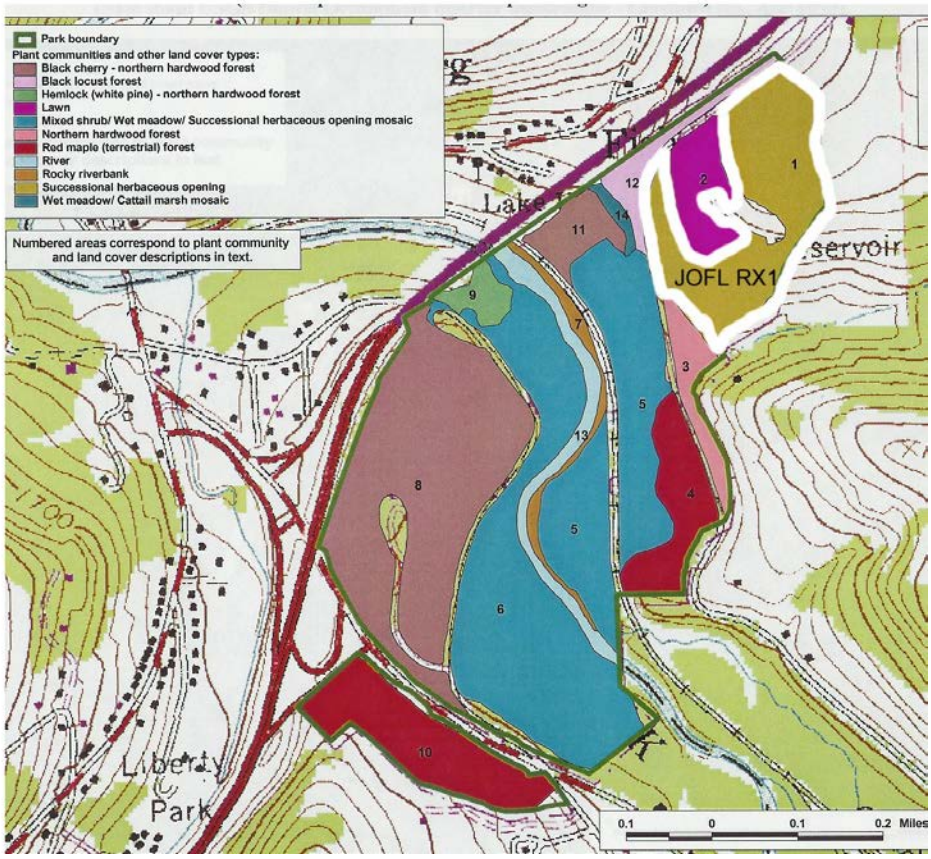


approximate limits of proposed fire prescription unit Blair Gap Run Rx3

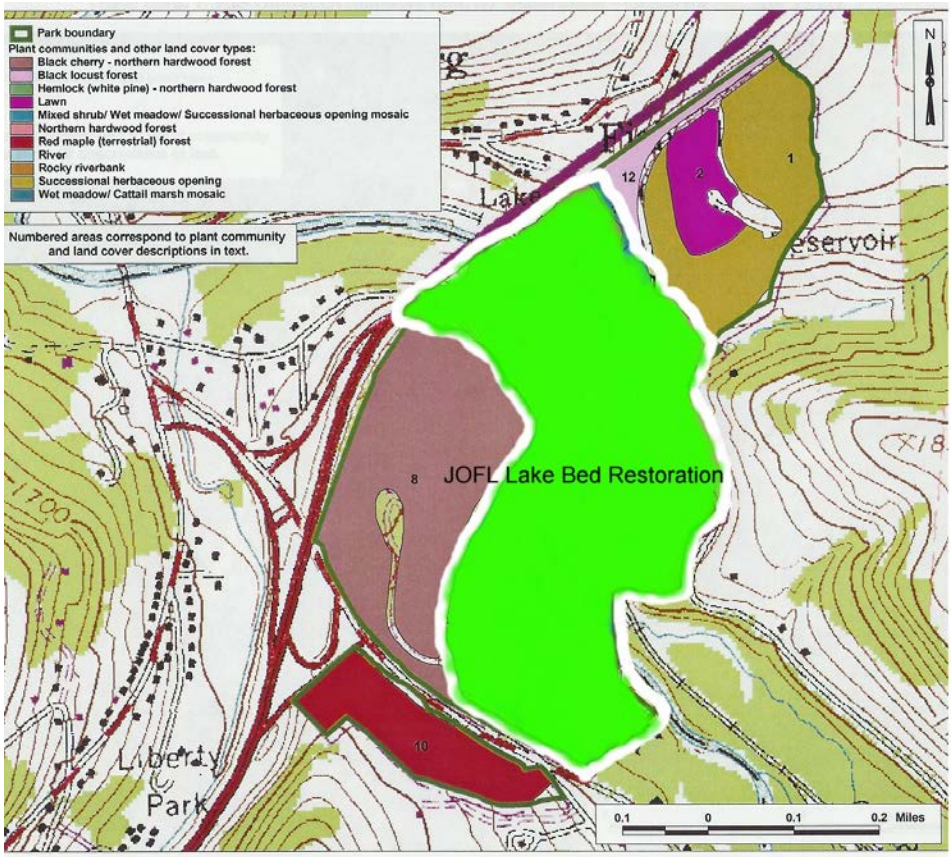
ALPO Staple Bend Unit Rx1



JOFL Rx1


Park boundary
Plant communities and other land cover types:
Black cherry - northern hardwood forest
Black locust forest
Hemlock (white pine) - northern hardwood forest
Lawn
Mixed shrub/ Wet meadow/ Successional herbaceous opening mosaic
Northern hardwood forest
Red maple (terrestrial) forest
River
Rocky riverbank
Successional herbaceous opening
Wet meadow/ Cattail marsh mosaic
Numbered areas correspond to plant community and land cover descriptions in text.
JOFL RX1
Lake
servoir
Liberty
Park
1700
0.1 0 0.1 0.2 Miles

JOFL Lakebed Restoration



The Draft 5-Year Plan that follows is intended to provide for the maximum number of management-ignited prescribed fires and non-fire hazardous fuel reduction projects needed to achieve fuel reduction and resource/ cultural management objectives. The implementation of these projects according to the established schedule is highly problematical, primarily due to limitations on funding, adverse weather, etc. The results of fire effects monitoring will largely influence the decision to proceed with the proposed burning schedules.

Table 2
5-Year Prescribed Fire/ Non-fire Plan

Note: Target Acres are estimated.

Alpha	WUI/RM CS or HF	Planning Year	Project Name	Activity Type	Treat Type	NEPA	Target Acres
ALPO	RM/CS	YR01	Summit Rx1	Monitoring	Fire	Within FMP NEPA	35.0
ALPO	RM/CS	YR02	Summit Rx1	Treatment	Fire	Within FMP NEPA	35.0
ALPO	RM/CS	YR03	Summit Rx1	Monitoring	Fire	Within FMP NEPA	35.0
ALPO	RM/CS	YR04	Summit Rx1	Treatment	Fire	Within FMP NEPA	35.0
ALPO	RM/CS	YR05	Summit Rx1	Monitoring	Fire	Within FMP NEPA	35.0
ALPO	RM	YR01	Summit Rx2	Monitoring	Fire	Within FMP NEPA	17.0
ALPO	RM	YR02	Summit Rx2	Treatment	Fire	Within FMP NEPA	17.0
ALPO	RM	YR03	Summit Rx2	Monitoring	Fire	Within FMP NEPA	17.0
ALPO	RM	YR04	Summit Rx2	Treatment	Fire	Within FMP NEPA	17.0
ALPO	RM	YR05	Summit Rx2	Monitoring	Fire	Within FMP NEPA	17.0
ALPO	RM	YR01	Staple Bend Unit Rx1	Monitoring	Fire/Manual	Within FMP NEPA	2.0
ALPO	RM	YR02	Staple Bend Unit Rx1	Treatment	Fire/Manual	Within FMP NEPA	2.0
ALPO	RM	YR03	Staple Bend Unit Rx1	Monitoring	Fire/Manual	Within FMP NEPA	2.0
ALPO	RM	YR04	Staple Bend Unit Rx1	Treatment	Fire/ Manual	Within FMP NEPA	2.0
ALPO	RM	YR05	Staple Bend Unit Rx1	Monitoring	Fire/ Manual	Within FMP NEPA	2.0
ALPO	RM/CS	YR01	Blair Gap Run Rx1	Monitoring	Fire/ Manual	Within FMP NEPA	3.0
ALPO	RM/CS	YR02	Blair Gap Run Rx1	Treatment	Fire/Manual	Within FMP NEPA	3.0
ALPO	RM/CS	YR03	Blair Gap Run Rx1	Monitoring	Fire/Manual	Within FMP NEPA	3.0
ALPO	RM/CS	YR04	Blair Gap Run Rx1	Treatment	Fire/Manual	Within FMP NEPA	3.0
ALPO	RM/CS	YR05	Blair Gap Run Rx1	Monitoring	Fire/Manual	Within FMP NEPA	3.0
ALPO	RM/HF	YR01	Blair Gap Run Rx2	Monitoring	Fire	Within FMP NEPA	6.5
ALPO	RM/HF	YR02	Blair Gap Run Rx2	Treatment	Fire	Within FMP NEPA	6.5
ALPO	RM/HF	YR03	Blair Gap Run Rx2	Monitoring	Fire	Within FMP NEPA	6.5
ALPO	RM/HF	YR04	Blair Gap Run Rx2	Monitoring	Fire	Within FMP NEPA	6.5
ALPO	RM/HF	YR05	Blair Gap Run Rx2	Monitoring	Fire	Within FMP NEPA	6.5
ALPO	RM/CS	YR01	Blair Run Gap Rx3	Monitoring	Fire/ Manual/Chemical	Within FMP NEPA	15.0
ALPO	RM/CS	YR02	Blair Run Gap Rx3	Treatment	Fire/ Manual/Chemical	Within FMP NEPA	15.0
ALPO	RM/CS	YR03	Blair Gap Run Rx3	Monitoring	Fire/ Manual/Chemical	Within FMP NEPA	15.0
ALPO	RM/CS	YR04	Blair Gap Run Rx3	Treatment	Fire/ Manual/Chemical	Within FMP NEPA	15.0
ALPO	RM/CS	YR05	Blair Gap Run Rx3	Monitoring	Fire/ Manual/Chemical	Within FMP NEPA	15.0

5-Year Prescribed Fire/ Non-fire Plan (Continued)

Alpha	WUI/ RM CS or HF	Planning Year	Project Name	Activity Type	Treat Type	NEPA	Target Acres
JOFL	RM/CR	YR01	JOFL RX1	Monitoring	Fire	Within FMP NEPA	30.0
JOFL	RM/CR	YR02	JOFL RX1	Treatment	Fire	Within FMP NEPA	30.0
JOFL	RM/CR	YR03	JOFL RX1	Monitoring	Fire	Within FMP NEPA	30.0
JOFL	RM/CR	YR04	JOFL RX1	Treatment	Fire	Within FMP NEPA	30.0
JOFL	RM/CR	YR05	JOFL RX1	Monitoring	Fire	Within FMP NEPA	30.0
JOFL	RM/CR	YR01	JOFL Lakebed Rest	Monitoring	Fire/Manual	Within FMP NEPA	70.0
JOFL	RM/CR	YR02	JOFL Lakebed Rest	Treatment	Fire/Manual	Within FMP NEPA	70.0
JOFL	RM/CR	YR03	JOFL Lakebed Rest	Treatment	Fire/Manual	Within FMP NEPA	70.0
JOFL	RM/CR	YR04	JOFL Lakebed Rest	Monitoring	Fire/Manual	Within FMP NEPA	70.0
JOFL	RM/CR	YR05	JOFL Lakebed Rest	Treatment	Fire/Manual	Within FMP NEPA	70.0

Definitions

WUI- Wildland Urban Interface Objective
RM – Resource Management Objective
CS – Cultural Scene Objective
HF – Hazardous Fuel Reduction Objective
Fire – Prescribed fire application(s)
Manual – Hand clipping, cutting, or pulling
Chemical – Appropriate herbicide application

ALPO/JOFL Fuels Treatment Unit Designations
PROPOSED NON-FIRE / PRESCRIBED FIRE TREATMENT AREAS

Unit	Primary Fuel Model(s)	Acres	Treatment Objectives
ALPO Summit Rx1	1(50%) 3(25%) 8(25%)	35.0	Maintain successional herbaceous opening; discourage woody species invasion; enhance species diversity; suppress/ remove invasive species; maintain cultural scene
ALPO Summit Rx2	3 (60%) 1(40%)	17.0	Maintain successional herbaceous opening; discourage woody species invasion; enhance species diversity; maintain cultural scene
ALPO Staple Bend Tunnel Rx1	3 (100%)	2.0	Enhance and preserve successional herbaceous opening; enhance species diversity; suppress/ remove invasives.
Blair Gap Run Rx1	3(90%) 1/9(10%)	3.0	Maintain, through the use of prescribed fire and manual treatments, successional herbaceous opening; protect cultural resources
Blair Gap Run Rx2	9 (100%)	6.5	Restore and enhance oak forest habitat through the application of prescribed fire.
Blair Run Gap Rx3	(3) 90% (9) 10%	15.0	Suppress and remove biomass of invasive species (Microstegium vimineum) as an adjunctive treatment with mechanical/ chemical treatments.
JOFL Rx1	3(50%) 1(50%)	30.0	Restore/ maintain cultural scene; restore and maintain native warm season grasses and herbaceous species; suppress/ remove invasive species.
JOFL Lakebed Restoration	3(40%) 9(20%) 1(40%)	70.0	Restore cultural scene; discourage woody species invasion; suppress/ remove invasive species; restore and maintain native herbaceous species.

ALPO/ JOFL PROPOSED PRESCRIBED FIRE/ NON-FIRE FUEL TREATMENT UNITS

(Alternative II and III)

Alternative II

Name of the Unit: Summit Rx1
Area: 35.0 acres
Type of Burn: Spring/ backfire/ strip-head fire ignitions
Fuels: Scrub and saplings/ various herbaceous species/ grasses, sedges, etc
Purpose of the Burn: Maintain / enhance successional herbaceous opening/ discourage woody species invasion; maintain cultural scene; suppress/ remove invasive species.

Vegetation Type	Acres	Hectares	
Typical of successional herbaceous opening, shrubs, pioneer woody species, grasses.	35.0		
TOTAL	**35.0**		
Geology / Soils	Deep, nearly level, moderately well drained, generally of the Gilpin-Ernest-Wharton association.		
Water Resources	None		
Flood Plain / Wetlands	Isolated Wet meadow community (see above)		
Vegetation	Black locust/ mixed conifer and hardwoods/ common herbaceous species		
Wildlife / Fisheries	Species typical of Allegheny mountain habitat.		
Threatened / Endangered / Sensitive Species	**Animals**	None Known	
	Plants	None Known	
Proposed Wilderness	No		

Name of the Unit: ALPO Summit Rx2
Area: 17 acres
Type of Burn: Spring/ backfire/ strip-head fire ignitions
Fuels: Previously cleared areas composed of herbaceous vegetation/ grasses/ forbs
Purpose of the Burn: Maintain / enhance successional herbaceous opening/ discourage woody species invasion; maintain cultural scene.

Vegetation Type	Acres	Hectares	
Typical of successional herbaceous opening, shrubs, pioneer woody species, grasses.	17.0		
TOTAL	**17.0**		
Geology / Soils	Deep, nearly level, moderately well drained, generally of the Gilpin-Ernest-Wharton association		
Water Resources	None		
Flood Plain / Wetlands	None		
Vegetation	Common herbaceous		
Wildlife / Fisheries	Wildlife typical of Allegheny mountain habitat		
Threatened / Endangered / Sensitive Species	**Animals**	None Known	
	Plants	None Known	
Proposed Wilderness	No		

Name of the Unit: ALPO Staple Bend Tunnel Rx1
Area: 2.0 acres
Type of Burn: Spring/ backing fire ignition pattern.
Fuels: A variety of herbaceous species interdispersed with a few scattered woody species. Native and invasive species present.
Purpose of the Burn: Enhance and preserve successional herbaceous opening, enhance species diversity; suppress/ remove invasives.

Vegetation Type	Acres	Hectares	
Herbaceous species, intermixed with scattered woody species	2.0		
TOTAL	**2.0**		
Geology / Soils	Cookport-Ernest-Laidig soils, nearly level poorly drained and moderately drained soils in alluvial material		
Water Resources	Little Conemaugh River		
Flood Plain / Wetlands	Artificially created wetlands associated with Little Conemaugh River		
Vegetation	See above		
Wildlife / Fisheries	Wildlife/ fisheries typical of Allegheny Mountain species.		
Threatened / Endangered / Sensitive Species	**Animals**	Northern Myotis (PA state species of concern)	
	Plants	None Known	
Proposed Wilderness	No		

Name of the Unit: Blair Gap Run Rx1
Area: 3.0 acres
Type of Burn: Spring/ backing fire ignition pattern
Fuels: A variety of herbaceous species, including a mix of vascular and non-vascular species.
Purpose of the Burn: Maintain, through the use of a combination of prescribed fire and manual treatments, a successional herbaceous opening; suppress/ remove invasive species (Microstegium vimineum and Alliaria petiolata) and protect cultural scene (old Portage Railroad trace).

Vegetation Type	Acres	Hectares	
Herbaceous species, including a mix of vascular and non-vascular plant species.	3.0		
TOTAL	**3.0**		
Geology / Soils	Basher-Monongahela-Purdy soil associations		
Water Resources	Blair Gap Run		
Flood Plain / Wetlands	None		
Vegetation	see above		
Wildlife / Fisheries	Wildlife/ fisheries typical of Allegheny Mountain habitat		
Threatened / Endangered / Sensitive Species	**Animals**	None Known	
	Plants	State Vulnerable species; consult park resource manager.	
Proposed Wilderness	No		

Name of the Unit: Blair Gap Run Rx2
Area: 6.5 acres
Type of Burn: A spring burn BEFORE acorn production begins for Quercus Sp; and NOT after.
Fuels: Forest fuels, leaf litter from deciduous species.
Purpose of the Burn: Restore and enhance oak forest habitat through the application of prescribed fire.

Vegetation Type	Acres	Hectares	
Hardwood leaf litter and some shrubs and herbaceous species	6.5		
TOTAL	**6.5**		
Geology / Soils	Basher-Monongahela-Purdy soil associations		
Water Resources	Blair Gap Run		
Flood Plain / Wetlands	None		
Vegetation	see above		
Wildlife / Fisheries	Wildlife/ fisheries typical of Allegheny Mountain habitat.		
Threatened / Endangered / Sensitive Species	**Animals**	None Known	
	Plants	None Known	
Proposed Wilderness	No		

Name of the Unit: Blair Gap Run Rx3
Area: acres
Type of Burn: A burn conducted during the fall of the year utilizing backing fire where possible in order to maximize residence time and downward heat pulse.
Fuels: Microstegium vimineum (invasive grass), scattered native grasses, forest fuels, leaf litter from scattered deciduous species.
Purpose of the Burn: Suppress/ remove biomass of invasive species (in conjunction with manual and chemical treatments), restore and enhance cultural scene.

Vegetation Type	Acres	Hectares	
Grass (both invasive and natural), scattered leaf litter	15.0		
TOTAL	**15.0**		
Geology / Soils	Basher-Monongahela-Purdy soil associations		
Water Resources	Blair Gap Run		
Flood Plain / Wetlands	None		
Vegetation	see above		
Wildlife / Fisheries	Wildlife/ fisheries typical of Allegheny Mountain habitat.		
Threatened / Endangered / Sensitive Species	**Animals**	None Known	
	Plants	None Known	
Proposed Wilderness	No		

Name of the Unit: JOFL Rx1
Area: 30.0 acres
Type of Burn: Spring/ backing fire/ strip-head fire ignition patterns
Purpose of the Burn: Restore and maintain the cultural scene; restore and maintain native grasses and herbaceous species and enhance species diversity; suppress/ remove invasive species.
Fuels: Various grasses and forbs

Vegetation Type	Acres	Hectares	
Various grasses, herbaceous species	30.0		
TOTAL	**30.0**		
Geology / Soils	Philo silt loam, moderately well-drained.		
Water Resources	None		
Flood Plain / Wetlands	None		
Vegetation	See above		
Wildlife / Fisheries	Wildlife typical of Allegheny Mountain habitats.		
Threatened / Endangered / Sensitive Species	**Animals**	None known	
	Plants	None known	
Proposed Wilderness	No		

Name of the Unit: JOFL Lakebed Restoration
Area: 70.0 acres
Type of Treatment/ Burn: Manual removal of trees, saplings. Pile burning followed by maintenance application of prescribed fire to maintain herbaceous species.
Fuels: Mixed grasses/ forbs/ forest species (saplings).
Purpose of the Burn: Cultural scene restoration of historic lakebed/ enhance species diversity; discourage woody species invasion; suppress/ remove invasive species.

Vegetation Type	Acres	Hectares	
Forest species (saplings and young trees), mixed grasses/ forbs	70.0		
TOTAL	**70.0**		
Geology / Soils	Combinations of Cookport, Brinkerton, Atkins, Philo, and Laidig soils.		
Water Resources	South Fork Little Conemaugh River		
Flood Plain / Wetlands	Small wetland habitat associated with South Fork of the Little Conemaugh River.		
Vegetation	See above		
Wildlife / Fisheries	Wildlife typical of Allegheny Mountain habitats. Fisheries heavily impacted by acid-mine drainage.		
Threatened / Endangered / Sensitive Species	**Animals**	None Known	
	Plants	State Threatened species nearby; consult park resource manager.	
Proposed Wilderness	No		

Note: The implementation plans for the lakebed restoration have been discussed in detail in the document: **Opportunities for Creating Herbaceous Communities within the 1989 Lake Conemaugh Shoreline at JOFL** by Todd W. Bowersox.

Alternative III

Under this alternative prescribed fire would not be utilized as a tool to manage vegetation, reduce hazardous fuels, protect and/ or enhance cultural resources, or reduce invasive species. Some of the projects described in Alternative II could be implemented under the auspices of this alternative, *though not to the extent of ecological benefit* as described in that Alternative (II). For example: grasses, forbs, and woody stems may be mowed in order to set-back the effects of vegetative succession, but species variability and over-all ecosystem enhancement are not by-products of this artificially induced process. Techniques utilized at managing vegetation, including the removal of invasives, could be drawn from a variety of techniques, utilized either individually or in combination, such as mechanical or hand mowing and cutting and the application of herbicides.

Because the use of prescribed fire is precluded as a tool to manage vegetation in this alternative, several projects outlined in Alternative II could *not* be accomplished under the guidelines established in Alternative III. The use of prescribed fire is essential to the restoration of some key ecosystem components, and traditional non-fire methods have

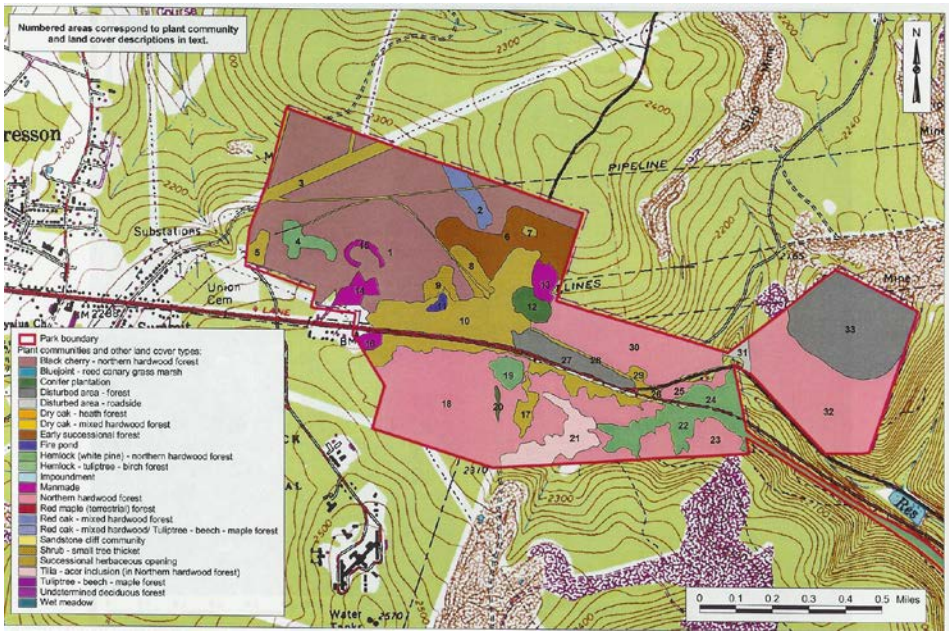
been shown to be largely ineffective in their stead. As a result, the following identified projects would be eliminated from consideration for treatment altogether for the reason(s) cited.

Project Designation	Objectives	Rationale for Elimination
Blair Gap Run Rx2	Oak forest restoration	Lack of ability to utilize fire to prepare seedbed, kill unwanted species, promote sprouting of oak species.
ALPO Summit RX1	Maintain herbaceous successional opening	Area may be too wet for use of mowing/ cutting equipment.

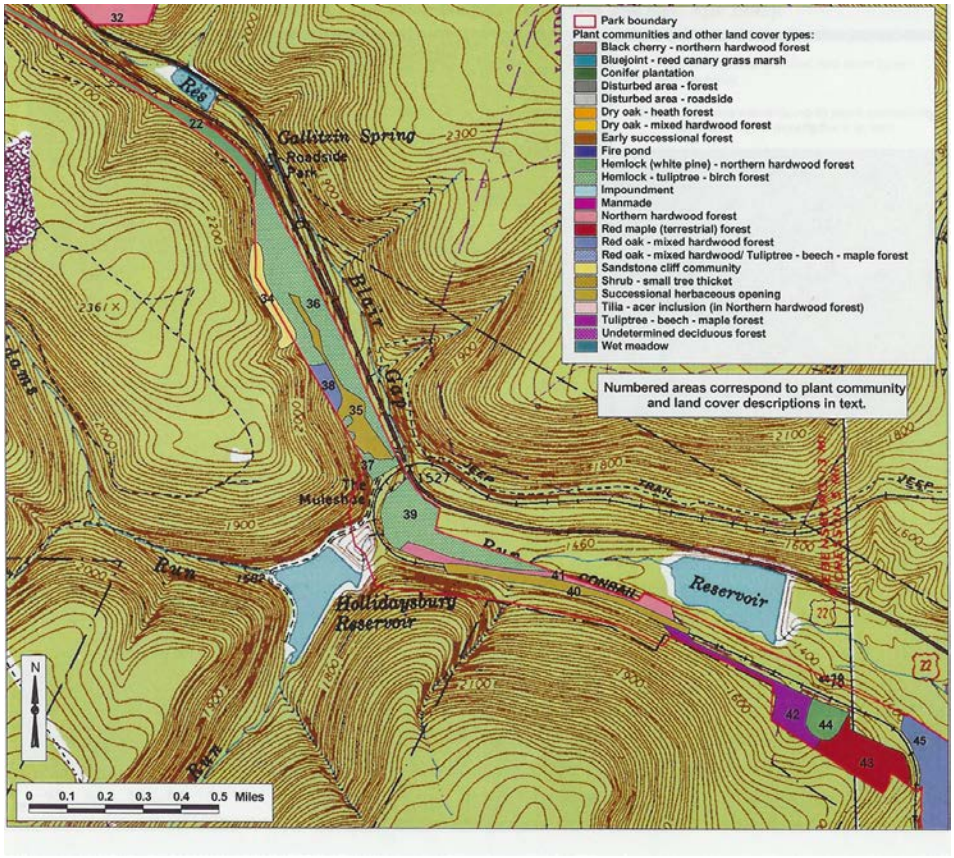
APPENDIX C

Maps Showing the Major Vegetation Communities of Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial.

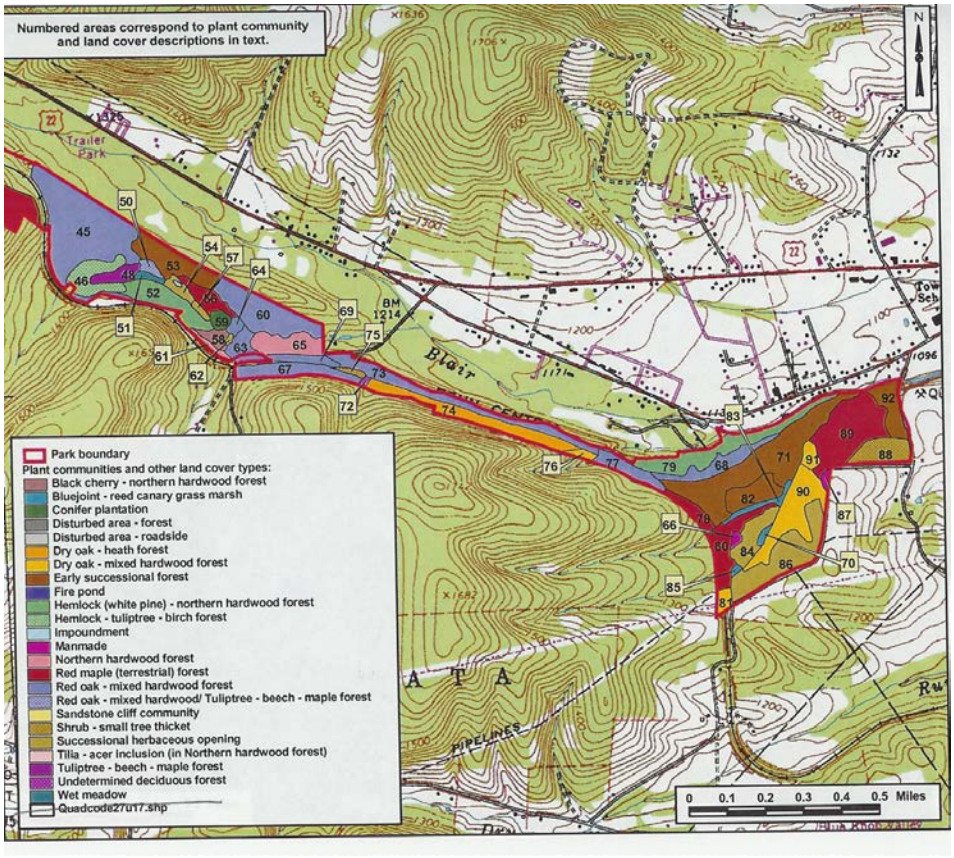
ALPO Summit Unit



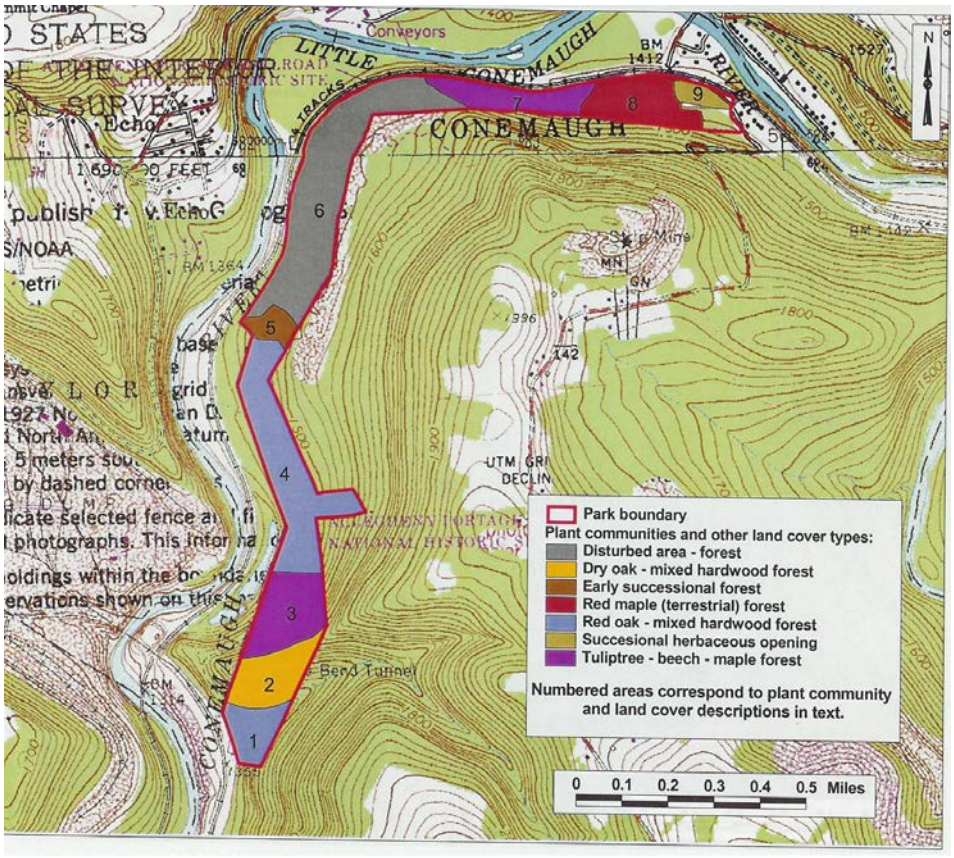
ALPO Blair Gap Run (Upper Section)



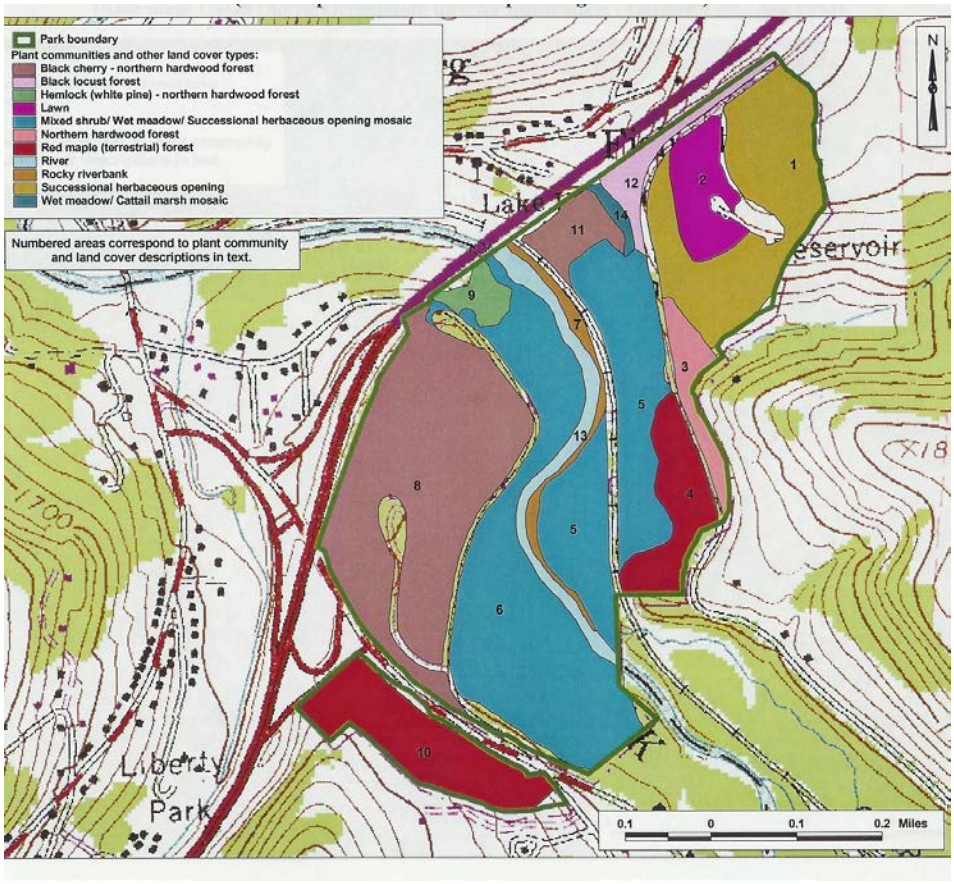
ALPO Blair Gap Run (Lower Section)



ALPO Staple Bend Tunnel



Johnstown Flood National Memorial (JOFL)



Appendix D

MINIMUM IMPACT SUPPRESSION TACTICS (MIST)

The change in emphasis from fire control to fire management has added a new perspective to the role of fire manager and firefighter. The old objective of putting the fire "dead-out", by a specified period of time has been replaced by the need to make unique decisions for each fire start, to consider the land and resource objectives, and to decide the appropriate management response and tactics which result in minimum costs and resource damage. Fire management activities within the park will be carried out in a manner that minimizes impacts to the park's natural and cultural resources. Incident facilities, when practical, will be located outside of natural and historic zones. Suppression forces will choose methods and equipment commensurate with suppression needs and a strategy that will least alter the landscape or disturb park resources. Of primary importance is the need to impress upon suppression forces the minimum impact suppression guidelines found in RM-18, Chapter 9. These guidelines take the park ethic into account in firefighting practices; they are not an excuse to relax normal safe firefighting practices. Techniques and policies of minimum impact firefighting that will be used in the park include (but are not limited to):

a. Minimize use of retardant. The park's aquatic ecosystem requires protection for various reasons. Park streams support a diverse fish population as well as important aquatic insect habitat. **As a result, it will be standard practice to keep the use of any chemical retardant at <u>least</u> 300 yards from any water source.**

b. Cold-trailing the fire edge when practical.

c. Use of natural firebreaks or wetlines wherever possible (in lieu of handline construction). Waterbars will be constructed on all handlines on steep slopes (15%>).

d. Use of soaker hose or foggers in mop-up to avoid "boring" and hydraulic action on soils.

e. Firelines kept to the minimum width needed to allow backfiring, burnout, or the creation of a safe blackline. Natural barriers should be used wherever possible.

f. Minimal tree-falling. Snags within or adjacent to firelines will be removed only if they show evidence of fire, present hazard to firefighters, or constitute a legitimate threat to the fireline integrity. Living trees will be undisturbed whenever possible. Lower branches will be limbed whenever possible to remove ladder fuels rather than removing the tree.

g. Maximize archeological protection measures in order to protect cultural resources.

h. Debris scattered or removed as prescribed by the Resource Advisor.

i. All firelines, camps, or other disturbance in visually sensitive areas will be rehabilitated to maintain a natural appearance.

j. After the fire emergency is over, transport of personnel, equipment, and trash out of the Park that is consistent with Park resource management objectives.

k. Engines used only on established roads within park boundaries, unless approval from the Superintendent or FMO has been obtained to leave park roads.

l. Bulldozers allowed only with written authorization from the Superintendent, who may authorize their use when high value resources are at risk. In these cases, Archeologists, Para-archeologists and/or Natural Resource Specialists will be assigned to dozers (if possible) to minimize damage to resources.

m. Utilize a "consumption strategy" when dealing with mop-up operations. This minimizes the exposure of firefighters to the physical hazards present along fire lines, i.e.; falling snags, rolling material, stump holes, etc., and allows for opportunities for the fire to consume fuels inside of the line without placing firefighters at unnecessary risk. Firefighters can monitor particularly hazardous areas along the line by initiating patrol actions from outside the line. Maximize the opportunity for the fire to consume fuels inside of the line without extensive mop-up activity by crews. The use of this strategy does NOT imply that the fire is left to its own devices, but rather that a coordinated approach of mop-up activity is utilized that allows for minimum exposure to firefighters during this phase of the fire suppression effort.