Plan the work, work the plan: An introduction to the National Park Service Climate, Science, and Disaster Response Program

Jeneva P. Wright and Morris Hylton III

INTRODUCTION

The climate crisis poses significant and unprecedent threats to the resources stewarded by the National Park Service (NPS). Some impacts are already apparent, while understanding of other outcomes is still developing. While the rate and magnitude of climate change ultimately depends on worldwide management of greenhouse gas emissions, resource managers today face choices about what actions to take, despite the uncertainty. To support the mission of NPS and its cultural resource preservation goals, the Climate, Science, and Disaster Response (CSDR) Program has been developed to explore climate impacts, provide cultural resource expertise, and expand and accelerate initiatives related to cultural resources and climate change adaptation. Here we introduce the construct of the CSDR program, share the components of the program's 2022–2025 Action Plan, and highlight initial activities.

REGULATIONS AND POLICY

Regulations and policy provide both structural support and philosophical underpinning for the CSDR action plan. NPS is an agency dedicated to preservation in perpetuity, with a mission "to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (16 USC 1). The importance of preservation as a guiding ethos cannot be overstated, yet fulfilling this directive is not best achieved by attempting to freeze resources in time, but rather engaging with the changing world to make strategic management decisions that promote resource integrity and interpretation.

The climate crisis presents unique challenges to NPS management directives, not least of which is the issue's politicization. While the agency's early engagement with global warming met political resistance, NPS gradually developed its role in addressing climate change. This effort was reflected in NPS's *Climate Change Response Strategy* (NPS 2010), which organized the agency's climate change efforts around four pillars: science, adaptation, mitigation, and communication. The last decade has seen significant advances in each area, including the agency's approach to producing, assessing, and incorporating climate science into planning and management practice.

These four pillars were also fundamental to the NPS *Cultural Resources Climate Change Strategy* (Rockman et al. 2016). In looking specifically at cultural resources within the existing agency paradigm, the authors provided

Jeneva P. Wright and Morris Hylton III
National Park Service
Climate, Science, and Disaster Response Program
1201 Oakridge Drive
Fort Collins, CO 80525

CORRESPONDING AUTHOR: Jeneva P. Wright; jeneva_wright@nps.gov

The quote "plan the work, work the plan" is from Dr. William Carter Hambley, who was the "architect" of the "Cut-Through" initiative in Pikeville, Kentucky—one of the largest earth-moving projects in the northern hemisphere (1973–1986) to help make the Appalachian community more resilient to river flooding. Pikeville is the birthplace and childhood home of author Morris (Marty) Hylton III, historic architect for climate change.

four overarching goals: connect impacts and information, understand the scope, integrate practice, and learn and share. The resultant document set forward the approach for considering cultural resources within the context of climate change, incorporating research, planning, and stewardship. The strategy expanded from the guidance offered by NPS Director Jonathan B. Jarvis in Policy Memo 14-02, "Climate Change and Stewardship of Cultural Resources" (Jarvis 2014). This policy provides critical agency direction, including recognition of the significant differences in managing cultural resources versus natural, an emphasis on diverse stakeholders and communication capacity, and prioritization based on vulnerability and significance that acknowledge real potential for loss.

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The *Cultural Resources Climate Change Strategy* includes a section that explores a range of potential climate impacts (temperature change, precipitation change, sea level rise, combined stressors, and increased greenhouse gas emissions) across the five principal cultural resource categories recognized by NPS (archaeological sites, cultural landscapes, ethnographic resources, museum collections, and buildings and structures). This preliminary compilation, although not comprehensive, is helping inform existing and future research directions, including additional guidance such as the *Guidelines for Flood Adaptation for Rehabilitating Historic Buildings* (2019, reissued with illustrations: Eggleston, Parker, and Wellock 2021).

CLIMATE, SCIENCE, AND DISASTER RESPONSE PROGRAM

These regulations, policies, and strategies laid the groundwork for the emergent work of the CSDR Program to implement the *Cultural Resources Climate Change Strategy* and to advance climate change understanding and response for cultural resources. The mission of the program is intentionally simple and direct: to support the NPS stewardship of cultural resources impacted by a changing climate and disasters. However, within this straightforward programmatic mission, CSDR's activities span a variety of scales, stakeholder groups, and organizational thresholds.

The two climate-centric positions in the CSDR program (the NPS historic architect for climate change and archaeologist for climate change) have been organized intentionally to serve in an interdisciplinary space. Formally supervised and directed by the Cultural Resources, Partnerships, and Science Directorate in NPS's Washington headquarters (WASO), these positions are also housed and co-managed by the Climate Change Response Program within the WASO Natural Resources Stewardship and Science Directorate. The result is an integrated approach to address the impacts of climate change on both natural and cultural resources that help facilitate visitor access to and interpretation of park units and historic communities. The CSDR team brings cultural resources concepts and expertise to foster the agency's preservation requirements and goals within the climate science and adaptation management conducted by the Climate Change Response Program. Concurrently, the CSDR team members promote the use of best available science and climate change considerations to the agency's cultural resource activities and strategic planning initiatives.

CLIMATE, SCIENCE, AND DISASTER RESPONSE PROGRAM GUIDING PRINCIPLES

As CSDR formed, the team established a series of guiding principles to focus and assess the program's work. These are intended to provide overarching direction at broad scales, and to extend past the duration of the CSDR program's initial action plan to subsequent iterations.

First, the program acknowledges and emphasizes the critical role of partnerships and stakeholder engagements, both within and outside of NPS and the federal government. While the focus and actions heavily target NPS resources, cultural resource management is an inherently outwardly facing discipline. Tribal and traditionally

associated stakeholders, descendent groups, local governments and communities, and state historic preservation officers, among others, have a role to play in the management of cultural heritage, regardless of agency land ownership. Additionally, the NPS Cultural Resources, Partnerships, and Science Directorate supports not only NPS units, but also external programs that rely on the agency's role of managing the National Register of Historic Places, administering grants via the Historic Preservation Fund, and supporting external stewardship of national heritage areas, national historic landmarks, and others. This paradigm requires that the CSDR program emphasize and consider partnerships and stakeholder engagement in every action and for historic communities and sites that are both officially recognized by the National Register and those that are officially deemed or may prove eligible for listing. Throughout our stakeholder engagements, an emphasis on environmental justice will inform all the policies, guidance, initiatives, and work of CSDR as the program strives to make sure all stakeholder voices and perspectives and all community needs are considered.

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The program's next guiding principle promotes the integrated and multifaceted management approach across disciplines that CSDR's organizational structure represents. The challenges of the global climate crisis require engagement across scientific and management disciplines, and the urgency of climate impacts emphasizes the necessity for cultural resource practitioners to establish streamlined and effective engagement with other scientific, infrastructural, or management experts. This engagement is not simple; it requires patience, a willingness to attempt translation of complex disciplinary paradigms to diverse professionals across scientific and management spectrums. Unproductive comparisons or scales may emerge ("climate change responses to natural resources are harder to manage than those to cultural resources"; "management of cultural resources should be no different than facility management"). The nuance of disciplinary priorities can be perceived as overly complex, even competitive ("there is already an approach that meets one resource need, why introduce unnecessary confusion?"; "my way of looking at this problem should meet your needs"). Such incidental challenges are to be expected in the face of a daunting crisis when attempting to work across disciplinary boundaries, but perseverance can spark novel and integrated approaches. The CSDR program is dedicated to fostering such collaboration, with the result of significantly higher-utility outputs for all parties receiving the benefits of diverse, coordinated expertise executed in cooperation.

This approach has been highly supported by the Climate Change Response Program, itself a team that contains a large amount of multidisciplinary expertise and works across the national park system. While providing CSDR program co-management and openly and proactively incorporating cultural resource considerations into current activities, the Climate Change Response Program has enabled CSDR to carry out this next guiding principle: the use of best available science to understand climate and disaster impacts and inform responses and decisions. Cultural resource practitioners may lack access to or familiarity with climate science datasets, particularly those downscaled to actionable local attributes. The partnership with the Climate Change Response Program has championed collaboration to employ exactly such expertise and guidance.

We have also made a commitment to focusing on adaptation interventions. We promote consideration of options to address climate vulnerability and seek implementation of measures to mitigate potential loss of integrity. We also acknowledge the potential for resource loss, and in keeping with NPS Policy Memo 14-02 (Jarvis 2014), seek to mitigate the loss of cultural data and associated heritage values. The program acknowledges that the work must be rooted in climate science. However, park units and wider disciplinary practitioners are seeking practical guidance on available options to address climate change vulnerability in real time. Such guidance can be viewed along a continuum from major interventions to none at all. For example, an archaeological site may be a candidate for reburial or capping, or soil stabilization measures, or emergency excavation, or documentation with no further action—all of which require critical assessment of vulnerability, resource prioritization, and data recovery. How to balance the necessity of solid scientific data and modeling of multiple climate futures

with immediate, on-the-ground planning and management needs remains a major area for debate and discussion. In keeping adaptation a guiding focus, CSDR aims to promote and share feasible strategies that can be taken in the face of finite resources and capacity, and in keeping with the spirit and intent of preservation goals and compliance.

Historic preservation is an inherently sustainable practice, but there are areas where the mitigation of emissions and preservation of resources conflict.

In promoting adaptation interventions, the CSDR program also commits to exploring and encouraging sustainable strategies and management practices that help reduce greenhouse gas emissions. The limiting of emissions and incorporation of mitigation measures across all aspects and activities of NPS management is one of the four pillars of the Climate Change Response Strategy (NPS 2010). Historic preservation is an inherently sustainable practice, but there are areas where the mitigation of emissions and preservation of resources conflict, such as the installation of solar panels on historic structures or placement of wind turbines on or near archaeological sites, among others. Engaging with external policy like the UN's Sustainable Development Goals (UNESCO 2015) and internal guidance like the Green Parks Plan (NPS 2016), CSDR will seek opportunities to integrate sustainable measures as part of adaptation interventions, post-disaster recovery and reconstruction, and other activities to address climate impacts.

Finally, underpinning and supporting all the principles above is a commitment to communication, both internally and externally. By seeking and promoting real-world climate stories related to cultural resources, and interpreting their histories, the concept of "every place has a climate story" becomes paramount (Richman 2015; Rockman and Maase 2017). The CSDR program also seeks to share its activities, goals, successes, and failures, encouraging collaborative learning and action assessment.

THE 2022–2025 ACTION PLAN

The CSDR team developed a three-year action plan (2022–2025) intended to systematically and strategically organize, articulate, and measure the impacts of a series of emergent, interrelated activities. Eight action areas, described below, have been articulated. There is a range of scales captured within each action area. Some activities target problem-specific research at individual park units, while others attempt broader strategies. As displayed in Figure 1, each action area is organized in basic relation to the others. This does not reflect a designation of importance, but rather the procedural and conceptual flows that have emerged.

1. **Policy and strategy.** Engagement with policy and strategy takes several forms. To help form a baseline understanding of the current context within which we work, an assessment of international and national policy is needed to help shape NPS cultural resource adaptation strategies. Developing an understanding of institutional history, the development of agency climate change response, and past iterations of cultural resource climate change engagement provides an essential foundation for advancing wider agency goals. To this end, the CSDR team has supported the development of directorate and programmatic strategic plans. Engagement at these broad scales is intended to ensure that finer-resolution actions both inform and feed into wider goals (i.e., top-down and bottom-up action progression).

2. **Climate science and vulnerability assessments.** As discussed in the guiding principles, many of the day-to-day activities of the program focus on the incorporation of science and the development of adaptation guidance. Climate science is often first applied to cultural resources through vulnerability assessments. "Vulnerability … is defined as the propensity or predisposition to be adversely affected and encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt" (IPCC 2022). A vulnerability assessment is a structured evaluation of how climate change may affect a resource, typically derived from three factors: exposure, sensitivity, and adaptive capacity (Dawson et al. 2011; Glick, Stein, and Edelson 2011; Michalak et al. 2021). Exposure is spatially derived and refers to the extent a locale

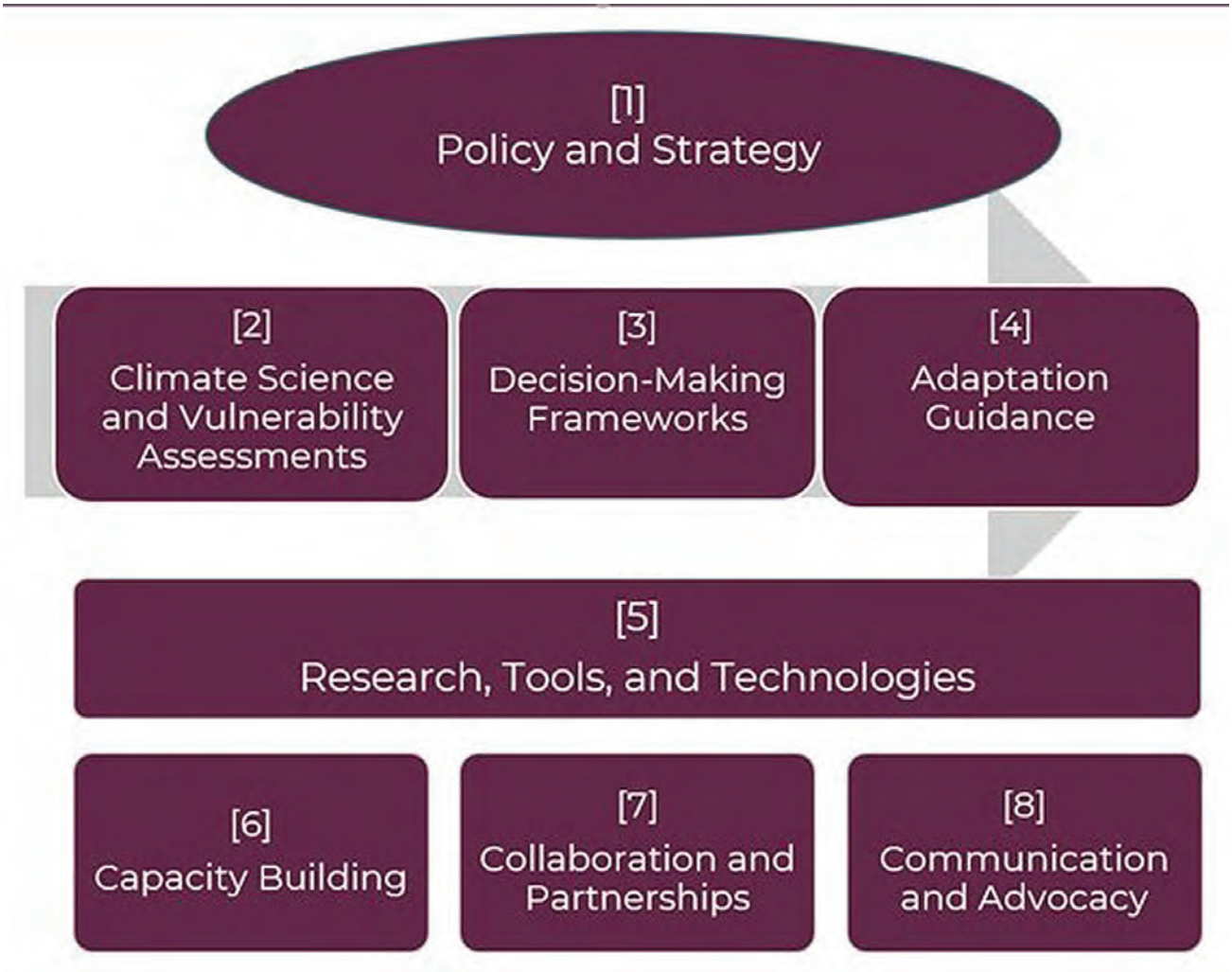

FIGURE 1. There are eight areas to the Climate, Science, and Disaster Response Program Action Plan that flow from top down and bottom up.
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would experience physical climate stressors (again emphasizing the program's reliance and coordination with the Climate Change Response Program's downscaled climate models and products). Sensitivity is determined by how the resource responds to the identified climate stressor (including a resource's current condition), and adaptive capacity is the ability of the resource to adjust to the new environment.

While current vulnerability assessment approaches utilized within the NPS have been primarily driven by assessments of natural resources or facilities and infrastructure, many elements are readily transferable to cultural resources as well. For example, the Cultural Resource Environmental Vulnerability Assessment Toolbox (CREVAT), developed by the NPS Vanishing Treasures Program, explores both environmental exposures as well as historic material sensitivity (e.g., stone, wood, concrete, brick) to determine a vulnerability score (NPS 2020).

Western Carolina University's Program for the Study of Developed Shorelines has been working with NPS to develop a "Coastal Hazards and Sea Level Rise Asset Vulnerability Assessment Protocol" that is initially being deployed at coastal parks along the Eastern Seaboard. This park-level protocol includes the standardization of well-established and accessible data to assess the exposure of facilities, roads, and other infrastructure and provides a set of indicators for various sensitivities. Some of these facility and infrastructure assets are also recognized as cultural resources.

The University of Rhode Island has collaborated with the Climate Change Response Program's regional coastal climate coordinator to prepare an integrated vulnerability assessment at the individual resource (natural and cultural) and asset scale. Piloted at several parks, this methodology builds upon the Western Carolina protocol by ground-truthing exposure, refining sensitivity data, and exploring adaptive capacity of living resources. At George Washington Birthplace National Monument, a multidisciplinary team recently participated in workshops to complete a resource- and asset-level assessment of vulnerabilities and explore adaptation strategies (Figure 2). The final outcomes will include the key components of vulnerability assessment, including verified exposure data, suggested sensitivities, and evaluation of adaptive capacity. These data can then be utilized to inform decision-making and prioritize actions.

3. **Decision-making frameworks.** Of course, scoring vulnerability provokes discussions on what can be done to best manage the resource. While creative or prosaic adaptation interventions may be readily developed, acknowledgement of finite resources requires critical assessment of sustainable stewardship decisions. Making proactive decisions on the selection and execution of an adaptive treatment is a preferable alternative to responses that are reactive or maladaptive. The CSDR team is devoting effort to considering decision-making frameworks to provide guidance and support, particularly when managers consider the decision to cease adaptation intervention and accept resource loss. "Such decisions for loss cannot be

FIGURE 2. From March through July 2022, George Washington Birthplace National Monument collaborated with the Climate Change Response Program and University of Rhode Island to review the outcomes of the Western Carolina University park-level vulnerability assessment (exposure and sensitivity) and explore the adaptive capacity of natural and cultural resources and facilities and park assets. NATIONAL PARK SERVICE

made lightly nor without appropriate consultation and compliance. They must incorporate interdisciplinary research and should be coordinated on a consistent and Service-wide basis" (Jarvis 2014).

Defensible decision-making is closely aligned with the development of actionable adaptations.

To help advance the development and implementation of adaptation strategies, the Climate Change Response Program brought together a range of experts to prepare *Planning for a Changing Climate* (P4CC) guidance and training. P4CC is intended to help shift park management and stewardship from an "unimpaired" baseline condition to planning that considers the dynamic and shifting conditions created by climate change (NPS 2021a). At the core of this approach is consideration of a range of future climate conditions that are possible based on climate science and modeling. An integrated approach to addressing impacts on natural and cultural resources as well as facilities and assets is also key. Rather than introduce a new approach, P4CC encourages including consideration of plausible and divergent future climate impacts into existing NPS planning processes from, National Environmental Policy Act (NEPA) and National Historic Preservation Act Section 106 compliance to general management plans to park resource stewardship strategies. The training for P4CC served as the core curriculum for the development of a cultural resource and coastal hazard-specific workshop offered by the CSDR Program in San Juan, Puerto Rico, in June 2022, described in more detail below.

Assessment of decision-support frameworks from outside NPS is also underway. One avenue for consideration and potential NPS adaptation for cultural resources is the Federal Emergency Management Agency's (FEMA's) approach to hazard mitigation planning and the agency's STAPLEE Criteria framework (an acronym for Social, Technical, Administrative, Political, Legal, Economic, and Environmental factors). (FEMA STAPLEE 2022). The process depends upon engaging state, Tribal, and local municipalities in identifying the common disaster risks and vulnerabilities most likely to impact their communities. The outcomes of the assessment of vulnerabilities are then used to help develop long-range strategies for protecting people and property. These options could range from policy changes to adaptation interventions. An example might include strengthening a shoreline to better absorb storm surge and coastal flooding. A variety of approaches, from a sea wall to living shoreline, might be evaluated. Under each proposed project and heading (social, technical, administrative, etc.) there are a series of considerations that get ranked. For instance, the considerations under *social* are "community acceptance" and "effect on segment of population" while the considerations for *economic* are "benefit of action, cost of action, contributes to economic goals, and outside funding required" (FEMA STAPLEE 2022). Much like NPS, FEMA promotes a holistic and collaborative approach to hazard mitigation that addresses, among other considerations: social justice and equity, restoring natural systems and functions, economic considerations, and community and cultural values, but does not promote consideration of multiple plausible climate futures.

4. **Adaptation guidance.** Defensible decision-making is closely aligned with the development of actionable adaptations. NPS commonly uses the Resist–Accept–Direct (RAD) framework, developed for natural resource managers, to explore climate adaptation options and aid in conservation decisions (Schuurman et al. 2020). The three options are defined as follows:

    - Resist the trajectory of change, by working to maintain or restore ecosystem processes, function, structure, or composition based upon historical or acceptable current conditions.
    - Accept the trajectory of change, by allowing ecosystem processes, function, structure, or composition to change, without intervening to alter their trajectory.
    - Direct the trajectory of change, by actively shaping ecosystem processes, function, structure, or composition towards desired new conditions (Schuurman et al. 2020: 6).

RAD has some apparent correlations for cultural resource managers. An example of resisting change might be the installation of flood gates or other protective measures, accepting change could take the form of

mitigative documentation, and directing change could include building elevation.

Other emerging models for cultural resources not only utilize language more familiar to heritage practitioners, but also emphasize cultural resource management objectives. For example, the CSDR team is exploring a Protect–Adapt–Retreat–Commemorate (PARC) model where, in simplest derivation, adaptation options could be characterized by limiting threats by reducing exposure (protect), limiting threats by reducing resource sensitivity (adapt), limiting threats through removal from environmental context and accepting diminished integrity (retreat), or acknowledging imminent destruction, mitigating data loss, and preserving the memory and stories that the resource represented (commemorate). For clarity, in some instances, the story of a resource or site may be a difficult one where the approach is less about celebrative commemoration and more about "public acknowledgement," as described by Sharon Macdonald (Macdonald 2015) (e.g., memorializing the loss of resources associated with slavery). The CSDR team is using PARC, RAD, and other frameworks to help generate and consider options for cultural resource adaptation that reflect NPS preservation values and the unique and irreplaceable nature of each cultural resource.

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5. **Research, tools, and technologies.** To support developments in climate science, decision-making, and adaptation guidance, one of the action areas is the wider bucket of research, tools, and technology. The intent here is to maintain currency on climate change and cultural resource literature, emergent approaches, and large research goals that serve both the program goals and wider agency policies and processes. For this action area, we emphasize the goals identified in the 2022 Tri-Directorate Workplan (NPS 2021b) that articulate shared objectives across three directorates of the NPS: natural resources, cultural resources, and facilities.

   The first of these goals addresses the inventory and monitoring issues that NPS cultural resources face. Developing adequate inventory systems to enable climate vulnerability assessment, rapid documentation and monitoring for changes, and documentation of selected adaptations is a foundational element to improving cultural resource managers abilities to respond to the climate crisis. As Michalak et al. described in a recent agency publication on climate vulnerability of NPS resources and values, "We also lacked adequate information on the distribution and/or condition of cultural resources … it would be useful or necessary to have access to consistent and accurate information on the location, condition, and relevant attributes of resources. Working with the regional coordinators for the Cultural Resource Inventory System (CRIS) to design and populate the database will be important to ensure that the database can facilitate CR VAs [cultural resource vulnerability assessments] in the future" (Michalak et al. 2021: 37).

   Also included in the research, tools, and technology action area are new methods for testing cultural materials (Figure 3). This work aids in assessing climate sensitivity of architectural and archaeological materials, and therefore their vulnerability, and can inform adaptation guidance. The CSDR team is supporting several advances in this work, including collecting literature reviews on active material studies both within and outside of NPS (e.g., NPS Desert Research Learning Center 2022). This includes assessment of the ongoing NPS partnership with the US Army Construction Engineering Research Laboratory to undertake testing the flood resilience of historic building assemblies (Round 1), materials in isolation (Round 2), and coatings and substrates (Round 3) (Stynoski et al. 2019). The goal, among others, is to provide the scientific data needed to inform building codes, zoning, flood insurance, and historic preservation design review for historic buildings located within flood zones. Existing studies focus exclusively on how modern building materials react to flood waters. FEMA dictates that building materials must be inundated for 72 hours and tested to confirm that they

FIGURE 3. The Cultural Resources Partnerships and Science Directorate is collaborating with the USAr my Corps of Engineers Engineer Research and Development Center to devise and implement a methodology for testing the flood resilience of historic building assembles, materials, and finishes and substrates. NATIONAL PARK SERVICE

can officially designated as "flood damage resistant." Given that they are not rated as flood damage resistant, historic materials are often replaced, rather than repaired (Eggleston et al. 2021).

CSDR has also proposed collaborating with the United Nations Educational, Scientific, and Cultural Organization's International Center for the Study of the Preservation and Restoration of Cultural Property and other interested international and domestic partners to expand the flood testing program to look at other climate change impacts and archaeological resources as well as historic buildings. A larger goal is to focus on adding to the body of knowledge on historic materials as part of efforts to mitigate potential loss of integrity. A more targeted objective is to help managers of cultural resources and property owners to address the loss of material authenticity in the face of extreme precipitation, temperature fluctuations, and wildfires, among other threats.

6. **Capacity building.** Underpinning CSDR's research and climate change actions are efforts intended to strengthen and support the program itself and accelerate each goal. By seeking collaborative funding calls and bringing on an intern to share some of the research load, the team intends to continue increasing its pace. To this end, CSDR has established a task agreement with the National Conference of State Historic Preservation Officers (NCSHPO), a non-profit organization, to enable external support for activities related to climate monitoring, vulnerability, decision frameworks, and adaptation guidance for cultural resources. Such strategic partnerships serve as a force multiplier, accelerating actions, increasing effectiveness, and enabling

feedback and communication loops with heritage practitioners both within and outside of the agency. Continuing to actively seek and steward partnerships (including those in other NPS programs and directorates) is a critical component to foster innovation, promote multidisciplinary management, and increase opportunities for communication.

The intent is that all cultural resource management topics are climate-informed, and that the work is disseminated to field practitioners and other interested parties in an active and actionable way.

7. **Communication and advocacy.** Through a variety of internal and external platforms (e.g., NPS Intermountain Region Climate Symposium, Keeping History Above Water: Norfolk 2022 Conference, National Alliance for Preservation Commission 2022 Conference, TERRA 2022 Conference on earthen architectural heritage, Preserve America Youth Summit, American Institute of Architects Conference on Architecture 2022, NPS programmatic meetings, etc.), the team has shared NPS perspectives and built professional collaborative opportunities. The intent is that all cultural resource management topics are climate-informed, and that the work is disseminated to field practitioners and other interested parties in an active and actionable way. For example, the CSDR team is supporting the refresh of a workshop for disseminating the NPS Guidelines on Flood Adaptation for Rehabilitating Historic Buildings (Eggleston, Parker, and Wellock 2021), to offer practitioners both within and outside of NPS practical guidance on adaptation. Other activities include the ongoing development of NPS Historic Structures Reports and Archeological Management Plans that specifically address climate vulnerability and adaptation.

8. **Collaboration and partnerships.** As described above, the commitment to multi-disciplinarity and communication as guiding principles have encouraged collaboration beyond the program. Through expert partnerships and internal community-building, CSDR seeks to both understand the issues facing cultural resource managers and utilize their expertise wherever possible. A recent example was CSDR collaboration with FEMA, the National Endowment for the Arts, and the Puerto Rico State Historic Preservation Office (SHPO), among others, to develop and offer a workshop on coastal hazards and cultural resources with a focus on various types of flooding, including storm surge, in San Juan. Approximately 50 historic preservation and related professionals (architecture, archaeology, planners, etc.) and staff from the Puerto Rico SHPO and San Juan National Historic Site participated in the two-day workshop (Figure 4).

   Presentations and content included a broad overview of climate change implications for cultural resources, a quick review of relevant federal policies and strategies, and adaptation planning management strategies. Multidisciplinary teams were asked to work together in a series of exercises to develop and evaluate an adaptation strategy for an assigned individual landmark, specifically the US Customs House in San Juan, or contributing building (residential, civic, or commercial) to the Cataño neighborhood, located across the Bay of San Juan.

   From participant surveys and an immediate partner debrief, the training seemed successful in relaying general concepts and terminology and sources for flooding and other coastal data. The adaptation planning exercise was also deemed successful. There was a recognition of the need for information and training on how to implement and fund adaptation projects and guidance for other types of resources such as archaeological sites and cultural landscapes.

CONCLUSION

The development of the CSDR program is an important step as PS grapples with the climate crisis in general and the future of cultural resources more specifically. While program staff are both new additions to the agency, the urgency of the work has provoked an accelerated onboarding and motivated this strategic layout of goals and

FIGURE 4. In June 2022, the Climate, Science, and Disaster Response Program collaborated with the Federal Emergency Management Agency, the National Endowment for the Arts, and the NPS National Center for Preservation Technology and Training to work with local partners in Puerto Rico to offer a workshop focused on the impacts of coastal hazards and adaptation of historic structures in San Juan. NATIONAL PARK SERVICE

actions. In developing the eight action areas, the team of two have worked collaboratively to propose a map for moving forward, and, by defining guiding principles, have characterized how CSDR intends to carry out these initiatives. A good plan is essential to a good product, but there is recognition that planning itself is insufficient to the task at hand. As described above, CSDR has only begun to implement attendant actions. The immediate intent is to learn rapidly, provide considered and scientifically sound recommendations, and develop and steward partnerships to maximum utility. As the team iterates and responds to climate and preservation science, emergent disasters, and lessons learned, we will continue to plan the work and work the plan.

REFERENCES

Daly, Cathy. 2014. "A Framework for Assessing the Vulnerability of Archaeological Sites to Climate Change: Theory, Development, and Application." *Conservation and Management of Archaeological Sites* 16 (August): 268–282. https://doi.org/10.1179/1350503315Z.00000000086

Dawson, Terence P., Stephen T. Jackson, Joanna I. House, Iain Colin Prentice, and Georgina M. Mace. 2011. "Beyond Predictions: Biodiversity Conservation in a Changing Climate." *Science* 332 (6025): 53–58.

Eggleston, Jenifer, Jennifer Parker, and Jennifer Wellock. 2021. *The Secretary of the Interior's Standards for Rehabilitation and Guidelines on Flood Adaptation for Rehabilitating Historic Buildings.* Washington, DC: National Park Service Cultural Resources, Partnerships, and Science Directorate.

Eggleston, Jenifer, Jennifer C. Parker, Mary F. Striegel, Peter B. Stynoski, and Jennifer Wellock. 2021. "Testing the Flood Resilience of Traditional Building Materials." *Association for Preservation Technology Bulletin Journal* (51:1): 15–25.

Environmental Protection Agency. 2022. Environmental Justice. https://www.epa.gov/environmentaljustice

Fatorić, S., and E. Seekamp. 2107. *Assessing Historical Significance and Use Potential of Buildings within Historic Districts: An Overview of a Measurement Framework Developed for Climate Adaptation Planning*. AG-832. Raleigh, NC: North Carolina State Extension.

FEMA [Federal Emergency Management Agency]. 2022. "Hazard Mitigation Planning." https://www.fema.gov/emergency-managers/risk-management/hazard-mitigation-planning

FEMA. 2022. "Federal Emergency Management Agency STAPLEE." https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Ftraining.fema.gov%2Fhiedu%2Fdocs%2Fhazriskmanage%2Fhazards%2520risk%2520mgmt%2520-%2520session%252016%2520-%2520handout%252016.7.doc&wdOrigin=BROWSELINK

Glick, Patty, Bruce A. Stein, and Naomi A. Edelson. 2011. *Scanning the Conservation Horizon: A Guide to Climate Change Vulnerability Assessment.* Washington, DC: National Wildlife Federation. http://www.fs.usda.gov/treesearch/pubs/37406

IPCC [Intergovernmental Panel on Climate Change]. 2022. "Summary for Policymakers." In *Climate Change 2022: Impacts, Adaptation, and Vulnerability*, edited by Hans-Otto Pörtner, Debra C. Roberts, Melinda M.B. Tignor, Elvira Poloczanska, Katja Mintenbeck, Andrés Alegria, Marlies Craig, Stefanie Langsdorf, Sina Löschke, and Vincent Möller. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, UK: Cambridge University Press.

Jarvis, Jonathan B. 2014. "Policy Memorandum 14-02, Climate Change and Stewardship of Cultural Resources." National Park Service. https://www.nps.gov/policy/PolMemos/PM-14-02.htm

Macdonald, Sharon. 2015. "Is 'difficult heritage' still difficult?" *Museum International* 67: 6–22.

Michalak, Julia, Josh Lawler, John Gross, and Caitlin Littlefield. 2021. *A Strategic Analysis of Climate Vulnerability of National Park Resources and Values.* National Park Service. https://doi.org/10.36967/nrr-2287214

NPS [National Park Service]. 2010. *National Park Service Climate Change Response Strategy.* Fort Collins, CO: NPS Climate Change Response Program.

NPS. 2020. "CREVAT Toolbox." 2020. https://experience.arcgis.com/experience/bf35fe50fcb2468b9809970eba750139

NPS. 2021a. *Planning for a Changing Climate: Climate-Smart Planning and Management in the National Park Service.* Fort Collins, CO: NPS Climate Change Response Program.

NPS. 2021b. "Tri-Directorate Work Plan FY23."

NPS. 2022. "George Washington Birthplace National Monument, Virginia." https://www.nps.gov/gewa/index.htm

NPS Desert Research Learning Center. 2022. "Measuring the Effects of Rainstorm Intensity on Adobe Walls." https://www.nps.gov/articles/sodn_adobe_test_walls.htm (accessed 8/5/2022)

National Preservation Act. 2016. https://www.achp.gov/sites/default/files/2018-06/nhpa.pdf

Richman, Angela M. 2015. "Every Place Has a Climate Story: Interpreting Climate Change at Historic Sites." *The George Wright Forum* 32(1): 71–76.

Rockman, Marcy, and Jakob Maase. 2017. "Every Place Has a Climate Story: Finding and Sharing Climate Change Stories with Cultural Heritage." In *Public Archaeology and Climate Change*, Tom Dawson, Courtney Nimura, Elías López-Romero, and Marie-Yvane Daire, eds. Oxford: Oxbow Books, 107–114. https://doi.org/10.2307/j.ctvh1dp4n

Rockman, Marcy, Marissa Morgan, Sonya Ziaja, George Hambrecht, and Alison Meadow. 2016. *Cultural Resources Climate Change Strategy.* Washington, DC: NPS Cultural Resources, Partnerships, and Science and Climate Change Response Program.

Schuurman, Gregor W., Cat Hawkins Hoffman, David N. Cole, David J. Lawrence, John M. Morton, Dawn R. Magness, Amanda E. Cravens, Scott Covington, Robin O'Malley, and Nicholas A. Fisichelli. 2020. *Resist–Accept–Direct (RAD)—A Framework for the 21st-Century Natural Resource Manager.* Natural Resource Report 2020/2213. Washington, DC: National Park Service. https://doi.org/10.36967/nrr-2283597

Stynoski, Peter, Thomas Carlson, Abigail Brake, Clint Arnett, Marion Banko, and Matthew Landi. 2019. "Flood Resilience of Traditional Building Materials: Report of Simulated Flood Immersion According to ASTM E3075 Standard Procedures." Engineer Research and Development Center (U.S.). https://doi.org/10.21079/11681/32823

Turner, B.L., Pamela A. Matson, James J. McCarthy, Robert W. Corell, Lindsey Christensen, Noelle Eckley, Grete K. Hovelsrud-Broda, et al. 2003. "Illustrating the Coupled Human-Environment System for Vulnerability Analysis: Three Case Studies." *Proceedings of the National Academy of Sciences of the United States of America* 100(14): 8080–8085. https://doi.org/10.1073/pnas.1231334100

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Climate change creates conditions conducive to larger, more frequent fires, particularly in the American West. As a result, historic structures and artifacts are at greater risk of fire damage. The Bent's Fort Fire started on the morning of April 12, 2022. Approximately 85% of the national historic site's 800 acres burned. Thanks to the efforts of fire crews, the reconstructed adobe fort was undamaged. | NATIONAL PARK SERVICE