NATIONAL PARK SERVICE • U.S. DEPARTMENT OF THE INTERIOR

RESOURCE STEWARDSHIP STRATEGY SUMMARY

ACADIA NATIONAL PARK

MAINE









JULY 2023

CONTENTS

Introduction 1
Purpose of a Resource Stewardship Strategy 1
Intent of This Summary Document 2
Development of the Resource Stewardship Strategy for Acadia National Park 5
Key Park Issues, Stressors, and Threats 7
Climate Change and Effects on Park Resources 16
Priority Resources and Components 19
Stewardship Goals and Activities 23
Ongoing Implementation of the Resource Stewardship Strategy 53
References 54
Contact Information 56

FIGURES

Figure 1. Acadia National Park Map 4
Figure 2. Historical and Future Projections for Acadia National Park 18
Figure 3. RSS Implementation Process 53

TABLES

Table 1. Key Issues, Stressors, and Threats; Potential Implications; and Affected Resources 7

Table 2. Priority Resources and Components 19

Table 3a. Stewardship Goals and Stewardship Activities for Priority Resource: Parkwide Resources 24

Table 3b. Stewardship Goals and Stewardship Activities for Priority Resource: Surface and Groundwater 25

Table 3c. Stewardship Goals and Stewardship Activities for Priority Resource: Wetlands – Freshwater and Saltwater 27

Table 3d. Stewardship Goals and Stewardship Activities for Priority Resource: Forests 29

Table 3e. Stewardship Goals and Stewardship Activities for Priority Resource: Islands 31

Table 3f. Stewardship Goals and Stewardship Activities for Priority Resource: Fauna 32

Table 3g. Stewardship Goals and Stewardship Activities for Priority Resource: At-Risk Species 36

Table 3h. Stewardship Goals and Stewardship Activities for Priority Resource: Geologic Resources 38

Table 3i. Stewardship Goals and Stewardship Activities for Priority Resource: Open Summits and Headlands 39

Table 3j. Stewardship Goals and Stewardship Activities for Priority Resource: Archeological Resources 40

Table 3k. Stewardship Goals and Stewardship Activities for Priority Resource: Cultural Landscapes and Historic Districts 41

Table 3l. Stewardship Goals and Stewardship Activities for Priority Resource: Ethnographic Resources 42

Table 3m. Stewardship Goals and Stewardship Activities for Priority Resource: History 43

Table 3n. Stewardship Goals and Stewardship Activities for Priority Resource: Historic Structures 44

Table 3o. Stewardship Goals and Stewardship Activities for Priority Resource: Museum Collections and Archive 45

Table 3p. Stewardship Goals and Stewardship Activities for Priority Resource: Air Quality 46

Table 3q. Stewardship Goals and Stewardship Activities for Priority Resource: Scenic Views 49

Table 3r. Stewardship Goals and Stewardship Activities for Priority Resource: Night Skies 51

Table 3s. Stewardship Goals and Stewardship Activities for Priority Resource: Soundscapes 52

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 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 Acadia National Park. For the sake of simplification and abbreviation, this unit of the national park system will also be referred to as "the park" or ACAD 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 ACADIA NATIONAL PARK

Since time immemorial, Native American peoples have inhabited the land now called Maine. Acadia National Park continues to be a place of enduring and immeasurable importance to the Wabanaki, People of the Dawnland. Resistant and resilient, Wabanaki people are still here.

We gratefully acknowledge the Houlton Band of Maliseet Indians, Aroostook Band of Micmac, Passamaquoddy Tribe at Motahkokmikuk, Passamaquoddy Tribe at Sipayik, and the Penobscot Indian Nation, on whose ancestral homelands we now gather.

Acadia National Park preserves approximately 50,000 acres in Hancock and Knox Counties in the northeastern United States along the mid-section of the Maine coast (figure 1). The park consists of portions of Mount Desert Island plus a portion of Isle au Haut to the southwest of Mount Desert Island, the tip of the Schoodic Peninsula on the mainland to the east, and most of or portions of 16 smaller outlying islands. The park also preserves more than 13,000 acres in conservation easements across its legislated boundary, which runs from the Penobscot River ship channel to just east of the Schoodic Peninsula.

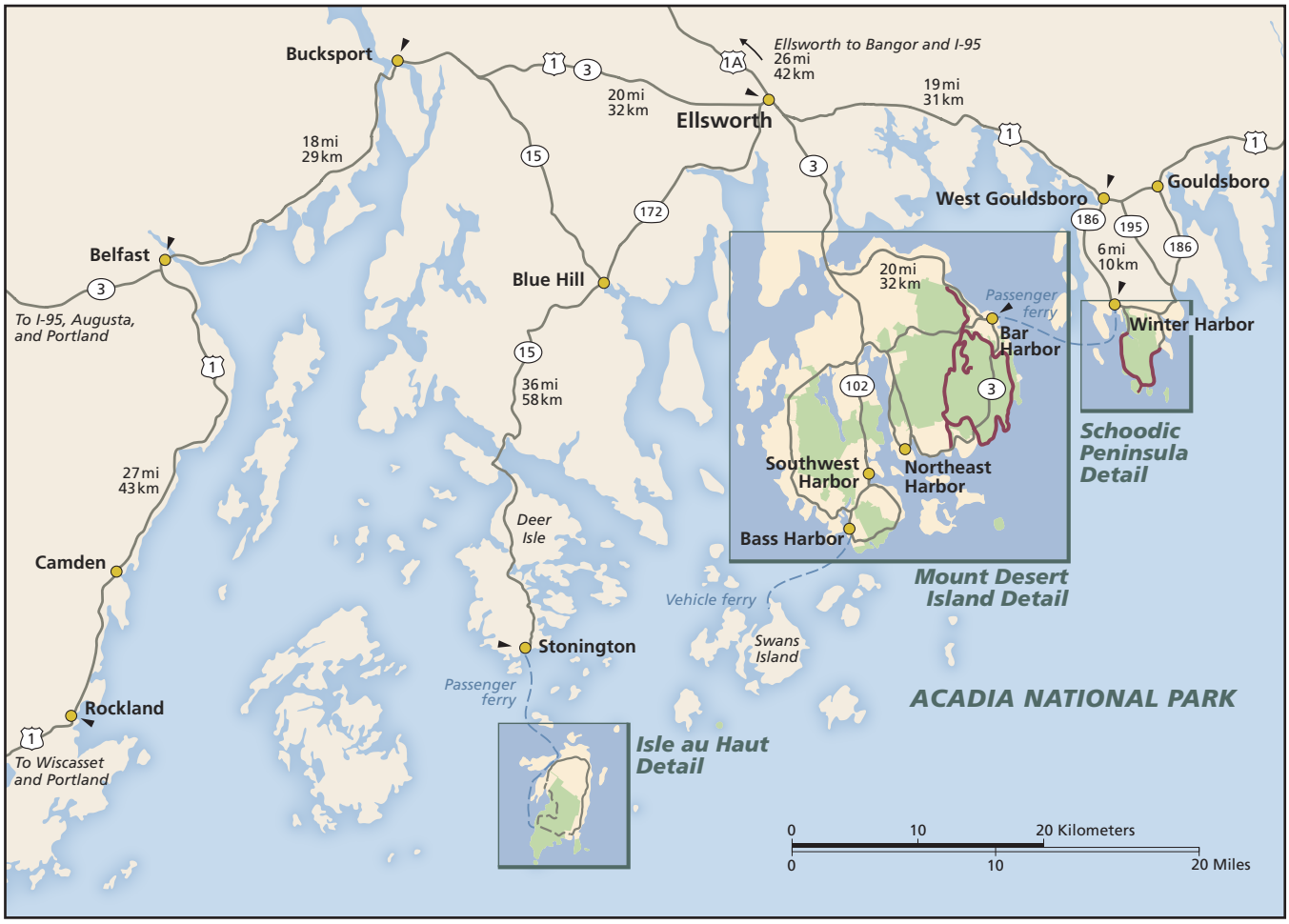
The park was created to protect the natural beauty of the highest mountains and rocky headlands along the Atlantic shore of the United States. Significant resources include a glaciated coastal and island landscape, an abundance of habitats, a high level of biodiversity, clean air and water, and a rich cultural heritage. Acadia National Park was established in 1916 as Sieur de Monts National Monument and incorporated into Lafayette National Park in 1919 as the first national park east of the Mississippi River. Much of the land comprising the park was donated from private landowners; a practice that continued throughout much of the 20th century. Congress authorized the National Park Service to accept a donation of land on the Schoodic Peninsula in 1929 when the park's current name was adopted. In 1986, Congress granted the National Park Service authority to exchange, or purchase from willing sellers, selected inholdings in an effort to remove private inholdings in the park; transfer ownership of selected noncontiguous parcels; establish a more permanent and contiguous park boundary; continue the authority to accept conservation easements to protect scenic, ecological, and cultural values; and establish a park advisory commission. The park advisory commission was reauthorized for an additional 20 years in 2006.

Acadia National Park is in a transition zone between temperate deciduous and northern coniferous forests along the Gulf of Maine and Atlantic flyway, overlying glacially sculpted granite mountains with interspersed glacially scoured lake beds and bounded by rocky headlands. Noteworthy natural resources include both coniferous and deciduous coastal spruce-fir forest, subalpine communities, heaths and marshes, an exceptionally diverse flora, over 40 species of mammals, and documented sightings of over 300 bird species. The landforms of the park illustrate the dynamics of many geologic processes including all three rock types, plate tectonics, volcanism, glaciations, and shoreline erosion. The power of glaciers is evident in U-shaped valleys and cliffs, while the ongoing assault by the sea constantly reworks the island's shoreline.

The cultural resources of Acadia National Park document human activities that span 5,000 years. Acadia's human history begins with centuries of use by native people known as the Wabanaki. Five centuries ago, Europeans began making contact with these people as they explored and settled here. Decades of commercial use by stonecutters, lumbermen, shipbuilders, and fishermen, as well as an evolving and growing northeast interest in tourism, fostered an increased interest in conservation. Other historic resources protected within the boundary of Acadia include 33 miles of scenic motor roads, 120 miles of hiking trails, 45 miles of carriage roads, a hiking trail system noted for its community origins and high level of craftsmanship, four lighthouses, and the Islesford Historical Museum.

Acadia National Park receives an average of 2.5 million visits per year, with most occurring from June through October; in 2021, 4.07 million visitors were reported for Acadia National Park. The most popular destinations include Cadillac Mountain, Sand Beach, and Jordan Pond. Resource-based recreational activities include viewing the scenery, hiking, bicycling, camping, horseback and carriage riding, sea kayaking, and canoeing. The park provides opportunities for educating visitors about its resources and values through a variety of interpretive activities including guided walks, amphitheater presentations, education programs, and outreach activities.

Figure 1. Acadia National Park Map



DEVELOPMENT OF THE RESOURCE STEWARDSHIP STRATEGY FOR ACADIA NATIONAL PARK

This resource stewardship strategy represents the collaborative efforts of National Park Service (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; 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

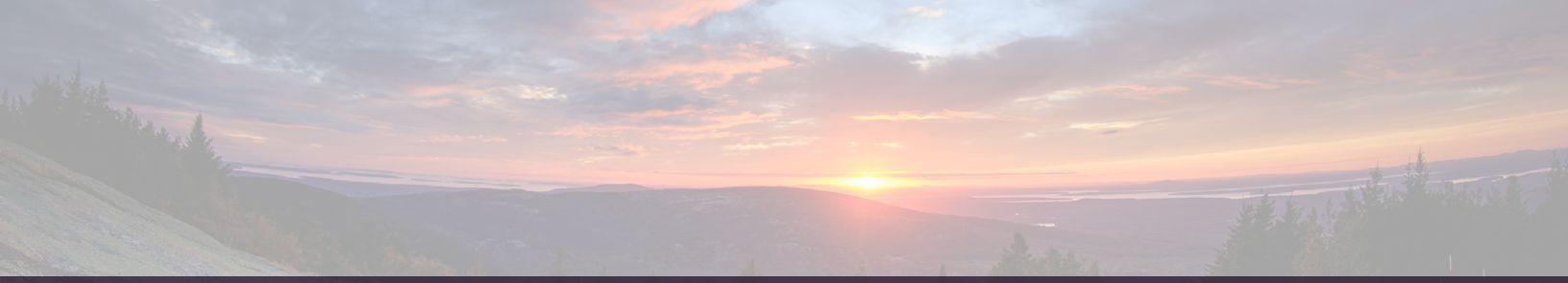
Priority Resource: A cultural or natural resource or value that the National Park Service manages or monitors to maintain a park unit's purpose and significance, to address policy/law mandates, or to address scholarly and scientific research needs or findings.

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

Acadia National Park 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.

Given the significance of climate change stressors on resources at the park, a brief narrative that elaborates on climate change effects and responses is provided after the table.

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

KEY ISSUE, STRESSOR, OR THREAT[1]	POTENTIAL IMPLICATIONS	RESOURCE TYPES AFFECTED
CLIMATE CHANGE—Frequency, Intensity of Coastal Storms	- The anticipated increase in coastal storm intensity, coupled with the expected rise in sea level and increased storm surge, creates a multiplier effect on the severity and repeated nature of resulting impacts from sea level, storm surges, and precipitation increases.	- Cultural landscapes - Cultural resources - Open summits - Native vegetation communities (islands, forests, wetlands) - Surface water - Intertidal zones - Wildlife, including species of concern
CLIMATE CHANGE—Precipitation	- Changes in precipitation quantity, timing, and type (e.g., snow versus rain) can raise the risk of drought and/or flood severity. This is known to exacerbate wildfire risk, alter species composition and habitat, and degrade aquatic habitat. - The shift in precipitation patterns my also increase flooding, causing erosion or landslides. Erosion/runoff causes changes in water quality/chemistry that can increase vulnerability to harmful algal blooms (HABs). - Changes in precipitation patterns (seasonal snow, rain patterns, or dry periods) can alter streamflow and plant invasion risk. Increased flooding may lead to washout of roads, including historic carriage roads and trails, resulting in gravel and other road materials being dumped into streams, lakes, or cultural landscapes. - Localized flooding can also expose and impact cultural resources (exposure, loss, accelerate deterioration).	- Cultural landscapes - Cultural resources - Open summits - Native vegetation communities (islands, forests, wetlands) - Surface water - Intertidal zones - Wildlife, including species of concern

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—Sea Level Rise	- Sea level rise may affect wildlife populations and specialized plant communities by altering intertidal and other coastal and hydrologically connected ecosystems, including coastal forests, wetlands, streams, and ponds. Sea level rise can change erosion rates, which may limit access to the intertidal zone and negatively impact cultural landscapes and other cultural resources. - Rising ocean temperatures and ocean acidification have ramifications for shellfish and other intertidal and aquatic resources and, in combination with sea level rise, potentially for shell middens or other buried artifacts that are associated with shorelines. - Changes to the frequency and duration of inundation associated with sea level rise can result in changes to the physical, chemical, and biological characteristics of coastal habitats and species/communities and their ecosystem functions - Saltwater intrusion associated with sea level rise has the potential to negatively impact the character and ecological function and role of groundwater and wetland habitats.	- Cultural landscapes - Cultural resources - Native vegetation communities (islands, forests, wetlands) - Surface water - Groundwater - Intertidal zones - Wildlife, including species of concern (marine mammals and birds) - Geologic resources and processes
HUMAN IMPACTS—Habitat Fragmentation	- Park visitation is increasing. - There is a proliferation of unofficial trails stemming from designated park trails associated with high rates of visitor use, and to a much lesser degree, research staff and others who are carrying out administrative tasks for the park. Widening and braiding of trails due to high levels of use are evident throughout the park. This includes informal trails that branch from maintained trails as well as unendorsed or unauthorized trail construction. - Implications from the proliferation of social trails includes continued habitat fragmentation that negatively impacts habitat quality for sensitive wildlife, sustained incursion of people into otherwise unbroken habitats, removal of vegetation, decreased soil stability in areas of heavy use (erosion), and establishment of invasive plants. There are related concerns for water quality, including erosion, nutrient enrichment, and human waste issues (physical and biochemical changes). - The integrity of the cultural/historic landscape system, contributing features, etc. is impacted as well. - The impacts of fragmentation on plants and animals are exacerbated because Acadia's ecosystems are already fragmented by the park's trails, carriage roads, motor roads, islands, and local towns and town infrastructure (roads, development, etc.). - The park's existing trails, carriage roads, motor roads, islands, and local towns and town infrastructure (roads, development, etc.) are vulnerable to washouts stemming from high-precipitation events that deposit large amounts of foreign fill material, which impedes the geological process and stratigraphy. These events threaten the science, discovery, and ecological processes related to the geological resources.	- Cultural landscapes - Cultural resources - Native vegetation communities (islands, forests, wetlands) - Surface water - Intertidal zones - Wildlife, including species of concern

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

KEY ISSUE, STRESSOR, OR THREAT[1]	POTENTIAL IMPLICATIONS	RESOURCE TYPES AFFECTED
HUMAN IMPACTS—Nearshore Anthropogenic Activities (e.g., Harvesting)	- The condition of seagrass bed ecosystems has deteriorated in recent years due to a number of issues. From studies in habitats similar to those of Mount Desert Island, shellfish harvesting, and boat moorings are known to impair seagrass beds, including eelgrass beds. Seagrass beds can also be impaired by dredge and fill operations, boat propellers, docks, and anchors. Damage to seagrass beds can take several years to recover or the beds may be destroyed, depending on conditions. Harvest of rockweed is also a concern. - Other factors that contribute to seagrass decline are algal blooms caused by nitrogen pollution and sedimentation from intensive land use practices that causes high turbidity, limiting the amount of sunlight reaching seagrass leaves.	- Surface water - Intertidal zones - Wildlife, including species of concern - Marine vegetation - Marine invertebrates - Benthic habitat
HUMAN IMPACTS—Increased Visitation	- A recent increase in visitation has had a variety of negative impacts on park resources. Increased visitation is directly related to the warming climate and extended shoulder seasons. Increased traffic and visitation are also associated with the popularity of cruise ship arrivals in adjacent Bar Harbor and tourism promotion from local chambers of commerce. This has reduced park staff capacity to respond appropriately and adequately to resource management needs. - Increased visitation has also increased demands on park staff and facilities, and patterns of visitor use generate resource damage at key destination points. Resources impacted include vegetation, wildlife, soils, and geologic features such as domes, cliffs, rock walls, and rare calcareous soil types and sand dune features. - Recreational activities such as those affecting geological resources (bouldering, rock climbing, resource collection for landscaping and souvenirs), and detrimental activities (graffiti) have targeted impacts on geological resources. - Increased visitation also negatively affects air quality. This stems from the increase in vehicle use from previous years to accommodate visitors, including private and rental vehicles, buses, and cruise ships. There is also the related issue of idling due to traffic congestion and time spent waiting for open parking spaces. - Increased visitation also expands the range of invasive species (particularly plants and insects) by visitors who unintentionally bring seeds and insects (e.g., in shoes, firewood, boats, camping supplies) into the park from other locations. Landscaping in local communities, plantings after construction, and other practices also substantially contribute to the spread of invasive species.	- Cultural landscapes - Cultural resources - Native vegetation communities (islands, forests, summits, wetlands) - Surface water - Intertidal zones - Wildlife, including species of concern - Geologic resources and processes - Air 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
EMERGING PESTS AND PATHOGENS	- Emerging pests and pathogens can be defined as organisms that may have existed at naturally low levels in an environment or that have recently appeared in ecosystems but are rapidly increasing in incidence or geographic range, with the potential to disrupt natural ecosystem functioning at large scales. The increases in incidence or range of emerging pests and pathogens are related to expanded and/or changing land use, trade and travel networks, via accidental or intentional introductions, and through changing climatic patterns that influence ambient conditions on the landscape (e.g., temperature, humidity, air and ocean currents) where emerging pests and pathogens might establish or expand. - Park management and staff have concerns regarding several emerging pests and pathogens that are stressors to native wildlife and plant species in the park. These include large-scale insect outbreaks in red spruce-dominated and hemlock forests, HABs stemming from nutrified water and sedimentation, Pseudogymnoascus destructans, a non-native fungus that causes white-nose syndrome (a disease that has had devastating impacts on North American bat populations), and Asian shore crabs that can dominate shallow intertidal rocky habitats and threaten native intertidal species such as blue mussels and rock crabs.	- Forest condition and ecosystem services - Wildlife, including species of concern - Native vegetation communities (islands, forests, wetlands) - Viewsheds (open summits) - Surface water
INVASIVE SPECIES—Non-native Invasive Plants	- Nonnative, invasive plants compromise key ecological processes and communities by reducing native species diversity and altering community structure and wildlife habitat conditions. Because of numerous human-modified vegetation communities, native plant communities are especially vulnerable to competition from nearby sources of invasives.	- Cultural landscapes - Cultural resources - Native vegetation communities (islands, forests, wetlands) - Surface water - Intertidal zones - Wildlife, including species of concern
INVASIVE SPECIES—Non-native Invasive Animals	- Human-caused factors and conditions introduce or promote novel animal pests or augment continued dispersal of existing animal pests. Establishment of animal pest species may alter or disturb vegetation community structure, wildlife, and habitat, as well as impact historic structures.	- Cultural landscapes - Cultural resources - Native vegetation communities (islands, forests, wetlands) - Surface water - Intertidal zones - Wildlife, including species of concern

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

KEY ISSUE, STRESSOR, OR THREAT[1]	POTENTIAL IMPLICATIONS	RESOURCE TYPES AFFECTED
PARK FACILITY AND INFRASTRUCTURE DEVELOPMENT	- Facility operations, existing and new infrastructure, and site development (e.g., parking lot construction), and other management activities contribute to continued habitat fragmentation, noise and light pollution (including after construction activities have concluded), introduction of invasive plants, increase risk of vehicle-wildlife collisions, and alter local hydrological functioning. These developments occur in response to needs identified for park operations, and increased visitation demands. - Internal influences could include: · Road building and filling · Ditches, culverts, and dredging · Bridges, causeways, dikes, and other physical barriers · Water withdrawals · Interior park lighting	- Cultural landscapes - Cultural resources - Native vegetation communities (islands, forests, wetlands) - Surface water - Intertidal zones - Wildlife, including species of concern (fish, marine mammals and birds) - Scenic views - Night skies - Soundscapes
EXTERNAL LAND USE CHANGES—Developmental, Residential, Non-Residential	- Differing and sometimes incompatible land management practices 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. These include elements such as continued landscape, hydrological, and ecological connectivity; the undeveloped character of park lands and resources; the ability to carry out fire management practices; and protection of traditional cultural resource values, visual resources, night sky, and soundscape. In particular, issues arise from differences in understanding between agency policies and administrative approaches to municipal water use, and when there is insufficient outflow from reservoir lakes to outlet streams that would otherwise maintain aquatic life in the streams. - External influences could include: · Dams and physical barriers · Water withdrawals (municipal drinking water, tank trucks for pools, irrigation) · Aquaculture · Management of water quality · Nutrient enrichment from septic systems/wastewater · Subdivision/urban development · Landscaping vegetation that has moved outside of its intended boundaries · Pesticide use · Sediment management · Cell phone towers, wind turbines, and other tower-type construction · Infrastructure development or upgrades · Lighting in adjacent or nearby communities · Lighting from nearby federally permitted projects (e.g., wind farms)	- Cultural landscapes - Cultural resources - Native vegetation communities (islands, forests, wetlands) - Surface water - Intertidal zones - Wildlife, including species of concern (marine mammals and birds) - Geologic resources and processes - Scenic views - Night skies - Soundscapes

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

KEY ISSUE, STRESSOR, OR THREAT[1]	POTENTIAL IMPLICATIONS	RESOURCE TYPES AFFECTED
EXTERNAL MANAGEMENT OF NATURAL RESOURCES FOR RECREATION AND OTHER USES	- Agencies that are external to the park manage some natural resources to support the public's desire for recreational experiences and to support harvesting. These activities include stocking waterways with non-native game fish and managing harvesting of clams and marine worms. - Introduction of non-native species contributes to continued introduction and/or spread of invasive exotic species (fish, invertebrates, etc.) that impact sensitive species and other native wildlife.	- Traditional tribal land and resource values and use - Cultural landscapes - Cultural resources - Native vegetation communities (islands, forests, wetlands) - Surface water - Intertidal zones - Wildlife, including species of concern (marine mammals and birds) - Geologic resources and processes
DATA NEEDS FOR NATURAL RESOURCE PROTECTION	- The park's lands contribute to regional biodiversity and serve as an important wildlife corridor and habitat. Though there is information and research for many of the park's resources, ongoing inventory, monitoring, and baseline information are needed to address increasing negative impacts to vegetation community composition, wildlife, hydrology, etc. - Current baseline data can guide management decisions for natural resource conservation and detect changes to natural resource quality over time. - Many of the natural resources in the park do not have baseline data or monitoring plans or else would benefit from updated data. Well-managed data keep park managers current and facilitates the understanding of trends and conditions of the resources the park is responsible for managing.	- Aquatic plant species - Water quality and flow - Night skies - Viewsheds - Cultural landscapes - Native vegetation communities (islands, forests, wetlands) - Surface water - Intertidal zones - Wildlife, including species of concern (marine mammals and birds)

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	- Without the effect of pollution, visual range is 75-175 miles. However, scenic views are often diminished by pollution-caused haze, reducing visibility to 55-135 miles depending on pollution levels. At night, particulates scatter artificial light, increasing the impact of light pollution on night skies. - Ground-level ozone reaches levels that can negatively affect breathing for sensitive user groups and has caused foliar injury to some of the park's 32 ozone-sensitive plants. Studies at ACAD have documented injury to spreading dogbane and big-leaf aster plants and reduced growth in white pines. From 2011 to 2020, ozone concentration remained relatively unchanged, and the park experienced up to three ozone annual exceedances of EPA's National Ambient Air Quality Standard (NAAQS). - Airborne contaminants, including mercury, can accumulate in organisms, leading to reduced foraging efficiency, survival, and reproductive success. Elevated mercury levels have been found in park wildlife, including insects, fish, birds, salamanders, otters, and mink. The Maine Center for Disease Control & Prevention has statewide freshwater and saltwater fish safe eating guidelines due to mercury, PCBs, and dioxins. - Park ecosystems are highly sensitive to and at risk from acidification effects of excess nitrogen and sulfur deposition to soils, lakes, ponds, and streams. The park has at least 23 acid sensitive plant species, including sugar maple and red spruce that are especially sensitive to acidification. - In addition to natural weathering, air pollution contributes to deterioration of historic structures and other exposed cultural resources made from stone, paint, or metal.	- Air quality - Scenic views - Night skies - Cultural landscapes - Cultural resources - Native vegetation communities (islands, forests, wetlands) - Surface water - Intertidal zones - Wildlife, including species of concern (marine mammals and birds) - Historic structures
LIGHT AND NOISE POLLUTION	- Noise and light pollution from adjacent developments encroaches on soundscapes, night skies, and visitor experience in the park. Noise from motorcycles, tour buses, and overflights affect visitor opportunities to enjoy the natural soundscape. Noise and light pollution can detract from a range of visitor experiences including ranger-let programs, wildlife viewing, camping, and seeking solitude. Habitats and wildlife populations can be disrupted by noise and artificial light from nearby developments, aquaculture, roadways, and some visitor activities. Noise and light pollution can be particularly harmful for migratory birds, bats, and insects, many species of which are significantly declining in abundance and some of which are listed as threatened or endangered. Noise and light pollution can also adversely affect aquatic biota, potentially causing physiological changes as well as disrupting natural biological cycles and behavior.	- Night skies - Soundscapes - Cultural landscapes - Wildlife (terrestrial, aerial, aquatic)

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

KEY ISSUE, STRESSOR, OR THREAT[1]	POTENTIAL IMPLICATIONS	RESOURCE TYPES AFFECTED
OUT-OF-DATE OR INCOMPLETE CULTURAL RESOURCES BASELINE DOCUMENTATION	- Although the park has baseline documents for its cultural resources, many of the documents are now out-of-date. The archeological overview and assessment is from 2003 to 2004 and while it is still used regularly by park staff, it needs to be updated to include archeological sensitivity modeling. The ethnographic overview and assessment was completed at the same time and while it was comprehensive at the time, it is now out of date. The park's collections management plan is, as of 2022, more than 25-years old. - In addition, cultural landscape reports need to be completed for several popular sites, including Sieur de Monts Spring, Jordan Pond House, and Cadillac Mountain Summit. Park staff are also concerned about older National Register of Historic Places documentation. - Inadequate guidance documents limit the park staff's ability to protect the resources and threatens the resources themselves.	- Archeological resources - Cultural landscapes - Ethnographic resources - Historic structures - Museum collection
INADEQUATE MUSEUM CONDITIONS	- Assessments of the park's museum collections have noted that the existing HVAC system is a threat. Other NPS museum facilities have been assessed for vulnerabilities to climate change impacts (humidity, structural elements, location, air flow, heat retention). Poor environmental and climate conditions pose risks to long-term preservation of museum collections. Seasonal fluctuations in temperature/humidity and other issues related to inadequate climate control and climate change impacts are of particular concern. Left unaddressed, the items in the museum collection will deteriorate to the point that they will no longer illustrate their historic significance.	- Museum collection
BACKLOG IN CATALOGING PARK RECORDS	- There is a significant backlog of uncatalogued records, primarily park resource management records. More than 300 boxes are currently inaccessible to park staff and the public. Funding and capacity issues at the park level and the regional level impede completing this work.	- Museum collection
WEATHERING AND DETERIORATION OF HISTORIC RESOURCES	- The condition of many of the park's cultural landscapes is deteriorating. A significant amount of deferred maintenance has been identified on the assets associated with cultural landscapes. The condition of Civilian Conservation Corps structures and infrastructure is diminishing. The lack of baseline documentation has made it difficult for park managers to make decisions about managing this important historic resource. In addition, the Baker Island lightkeeper's house and the Baker Island lighthouse are in fair condition. The lighthouse will continue to degrade from exposure to the elements unless the exterior is treated. The Gilley House is in poor condition.	- Cultural landscapes - Historic structures

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

KEY ISSUE, STRESSOR, OR THREAT[1]	POTENTIAL IMPLICATIONS	RESOURCE TYPES AFFECTED
LACK OF SPECIALIZED PRESERVATION MAINTENANCE CAPACITY	- Staff generally have the necessary skills and abilities to perform preservation maintenance work on the park's historic structures. Training is provided to improve skills and keep them up to date. Some historic structures, however, have high-level needs that surpass the capacity of park staff to provide the required level of effort. - Due to lack of staff and time, the maintenance team has reduced capacity to devote to caring for the historic resources. This issue far outweighs the lack of skill.	- Cultural landscapes - Historic structures
VISITORS RELOCATING OR DECONSTRUCTING CAIRNS	- The park contains designed landscapes comprising nationally significant cultural resources, including the finest example of a historic carriage road system in the United States and structures that embody NPS Picturesque and Rustic Design styles. Park staff struggle to maintain cairns along hiking trails as visitors tend to relocate or deconstruct the cairns. These are constructed in the historic style of pathmaker Waldron Bates and are a character-defining feature of the nationally significant historic trail system. As of the 2016 foundation document, construction of unauthorized cairns by park visitors was increasing.	- Cultural landscapes - Historic structures

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



CLIMATE CHANGE AND EFFECTS ON PARK RESOURCES

Acadia National Park has already had significant and rapid human-caused climate change (USGCRP 2017). In Maine, the average summer and winter temperatures in the periods 2010-2014 and 2015-2019 were among the warmest five-year intervals in more than a century (Runkle et al. 2022). Minimum annual temperatures in ACAD have significantly increased since 1970. Average annual precipitation has increased at a rate of 7.2 inches per 100 years over the historical period to present and there have been critical shifts in the style of the precipitation events. Extreme rainfall events have increased regionally and can change the frequency of flood peaks on tributary stream systems of ACAD, with implications for geomorphology and sediment transport. Increasing frequency of extreme precipitation is partly due to storms, including hurricanes and Nor'easters, which also can cause additional coastal damage from storm surge and flooding (NOAA 2019). Storm impacts are also expected to increase with sea level rise. The historic average rate of sea level rise (based on the Bar Harbor tide gauge record) is 0.09 inches per year during the period of record (1947–2022). Spring onset (classified as at the extremely early end of the historical range of first leaf index dates) has been trending earlier. These sorts of climate change effects frequently act as stress multipliers and exacerbate existing threats to natural resources, historic structures, and cultural landscapes.



All climate models project warming temperatures at ACAD by ca. 2040 relative to a 1979-2012 baseline (analyses: NPS Climate Change Response Program [CCRP]; Figure 2). All models also project increasing average annual precipitation relative to the historical period. CCRP produced two divergent and plausible climate futures specific to ACAD for consideration during the RSS process. These include a "Warm Damp" and "Hot Wet" climate future. Under both projections, temperatures and precipitation increase but differ in the magnitude of change for both measures with only moderate increases in total precipitation anticipated in the "Warm Damp" future. Considering different scenarios of climate change at ACAD is intended to allow planning for a range of plausible scenarios under uncertain conditions; the scenarios used here are simpler and more recent than those used in ACAD's 2015 scenario planning workshop (Lawrence et al. 2021, Star et al. 2016).

Specifically, under a "Warm Damp" climate future, mean annual temperatures are projected to rise 2.9 degrees Fahrenheit by 2040. Sea level rise of 1.1 feet is expected by 2050 under this scenario (Sweet et al. 2022). In a "Hot Wet" climate future, mean annual temperatures are projected to increase 5.3 degrees Fahrenheit (Figure 2) by 2040. Sea level rise is estimated at 1.5 feet by midcentury in a "Hot Wet" climate future (Sweet et al. 2022). Both climate futures project a decrease in days below freezing (-14% to -26%) and either a doubling or tripling of the number of days above the 95th percentile for heat (81.7 degrees Fahrenheit). Such changes in temperature will affect species ranges. They will exclude some species that depend on cooler conditions while allowing further range expansions of subtropical species, including non-native exotics.

Models also project that precipitation may occur during higher-intensity one- or two-day events throughout the Northeast, due to the higher water vapor content of the atmosphere with increasing temperature (USGCRP 2017). Seasonal precipitation is projected to increase in the "Warm Damp" climate future, particularly in winter, spring, and fall, whereas seasonal precipitation is projected to increase from one to two inches across all seasons for the "Hot Wet" climate future. Overall, climate change is anticipated to intensify the hydrologic cycle at ACAD, increasing the intensity and frequency of extreme events including drought and deluge.



Climate change acts as a threat multiplier (Gross et al. 2016) and these physical changes are already causing ecological changes on summits, forests, and wetlands that ACAD staff are researching. Scenario planning for ACAD (Star et al. 2016) highlighted vulnerabilities related to streamflow affecting historic culverts and carriage roads, invasive species, and native vegetation restoration. Erosion due to intense precipitation is already negatively impacting archeological resources and cultural landscapes of ACAD. Sea level rise may affect salt marsh composition and access to marshes by Wabanaki sweetgrass harvesters.

Climate change could alter the flora and fauna of ACAD due to changes in air temperatures and precipitation patterns and could affect the fundamental hydrology that determines the function, composition, and structure of this ecosystem. A changing climate and associated drought stress may also make the forests of ACAD more susceptible to native (e.g., southern pine beetle; *Dendroctonus frontalis*) and non-native tree pests (emerald ash borer, hemlock woolly adelgid) by lengthening the frost-free season.

Forests in Acadia are currently dominated by red spruce (*Picea rubens*; Miller et al. 2014). Suitable habitat for red spruce is predicted to decline, which may result in a more mixed, possibly hardwood-dominated forest (Peters et al.). Such shifts in dominant tree species may affect historic viewsheds.

Climate change also increases the threat from invasive plant species at ACAD. Longer growing seasons, shorter cold snaps, and higher carbon dioxide concentrations may allow invaders to expand into new ranges. New pest risks may require updates to existing integrated pest management plans.

Changing temperature and precipitation patterns could also compromise key ecological processes due to mismatch of timing of natural events (phenology), possibly reducing native species richness and altering community structure.

Wildlife species such as birds may shift occupancy and use of ACAD because of climate change. For example, Wu et al. (2018) found that under a high greenhouse gas emissions scenario some bird species will potentially be extirpated from the site (60 species in the summer, 12 species in the winter) while other bird species may colonize the area as it becomes more climatically suitable (12 species in the summer, 45 species in the winter).

A warming climate is likely to have a complex effect on visitation to ACAD, where potential increases will not be evenly distributed spatially or temporally (Fisichelli et al. 2015). These impacts will then cascade into a variety of management decision needs, from congestion to altered maintenance priorities and staffing needs.



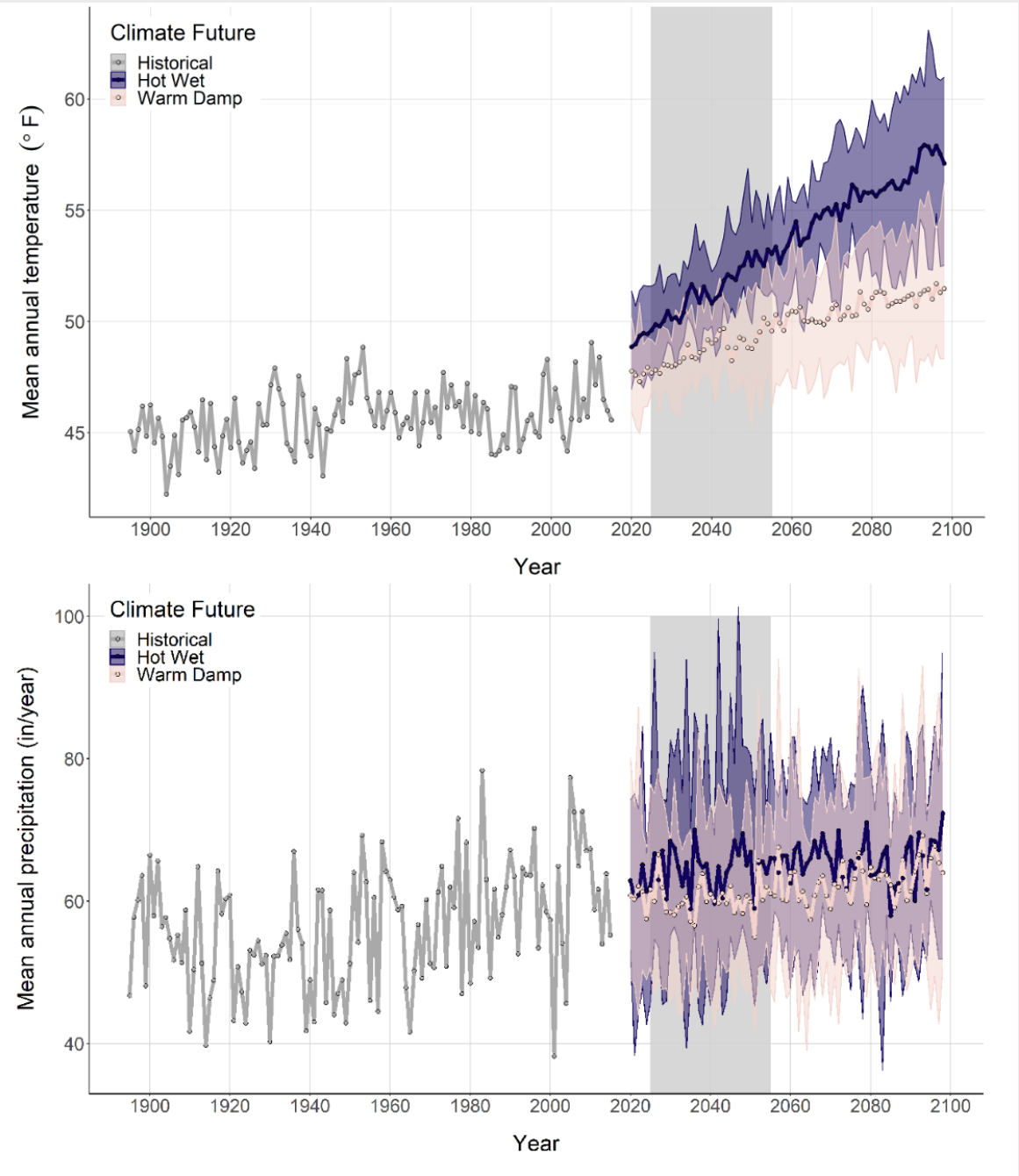


Figure 2. Historical and Future Projections for Acadia National Park

Note: Historical observed data (gray lines; NOAA nClimGrid records from 1895-2020 [Vose et al. 2014], bias-corrected using gridMET records from 1979-2020 [Abatzoglou 2013]) and future projections (purple and pink lines; downscaled global climate model (GCM) projections from 2023-2099 [Abatzoglou & Brown 2012]) for annual mean temperature and precipitation in ACAD. The purple and pink lines represent the means of GCMs grouped into Hot Wet and Warm Damp climate futures. Gray shaded area represents the future time period 2025-2055, used to average future changes from the historical baseline.

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 the NPS Northeast Temperate Inventory and Monitoring Network reports.

Table 2 lists priority resources and their components for the Acadia National Park resource stewardship strategy.

Table 2. Priority Resources and Components

PRIORITY RESOURCE	COMPONENT(S)
PARKWIDE RESOURCES	- No components identified
SURFACE WATER AND GROUNDWATER	- Water quality and condition - Natural flow - Native aquatic species - Lake and stream fish assemblages - Macroinvertebrate assemblages
WETLANDS – FRESHWATER AND SALTWATER	- Intertidal zones - Rocky intertidal areas - Mudflats - Salt marshes - Estuarine emergent wetlands - Seagrass beds - Freshwater wetlands - Big heath - Shellfish assemblages - Fish assemblages - Marine macroinvertebrate assemblages



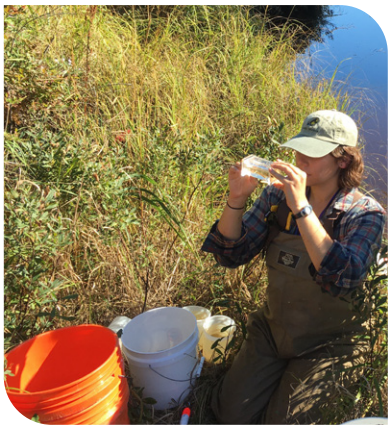










Table 2. Priority Resources and Components (continued)

PRIORITY RESOURCE	COMPONENT(S)
FORESTS	- Red spruce forests - Coniferous and deciduous forests - Hemlock forests (includes mixed-forest) - Jack pine woodland - Pitch pine woodland - Pitch pine/broom crowberry - Old growth coastal red spruce (Western Mountain) - Forest landbirds - Mammals - Bats - Amphibians - Insects
ISLANDS	- Resident/breeding seabirds - Forest, marsh, or coastal resident/breeding birds - Migratory avifauna - Biogeography - Archeological sites - Cultural landscapes
FAUNA	- Diadromous fish (e.g., sea run brook trout, alewife, eels) - Fish - Herptiles - Resident/breeding/migratory bird species - Small and midsized mammals - Invertebrates
AT-RISK SPECIES	- Bats - Migratory bird species - Insects - Rare, threatened, or endangered species - Culturally significant plant species
GEOLOGIC RESOURCES	- Surficial geology - Post-glacial landscape - Cliffs and talus slopes - Quarries - Sand beach
OPEN SUMMITS AND HEADLANDS	- Low-elevation bald and rocky summit heath - Emergent rock habitats and rocky woodlands - Cliff and talus slopes - Open headlands (not summits, but open and rocky environments)
ARCHEOLOGICAL RESOURCES	- Native American archeological sites - Historic archeological sites

Table 2. Priority Resources and Components (continued)

PRIORITY RESOURCE	COMPONENT(S)
CULTURAL LANDSCAPES AND HISTORIC DISTRICTS	- Seawall Campground - Blackwoods Campground - Isle au Haut - Light station complexes: Baker Island, Bear Island, Bass Harbor Head - Jordan Pond House - Sieur de Monts Spring - Historic hiking trail system - Historic carriage road system - Historic motor road system - Cadillac Mountain summit - Thunder Hole - Schoodic Peninsula
ETHNOGRAPHIC RESOURCES	- No components identified
HISTORY	- No components identified
HISTORIC STRUCTURES	- Brown Mountain Gatehouse - Jordan Pond Gatehouse - Islesford Museum - Bear Island Light Station - Bass Harbor Light Station - Thunder Hole Ranger Station - Eli Creek Cabin - The Carroll House - Storm Beach Cottage - Baker Island Light Station - Carriage Roads and Motor Road Bridges - The Blue Duck Ship Store - U.S. Naval Radio Station Apartment Building and Generator Building - Seawall Checking Station
MUSEUM COLLECTIONS AND ARCHIVE	- Archival collections - Cultural history collections - Native American archeological collections - Natural history collections - Herbarium collection
AIR QUALITY	- No components identified
SCENIC VIEWS	- Conservation easements
NIGHT SKIES	- No components identified
SOUNDSCAPES	- No components identified









The team also identified stewardship goals and activities that addressed parkwide resource issues and needs such as park and public knowledge of resources, cross-boundary resource management, climate change science, and visitor use management.

WARNING

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 park made an effort to consider and document integrated resource management efforts within these activities and will seek to carry them out as described.



Tables 3a to 3s include each priority resource, stewardship goals, and prioritized stewardship 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: Parkwide Resources

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
PARKWIDE RESOURCES	Improve park and public knowledge of natural and cultural resources to facilitate higher levels of understanding and preservation of park resources.	Building off of Policy Memorandum 22-03, the park ensures that Indigenous science methodology is incorporated into resource management and park operations.	- Establish an advisory group to develop methods to implement the memorandum. (High) - Identify methods and partnerships to communicate strategies related to Indigenous science. (Medium)
PARKWIDE RESOURCES	Cross-boundary resources are managed through regional partnerships.	The park collaborates with external partners to benefit the park's cultural and natural resources.	- Communicate with nearby developers, planners, county zoning, industry, and sister agencies to increase awareness about the importance of parkwide resources. (Medium) - Collaborate with Maine Coast Heritage Trust (MCHT), Maine Department of Marine Resources (DMR), Maine Department of Environmental Protection (DEP), National Oceanic and Atmospheric Administration (NOAA), and Gulf of Maine Research Institute (GoMRI) to determine shared concerns and common solutions. (Medium) - Identify or renew existing partnerships that would expand the park's capacity to respond to cross-boundary resource issues affecting park priority resources. (Medium) - Collaborate with Natural Resource Stewardship and Science (NRSS) and Northeast Region (NER) to develop a process for responding to external stakeholder activities that may threaten park resources. (Medium)
PARKWIDE RESOURCES	Cross-boundary resources are managed through regional partnerships.	Park management and staff work with partners on large landscape conservation projects.	- Continue partnership and philanthropic conservation efforts to exchange, or purchase from willing sellers, selected inholdings to remove private inholdings in the park; transfer ownership of selected noncontiguous parcels; establish a more permanent and contiguous park boundary; and continue the authority to accept conservation easements to protect scenic, ecological, and cultural values. (Medium) - Continue to monitor and enforce current NPS-held conservation easements to protect scenic character and resources. (Medium) - Update ACAD land protection plan to establish priorities and needs related to property acquisition within the legislated park boundary. (Low) - Update the inventory of adjacent owners every five years to inform partnerships to improve cross-boundary issues. (Low) - Communicate with nearby land trusts, towns, sister agencies, and other landowners to identify and collaborate on landscape projects including habitat connectivity and climate refugia. (Medium)

Table 3a. Stewardship Goals and Stewardship Activities for Priority Resource: Parkwide Resources (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
PARKWIDE RESOURCES	Foster ecological integrity and cultural authenticity as climate change alters park resources.	Integrate climate change science in resource management actions.	- Work with NPS Climate Change Response Program to develop strategy and update scenario plans and climate projections as new data on impacts emerge. Address what to maintain and the hard decisions of what may not be able to be maintained due to climate impacts. (High) - Identify and prioritize vulnerabilities in areas of concern and factor in those in ongoing research and planning. (Medium)
PARKWIDE RESOURCES	Apply social science and visitor use management strategies to inform park management decisions.	Ongoing processes have been formalized and resulted in completed visitor use management plans.	- Conduct a resist-accept-direct (RAD) process to develop a visitor use plan that addresses increasing visitor impacts caused by increasing visitation during wet times of year, combined with long-term trends towards wetter conditions overall. (Low) - Identify indicators and standards relevant to desired conditions for a comprehensive plan for high visitor use areas/attractions (and if needed develop desired conditions beyond transportation plan). (Medium) - Update visitor counting procedures. (High) - Identify visitor use carrying capacities for high-priority areas (e.g., Bass Harbor Light, Cadillac Mountain, carriage roads, motor road). (Medium)

Table 3b. Stewardship Goals and Stewardship Activities for Priority Resource: Surface and Groundwater

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
SURFACE WATER AND GROUNDWATER	Improve ecological conditions by maintaining water quality and quantity, and recovering connectivity, structure, and transition between habitats, including connectivity between groundwater, riparian areas, uplands, and watersheds.	Strengthen partnerships in long-term water quality and quantity monitoring to help guide future management actions.	- Continue to support stream gauges at Otter Creek (US Geological Survey [USGS] stream gauge network) and continue collaboration to support stream gauges that are established by Friends of Acadia and College of the Atlantic (partners). (High) - Continue to support stream gauges for long-term monitoring and monitoring at key restoration sites to understand changes in water dynamics and the effectiveness of management actions. (Medium) - Continue supporting the McFarland Hill USGS groundwater monitoring well. (Medium) - Reactivate other inactive wells on Mount Desert Island, as appropriate. (Low) - Implement a focused condition assessment to assess groundwater trends in the park (including saltwater intrusion). (Medium) - Continue to work with partners to remove barriers to stream connectivity in reaches of streams outside of the park where feasible (e.g., working with Bar Harbor Public Works Department on Cromwell Brook and other streams). (High) - Restore/maintain habitat quality for fish and other aquatic species. (High)

Table 3b. Stewardship Goals and Stewardship Activities for Priority Resource: Surface and Groundwater (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
SURFACE WATER AND GROUNDWATER	Improve ecological conditions by maintaining water quality and quantity, and recovering connectivity, structure, and transition between habitats, including connectivity between groundwater, riparian areas, uplands, and watersheds.	Develop rapid response plans via prioritization of vulnerabilities to water quality, quantity, connectivity, and structure (include vulnerability assessment outcomes related to cultural resource management and climate change).	- Maintain and strengthen water quality and quantity monitoring program. (High) - Identify trends, conditions, and threats to water quality and quantity (e.g., HABs). (High) - Identify vulnerabilities to water quality, quantity, connectivity, and structure, particularly given climate change. (Medium) - Identify infrastructure vulnerabilities that may negatively impact water quality components if compromised. (High) - Gather information and assess specific climate change vulnerabilities related to water quantity and quality (e.g., erosion, flood damage, sedimentation) where fine-scale information is necessary to plan appropriate management actions to preserve ecological conditions, cultural resources (e.g., structures, trails, roads), and transportation infrastructure. (Medium) - Continue supporting public water supplies. (Low) - Develop and implement a consistent monitoring plan for invasive aquatic species to allow early detection and rapid response, and periodically reevaluate which species are high priority. (Medium)
SURFACE WATER AND GROUNDWATER	Improve ecological conditions by maintaining water quality and quantity and recovering connectivity, structure, and transition between habitats, including connectivity between groundwater, riparian areas, uplands, and watersheds.	Improve hydrology along elevational gradients to support natural functions of aquatic ecosystems to build resiliency.	- Assess and monitor native fish assemblages. (High) - Improve understanding of fish dynamics and vulnerabilities for populations in highest management (lakes) and less understood coldwater species (e.g., sea run brook trout, American eel). (High) - Collaborate with partners to ensure best practices for fish harvest and management. (Medium) - Assess and prioritize improvements for aquatic organism passages. (Medium)

Table 3c. Stewardship Goals and Stewardship Activities for Priority Resource: Wetlands – Freshwater and Saltwater

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
WETLANDS – FRESHWATER AND SALTWATER	Protect biodiversity and function of wetlands via strategic management of wetland habitat.	Improve understanding of the ecology and functioning of softbottom systems.	- Partner with diverse groups (e.g., Maine DMR, harvesters, Wabanaki, universities, citizen science) to monitor soft-bottom intertidal resources to better understand ecology of this system. (High) - Monitor/conduct research with partners to better understand the physical and chemical properties of soft-bottom habitats and associated resources (i.e., shellfish, worms, and other invertebrate communities). (Medium) - Work with partners to conduct research on the effects of human activities (e.g., harvesting) and climate change (e.g., sea level rise, changing temperatures, ocean acidification) on soft-bottom intertidal resources. (High) - Inventory and assess how fin fish use intertidal habitats, to understand their vulnerabilities. (Medium)
WETLANDS – FRESHWATER AND SALTWATER	Protect biodiversity and function of wetlands via strategic management of wetland habitat.	Synthesize understanding of soft-bottom and rocky intertidal ecosystems and implement necessary management strategies to protect them.	- Revisit 15-year-old studies of trampling in rocky intertidal areas to assess visitor impacts on intertidal species. (High) - Develop a visitor use management strategy to protect rocky intertidal habitats. (Low) - Conduct a focused condition assessment to synthesize information on the rocky and soft-bottom intertidal habitats to inform management, and to identify information gaps/research needs related to soft-bottom intertidal resources. (High) - Support research to understand impacts of climate change (including ice scour) on algae, clams, and other intertidal species in rocky and soft-bottom areas. (Medium) - Continue monitoring and response to poaching of intertidal species, particularly seaweeds. Also continue research to understand impacts of harvesting of algae in and around ACAD. (Medium) - Following inventory and assessment of fin fish and intertidal habitat use, develop approaches to prioritize and protect the fish and their habitats. (Low)
WETLANDS – FRESHWATER AND SALTWATER	Protect biodiversity and function of wetlands via strategic management of wetland habitat.	Understand impacts of sea-level rise and storm surge induced transitional changes in coastal habitats.	- Identify specific mitigation sites and methods to reduce influence of infrastructure obstructing shifts in coastal habitats. Consult existing marsh migration modeling studies to inform mitigation actions where infrastructure may be obstructing shifts. (High) - Apply RAD approach to management decisions for marsh migration. (Medium) - Continue to work with the Schoodic Institute to communicate information to the public on sea level rise, storms, and their impacts. (Medium)

Table 3c. Stewardship Goals and Stewardship Activities for Priority Resource: Wetlands – Freshwater and Saltwater (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
WETLANDS – FRESHWATER AND SALTWATER	Protect biodiversity and function of wetlands via strategic management of wetland habitat.	Restore wetland hydrology in Great Meadow to improve overall wetland function by implementing EA recommendations.	- Complete design of Park Loop Road culvert and stream channel restoration. Get construction documents out for bid. (High) - Develop visitor use/safety plan for vista and culvert site. (Low) - Complete design for Hemlock Path Restoration. Get construction documents out for bid. (High) - Coordinate with Trails Program, Friends of Acadia, Kebo Valley Golf Course, and Town of Bar Harbor on community connector trails. (Low) - Complete design for ditch plugs and removal of road material. (Medium) - Inventory and manage invasive plants in wetlands and adjacent landowner properties. (Medium) - Develop native vegetation restoration plan and ability to propagate from locally sourced seed bank. (High) - Develop waysides and programs interpreting the Great Meadow wetland restoration project. (Medium) - Develop request for additional Bipartisan Infrastructure Legislation–Ecosystem Restoration (BIL-ER) funding and identify additional funding sources. (High) - Coordinate with the Town of Bar Harbor and Friends of Acadia to ensure traffic flow is not interrupted unduly while culverts are installed on Great Meadow Park Loop Road to protect downstream from flooding. (Medium) - Develop plan for post-project monitoring and adaptive management of water levels at weir (a water retention device at the Great Meadow culvert to prevent downstream flooding). (Medium)
WETLANDS – FRESHWATER AND SALTWATER	Protect biodiversity and function of wetlands via strategic management of wetlands habitat.	Restore native and traditionally significant plants and ecological function in Bass Harbor Marsh, including surrounding upland area.	- Develop prioritized management strategies that incorporate tribal perspectives via structured decision-making process (workshop in 2023). (High) - Continue sweetgrass workgroup with Tribes and use two-eyed seeing approach (i.e., use Indigenous knowledge) to planning management in the marsh. (High) - Test methods for facilitating landward migration of marsh species. (Low) - Test methods of reducing reinvasion of invasive plants. (Medium) - Communicate management approach and results with others managing salt marshes in the region. (Low) - Identify and manage invasive plant species that threaten wetlands ecosystem function. (Medium)

Table 3c. Stewardship Goals and Stewardship Activities for Priority Resource: Wetlands – Freshwater and Saltwater (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
WETLANDS – FRESHWATER AND SALTWATER	Protect biodiversity and function of wetlands via strategic management of wetland habitat.	Identify and manage external threats to wetland biodiversity and function.	- Assess threats to intertidal and coastal wetland ecosystems from development of aquaculture, residential land use, and cumulative local changes outside the park. (Medium) - Strengthen and support partnerships to conduct research and collect baseline hydrologic data outside the park to measure impacts to park wetlands resources, including use of hydrological/ circulation modeling along with water quality data. (Medium) - Conduct a data gap analysis to better understand critical information needed to respond to external resource threats such as large-scale commercial aquaculture proposals. (Medium)

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

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
FORESTS	Maintain forest function and current extent while stewarding change in species that constitute the forest to the extent practicable given the effects of climate change.	Understand and respond to current forest composition vulnerabilities related to existing and emerging threats (i.e., where change is likely to occur fastest) and manage to address those vulnerabilities.	- Continue to partner with and provide support for Northeast Temperate Network (NETN) forest health monitoring and use NETN data to inform future forest management. (High) - Prepare plans that address identified forest composition vulnerabilities. (High) - Continue to use monitoring data to inform communication to the public about park management priorities and to address public concerns (e.g., deer browse, etc.). (Medium) - Coordinate with facilities staff on hazard tree removal. (Low) - Complete project to map distribution and condition of vulnerable tree species. (Medium) - Continue to conduct vulnerability assessments to address a broad range of vulnerable species and forest types to support management planning and actions. (Medium) - Develop rapid response management plans to allow park staff to respond when forest degradation occurs from pest outbreaks or other large disturbances. For example, the park needs rapid response plans for declines and loss of hemlock, ash, red spruce, and other vulnerable tree species. (High) - Continue to identify, monitor, and manage invasive plant species. (High) - Continue to communicate to key audiences to limit import of invasive species via firewood, nursery plants, and other materials. (Medium) - Review fire management plan for forest resilience best practices. (Low)

Table 3d. Stewardship Goals and Stewardship Activities for Priority Resource: Forests (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
FORESTS	Maintain forest function and current extent while stewarding change in species that constitute the forest habitat to the extent practicable given the effects of climate change.	Assess future forest ecosystem to develop management options.	- Research to determine best species to plan for future long-term function of forest habitat. (High) - Identify climate change refugia where climate conditions are likely to change most slowly and develop management plans for them. These refugia could provide important areas to preserve current park biodiversity longer into the future. (High) - Use scenario planning, models, and experiments to understand how wildlife species might interact with changes in forest species and function (e.g., seed dispersal, food provision, bird habitat, etc.). (Medium) - Use outcomes of scenario planning to inform approaches to wildlife species management. (Low) - Continue research to understand historical forest dynamics (natural and cultural) and use them to inform models and management of future forest dynamics. (High)
FORESTS	Maintain forest function and current extent while stewarding change in species that constitute the forest habitat to the extent practicable given the effects of climate change.	Improve forest function as wildlife habitat, such as reducing habitat fragmentation and improving/ maintaining forest structure that is critical to many wildlife species, including soils, vegetation, and native terrestrial invertebrates.	- Improve knowledge of terrestrial mammal use of the landscape and the influences of human or landscape activities to prioritize high-value core habitats. (Medium) - Improve knowledge of and monitor invertebrate populations and trends across the park. (High)

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

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
ISLANDS	Steward habitats, at-risk species, and cultural landscapes via comprehensive management of island habitats.	Improve understanding of future conditions of island resources via evaluation of potential climate change effects and other external threats.	- Identify climate change/sea level rise impacts to coastal shell mound sites. Integrate tribal consultation as soon as possible in planning and management for these sites. (High) - Update inventories and create baselines, or monitor trends from baseline conditions for island resources, such as archeological resources, erosion, coastal water birds, bird nesting, and migration flyway/stopover. Consider use of emerging technologies and/or programs (e.g., drones, partnerships). (High) - Conduct climate change vulnerability assessment and scenario planning to understand vulnerabilities and develop a plan for island management with partners. (Medium) - Conduct a workshop with the U.S. Fish and Wildlife Service (USFWS) and others managing seabirds in the region to assess environmental conditions and to ascertain management options for seabirds. (Medium) - Repeat the Anderson 2015 nesting seabird census for a selection of fee and easement islands. (High) - Improve knowledge of visitor use of outer islands. (High) - Review commercial use authorization (CUA) terms for guides that bring visitors to islands to ensure stewardship of island resources. (Medium)
ISLANDS	Steward habitats, at-risk species, and cultural landscapes via comprehensive management of island habitats.	Protect and steward island resources via improved partnerships with agencies and other land managers, including private. (May include tools such as easement programs.)	- Use understanding of future condition of island resources to identify islands that could be further protected by conservation easements or amendments. (Medium) - Provide information or material support (such as seabird nesting signs) to easement lands to encourage best management practices. (Medium) - Continue and strengthen communication and partnership with the town of Isle au Haut to steward resources of the island. (High)

Table 3f. Stewardship Goals and Stewardship Activities for Priority Resource: Fauna

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
FAUNA	Advance understanding of wildlife population dynamics, condition, and threats while recognizing anticipated influences of expected and/ or ongoing environmental climate change.	Enhance understanding of bird population dynamics, distribution, annual cycle requirements, and ecology.	- Identify life-stage vulnerabilities in landbird populations to inform management actions. (High) - Assess existing seabird/waterbird data to inform management actions and ability to respond to external threats (e.g., via a focused condition assessment (FCA). (Medium)
FAUNA	Advance understanding of wildlife population dynamics, condition, and threats while recognizing anticipated influences of expected and/ or ongoing environmental climate change.	Enhance understanding of deer population dynamics and ecological relationships including predators and distribution behavior.	- Gather baseline data on abundance and distribution of deer use in making management decisions and in communications with towns and Maine Department of Inland Fish and Wildlife (IFW) (beneficial to use data to support management decision/rationale). (Low) - Further knowledge of relationship of coyote influence on deer population dynamics. Expand on studies conducted during coyote range expansion and arrival in ACAD. (Low)
FAUNA	Advance understanding of wildlife population dynamics, condition, and threats while recognizing anticipated influences of expected and/ or ongoing environmental climate change.	Identify ongoing or likely species colonization, vulnerabilities, extirpations, and range shifts associated with climate change.	- Work with internal and external partners to update the wildlife inventory for the park (e.g., related to range shifts and climate change influences). (Medium) - Improve knowledge of insect population conditions and trends in the park. Target populations with high ecological interaction such as prey base for insectivorous avifauna or pollinators. (High) - Update inventories of vernal pools and other amphibian breeding habitats. (Medium)

Table 3f. Stewardship Goals and Stewardship Activities for Priority Resource: Fauna (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
FAUNA	Advance understanding of wildlife population dynamics, condition, and threats while recognizing anticipated influences of expected and/or ongoing environmental climate change.	Improve understanding of the dynamics of disease, habitat, and wildlife populations, as well as risks to human health.	- Understand the roles of small mammals, vegetation types, and midsized mammals in tickborne illness. (Medium) - Explore expanding park capacity for conducting tick drags, analysis, and reporting. (Low) - Work with other agencies that are monitoring these diseases and researchers who are studying them to make ensure communication of key information to the public. (Low) - Prioritize monitoring activities to ensure that park management and staff are undertaking responsibilities for tasks for which they are best-equipped and have capacity to do. (Medium) - Submit proposals (e.g., Project Management Information System [PMIS]) for emerging wildlife disease fund source, particularly for avian influenza and white-nose syndrome. (High) - Develop plans to communicate issues and awareness on emerging threats. (Low) - Respond to emerging disease threats (i.e., avian influenza) as appropriate and as conditions change. (Medium) - Work with other agencies to determine emerging disease threats. (Medium) - Continue to study and respond to public and wildlife health threats (e.g., Lyme Disease, rabies, browntail moth) in forest habitats. (Low)
FAUNA	Advance understanding of wildlife population dynamics, condition, and threats while recognizing anticipated influences of expected and/or ongoing environmental climate change.	Enhance understanding of wildlife life history, species interactions, trends, behavior, and distribution in response to a changing environment.	- Advance understanding of salt-tolerant spotted salamander populations. (Medium) - Advance understanding of sea run brook trout. (Medium) - Update amphibian inventory and distributions in the park. (Low) - Assess freshwater fish assemblages including native and non-native species. (Medium) - Establish methods to track terrestrial invertebrate populations. (Medium) - Advance understanding of small mammal biodiversity and landscape distribution influenced by climate change and human land use. (Medium) - Update inventories of Schoodic Woods and other new acquisitions/interests. (Low) - Survey extent of feral cat presence in ACAD and their impacts to wildlife. (Low) - Inventory invasive animals in the park. (Medium) - Acquire accurate presence/absence of species, distributions, abundance, or ecological interactions and possible future range shifts. (Medium)

Table 3f. Stewardship Goals and Stewardship Activities for Priority Resource: Fauna (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
FAUNA	Steward wildlife populations via comprehensive and informed management, including anticipated influences of expected and/or ongoing environmental climate change.	Improve management planning and responses to threats, including climate change, to wildlife and/or wildlife habitat.	- Plan remediation actions (e.g., replacing culverts) and rapid response plans (e.g., response to HABs) based on priority vulnerabilities. (Medium) - Remove barriers for fish and wildlife passage and larger flows of water from large rainfall events. (Medium) - Understand and act on threats from invasive animals, particular aquatic invasive species that are a high priority for management. (Medium) - Develop protocols to monitor vital rates of breeding and migrating bird populations to inform habitat management. (High) - Control invasive animals where practical in intertidal freshwater aquatic habitats. (Low) - Develop bird management plans based on NPS-Audubon projections of climate change-driven changes in bird assemblages. (Low) - Consider promoting habitat for target species in vegetation restoration projects. (High)
FAUNA	Steward wildlife populations via comprehensive and informed management, including anticipated influences of expected and/or ongoing environmental climate change.	Advance understanding of beaver populations and their influence on hydrology and ecology of wetlands.	- Establish a parkwide toolkit (similar to a standard operating procedure [SOP], but not as formal) for the infrastructure/beaver conflict. (Medium) - Advance understanding of infrastructure/hydrology modification on occupancy and beaver home ranges. (Medium)

Table 3f. Stewardship Goals and Stewardship Activities for Priority Resource: Fauna (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
FAUNA	Steward wildlife populations via comprehensive and informed management, including anticipated influences of expected and/or ongoing environmental climate change.	Reduce negative human-wildlife interaction via management actions directed at communications and infrastructure modifications.	- Complete a vulnerability assessment to identify and prioritize locations of infrastructure improvement required for herptile migration. Partner with other parks who are conducting similar assessments. (Medium) - Identify areas of significant mammal, bird, and insect road mortality. (Low) - On a periodic basis, review future transportation plans/projects for funding opportunities for wildlife passage improvements. (Medium) - Seek partnerships and funding to implement management actions to mitigate road mortality. (Low) - Adapt management of historic structures that provide important wildlife habitat. (Medium) - Work with partners to reduce negative human-wildlife interactions outside the park for species that use the park at some point in their life history. (Low) - Design and conduct a snowy owl and dog off-leash study to inform management communications and actions. (Medium) - Conduct artificial light and sound studies to understand their impacts to wildlife. (Medium) - Submit a technical assistance request (TAR) to revisit existing food storage human behavior modification study on impacts to wildlife to determine if communications are effective. Use outcomes to further improve communications. (Medium) - Replace existing waste receptacles with wildlife-proof waste receptacles. (High) - Implement communication strategies to improve visitor food storage and waste management. (High)
FAUNA	Steward populations of wildlife species via comprehensive and informed management, including anticipated influences of expected and/or ongoing environmental climate change.	Conserve and restore wildlife habitat and aquatic organism passage (AOP) via working relationships with partner agencies.	- Continue collaborating with USFWS and other partners working on diadromous fish issues. (Medium) - Have designs shovel-ready for stream-smart structures (for climate resilience and AOP), including appropriate levels of compliance activities. (High) - Identify unmapped barriers. (Low) - Include AOP in future infrastructure projects (e.g., dams, stream channelization). (Medium) - Identify barriers and work with stakeholders to develop shovel-ready projects to mitigate head-of-tide restrictions for AOP. (Medium) - Advocate for and incorporate Federal Emergency Management Agency and USGS recommended nature-based stream restoration techniques (bioengineering) to support aquatic habitat connectivity. (Medium) - Monitor alewife population and demographics. (Medium)

Table 3g. Stewardship Goals and Stewardship Activities for Priority Resource: At-Risk Species

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
AT-RISK SPECIES	Conserve and recover federally and state listed species and their habitats via informed park management planning to the extent possible given climate change.	Protect at-risk plants and wildlife via an improved understanding of current and projected conditions and threats.	- Identify current and potential pest and invasive species that impact or may impact at-risk species. (Low) - Conduct workshop to prioritize species and management activities given climate scenarios using the RAD framework. (Medium) - Identify important habitat components for at-risk species. (Medium) - Collaborate with partners who monitor at-risk species on using data for developing management strategies. (Medium) - Collaborate with tribes to identify culturally significant species at risk. (Medium)
AT-RISK SPECIES	Conserve and recover federally and state listed species and their habitats via informed park management planning to the extent possible given climate change.	Protect at-risk federally and state-listed threatened and endangered species by implementing highest-impact or value-management actions.	- Coordinate monitoring and Endangered Species Act (ESA) consultation requirements with facility management activities that may impact threatened and endangered species (i.e., funding). (High) - Minimize or mitigate human disturbance to at-risk species via ongoing compliance work. (High) - Update management plans to address 1) species for which the park might become newly climatically suitable and 2) historically occurring species that might disappear from the park due to a changing climate. (Low)
AT-RISK SPECIES	Conserve and recover federally and state listed species and their habitats via informed park management planning to the extent possible given climate change.	Maximize conservation of bat communities via direct application of best local scientific data to planning and management in order to meet the conserve and recover goals of the ESA.	- Monitor population, demographic trends, and disease prevalence of *Myotis* and *Perimyotis* bats. (High) - Identify and track important habitats of maternity and hibernacula of *Myotis* and *Perimyotis* bats. (Medium) - Collaborate with partners to promote conservation of bats on a landscape scale. (Medium)
AT-RISK SPECIES	Conserve and recover federally and state listed species and their habitats via informed park management planning to the extent possible given climate change.	Proactively plan park response to conserve ESA candidate species.	- Plan park response for potential/expected listing of monarch butterfly and habitat. (Medium)

Table 3g. Stewardship Goals and Stewardship Activities for Priority Resource: At-Risk Species (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
AT-RISK SPECIES	Conserve and recover federally and state listed species and their habitats via informed park management planning to the extent possible given climate change.	Proactively conserve migratory bird populations to meet conservation goals of the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, Executive Order 13186, and NPS/USFWS Memorandum of Understanding.	- Monitor and actively manage peregrine falcon territories. (Medium) - Manage bald eagle nesting and habitat. (Medium) - Monitor seabird nesting colonies and manage habitat. (Medium) - Establish procedures to assess project area impacts to breeding migratory birds. (Medium) - Address mortality due to window strikes and building lighting. (Low) - Research and monitor migratory birds and habitat to maximize management and decision-making. (High)
AT-RISK SPECIES	Conserve and recover federally and state listed species and their habitats via informed park management planning to the extent possible given climate change.	Identify, monitor, and conserve high-value wildlife habitats including vernal pool breeding areas and migration connections to upland habitats.	- Identify and monitor vernal pool breeding areas to better plan and implement park operations and maintenance projects. (Medium)
AT-RISK SPECIES	Conserve and recover federally and state listed species and their habitats via informed park management planning to the extent possible given climate change.	Protect state-listed plant species and their habitats.	- Collaborate with partners (e.g., Maine Natural Areas Program and Native Plant Trust) to identify and monitor rare plant populations and conserve their genetic diversity. (Medium) - Prepare management plans for highest-priority state-listed species. (Low)

Table 3h. Stewardship Goals and Stewardship Activities for Priority Resource: Geologic Resources

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
GEOLOGIC RESOURCES	Manage surficial geological conditions, processes, and features via informed management actions.	Protect and manage surficial geology conditions via parkwide collaboration (between divisions) and joint management of potential impacts, including visitor use. In some cases, geological conditions (e.g., talus slopes, sea caves) provide important habitats. In other cases, they preserve records of glacial history.	- Work collaboratively with resource management and facilities divisions to ensure that gravel and aggregate that are used in the park are responsibly sourced, absent of weeds, and aesthetically consistent in color, size, and shape with nearby stone where it will be used. (Medium) - Analyze alternative access options at Sand Beach given expected future conditions based on climate change impacts and bluff conditions including Great Head. (Medium) - Map quarries and evaluate continued use for extraction. (Medium) - Identify and protect bat habitat in geological (talus) features; this would include efforts to identify and protect unique geologic features that (potentially) provide habitat for at-risk species. (Medium) - Develop screening process to assess talus slopes as habitat ahead of ground-disturbing activities; ensure animals are protected. (High) - Submit a technical assistance request to NRSS-Geological Resources Division to update a geologic hazard inventory. (Low) - Revisit 2010 NETN paleontological inventory report for any park-specific issues. (Low) - Revisit park 2010 geologic resources inventory report. (Medium) - Develop and implement climbing management plan that considers preservation of cultural and natural resources along with visitor experiences. (High) - Conduct habitat assessment for expanded climbing routes and additional commercial locations. (High) - Support visitor geologic experiences and resource protection by maintaining and expanding permanent anchors where feasible for rock climbing. (Medium) - Assess continued human use and impacts to the tidepools in sea caves such as Anemone Cave. Compare to 1990s (revisit) baseline data. (Low)
GEOLOGIC RESOURCES	Manage surficial geological conditions, processes, and features via informed management actions.	Identify vulnerable areas of coastal geomorphology (e.g., sand bluffs, cobble seawalls, tidally restricted areas) to protect coastal geologic processes to the extent possible.	- Conduct an RAD evaluation of coastal geomorphology dynamics: identify what is vulnerable, assess options, develop plan, implement, and consider short-term goals versus activities. (High) - Implement appropriate management treatments based on RAD evaluation that resist, accept, and direct coastal dynamics to continue given climate change and reduce impacts to infrastructure. Treatments and activities are adjusted as preceding activities are completed. (Low)

Table 3i. Stewardship Goals and Stewardship Activities for Priority Resource: Open Summits and Headlands

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
OPEN SUMMITS AND HEADLANDS	Maintain ecological conditions to support open summit and headland biological communities.	Advance ecological knowledge of open-summit and headlands conditions including climate change effects and potential to act as climate refugia to inform management planning.	- Encourage scientific study of lichen communities vulnerable to climate change. (Low) - Define what climate-smart restoration looks like on summits, then restore native plant communities on summits to areas that have been degraded by human use and climate change. (High) - Continue assessing climate refugia for summit and headland biotic species/communities. (Medium)
OPEN SUMMITS AND HEADLANDS	Maintain ecological conditions to support open summit and headland biological communities.	Minimize human use impacts to open summits and headland ecology to implement management planning.	- Research ways to restore vegetation and soil loss caused by foot traffic, seasonal use (e.g., ice grippers, avoiding ice), as well as incidences of fire and intense rains that are amplified by climate change. (High) - Characterize and assess visitor use and how it may impact summit and headland communities seasonally. (High) - Identify activities (i.e., compliance, etc.) to support and prepare for winter use management plan. (Low) - Research visitor use and interaction with wildlife (e.g., snowy owls, salamanders, dogs off-leash) in these areas. (High) - Assess current visitor use on headlands and look for opportunities to rope off or educate for Leave No Trace. (High)
OPEN SUMMITS AND HEADLANDS	Maintain ecological conditions to support open summit and headland biological communities.	Coordinate management of cultural landscapes, human activities, restoration, and interpretive activities on open summits and headlands. Consider desired visitor experience for solitude in management.	- Learn from Bass Harbor management plan and consider all aspects of visitor use in a potential design concept plan or development concept plan (DCP) for Cadillac, Sand Beach/Great Head and Wonderland/Ship Harbor (includes vegetation management/rehabilitation). (High) - Using the interdisciplinary team model, increase information sharing between project teams working on Cadillac Mountain to ensure that visitor use, safety, and experience have minimal negative impacts on natural and cultural resources of the summit area. (Medium) - Conduct regular meetings to coordinate and discuss management of summits. (Medium) - Consider submitting a PMIS statement to develop a P3 for a DCP for Cadillac Mountain. (Low)

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

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
ARCHEOLOGICAL RESOURCES	The park has up-to-date information that provides direction for the research and protection of archeological resources and that informs park management, maintenance, and interpretation.	Identify gaps in archeological research and prioritize future studies and inventory projects.	- Reanalyze site collections and engage Tribes in reanalysis and any management decisions that result from the work. (High) - Update the park's archeological overview and assessment, including assessing climate change and sea level rise impacts, along with an archeological sensitivity model to address new research needs. (High) - Conduct a cultural resources archeology data reliability evaluation to assess Cultural Resource Inventory System-Archeological Resources (CRIS-AR) records to address the completeness and accuracy of known site boundaries and legacy archeological survey project boundaries, and a review of legacy archeological data about treatment and mitigation. (Medium) - Compare total areas surveyed to total area of the park's managed lands that are not yet archeological-inventoried. (Medium) - Update the park foundation document to include archeology as a fundamental resource. (Low)
ARCHEOLOGICAL RESOURCES	The park has up-to-date information that provides direction for the research and protection of archeological resources and that informs park management, maintenance, and interpretation.	In collaboration with the Northeast Regional Archeology Program, improve completeness and accuracy in archeological record-keeping.	- Engage Regional CRIS-AR specialist to assist in developing a strategy for updating records and site conditions. (High)
ARCHEOLOGICAL RESOURCES	The park has up-to-date information that provides direction for the research and protection of archeological resources and that informs park management, maintenance, and interpretation.	Identify inconsistencies and update and align respective databases as needed.	- Develop SOP to specify key links between facility and cultural resource databases and establish a protocol for data management to ensure that data are complete, accurate, and reliable. (Low)
ARCHEOLOGICAL RESOURCES	Archeological sites are maintained in good condition where possible considering climate change impacts.	Identify and prioritize vulnerabilities in areas of concern and factor in those in ongoing research and planning. Improve understanding of significance and sensitivity of site collections before they are lost.	- Understand impacts of overwash, sea level rise, and storm surges on archeological sites and other cultural resources. (High) - Using information from impact assessments (e.g., overwash, sea level rise, storm surges, etc.), work with partners to assess management options for archeological sites and other cultural resources. (High)

Table 3j. Stewardship Goals and Stewardship Activities for Priority Resource: Archeological Resources (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
ARCHEOLOGICAL RESOURCES	Archeological sites are maintained in good condition where possible considering climate change impacts.	Develop a strategy for park-wide management and treatment needs or more specific management plans, treatments, or mitigations to address threats to specific sites (e.g., climate change impacts to coastal sites).	- Develop archeology management plan to address broad issues. (High) - Coordinate archeology management plan planning with Wabanaki partners. (High)

Table 3k. Stewardship Goals and Stewardship Activities for Priority Resource: Cultural Landscapes and Historic Districts

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
CULTURAL LANDSCAPES AND HISTORIC DISTRICTS	Cultural landscape research is complete and treatment strategies are in place to guide long-term stewardship.	Develop a cultural landscape research and treatment planning strategy that prioritizes resources with the highest potential to be impacted by climate change and pending construction projects.	- Coordinate with trails program to identify and manage trails and visitor use to minimize erosion via use of consistent materials depending on area and level of use (e.g., for use on trails/roads in natural areas). (High) - Identify and implement park operational needs and best management practices to address erosion of material in cultural corridors that impacts natural resources. (High) - Collaborate with facilities staff to review the 5–10-year project list to define project needs and sequencing. Consider combining effort with historic structures strategy development and facilities/cultural resources data alignment effort. (High) - Complete high-priority cultural landscape research and treatment planning projects. (Medium)
CULTURAL LANDSCAPES AND HISTORIC DISTRICTS	Cultural landscapes are maintained in good condition to the extent possible considering climate change impacts.	Assess the alignment of data in CRIS and Facility Management Software System (FMSS), identify inconsistencies, and update respective databases as needed.	- Develop SOP to specify key links between facility and cultural resource databases and establish a protocol for data management to ensure that data are complete, accurate, and reliable. (Medium) - Update the park's integrated resource management applications (IRMA) digital files for 508 compliance. (Low)
CULTURAL LANDSCAPES AND HISTORIC DISTRICTS	Cultural landscapes are maintained in good condition to the extent possible considering climate change impacts.	High-priority treatment projects are implemented.	- Collaborate with facilities staff to ensure that high-priority projects are identified and advanced into their planning and implementation. Consider combining actions with historic structure scoping sessions and facilities data alignment. (High)

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

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
ETHNOGRAPHIC RESOURCES	The park has up-to-date information that provides direction for the research and protection of ethnographic resources and informs park management, maintenance, and interpretation.	Identify gaps in ethnographic research and prioritize future studies and inventory projects.	- Update the park's 2004 ethnographic overview and assessment. Utilize Tribal scholarship and Indigenous perspectives to address impacts of colonization on traditional use and new documentation and resources from the last 20 years. (High) - Develop CRIS-Ethnographic Resources entries for all Traditional Cultural Properties within the park. As part of this effort, define the best strategy for capturing ethnographic resource and group-data associated with the park (i.e., the entire park, individual sites, or a combination of both). (High) - Update the park's foundation document to include additional contexts related to ethnographic resources. (Low)
ETHNOGRAPHIC RESOURCES	The park has up-to-date information that provides direction for the research and protection of ethnographic resources and informs park management, maintenance, and interpretation.	Define dissemination protocols for research and documentation in partnership with Tribal historic preservation officers (THPOs).	- Develop an agreement surrounding what is to be shared or kept internal. (High) - Utilize Indigenous science in decision-making, forming an advisory group, and developing methods. (High) - Develop methods to incorporate Indigenous science into Bass Harbor Marsh research and management. (High)
ETHNOGRAPHIC RESOURCES	The park has up-to-date information that provides direction for the research and protection of ethnographic resources and that informs park management, maintenance, and interpretation.	Continue implementation of Native American Graves Protection and Repatriation Act (NAGPRA) in collaboration with THPOs and Wabanaki Repatriation Review Committee.	- Share implementation status and identify priorities for outstanding work. Include a review of Saint Croix Island International Historic Site collection for Indigenous materials subject to NAGPRA. (High)
ETHNOGRAPHIC RESOURCES	The park has up-to-date information that provides direction for the research and protection of ethnographic resources and that informs park management, maintenance, and interpretation.	Assess the alignment of data in CRIS and FMSS, identify inconsistencies, and update respective databases as needed.	- Develop an SOP to specify key linkages between facility and cultural resource databases and establish a protocol for data management to ensure that data are complete, accurate, and reliable. (Medium) - Develop protocols in collaboration with Tribes about appropriate access to the data. (High)

Table 3l. Stewardship Goals and Stewardship Activities for Priority Resource: Ethnographic Resources (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
ETHNOGRAPHIC RESOURCES	Incorporate climate adaptation planning in all ethnographic project planning.	Identify and prioritize vulnerabilities in areas of concern and factor in those in ongoing research and planning.	- Capture ethnography of loss and change related to climate change. (High) - Identify those significant ethnographic resources (e.g., sweetgrass, ash, shellfishing) and determine if there are climate adaptation responses that could address those resources. (High) - Learn from past responses to environmental change to incorporate into climate change-related planning (note: overlaps with archaeology). (High) - Coordinate on a landscape scale for climate adaptation planning across Wabanaki homelands. (High)

Table 3m. Stewardship Goals and Stewardship Activities for Priority Resource: History

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
HISTORY	The park plans for and undertakes historical research that is used by resource management and interpretation and actively pursues new perspectives and topics.	Develop a history research strategy that scopes historical research through a lens that considers multiple concurrent histories occurring in the park.	- Define a wide range of research consultants/ contractors in collaboration with Regional History Program. (Medium) - Establish an SOP for all research project scopes of work to include delivery of research files and materials to park as a 508-compliant deliverable and tied to final payment. (Medium) - Develop a plan to update and scope out new nominations of eligible resources. (Low) - Scope maritime heritage as a specific area of history research. (Low)
HISTORY	The park plans for and undertakes historical research that is used by resource management and interpretation and is actively pursuing new perspectives and topics.	Complete high-priority history research projects.	- Prepare environmental history to include natural resource research sites in the park. (Medium) - Complete the park's administrative history. Review draft report and define a scope of work and funding mechanisms to finalize the research in collaboration with Regional History Program. (High) - Prepare a park historic resource study (HRS), expanding and updating prior HRS work (1979/2022). Develop a scope of work to include contexts that need further research and documentation. (Medium) - Evaluate eligibility of "Circulation Systems of Acadia" as a National Historic Landmark; if eligible, proceed with National Historic Landmark nomination. (Medium) - Evaluate park's National Register documentation and identify needed updates. (Medium) - Update the park's Multiple Property Documentation Form to include additional historical contexts and associated resources (i.e., buildings, structures, landscapes, traditional cultural properties, archeology). Prioritize updates to address project compliance needs. (Medium)

Table 3n. Stewardship Goals and Stewardship Activities for Priority Resource: Historic Structures

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
HISTORIC STRUCTURES	Historic structure research is complete and treatment strategies are in place to guide long-term stewardship.	Develop a historic structure research and treatment planning strategy that prioritizes resources with the highest potential to be impacted by climate change and pending construction projects.	- Ensure that any strategy includes the need for treatment guidance for several park lighthouses. (Medium) - Consider combining efforts with cultural landscapes strategy development and facilities/ cultural resources data alignment effort. (Medium) - Assess historic structures for critical threatened and endangered wildlife habitat and consider provision of habitat (e.g., for bats) when planning historic structure management. (High)
HISTORIC STRUCTURES	Historic structure research is complete and treatment strategies are in place to guide long-term stewardship.	Complete high-priority historic structure treatment planning projects.	- Identify and advance priority historic structure projects. Collaborate with facilities and regional office staff to develop scopes of work and cost estimates for top-priority projects. Consider combining efforts with strategy development and facilities/cultural resources data alignment efforts. (Medium) - Prepare and submit PMIS statements for top priorities. (Medium)
HISTORIC STRUCTURES	Historic structure research is complete and treatment strategies are in place to guide long-term stewardship.	Assess the alignment of data in CRIS and FMSS, identify inconsistencies, and update respective databases as needed.	- Develop an SOP to specify key links between facility and cultural resource databases and establish a protocol for data management to ensure that data are complete, accurate, and reliable. (Medium) - Update the park's IRMA digital files for 508 compliance. (Low) - Collaborate with facilities staff to ensure that high-priority projects are identified and advanced into their planning and implementation. Consider combining action with cultural landscape scoping session and possible facilities data alignment. (Medium)

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

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
MUSEUM COLLECTIONS AND ARCHIVE	The park has up-to-date information that provides direction for the research and protection of park museum collections and that informs park management, maintenance, and interpretation.	Prepare additional documentation for museum collections in collaboration with the Northeast Museum Services Center.	- Prepare updated collections management plan in collaboration with the Northeast Museum Services Center that aligns with NPS-wide initiative. (High) - Develop a storage plan that tiers off the collections management plan. (High) - Prepare deaccessioning plan in collaboration with Northeast Museum Services Center. (Medium) - Address archival and manuscript collections backlog of uncatalogued and unprocessed files: mostly park records. (High) - Develop a long-term interpretive plan that leverages and showcases existing collections at the Islesford Historical Museum. (Medium)
MUSEUM COLLECTIONS AND ARCHIVE	The park has up-to-date information that provides direction for the research and protection of park museum collections and that informs park management, maintenance, and interpretation.	Incorporate climate adaptation planning in all museum facility and museum collections and storage planning. Identify and prioritize vulnerabilities in areas of concern and factor in those in ongoing research and planning.	- Develop and update core museum documents including scope of collections, emergency response, and museum collections salvage plans, as new data on impacts emerge. (Medium) - Update HVAC system to adapt facility to anticipated heat and humidity changes. (High)
MUSEUMS COLLECTIONS AND ARCHIVE	The park has up-to-date information that provides direction for the research and protection of park museum collections and that informs park management, maintenance, and interpretation.	Increase discoverability and share information about museum collections, museum archives, and research that takes place in ACAD.	- Continue digitizing museum and resource management records and upload to NP Gallery, IRMA Data Store, or other appropriate repositories to increase discoverability of new and historical research and archives in ACAD. (High) - Continue working with research communications teams of park staff and partners to increase internal and external awareness of research that takes place in the park. (Medium)

Table 3p. Stewardship Goals and Stewardship Activities for Priority Resource: Air Quality

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
AIR QUALITY	Improve understanding of air quality conditions and trends and pollution impacts, and maintain the long-term data record via continued monitoring of visibility, particulate matter, ozone, and pollutant deposition.	Improve understanding of air quality via continued collaborative monitoring, compiling existing information, identifying sensitive resources, and assessing future research needs.	- Maintain familiarity with existing online ACAD air quality information provided by Air Resources Division (ARD), including monitor locations, conditions and trends, regional conditions and trends, ACAD Class I park air profile, sensitive species, nitrogen critical loads and exceedances, ozone exceedances, and nearby sources of air pollution. (High) - In cooperation with ARD and the Maine Department of Environmental Protection (MDEP), continue to support air quality monitoring programs and special studies. (High) - With assistance from ARD and NER, assess future needs in air quality monitoring and research including per-and polyfluoroalkyl substances (PFAS), greenhouse gases, volatile organic compounds, air toxics, and microplastics to improve understanding of emission sources including ships, paper mills, liquified natural gas ports, algal blooms, wind energy development, and potential commercial aqua-culture. (High) - Complete the ACAD Mercury Synthesis Paper in collaboration with ARD, NER, State University of New York, Biodiversity Research Institute, USGS, Dartmouth, and Appalachian Mountain Club. (Medium) - Utilize final Mercury Synthesis Paper management implications and recommendation/toolbox to determine specific actions to implement and include in the resource stewardship strategy to address mercury contamination in park biota. (Low) - Continue collaborative efforts towards a holistic assessment of mercury in the food web guided by the Mercury Synthesis Paper. (Low) - In coordination with ARD and NER, continue to support assessments of (PFAS) "forever chemicals" contamination in park biota including fish , dragonfly larvae through the Dragonfly Mercury Project, National Atmospheric Deposition Program National Trends Network, and other studies to improve understanding and inform mitigation via MDEP and other partners. (Low) - Communicate and coordinate with ACAD facilities staff on PFAS monitoring requirements. (Medium) - Work with partners on appropriate management or public health responses to PFAS. (Medium) - Subscribe to Maine Department of Environmental Protection notifications to stay current on new and existing sources of air pollution by receiving public notices, department updates, regulatory information, and opportunities for comment. (High) - Continue to update ACAD air quality summaries every five years, including compilation of existing data, condition, threats, sensitive resources, and research. (Medium) - Update the 2004 assessment of long-term air quality programmatic, monitoring, and research needs document. (High)

Table 3p. Stewardship Goals and Stewardship Activities for Priority Resource: Air Quality (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
AIR QUALITY	Improve understanding of air quality conditions and trends and pollution impacts, and maintain the long-term data record via continued monitoring of visibility, particulate matter, ozone, and pollutant deposition.	Provide information about air pollution impacts to NPS management, park staff, the public, the scientific community, and other stakeholders.	- Continue to regularly provide air quality information to park staff, including air quality summary information in staff training, handbooks, or other resources. (Medium) - Continue to implement the park's air quality advisory program to notify visitors and staff when ozone and fine particulates reach unhealthy levels. (High) - Along with weather hazards, continue to ensure that air quality health advisory information is included in employee job hazard analysis for staff working outdoors. (High) - Convert the air quality interactive display to the Sieur de Monts Spring Nature Center to web-based content to enhance availability and accessibility. (Medium) - Enhance the air quality/pollution section of the park website to include the latest content and links to park air quality condition, trends, implications, and webcam, utilizing the NPS content management system Air Quality Element for live data. (Medium)
AIR QUALITY	Perpetuate the best possible air quality condition for the protection of resources affected by air pollution, eliminating human caused visibility impairment by the year 2064, and remain in compliance with EPA National Ambient Air Quality Standards (NAAQS).	Be an environmental leader by reducing park air pollutant emissions and improving park sustainability and environmental management, demonstrating the park's commitment to do its part for air quality, water quality, night sky, and climate change.	- Update the Worcester Polytechnic Institute park emissions inventory; compare with prior inventories to document progress/better understand emissions from park operations. (Low) - Revive and coordinate with park sustainability committee to develop and disseminate park energy, waste, water, and lighting guidelines for park staff and volunteers as standards of performance for the park's green culture. (Low) - Continue/enhance the park's alternate transportation system and implementation of park transportation plan to reduce vehicle miles driven in the park. (Medium) - Coordinate with facility management to pursue funding for electric vehicle charging stations and/or other emission reductions infrastructure. (Low) - Provide input into the next/upcoming ACAD fire management plan to ensure that appropriate smoke management issues are addressed while continuing to advise park fire management as needed to ensure adherence to state smoke permits and mitigation practices. (Medium) - Continue to inventory and assess progress to maintain or further reduce greenhouse gas emissions from park operations. (Low)

Table 3p. Stewardship Goals and Stewardship Activities for Priority Resource: Air Quality (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
AIR QUALITY	Perpetuate the best possible air quality conditions for the protection of resources affected by air pollution, eliminating human-caused visibility impairment by the year 2064, and remain in compliance with EPA National Ambient Air Quality Standards.	Collaborate with other federal, state, regional, and local planning organizations and stakeholders to reduce air pollution impacts in the park from sources of air pollution.	- Continue outreach and knowledge transfer/trainings with staff from other parks toward maintaining or improved understanding and management of NPS air quality issues, including quarterly calls with NER, Shenandoah National Park, and Cape Cod National Seashore. (Medium) - Continue annual meetings between ARD, NER, and MDEP for air resources planning. (High) - Continue to coordinate with ARD and NER for review, comment, and improvement of Maine's regional haze state implementation plan, which is anticipated to be finalized before August 2024 when a federal implementation plan will otherwise be provided. (Medium) - In collaboration with ARD and NER, continue to provide data and information necessary to inform review and comments, and make recommendations to the state for emission source permit applications with the potential to affect park resources, to prevent significant deterioration. (Medium) - Coordinate with NER to review and update local emissions sources to improve understanding of status of local contributions to emissions. (Low) - Through NER, continue involvement and collaboration with the Ozone Transport Commission to address and reduce long-range transport of ozone and precursors to the park. (Low) - Investigate revival and collaborate through the Northeast Regional Air Quality Committee, including federal, state, and Canadian provincial and park air resource managers, to further address regional and Canadian emission impacts to protected areas in the northeastern US and Atlantic provinces. (Low) - Collaborate with nearby developers, planners, county zoning, industry, and sister agencies to increase awareness about the importance of park air quality, scenic views, natural sounds, and night sky protection. (Medium)

Table 3q. Stewardship Goals and Stewardship Activities for Priority Resource: Scenic Views

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
SCENIC VIEWS	Protect, improve, and monitor the condition of views important for the natural scenery and cultural resources across park boundaries and collaborate with partners to promote cooperative conservation to protect the scenic beauty of the highest mountains and rocky headlands along the Atlantic shore of the United States.	Inventory and assess park views over time to monitor changes in conditions.	- Identify cumulative list of views important to steward and to ACAD's purpose, visitor, and Tribal values, including views for natural scenery, cultural resources, and historically designed views from motor roads, carriage roads, and trails. (High) - Submit a technical assistance request to the Air Resources Division Visual Resources Program for a visual resource inventory to establish baseline conditions of selected view. (High) - With assistance from ARD and NER, conduct a visual resource inventory and training (workshop) to establish baseline conditions of selected views by documenting scenic quality and view importance. (Medium) - Consult with ARD regarding a visual impact assessment of proposed development projects that would impact views. (Low) - Repeat visual resource inventory every five to ten years or as landscape changes are observed, to monitor changes in condition. (Low)
SCENIC VIEWS	Protect, improve, and monitor the condition of views important for the natural scenery and cultural resources across park boundaries and collaborate with partners to promote cooperative conservation to protect the scenic beauty of the highest mountains and rocky headlands along the Atlantic shore of the United States.	Minimize visual intrusions, contrast, and changes to views to the extent possible in the park.	- Manage scenic views and vistas in accordance with cultural landscape management plans, including historic motor road and carriage road vista management plans. (High) - Continue to collaborate with ACAD facilities management team to conduct cyclic maintenance/ clearing and restoration of scenic vistas through FMSS. (High) - Adopt ARD-recommended or develop park-specific visual resource best practices and/or facility guidelines to help reduce park infrastructure impacts. (Medium)

Table 3q. Stewardship Goals and Stewardship Activities for Priority Resource: Scenic Views (continued)

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
SCENIC VIEWS	Protect, improve, and monitor the condition of views important for the natural scenery and cultural resources across park boundaries and collaborate with partners to promote cooperative conservation to protect the scenic beauty of the highest mountains and rocky headlands along the Atlantic shore of the United States.	Collaborate with adjacent landowners, municipalities, developers, and other stakeholders to promote cooperative conservation of views across park boundaries.	- Build/maintain partnerships with park neighbors, developers, and planners to develop understanding of shared visual values/educate about scenic view protection. (Medium) - Monitor easements for specific conditions, such as invasive species, erosion, or scenic vistas, to incorporate those areas into activities as they are implemented. Continue to enforce current NPS-held conservation easements to protect scenic character and resources. (High) - In partnership with stakeholders, establish voluntary best practices and/or design guidelines for adjacent landowners and in-holders. (Medium) - Coordinate with ARD and NER to review and comment on wind energy proposal(s) to prevent or minimize impacts to park scenery and night skies. (Medium) - Collaborate with appropriate stakeholders to reduce impacts from current and future threats to scenic views, including cellular phone towers, residential and commercial development, cruise ship traffic, and redevelopment of the Bar Harbor ferry terminal. (Medium) - Collaborate with Jackson Laboratory to reduce impacts to views/sounds/night skies. (Medium)
SCENIC VIEWS	Protect, improve, and monitor the condition of views important for the natural scenery and cultural resources across park boundaries and collaborate with partners to promote cooperative conservation to protect the scenic beauty of the highest mountains and rocky headlands along the Atlantic shore of the United States.	Provide enhanced opportunities for visitors to access and understand the importance of park views.	- Consult with ACAD Interpretation program on the value of obtaining ACAD resource management program support for completion of the scenic photo gallery of the park's website with the important views chosen for the visual resource inventory, including historically designed views. (Medium) - Consult with ACAD Interpretation program on the value of obtaining ACAD RM program support to explore potential for establishing additional webcam(s) to enhance access to the changing colors and textures of ACAD's scenery across the seasons. (Low) - Include opportunities to make select park views accessible to visitors of all ability levels in the parkwide accessibility plan. (Medium)

Table 3r. Stewardship Goals and Stewardship Activities for Priority Resource: Night Skies

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
NIGHT SKIES	Improve understanding of night sky conditions and trends and light pollution impacts that affect park-protected resources.	Inventory and assess park night skies over time to monitor changes in condition.	- Submit a TAR to Natural Sounds and Night Skies Division (NSNSD) to resurvey nighttime resource conditions. (High) - Obtain geospatial maps of predicted sky conditions for the park and adjacent lands. (Medium)
NIGHT SKIES	Improve understanding of night sky conditions and trends and light pollution impacts that affect park-protected resources.	Assess impacts of light pollution on sensitive wildlife species.	- Identify sensitive species in the area that are likely to be affected by impaired night sky quality. (High)
NIGHT SKIES	Improve understanding of night sky conditions and trends and light pollution impacts that affect park-protected resources.	Facilitate and develop partnerships with the Interpretive division to educate visitors on light pollution and impacts.	- Assess the importance of the night sky to visitor experience and park interpretive programs. (High) - Interpret and share resource knowledge and information about Artificial Light at Night impacts on the night sky/nocturnal environment to the public, schools, the scientific community, and other stakeholders. (Medium)
NIGHT SKIES	Improve the night sky resource by reducing artificial light at night to preserve park-protected resources.	Protect and improve the nocturnal environment by reassessing how the park can improve employee and visitor safety at night, improve the visitor's recreation experience, and protect the cultural, wildlife, and wilderness values associated with the night sky.	- Review current lighting within the park and establish a lighting management plan. (High) - Resurvey park lighting inventory to document lights and outdoor fixtures contributing to light pollution. (Medium) - Identify areas where park-created light pollution intersects with nocturnal migrating and resident wildlife and address lighting conditions in those areas. (Medium) - Improve the nighttime environment by assessing how the park can improve employee and visitor nighttime scenery within the park boundary. (Medium) - Retrofit lighting that is not night-sky-friendly; use fully sustainable night sky lighting practices. (Low)
NIGHT SKIES	Improve the night sky resource by reducing artificial light at night to preserve park-protected resources.	Collaborate with adjacent landowners, municipalities, developers, and other stakeholders to promote cooperative conservation of night skies and nocturnal environment across park boundaries.	- Collaborate with NSNSD and other partners to better understand how visitors respond to in-park lighting and identify opportunities to make the park a leader in good lighting practices. (High) - Reduce threats to the nocturnal environment and nighttime scenery from outside park boundaries by engaging with nearby communities and raising awareness about the value of the resource and astrotourism and engage regional partners. (Medium) - Enhance visitor and student awareness of the night sky and its features. (Medium)

Table 3s. Stewardship Goals and Stewardship Activities for Priority Resource: Soundscapes

PRIORITY RESOURCE	LONG-TERM GOAL	SHORT-TERM GOAL	STEWARDSHIP ACTIVITIES (WITH PRIORITIES)
SOUNDSCAPES	Improve understanding of acoustic environment conditions and trends and noise pollution that affects park-protected resources.	Inventory and assess the park's acoustic environment over time to monitor changes in condition.	- Revisit and resurvey the nine acoustic monitoring locations across the park to quantify changing acoustic conditions. (High) - Collaborate with NSNSD to collect data on the airspace utilization above the park by collecting aircraft tracking data. (High) - Characterize baseline acoustic environment and its relationship and value to other resources. (High) - Identify how anthropogenic noise (i.e., stressors and threats) impacts the resources (i.e., wildlife, wilderness) and visitor experience in the park. (Medium)
SOUNDSCAPES	Improve understanding of acoustic environment conditions and trends and noise pollution that affects park-protected resources.	Improve knowledge of noise pollution impacts to wildlife behavior and productivity.	- Identify wildlife that are sensitive to an impaired acoustic environment (anthropogenic noise) and how these stressors and threats could affect fitness of those wildlife species. (High) - Identify and inventory sounds of the park, including those for vocalizing wildlife. (Medium) - Understand significance of sounds, which can be used for wildlife survey and documentation, behavior, phenology, and ecosystem function (related to bioacoustics). (Medium)
SOUNDSCAPES	Improve understanding of acoustic environment conditions and trends and noise pollution that affects park-protected resources.	Facilitate and develop partnerships with the Interpretive division to educate visitors on noise pollution and impacts.	- Assess the importance of quiet natural spaces and natural acoustic environments to visitor experience. (High) - Interpret and share resource knowledge and information about soundscapes and noise impacts to the public, schools, the scientific community, and other stakeholders. (Low) - Monitor trends in park sounds and interpret their significance for ecosystem function and visitor experience. (Medium)
SOUNDSCAPES	Improve the acoustic environment by reducing noise pollution to preserve park-protected resources.	Protect and improve conditions by assessing how park operations (e.g., grounds care, construction, transportation) affect the cultural, wildlife, and wilderness values associated with the natural acoustic environment.	- Identify noise sources and reduce or mitigate noise from park operations. (Medium) - Identify the sources and reduce or mitigate noise from visitor-based activities. (Medium) - Identify areas where park-created noise pollution intersects with migrating and resident wildlife and improve the acoustic environment in those areas. (Medium)
SOUNDSCAPES	Improve the acoustic environment by reducing noise pollution to preserve park-protected resources	Collaborate with adjacent landowners, municipalities, developers, and other stakeholders to promote cooperative conservation of the acoustic environment across park boundaries.	- Collaborate to promote cooperative conservation of the resource by partnering with neighboring communities, landowners, and other entities to reduce noise impacts that are external to the park. (Low) - Collaborate with NSNSD and Federal Aviation Administration to address overflight issues, including air tours. (Low)

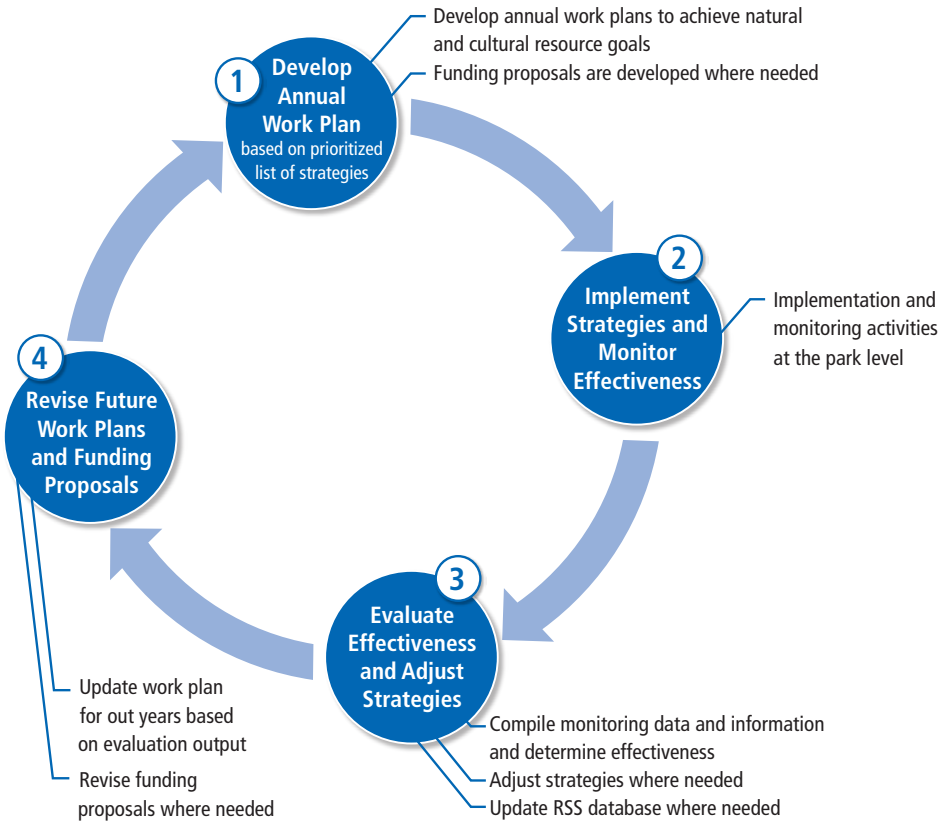


ONGOING IMPLEMENTATION OF THE RESOURCE STEWARDSHIP STRATEGY

The stewardship goals, activities, and other pertinent information of the resource stewardship strategy is managed and updated as needed using the RSS desktop application. 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 3 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 3. RSS Implementation Process



REFERENCES

Abatzoglou, J. T. and T.J. Brown
2012 A comparison of statistical downscaling methods suited for wildfire applications. International journal of climatology, 32(5), 772-780.

Abatzoglou, J. T.
2013 Development of gridded surface meteorological data for ecological applications and modelling. Int. J. Climatol., 33: 121–131.

Bradley, A., D. S. Wilcover, and M. Oppenheimer
2010 Climate change increases risk of plant invasion in the Eastern United States. Biological Invasions 12:1855-1872

Fisichelli, N. A., G. W. Schuurman, W. B. Monahan, and P. S. Ziesler
2015 Protected area tourism in a changing climate: will visitation at US national parks warm up or overheat? PLOS ONE doi: 10.1371/journal.pone.0128226.

Fisichelli, N. A. and P. S. Ziesler
2015 Acadia National Park: How might future warming alter visitation? National Park Service. Fort Collins, Colorado

Lawrence, D. J., A. N. Runyon, J. E. Gross, G. W. Schuurman, and B. W. Miller
2021 Divergent, plausible, and relevant climate futures for near- and long-term resource planning. Climatic Change 167:38.

Miller, K. M., B. R. Mitchell, P. J. Curtin, and J.S. Wheeler
2014 Forest health monitoring in Acadia National Park: 2006-2013 summary report. Natural Resource Report. NPS/NETN/NRR—2014/777. National Park Service. Fort Collins, Colorado

Peters, M. P., A. M. Prasad, S. N. Matthews, and L. R. Iverson
2020 Climate change tree atlas, Version 4. U.S. Forest Service, Northern Research Station and Northern Institute of Applied Climate Science, Delaware, OH. https://www.fs.usda.gov/nrs/atlas.

Rockman, M.
2016 Cultural resources climate change strategy. National Park Service, US Department of the Interior.

Runkle, J., K. E. Kunkel, S. M. Champion, R. Frankson, B. C. Stewart, A. T DeGaetano, and J. Spaccio
2022 Maine State Climate Summary 2022. NOAA Technical Report NESDIS 150-ME. NOAA/NESDIS, Silver Spring, MD, 4 pp.

Star J., N. Fisichelli, A. Bryan, A. Babson, R. Cole-Will, and A. Miller-Rushing
2016 Acadia National Park Climate Change Scenario Planning Workshop Summary. National Park Service

Sweet, W. V., B. D. Hamlington, R. E. Kopp, C. P. Weaver, P. L. Barnard, D. Bekaert, W. Brooks, M. Craghan, G. Dusek, T. Frederikse, G. Garner, A. S. Genz, J. P. Krasting, E. Larour, D. Marcy, J. J. Marra, J. Obeysekera, M. Osler, M. Pendleton, D. Roman, L. Schmied, W. Veatch, K. D. White, and C. Zuzak
2022 Global and Regional Sea Level Rise Scenarios for the United States: Updated Mean Projections and Extreme Water Level Probabilities Along U.S. Coastlines. NOAA Technical Report NOS 01. National Oceanic and Atmospheric Administration, National Ocean Service, Silver Spring, MD, 111 pp. https://oceanservice.noaa.gov/hazards/sealevelrise/noaa-nos-techrpt01-global-regional-SLR-scenarios-US.pdf

Vose, R.S., S. Applequist, I. Durre, M.J. Menne, C.N. Williams, C. Fenimore, K. Gleason, and D. Arndt.
2014 Improved Historical Temperature and Precipitation Time Series For U.S. Climate Divisions. Journal of Applied Meteorology and Climatology, 53(May), 1232–1251. DOI: 10.1175/JAMC-D-13-0248.1

Wuebbles, D. J., D. W. Fahey, K. A. Hibbard, J. R. Arnold, B. DeAngelo, S. Doherty, and J. Walsh
2017 Climate science special report: Fourth national climate assessment (NCA4), Volume I.

Wu, J. X., C. B. Wilsey, L. Taylor, and G. W. Schuurman
2018 Projected avifaunal responses to climate change across the US National Park System. PLoS One, 13(3), e0190557.

United States Global Change Research Program (USGCRP), D. J. Wuebbles, D. W. Fahey, K. A. Hibbard, D. J. Dokken, B. C. Stewart, et al., editors
2017 Climate Science Special Report: Fourth National Climate Assessment, Volume I. U.S. Global Change Research Program, Washington, DC, USA.

CONTACT INFORMATION

For more information about the resource stewardship strategy for Acadia National Park, contact:

Kevin Schneider
Superintendent
Acadia National Park
P.O. Box 177
Bar Harbor, Maine 04609

ACAD_superintendent@nps.gov

207-288-3338

www.nps.gov/acad



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.

ACAD 123/189755
July 2023

RSS

RESOURCE STEWARDSHIP STRATEGIES

NATIONAL PARK SERVICE



BRIDGING SCIENCE AND MANAGEMENT FOR TODAY AND TOMORROW