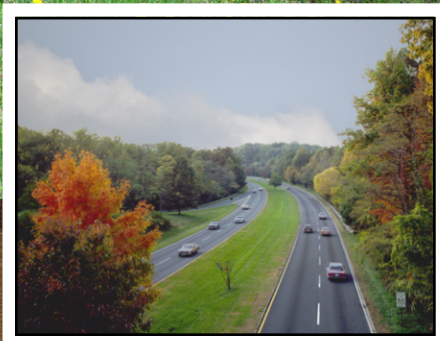




RESOURCE STEWARDSHIP STRATEGY SUMMARY

GEORGE WASHINGTON MEMORIAL PARKWAY
DISTRICT OF COLUMBIA, MARYLAND, VIRGINIA



CONTENTS

Introduction.....	1
Purpose of a Resource Stewardship Strategy	1
Intent of This Summary Document	2
Brief Description of George Washington Memorial Parkway	3
Development of the Resource Stewardship Strategy for George Washington Memorial Parkway ...	8
Key Park Issues, Stressors, and Threats	9
Priority Resources and Components	19
Stewardship Goals and Activities	21
Ongoing Implementation of the Resource Stewardship Strategy	39
References	40
Appendix A: Climate Change Narrative.....	41
Contact Information	44

FIGURES

Figure 1. George Washington Memorial Parkway Map	7
Figure 2. RSS Implementation Process	39
Figure 3. Historical Trends in Annual Average Temperature (upper plot) and Annual Total Precipitation (lower plot) for GWMP from 1895 to 2022	41
Figure 4. Comparison of Observed Climatic Water Deficit at GWMP (inches/year; 1979–2022) and Projected Climatic Water Deficit for the Two Climate Futures from 2023 to 2099	43

TABLES

Table 1. Key Issues, Stressors, and Threats; Potential Implications; and Affected Resources	9
Table 2. Priority Resources and Components	19
Table 3a. Stewardship Goals and Stewardship Activities for Priority Resource: Parkway Transportation Corridor	22
Table 3b. Stewardship Goals and Stewardship Activities for Priority Resource: Cultural Landscapes and Associated Historic Structures	25
Table 3c. Stewardship Goals and Stewardship Activities for Priority Resource: Museum Collections	28
Table 3d. Stewardship Goals and Stewardship Activities for Priority Resource: Archeological Resources	30
Table 3e. Stewardship Goals and Stewardship Activities for Priority Resource: Ethnographic Resources	31
Table 3f. Stewardship Goals and Stewardship Activities for Priority Resource: Eastern Deciduous Forest (and Associated Plant Communities)	32
Table 3g. Stewardship Goals and Stewardship Activities for Priority Resource: Aquatic Resources	34
Table 3h. Stewardship Goals and Stewardship Activities for Multidisciplinary Resource Needs	36

INTRODUCTION

PURPOSE OF A RESOURCE STEWARDSHIP STRATEGY

A resource stewardship strategy (RSS) is a strategic plan intended to help park managers achieve and maintain desired resource conditions over time (see National Park Service [NPS] *Management Policies 2006* [§2.3.2]). As part of a park's planning portfolio, a resource stewardship strategy serves as a bridge between the park's foundation document, other plans, and everyday management of its natural and cultural resources.

More specifically, a resource stewardship strategy is a dynamic planning tool used to set stewardship goals and track progress in achieving and maintaining desired natural and cultural resource conditions. All resource stewardship goals and activities should be based on science, law, NPS management policies, and the long-term public interest.

Essentially, a resource stewardship strategy establishes a framework and a coordinated process for

1. evaluating and summarizing existing information about priority park resources (including key issues, stressors, and threats),
2. using science, scholarship, and traditional knowledge to establish stewardship goals for priority resources,
3. integrating natural and cultural resource management to achieve stewardship goals, and
4. determining what stewardship activities are needed to get us “from where we are to where we want to be.”

This information provides a basis for making informed resource management decisions for specific project proposals and for developing and revising annual work plans over time.

A resource stewardship strategy is not a static document or one-time effort. Rather, it is a dynamic framework that should be updated as needed as conditions change; new issues, stressors, or threats are identified; and activities are accomplished. A resource stewardship strategy is reviewed by NPS subject-matter experts and decision makers; however, it is not a publicly reviewed decision document.

The RSS process also provides an opportunity for a park to take an integrated approach to resource management by capitalizing on overlapping opportunities among and within disciplines, identifying stewardship activities that benefit multiple resources, or addressing larger parkwide issues. Taking an integrated approach can result in more effective stewardship for resources through the use of science, scholarship, research, policy, interpretation, and direct management.

INTENT OF THIS SUMMARY DOCUMENT

This summary document is intended to provide readers with a snapshot of the resource stewardship strategy for George Washington Memorial Parkway. For the sake of simplification and abbreviation, this unit of the national park system will also be referred to as “the park” or GWMP in this document. The document serves as a communication tool that complements the evolving RSS desktop application that is updated to reflect the progress and changing needs of resource stewardship over time. This summary is not intended to describe all of the elements in the resource stewardship strategy; instead, the summary focuses on those aspects of the strategy that are essential for communicating information about the park’s plan to address management issues and seize opportunities for those resources identified as priority natural and cultural resources.

This document includes a summary of key issues, stressors, and threats affecting park resources; the park’s priority resources and their components; stewardship goals for priority resources; and stewardship activities determined to be priorities for the next three to five years. The document concludes with a brief description of future RSS implementation.

Remember that implementation of the resource stewardship strategy is an ongoing process, with necessary updates and revisions occurring as resource and management conditions change and stewardship activities are carried out.



BRIEF DESCRIPTION OF GEORGE WASHINGTON MEMORIAL PARKWAY

George Washington Memorial Parkway was established by Congress on May 29, 1930, through Public Law 71-284, the Capper-Cramton Act. The parkway runs along the Potomac River through two states—Virginia and Maryland—as well as the District of Columbia, protecting the landscape and natural shoreline of the river while offering magnificent scenic vistas of Washington, DC, and the Great Falls of the Potomac. Along its route, the parkway also connects several important historic sites, memorials, and scenic and recreation areas in the Washington, DC, metropolitan area.

The Capper-Cramton Act prescribed the construction of two parkway segments along the Potomac River. The Maryland section would be built from Fort Washington to the Great Falls and, on the Virginia side, from George Washington's Mount Vernon Estate to the Great Falls. Already under construction in Virginia, as part of an earlier planning effort for the George Washington Bicentennial Celebration in 1932, was the Mount Vernon Memorial Highway, running from Arlington Memorial Bridge in Washington, DC, to Mount Vernon. The Capper-Cramton Act included this roadway, begun in 1928, under the authorization for the George Washington Memorial Parkway. This initial southern section, opened in 1932, pioneered many principles of roadway design including limited access construction, grade-separated intersections, cloverleaf interchanges, and landscape design.

The northern section of the parkway, from Arlington Memorial Bridge to I-495, was built in stages starting in the 1940s and reaching completion in 1962. This northern section displayed the latest in road engineering methods for its time—a wide, gently curving roadway with a grassy median, low stone guide walls, and soaring steel-and-concrete arched bridges. In 1989, the George Washington Memorial Parkway running along the Maryland side of the Potomac River was renamed Clara Barton Parkway. Construction on the northern portion of this roadway, from MacArthur Boulevard to Glen Echo was completed in 1965 and the southern portion, from the Maryland/District of Columbia line to Chain Bridge was completed in 1970.

Arlington House, The Robert E. Lee Memorial. The Robert E. Lee Memorial was formally designated by the federal government on June 29, 1955, through Public Law 84-107 to suitably memorialize Robert E. Lee. He lived at Arlington House for 30 years with his wife, Mary Custis Lee, before resigning from the US Army in 1861 on the eve of the Civil War. Following his decision to resign and serve his native state of Virginia in the Confederacy, the Lee family left Arlington and Union forces occupied this strategic location in Virginia, on a ridge overlooking the Potomac River and Washington DC. Arlington House served as a military headquarters for the Union Army throughout the Civil War. Portions of the estate were also selected as the site for Freedman's Village, which was intended to be a model community for freed slaves who had descended upon Washington, DC, following the signing of the Emancipation Proclamation. In May 1864, the Army started burying soldiers along the northern border of the Arlington estate, approximately one-half mile from the mansion headquarters. In June of that year, the creation of a national cemetery was approved. This tradition of military burials continued after the Civil War, transforming the landscape of the Arlington estate into Arlington National Cemetery, a place considered to be America's most sacred shrine. Today, the Robert E. Lee Memorial consists of the Greek Revival mansion, the Robert E. Lee Museum, both flower and kitchen gardens, mature woodlots, and two enslaved quarter buildings.

The Arlington Memorial Bridge and Memorial Avenue. Arlington Memorial Bridge and Memorial Avenue provide a ceremonial entrance to Washington, DC, as well as the ceremonial gateway into Arlington National Cemetery. It was designed as an "Avenue of Heroes," and is lined with monuments and memorials that celebrate the virtues of valor and sacrifice, and honor such diverse figures as Admiral Byrd and the Seabees. The memorial bridge and avenue also connect the Lincoln Memorial to Arlington House, The Robert E. Lee Memorial, symbolically and physically uniting a once-divided North and South.

Arlington Ridge Park. Arlington Ridge Park is situated on a ridge overlooking the Potomac River and Washington, DC. Its natural elevation provides the western backdrop for views from the National Mall and West Potomac Park. Arlington Ridge Park contains commemorative areas for two major monuments: the Netherlands Carillon and the US Marine Corps War Memorial.

Netherlands Carillon—The Netherlands Carillon was a gift from the people of the Netherlands to the people of the United States in gratitude for American aid during and after World War II. It is intended to symbolize friendship between the two countries and their common allegiance to the principles of freedom, justice, and democracy. The carillon is cast from a bronze alloy and features 50 bells, each carrying an emblem and verse representing a group within Dutch society.

US Marine Corps War Memorial—The US Marine Corps War Memorial is dedicated to all personnel of the United States Marine Corps who have died since the corps was established by the Continental Congress in 1755. The memorial itself was inspired by and based upon an iconic photo taken during the US invasion of Iwo Jima during World War II. It features six 32-foot-high figures that are raising a 60-foot flagpole. The names and dates of principal Marine Corps campaigns and battles are engraved at the base of the memorial, as well as the motto of the Marine Corps, the Latin phrase “Semper Fidelis,” which means “always faithful.” The memorial also features the phrase, “Uncommon valor was a common virtue,” a quote from Admiral Chester W. Nimitz in honor of the Marines’ actions on Iwo Jima.

Clara Barton National Historic Site. Clara Barton National Historic Site was established by Congress on October 26, 1974, through Public Law 93-486. The site was created to honor the founder of the American Red Cross and consists of Miss Barton’s home during the last 15 years of her life. On April 19, 1861—just days after the start of the Civil War—Miss Barton treated soldiers of the 6th Massachusetts Infantry who had been mobbed by southern-sympathizing Baltimoreans. Throughout the Civil War, she traveled to various battlefields to distribute supplies, aid the wounded, and help establish field hospitals. After the war was over, she was a critical part of the successful effort to identify the graves of nearly 13,000 men at Andersonville Prison in Georgia, and she was instrumental in the establishment of Andersonville National Cemetery. She also established The Office of Correspondence with Friends of the Missing Men of the United States Army and directed a four-year search for missing men. In the early 1870s, Miss Barton organized relief efforts for the Franco-Prussian War, under sponsorship of the International Red Cross and the German Red Cross. Miss Barton then began a campaign to garner support for the American Association of the Red Cross, which was officially formed on May 21, 1881. Miss Barton was elected president of the organization at a meeting held June 9 in Washington, DC. In 1891, the building in Glen Echo, Maryland was constructed for Miss Barton and was primarily used as a Red Cross warehouse. Miss Barton began to occupy the house in 1897, and it was remodeled to serve three functions: a supply warehouse, the American Red Cross headquarters, and Miss Barton’s home until her death in 1912 at the age of 90. Today the Clara Barton National Historic Site serves to honor this remarkable person.

Dyke Marsh Wildlife Preserve. Dyke Marsh is one of the largest remaining freshwater tidal wetlands in the Washington, DC, metropolitan area. Its 485 acres of tidal marsh, floodplain, and swamp forest protect a diversity of plant and animal life.

Fort Hunt Park. Originally part of George Washington’s Mount Vernon estate, the land that is Fort Hunt Park has undergone several transformations. Batteries at Fort Hunt defended the Potomac River during the Spanish-American War; the Civilian Conservation Corps operated a camp there during the Great Depression; and soldiers at Fort Hunt interrogated prisoners, trained pilots, and conducted intelligence operations during World War II. Today the park is a popular recreational and picnic area, and its surrounding forests serve as habitat for birds and other wildlife.

Fort Marcy. Fort Marcy and its counterpart, Fort Ethan Allen, were hastily planned and built to protect the Chain Bridge approach to Washington, DC, during the Civil War. Its earthwork walls, trenches, rifle pits, and parade ground are among the best-preserved defenses from that era.

Glen Echo Park. Glen Echo Park began in 1891 as the nation's 53rd National Chautauqua Assembly "to promote liberal and practical education." Glen Echo was an amusement park from 1899 to 1968, and many structures from that period are still part of the park, including the restored 1921 Dentzel Carousel, which is still in operation. Since 1971, the National Park Service has administered and operated the site. Since 2002, with the help of the Glen Echo Park Partnership for Arts and Culture, which was formed in partnership with Montgomery County, Maryland, Glen Echo Park offers year-round cultural and recreational activities.

Great Falls Park and the Patowmack Canal. Great Falls Park is a place where both local residents and tourists come to pursue recreational activities and experience a unique period of American history as well as the spectacular geological features and natural biodiversity found at the head of the Potomac Gorge. At this site, the Potomac River rushes over a series of steep, jagged rocks into a narrow gorge—named Mather Gorge for the first National Park Service director, Stephen T. Mather. The park also protects remnants of the historic Patowmack Canal system, which was completed by the Patowmack Company in 1802.

Great Falls Park offers a diversity of resource-based recreational experiences in close proximity to the nation's capital. Activities range from picnicking, birding, guided ranger programs, hiking, and horseback riding to bicycling through scenic wooded trails, rock climbing along the Mather Gorge, whitewater activities on the river, and visiting historic features.

One of the most prominent historic features on the landscape is the Patowmack Canal. The canal system was intended to encourage trade between the East and the Ohio Valley, and its construction was presided over by George Washington. During the 26 years that the system was in operation, flour, corn, whiskey, furs, tobacco, iron ore, and timber were brought down the river from as far away as Cumberland, Maryland. Trade flourished during this period in the nearby town of Matildaville, until the canal officially closed in 1828. Great Falls Park continues to protect both the remnants of the canal and the Matildaville site. The Great Falls Park Visitor Center, opened in 1968, is one of the largest Mission 66 architectural efforts constructed in the National Capitol Region and to this day frames the experience of visitors to this unit of the park.

Jones Point Park and Lighthouse. Jones Point Park is just south of Old Town Alexandria and its lighthouse was important to the city's history as a shipping, manufacturing, and transportation center. The lighthouse was built in 1856 to guide ships down the Potomac River and is the last remaining riverine lighthouse in Virginia. The park also contains the south cornerstone of Washington, DC, which was set in the 1791 survey of the original southern boundary of the nation's capital.

Lyndon Baines Johnson Memorial Grove. Lyndon Baines Johnson Memorial Grove on the Potomac was established by Congress on December 28, 1973, through Public Law 93-211. The memorial is intended to honor President Lyndon B. Johnson and recognize his achievements in preserving the nation's environment, as well as his love of the land. It was privately funded and planned, but was dedicated to the public as a unit of the National Park Service, serving as a place where people can enjoy the pleasures and beauties of nature along with scenic views of the capital and many of its great monuments.

The 17-acre site is located in Lady Bird Johnson Park on Columbia Island, an island in the Potomac River, and consists of two primary areas. The first area is commemorative in nature, consisting of a granite monolith surrounded by a winding network of walks and trails. The second is a grass meadow that provides a tranquil refuge for reflection and rejuvenation. The site is a living memorial with several species of flora including white pines, dogwood trees, azaleas, and rhododendron. Thousands of perennials and spring bulbs also bloom in season and rustic benches are scattered through the grove.

Navy and Marine Memorial. Located in Lady Bird Johnson Park on Columbia Island, the Navy and Marine Memorial is a monument dedicated to the sailors of the US Navy and the US Merchant Marine who died at sea during World War I. The memorial is also known as “Waves and Gulls,” and depicts seven seagulls above the crest of a wave. It is cast from aluminum, with a base made of green granite, and stands 35 feet tall and 30 feet wide.

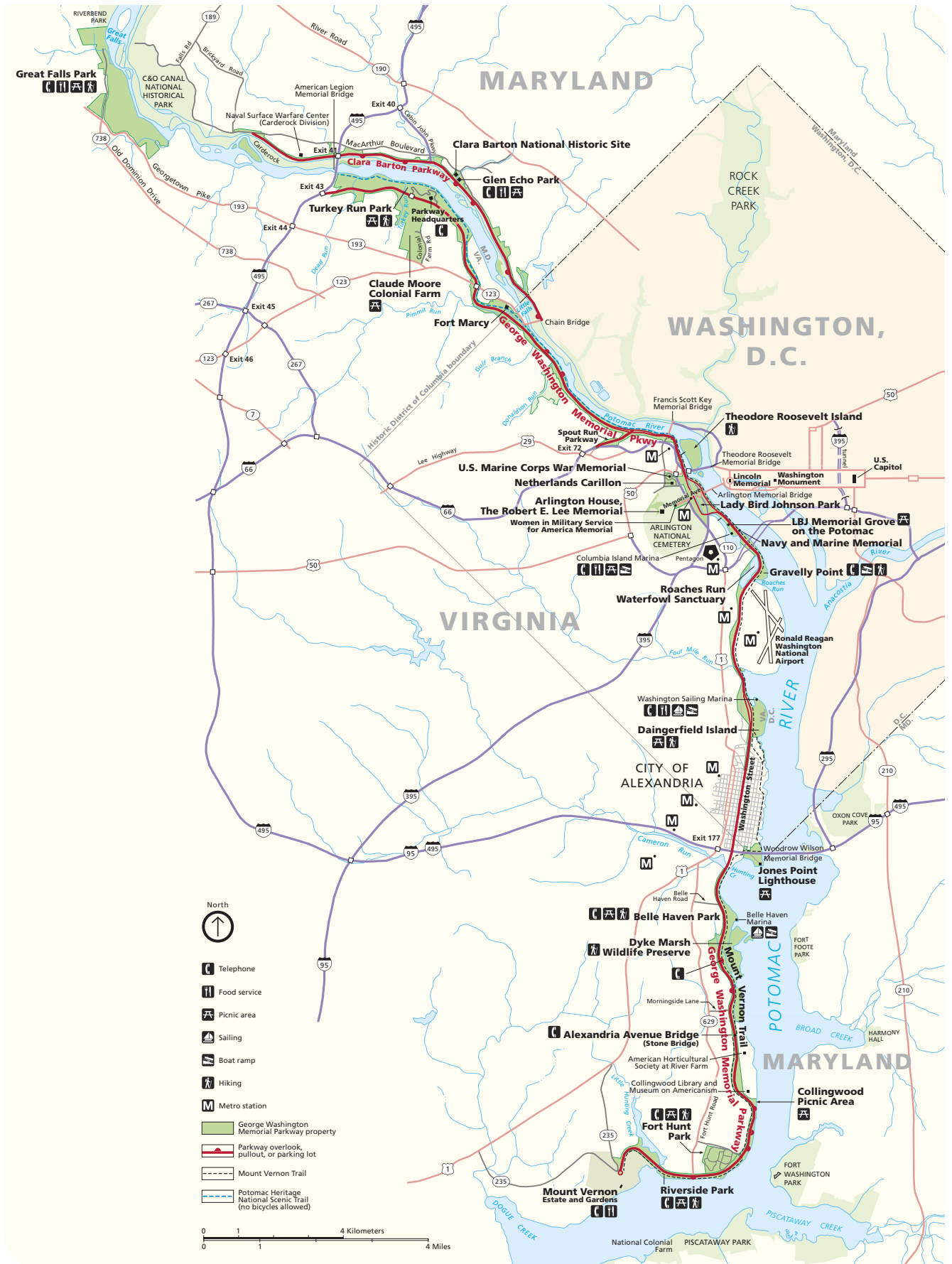
Theodore Roosevelt Island. Theodore Roosevelt Island was established by Congress on May 21, 1932, through Public Law 72-146. This 70-acre, wooded island in the Potomac River is a tribute to the vision and passion of Theodore Roosevelt, our 26th president. He was a lifelong steward of the nation’s natural resources and his passion for conservation is reflected in the natural, scenic qualities of the island itself. The site features a 17-foot bronze statue of the president, as well as a promenade, fountains, and four granite tablets inscribed with Roosevelt’s tenets on citizenship.

The island has a diverse history. Evidence shows that American Indians used the island as a seasonal fishing village and it was owned by several different colonists throughout the 17th and 18th centuries. In the 1790s, John Mason, son of George Mason IV (author of the Virginia Bill of Rights), built a brick mansion and cultivated gardens on the island. During the Civil War, the site served as a training area for the Union Army, including the first United States Colored Troops.

The NPS landscape now serves not only as a natural refuge in an urban center, but as a fitting memorial to honor the legacy of a president who was a passionate naturalist and conservationist.



Figure 1. George Washington Memorial Parkway Map



DEVELOPMENT OF THE RESOURCE STEWARDSHIP STRATEGY FOR GEORGE WASHINGTON MEMORIAL PARKWAY

This resource stewardship strategy represents the collaborative efforts of NPS personnel from the park; the NPS Regional Office for Interior Region 1, the NPS Cultural Resources, Partnerships, and Science Directorate; the NPS Natural Resource Stewardship and Science Directorate (NRSS); and the NPS Denver Service Center Planning Division. A resource stewardship strategy is based on information about park resources that was available at the time of RSS development and on the experience and professional judgment of resource specialists.

In developing the resource stewardship strategy, the project team followed a five-step process established by an NPS working group that formed to provide direction and oversight for RSS efforts nationwide. First, the team gathered and evaluated existing information about park resources to determine the current condition of resources and status of information. Next, the team identified and assessed key issues, stressors, and threats that are impacting park resources or could do so in the future. The team then identified priority resources and their components for this resource stewardship strategy. The team subsequently set stewardship goals for each priority resource. Finally, the team identified stewardship activities aimed at achieving those goals and prioritized activities to implement within the next three to five years. The organization of this summary document parallels this RSS development process, which is described in more detail in internal NPS documents, including the 2022 RSS Development Guide. Some key terms that are used throughout this summary document are defined below.

DEFINITIONS OF KEY TERMS

Priority Resource: A cultural or natural resource or value that the National Park Service manages or monitors to maintain a park unit's purpose and significance, to address policy/law mandates, or to address scholarly and scientific research needs or findings.

Priority Resource Component: An aspect or attributing resource that is integral to the functionality, importance, or condition of a priority resource and can be managed or monitored practically over the next five-year horizon. A priority resource component is included, or nested, under the associated priority resources.

Stewardship Activity: One or more initiatives that lead to the achievement of a short-term stewardship goal. On its own, a stewardship activity should produce a specific deliverable or outcome. Activities may include assessments, documentation, identification, maintenance, operations, resource protection, thematic studies, cataloging, evaluation, interpretation, planning, training, data recovery, education, inventory, monitoring, research, survey, treatment, restoration, or other types of management.

Stewardship Goal: A description of the resource condition or information that managers are working to achieve for a particular priority resource or component. Stewardship goals guide the National Park Service in its aim to enhance information; improve or maintain resource conditions; address issues, stressors, or threats; or achieve other park stewardship needs related to the priority resource, such as increasing collaboration with partners or expanding education, interpretation, and other programming.

Strategy: A tactical path forward defined through achievable actions that maintain or improve aspects of a priority resource/component. Strategies start with a stewardship goal and include a comprehensive set of activities to achieve that goal. Strategies are logically organized, science/scholarship-based, well documented, and reviewed by subject-matter experts. The typical time frame for executing a strategy is short term—typically three to five years, depending on a park's needs.



KEY PARK ISSUES, STRESSORS, AND THREATS

George Washington Memorial Parkway faces a variety of key issues, stressors, and threats that affect park resources or may potentially affect park resources in the future (table 1). Key issues are management concerns that directly relate to park resources and their conditions. Stressors are factors that exacerbate change in resource conditions. Threats are impending or potential factors that would negatively impact park resources in the future, though park resources are not currently affected. Identifying issues, stressors, and threats helped to inform the next steps of the RSS development process, including the selection of priority resources, the identification of stewardship goals, and the development and prioritization of stewardship activities.

Table 1. Key Issues, Stressors, and Threats; Potential Implications; and Affected Resources

KEY ISSUE, STRESSOR, OR THREAT ¹	POTENTIAL IMPLICATIONS	RESOURCE TYPES AFFECTED
EXTERNAL PROJECTS	The volume and scope of external projects that impact or have the potential to impact park resources is substantial. This is the overarching issue that drives all other resource management issues and that drives (or distorts) park stewardship priorities. Park staff must constantly respond to proposals for, or impacts of, external projects, which strains staff capacity and prevents them from fully addressing other resource management needs such as resource inventory and treatment. The park’s geography will always be intersected by the surrounding population and will be subject to infrastructure projects. The park is long and linear, following the Potomac River, so anyone who needs to cross the river must cross the park. Train tracks, roadways, powerlines, and other infrastructure also cross the park and are often subject to projects driven by external agencies. Infrastructure projects by the District of Columbia Department of Transportation (DOT), Maryland DOT, Virginia DOT, and others often include tree removal along roadways and bridges, which impacts natural resources and historic views (cultural landscapes). Tree removal inside the park can impact wildlife and surrounding ecosystems more broadly. The park plays a role in mitigation actions connected to external projects, which have timelines that park staff must adhere to and which represents a substantial workload. For example, to mitigate impacts from the Potomac Yard Metro Station project, the City of Alexandria partially funded wetlands restoration projects, which benefited natural resources in the park. However, the park was responsible for executing the associated compliance actions.	- Parkwide resources - The memorial landscape - Cultural landscapes - Easements and rights-of-way - Sense of place - Tree canopy, forest health/ composition - Vistas and views

Table 1. Key Issues, Stressors, and Threats; Potential Implications; and Affected Resources (continued)

KEY ISSUE, STRESSOR, OR THREAT ¹	POTENTIAL IMPLICATIONS	RESOURCE TYPES AFFECTED
DATA GAPS— Cultural Resources	While the park has many of its needed cultural resource baseline documents, gaps in its inventories, National Register of Historic Places (NRHP) eligibility evaluation data, and treatment guidance make it challenging for the park to manage its cultural resources proactively and respond to resource threats. The most critical issues related to data gaps will be discussed here. Baseline data are largely lacking for the park’s Mission 66-era resources, which complicates preservation planning and routine maintenance. In general, the park also lacks complete treatment plans for its historic landscapes, which makes it difficult to preserve the park’s urban forest character through appropriate vegetation management. The park has some ethnographic research but lacks needed baseline data, which is complicated by the fact that a single ethnographic overview and assessment (EOA) is not feasible given the complexity of its history, geography, and traditional users. Different park units and different aspects of traditional use, for example, subsistence fishing, each require separate studies. Essential core documentation is missing for the park’s eight separate museum collections, foremost of which is an overarching collections management plan. Half of the collections are also missing a scope of collection statement (SOCS), which is vital for ensuring that the museum program is not accessioning inappropriate objects into the collection and unnecessarily adding to its management burden. Collection-specific emergency operations plans are also needed for most curation sites to ensure the safety of the collections during contingencies. The compliance burden imposed on park staff by external projects is substantial, including the need to assess project impacts on historic properties per Section 106 of the National Historic Preservation Act. Section 106 assessments are more time-consuming when current inventory and determination of eligibility (DOE) data for the project’s affected area do not exist. National register nomination documentation is also lacking for many historic properties. These and other research documents (e.g., historic resource studies) are needed to fully understand the significance of park resources and to inform interpretation and education programs. The park’s Visitor Services Division staff should be able to rely on park-specific research as the informational base for education and outreach programs rather than on external sources.	- All cultural resources
CLIMATE CHANGE— Flooding (River, Coastal, Stormwater)	Flooding is common in Washington, DC. Historically, the area has been vulnerable to river flooding and coastal flooding (e.g., from hurricanes), as well as to flash floods resulting from stormwater after intense rain events. The park is undertaking a large project to more precisely understand the threat of flooding to resources, but it is a known and ongoing threat that is expected to intensify from historical patterns, as the impacts of climate change are expected to include sea level rise and more frequent and severe storm events (sea level rise is addressed in more detail below). Increases in the amount of impervious surfaces throughout the Washington, DC, area also exacerbate the threat of flash flooding. Flooding can destroy vegetation, disrupt wildlife, erode archeological resources, disrupt traditional usage of park resources, and compromise historic structures and landscapes. Flooding in curation facilities may harm or destroy museum collection objects.	- Parkwide resources

Table 1. Key Issues, Stressors, and Threats; Potential Implications; and Affected Resources (continued)

KEY ISSUE, STRESSOR, OR THREAT ¹	POTENTIAL IMPLICATIONS	RESOURCE TYPES AFFECTED
CLIMATE CHANGE— Atmospheric Temperature	Ground-level ozone impacts trees, other natural resources, and wildlife (breathing) and presents a safety hazard to visitors. Melting asphalt can degrade resources. Temperature changes can also drive changes to ranges of native species (range constriction) and invasive species (range expansion). The park may experience an increase in pests and invasive species. Higher mean temperatures may result in a longer visitation season, which can exacerbate visitor use impacts on park resources.	- Native vegetation - Wildlife - Cultural landscapes - Ethnographic resources - Museum resources - Historic structures
CLIMATE CHANGE— Water Temperature	Warmer temperatures will shift habitat suitability and alter biological communities across the stream, river, and the tidal wetland landscape. Rising temperatures are lengthening the growing season in the mid-Atlantic region, which could reshape the composition of woodlands, change the timing of ecological processes, and contribute to changes in the biochemical properties of water resources. For fisheries, an increase in water temperature could do any of the following (not an exhaustive list): (1) limit the hospitable environment for cold-water fish species, (2) enable a range expansion for species that are warm-water-adapted, (3) provide conditions that exacerbate the dispersal and presence of invasive species, and (4) provide conditions that make fish more susceptible to disease (bacteria, parasites).	- Aquatic life - Ethnographic resources (fishing)
CLIMATE CHANGE— Sea and Shoreline Level Rise and Storm Surge	Relative sea level rise and surges of water associated with hurricanes and storms affect the estuarine Potomac River and the shoreline of GWMP. Shoreline erosion is a continuing issue, and as global sea levels continue to rise, these inundation issues will only become more prevalent at the parkway (2016 NRCA).	- Wetlands - Archeological resources - Ethnographic resources - Historic structures - Cultural landscapes
CLIMATE CHANGE— General Impacts and Compound Events	Climate change is expected to generate compound events, where multiple impacts of changing climate on environmental elements interact to create second-order effects that are potentially more damaging than individual effects. For example, increased soil moisture, combined with increased storm frequency and intense rain events, can exacerbate flooding. Changes to precipitation intensity and amounts may drive changes to flooding rates, storm surges, and sea level rise. These elements, when coupled with increased temperature, may impact vegetation characteristics. This could include accelerated tree death and changes to vegetative ground cover. A decline in tree cover may result in slope destabilization, increased soil saturation, and increased frequency of landslides, rockfall, slumps, etc. Gullying and decreased slope stability are issues when stormwater systems are not engineered to manage large water outflows from storm events. Increased flooding and rapid changes in river levels may exacerbate erosion. This, in turn, can damage vegetation, historic structures, and landscapes, among other resources. Shoreline erosion has larger ecological consequences that go beyond park boundaries.	- All park resources

Table 1. Key Issues, Stressors, and Threats; Potential Implications; and Affected Resources (continued)

KEY ISSUE, STRESSOR, OR THREAT ¹	POTENTIAL IMPLICATIONS	RESOURCE TYPES AFFECTED
CLIMATE CONTROL SYSTEMS IN HISTORIC STRUCTURES	Increased temperature, coupled with increased precipitation, could increase humidity levels, which may strain HVAC systems and cause damage to museum objects that are susceptible to swelling or mold. Most of the park's historic structures are not designed for modern HVAC systems, so there is often insufficient space to install the compressors, ducts, etc., without impacting historic fabric. The climate control systems in the park are not functioning sufficiently to adequately protect museum collection objects—including historic furnishings—and the historic fabric of the structures. This may lead to degradation in resource condition. Maintaining climate control systems in historic structures presents additional challenges for facilities staff. In many cases, the park either lacks the right system for its historic buildings or it lacks the right expertise to manage those systems. HVAC systems often have proprietary software required for their operation that is not easy to set up and maintain. This is an operational challenge that can lead to system failure or improper function, which, in turn, can degrade the resource. System failures may result in the establishment of pests, increased humidity, frozen water lines, and fire suppression system failure. These latter two threats may result in burst pipes and flood damage.	- Historic structures - Museum collections
COMMUTER USE AND VISITATION—Timing and Duration of Density, Areas of High Use, Seasonality Causes Degradation of Resources	The effects of intense visitation to the parkway and heavy demands for park services, from commuters on the parkway to bikers on the Mount Vernon Trail, place increasing demands on its protected areas and degrades historic infrastructure (e.g., there is pressure to expand the width of the Mount Vernon Trail, which is a heavy commuter route). For example, high-speed traffic (40–60 miles per hour) regularly kills wildlife, including many insects, otters, coyotes, and turtles. The park's major road corridors and surrounding areas have been degraded over time due to heavy and changing use and the challenges in keeping up with rehabilitation and routine maintenance needs. The George Washington Memorial Parkway and Clara Barton Parkway were designed and constructed between the 1930s and 1970 to serve as part of the regional transportation network as recreational scenic byways and environmental conservation areas. They have become major high-speed transportation arteries, experiencing hundreds of thousands of commuters per year. The two corridors are currently among the 10 most-visited units of the national park system, but many commuters may not realize that they are in a national park. Park staff engage with the challenging tension between managing usage as a high-speed transportation artery and managing resources and visitor experience.	- Historic structures - Cultural landscapes - Native vegetation - Biological integrity (habitat connectivity)

Table 1. Key Issues, Stressors, and Threats; Potential Implications; and Affected Resources (continued)

KEY ISSUE, STRESSOR, OR THREAT ¹	POTENTIAL IMPLICATIONS	RESOURCE TYPES AFFECTED
COMMUTER USE AND VISITATION	A substantial amount of technical planning and work is required to maintain the road systems to be safe and usable for commuters while also preserving their historic character. The National Park Service, its partners, and neighboring communities may all agree that reducing injury and fatal accidents on the roadway is a critical goal but may have differing visions on how to meet this goal (e.g., what constitutes acceptable intersection treatments, roadway geometry, guardrails). Necessary upgrades to meet safety standards must also undergo Section 106 compliance review, which consumes staff time. At any given time, there are numerous ongoing environmental assessments in preparation for road maintenance and rehabilitation projects. A major rehabilitation project is underway in the parkway's north section, and a similar project may be needed for the south section (though perhaps less intensive). A major infrastructure project is also underway for the cantilever bridge along the Clara Barton Parkway in Maryland. Project planning and compliance consumes significant staff time. Park staff must also respond to events that become emergencies due to the parkway's commuter usage. A severe thunderstorm recently felled over 250 trees, which shut down the parkway for several days. The event left gaps in tree coverage, which impacts the historic landscape and natural ecosystem, but also presented an emergency as managers worked to bring in crews from other NCR parks to reopen the commuter routes as soon as possible. Beyond the roadways and trails, the sheer volume of visitors who now visit the park's various units brings the usual stressors attendant to high use, causing wear on the natural environment and on the historic fabric of structures and landscape features. Concentrated visitor use patterns, including pedestrian traffic, expands the human footprint (e.g., social trailing, noise, concentrated nodes of visitors, refuse) and related impacts into natural and culturally sensitive areas. These stressors may intensify if warmer temperatures driven by climate change leads to a longer visitation season (greater duration of impacts).	- Historic structures - Cultural landscapes - Native vegetation - Biological integrity (habitat connectivity)
STAFF CAPACITY AND CAPABILITY	The park's staff are working at capacity, their work tempo and priorities driven primarily by the needs of external projects. Therefore, routine but important internal management tasks are not being completed. Furthermore, the park does not have all the needed expertise on staff. Gaps in technical expertise make it more challenging to address certain specific resource management needs in a timely manner since the park has to look elsewhere for assistance. The park's horticulturist position is particularly essential since vegetation throughout the park contributes to the historical character of its various units, each of which is a cultural landscape. Maintaining the urban forest character of much of the units, for example, is crucial. Working at full capacity strains the staff's ability to plan and anticipate resource management issues. An unexpected need or emergency may mean that routine but important management tasks are not accomplished, including tasks related to monitoring and protection. Existing resource stressors and threats may be exacerbated by the effects of climate change, which would further strain the staff's ability to respond to emergency resource needs.	- Parkwide resources

Table 1. Key Issues, Stressors, and Threats; Potential Implications; and Affected Resources (continued)

KEY ISSUE, STRESSOR, OR THREAT ¹	POTENTIAL IMPLICATIONS	RESOURCE TYPES AFFECTED
HISTORIC PLANTING PLANS —Effects to Native Vegetation Communities	Vegetation throughout the park is a character-defining feature of its historic landscapes. Maintaining the urban forest character of the park, for example, is a high stewardship priority. This is complicated if historic vegetation design included the use of nonnative, noxious species. Some of the most prolific nonnative species in GWMP were deliberately established through historical planting plans for the parkway, developed by Wilbur Simonson in 1932. Furthermore, these nonnative plant species support nonnative insects that in turn pollinate other nonnative species. Park and regional staff are in strong agreement that historical plantings are a significant problem. Park and regional staff have discussed potential alternatives to maintaining species that are now known to be nonnative invasives. There may be, for example, native or less noxious species that are similar in appearance to the historical vegetation, thus maintaining historic appearances.	- Native vegetation - Cultural landscapes - Native wildlife - Biological integrity (habitat connectivity)
EXOTIC AND INVASIVE PLANT AND ANIMAL SPECIES	Invasive plant and animal species are a considerable threat to both terrestrial and aquatic habitat types. Invasive species can include nonnative plants, animals, fungi, and pathogens and are introduced in a variety of ways, including, but not limited to, wind, marine currents, ballast water discharge, importations of diseased plants, and the movement of watercraft and vehicles. The linear shape of the park results in more disturbed edge habitat that is vulnerable to impacts from invasive plants. Impacts occur on both cultural resources and natural resources. For cultural resources (landscapes, structures, collections), the impacts may be on the building's structural integrity and engineering (e.g., wood-based materials, brick and mortar materials), interior elements and museum collections (paper-based materials, plant- or animal-based materials), or the environment (rapidly growing plants that alter cultural landscapes settings, increase a structure's vulnerability to mold, or introduce fire hazards). For natural resources, exotic and invasive plant and animal species compete with and/or displace native species, while insects and other pests cause damage to forest trees. The result can be loss and destruction of forage and habitat for wildlife, threats to fisheries, reduced biodiversity, loss of forest productivity, increased fire vulnerability in vegetation communities, reduced groundwater levels, and soil degradation.	- Cultural landscapes - Native vegetation - Native wildlife - Biological integrity (habitat connectivity)
EXTERNAL DEVELOPMENT —Changes in Type and Extent of Land Use	This problem is present, ongoing, and significant. Differing and sometimes incompatible land management practices stemming from development pressures associated with urban growth and use outside of park boundaries can constrain the park's ability to manage resources for the long-term benefit of natural and cultural resources. Population and housing densities continue to increase in the park's adjacent areas, which has negative consequences for hydrological and ecological connectivity and the protection and viability of cultural and ethnographic resources and potentially impacts historic views. There is also the increasing threat of pollutants carried into the river and river riparian corridors as populations become more densely concentrated.	- Biological integrity (habitat connectivity) - Water resources - Wetlands - Cultural landscapes - Vistas and views

Table 1. Key Issues, Stressors, and Threats; Potential Implications; and Affected Resources (continued)

KEY ISSUE, STRESSOR, OR THREAT ¹	POTENTIAL IMPLICATIONS	RESOURCE TYPES AFFECTED
WHITE-TAILED DEER DENSITY AND DISTRIBUTION	White-tailed deer use the park as a refuge, resulting in intensive browsing of native flora, particularly tree seedlings. This is the long-term result of continued land conversion (urbanization, agriculture) and a decline in widespread habitat suitability for deer. The intensive browsing may produce landscape-scale and long-term habitat conversion that would affect forest-dependent species who rely on mast-producing trees to provide forage (small mammals, forest birds). Intensive browsing also alters the structure and composition of the vegetation and contribute to a large-scale lack of tree regeneration and/or compositional mismatch between regeneration and canopy layers (regeneration debt). This process can lead to long-term shifts in forest composition, structure, and, in extreme cases, forest loss. This disruption can also alter soil moisture content that supports amphibian species and facilitate the establishment of invasive plants species through opening or removing forest understory and canopies. Cultural landscapes are also impacted through selective browsing as deer target more palatable plantings.	- Forest structure and regeneration - Water quality (nutrient loading) - Wildlife (forest-dependent species) - Biological integrity (habitat connectivity) - Sensitive forest-dependent species (animals, plants) - Cultural landscapes
VISITOR USE IMPACTS	Off-trail traffic by visitors threatens vegetation, can lead to the possible introduction of nonnative species and the disturbance or displacement of wildlife (NRCA 2016). As the off-trail use develops into an informal trail system, the trails are often poorly arranged and often include “shortest distance” routing with steep grades and parallel alignments to slopes. Under heavy traffic, such routes are not sustainable, and the subsequent resource degradation is often severe. Vegetation impacts include loss of vegetation cover, changes in species composition, and the potential introduction and dispersal of nonnative plants. Soil impacts include the chronic loss of organic litter, and the exposure, compaction, and erosion of soil. Soil deposition in streams, disturbance to wildlife, and damage to sensitive historic resources are also possible. Other visitor use impacts include off-leash dogs, which disturb wildlife; vandalism, which causes direct harm to natural and cultural resources; fishing; and improper waste disposal, which pollutes ecosystems and impacts cultural landscapes.	- Earthworks (historic structures/landscapes) - Cultural landscapes (general) - Native vegetation - Archeological resources - Rare, threatened, and endangered species - Water resources - Biological integrity (habitat connectivity)
VEHICLE COLLISIONS—Wildlife	Collisions between wildlife and vehicles on GWMP, now a high-speed commuter route in and out of the District of Columbia, are the major threat to top-level predators and other large mammals in GWMP (NRCA 2016).	- Wildlife, especially deer but also squirrel, birds, opossum, rabbit, and box turtle
EROSION AND SEDIMENT LOADING	Erosion on the landscape, combined with increases in impervious surface area’s tributaries and watersheds, leads to increases in sediment carried by the waterways passing through the park and may result in changes to channel morphology and frequency of overbank flooding. Distribution, timing, and the amount of sediment loads may also affect the structure and functions of riparian and aquatic ecosystems (NRCA 2016).	- Aquatic life (biological integrity) - Aquatic life (habitat suitability) - Water quality

Table 1. Key Issues, Stressors, and Threats; Potential Implications; and Affected Resources (continued)

KEY ISSUE, STRESSOR, OR THREAT ¹	POTENTIAL IMPLICATIONS	RESOURCE TYPES AFFECTED
POINT-SOURCE AND NON-POINT-SOURCE WATER POLLUTION— Phosphorous and Nitrogen, Salt Inputs	Washington, DC, is especially vulnerable to both point and non-point source water pollution. Point source pollution includes municipal wastewater and stormwater discharges. For example, millions of gallons of raw sewage may be released from combined sewer outfalls into tributaries and streams, and eventually into the Anacostia and Potomac Rivers, even after relatively minor storm events. Non-point source pollution from stormwater movement is the result of contaminants that are found widespread throughout urban areas, including roads, construction, impervious surfaces, and new development, both in the district and upstream, bringing pollutants into the Potomac, Anacostia, and Rock Creek watersheds. Of concern is the increase in salt concentration that is occurring due to human activities, such as road salt application, water softening, and wastewater from commercial and industrial processes, as well as the weathering of concrete from fertilizer applications and sea level rise. The increase in salt concentration can harm freshwater environments for aquatic-dependent organisms, as well as facilitate aquatic nutrient pollution due to the accelerated mobilization of nitrate-nitrogen compounds that is facilitated by increased salinity in soil moisture and waterways. The increased salinity may also have deleterious effects on cultural resources and values, for example subsistence fishing.	- Aquatic life (biological integrity) - Water quality - Native vegetation - Ethnographic resources
DATA GAPS— Natural Resources (Novel Stressors and Predicted Implications for Resources Related to Climate Change)	Though information and research for many of the park's resources exists, there is limited available knowledge on how habitats may change with novel stressors (pests, diseases, plant establishment). Lack of baseline information and other types of knowledge gaps can challenge park managers to plan, anticipate, and mitigate stressors and threats; improve resource condition; and maintain beneficial relationships with external partners. Well-managed data keep park managers current and facilitates the understanding of trends and conditions of the resources the park is responsible for managing.	- Native vegetation - Aquatic life (biological integrity) - Rare, threatened, and endangered species - Water resources - Biological integrity (habitat connectivity)
DATA GAPS— Natural Resources (Data Needs That Are Not Collected or Reported Through Inventory & Monitoring [I&M] Program Vital Signs Monitoring)	Data are needed to help identify nutrient sources/point pollution that affect water quality. Known occurrences of exotic plant species that do not show up through long-established, legacy I&M Program monitoring activities suggests that there may be a need to gather data specifically related to exotic plant inventories.	- Native vegetation - Aquatic life (biological integrity) - Rare, threatened, and endangered species - Water resources - Biological integrity (habitat connectivity)
POTENTIAL FUTURE DEVELOPMENT OF POTOMAC HERITAGE NATIONAL SCENIC TRAIL	Gaps for Potomac Heritage National Scenic Trail exists in GWMP. Trail advocates have identified locations to develop trail segments. Some of the proposed segments may affect cultural and natural resources.	- Cultural landscapes - Cultural resources in general - Rare, threatened, and endangered species - Waterways

Table 1. Key Issues, Stressors, and Threats; Potential Implications; and Affected Resources (continued)

KEY ISSUE, STRESSOR, OR THREAT ¹	POTENTIAL IMPLICATIONS	RESOURCE TYPES AFFECTED
AIR POLLUTION, NOISE POLLUTION, LIGHT POLLUTION—External Sources	Vistas and views are diminished by air pollution-caused haze that reduces visual range. At night, particulates scatter artificial light, increasing the impact of light pollution on night skies. The parkway is within an Environmental Protection Agency-designated ozone nonattainment area, where ground-level ozone reaches levels that affect breathing for sensitive user groups and can cause injury to ozone-sensitive plants. Natural communities are at risk from nutrient enrichment and acidification effects from excess nitrogen and sulfur deposition. Airborne contaminants, including mercury, can accumulate in organisms, leading to reduced foraging efficiency, survival, and reproductive success. In addition to weathering, air pollution contributes to the deterioration of exposed cultural resources made from stone, metal, and paint. Noise from aircraft, vehicle and motorcycle traffic, and other anthropogenic sounds negatively impacts ambient acoustic conditions, wildlife behavior, and cultural resources. Noise pollution could increase in the future with increased visitation. High volumes of visitors lead to crowding and noise issues that impact the overall park setting environment. An example is the timing of lawn mowing activities during peak visitation hours. Noise from these sources diminishes the visitors' ability to experience the intrinsic value of park settings. The National Park Service has no jurisdictional powers beyond their boundaries and have limited ability to address noise issues (flight path at Ronald Reagan Washington National Airport).	- Air quality - Soundscape - Night skies - Vistas and views - Parkwide resources - Park setting - Rare, threatened, and endangered species - Vegetation - Wildlife - Cultural resources
FIRE IMPACTS	Shoulder fires along parkways during dry periods can grow into larger fires that threaten resources. Fires have also been started by unsheltered people and youth who access the parks after hours (unauthorized access).	- Native vegetation - Wildlife - Historic structures - Cultural landscapes
ENCROACHMENT	Lack of boundary maintenance and management can lead to direct impacts on natural and cultural resources from outside actors, as in 2011 (Gulf Branch Run Encroachment) when a neighbor cleared a trail into the park and built a set of wooden-framed steps into and over a Civil War earthwork feature.	- Historic structures - Natural resources - Archeological resources

1. The order of the key issues, stressors, and threats listed in this table does not indicate level of concern or severity.



PRIORITY RESOURCES AND COMPONENTS

A priority resource is a cultural and/or natural resource that the National Park Service manages or monitors to maintain a park unit's purpose and significance, to address policy/law mandates, or to address scholarly and scientific research needs or findings. Some priority resources may be subdivided into one or more components. Priority resources drive the entire RSS process by focusing attention on those park resources that are critical and could most benefit from management direction within the next three to five years. Descriptions and additional information about the park's cultural and natural resources can be found in the cultural resource stewardship assessment, natural resource condition assessments, park planning documents, baseline cultural resource documents, and natural resource reports.

Table 2 lists priority resources and their components for the GWMP resource stewardship strategy.

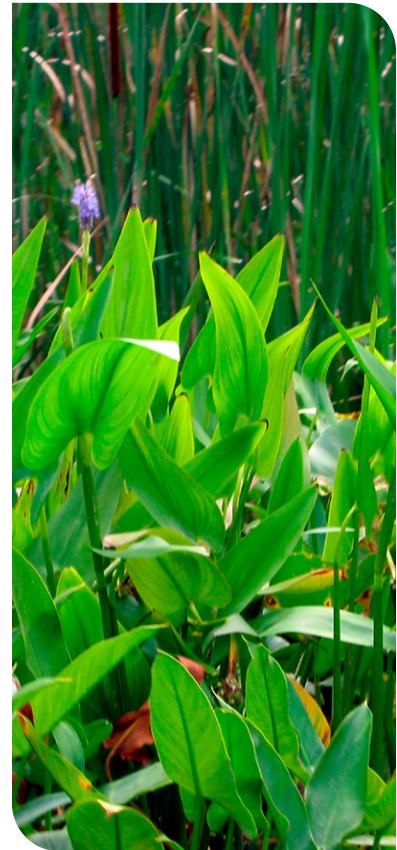
Table 2. Priority Resources and Components

PRIORITY RESOURCE	COMPONENT(S)
PARKWAY TRANSPORTATION CORRIDOR	- Vistas and views - Parkway design (context sensitive design) - Potomac Gorge - Vegetation
CULTURAL LANDSCAPES AND ASSOCIATED HISTORIC STRUCTURES	- Fortifications - Mission 66 resources - Historic house sites - Partner-managed resources - Memorial landscapes - Vistas and views
MUSEUM COLLECTIONS	- Collections (general) - In-park exhibits - In-park storage or repositories
ARCHEOLOGICAL RESOURCES	- No components identified
ETHNOGRAPHIC RESOURCES	- Relationships and partnerships with traditional users - The families of Arlington House - Petroglyphs



Table 2. Priority Resources and Components (continued)

PRIORITY RESOURCE	COMPONENT(S)
EASTERN DECIDUOUS FOREST (AND ASSOCIATED PLANT COMMUNITIES)	- Rare natural communities (e.g., riverside prairie) - Rare species (insects, mammals, birds, crustaceans, snails, plants—state-listed and natural heritage program-tracked species) - At-risk species - Forest habitats (inclusive of canopy, understory, herbaceous, and open habitats)
AQUATIC RESOURCES	- Riparian plant communities - Dyke Marsh - Roaches Run - Groundwater seeps (containing state listed amphipods and a snail). - Vernal pools (important habitat for breeding amphibians). - Fish
MULTIDISCIPLINARY RESOURCE NEEDS	- Connectivity of park resources (buffers and borrowed landscapes, conservation connectivity, core habitat areas) - Partnerships and other capacity enhancers - Increased efficiencies through technology - Enhanced communication and coordination across park divisions



STEWARDSHIP GOALS AND ACTIVITIES

Based on the current status of information and the condition of natural and cultural resources, as well as stressors and other management considerations (e.g., urgency to protect the priority resources, feasibility, sequencing order), park staff identified a wide array of stewardship goals and associated management activities to consider. Whenever possible, activities were designed with integrated resource stewardship in mind, both in terms of their potential to improve the condition or understanding of multiple resources and/or their potential for efficient deployment through the integrated efforts of multiple staff. In addition, many of the activities developed include components that involve partnerships or coordination with regional NPS staff. The project team strived to consider and document integrated resource management efforts within these activities and will seek to carry them out as described.

Tables 3a to 3g include each priority resource and components (if applicable), stewardship goals, and prioritized stewardship activities. The park also identified stewardship goals and activities (in table 3h) to address the following multidisciplinary resource issues and needs:

- Park resources are protected, sustained, and their condition is improved through engagement in a regional effort to manage natural landscape blocks.
- Research and knowledge gaps that are difficult to fill with current staff capacity are addressed through partnerships, volunteers, interns, and other external resources.
- Staff efficiency and capacity are increased through the use of new technologies across all resource management areas.
- Communication and coordination across all park divisions is enhanced to streamline resource management and compliance activities.

The team considered a wide variety of factors when determining if an activity was high, medium, or low priority, including feasibility and impact of the management activity, urgency, potential funding opportunities, and sequencing in relation to other activities. Medium- and low-priority activities are still valuable for achieving resource objectives, but they are generally less urgent or represent secondary approaches. Many of the medium- and low-priority activities may rise to the level of a high priority in the coming years as stewardship activities are implemented, stewardship goals are achieved, and/or resource conditions change over time.

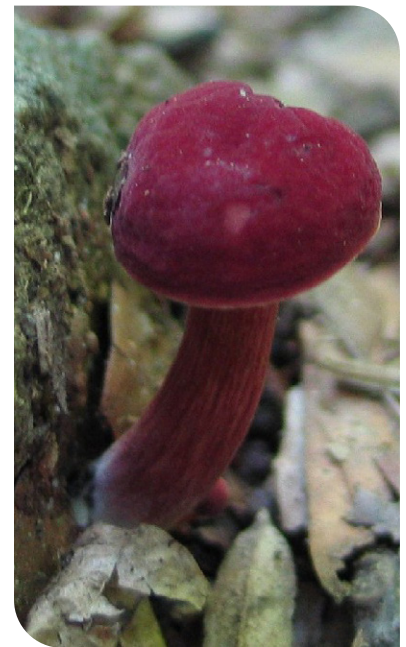


Table 3a. Stewardship Goals and Stewardship Activities for Priority Resource: Parkway Transportation Corridor

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
PARKWAY TRANSPORTATION CORRIDOR	The historic transportation corridor is documented and maintained according to published historic preservation guidelines and current safety standards such that its natural and cultural design elements continue to convey the distinctive feeling of a scenic roadway while accommodating heavy commuter use.	The historic significance and scenic character of the parkway, including the Potomac Gorge, are documented and considered in management actions.	- Conduct visual impact assessments of any proposed project(s) that would have impacts on scenic character. (Low) - Update the GWMP administrative history to record recent management trends (i.e., over the last few decades) impacting the parkway to inform future decision-making. (Low) - Inventory and document vistas and views along the central section of the parkway. (High) - Inventory and document vistas and views along south section of parkway. (High) - Review current planning documents and assess the planning needs of the park. Identify priority planning activities to support resource preservation and develop and submit priority projects in the Project Management Information System (PMIS), as needed. (Low) - Review existing cultural landscape reports (CLRs) for the south and central portions of the parkway and assess the need for updated CLRs to aid compliance for upcoming projects. (Medium) - Resubmit the PMIS project statement to complete a cultural landscape inventory (CLI)/CLR for Spout Run Parkway (none exists), with goal of completing by 2026. (High) - Gather data on the volume and type of commercial vehicles and other vehicles that are restricted from using the parkway (are unpermitted) to support management decisions. Collaborate with park police on enforcement strategies to reduce and eliminate unpermitted use. (Low) - Coordinate with the Facilities Division and update the programmatic compliance document over a five-year time frame to cover a more robust set of routine activities conducted by maintenance staff to streamline compliance. (High) - Develop a scope of work for developing a CLR for the Clara Barton Parkway and aim for completion of the CLR within five years after receipt of the mitigation funds. (Low)

Table 3a. Stewardship Goals and Stewardship Activities for Priority Resource: Parkway Transportation Corridor (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
PARKWAY TRANSPORTATION CORRIDOR	The historic transportation corridor is documented and maintained according to published historic preservation guidelines and current safety standards such that its natural and cultural design elements continue to convey the distinctive feeling of a scenic roadway while accommodating heavy commuter use.	Manage park transportation corridors through the application of context-sensitive solutions for mitigating issues, stressors, and threats to benefit park resources or improve safety.	- Implement the North Parkway Vista Management Plan in 5-mile sections to rehabilitate vistas along the North Parkway by 2030. Continue to manage views/vistas. (High) - Continue active management of vegetation along Mount Vernon Trail to maintain its historic character while maintaining safety standards to this significant commuter route. (Low) - Update the landscape maintenance contract for mowing along the parkway corridor to better reflect preservation guidelines and historic context-sensitive design. (High) - Pilot the use of drought-resistance turf grasses that are more resilient to climatic changes (warmer, drier) in multiple locations (roadside, memorial areas, picnic areas) while maintaining cultural landscape characteristics. (Medium) - Add cyclic vista management to the hazard tree contract based on viewshed management plans. (High) - Coordinate every five years, with transportation subject matter experts on new surface technologies that may be better suited for mitigating storm runoff and impacts from climate change impacts. Seek funding to integrate these new technologies if they are suitable. (Low) - Implement solutions to address Mount Vernon Trail and Potomac Heritage Trail slope stabilization and erosion mitigation while maintaining the historic character of trail corridor. (High) - Conduct a review of existing drainage systems (culverts and drainages) to assess conditions for culverts and drainages and whether they are adequate under more frequent and potentially larger precipitation events. Leverage the Scientist in Parks program for expertise and data gathering relevant to surface runoff, infiltration rates, and other processes related to water quality. (Low) - Request support from the regional Natural Resources Division to find, report, and identify techniques and materials for deicing and snow removal procedures that reduce the negative effects on water quality. (Low) - Research alternative materials for rebuilding the South Parkway that are compatible with historic design since the historically compatible materials currently in use may not be available in the future. (Low)

Table 3a. Stewardship Goals and Stewardship Activities for Priority Resource: Parkway Transportation Corridor (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
PARKWAY TRANSPORTATION CORRIDOR	The historic transportation corridor is documented and maintained according to published historic preservation guidelines and current safety standards such that its natural and cultural design elements continue to convey the distinctive feeling of a scenic roadway while accommodating heavy commuter use.	Partnerships and outreach efforts are leveraged to preserve and protect the resource, improve safety on the parkway, and mitigate threats while maintaining its historic character.	- Coordinate with other local national parks to achieve the overall goal of the stormwater runoff plan to maintain the MS4 permit in both Maryland and Virginia. Continue annual reporting to support the plan. (Medium) - Prioritize issues during interagency community of practice to work on resource management issues, especially along corridor from 14th Street to the airport. The Metropolitan Washington Airports Authority is the host agency. (Medium) - Engage local communities (e.g., homeowners associations) through the Resource Assessments for Management Strategies project with the University of Maryland Center for Environmental Science and the National Capital Region (NCR) Office of Natural Resources and Science to manage stormwater and other safety concerns along roadways. (Low) - Consider competing for a National Scenic Byways Program grant to complete maintenance on components of the park transportation corridors. (Low) - Work with external entities that have infrastructure in the park to manage stormwater and water quality issues (e.g., identify who has responsibilities for clearing and repairing drains that are in the park but park does not own). (Low)



Table 3b. Stewardship Goals and Stewardship Activities for Priority Resource: Cultural Landscapes and Associated Historic Structures

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
CULTURAL LANDSCAPES AND ASSOCIATED HISTORIC STRUCTURES	The diverse historic landscapes and structures throughout the park are preserved through internal efforts and external partnerships to mitigate significant impacts from developmental pressures, heavy visitor use, and climate change.	Cultural landscapes and historic structure inventory and treatment documentation, including records of treatment, reflect current conditions and inform management.	- Prioritize which older CLIs, CLRs, and historic structure reports (HSRs) need to be updated and which properties need new CLIs/CLRs and HSRs. Build these needs into a five-year plan. (Low) - Assess documentation and treatment guide gaps (missing/ outdated CLRs and HSRs) needed to support known projects for the next two fiscal years and make these a top priority for completion. (Low) - Create a PMIS statement for Great Falls Park CLR. (High) - Develop a prioritized list of Mission 66 landscapes across the park that need CLIs and develop PMIS statements for them. (Medium) - Create PMIS statement for Turkey Run Park Mission 66 picnic grounds CLI. (Medium) - Update the NRHP nomination documentation for Arlington Memorial Bridge. (Medium) - Work with the regional historian office to complete the remaining items for the parkwide NRHP nomination documentation for GWMP. (High) - Complete NRHP nomination documentation for Mission 66 resources. (Low) - Follow up with the Washington Metropolitan Area Transit Authority to update the Maryland State inventory form for the Brookmont trolley trestles. (Low) - Update the NRHP and national historic landmark nomination forms for Clara Barton National Historic Site. (Low) - Update the HSR for the Clara Barton National Historic Site. (Low) - The park Facility Management Software System (FMSS) program lead facilitates a crosswalk between FMSS and Cultural Resource Inventory System-Cultural Landscape (CRIS-CL) and Historic Structures (CRIS-HS) databases for consistency and completeness. (Medium) - Apply climate change risk assessment tool results to assess cultural resources and develop adaptive management strategies to cope with predicted impacts from climate change. (Low) - Follow up with regional historical architecture and cultural landscape programs for cyclical condition assessments. (Low) - Create preservation maintenance plans for landscapes and structures that maintenance staff can apply to their work. (High) - Develop a plan with GWMP Professional Services Staff for phased efforts to preserve, rehabilitate, and restore the Great Falls Mission 66 Visitor Center per the Ultimate Treatment and Use Recommendations in the Visitor Center HSR (2023). (High)

Table 3b. Stewardship Goals and Stewardship Activities for Priority Resource: Cultural Landscapes and Associated Historic Structures (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
CULTURAL LANDSCAPES AND ASSOCIATED HISTORIC STRUCTURES	The diverse historic landscapes and structures throughout the park are preserved through internal efforts and external partnerships to mitigate significant impacts from developmental pressures, heavy visitor use, and climate change.	Cultural landscapes and associated structures and views are maintained through coordination and collaboration between all park staff, including information sharing from baseline documents.	- Promote interdisciplinary training about preservation maintenance activities, including the “Maintenance is Preservation” training. (High) - Conduct quarterly topical historic preservation and treatment training that integrates technical preservation guidelines, checklists, terminology, and other materials into Facilities Division workflows. (Medium) - The Resource Management (RM) Division will provide annual reviews of vegetation management activities (contracts, volunteers, NPS staff) in support of resource management goals. Programmatic compliance protocols are followed for historic landscape character using native species compatible with historic design and climate change to the extent possible. (High) - Update mowing and landscaping contracts (including maps) as needed to reflect current preservation guidelines that maintain the character of historic landscapes. Estimated time frame for an updated contract is 2–3 years. (High) - Conduct a cost-benefit analysis to support any updates to the scope of work for adding services to landscaping contracts that improve the preservation of cultural landscapes. (High) - Identify resource preservation core competencies, and potential ways to obtain these competencies, that are important to ensure maintenance crews who are working in the field with the resources have the necessary skillset. (Low) - The RM Division will create a preservation treatment cheat sheet for facilities staff that distills treatment guidance from formal plans into a user-friendly field guide for maintenance crews and includes compliance and a guide to terminology. (Medium) - Conduct post-project reviews of treatment projects that required Section 106 compliance to identify what went well and what could change. This will improve continuity when new facilities staff are hired and would improve internal processes. (Medium) - Continue cross-divisional planning meetings and look for ways to improve cross-divisional communication and understanding (e.g., roles, terminology, needs). (Low) - Ensure the new prospectus for concessions incorporates resource management needs, including compliance actions. (Low) - Conduct historical property inventories, DOEs, and condition assessments of Mission 66-era marinas. (Low)

Table 3b. Stewardship Goals and Stewardship Activities for Priority Resource: Cultural Landscapes and Associated Historic Structures (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
CULTURAL LANDSCAPES AND ASSOCIATED HISTORIC STRUCTURES	The diverse historic landscapes and structures throughout the park are preserved through internal efforts and external partnerships to mitigate significant impacts from developmental pressures, heavy visitor use, and climate change.	Strong partner relationships continue the stewardship of partner-assigned historic resources to achieve shared preservation goals. (This goal is only about partner-assigned resources, and so its activities apply only to Glen Echo.)	- Complete the Glen Echo environmental assessment to guide management of the site into the future. (Low) - Complete Section 106 on the Spanish Ballroom for its rehabilitation project. (High) - Complete the Crystal Pool CLR. (Low) - Complete a feasibility study and determine next steps regarding solar power at parking lot for Glen Echo and the Clara Barton House. (Low) - Maintain a current permit with the US Army Corps of Engineers (USACE) for the upper parking lot. (Low) - Continue maintaining the historic trestle bridge and shared use trail (the Montgomery County trail system) over Minnehaha Creek. (Low) - Collaborate with Visitor Services (VS) Division staff to determine whether or not to expand the park's interpretive presence at the Glen Echo site as relevant to site history, using spaces already assigned. Work with the Glen Echo Park Partnership for Arts and Culture. (Medium) - Coordinate with the Air Resources Division (ARD) to conduct a parkwide visual resource inventory of views associated with cultural landscapes and other park areas. (Low) - Continue to manage vegetation to improve views, including screening and clearing obstructions, according to programmed maintenance schedules. When possible, use nature-based solutions that are resilient to climate change. (Low) - Review the easement that the park holds over the City of Alexandria (Washington Street) to ensure that the city's development is consistent with maintaining certain viewsheds per the easement. (Medium) - Continue assessing and removing unnecessary facilities, structures, signs, and other visual intrusions in the park. (Medium) - Include views from the visual resources inventory (VRI) in the park website photo gallery for visitor access and stakeholder understanding—effectively announcing VRI views as important for stewardship. (Low) - Link the existing NRSS Air Resources Division webcam installed at Arlington Ridge (the view is primarily of Washington, DC) to the park's website. (Low) - Promote cooperative conservation of park vistas and views character by building and maintaining partnerships with park neighbors, volunteer groups, and other civic partners. (Low) - Partner to strengthen and expand easement programs to better manage development pressures, changing technologies, and new types of signage. (Low)

Table 3c. Stewardship Goals and Stewardship Activities for Priority Resource: Museum Collections

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
MUSEUM COLLECTIONS	Museum objects and archives across the park's collections are cataloged, conserved, and curated according to current NPS museum program standards and are findable by staff and the public for purposes of research and education.	Priority core documentation is completed for the park's eight museum collections.	- Review and update SOCS. (Medium) - Update the facilities checklists (Automated Checklist Program) for museum spaces in the park. (Low)
MUSEUM COLLECTIONS	Museum objects and archives across the park's collections are cataloged, conserved, and curated according to current NPS museum program standards and are findable by staff and the public for purposes of research and education.	Collection objects and archives are documented and cataloged and are findable by researchers and the public.	- Work with the park historian to accession and catalog any associated objects and archives from the oral history projects for sites in the park. (Low) - Accession and catalog audio tapes and other materials from the completed Fort Hunt PO Box 1142 oral history project. (Low) - Accession and catalog materials related to the South Enslaved Quarters (artifacts, oral histories, new information brought into archives collection) so that they are accessible to the public and researchers. (High) - Catalog and process archival collections. Ensure that time for this activity is incorporated into annual work plans for museum services staff and adequate time is accounted for. (Medium) - Prioritize collections that need updated finding aids and update them. (Medium) - Review archives that were cataloged as individual items (e.g., as individual documents) instead of as a collection and re-catalog them according to best practices for archives management. (Medium) - Complete an audit to fully determine the gaps in accession and deaccession records. (Low) - Put together cataloging templates for archeology, natural history, and other disciplines, as well as a standard operating procedure (SOP) for researchers (i.e., how to use the templates) so that contractors and researchers submit their collections with information that is easy to enter into NPS databases. (Medium) - Identify other online repositories or systems that the park can use (e.g., NPS gallery) to make park collections more visible and easily findable by researchers and the public. (Low) - Complete backlog cataloging for museum collections parkwide. (Low)

Table 3c. Stewardship Goals and Stewardship Activities for Priority Resource: Museum Collections (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
MUSEUM COLLECTIONS	Museum objects and archives across the park's collections are cataloged, conserved, and curated according to current NPS museum program standards and are findable by staff and the public for purposes of research and education.	Collection condition and conservation needs are understood, and needed treatments are carried out.	- Seek cultural resource cyclic funding and submit PMIS project statements to complete the needed conservation work for museum collections. (Medium)
MUSEUM COLLECTIONS	Museum objects and archives across the park's collections are cataloged, conserved, and curated according to current NPS museum program standards and are findable by staff and the public for purposes of research and education.	Collection objects are consistent with the SOCS and stored in appropriate (and appropriately maintained) curation facilities.	- Continue transferring natural history collections to the Smithsonian Institute. (High) - Continue deaccessioning museum objects to create more storage space and consolidate storage space. (High) - Conduct a general survey of what is in the museum collection and deaccession inappropriate or duplicate objects. (High) - Seek funding to upgrade the Arlington House, The Robert E. Lee Memorial National Historic Site HVAC system to address critical system support for fire and intrusion alarm systems and heating, ventilation, and air conditioning systems at curation facilities. (High) - Review FMSS to ensure that all museum facilities are included and that records are complete (e.g., that heritage assets and curation facility identifiers are identified). (Low) - Improve housing for individual collection items (including upgrades to storage equipment) stored in the Arlington House administration building. (Low)



Table 3d. Stewardship Goals and Stewardship Activities for Priority Resource: Archeological Resources

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
ARCHEOLOGICAL RESOURCES	Sufficient research and data are available to inform archeological resource preservation and mitigation efforts in the face of internal and external threats.	Archeological resource data—inventories, locational data, condition, and threats—are current, available and applied to resource management and preservation.	- Update the existing archeological resources inventory database (CRIS-AR) contracting form template. The new template should mirror the CRIS database format to facilitate data entry after external partners or project contractors have filled out the survey (Low) - Enter the outcomes of archeological inventory (whether Section 106 or Section 110 inventory) into CRIS-AR after new inventories or new site condition assessments. (Medium) - Address the backlog of current archeological studies by entering data from existing reports into CRIS-AR. (Low) - Develop a Section 106 programmatic agreement to streamline compliance for new sign installation. (High) - Identify needed archeological overview and assessments (AOAs) for the various park units. (Medium) - Prioritize a list of needed AOAs to ensure completion prior to major construction projects. Develop PMIS statements with assistance from the regional archeology program. (Low) - Use regional Preservation Services Team geographic information systems (GIS) modeling to inform a climate change vulnerability assessment of potential impacts on archeological resources. (Low) - Demonstrate the utility of building GIS spatial models as a tool for supporting compliance, natural and cultural resource management, research priorities, etc. Low leverage external projects and developments to complete DOEs and NRHP nomination documentation (Section 106 mitigation), with priority for archeological districts. (Low) - Prioritize, by fiscal year 2025, Phase 1a and 1b archeological survey for Great Falls courtyard and overlooks. (High)
ARCHEOLOGICAL RESOURCES	Sufficient research and data are available to inform archeological resource preservation and mitigation efforts in the face of internal and external threats.	Opportunities for external support and partnerships are sought out to complete an archeological inventory and research outside of project-driven contexts.	- Work with the regional archeology program, the regional Resource Stewardship and Science Directorate, and external partners to develop list of the missing research areas and possible historic contexts (e.g., post-Civil War African American settlements). (Low)

Table 3e. Stewardship Goals and Stewardship Activities for Priority Resource: Ethnographic Resources

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
ETHNOGRAPHIC RESOURCES	Associated Tribal nations and descendant communities associated with the park's diverse landscapes and resources are understood, and relationships are strengthened to support ongoing traditional connections and use.	Baseline documentation about ethnographic resources, usage, and user groups is improved.	- Work with the regional cultural anthropologist to fund and complete a parkwide EOA, particularly to identify and inform additional, more nuanced research themes. (Medium) - Improve the knowledge and documentation of subsistence fishing in the park as a traditional use. (Low) - Work with the regional cultural anthropologist, after completing a parkwide EOA, to determine appropriate ethnographic research themes (multiple EOAs) for the park and prioritize them and submit PMIS statements for baseline research. (Low) - Prioritize sites in the park for oral history projects and develop PMIS statements to interview relevant communities for those with the highest priorities. (High) - If the EOA identifies Tribal nations or communities who practice nonconsumptive resource use or would like access to traditional resources, work with park leadership to update the Superintendent's Compendium and execute necessary agreements to facilitate access and traditional use. (Low)
ETHNOGRAPHIC RESOURCES	Associated Tribal nations and descendant communities associated with the park's diverse landscapes and resources are understood, and relationships are strengthened to support ongoing traditional connections and use.	Ethnographic resources and traditional uses are protected through collaborative efforts among the park, Chesapeake & Ohio Canal National Historical Park (CHOH), Potomac Heritage National Scenic Trail (POHE), Tribal nations, and other Tribal communities.	- Reach out to POHE regarding its African American Historic Resource Study (PMIS 328323) for coordination on ethnographic resource activities. (Low) - Reach out to the regional Tribal liaison, CHOH, and POHE to establish an annual meeting to identify priority tasks that each can complete in collaboration, including developing co-stewardship relationships. (High) - Follow up with the Rappahannock Tribe to develop a treatment approach for petroglyph protection and vandalism remediation (High)
ETHNOGRAPHIC RESOURCES	Associated Tribal nations and descendant communities associated with the park's diverse landscapes and resources are understood, and relationships are strengthened to support ongoing traditional connections and use.	Relationships with descendant families associated with historic sites are enhanced through shared goals.	- Identify communities that are traditionally associated with park sites and build partnerships that ensure sensitive management, as well as properly contextualized interpretation for those sites. (High) - Enhance the knowledge of ethnographic resources and traditional uses through partnerships with Alexandria Archeology, university-based researchers, and others. (Low)

Table 3f. Stewardship Goals and Stewardship Activities for Priority Resource: Eastern Deciduous Forest (and Associated Plant Communities)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
EASTERN DECIDUOUS FOREST (AND ASSOCIATED PLANT COMMUNITIES)	Ecological integrity, ecosystem function, and dynamic processes are supported to conserve biological diversity, foundational species, and trophic connections, considering climate change impacts and other non-climate stressors.	Habitat to support migratory species is improved (e.g., birds, bats)	- Identify areas to replant trees to restore nesting habitat. Cross-divisional coordination would occur for this activity (includes arborist, biologist, landscape architects, and other specialists). (High) - Identify habitat areas that provide habitat for migratory birds in the interior forest and define protection measures to prevent impacts from disturbance. (High) - Facilitate access to existing geospatial data to aid coordination across park divisions on planning for habitat protection. This could include orientation and training for GIS staff to use analytics tools. (Low) - Identify training opportunities to enhance the ecological knowledge for arborists conducting work in the park related to the five-year hazardous tree programmatic compliance document. (Medium)
EASTERN DECIDUOUS FOREST (AND ASSOCIATED PLANT COMMUNITIES)	Ecological integrity, ecosystem function, and dynamic processes are supported to conserve biological diversity, foundational species, and trophic connections, considering climate change impacts and other non-climate stressors.	Maintain the integrity of forest cover and improve the regeneration of eastern deciduous forest Note: Actively manage for forest health rather than just tree removal, acknowledging the value of all trees, including seedlings and saplings.	- Create term positions to support vegetation management activities. (High) - Apply resilience study (core blocks) and other available information as a guide for prioritizing actions to promote forest regeneration. (Low) - Restore abandoned agricultural fields to forested land at South Turkey Run Park to forest, including conducting compliance. (Medium) - Determine the appropriate management for right-of-way corridors that does not default to managing for trees. (Medium) - Update the management plan for partner implementation for vegetation management in right-of-way corridors. (Medium)
EASTERN DECIDUOUS FOREST (AND ASSOCIATED PLANT COMMUNITIES)	Ecological integrity, ecosystem function and dynamic processes are supported to conserve biological diversity, foundational species, and trophic connections, considering climate change impacts and other non-climate stressors.	Native natural community composition, form, and function are sustained through the preservation and conservation of natural, ecological processes.	- Change mowing habits to foster native pollinators. (Medium) - Draft a white paper on issues related to poaching and other resource crimes in the beltway parks to inform collaboration over a solution that does not rely on law enforcement. (Low)

Table 3f. Stewardship Goals and Stewardship Activities for Priority Resource: Eastern Deciduous Forest (and Associated Plant Communities) (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
EASTERN DECIDUOUS FOREST (AND ASSOCIATED PLANT COMMUNITIES)	Ecological integrity, ecosystem function, and dynamic processes are supported to conserve biological diversity, foundational species, and trophic connections, considering climate change impacts and other non-climate stressors.	Improve the understanding of mature forest stands to inform future research efforts, as well as guide park management responses.	- Improve the public communications messaging (social media, website) about invasive species and edge effects on neighboring landowners. (Low) - Leverage park partnerships to encourage legislation and other measures that discourage (prohibit) landscaping with invasive plants as on adjacent properties. (Medium) - Work with visitor services to create junior ranger materials about climate change and forest health (pertains to bats, amphibians, birds). (Medium) - Complete compliance on Brookmont House to allow demolition and restoration of the lot. (Medium) - Conduct an after-action review of the Conway property about successes and challenges with post-restoration maintenance activities. Use the review to develop strategies that might improve the success of future restoration projects. (Medium) - Develop protocols for assessing impacts (especially construction impacts) to forest areas, including seedlings and soils. (High) - Develop communications for the public about climate change and other threats to resources that are relevant to GWMP with the objective of describing impacts the public is experiencing or observing. (Low) - Update internal processes (e.g., a written SOP) to promote “early and often” communications during project planning between Resource Management, Visitor Services, and other divisions to better coordinate planning and management efforts. (High) - Collaborate and share knowledge with the regional office on connectivity analyses and natural landscape blocks, with the intention of working with partners to take advantage of land acquisition or canopy opportunities. (Low) - Complete the acquisition of Langley Oaks. (High) - Work with American Chestnut Foundation to develop an American Chestnut reintroduction project in the park. (Medium) - Conduct an analysis to select appropriate sites for American Chestnut reintroduction. (Medium) - Complete a South Turkey Run tree survey and a tree planting plan. (High) - Identify suitable partner (e.g., through a Cooperative Ecosystem Studies Units) to assist in developing a project for the reintroduction of American Chestnut at South Turkey Run, as well as other planting needs. (Medium)

Table 3g. Stewardship Goals and Stewardship Activities for Priority Resource: Aquatic Resources

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
AQUATIC RESOURCES	Riparian, marsh, vernal pools, and similar habitats are maintained/ improved to support biological diversity, foundational species, and trophic connections.	A volunteer network for invasive plant management is enhanced.	- Sustain the volunteer network for invasive plant management. (Low)
AQUATIC RESOURCES	Riparian, marsh, vernal pools, and similar habitats are maintained/ improved to support biological diversity, foundational species, and trophic connections.	The ecological restoration of Dyke Marsh is sustained.	- Continue to advocate that the National Park Service does not need a state permit to implement Dyke Marsh restoration activities. Encourage relevant Washington Office-level offices to come to an agreement with the state, and support the discussion with the best available science. (Medium) - Continue collaborating with the regional I&M Program to maintain sediment evaluation tables (manage and monitor). (Low) - Be prepared to respond to pre- and post-storm significant weather events that allow the park to conduct additional restoration at Dykes Marsh (when money is likely to become available). (Low) - Leverage partnerships to expand communications with neighboring communities about the ecological functions and ecosystem services of Dyke Marsh, including protection of resources and communities from storm surges. (Low) - Acquire the final Submerged Aquatic Vegetation report and post to Integrated Resource Management Applications. (Low) - Work with an appropriate federal agency (could be USACE, the coast guard, or another agency) to create and implement a buoy management plan to reinforce the park boundary and decrease instances of illegal activities. (High) - Continue to monitor newest climate change data and projections and updated models and determine if there is tipping point where an update to the restoration plan and associated environmental impact statement is required. (Low) - Create a fact sheet to be shared with law enforcement about aquatic resources of interest and importance, including location information, to aid patrol activities and resource damage response. (Low) - Monitor sensitive aquatic areas with the park's boat. (Medium) - Send select park staff to Hazardous Waste Operations & Emergency Response training (eight-hour training module). (Low) - Contact the regional office (informal multidisciplinary climate change working group, and soon-to-be-hired-hydrologist) for climate change data. (Low) - Use Dyke Marsh as a good case study for climate change impacts in messaging materials. (Low) - Position Dyke Marsh as a nature-based solution case study for the new departmental policy 600 DM7

Table 3g. Stewardship Goals and Stewardship Activities for Priority Resource: Aquatic Resources

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
AQUATIC RESOURCES	Water quality is improved to support riparian, marsh, vernal pools, and similar communities.	Existing knowledge on stormwater management is improved to guide decisions about water management design inside park boundaries.	- Engage with the regional hydrologist and the I&M Program network to reevaluate water quality sampling sites and potentially expand them. (Medium) - Request a focused natural resource condition assessment on the park's water quality and pollution sources. (Low) - Conduct a "coarse filter" assessment of the vulnerability of these water bodies, including impacts of land use/cover outside the parks. (Low) - Update geospatial datasets with current infrastructure systems so that maps are current including rights-of-way and externally-owned/managed infrastructure. (High) - Provide training for park staff to help them identify when sewage overflows occur. (Low) - Leverage assistance from the interpretation program to educate the public about water quality and how they can help the park to maintain good water quality. (Medium)
AQUATIC RESOURCES	Water quality is improved to support riparian, marsh, vernal pools, and similar communities.	Seeps, springs, and other groundwater-dependent wetlands are monitored to record and report conditions on condition, status, and ecological integrity.	- Continue GIS mapping of seeps and springs and update park geospatial datasets. (Medium) - Use new regional geospatial datasets related to ecological services to inform park research and management decisions. (Medium) - Map underground streams in the park. (Medium) - Clarify whether the park owns underground streams and/or what its authorities are. (Low) - Leverage graduate students or other external researchers to study subterranean water sources to help the park understand its systems. (Low)



Table 3h. Stewardship Goals and Stewardship Activities for Multidisciplinary Resource Needs

TOPIC	STEWARDSHIP GOAL(S)	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
MULTIDISCIPLINARY RESOURCE NEEDS	Park resources are protected and sustained, and their condition is improved through engagement in a regional effort to manage natural landscape blocks	- Expand landscape-scale resource stewardship by enhancing collaboration with nonfederal entities to manage resources and resource connectivity outside park boundaries. (Low) - Pursue land acquisition strategies to protect views and other park resources. (Low) - Assess the ways in which fragmentation has progressed in the park due to external infrastructure projects and development, and use this data to inform future management decisions, including responses to new projects. (Medium) - Submit a technical assistance request to the Natural Sounds and Night Skies Division for ecosystem services assessment/evaluation and/or synthesis. (Low) - Identify opportunities to be represented in the Metropolitan Washington Council of Governments. (Low) - Find and review existing local research that provides data on ecosystem services (Nature's Contribution to People) that the park could leverage in messaging that supports resource protection and ecosystem connectivity. (Low)
MULTIDISCIPLINARY RESOURCE NEEDS	Research and knowledge gaps that are difficult to fill with current staff capacity are addressed through partnerships, volunteers, interns, and other external resources.	- Work with the park and regional GIS staff to develop tactics for ground truthing and updating geospatial data for resources, including the potential for hiring an intern. (Medium) - Develop a prioritized list of research topics across natural and cultural resources that the park wants to accomplish that could be proactive (rather than reactive responses to compliance reviews) but that park staff lack the capacity to complete. (Medium) - Identify and coordinate with partners who can help the park manage or mitigate external development and continue to respond to proposals for external development that will impact park resources. (Medium) - Work with sponsors to secure funding for internships that support the park's prioritized list the research needs. (Medium) - Identify universities (graduate research, field schools) and potential partners (volunteers, interns) who could accomplish park research and schedule speaking engagements (e.g., park archeologists) to talk about park resources and create interest. (Medium) - Incorporate messaging into interpretation and educational materials that respond to neighbor and community concerns of which the park is already aware. (Medium) - Continue park's climate-friendly status and green team activities. (Low)

Table 3h. Stewardship Goals and Stewardship Activities for Multidisciplinary Resource Needs (continued)

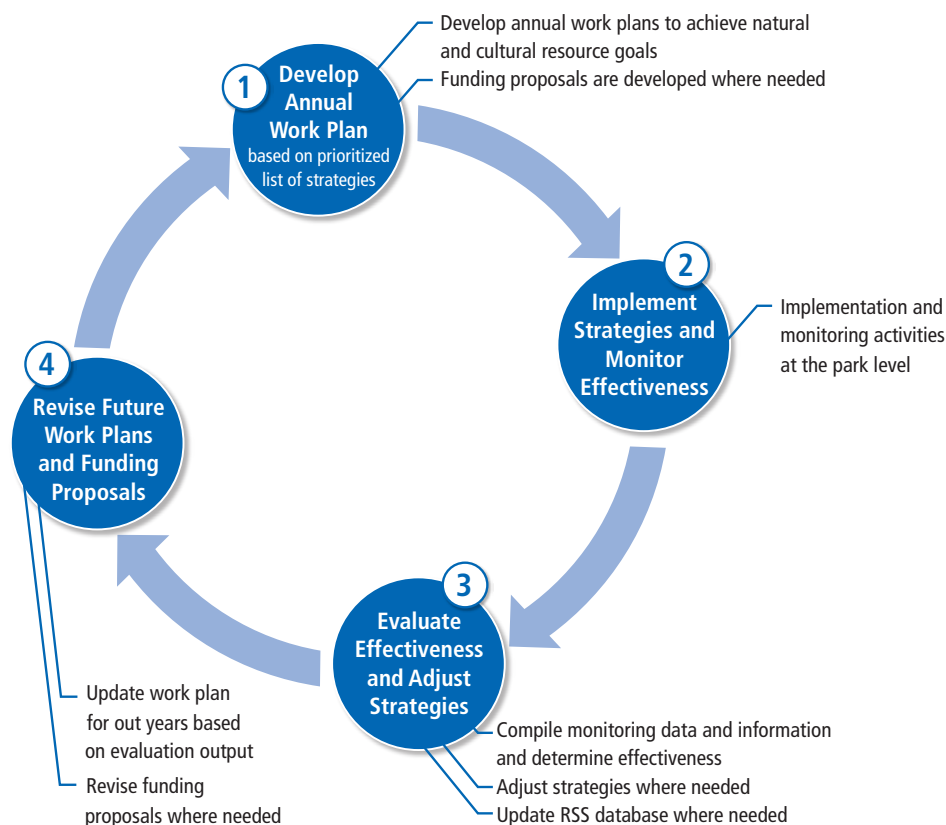
TOPIC	STEWARDSHIP GOAL(S)	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
MULTIDISCIPLINARY RESOURCE NEEDS	Staff efficiency and capacity are increased through the use of new technologies across all resource management areas.	- Assess the use of technology to maximize efficiency for tree surveys and to bring park in line with current and cost-effective practices. Note technologies that apply across resource management disciplines increase changes to secure funding. (Medium) - Assess the use of technology in data gathering for resource management (e.g., counters on the roadway that gather visitor use numbers) with smaller footprints and therefore smaller impacts on views and other resources. (Medium)
MULTIDISCIPLINARY RESOURCE NEEDS	Communication and coordination across all park divisions is enhanced to streamline resource management and compliance activities.	- Address the current issue regarding boxes of non-records that were dropped off at the museum services center and are taking up space, and make sure this does not keep happening (e.g., by enforcing parkwide files management SOPs). (Low) - Determine which documents the park needs in hard copy as opposed to retaining digital copies, including whether the park needs to maintain a physical research library. (Low) - The RM Division identifies information that it would like to disseminate to the public that advocates/informs/creates interest in stewardship of cultural and natural resources and works with the VS Division to create public-facing content to that end. (Medium) - Use existing visitor use studies to identify opportunities for the RM and VS Divisions to work together to create public-facing content that VS has an in communicating publicly and that RM can support with data, research, and follow-through. (Medium) - Develop a priority list of targeted public messaging for resource protection. Coordinate with regional office to tag park media outputs in regional education and outreach applications, and amplify park messaging to be searchable online. (Medium) - Develop programs and processes for sharing research (as opposed to messaging about resource protection) about park cultural resources more broadly with the public, including underrepresented stories. (Medium) - The RM Division participates in long-range interpretive plan development to ensure that relevant resource information is represented and accurate. (Medium) - Continue activities that have worked well in the past for increasing interdivisional communication and cross-training, like staff site visits ahead of problem-solving discussions. (Medium)

ONGOING IMPLEMENTATION OF THE RESOURCE STEWARDSHIP STRATEGY

The stewardship goals, activities, and other pertinent information of the resource stewardship strategy is managed and updated as needed using the RSS desktop application and/or other working documents. This information will assist resource managers in determining what, how, when, and where resource management occurs in the park and will assist the park's resource management staff in developing annual work plans. These work plans will be an important planning tool for park employees to determine what they will be able to realistically tackle over the coming years.

Long-term implementation of the resource stewardship strategy includes park managers monitoring resource information and conditions in order to evaluate the effectiveness of resource stewardship strategies over time. Regularly monitoring RSS progress will give park managers an opportunity to evaluate whether the stewardship activities are making progress towards identified goals and consider whether adjustments are needed. (See figure 2 for more information on the cyclical nature of this process.) In addition, routine communication with the public is another important aspect of the implementation process. These outreach efforts are intended to improve public awareness about the science and strategies used to protect the park's diverse resources and values over time.

Figure 2. RSS Implementation Process



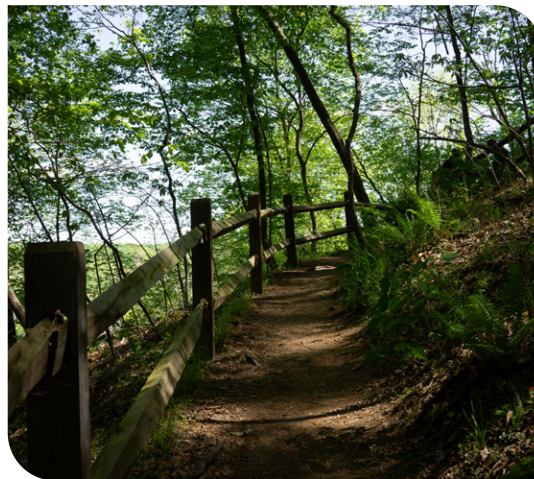
REFERENCES

Climate Change Response Program (CCRP)

2024 *George Washington Memorial Parkway Climate Futures Summary*. National Park Service. Fort Collins, CO. <https://irma.nps.gov/DataStore/DownloadFile/702690>.

Marvel, K., W. Su, R. Delgado, et al.

2023 “Ch. 2. Climate Trends.” In: *Fifth National Climate Assessment*. A. R. Crimmins, C. W. Avery, D. R. Easterling, K. E. Kunkel, B. C. Stewart, and T. K. Maycock (eds.). US Global Change Research Program, Washington, DC, USA. <https://doi.org/10.7930/NCA5.2023.CH2>.



APPENDIX A: CLIMATE CHANGE NARRATIVE

George Washington Memorial Parkway has already experienced rapid increases in temperatures, and the park is in a region where heavy precipitation events are increasing. These and other important climate changes are summarized here and reported more completely in the NPS Climate Futures Summary (CCRP 2024).

Average annual temperature increased at the rate of 2.3°F per century from 1895 to 2022, and since the acceleration of anthropogenic climate changes around 1970, temperatures have increased at the extremely rapid rate of 6.3°F per century (Figure 3). The hottest two years before 2000 were 1991 and 1998, and these anomalies were exceeded in six years since 2000 (27.3% of years). Since 1970, daily minimum (nighttime) temperatures have increased more rapidly than daily maximum (daytime) temperatures, meaning nights are warmer and the range between daytime and nighttime temperatures has diminished.

Annual precipitation has not changed significantly, but the high variability in annual precipitation makes it difficult to detect a statistical trend. However, the National Climate Assessment (Marvel et al. 2023) reported that heavy precipitation events have increased across the entire east coast. For example, the proportion of precipitation that falls in the heaviest 1% events increased by 40%–60%.

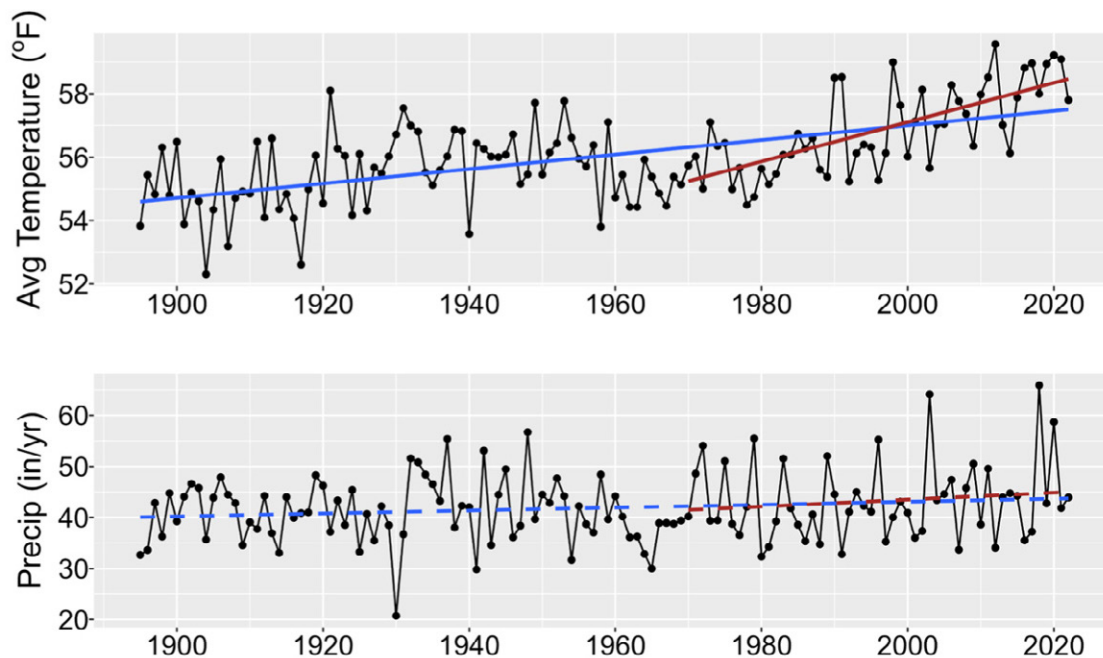


Figure 3. Historical Trends in Annual Average Temperature (upper plot) and Annual Total Precipitation (lower plot) for GWMP from 1895 to 2022

Note: Black points show yearly values while blue lines are linear regressions for the entire period record and red lines for 1970–2022 trends. Solid lines are significant trends (i.e., $p < 0.05$); dashed lines are not statistically significant.

The National Park Service identified two plausible, divergent climate futures (“Warm Wet” and “Hot Dry”) to capture relevant variation across climate models and greenhouse gas emissions scenarios. Average annual temperatures are projected to increase under both the Warm Wet and Hot Dry climate futures relative to the historical baseline period (1979–2012). Increases by 2050 under the Warm Wet climate future are considerable (+3.6°F), and increases under the Hot Dry climate future are extreme (+6°F) (Figure 4). To put this in context, historically hot years recorded at GWMP would be “average” temperature years in the Warm Wet climate future. Average temperatures under the Hot Dry climate future would generally exceed anything experienced at GWMP in recent history. These projections are consistent with temperature increases already observed due to climate change at GWMP.

Average annual precipitation is projected to be highly variable. Projections under both climate futures indicate considerably drier and also wetter years than experienced historically (Figure 4). These projections are consistent with the scientific understanding that climate change will result in increased extremes in precipitation (Marvel et al. 2023)). This means that very dry years could still occur under both climate futures, despite a positive trend in precipitation. Overall, the NPS Climate Change Response Program analysis projects +4.4 inches in annual precipitation under the Warm Wet climate future and +1.2 inches under the Hot Dry climate future relative to 1979–2012.

While climate averages indicate broad changes, climate extremes tend to be the most consequential climate events. Extreme temperatures are expected to increase at GWMP under both climate futures, with an additional +12.2 days each year exceeding the historical 99th percentile (96.7°F) threshold under the Warm Wet climate future and a more pronounced increase of +29.2 days each year under the Hot Dry future.

The National Oceanic and Atmospheric Administration reported an increase in sea level rise at Washington, DC, of just over 1/0.125 inches/year (3.45 mm/year) over the past 80 years. The compounded effect of flooding from extreme precipitation and sea level rise will result in both increased river heights and greater energy reaching shores. This may threaten tidal marshes, shorelines, and park facilities exposed to flooding, water-borne sediments, and erosion.

Evapotranspiration rates are increasing with temperature. With much hotter temperatures, GWMP may be subjected to drought conditions that develop more quickly than in the past. The Hot Dry climate future projects droughts that are both more frequent and more severe than in the historical record. Impacts of disease and forest pests can be exacerbated when plants are stressed by high temperatures and lack of water.

Climate changes often act as “stress multipliers” that amplify current management issues with invasive species, water temperatures and water quality, insect pests, forest disease, erosion and flooding, and changes in other climate-related processes. The National Park Service recommends considering a range of climate projections to ensure that management plans are robust to the range of potential future changes.



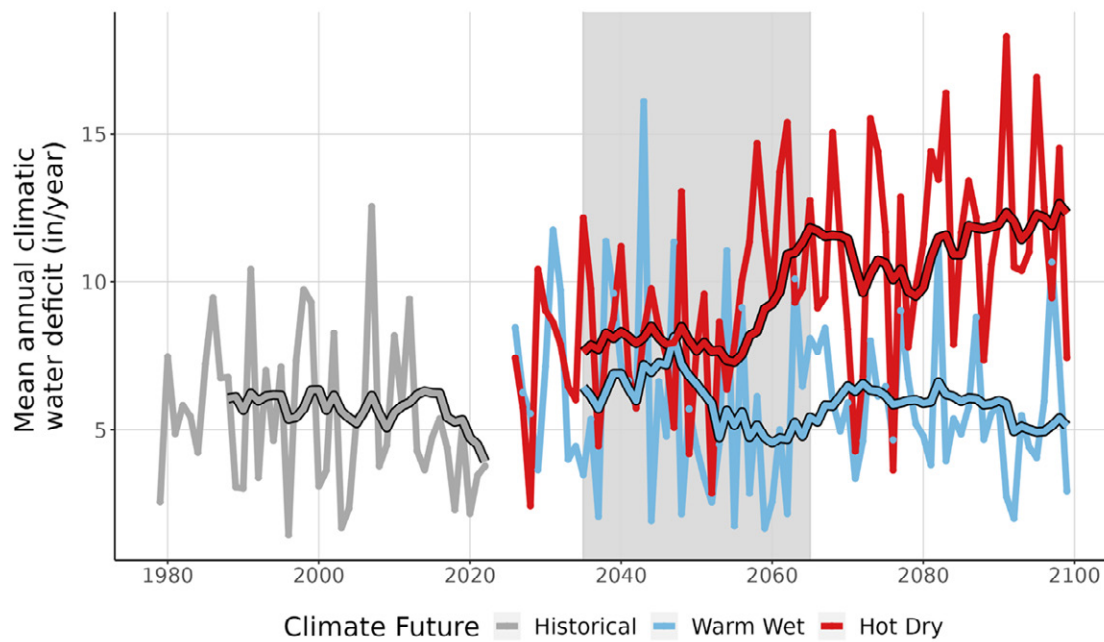
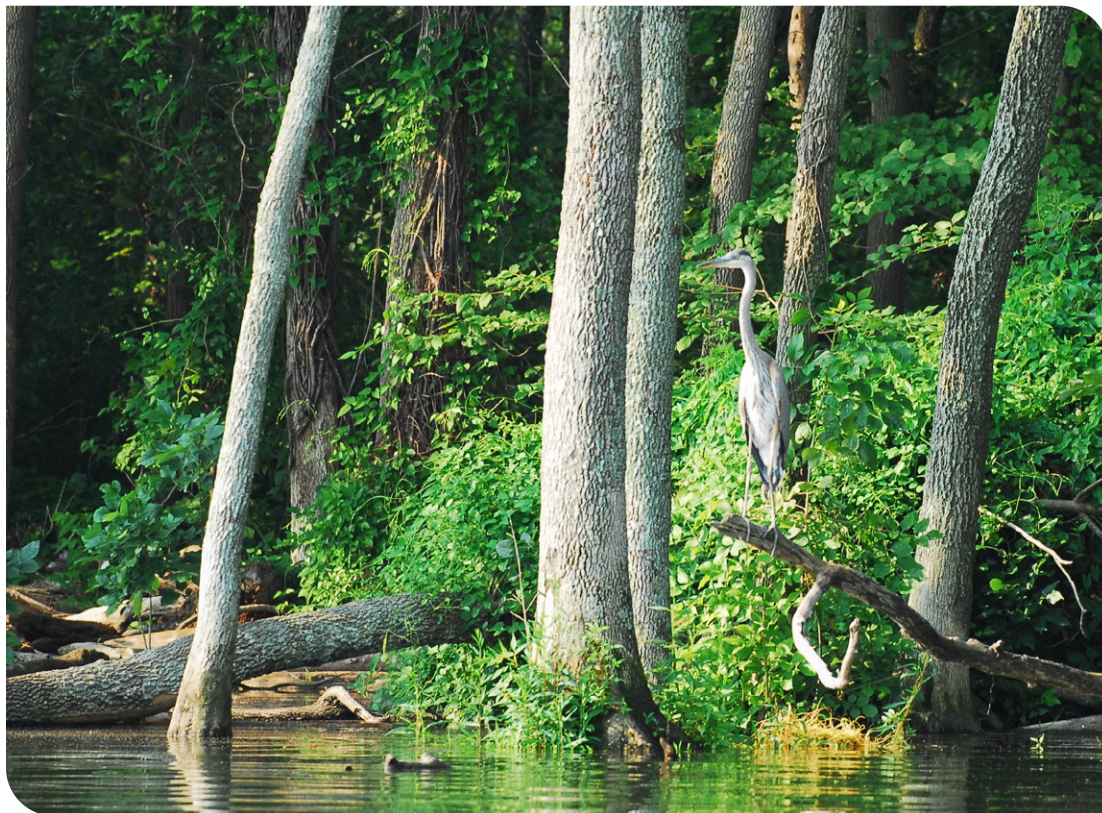


Figure 4. Comparison of Observed Climatic Water Deficit at GWMP (inches/year; 1979–2022) and Projected Climatic Water Deficit for the Two Climate Futures from 2023 to 2099

Note: Water deficit is the difference between water actually available for plants and what plants could use if it were available. A larger water deficit thus indicates drier conditions. Historical observations are shown in gray, the Warm Wet climate future in blue, and the Hot Dry climate future in red. The smooth line running through each projection is the 10-year running average. The gray-shaded area represents the time period that was averaged (2035–2065) to summarize future projections for the year 2050.



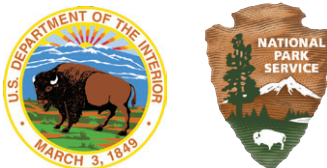
CONTACT INFORMATION

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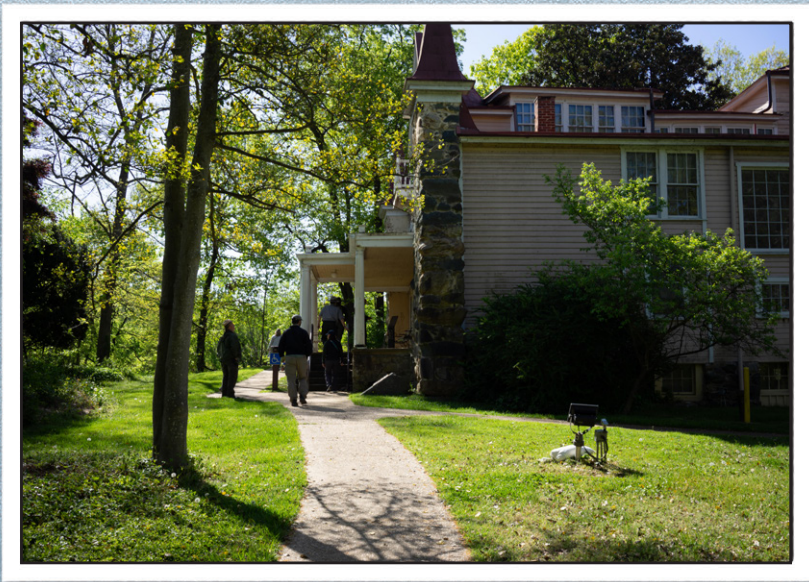




As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under US administration.

RSS

RESOURCE STEWARDSHIP STRATEGIES



BRIDGING SCIENCE AND MANAGEMENT FOR TODAY AND TOMORROW