

EXECUTIVE SUMMARY

The wildland fire management policies of the National Park Service (NPS) support Chesapeake & Ohio Canal National Historical Park's resource management goals. The overriding goal is providing for firefighter and public safety and protection of natural and cultural resources, and protection of human developments from unwanted wildfire.

This Wildland Fire Management Plan contains the following program direction:

- 1) To guide the decision-making process where safety, social, political, and resource values are evaluated, and appropriate management response strategies are identified for wildfires.
- 2) To provide a framework for fuels management strategies through the use of prescribed fire, and mechanical treatments.
- 3) To provide a basis from which to cooperate more fully in planning and implementing a wildfire program across agency boundaries.

Program operations included in the Plan are:

- 1) Preparedness
- 2) Prevention
- 3) Suppression
- 4) Fuels Management.

Applicable resource goals and objectives are derived from approved agency resource and general management plans.

The Plan is organized to combine the latest scientific knowledge, including regional and local studies, with policy direction from the National Park Service, the Department of the Interior, the Federal Wildland and Prescribed Fire Management Policy and Program Review (USDI/USDA1995), and other Federal Government level wildfire policies to accomplish resource and fire management goals and objectives. The intent of the plan is primarily operational in nature.

This Plan is in compliance with the requirements found in the National Environmental Policy Act (NEPA). These requirements ensure a prudent assessment and balance between a federal action and any potential effects of that action, leading to consensus between fire managers, agency resource specialists, and the public. Any constraints or limitations imposed on the fire management program are also included.

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INTRODUCTION

The Fire Management Plan

National Park Service (NPS) wildfire management activities are essential to the protection of human life and property, the protection and management of irreplaceable natural and cultural resources, and to the accomplishment of the NPS mission. The Chesapeake & Ohio Canal National Historical Park (C&O Canal) Wildfire Management Plan (the Plan) is the primary planning document directing park wildfire management activities at C&O Canal. These activities include preparedness planning and activities, fire staffing and training, prevention, suppression, and the use of mechanical and prescribed fuel treatments to achieve management and resource management objectives.

This Plan meets the requirement of Director's Order-18 (DO-18) that all NPS park units with burnable vegetation have a wildfire management plan approved by the superintendent.

C&O Canal will review and update the fire management plan annually. Annual review is essential to ensure that the Plan continues to conform to current laws, objectives, procedures and strategies. A comprehensive plan revision, and National Environmental Policy Act (NEPA) compliance review, is required every five years. C&O Canal will provide a digital copy of each approved Fire Management Plan and all subsequent amendments to the NPS Fire Management Program Center (FMPC), located at the National Interagency Fire Center (NIFC), in Boise, Idaho.

Collaborative Processes Used to Develop the Plan

The C&O Canal General Plan (1976) revised 1981, Statement for Management (1991), Resource Management Plan (1996), and the Fire Management Plan (2004) are all developed with input from neighboring communities, and other NPS program management areas. A General Management Plan is scheduled to be prepared for the C&O Canal starting in 2012.

The activities covered by the Plan have been given due consideration in balance with other NPS unit management activities.

The superintendent is responsible for assuring policy compliance and the technical and operational soundness of the wildfire management plan before he or she approves it. Before approving the plan, the superintendent sought the review and advice of Park staff, area and regional staff, and other fire professionals.

Implementation of Federal Fire Management Policy

This Fire Management Plan will implement fire management policies and help achieve resource management and fire management goals defined in:

- A. Federal Wildfire Management Policy and Program Review (1995)
- B. Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems – A Cohesive Strategy (USDOJ/USDA, 2002)
- C. A Collaborative Approach for Reducing Wildfire Risks to Communities and the Environment: 10 Year Comprehensive Strategy Implementation Plan (2001)
- D. Guidance for Implementation of Federal Wildland Fire Management Policy (2009)
- E. Managing the Impacts of Wildfires on Communities and the Environment (2002)
- F. National Fire Plan (2001)
- G. 10-Year Comprehensive Strategy (2001) Implementation Plan, 10-Year Comprehensive Strategy (2001)
- H. National Park Service Management Policies (2006)
- I. Chesapeake & Ohio Canal National Historical Park General Plan (1976)

C&O Canal has developed a Resource Management Plan (1996). The goals and objectives in the resource management plan have generally been incorporated into this Plan. The FMP is usually a component of the park's Resources Management Plan (RMP) and is designed to facilitate the achievement of the park's cultural and natural resource management objectives. There is no mention however of fire management in the park's current RMP (1996) nor is it mentioned in the park's General Plan (1976), Statement for Management (1991) or enabling legislation of January 8, 1971 (Public Law 91-664).

Environmental and Cultural Compliance

Wildfire suppression is conducted within C&O Canal as an emergency action. This plan states that other elements associated with wildfire management, such as prescribed fire, fuel management, burned area rehabilitation, etc., are non-emergency actions and will be individually evaluated under the requirements of NEPA, the National Historic Preservation Act (NHPA) and other applicable regulations.

Director's Order #12: Conservation Planning, Environmental Impact Analysis, and Decision-making (2001) addresses NEPA compliance for the National Park Service. It lists various activities that qualify as categorical exclusions (CE) which do not require environmental assessments or environmental impact statements. The parks were instructed to replace DO-12 Handbook Chapter 3 Sections 3.3, 3.4, and 3.5. This list is to remain in effect until the revised DO-12 is issued.

The revised CE's that are applicable to this plan are found in Section 3.4:

G. Actions Related to Hazardous Fuels Reduction and Post-fire Rehabilitation.

1. Hazardous fuels reduction activities using prescribed fire not to exceed 4,500 acres, and mechanical methods for crushing, piling, thinning, pruning, cutting, chipping, mulching, and mowing, not to exceed 1,000 acres. Such activities:
 - (1) Shall be limited to areas—
 - (i) In wildland-urban interface; and
 - (ii) Condition Classes 2 or 3 in Fire Regime Groups I, II, or III, outside the wildland-urban interface;
 - (2) Shall be identified through a collaborative framework as described in “A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan;”
 - (3) Shall be conducted consistent with bureau and Departmental procedures and applicable land and resource management plans;
 - (4) Shall not be conducted in wilderness areas or impair the suitability of wilderness study areas for preservation as wilderness; and
 - (5) Shall not include the use of herbicides or pesticides or the construction of new permanent roads or other new permanent infrastructure; and may include the sale of vegetative material if the primary purpose of the activity is hazardous fuels reduction. (Refer to the ESM Series for additional, required guidance.) Guidance: NPS, pursuant to a Department of Interior determination, should not use this CE in Alaska, Hawaii, Washington, Oregon, California, Idaho, Montana, Arizona and Nevada due to a 9th Circuit Court case involving the U.S. Forest Service. Parks in other states should consult their Solicitor before using this CE.
2. Post-fire rehabilitation activities not to exceed 4,200 acres (such as tree planting, fence replacement, habitat restoration, heritage site restoration, repair of roads and trails, and repair of damage to minor facilities such as campgrounds) to repair or improve lands unlikely to recover to a management approved condition from wildland fire damage, or to

repair or replace minor facilities damaged by fire. Such activities must comply with the following (Refer to the ESM Series for additional, required guidance.):

- (1) Shall be conducted consistent with bureau and Departmental procedures and applicable land and resource management plans;
- (2) Shall not include the use of herbicides or pesticides or the construction of new permanent roads or other new permanent infrastructure; and
- (3) Shall be completed within three years following a wildland fire.

The National Historic Preservation Act, Section 106(NHPA) and the *2008 Nationwide Programmatic Agreement Among The National Park Service (U.S. Department of the Interior), The Advisory Council on Historic Preservation, and The National Conference of State Historic Preservation Officers for Compliance With Section 106 of the National Historic Preservation Act (November 14, 2008)* states the following;

STREAMLINED REVIEW

Where the Park Section 106 Coordinator determines the following criteria are met for a proposed undertaking, no further consultation is required unless otherwise specifically requested by the SHPO/THPO, Federally recognized Indian Tribe(s) or Native Hawaiian organization(s), or the ACHP.

Undertakings Eligible for Streamlined Review includes;

#7 – “Hazardous Fuel and Fire Management: The Streamlined Review Process *may be used only if* the park has an approved fire management plan or forest management plan.

If the project activities include ground disturbance, archeological monitoring may be appropriate throughout the ground disturbing activities, in accordance with any recommendation of the CRM [Cultural Resource Management] Team. When monitoring is recommended, members of any appropriate Federally recognized Indian Tribes or Native Hawaiian organizations may be invited to participate in monitoring.

Following completion of activities under this section, post-burn inspection and monitoring should be Conducted by a qualified archeologist to ensure no archeological sites were impacted or previously unknown sites revealed.

Consistent with the approved fire management plan or forest management plan, this streamlined activity includes the following undertaking, as well as others that are comparable in scope, scale, and impact:

- a. Removal of dead and downed vegetation, outside of historic districts, cultural landscapes, and archeological sites, using equipment and methods that do not introduce ground disturbance beyond documented natural or historic disturbance.

- b. Removal of dead and downed vegetation, as well as trees and brush located within historic properties, if the vegetation does not contribute to the significance of the historic property and equipment and methods are used that do not introduce ground disturbance beyond documented natural or historic disturbance.
- c. Forest management practices, including thinning of tree stands, outside of historic districts, cultural landscapes, and archeological sites, using equipment and methods that do not introduce ground disturbance beyond documented natural or historic disturbance.
- d. Restoration of existing fire line disturbances, such as hand lines, bulldozer lines, safety areas, helispots, and other operational areas.
- e. Slope stabilization to include reseeded with native seeds, replanting with native plants and/or grasses, placement of straw bales, wattles, and felling of dead trees when the root ball is left intact and in situ.

This *Wildfire Management Plan* 2009, as presented, has undergone review to determine if it meets the above listed NEPA and NHPA criteria. Appendix XXX contains the NEPA Environmental Screening Form and the NHPA Assessment of Effects Form.

Because C&O Canal staff has chosen a suppression-only policy for the park, it has been determined that this policy meets the requirements for a categorical exclusion 1.12. Due to the cultural resource base of the C&O Canal, all post-fire rehabilitation actions, even if they meet the criteria of CE #1.13, will be processed through the NEPA Environmental Screening Process of Director's Order #12, NHPA, and other applicable regulations. The Environmental Screening Form (ESF) and support material for the review of this *Wildfire Management Plan* 2009 is attached.

Authorities for Implementation of Fire Management Plan

The authority for fire management is found in the National Park Service Organic Act (Act of August 25, 1916), which states the Agency's purpose:

"... is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.

This authority was further clarified in the National Parks and Recreation Act of 1978.

"Congress declares that...these areas, though distinct in character, are united...into one national Park system.... The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress.

Additional statutory authorities are:

- The General Authorities Act of 1970
- Public Law 91-664 (C&O Canal Enabling Legislation, 1971)
- The Clean Air Act, Clean Water Act
- The Endangered Species Act
- The Antiquities Act.

LAND MANAGEMENT PLANNING AND FIRE POLICY

NPS Management Policies as Related to Fire Management

The National Park Service Management Policies (2006) is the basic Service-wide policy document of the National Park Service. It is the highest of three levels of guidance documents in the NPS Directives System. National Park Service Management Policies is designed to provide NPS management and staff with clear information on NPS policy, required and/or recommended actions, and other information to help them manage parks and programs effectively. Appendix B contains a summary of elements relating to compliance with the 2009 Guidance for Implementation of Federal Wildland Fire Management Policy.

National Park Service Management Policies include the following guidance related to the preparation of fire management plans and the management of fire on national park sites:

- Park fire management programs designed specifically to meet park resource management objectives—including allowing fire to perform its natural role as much as practicable -- will ensure that firefighter and public safety are not compromised. (NPS Management Policies, Chapter 4.5).

Fires that burn natural or landscaped vegetation in parks are called wildland fires. Wildland fires occur from both natural and human sources of ignition. Wildland fires may contribute to or hinder the achievement of park management objectives, and management response to each wildland fire is determined by whether or not the fire occurs within prescription as identified in the park's fire management plan. Wildland fire use is the application of an appropriate management response to naturally ignited wildland fires to accomplish specific resource management objectives in predefined areas outlined in fire management plans. Prescribed fires are the deliberate ignition of fires under prescribed circumstances to accomplish resource management objectives in predefined areas outlined in approved fire management plans.

Fire management consists of a program of activities designed to meet management objectives for protection of resource values, life, and property and, where appropriate, for using naturally ignited and human-ignited wildland fires as management tools. Park fire management programs designed specifically to meet park resource management objectives—including allowing fire to

perform its natural role as much as practicable—will ensure that firefighter and public safety are not compromised.

Parks with vegetation capable of burning will prepare a fire management plan that is consistent with federal law and departmental fire management policies, and that includes addressing the need for adequate funding and staffing to support the planned fire management program. The plan will be designed to guide a program that:

- responds to the park's natural and cultural resource objectives;
- provides for safety considerations for park visitors, employees, and developed facilities;
- addresses potential impacts on public and private neighbors and their property adjacent to the park; and
- protects public health and safety.

All wildland fires will be effectively managed through application of the appropriate strategic and tactical management options as guided by the park's fire management plan. These options will be selected after comprehensive consideration of the resource values to be protected, firefighter and public safety, costs, availability of firefighting resources, weather, and fuel conditions. Naturally ignited and human-ignited fires managed to achieve resource management and fuel treatment objectives, and the smoke they produce, will both be managed to comply with applicable local, state, and federal air quality regulations. Such fires will also include monitoring programs that record fire behavior, smoke behavior, fire decisions, and fire effects to provide information on whether specific objectives are met and to improve future fire management strategies. All parks will use a systematic decision-making process identified in their fire management plans or other documents to determine the most appropriate management strategies for all unplanned ignitions and for any naturally or management-ignited fires that are no longer meeting resource management objectives.

There may be situations in which an area may be closed to visitor use to protect the natural resources (for example, during an animal breeding season) or for reasons of public safety (for example, during a wildfire). Such closures may be accomplished under the superintendent's discretionary authority, and will comply with applicable regulations (36 CFR 1.5 and 1.7). (NPS Management Policies, Chapter 4.1)

The second level of NPS guidance documents (under NPS Management Policies) are Director's Orders. Director's Orders provide operational policies and procedures that support and supplement Management Policies. Director's Orders are often further supported with a third level of guidance consisting of reference manuals or handbooks. Specific guidance to the NPS on wildfire is contained in Directors Orders (DO-18) and attendant Reference Manual (RM-18), and "The Wildland and Prescribed Fire Management Policy: Implementation and Reference Guide" (1998).

Director's Order 18 – Wildfire Management and Reference Manual 18 – Wildfire Management are the documents that provide National Park Service units with specific guidance on the

preparation of wildfire management plans and on wildfire and prescribed fire management. DO-18 states:

- Wildfire may contribute to or hinder the achievement of park management objectives. Therefore, park fire management programs will be designed to meet resource management objectives prescribed for the various areas of the park and to ensure that firefighter and public safety are not compromised. Each park with vegetation capable of burning will prepare a fire management plan to guide a fire management program that is responsive to the park's natural and cultural resource objectives and to safety considerations for park visitors, employees, and developed facilities.
- The NPS is committed to protecting park resources and natural ecological processes; but firefighter and public safety must be first priority in all fire management activities.

RM-18 states that the paramount considerations of each park fire management program will be:

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

These priorities are further emphasized in RM-18 (chapter 3, page 1) with the following language:

- Safety is the responsibility of everyone assigned to a wildland or prescribed fire incident. The safety of employees and visitors alike must be of prime concern during fires. Agency administrators at all levels need to stress that firefighter and visitor safety always takes precedence over property and resource loss.

C&O Canal NHP Enabling Legislation

The first federal legislation pertaining to the C&O Canal was the Capper-Cramton Act of May 29, 1930, which authorized the George Washington Memorial Parkway along both sides of the Potomac River to just above Great Falls. This bill also included "the shores of the Potomac, and adjacent lands . . . from Fort Washington to a similar point above the Great Falls on the Maryland side except within the District of Columbia, and including the protection and preservation of the natural scenery of the Gorge and the Great Falls of the Potomac and the acquisition of that portion of the Chesapeake and Ohio Canal." In its final form, the Capper-Cramton Act authorized acquisition of the C&O Canal as far upriver as Point of Rocks.

The Capper-Cramton Act followed and was in accordance with Public Law 69-202 of June 6, 1924, known as the "National Capital Park and Playground Act." An important purpose of the latter was to:

- Prevent pollution of Rock Creek and the Potomac and Anacostia Rivers, to preserve forests and natural scenery in and about Washington, and to provide for the comprehensive, systematic, and continuous development of the park, parkway, and playground system of the National Capital.

This act thus provides additional guidance for the protection of natural scenery, forests, and water quality for park lands from the Maryland/District line to Great Falls, including the scenery as viewed from the Virginia side of the Potomac River.

President Franklin D. Roosevelt purchased the entire C&O Canal from the financially troubled B&O Railroad in 1938, using authority granted under the National Industrial Recovery Act of 1933. This act gave the president power to purchase any property for unemployment relief measures.

Under Proclamation 3391 on January 18, 1961, President Dwight D. Eisenhower created the Chesapeake and Ohio Canal National Monument. This monument included all canal property between Seneca and Cumberland, but had little practical effect as it contained no funding and did not authorize any expansion or development. This proclamation followed a protracted, but unsuccessful attempt to pass a bill in Congress to establish a national historical park.

The C&O Canal National Historical Park finally was authorized by Public Law 91-664 ("Chesapeake and Ohio Canal Development Act") on January 8, 1971. The new Park was created from federal lands under the administration of the George Washington Memorial Parkway, federal lands within the Chesapeake and Ohio Canal National Monument, and from state and private lands.

This law defined the specific purposes of the park to:

Preserve and interpret the historic and scenic features of the Chesapeake and Ohio Canal, and to develop the potential of the canal for public recreation, including such restoration as may be needed.

Section 7 of this law further directed that the park be administered in accordance with the 1916 Act and amendments.

The 1971 law provided for access to the Potomac River or non-federal lands for the purpose of hunting at locations designated by the Secretary. As this provision allows for access only and does not permit hunting within the park, and allows the National Park Service to designate locations for such access, it requires increased management (administrative and enforcement).

The 1971 act also directs park management to consider local and state development, land use, or recreational plans and to manage, whenever practicable, park lands in a manner that does not

conflict with such plans. It also directs that management meet and consult with a Chesapeake and Canal National Historical Park Commission on general policies and specific matters relating to the administration and development of the park.

Specific uses provided for in the enabling legislation, which allow some impairment or derogation of resources, include retainment of existing rights and valid permits. These include perpetual easements for rights-of-way authorized by Public Law 83-184 of August 1, 1953:

- For purposes of electric, telephone, and telegraph lines or conduits, or for other utility purposes incident to industrial, commercial or agricultural use, or to the supply of water for domestic, public, or any other beneficial use.

The 1971 law also authorized other uses of park lands, and utility, highway, and railway crossings. There are some constraints on these uses, since the 1953 law directs that easements be subject to such reasonable conditions as are necessary for the protection of the Federal interests. In addition, the 1971 enabling legislation states that permits are not to be in conflict with the purposes of the park and are [to be] in accord with any requirements found necessary to preserve park values.

These easements also are subject to the interest reverting to the United States for breach of restrictions or abandonment:

- No part of said easements shall be used for any other than the purposes for which they are granted, and in the event of any breach of this restriction, or in the event of any failure to observe the conditions in said easements . . . or in the event the said easement is abandoned for the purposes granted, the entire interest . . . shall . . . revert to the United States.

These stated mandates demonstrate the complexity of managing the Park and the evolution of the administration of the area.

C . C&O Canal NHP General Plan

A General Management Plan will be prepared for the C&O Canal planned to start in 2012. It is estimated to be 5 years or more before completion. Currently the C&O Canal operates under an approved General Plan (1976).

The main function of a General Management Plan (GMP) is to identify desired resource conditions and visitor experiences to be achieved by the Park over a 10 to 20 year period. The desired resource conditions and visitor experiences ultimately determine the strategies, programs and actions the Park will utilize.

All parks within the National Park System are required by law to operate under approved general management plans. This ensures that park managers carry out the mission of the NPS and the individual park unit as effectively and efficiently as possible.

The GMP provides a foundation to guide and coordinate all subsequent park planning and management. Other park planning documents, including fire management plans and resource management plans, must follow the management direction of the GMP.

Although fire management is not directly addressed in the C&O Canal General Plan, the decisions made when controlling any fire on the site must not contradict C&O Canal's purposes and goals as stated in the GP. The important purposes of Chesapeake & Ohio Canal National Historical Park as described in its enabling legislation and reflected in the GP, which direct this C&O Canal FMP are:

1. To preserve, protect, and maintain the historic resources and to prevent further deterioration and decay based on a level of stabilization, restoration or reconstruction through a practical preservation program.
2. Preserve and protect the atmosphere of past times and enduring natural beauty and safeguard historic remains and natural features.
3. Impart to visitors an understanding and appreciation of an historic way of life blended into the natural setting of the Potomac Valley.
4. Develop the potential of the park's recreation resources for safe yet stimulating enjoyment by the visitors of the historic resources and natural features within limits compatible with management objectives #1 and #2.
5. Interpret to the visitor the canal's reason for being, its construction, and role in transportation, economic development and westward expansion; including the way of life which evolved upon it and the history of the region through which it passes and to give an insight into the era of canal building in the United States, specifically the C&O Canal.
6. To cooperate with agencies of the State of Maryland, as well as other governmental agencies, including the C&O Canal National Historical Park Commission, organizations, and private individuals to help ensure that the use and development within the park and its vicinity are compatible to the greatest possible degree with protection of park resources and high quality experiences for its visitors.
7. To communicate to the local and regional public, activities and programs of the park in a way that promotes understanding of the purposes, mission, and significance of the park.
8. Through cooperation with outside interests, to assure adequate public access to the park's information, orientation, and recreation facilities and to minimize, through appropriate

regulation, the adverse effects associated with public use of numerous minor access roadways leading to the park.

9. To promote safety programs, particularly relating to the Potomac River, among visitors and park employees.
10. Provide the park recreational user with a natural hiking, biking and camping experience, rather than structured recreational playgrounds or other man-made facilities.
11. To manage the park in the most energy efficient manner using the best technology available.

D. C&O Canal NHP Resource Management Planning

C&O Canal currently has an approved Resource Management Plan which was written in 1996. The plan is due for revision. Like the GP, the Resource Management Plan makes no direct references to fire or fire suppression. It does place a strong emphasis on protection of the natural and cultural resources of the park.

E. Meeting GMP and RMP Goals Through the Plan

Implementation of the Chesapeake & Ohio Canal National Historical Park Fire Management Plan will help meet the objectives of the General Management Plan and Resource Management Plan by:

- Contributing to the preservation and rehabilitation of historic landscapes.
- Protecting historic, cultural, and natural resources.
- Ensuring human health and safety throughout fire management programs and activities.

The Fire Management Plan is a detailed program of action to implement fire management policies and objectives.

Wildfire Management Strategies

All fires that are not ignited by park managers for specific purposes are defined as wildfires. All wildfires will receive management actions appropriate to the safety of firefighters and the public, the resources and values to be protected, the condition of fuels, current and predicted fire behavior, weather, and topography to accomplish the specific objectives for that individual fire. These management actions, termed “appropriate management responses,” will vary from fire to fire and may vary within an individual fire.

General Management Considerations

The primary goals of the wildfire management program at C&O Canal are to protect human health and safety, protect property, enhance community protection, diminish risk and consequences of severe wildfires, and to the extent possible, increase health of the ecosystem

To accomplish these goals, wildfires at C&O Canal will normally be managed through suppression strategies. Fire managers will balance the potential impacts of wildfire with the potential impacts of fire suppression activities in choosing the appropriate management response.

Important values to be protected at C&O Canal include the cultural landscapes (and the natural resources of which they are composed) and historic structures associated with the Park. Values to be protected also include natural resources and processes, natural levels of biodiversity, and archeological resources.

The Chesapeake and Ohio National Historical Park lies adjacent to the Potomac River for 184.5 miles between Washington, DC and Cumberland, Maryland and spans four physiographic provinces. These provinces include the Coastal Plain - Washington to Great Falls (mp 0-5), the Piedmont - Potomac Gorge to Harpers Ferry (mp 5-60), the Blue Ridge - Harpers Ferry to Hancock (mp 60-120), and the Ridge & Valley - Hancock to Cumberland (mp 120-184.5)

The geographic provinces within which the park lies along with the influences of the Potomac River are responsible for the rich geologic, ecological, and biological diversity found within its boundaries. If not today, in the future, the C&O Canal NHP manages or will manage one of the largest acreage holdings of unfragmented floodplain forests within the east.

The C&O Canal NHP administers 46 sites recognized as state and nationally significant natural areas. Two areas are registered Important Bird Areas (IBA) as recognized by the Audubon Society.

Nationally/Globally Significant Natural Resources

The Potomac Gorge along with the Great Falls of the Potomac River represents one of the most outstanding and dramatic examples of Atlantic coast fall line representing unique river geology and terrace ecosystems represented along the east coast US. Except for some private land holdings, much of the lands within this are administered by the George Washington Memorial Parkway and the C&O Canal. Within the C&O Canal, the river terrace ecosystem lies between Great Falls and Key Bridge and contains the last remaining reserves for many rare and endangered plant species. Near the Paw Paw Tunnel and the bends are several Appalachian shale barren communities containing globally rare and unique plants. They are believed to be the only representatives of this type of community in the National Park

Service. The park is one of the most biologically diverse, especially for plant species, in the National Park Service.

Regionally Significant Natural Resource

The State of Maryland Natural Heritage Program considers the C&O Canal NHP to have the most significant biodiverse resources in the Mid-Atlantic States (Bartigis, Wiegand, pers. communication). The park has recorded over 1,200 species of vascular plants, including over 100 rare, threatened or endangered species of plants in Maryland and The District of Columbia, and one federally endangered plant species.

Numerous ecological factors along the Potomac River create a mosaic of these different natural habitats. From the fall line to western Maryland, geologic formations support diverse native plant communities. Isolated populations of western species survive where rare prairie habitat persists along the river. Floodplain forest, in addition to limestone forest, provides excellent habitats for native plants. Areas along the Potomac River are subject to frequent floods, causing canopy gaps, scouring and deposition that creates a diversity of habitats and organisms. Distributions of many northern and southern plant species overlap the Potomac River. Upland piedmont forest covers the remainder of the park, providing a significant forested habitat corridor.

Rare limestone and other calcareous outcrop natural communities occur in the park, especially in the Great Valley section and the Dickerson (Chilton) Woods of Montgomery County. Because limestone soils are highly productive for agriculture uses, these forest habitats are the most impacted by development of eastern deciduous forest types into agricultural lands. The limestone forests are not well represented within the National Park Service and The Nature Conservancy has estimated that most of the remaining 1,500 acres (was 500,000 acres) of rare limestone forests and out crop communities in Maryland lie within C&O Canal NHP.

The number of rare plants represents one of the highest concentrations of state-listed rare plants in the eastern US and is one of the most biologically diverse areas in the Mid-Atlantic States. Several species are globally rare, and some occur here because they are dependent upon special habitats and ecological conditions present along the Potomac River. Thus, the C&O Canal NHP provides a haven for numerous rare, threatened and endangered plant species and associated habits. Because of this, the park is considered to be very important to the state of Maryland. (Rare Plant Survey along the C&O Canal NHP and Potomac River, 1995, Richard Wiegand and Paula G. Becker).

Nationally Significant Cultural Resources

C&O Canal consists of an intact historical canal system that extends 184.5 miles from Georgetown in the District of Columbia to Cumberland, Maryland. For almost its entire length this canal closely follows the north bank of the Potomac River and its North Branch. The park contains over 500 historic canal-related structures, comprised primarily of lift locks, culverts,

aqueducts, waste weirs and lock houses. In addition to canal-related resources, numerous historic structures associated with adjoining agricultural, industrial and transportation uses stand within the park boundary. More than 200 archeological sites, most recording a significant prehistoric presence along the Potomac, have been identified in the park as well. In summary, C&O Canal contains a tremendous depth and diversity of cultural resources that span almost all eras of American History.

B. Wildfire Management Goals

Goals

These goals are programmatic in direction and are intended to provide safe and effective implementation of the fire management plan.

- Goal 1:** Make firefighter and public safety the highest priority of every fire management activity.
- Goal 2:** Suppress all wildfires, regardless of ignition source, to protect the public, private property, and natural and cultural resources of Chesapeake & Ohio Canal National Historical Park.
- Goal 3:** Manage wildfires in concert with federal, state, and local air quality regulations.
- Goal 4:** Facilitate reciprocal fire management activities through the development and maintenance of cooperative agreements and working relationships with pertinent fire management entities.
- Goal 5:** Reduce wildfire hazard around developed areas and areas adjacent to cultural and historic sites.
- Goal 6:** Use fire as a means to remove the vegetative debris produced by mechanical fuel treatments, normal maintenance operations, and storm damage.
- Goal 7:** Educate employees and the public about the scope and effects of wildfire and wildfire management.

These goals provide the programmatic direction for the wildfire program. The goals meet the overall objectives found in the C&O Canal General Plan and the C&O Canal Resource Management Plan.

The C&O Canal fire management program goals reflect Federal fire policy, the core principles and goals of the *Comprehensive Strategy*, and *Cohesive Strategy* where supported by land and resource management plans.

C&O Canal's wildfire management goals contribute to accomplishing the *National Park Service 10-year Comprehensive Fire Strategy (NPS, 2000)*. This strategy outlines goals and actions in four fire management program areas: oversight and accountability, wildfire preparedness, wildfire operations, and fire protection capabilities of rural fire districts.

C. Wildfire Management Options

The following wildfire management options are available for use at C&O Canal:

1. Wildfire Suppression: Historically, all wildfires have been suppressed at C&O Canal. Under this plan, the Park will continue to suppress all wildfires using the most appropriate management action. Determination of the most appropriate management action will consider human safety, threat and potential damage to property, resources, and cost effectiveness. Suppression may not be used to accomplish resource objectives.

2. Prescribed Fire: Fires intentionally ignited by management to accomplish management objectives in selected areas under certain conditions are called prescribed fires. Prescribed fires will be managed to achieve resource management objectives included in the GP and the RMP. Prescribed fire goals will be to protect cultural resources, especially historic scene restoration and maintenance, reduce hazard fuels, reduce understory vegetation; manage vegetation to maintain cultural resources and agricultural fields and promote the growth of native grasses; and control exotic vegetation. When necessary, prescribed fire will be used in conjunction with other treatment methods to achieve the desired results. See Appendix J for a sample Prescribed Fire Plan.

If a determination is made that a specific prescribed fire is required, that prescribed fire will be subject to the requirements of NEPA, the NHPA and other applicable regulations.

Fire may be used to dispose of natural vegetative debris deemed infeasible or impractical to remove mechanically in a non-wildland fuel environment (parking lot, storage yard, gravel pit, snow-covered area, etc.). The debris may be generated from routine maintenance activities, piled debris generated from construction activities, removal of hazard trees, discarded building, and administrative materials. Debris burned in a non-wildland environment does not require a prescribed fire burn plan. Debris burned in a wildland environment (including on snow covered ground) requires a prescribed fire burn plan. Any material being burned for debris disposal must be classified as permissible to burn under applicable Federal, State, Tribal, and Local regulations.

Prescribed fires that exceed prescription limits will be declared wildfires and will be immediately suppressed using the appropriate suppression option. The Park will follow all applicable guidance and regulations when using fire for debris disposal. NPS guidance on debris burning is found in RM-18.

3. Wildfire Use: Any Non-prescribed fire will not be used at C&O Canal. This option was rejected due to the adjacent wildland/urban interface considerations and the lack of knowledge concerning the role that fire has historically had on the Park's natural resources.

4. Non-Fire Applications: The reduction or removal of fuels by mechanical means is an option that may be used for objectives such as protection of resources, historic scene restoration and maintenance, protection of private property located in the wildland/urban interface, invasive species control, or other natural resource objectives.

D. Description of Wildfire Management Strategies by Fire Management Unit

C&O Canal National Historical Park is defined as one Fire Management Unit (FMU).

The C&O Canal National Historical Park is in the District of Columbia and the State of Maryland, extending from the mouth of Rock Creek in Georgetown to Cumberland, Maryland, and parallel to the Potomac River most of the distance. Approximately 6 miles (123.80 acres) of the approximate 35 miles of the abandoned Western Maryland railroad added to the park by Public Law 95-625 on November 10, 1978, are located in Morgan County, West Virginia.

In Maryland, the C&O Canal Park lies in the counties of Montgomery, Frederick, Washington, and Allegany. The Congressional districts are the 6th (sixth) and the 8th (eighth).

In West Virginia, the park lies in the counties of Morgan and Mineral. The Congressional district is the 2nd (second).

In the District of Columbia, the park begins at Rock Creek in Georgetown and runs upstream beside the Potomac River. The total area within the District of Columbia is represented by the District delegate to Congress.

A comprehensive description of land status including existing federal and non-federal ownership, and privately owned in-holdings can be found in the current Land Protection Plan. (July 31, 2003)

Preplanned decisions based on historical fire behavior indices will be considered in selecting appropriate management responses for suppression. The Park will not use wildfire for resource benefit at this time. The Park's use of wildfire will not be used at this time due to the adjacent wildland/urban interface considerations and the lack of knowledge concerning the role that fire has historically had on the Park's natural resources.

Wildfires at C&O Canal are managed with the support of local community fire departments. This community-based approach to wildfire management involves partnership, cooperation and collaboration. (See appendix G)

Additional fire planning support and collaboration is provided by the National Capital Region Fire Management Office located in Sharpsburg, MD. The Regional FMO provides technical assistance to the Park on all fire management matters, including fire management programs such as the Weather Information Management System (WIMS), the NPS Wildfire Computer System, the National Fire Danger Rating System (NFDRS), the resource ordering system (ROSS), the Incident Qualification and Certification System (IQCS), Fire Program Analysis (FPA), and FIREPRO budgeting. The Regional FMO also assists with the Park's wildfire qualification and certification program, coordination of fire training and mobilizations, development of cooperative agreements with local and state agencies, administration of Rural Fire Assistance Program grants to local fire departments, and developing fire prevention, preparedness, and suppression operational plans.

The Park, in accordance with NPS policy, uses Minimum Impact Suppression Tactics (MIST) in all fire management activities. MIST is defined as the application of techniques that effectively accomplish wildfire management objectives while minimizing the impacts to cultural and natural resources commensurate with ensuring public and firefighter safety and effective wildfire control. Examples of MIST include using existing natural or constructed barriers to contain wildfires, mowing firebreaks in grassland, and using pumps and hoses to apply water to suppress fire activity and reduce fire spread.

Physical and Biotic Characteristics

1. Topography

The topography is highly dependent on the geology of the park (See geology.) The park encompasses land from Georgetown DC to Cumberland Maryland, 184.5 miles along the Potomac River. Most of the park is in the 50 year flood plain. There are some heights within the park where upland piedmont forests will be located. The canal and towpath were engineered to traverse about 650 feet rise in elevation over the 184.5 miles and the historic structures are significant components of the cultural landscape.

2. Geology

The geology of the park is shaped by the 184.5-miles, mainly within a 2-mile-wide corridor centered on the Potomac River, segmented east to west, from Georgetown to Cumberland, by geologic provinces and sections: the Coastal Plain, Piedmont Valley, Blue Ridge, and Valley and Ridge. A significant feature of the park is the "Fall Line" or "Fall Zone" which is not a line but rather a transition zone between the Coastal Plain and the Piedmont. The Great Falls of the Potomac are bounded by the C&O Canal NHP and the George Washington Memorial Parkway. There are more than 100 bedrock formations identified along the Potomac River. Of these, there are 27 type-localities along the river, 21 type-localities near the river, and 24 type-localities within the Potomac River drainage basin. (Geology of the Chesapeake and Ohio Canal National Historical Park and Potomac River Corridor, District of Columbia, Maryland, West Virginia, and

Virginia: USGS OFR-01-188B). The Geologic Mapping Division of the USGS completed a park wide geologic mapping project at a scale of 1:12000 and 1:24,000 as appropriate.

3. Soils

The soils of the park have been mapped by the USDA, NRCS National Cooperative Soil Survey. The data is linked to the National Soil Information System relational database, which gives the proportionate extent of the component soils and their properties. The soil map and data used in the SSURGO product were prepared by soil scientists as part of the National Cooperative Soil Survey. This soil survey depicts information about the kinds and distribution of soils on the landscape. The soils would correspond to the underlying geology of the park. (Soil Survey Geographic Database for Frederick County, MD 2001)

4. Elevation

The elevation ranges from near sea level to about 760 feet about sea level, with most of the topography being within the floodplain terraces of the Potomac River.

5. Hydrology

Portions of 161 perennial streams (37 named; 124 unnamed) and hundreds of intermittent streams pass through the park to the Potomac River or its larger tributaries. There are approximately 200 historic hydrological structures: culverts, waste weirs, aqueducts, and the canal.

Nearly 85 % of the park is within the 50-year floodplain of the Potomac River, much of which is non-tidal wetlands of the forested palustrine type (i.e., swamps, bottomland hardwood forests). Seeps and springs can be found park wide and Karst topography and subterranean ecosystems, including 13 caves, 8 mines and associated speleothems and fauna, limestone sinks, and aquatic systems containing endemic groundwater invertebrates are documented. Vernal pools and at least 60 miles of the canal are naturally watered or maintained watered, all providing habitat for amphibian species and state rare and endangered wetland plants and two state rare crustaceans. The park is adjacent to approximately 150 miles of Potomac River shoreline.

The park encompasses 19,236 acres (7694 hectares) within the Potomac River Basin with the majority of those acres are within the riparian zone and floodplain. Period flooding is part of the normal ecosystem (natural process) although some flood events are significant and cause damage to man made structures within the park.

6. Vegetation

The rich geological, ecological and biological diversity preserved inside the boundaries of the park include a wealth of communities such as riparian, terrace, upland forest, seeps and springs, cave and wetlands. More than 40 state and nationally significant natural areas, including Appalachian shale barren communities (areas that harbor globally rare plants, rare limestone outcrops and scoured bedrock floodplain, are found in the park. The park also protects the largest extant block of upland forest in Maryland's Piedmont, the Goldmine tract, and the highest quality limestone and calcareous shale habitats remaining in the state, Ferry Hill bluffs and Chilton Woods.

Invasive non-native plants have been introduced by human activity and disrupt natural ecological processes by out competing and replacing native plants and animals through competition for space, light and water, and by creating new habitat conditions inhospitable to native species. The park is home to over 260 non-native plant species, which are one of the most significant threats to park natural resources and are a particular problem because of the competition they present to the very large number of state rare, threatened, and endangered plant species.

The park manages about 1,200 acres of land, which is under agricultural permit to local farmers, who raise row and hay crops and livestock including cattle and goats. Crops include grains, such as corn, soybean, hay and wheat. The agricultural permitting program allows the park to manage the cultural landscape in farming practices, common to the historic C&O Canal era and adjacent communities. The farmed acreage can be found from Edwards Ferry, about mile 30 to Old Town, mile 170.

The park is currently in part of a region wide program to develop new and previously non-existent vegetation mapping. The products will describe the vegetation according to the NVCS National Vegetation Classification System. This project should be completed during 2010.

7. Wildlife

The C&O Canal provides important habitat to many animals, aquatic and terrestrial during breeding and migration seasons and throughout the year. Aquatic environments in the park include wetlands, streams, rivers, springs and seeps, and open water habitat in the sections of watered canal. These habitats support animals such as frogs, toads, salamanders, fish, freshwater mussels, beaver, and muskrat. Terrestrial habitats such as forests, open fields, rocky outcrops, developed, and transition habitats support many common Eastern Deciduous woodland species: deer, song birds, red and gray fox, raccoon, gray and fox squirrels, and a few uncommon species, like the black bear and bobcat. Bald eagles maintain nests within the park.

The linear shape of C&O Canal along the riparian forest of the Potomac River provides a transportation corridor for wildlife. The corridor of unfragmented habitat is important for the preservation of the parks biodiversity, allowing for the movement of species between areas of higher quality or preferred habitat. Additionally, the larger blocks of parkland of 100-500 acres provide important protected habitat to wildlife. As adjacent land becomes more developed or urbanized, corridors of contiguous, protected habitat will become increasingly important in the preservation of biodiversity and the maintenance of viable wildlife populations.

Numerous bird species can be observed throughout the year at C&O Canal NHP. Many are year round inhabitants while others are neo-tropical migratory traveling through the park from South and Central America, the Caribbean and southern US to North American nesting habitats. Scientists have found that certain migratory birds that utilize much of the habitat type found at C&O Canal NHP for breeding are declining worldwide. The Potomac River floodplain provides habitat for many migrating and breeding birds and is becoming increasingly important as natural areas are lost or fragmented in Maryland and all over the U.S. The American Bird Conservancy and National Audubon Society have designated many segments of the C&O Canal NHP as Important Bird Area (IBA), which are small sites designated as critical to rare species or that support large concentrations of a species.

The park contains a diverse native mussel community, including several species that are state listed. Native mollusks, or mussels, are the most imperiled aquatic fauna in North America and continue to decline primarily due to habitat loss and invasion of non-indigenous species. Of nearly 300 species of mussels in North America, 13 are considered extinct and 57 are designated federally endangered or threatened species. Of the 20 species of freshwater mussels in Maryland, 10 are in C&O Canal NHP.

8. Threatened and Endangered Species

The C&O Canal is one of the most biologically diverse parks, especially for plant species, in the National Park system. The park has recorded over 1,200 species of vascular plants, over 100 rare, threatened or endangered species of plants in Maryland and The District of Columbia, and 1 federally endangered plant species. The number of rare plants represents one of the highest concentrations of state-listed rare plants in the eastern US. Several species are globally rare, and some occur here because they are dependent upon special habitats and ecological conditions present along the Potomac River.

There are 192 birds, 64 fish, 62 reptiles and amphibians, and 47 species of mammals documented. Extirpated species includes, the dwarf wedge mussel (*Alasmidonta heterodon*). Both the shortnose sturgeon (*Acipenser brevirostrum*) which had not been seen for nearly 75 years and the Indiana Bat (*Myotis sodalis*) not seen in the park since the 1970's, have been documented in the park or Potomac River adjacent to the park

within the last three years. Shortnose sturgeon has been monitored in the Potomac River from the park since 2006. Indiana Bat was documented in one of the abandoned railroad tunnels in the park in 2007. *Harperella* (*Ptilimnium nodosum*), the one federally endangered plant species in the National Capital Region, has been reintroduced into the park in 2008 and is being monitored. Several rare aquatic biota have either been documented in the seeps within the park. A study has been requested to study the springs and cave communities of the park for aquatic biota and is waiting on funding. Several bald eagle nests are monitored by the State of Maryland year round for activity.

8. Air Quality

The C&O Canal NHP is located in urban Washington DC and the metro area, passes into the suburbs of Montgomery County, through the agrarian lands of Frederick and Washington Counties and into the mountains of Western Maryland and Allegany County. Throughout the 184.5 mile stretch, the park passes through across two 1-hour non-attainments and one 8 hour non-attainment zone. Allegany County is the only attainment area the park is in. The park is in a Class II Air shed. The park does not monitor for air quality but relies on the National Capital Region, Air Resources Program at the Center for Urban Ecology to coordinate with national-scale air quality monitoring programs both within and outside the National Park Service. The park staff regards all air quality alerts (ozone health advisories) posted for the metro Washington DC area.

9. Cultural Resources

There are a total of 1,365 historic structures within the park, most of which are deemed to be “contributing” elements to the Chesapeake and Ohio Canal National Historical Park historic district, listed in the National Register of Historic Places.

The most sensitive historic structures include 120 buildings (22 lock houses, 5 canal-operation buildings such as the Great Falls Tavern and section houses, 47 other historic buildings such as farm houses and their dependencies, 6 commercial structures such as stores and mills, and 4 governmental structures such as Washington Aqueduct features).

The canal-related structures include engineering works such as lift locks, culverts, bridges, waste weirs, and dams, primarily composed of fire-resistant materials such as stone, brick, and earth.

There are 15 formally recognized cultural landscapes within the park, including the 184.5 miles of canal and prism. Specific landscapes have also been identified at Abner Cloud/Potowmack Canal, Antietam Village, Carrollton Manor Farms, Cumberland, Ferry Hill, Fort Duncan/Christian Smith Homestead, Four Locks, Great Falls Tavern, Hancock, Old Town, Point of Rocks, Two Locks/Opequon Crossing, Williamsport, and Western Maryland Railway.

Strategic and Measurable Fire Management Objectives

The entire Park is designated as a single fire management unit (FMU) with a single set of management goals and objectives applying to the entire Park. These goals and objectives are listed below:

Goal 1.

Maintain firefighter and public safety. Firefighter and public safety is the highest priority of every fire management activity.

Objective:

100 percent of wildfire operations are conducted so that they cause no injuries to the public and no serious injuries to firefighters.

Goal 2.

Suppress unwanted and undesirable wildfires regardless of ignition source to protect public health and safety, real property, and the natural, cultural, and historic resources of the Park.

Objective

100 percent of wildfires are controlled within 24 hours and limit wildfires to less than 5 acres.

Objective

Protection of Park resources is actively considered in 100 percent of all wildfire planning and fire management activities.

Objective:

Consideration of resource protection will be described in 100 percent of all wildfire planning and management documents (FMP, WFIP WFSAs, BAER Plan, etc.).

Goal 3.

Manage wildfires in concert with federal, state, and local air quality regulations.

Objective:

100 percent of all wildfires and debris burning will be conducted consistent with all Federal, State, and local smoke management regulations.

Goal 4

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

Objective:

Cooperative agreements will be developed and maintained with all appropriate local, regional, and national fire management organizations.

Goal 5:

Reduce wildfire hazard around developed areas and areas adjacent to cultural and historic sites.

Objective:

100 percent of known hazardous fuel accumulation that could contribute to the damage of primary Park resources or the properties of neighboring landowners will be reduced by mechanical treatment.

Goal 6:

Use fire as a means to remove the vegetative debris produced by mechanical fuel treatments, normal maintenance operations, and storm damage

Objective:

100% of all debris burning will be conducted in accordance with NPS policy and applicable state and local regulations.

Goal 7.

Educate employees and the public about the scope and effects of wildfire and wildfire management.

Objective:

All C&O Canal employees will be able to provide basic fire information to visitors or direct them to a Park employee who is able to provide it.

Objective:

All Park staff with fire management responsibilities will receive sufficient training to bring them to the appropriate level of knowledge, skill, and certification and to maintain that certification.

Objective:

When fire danger is very high or extreme, Park staff will strive to contact all Park visitors with a fire prevention message through signage, handouts, interpretive activities, personal contact press releases, web sites and other means.

Management Considerations

These constraints, considerations, or decision criteria will influence all fire management activities within the fire management unit.

Health and Safety

All fire management actions will have firefighter and public safety as its top priority. All Park firefighters will adhere to applicable NPS policy relating the training, certification, and performance of NPS firefighters.

No unacceptable impacts to cultural resources. All appropriate steps necessary to protect the Park's cultural resources will be taken as long as those steps do not endanger firefighter and public safety. Consultation with Cultural Resource Specialists is required as part of planned activities and should be included in suppression activities.

Ensure socio-political economic impacts, including those involving the wildland urban interface (WUI), are considered in developing implementation plans.

The effects of any fire management activity on the neighboring communities, with emphasis on the wildland/urban interface component of those communities will be considered during planning and implementation of those activities.

Ensure that the public, organizations, and cooperating agencies are aware of any fire management operation that may have an impact on them.

To ensure good relations with Park neighbors, local organizations and governments, cooperating agencies and the public, every effort will be made to keep these parties informed about significant fire management actions that might impact them or their interests.

Historic Role of Fire

The majority of the lands included in C&O Canal were cleared during the construction of the canal. No fire history of the area was recorded. The role of fire in the pre-European settlement of the area is unknown and should be studied.

According to NCR Archeologist, there are several references one can start with to get an aboriginal use of fire as a wildlife management tool. Roundtree, Helen (1989) *The Powhatan Indians of Virginia: Their Traditional Culture*. Norman: University of Oklahoma Press and (1990) *Pocahontas's People: The Powhatan Indians of Virginia Through Four Centuries*. Norman: University of Oklahoma Press. Also Turner, E. Randolph, III (1978) *An Intertribal Deer Exploitation Buffer Zone for the Virginia Coastal Plain-Piedmont Regions*. Archeological Society of Virginia Quarterly Bulletin 32(3):42-48. Colonists from Jamestown documented the Virginia Indians use of fire to create “deserts” at the heads of rivers. They also documented the use of fire to drive or surround deer and harvest them in great numbers.

Park records from 1978-2009 show that C&O Canal averages 3.34 fires per year. Many years had zero fires. The majority were smoldering leaf litter or smoking logs of low intensity. The majority are the result of human carelessness including escaped campfires, discarded cigarettes and playing with fire. (See appendix H and attached maps)

Maryland Department of Natural Resource records from the counties surrounding the park show that from 1990 – 2003 the average number of wildfires per year were as follows: Montgomery County - 7.3 fires, Frederick County - 26.9, Washington County – 23.5, and Allegany County – 36. These records represent approximately 25% of total wildfires. The remaining 75% are handled by volunteer fire departments.

E. Wildfire Management Situation

1. Historic Weather Analysis

C&O Canal is located in a temperate climate zone with well-defined seasons. Temperatures range from an average low of 32 degrees Fahrenheit in January to an average high of 80 degrees in July. The average annual temperature is 58 degrees. Humidity is moderate to high with an average annual precipitation of about 40 inches.

2. Fire season

Maryland traditionally experiences a split spring and fall fire season of higher fire danger. The spring fire season usually runs from March 1 through May 15 and the fall fire season runs from October 15 through December 15 according to the Maryland Department of Natural Resources Forest Service. Precipitation, green up and freezing temperatures are the controlling factors.

3. Fuel Characteristics (Anderson, 1982)

Fire Behavior Fuel Model 9 (Hardwood Litter) – 75% of the park falls under this Fuel Model. In fuel model 9, fires run through the surface litter faster than model 8 (7.5 chains/hour) and have longer flame lengths (averaging 2.6 feet). Fall fires in hardwoods are predictable, but high winds will actually cause higher rates of spread than predicted because of spotting caused by rolling and blowing leaves. Concentrations of dead-down woody material will contribute to possible torching out of trees, spotting, and crowning.

Fire Behavior Fuel Model 3 (Tall Grass) – 15% of the park falls under this Fuel Model. Fires in this fuel type are the most intense of the grass group and display high rates of spread under the influence of wind. Fires in the grass group fuel models exhibit some of the faster rates of spread under similar weather conditions, averaging 104 chains/hour (one chain = 66 ft.) with flame lengths of 12 feet. This would be representative of cultivated grain crops near harvest including: wheat, oats, barley, rye, corn, and soybeans and utility rights of way.

Fire Behavior Fuel Model 1 (Short Grass) – 1% of the park falls under this Fuel Model. Fire is in the surface fuel and can burn very rapidly. The rate of spread can be fast with relatively low fire line intensity. This fuel type represents unglazed grasslands and crop stubble.

Approximately 9% of the park has no burnable vegetation. (see map A for fuel models and surrounding land characteristics)

4. Fire Regime Alteration and Condition Class

The majority of C&O Canal is heavily forested with various eastern hardwood forest types. These forest types are considered to be in what is referred to as Natural Fire Regime 1. Natural fire in the context of this FMP is fire caused by for example, lightning rather than human caused. Natural Fire Regime 1 refers to a forest that has infrequent, low-intensity surface fires with a recurrence interval of up to 35 years. Most fires within this type of regime are small in area. While natural fires once played a variety of roles in the natural ecosystems that existed in the Middle Atlantic States prior to the arrival of Native Americans, historical evidence indicates that since the arrival of Native Americans and later human settlement, humans have caused the vast majority of wildfires in the Mid-Atlantic region. Human caused fires have in turn had their own profound effect on the various ecosystems in this area.