



Climate Resilience Strategy Components and Development Approach

Overview

This document provides information related to developing a climate resilience strategy:

- [Overview](#)
- [Suggested components](#)
- [Development approach](#)

Overview

Climate change is everywhere; however, its impacts are ever-changing and unevenly distributed. This resilience strategy template is an organizational approach that users can adapt to their situation based on their experience with climate change, their discoveries during the learning and planning process, and the needs and opportunities at the site and in the community or region.

You'll be able to plan by using the [Climate Hazard Risk Assessment Map](#) for four timescales: current, now – 2050 (early), 2051 – 2070 (mid), 2071 – 2099 (late). It makes sense to start with current and early-century if you're new to this, but it is important to capture information regarding how future plans can be affected by mid- and late-century climate issues. Then, as you update strategic and master plans, they can be incorporated into long-term resilience strategies.

We recommend using this structure, at first, as a bulletin board with sections: as you do this work, paste or type in the information you find largely useful now or perhaps in the future. You will return to and refine each section often as you learn more about the ramifications of climate change on your site and community, and as you broaden and/or refine your community connections.

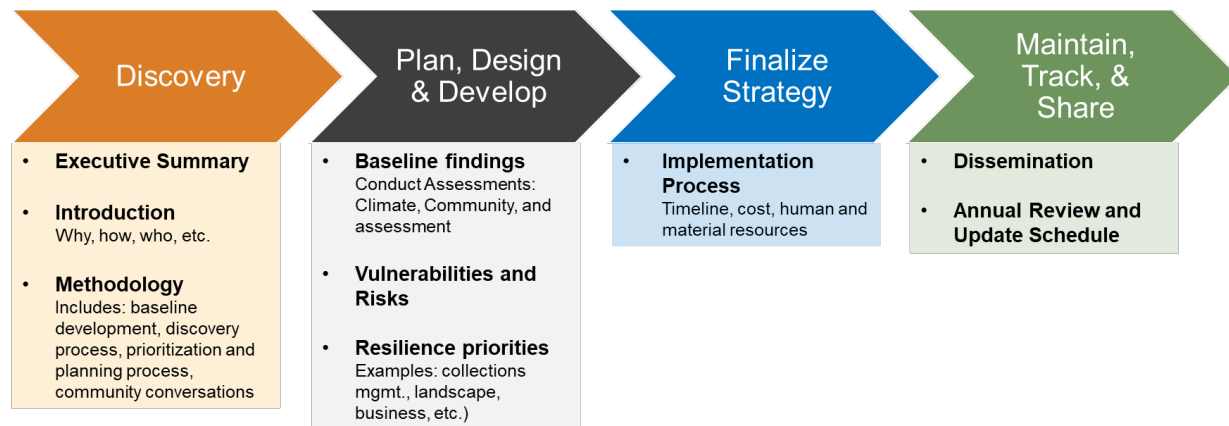
So, at first, do not worry about wordsmithing or organization beyond placing data and discoveries where they seem to fit best, leaving blanks as appropriate rather than working to fill every slot. Just as you choose to complete parts at different times, and to review and edit your additions, you may also choose to reinterpret headings or reorganize categories. You might add links to resources, you might add drawings and pictures. This is your resource, please adapt it to be most useful to you. We will build a collection of resilience strategies for your reference and encouragement.

Note: The climate is best approached with systems thinking: the recognition that everything that is part of the climate has connections to other components and to processes within the system. That interconnection and complexity makes it challenging to proceed in a linear learning fashion as in the month-to-month topical learning modules. So, you will find that learning in each module affects multiple sections of the resilience strategy.

For example, your table of contents may look like what is described below and align with the modules in multiple places.

Development Approach

Below is a sample four-phase approach to developing your climate resilience strategy. The four phases are: (1) Discovery, (2) Plan Design & Development, (3) Finalize Strategy, and (4) Maintain, Track Progress, and Share.



Phase 1: Discovery

Preparation

- Read Module 1: Introduction to Climate Change and Resilience
- Who on the internal team has knowledge or concerns that align with the goal: to create a responsive resilience strategy for the organization, starting with current threats and supporting future planning? All-team planning early on, followed by all-team review and comment, should be complimented by varied staff participation in other ways:
 - At a minimum, curatorial and facilities professionals, and administrative leaders should be permanent members of the strategy team.
 - Financial staff, and all other operational and programming staff should participate in design and review at a variety of points and levels depending upon your threats and concerns and need for creative solutions.
- Which external partners will be valuable and/or critical for assessment and planning? Though not all may be engaged early on, it is helpful to identify and re-identify partners that will be affected by your decisions or helpful in designing and implementing them.
- Contact staff and partners as you identify them. Introduce them to the project and keep them updated when not directly engaged.

Baseline climate assessment

- Are there climate assessments or resilience plans already available at the city, county, state or federal level that cover your area?

- Use the [Climate Hazard Risk Assessment Map's](#) Next Year (FEMA) Risk Time Period to establish your baseline. This provides a view of historical climate hazards at your site and in your community.
- Search for other published assessments, reports and plans from local government agencies (Sustainability Office, Department of Ecology, Department of Emergency Planning, etc.)
- What are the most common current threats and those expected at future intervals (the degree and type may change)?
- What primary risks and hazards do these threats highlight for the institution?
- What do you know / not know about addressing them?

Baseline community assessment

- What do you know about the community's awareness of climate change risks
 - How is the local government preparing?
 - This includes the reports listed above plus ongoing efforts noted in news reports and agency updates.
 - How does the institution see climate change as experienced in the community?
 - Who in the community is also affected, and how? Can you plan to help them as well?
 - Whom should you listen to or reach out to for understanding the experience of residents and other organizations in a changing climate.
 - Identify and introduce yourself to appropriate groups or individuals, ask for recommendations, and plan to work more deeply with them in the future.
- What capabilities does the community have that you can borrow or learn from?
 - What are these? (shared emergency supplies and generators, rapid response team, emergency network, early warning systems, etc.)
 - Who competes for those capabilities in challenging times, indicating you must build capacity to provide them for site?
 - Are there any events when community agencies or neighborhoods practice disaster response or hold disaster or climate response planning?

Baseline institutional assessment

- What sites and materials are under consideration?
- What reports and assessment do you have already?
- What do you know about their risk experiences of the past?
- What time scenarios are you planning for? Now, 2030, 2050, 2080?
- What discovery work is necessary for planning potential scenarios?
- What capabilities do you have for ourselves or to offer?
- Given the hazards and risks identified, what are our key vulnerabilities and related concerns?

- How are mechanical systems likely affected or needed to address conditions?
- What knowledge, skills and abilities do you anticipate needing to develop and implement this plan?

Phase 2: Plan Design & Development

- Where to start
 - Use the [Climate Hazard Risk Assessment Map's](#) to identify predicted future climate hazards. Some hazards you may already be experiencing but some may be new to you.
 - Explore the Risk Periods: Now–2050 (ClimateCheck), Now–2044 (NOAA), 2035–2064 (NOAA), and 2077–2099 NOAA).
 - Run a Site level report from Climate Check to acquire a detailed report of your location and site.
 - Then, use the [Climate Risk Vulnerability Assessment Tool for Cultural Heritage](#). Identify major threats and corresponding resilience planning and preparation based on the above assessments.
 - Ex. Prepare for storm surges, prepare for power losses, address surface water events, design firebreak, secure financial tools for stresses, etc.
 - Continue community discovery process through conversations and network development
- Prioritize needs for response planning.
 - The [Cost Effort Value Tool / Scatter Chart](#) (samples) supports the planning and scheduling of responses to vulnerabilities identified in survey
- Identify steps *within* each response approach
 - Identify
 - Hazards, risks, and vulnerabilities (HRVs) being addressed with each response
 - The capacity of these to compound or cascade as they intersect with climate and non-climate issues (health, earthquake, supply change disruption, etc.)
 - Human resources and physical assets to protect and deploy
 - Financial and supply needs and opportunities
 - Any other must-haves for operations
 - Look for interactions among HRVs that create/join cascading and compounding effects
 - Look for adjacencies / co-benefits (doing two things simultaneously or in sequence may make both easier or improves results)
- Sketch out implementation section
 - Identify further evaluation and site-specific planning
 - Identify purchases, partnerships or agreements for resources

- Identify appropriate policies and procedures, guidelines, how-tos to develop or update
- Draft a sequence of steps for implementation and align resources

Phase 3: Finalize Strategy

In this phase, finalize the document so you have a usable plan. This sample *Table of Contents* illustrates potential components for your Climate Resilience Strategy. Some may not be relevant, or some additional components may be needed that are not listed here. This is meant to be a starting point to developing your strategy.

Table of Contents for the “final version”

- Executive Summary (write last)
- Introduction (why, how, who, etc.)
- Methodology (baseline development, discovery process, prioritization and planning process, community conversations)
- Baseline findings
- Vulnerabilities and Risks
- Resilience priorities and strategies
 - Priority areas could be business, structure, landscape, mechanical systems, collections management, emergency and disaster response, community engagement, etc.
- Implementation Process (timeline, cost, human and material resources)
- Dissemination
- Annual Review and Update
- Appendices
 - Climate risk resources consulted
 - Mapping and site images
 - Contacts and participants
 - Bibliography and endnotes

Phase 4: Maintain, Track Progress, and Share

Strategies are most effective when reviewed, tested, updated, and socialized. Choose a week every year when you gather as an organization to review the strategy and prioritize updates. Also establish an activity for you and the community to share and review plans, test scenarios and systems, and build the skills, knowledge and abilities of “Friends from Before” and “Neighbors helping Neighbors” in preparation for whatever challenges or opportunities greet your community. The first of May every year, May Day, is a very appropriate time for this work.

May first every year, May Day, is already often the day when cultural institutions review their disaster plans. The approach was begun by the Society of American Archivists and

Heritage Preservation, now continued by American Institute for Conservation. There may also be other designated times you find appropriate:

- California has Shakeout Day for earthquake preparedness; your community may have an anniversary or commemoration that fits with preparedness planning;
- U.S. federal government has declared September to be [National Preparedness Month](#) | [Ready.gov](#)



The terms below are adapted from the [U.S. Climate Resilience Toolkit](#) unless otherwise noted.

ADAPTATION: The process of adjusting policies, practices, and attitudes to new climate conditions in order to reduce risks to valued assets.

BELIEFS: Ideas that are held to be true whether or not evidence exists to support them.

ADAPTIVE CAPACITY: The ability of a person, asset, or system to adjust to a hazard, take advantage of new opportunities, or cope with change.

CASCADING HAZARDOUS EVENTS: Multiple hazardous events are considered cascading when they act as a series of toppling dominoes, such as flooding and landslides that occur after rain over, as an example, areas where wildfires occurred. Cascading events may begin in small areas but can intensify and spread to influence larger areas. (Chen, Joanne, and Michael Greenberg. 2022. “Cascading Hazards and Hazard Mitigation Plans: Preventing Cascading Events in the United States.” *Risks, Hazards, & Crisis in Public Policy* 13 (1): 48–63. <https://doi.org/10.1002/rhc3.12220>.)

CLIMATE ACTION PLAN: An implementation document that includes strategies to reduce contributions to the drivers of climate change (e.g., reduce/eliminate greenhouse gas emissions). Often the goal is to become carbon neutral.

CLIMATE CHANGE: A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. (UNFCCC definition <https://unfccc.int/resource/ccsites/zimbab/conven/text/art01.htm>)

CLIMATE DIASPORA / MIGRATION: Migration (of both animal and plant species) that can be attributed largely to the slow onset impacts of climate change on livelihoods owing to shifts in water availability and crop productivity, or to factors such as sea level rise or storm surge and other compounding issues. (Adapted from White House Report on the Impact of Climate Change on Migration, 2021.)

CLIMATE RESILIENCE STRATEGY: A planning document that coordinates an organization’s response to the effects of climate change. The plan assesses vulnerabilities and prioritizes actions for managing risks to assets, operations, and support infrastructure and to be better prepared for more changes.

COLLECTIONS: An accumulation of material (including, but not limited to, writings, objects, artifacts, artistic creations, clothing, tools and weapons, domestic and industrial items) gathered for temporary or long-term protection, research, and educational purposes. (UNESCO: UNESCO Institute for Statistics, 2009 UNESCO Framework for Cultural Statistics, Cultural heritage | UNESCO UIS, Intangible: <https://ich.unesco.org/en/what-is-intangible-heritage-00003>)

CONSERVATION: As it relates to cultural resources, the preservation management, documentation, examination, and treatment, of objects, art, collections, built heritage, sites, and landscapes. "Conservation encompasses all those actions taken toward the long-term preservation of cultural heritage. Activities include examination, documentation, treatment, and preventive care, supported by research and education." (<https://www.culturalheritage.org/about-conservation/what-is-conservation>)

COMPOUNDING HAZARDOUS EVENTS: Events where more than one unrelated hazard interacts and cause greater destructive consequences.

COMMUNITY: A body of individuals who share a degree of common interests or identify and live in a particular area of a larger society or are scattered within that society. Community can also be defined as an area, such as the community around the cultural resource, the South Bay, the Lower East Side, a particular housing development or neighborhood, etc.

CULTURAL RESOURCE: Tangible and intangible evidence of human activity, creativity, and/or appreciation, which includes any archaeological remains, building or structure, heritage setting, collection, works of art or craft, and native/traditional communities of knowledge. Cultural Resources are often non-renewable and as such require protection and preservation.

CULTURAL SITE: A space incorporating an area of land or a building that represents, or houses, or shares, aspects of the culture and heritage of the community, region, and/or nation.

DEBRIEF (aka "HOT WASH"): The immediate evaluation of a group's or a community's performance following training for or responding to an emergency/disaster event. The purpose is to identify successes or needs for change.

DEMOGRAPHICS: Statistical data referring to a population and/or particular groups within a population.

DISASTER: A large-scale natural or human-caused catastrophe that requires immediate response. A disaster often overwhelms the ability to respond using available local resources.

EMERGENCY: Large to small-scale manageable event that threatens a resource (human, natural, or cultural). Emergencies require an immediate response.

FEMA: The Federal Emergency Management Agency (<https://www.fema.gov/>)

GREENHOUSE GASES (GHG): Gases emitted through both anthropogenic (burning of fossil fuel, extractive industries, etc.) and non-anthropogenic (volcanic eruptions, wildfires, etc.) activities. Anthropogenic emissions include carbon dioxide (CO₂), methane (CH₄), ozone (O₃), hydrochlorofluorocarbons (HCFC), hydrofluorocarbons (HFC), and nitrous oxide (N₂O) as the main components. Concentration levels of these gases beyond the ability of the environment to absorb are detrimental to a healthy climate. ([United States Environmental Protection Agency “Overview of Greenhouse Gases”](#)).

HAZARD: An event or condition that may cause injury, illness, or death to people or damage to assets. Natural hazards are often amplified by climate change and the degree of vulnerability to the hazard.

IPCC: United Nations Intergovernmental Panel on Climate Change

MITIGATION: Actions that reduce, stop, or reverse the impact of a hazard or risk.

NOAA: National Oceanic and Atmospheric Administration (noaa.gov)

PRESERVATION: Actions that maintain a collection, structure, cultural heritage resource, or landscape while sustaining a high level of historic and cultural integrity.

RCP: Representative Concentration Pathway (RCP) is a prediction model adopted by the IPCC which is “based entirely on greenhouse gas (GHG) concentrations in the atmosphere” (not emissions). The pathways describe different climate futures, all of which are considered possible depending on the volume of GHG emitted in the years to come. ([United States Department of Agriculture Climate Hubs “What are climate model phases and scenarios?”](#))

RCP 4.5: A moderate stabilization pathway (prediction model) in which radiative forcing (the difference between incoming and outgoing energy in the Earth’s biosphere) stabilizes shortly after the year 2100. RCP 4.5 is more likely than not to result in a global temperature rise of between 2.6°F/ (2°C) and 5.4°F/ (3°C) by 2100. (The “4.5” refers to watts per meter squared of energy, used to calculate possible temperature change.) ([United States Department of Agriculture Climate Hubs “What are climate model phases and scenarios?”](#))

RCP 8.5: A high climate change scenario or stabilization pathway characterized by increasing greenhouse gas emissions (GHG) over time, and factors in the highest GHG concentration levels of all the scenarios by the year 2100. Radiative forcing continues to increase after 2100. Under RCP 8.5, the worst-case scenario projects average global temperature change could reach as high as 8.8°F/4.9°C. ([United States Department of Agriculture Climate Hubs “What are climate model phases and scenarios?”](#))

RESILIENCE: The ability to recover effectively and to successfully adapt to challenges through flexibility and adjustment to external and internal needs.

RISK: The potential for negative consequences where something of value is at stake. In the context of the assessment of climate impacts, the term risk is often used to refer to the potential for adverse consequences of a climate-related hazard. Risk can be assessed by multiplying the probability of a hazard by the magnitude of the negative consequence or loss. (Risk = Hazard × Exposure × Vulnerability.)

RISK EXPOSURE: The presence of people, assets, and ecosystems in places where they could be adversely affected by hazards as well as the influence of the intensity and frequency of any given hazard or combination.

SENSITIVITY: The degree to which a system, population, or resource is or might be affected by hazards.

SHARED SOCIOECONOMIC PATHWAYS (SSPs): A set of pathways (models) that explore socioeconomic factors and how they may change over the next century. These include things such as population, economic growth, education, urbanization, and the rate of technological development. The pathways are based on five different narratives in which the world might evolve in the absence of climate policy and how different levels of climate change mitigation could be achieved when the mitigation targets of RCPs are combined with the SSPs. ([United States Department of Agriculture Climate Hubs “What are climate model phases and scenarios?”](#))

STABILIZATION: A term usually referenced by conservation practitioners and specialists to describe a state or process of repair or maintenance of an object that stops or slows deterioration.

STRESSOR: An action or event that increases the level of stress on humans or heritage resources leading to an increased risk.

STRESSOR (Climate): A condition, event, or trend related to climate variability and change that can exacerbate hazards.

SUSTAINABILITY: Maintaining existing resources or conditions while avoiding as little negative change as possible.

TIPPING POINT: The point at which it becomes difficult to effect change or stop deterioration of a cultural resource.

UNIVERSAL VALUES: (U.N. definition for Heritage sites): Possessing a cultural and/or natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity.¹

VALUES: A person's or group's set of principles or standards of behavior. (6)

VULNERABILITY: The susceptibility to hazards that encompasses exposure, sensitivity, potential impacts, and adaptive capacity. (Adapted from US Resilience Toolkit Glossary, <https://toolkit.climate.gov/content/glossary>.)

Citation

Climate Resilience Resources for Cultural Heritage. 2024. "Terms and Definitions." Foundation for Advancement in Conservation, March 13, 2024.
<https://www.resilience.culturalheritage.org/pages/build-resilience-strategy>

¹ UNESCO World Heritage Centre. n.d. "UNESCO World Heritage Centre - Compendium."
https://whc.unesco.org/en/compendium/action=list&id_faq_themes=962.



Overview

This module provides:

- [Terms and definitions](#)
- [Core concepts and approaches](#)
 - [Cultural Resources and Climate Change](#)
 - [A Change in the Climate](#)
 - [The Time for Action](#)
 - [What is Resilience?](#)
 - [Location, Location, Location](#)
 - [Making Your Case for Resilience](#)
- [Next steps](#)
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- [Sources for further study](#)
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- [Activities](#)

Terms and Definitions

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ADAPTATION: The process of adjusting policies, practices, and attitudes to new climate conditions in order to reduce risks to valued assets.

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¹ United Nations Framework Convention on Climate Change. n.d. "Article 1, Definitions."
<https://unfccc.int/resource/ccsites/zimbab/conven/text/art01.htm>.

(HFC), and nitrous oxide (N₂O) as the main components. Concentration levels of these gases beyond the ability of the environment to absorb are detrimental to a healthy climate.

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Cultural Resources and Climate Change

Cultural Resources are the heritage that communities seek to protect and preserve in a changed and changing climate. No matter your role, what it is you are caring for, the size of your institution, or the amount of available assets, resilience in the face of escalating climate change is essential. Engaging Cultural Resource stewards in climate resilience is critical since they are in a unique position of trust and responsibility within the community and as such have a powerful role to play in effecting positive change. There are many people within and outside of the cultural sector who are working together to build climate resilience and everyone, individuals, institutions, and communities alike, will continue to make progress together.

A Change in the Climate

Scientific observation shows that humans have had a dramatic impact on the climate since the early 19th century and the Industrial Revolution. The realization that carbon emissions impact our climate and lead to warming of the atmosphere was described as early as 1896 by Swedish chemist Svante Arrhenius.² The burning of fossil fuels has dramatically increased emissions of greenhouse gases (GHG), such as carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), into the atmosphere.

Today the climate is exhibiting the cumulative effects of over 250 years of pollutants pumped into the air. The resulting warming of our climate has caused numerous negative impacts such as the melting of glacial ice and changing weather patterns. These impacts have diminished the earth's ability to absorb the added carbon and as our knowledge of the warming climate evolves, we are beginning to understand the long-term consequences.

² Weart, Spencer R. n.d. "The Carbon Dioxide Greenhouse Effect." *The Discovery of Global Warming*. American Institute of Physics. <https://history.aip.org/climate/co2.htm>.

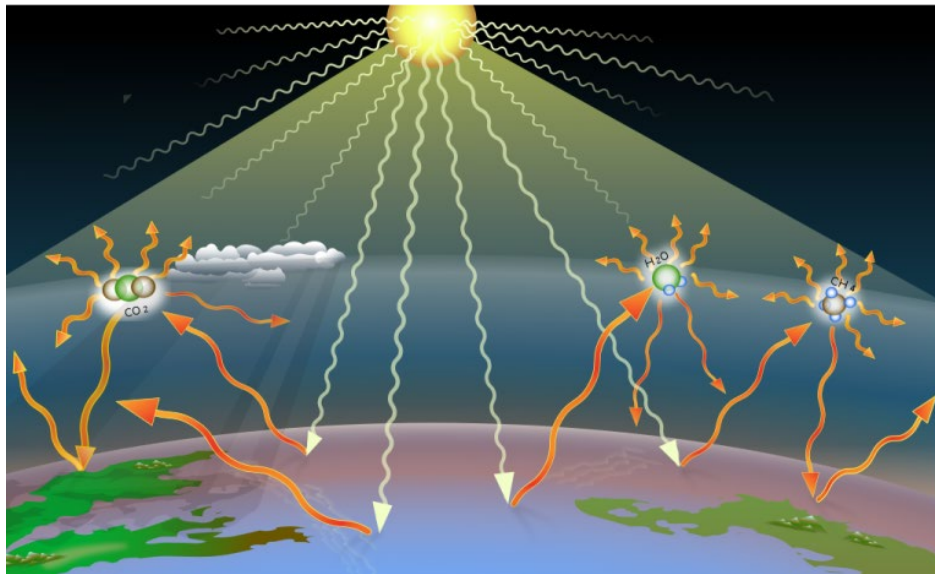


Figure 1. “Simplified diagram showing how Earth transforms sunlight into infrared energy. Greenhouse gases like carbon dioxide and methane absorb the infrared energy, re-emitting some of it back toward Earth and some of it out into space.”³ Image credit: [A loose necktie, CC BY-SA 4.0](#), via [Wikimedia Commons](#).

Human activity has resulted in such rapid emissions of GHG’s that the biosphere and lithosphere (earth’s crust) are incapable of absorbing and holding it all. The excess gases become part of the Earth’s atmosphere. The sunlight (energy) that comes into our atmosphere has a short infrared wavelength compared to the heat energy absorbed and then released by the Earth. GHGs, such as carbon dioxide or CO₂, capture that longer-wavelength energy. As the heat energy escapes, some leaves our atmosphere and some is reflected back to Earth, contributing to warming of the atmosphere (Figure 1).

The most recent report from the United Nations Intergovernmental Panel on Climate Change (IPCC) identifies an increase of 2.7°F/1.5°C in overall global temperature is already a certainty. The result, among other challenges, will be sea level rise and flooding in vulnerable coastal areas (see Figures 2 and 3 below).

³ Fecht, Sarah. 2021. “How Exactly Does Carbon Dioxide Cause Global Warming?” *State of the Planet*, February 25, 2021. <https://news.climate.columbia.edu/2021/02/25/carbon-dioxide-cause-global-warming/#:~:text=As%20CO2%20soaks%20up%20this,contributing%20to%20the%20'greenhouse%20effect>.

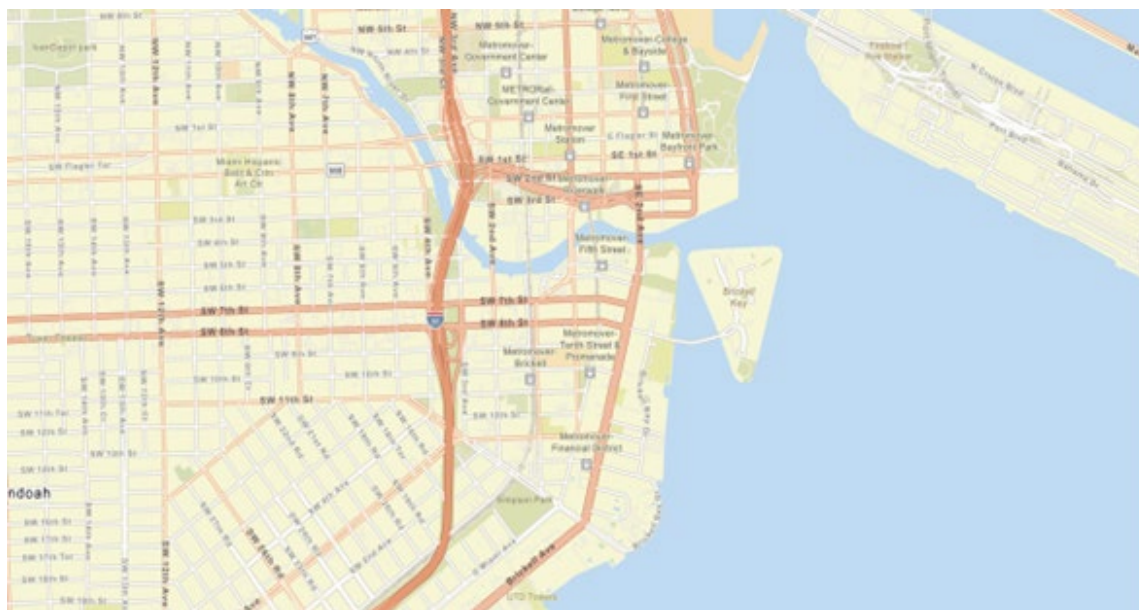


Figure 2. Miami, Florida, 2022.

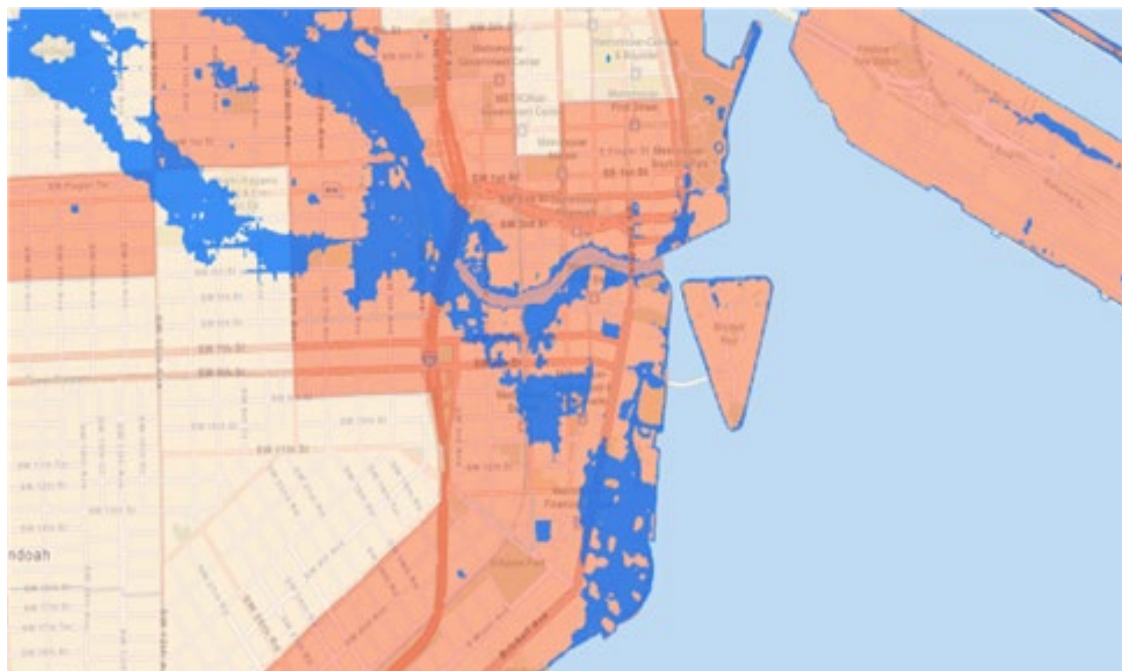


Figure 3. Miami, Florida, NOAA and FEMA projected sea level rise and flood risk by 2090.

The Time for Action

The IPCC noted in its *Climate Change 2023: Synthesis Report*, climate change is straining existing resources and changing the way we live. This will continue into the future. However, there are many reasons for hope. Everyone can take steps now to manage how individuals, institutions, and communities will respond. Cultural Resource stewards can work collaboratively to make sure no individual site or cultural resource must face the risks alone. Everyone shares the risks, and all have a role to play in finding solutions. It is important to act now.

Cultural Resource stewards are in a unique position of trust to effect change for the better within their professional roles and within their communities. This trust is grounded in the belief that Cultural Resource stewards work toward the long-term preservation of our shared heritage in the most equitable way possible. Together we must find ways to make Cultural Resources more resilient in the face of growing challenges. In doing this we meet our primary objective of preservation and future access. Resilience, through both adaptation and mitigation, must become our primary concern. Cultural Resources stewards not only need to prepare for the impact of the climate crisis, but also take action to reduce their contributions to those changes. In doing so we move toward an equitable, just, and healthy community.

What is Resilience?

Resiliency is the ability to recover effectively and to successfully adapt to challenges through flexibility and adjustment to external and internal needs. Part of clearly understanding resilience is the premise that there is a challenge to overcome and that both the challenge and the process of overcoming it will be different for each person, site, Cultural Resource, or community. Cultural Resource stewards will need to approach resiliency from a broader perspective than simply emergency preparedness for collections. Cultural heritage and community are intertwined. They survive and thrive through cooperation.

Resilience can be built through the development and application of the four “pillars” of effective resilience:

- **Preparedness** – anticipating the negative effects caused by the hazards through awareness and gathering resiliency resources.
- **Response** – organized and effective short-term actions intended to minimize further loss or damage caused by an emergency or disaster.
- **Adaptation** – exercising flexibility in the face of challenges.
- **Mitigation** – taking actions to reduce, stop, or reverse climate change.*

**(Any long-term resiliency effort requires a clear strategy to develop and implement mitigation efforts. Adaptation and mitigation are commonly used terms in discussions of climate change and the various responses to the associated hazards, but they represent slightly different approaches. The Intergovernmental Panel on Climate Change (IPCC) defines adaptation as “the process of adjustment to actual or expected climate and its effects. The IPCC defines mitigation as “human intervention to reduce the sources or enhance” capture of greenhouse gases.⁴)*

To be resilient and to adapt to the known climate challenges and those yet to be understood, Cultural Resource stewards will need to:

1. Examine the hazards and risks that impact the resources they protect;
2. Recognize how climate change impacts their communities, both locally and regionally;

⁴ International Panel on Climate Change. 2014. “Summary for Policymakers.” In *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by O. Edenhofer, R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, et. al., 1-30. Cambridge, UK: Cambridge University Press. https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_summary-for-policymakers.pdf.

3. Take action to manage responsibilities to Cultural Resources; and
4. Provide support for, and cooperate with, all who are building resilience.

Location, Location, Location

Every location, site, building, and collection has unique climate concerns and opportunities. Some localities are expected to experience dramatic weather fluctuations such as large storm events, prolonged record-setting heat, and drought, others will suffer increased flooding or coastal inundation, all occurring with greater frequency and for longer durations.

Examples

Torrential rain events (referred to as atmospheric rivers) inundated parts of California in early 2023. These rains fell on a landscape hardened by years of drought and depleted by wildfires. The rapid influx of water caused floods and landslides where the land was incapable of absorbing the water. As of February 22, 2023, the National Weather Service issued blizzard warnings for areas of southern California.



Increased rainfall in the Northeastern United States regularly overwhelms gutter systems on historic houses. As the water overflows, it cascades in an uncontrolled fashion, sending water along the paths of least resistance. Rather than being directed away from the roof, walls, and foundation, the water now can intrude into new spaces, or freeze into icicles and dams. The region's increase in extreme snowfall events brings other challenges, such as potential for roof collapse from heavy accumulation or a buildup of icicles from freeze-thaw cycles. The Mark Twain House & Museum in Hartford, Connecticut, addressed the risk of icicle buildup (pictured here in 2017) by installing a heating coil over the slate roof tiles. When snow is forecasted, the coil can be easily switched on, thereby eliminating the problem. *At left: Icicle build-up before adding the heating coil. Photo courtesy of The Mark Twain House & Museum.*

The US-Caribbean climate is expected to change in ways that include both an overall increase in average temperatures from 1.5°F/0.8°C to 4°F/2.2°C by 2050 and by a decrease in overall rainfall. Paradoxically, although the average amount of daily rainfall will decrease there will be a corresponding increase of severe rain events with increased intensity. Along with the increase of air temperature, an increase in water

temperature will intensify the storms and add to sea level rise.⁵ The US southwest is expected to see the average mean temperature increase by nearly 15°F/8.3°C by the end of century. Heatwaves will increase in duration, frequency, and intensity. A projected increase in temperatures throughout the state of New Mexico (Figure 4a) is a marked departure from the historic averages (Figure 4b).

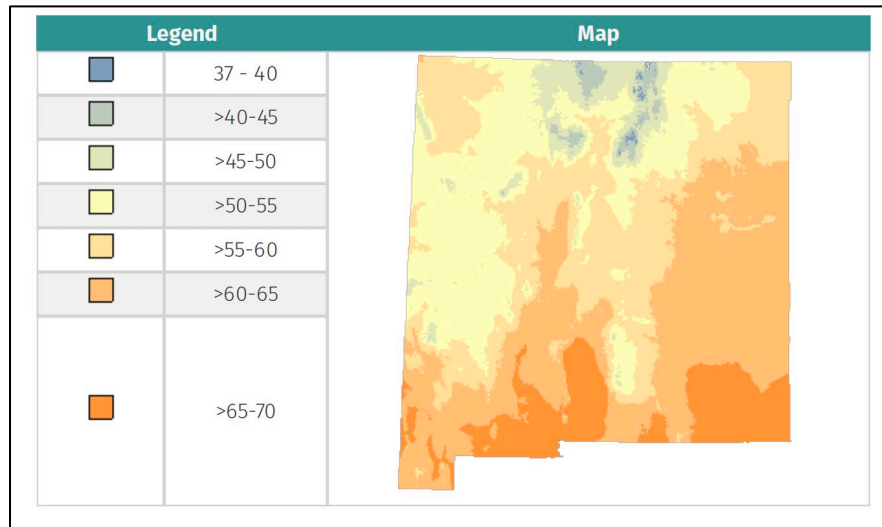


Figure 4a. Map displaying the average projected temperature (Fahrenheit) for New Mexico for 2021-2050 shows an overall average temperature increase of 5°F by 2050. (Sourced from <https://nmclimaterisk.org/>)

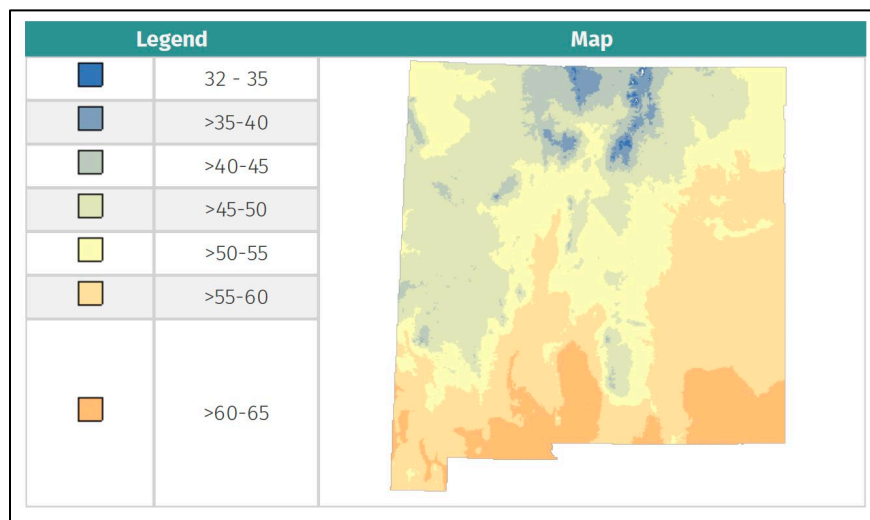


Figure 4b. Map displaying the historical 30-year mean temperature (Fahrenheit) for New Mexico. (Sourced from <https://nmclimaterisk.org/>)

Making Your Case for Resilience

Much like a case statement in a grant application or capital campaign, a case for resilience is meant to explain the importance of the Cultural Resource to the community, the challenges and opportunities, work accomplished to date, plans for future efforts, the resiliency resources needed, and the results and benefits of future efforts. Every case statement reflects the specific situation and needs. Not only does the statement

⁵ Gould, William A., Ernesto L. Diaz, Nora L. Álvarez-Berrios, Felix Aponte-González, Wayne Archibald, Jared H. Bowden, Lisamarie Carrubba, et al. 2018. "Chapter 20: U.S. Caribbean." In *Impacts, Risks, and Adaptation in the United States: The Fourth National Climate Assessment, Volume II*, edited by D.R. Reidmiller, C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart, 809-871. Washington, DC: U.S. Global Change Research Program. <https://doi.org/10.7930/nca4.2018.ch20>.

focus on the details of the institution but also on the motivations of the reader/reviewer. To convince the reader/reviewer to support the cause, you must first understand the reader's/reviewer's motivation, capacity for support, and degree of knowledge and interest.

The neighbor may be motivated by nostalgia, the board treasurer by current and future costs, the mayor by politics, the planner by the impact on nearby projects, and the emergency managers by the need for flexible responses and the possibility of reducing the need to respond. You can add other benefits to broaden your case and educate the reader, but first, meet their needs so that they are willing to meet yours.

Ultimately, resilience will ensure the long-term preservation of Cultural Resources by helping stewards and communities prepare for hazardous events, respond in an organized way, adapt to the changes already underway, and ultimately plan for and implement mitigation strategies.

Example

Collaborative work is already taking place among cultural institutions and their surrounding communities. The Strawberry Banke Museum is working with the city of Portsmouth, New Hampshire, to understand the dynamics of rising tides. The goal is to address preservation needs for the museum, its landscape, and residences in the Puddle Dock neighborhood of the city. The museum and the city work collaboratively in over a dozen initiatives to bring together researchers, scientists, and engineers from around the country and the world to develop strategies addressing climate resiliency.

Next Steps

- [Read](#) the recommended readings and do the [activities](#).

Recommended Reading

McGhie, Henry. 2021. *Mobilising Museums for Climate Action: Tools, frameworks and opportunities to accelerate climate action in and with museums*. Sections b and c. London: Museums for Climate Action.

<https://www.museumsforclimateaction.org/mobilise/toolbox>.

Preservation Priorities Task Force. 2021. Sustainability and Climate Action, Preservation Priority Issue Brief – Fall 2021.

<https://static1.squarespace.com/static/60748c08c5e3c41f47c49cbd/t/61434da4f0fbc56ed870d59/1631800743277/PPTF+Sustainability+and+Climate+Action+Issue+Brief.pdf>.

Sources for Further Study

City and County of Honolulu, Resilience Office. n.d. "Office of Climate Change, Sustainability and Resiliency." <https://www.resilientoahu.org/>. (For resources on sustainability plan, climate action plan, climate adaptation plan, and climate resilience strategy.)

McKay, David I. Armstrong, Arie Staal, Jesse F. Abrams, Ricarda Winkelmann, Boris Sakschewski, Sina Loriani, Ingo Fetzer, Sarah Cornell, Johan Rockström, and Timothy

M. Lenton. 2022. "Exceeding 1.5°C Global Warming Could Trigger Multiple Climate Tipping Points." *Science* 377 (6611). <https://doi.org/10.1126/science.abn7950>.

Park, Hyung Sam, and Arnold Vedlitz. 2013. "Climate Hazards and Risk Status: Explaining Climate Risk Assessment, Behavior, and Policy Support." *Sociological Spectrum* 33 (3): 219–39. <https://doi.org/10.1080/02732173.2013.732900>.

Sutton, Sarah. 2023. *The Arts and Humanities on Environmental and Climate Change: Broadening Approaches to Research and Public Engagement*. Oxon, UK: Routledge.

U.S. Federal Government. 2014. U.S. Climate Resilience Toolkit. <http://toolkit.climate.gov>.

Volz, Lindsey. 2022. "Highlighting Community Resilience Efforts through Storytelling." National League of Cities. May 6, 2022. <https://www.nlc.org/article/2022/05/06/highlighting-community-resilience-efforts-through-storytelling/>.

Citation

Climate Resilience Resources for Cultural Heritage. 2024. "Introduction to Climate Change and Resilience." Climate Resilience Resources Module 1. Foundation for Advancement in Conservation, March 13, 2024. <https://www.resilience.culturalheritage.org/pages/build-resilience-strategy>

Activities

- 1. How does weather or the seasons impact your institution, site, collection, or building? How does weather or the seasons impact your community?** *Think broadly about this question, you'll have a chance to take notes and to be more specific later. For now, just recognize that weather and seasonality is already a factor in your planning, and that will expand in the future.*

Consider your event calendar and operations schedule. How do seemingly routine practices already reflect weather considerations (for example, precipitation, temperature, wind, and travel conditions)? What if those weather conditions became more intense, frequent, or prolonged? How would that affect your operations? Would you make different schedules, choices, or plans? Would you change aspects of your building, or your landscape uses to adapt?

Then consider the most challenging weather and weather events your community has experienced recently. How has the community been affected? Are there times when power is out, roads are blocked, or systems are offline that affect your community and you? Whose systems are restored first in your community? How does waiting for improved conditions impact your community and your organization?

- 2. Have the weather patterns changed at your site in the past decade? In what ways have you adapted?** This question focuses on your site's experience adapting to past situations. *Again, think broadly; you'll have a chance to take notes and to be*

more specific later. For now, just recognize that weather and seasonality is already a factor in your planning, and that it may already have been becoming more of a factor, and you may already be adapting in ways that make your institution more resilient.

Part of resilience includes rediscovering past habits, routines, and practices, from a few years ago when your organization was different, or a decade ago or more when the climate was different. What activities served you well in different times? How can the past experience of identifying new practices serve you well in developing climate resilient approaches? You have experience, already, adapting to new demands and opportunities, of any type, and that can help you adapt now.

Adaptive and resourceful thinking is a skill to practice as individuals, organizations, and communities. This is one reason why “tabletop exercises” help planners of any kind test out scenarios and think through situations and responses.

- 3. In what ways are you already responding to climate events?** This question focuses on your site’s response to a specific recent event (rather than a slow-onset change). *Now it’s time to take notes. These responses may be important actions that reduce your vulnerability to climate change and are part of the resilience strategy you are building.*

Think about a climate event within the last year that disrupted business as usual: Did you respond using plans made for those situations? By figuring it out as you reacted? Or was it a mix? What did you learn that highlights what to add to your resilience strategy now?

- 4. What are the benefits for Cultural Resource stewards to promote resilience and adaptation?** This question is about more than response, it’s about recognizing the benefits from planning, preparedness, and adaptation.

Think back to when you experienced an emergency in the past—an injury, damage to the building, or a loss of an operational system, for example. What costs were there: lost revenue, expensive repairs, higher insurance rates, perhaps even risk or damage to your reputation? Once the incident was over, you probably took steps to reduce the chances of both a repeated experience and the degree of damage incurred.

Now think of a climate event. By improving your preparation, what costs could you avoid? What efficiencies or benefits might you build into the solution? What advantages might you simultaneously be able to offer others in your community? *As you recall this, write it down as part of your institutional story (case) for becoming more resilient.*

Here’s an example: To prepare for the increasing impact and frequency of heat waves, the volunteers are planning to work with the community conservation district to plant deciduous trees on the south side of the museum, shading the windows and

covering the sidewalk. They'll also add trees in the front, as part of a new rain garden area and for shade over the benches and the new chairs and tables that offer more patrons open air access to the café. This is resilience.

- The building will be cooler in the summer because the lobby windows are shaded.
- The building will need less energy for summer cooling, which saves money and reduces GHG emissions.
- These cool spaces out front will reduce urban heat island effect for the site and nearby community.
- They will make the space more inviting (perhaps increasing visitation), especially to visitors who prefer to eat outdoors since COVID-19 (why the tables and chairs were added).

Conclusion: The next heat wave or heat dome may mean your site can help mitigate the impacts by being a cooling place, inside or out, for the community. The benefits of this resilient capacity are:

- lowered energy costs and improved comfort,
- a mental health boost through greenspace, and
- continued café income even during increasing hot spells.

5. Test the case in the eyes of users. Choose two likely readers of your case. Identify their likely motivations and consider how their needs can be addressed through your case. Where are there gaps and opportunities for improvement?

This exercise may identify more benefits than you realized, and more opportunities for resilience, so let this discussion range widely before bringing it back to what you believe is the strongest message in the case for resilience for your institution. Then identify what information you need, from both internal and external sources, to make a clear and reliable case.

If you examine your case from a few different readers' viewpoints, it won't be long before you have a packet of resources and text to adapt to any situation where you are making the case for investing time, efforts, and money into resilience strategic planning.



Overview

This module provides:

- [Terms and definitions](#)
- [Core concepts and approaches](#)
 - [Introduction/Vulnerabilities of Cultural Heritage in a Changing Climate](#)
 - [Six Agents of Hazard Vulnerability](#)
 - [Learning to Assess Vulnerability](#)
- [Activities](#)
- [Next steps](#)
- [Sources for further study](#)
- [Citation](#)

Terms and Definitions

(The terms below are adapted from the [U.S. Climate Resilience Toolkit](#).)

ADAPTIVE CAPACITY: The ability of a person, asset, or system to adjust to a hazard, take advantage of new opportunities, or cope with change.

HAZARD: An event or condition that may cause injury, illness, or death to people and/or damage to assets. Natural hazards are often amplified by climate change and the degree of vulnerability to the hazard.

CASCADING HAZARDOUS EVENTS: Multiple hazardous events are considered cascading when they act as a series of toppling dominoes, such as flooding and landslides that occur after rain, as an example, over areas where wildfires occurred. Cascading events may begin in small areas but can intensify and spread to influence larger areas.¹

COMPOUNDING HAZARDOUS EVENTS: Events where more than one unrelated hazard interacts and cause greater destructive consequences.

RISK: The potential for negative consequences where something of value is at stake. In the context of the assessment of climate impacts, the term *risk* is often used to refer to the potential for adverse consequences of a climate-related hazard. Risk can be

¹ Chen, Joanne, and Michael Greenberg. 2022. "Cascading Hazards and Hazard Mitigation Plans: Preventing Cascading Events in the United States." *Risks, Hazards, & Crisis in Public Policy* 13 (1): 48–63. <https://doi.org/10.1002/rhc3.12220>.

assessed by multiplying the probability of a hazard by the magnitude of the negative consequence or loss. (Risk = Hazard × Exposure × Vulnerability.)

RISK EXPOSURE: The presence of people, assets, and ecosystems in places where they could be adversely affected by hazards as well as the influence of the intensity and frequency of any given hazard or combination.

SENSITIVITY: The degree to which a system, population, or resource is or might be affected by hazards.

STRESSOR (Climate): A condition, event, or trend related to climate variability and change that can exacerbate hazards.

VULNERABILITY: The susceptibility to hazards that encompasses exposure, sensitivity, potential impacts, and adaptive capacity.

Introduction/Vulnerabilities of Cultural Heritage in a Changing Climate

Resilience requires recognition and understanding of a hazard, or multiple hazards, and the informed prediction of the chance that it/they will occur. It also requires estimating how any given hazard, alone or in combination, will negatively affect the resource under consideration thus establishing a measurable degree of vulnerability. This module prepares you for the activity in the [Mapping Hazards and Risk module \(#3\)](#). The activity in this module is intended to provide an example of how the Vulnerability Assessment could be applied.

Across the globe, the vulnerability of cultural resources to any number of climate change related hazards has become increasingly concerning. Museum objects, archives, heritage sites, and traditional knowledge, as examples, are increasingly at risk from climate-related hazards. Using vulnerability assessment and associated mitigation, emergency preparedness, and business continuity plans constitute a primary component of resilience building for Cultural Resource stewards.

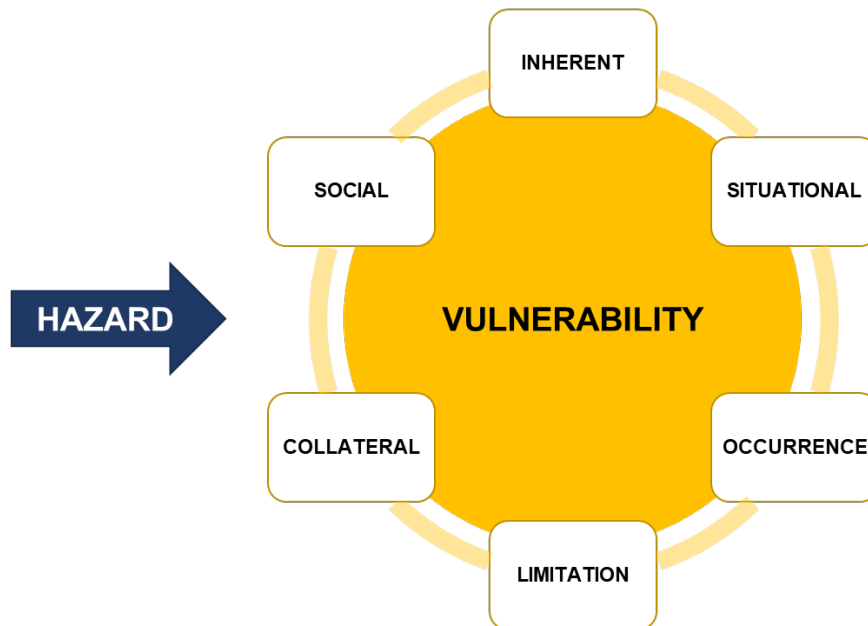
This module emphasizes climate-related hazards, but there are other kinds of hazards that may also occur simultaneously that worsen the situation. These include:

- earthquakes, as an example of a natural hazard, and
- a shortage in supplies caused by limited availability due to high demand for materials, such as Personal Protective Equipment (PPE) during the COVID-19 pandemic, or plywood because of mass preparations or response to a disaster.

Though no vulnerability assessment can account for all the variables, the practice of assessing potential hazards and your vulnerability to them will improve your preparedness practice. As you begin to work through this module, the suggested activities, and the vulnerability assessment, we advise that you envision only one or two hazards. As you think the process through, and build your skills in making connections among hazards, impacts, and vulnerability, you can add more hazards and risk levels to your analysis. This process helps you build fluency in these issues and the practice/review helps establish your command of the material.

Six Agents of Hazard Vulnerability

The *Six Agents of Hazard Vulnerability* flow chart below is a visual representation of the relationship between any given hazard and a resource’s degree of vulnerability.



Inherent	Describes the Cultural Resource’s vulnerability due to inherent, predominantly material, characteristics. The manufacture or assembly processes used to create the resource may also define inherent vulnerability.	For example, materials used to make paper have an inherent vulnerability to fire since the plant fibers, which make up most paper types, are highly flammable. Water (in its various forms) on the other hand, threatens the integrity (dimensional stability and strength) of the manufactured paper. Wood, and therefore anything made of it, is also inherently vulnerable to fire and water. Many metals are inherently vulnerable to moisture. Many synthetic materials can be highly vulnerable to prolonged high temperatures and polluted atmospheres.
Situational	Describes the physical and/or circumstantial surroundings in which the Cultural Resource is placed.	A historic house museum located in New Orleans or Houston on or next to a levee or river, for example, has an increased vulnerability to flooding and water damage. Books and photographs stored in below-grade areas without drains or sump pumps (or in cardboard boxes on the floor of a basement storage) are more vulnerable because of their placement and situation. Situational vulnerability also includes a change in the Cultural Resource’s vulnerability due to handling, treatment, or alteration as may have occurred over time (aged material is more vulnerable) or during response, salvage, or recovery operations. In many instances damaged material is more vulnerable to additional damage particularly when it is

		exposed to unusual circumstances like salvage and recovery.
Occurrence	Describes the projected frequency and intensity of the hazard. Obviously, the more intense a hazard is and/or the more often it occurs, the more vulnerable to damage and loss the heritage resource will be overall.	If a 100-year flood strikes the same area two or three times (or more) in any given year, vulnerability increases.
Limitation	Refers to the response resources (materials, expertise, funding, etc.) available to mitigate the effects of the hazard before, during (response), and after (during salvage and recovery) occurrences.	The fewer the response resources that are available, the more vulnerable the Cultural Resource will be.
Collateral	Describes potential vulnerability to secondary or relational hazards. Hazards catalyzed by one of the major hazard categories.	For example, fire might be considered a collateral hazard due to drought or extreme heat. Insect damage of paper, textiles, or wood might be considered a collateral vulnerability catalyzed by water in the form of higher humidity along with higher temperatures. This will also be true of other biological growth such as mold. Reduction or loss of security, flooding, fire, pollution, redevelopment, and/or lack of resources can lead to neglect and exposure. Additionally, disruptions to supply chains or the hazard's impact on community resources present other potential collateral vulnerabilities.
Social	Describes an organization or community's level of wealth and access to resiliency resources, whether financial, social, or political, which can potentially make it hard to build resilience to a particular hazard or set of hazards, now or in the future.	It is likely that climate change hazards will generally increase the income divide over time in the US, and, as a result, social vulnerability will become the most important and pervasive of the vulnerability challenges. ²

² Meyer, Robinson. 2017. "The American South Will Bear the Worst of Climate Change's Costs." *The Atlantic*, June 29, 2017. <https://www.theatlantic.com/science/archive/2017/06/global-warming-american-south/532200/>.

Learning to Assess Vulnerability

Determining **vulnerability** (and **risk**) can appear quite complex at first. There are a lot of new terms and new concepts, some of which can overlap and all of which are interrelated. In fact, there are hazards that will impact vulnerability that may not have anything to do with climate change but still have an impact on an assessment. One approach to bring this all into perspective is to consider a hazard that many of us face every day. We are told from an early age, “Careful crossing the street.” But what does that mean exactly? What do we take into consideration every time we cross the street? What is the hazard? In what ways do we adapt to the threat?

It may appear odd to compare vulnerability assessments of Cultural Resources to the apparently simple act of crossing a street, but the interrelatedness of the terms you have been discussing can be more obvious through the exercise of dissecting a familiar practice involving vulnerability: safely stepping off the curb and getting to the other side of the street.

Let’s apply some of the following terms to this seemingly mundane activity:

You are approaching a street you wish to cross. You undertake a variety of complex evaluations, estimations, decisions, and precautions well before that first step off the curb into the crosswalk. All of them are, directly or indirectly, related to the hazards you face and the potential impact they may have on you.

Although not the only hazard, the prominent one in this scenario is **traffic**, the cars and trucks zooming by and crossing your desired path. So, to begin, we can say that the **hazard, the threat, is traffic**.

- The **intensity** of the **hazard** is defined by the number of vehicles, their speed and their size, and the willingness of the drivers to control them responsibly (following the law and paying attention to each other and to pedestrians).
- Your **risk** level is related to the measure of **intensity**. For example, faster cars have less time to see you and to swerve or stop to avoid hitting you. And a larger number of vehicles (a busy street) increases the statistical likelihood that you may be hit and injured (this can be considered part of **exposure**, which is a necessary condition for a **hazard to become a risk**).
- Your **risk exposure** also contributes to raising your **risk** level and your **vulnerability**. You are out in the open, not protected by any armor, against something much larger, more powerful, and heavier. **Risk exposure** might also be seen as a measure of the number of vehicles, how busy the street is. And it might even be considered higher if the crosswalk is hard to see or the “walk” signal is very short, leaving you stranded in the street before you have safely crossed.

Risk Exposure = Risk impact x probability

So...the greater the **intensity** (number of vehicles) of the **hazard** (traffic), and the greater your **exposure** (high) to

that **hazard**, the greater your **vulnerability** and the chances of you getting hit. If we think of the calculation as **risk impact × probability**, then the effect of being hit by a car

multiplied by the probability of being hit (which is determined by many factors including the number of cars, their speed, the attentiveness of the drivers, the presence or effectiveness of a cross walk, etc.) will result in our **risk exposure**.

Your greatest **vulnerability** as you venture across the street has to do with how vehicles can negatively affect you, which is determined by characteristics you hold and those held by the vehicles. These characteristics are commonly out of our control. For example, bigger vehicles will likely do more damage. Vehicles moving at a higher rate of speed or being driven by inattentive or irresponsible drivers increase your vulnerability and thus your risk. You are, by physical nature, no match for several tons of steel. You lack replaceable “crumple zones.” You are, by both the nature of the hazard and by your own characteristics, highly **vulnerable**.

Traffic has been defined as the main **hazard** in our scenario. But there are other **hazards** in the form of **cascading hazards** or **compounding hazards**. Let's consider, as an example, slick roads which make things more dangerous for pedestrians because they might fall when crossing, or are slower to cross, thus increasing their **exposure** and **vulnerability**. Slick roads also make it harder for cars to maneuver and stop. So slick roads are a **hazard** of high intensity.

The surface of heavily trafficked roads can become slick due to deposited oil or rubber from tires. In such a case the slick roads represent a **cascading hazard**, since it was the vehicular traffic itself that caused the condition. The slick road is a byproduct of the traffic.

Ice or rain may also cause roads to become slick. In such cases the slick roads are considered a **compounding hazard** because the traffic was neither directly nor indirectly the cause of the ice or rain.

A driver may be inattentive, which raises the intensity of the main hazard (traffic) because the driver may not see you crossing the road. The driver may be less attentive because they are talking on the phone. It would be reasonable to call the cell phone a **contributing hazard**, one which increases the main hazard's **intensity**, and your **vulnerability**.

A malfunctioning traffic light, although not directly caused by the traffic, may increase **vulnerability** and thus be a **contributing hazard**. A traffic light hit by a vehicle and now inoperable will do the same, but since it was directly caused by the traffic it is now a **cascading hazard** rather than a **compounding hazard**. The intensity of such a hazard may take precedence if, for example, the pole falls on you.

To reduce our risk resulting directly or indirectly from hazards, we **mitigate** the **intensity** of the hazard, mitigate the negative effects of the hazard (reduce our **vulnerability**), and/or **adapt**. All of these often have the same effect.

To **mitigate** intensity and negative impact in our street-crossing scenario we might redirect some traffic to other routes; we might reduce speed limits or install crosswalks, pedestrian overpasses, stop signs, or traffic lights. We, as pedestrians, might **adapt** by showing more caution than previously or we might **adapt** by changing our route to cross

at another corner or street and thus avoid the hazard, or at least face a less intense hazard. An important thing to remember here too is that some mitigation and adaptation is our responsibility, and some is part of a cooperative action within our community.

Regardless of how you choose to address the variations of the hazards you have identified (and the many variables surrounding them), you will bring a more proactive caution into play once you are aware of the hazards and your vulnerability. You will anticipate possible threats directly or indirectly growing from the major hazard, and you will consider how unrelated hazards can make life more complicated as you cross the street. You may even decide to become more active in advocating for more **mitigation** at the corner or crosswalk.

So, you see...crossing the street can be somewhat complicated when we attempt to categorize all the aspects involved that have become “common sense” and intuitive that we take them for granted.

In the end, to safely cross the street requires identifying the hazards, becoming aware of our exposure and our vulnerabilities so that we can determine our risks. We can then employ adaptive behaviors and pursue mitigating efforts to make it safely across.

Although the steps required to cross a street appear far less complicated than those required to properly manage and preserve cultural resources in the face the climate crisis, the two scenarios have much in common if we are to achieve our goal...getting to the other side safely.

Activity: A Climate Scenario

The following is a case study representing a simplified situation to help you build skills for anticipating vulnerabilities, impacts, and paths to recovery. Like the example of the everyday occurrence of crossing the street, the following is meant to help you see what direction your own assessment might take. Two of the most important tools for this work are already available to you: the ability to break down events into very small steps and to see how each part links to other parts. You can call this approach “chunking” or “chaining” events and impacts, or simply dissecting a big situation into all the tiny parts you might not otherwise notice. This very deliberate process of thinking through the details makes it easier to notice all the connections—whether to problems or to solutions.

First, we’ll describe the situation, then we’ll offer some ways to think through it.

No matter where this cultural resource might exist, note first that:

1. It represents a small heritage organization with limited financial and staff reserves.
2. It holds a wide variety of materials and sensitivities which can fit almost any range of hazards we want to test.
3. There is limited knowledge among the staff or volunteers regarding preservation practices. This, by necessity, keeps the approach very pragmatic and direct.

Collections Components and Structural Characteristics

The Historic House (House) and its associated grounds/landscape of value (such as a battlefield, a sacred site, exterior archaeological remains) also have structures of related heritage value (such as slave quarters, agricultural or manufacturing facilities of historic importance).

- The House contains a small collection of historic artifacts and archives of a wide range of materials sensitive to temperature and humidity, and at risk of mechanical or biological damage, but to differing degrees.
- The house structure(s) is of mixed construction material and of a range of dates. There is a mix of wood, brick, and stone construction, perhaps even rammed earth. Roofing is also varied.
- There is no HVAC system and effective insulation is difficult in most areas of the buildings.
- The exterior collection is a mix of materials presenting a wide range of sensitivities: industrial remains, archaeological remains, exterior artifacts such as totem poles and/or sculpture. Some of it is art, some of it religious, some of it is civic monuments.

Institutional Activities and Resources

The site/place/structure acts as a cultural center where the community can undertake the exploration or practice of cultural traditions/ceremonies. Perhaps, for example, they have a reconstructed meeting lodge which the local Native American community now uses for traditional ceremonies.

- Staff is limited. Many are volunteers with limited knowledge of preservation practices.
- Security is minimal and limited to door locks and neighborhood eyes on the property.
- Resources for training or supplies are very limited.
- There is limited earned income, primarily derived from tourism.
- Gift and grant funding is low and hard to come by; contributions come mainly from the local community and are small.

Climate Setting

The House is set in a rural area in a region increasingly prone to heavy, extreme weather like flooding, for example, in or near an old riverbed or lowland area prone to rapid flooding now that storms often contain more water and move more slowly through the region due to climate change. Or it could be located in an area prone to extreme windstorms and high heat. Or it could be in a coastal area, say around Florida or New Orleans, where regular inundation due to sea level rise or tidal surge or extreme storms or hurricanes will be a problem.

Activity: Assessment Practice

First, using the outline of a site as described above and focusing only, for the moment, on the exposure of the site and collection to flooding, consider the vulnerabilities listed in the yellow (**bold**) and white sections in the chart below. Then, add an overnight freeze after the flooding. Consider the vulnerabilities from the compounding or cascading effects listed in the blue (*italics*) sections in the chart below.

Water Impact				
The force of water if it is rushing	The presence of water if it is rising on the landscape and in the structure		The presence of water that remains long enough to	
Knocking down structures, scouring roads and foundations <ul style="list-style-type: none"> • Breaking down fences, pulling down trees, moving cars <ul style="list-style-type: none"> ○ Dragging these into the building and across access roads 	Where will it come in first? <ul style="list-style-type: none"> • Lowest level doorways and windows • Mechanical openings or conduits • Groundwater seeping up through the basements and cellar holes 	How will it get out? <ul style="list-style-type: none"> • Where will it get trapped and not be able to flow out without assistance – either via pumping or creating a new pathway? • Who has keys to open doors to let out the water or let in the firefighters to help you pump? 	<ul style="list-style-type: none"> • Soak wood, plaster, carpet, objects • Create humidity and mold • Weaken a foundation • Limit access to vehicles, equipment, and people to begin recovery 	
<p><i>Freeze: Standing water freezes in place, mechanically damaging building materials and objects, damaging or killing plants, and blocking access, airflow, and water egress.</i></p> <ul style="list-style-type: none"> • <i>Damage to objects, building structures and foundations not designed for freezing</i> • <i>Ice dams or icicle build up along roofs and gutters, windowsills, porch, and door overhangs</i> • <i>Slipping and access hazards at bulkheads, steps, sidewalks, roadways, rooftop access</i> <p><i>Thaw: When the ice and snow melt, there is a new surface water influx that repeats the flood impact.</i></p>				
Mechanical Systems Impact				
What systems will be affected, and how does that impact recovery and lasting conditions?				
When will the electricity be back on so you can pump water, or run fans and dehumidifiers?	Can the system meet increased humidification needs?	Is there a well for water? Will a flood contaminate your drinking water?	Is the furnace or the electrical panel in the basement and can the water reach it to ruin it?	Can computers and other technology be affected? Was the information backed up or will you lose data and Internet access?
<p><i>Freeze: Can the system sustain heating during extreme cold, or cold at temperatures beyond the system's design?</i></p>				

The Aftermath					
Is the access road still intact and safe?	Is it safe to work at the site (what did the water carry and leave)?	If there is destruction, where will the ruined material go?	Who will help with the clean-up, assessment, repair?	What will you need (money, equipment, expertise, materials, people) <ul style="list-style-type: none"> • Where will objects be cared for (here, a conservation studio, etc.?) • How will the building be cared for? • How will you get the supplies? • Who can help you do the recovery? 	Who else in the community was affected? <ul style="list-style-type: none"> • Can you pool, coordinate, or compete for efforts and resources in recovery? • In the list of priorities, where does your site fall if the entire community, or much of it, is also affected by the flooding?
<p><i>Freeze:</i></p> <ul style="list-style-type: none"> • How long will it take for water to recede after freezing for you to access the building and site? • Is there alternative access capacity? 					

Next Steps

1. [Explore the resources](#) below for further study.
2. Begin noticing how the climate hazards you hear about, or have experienced at your site, might be predictable through the modeling and research that undergirds the interactive map you will use in the next Learning Module, [3. Mapping Climate Hazards and Risks](#). In that module you'll practice connecting the hazards familiar to you with the climate hazards identified in the interactive map. You'll practice pinpointing the hazards that are most likely to impact you, and then evaluating them based on your growing understanding of vulnerability.

Sources for Further Study

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Overview

This module provides:

- [Terms and definitions](#)
- [Core concepts and approaches](#)
 - [What is a hazard? What is a risk?](#)
 - [Understanding Cascading and Compounding Impacts](#)
 - [Understanding Risk Levels](#)
 - [Introduction to the interactive Climate Hazard Risk Assessment Map](#)
- [Activities](#)
- [Next Steps](#)
- [Resources for further study](#)
- [Citation](#)

Terms and Definitions

(The terms below are adapted from the [U.S. Climate Resilience Toolkit](#).)

CASCADING HAZARDOUS EVENTS: Multiple hazardous events are considered cascading when they act as a series of toppling dominoes, such as flooding and landslides that occur after rain, as an example, over areas where wildfires occurred. Cascading events may begin in small areas but can intensify and spread to influence larger areas.¹

COMPOUNDING HAZARDOUS EVENTS: Events where more than one unrelated hazard interact and cause greater destructive consequences.

CULTURAL RESOURCE: Tangible and intangible evidence of human activity, creativity and/or appreciation, which includes any archaeological remains, building or structure, heritage setting, collection, works of art or craft, and native/traditional communities of knowledge. Cultural Resources are often non-renewable and as such require protection and preservation.

HAZARD: An event or condition that may cause injury, illness, or death to people and/or damage to assets. Natural hazards are often amplified by climate change and the degree of vulnerability to the hazards.

¹ Chen, Joanne, and Michael Greenberg. 2022. "Cascading Hazards and Hazard Mitigation Plans: Preventing Cascading Events in the United States." *Risks, Hazards, & Crisis in Public Policy* 13 (1): 48–63. <https://doi.org/10.1002/rhc3.12220>.

RISK: The potential for negative consequences where something of value is at stake. In the context of the assessment of climate impacts, the term *risk* is often used to refer to the potential for adverse consequences of a climate-related hazard. Risk can be assessed by multiplying the probability of a hazard by the magnitude of the negative consequence or loss. (Risk = Hazard × Exposure × Vulnerability.)

STRESSOR (Climate): A condition, event, or trend related to climate variability and change that can exacerbate hazards.

Introduction

Stewards of cultural heritage face a wide variety of hazards ranging from leaky waterpipes that slowly damage structures and collections over time to rising flood waters that can quickly envelop a building, collection, or other resources. While many collections, sites, and buildings have readied for such situations by developing emergency preparedness policies and short-term procedures to deal with response and remediation, climate change now presents a significant shift in the complexity, intensity, duration, and recurrence rate of these hazard events. Additionally, hazards can catalyze cascading events and are made more complex and destructive by compounding hazards.

Serious damaging events and conditions are no longer rare occurrences and as such require a commitment to and development of resilience through adaptation and long-term planning. The increased challenges brought about by climate change not only require recognizing what the hazards are, but also recognizing that resources for response, perhaps already limited, will be strained into the future by competing needs within the community that is also experiencing similar impacts.

The *impact* of any hazard is largely determined by the degree of vulnerability that any cultural heritage resource has. Determining that vulnerability (Module 3) requires a clear understanding of the presence and nature of hazards (Module 2). This module explores some of the hazards associated with climate change, how they impact cultural heritage resources, and introduces the reader to the interactive Climate Hazard Risk Assessment Map.

What is a hazard? What is a risk?

Defining exactly what a hazard is and how it differs from a risk can seem confusing since the terms are often used interchangeably. However, the two terms have very different meanings. A *hazard* represents any potential source of damage or loss to humans and tangible or intangible cultural resources. *Risk* is a measure of the possibility or probability of adverse effects upon a cultural resource.

There may be times when hazards are a result of other hazards, creating a *cascading* threat. Or there may be instances where unrelated hazards occur simultaneously, *compounding* the damage and loss.

Hazards may include:	
<ul style="list-style-type: none"> • Coastal inundation • Drought • Extreme weather (e.g., heat, rain, snow) • Forced movement/ relocation of people • Landslides • Loss of power (e.g., standalone hazard unrelated to climate such as a grid overload or inability to pay bills) 	<ul style="list-style-type: none"> • Sea level rise • Severe weather (e.g., hurricanes, tropical storms, high winds) • Social unrest • Subsidence • Wildfire • Additional compounding/ cascading hazards

It is important to remember that

evaluation of hazards and risk is always a fluid and dynamic situation. What may have been a small risk last year could be one of heightened concern this year. It is also important to remember that determining what constitutes a significant hazard in an area may also vary depending on who is asked and what concerns the Cultural Resource steward most.

Understanding Cascading and Compounding Impacts

Hazards rarely act alone. Each of the hazards above may interact in a way that increases risk. Each is often accompanied by cascading and/or compounding hazard events, as mentioned earlier. For example, preparing for a flood is a major step in resilience, but the cascading and compounding hazards such as landslides, loss of power, prolonged lack of access and security, to name only a few, should also be considered and prepared for. These too can cause a great deal of damage and hinder both response and recovery. It should also be kept in mind that each collection, work of art, monument, building, site, or tangible/intangible resource will vary to some degree in vulnerability and response to these hazards.

The following is an example of some of the impacts one might expect from water and extreme temperature hazards. It is important to understand that these examples are not meant to be comprehensive but rather a guide to help fully explore possible scenarios.

Example #1: Hazard – Water, Hazard Event – Flooding

EXAMPLE CAUSES
Extreme rain event Breach of river, flood channel or levee Inundation due to storm surge and/or sea level rise Containment breach of dam or reservoir

EFFECTS			
<p>High humidity within the building</p> <ul style="list-style-type: none"> • Swelling and distortion • Mold 	<p>Saturation of porous/sorbent material</p> <ul style="list-style-type: none"> • Dissolution or structural weakening (directly or through contaminants) • Swelling and distortion • Activation or absorption of deleterious material such as soluble salts or other contaminants 	<p>Ground saturation leading to instability</p> <ul style="list-style-type: none"> • Debris or mud flows • Landslides 	<p>Undermining, shifting, or subsidence</p> <ul style="list-style-type: none"> • Physical abrasion and impact due to force of water and/or debris carried by fast moving water
Table continued on next page			

CASCADING HAZARD EVENTS	COMPOUNDING HAZARD EVENTS
<ul style="list-style-type: none"> • Landslides, mudslides, subsidence • Loss of structural integrity • Loss of power and other utilities • Transport and inundation of deleterious material (sewage, chemical waste, oil, fuel) • Deposition of debris • Increase in absolute and relative humidity <ul style="list-style-type: none"> o distortion/warping/swelling o migration and efflorescence of soluble salts o corrosion • Increase in freeze/thaw cycle damage • Increase in rising damp • Sewage/drain backup leading to internal flooding • Fouling and potential loss of water supply • Difficulty or loss of access • Compromise or loss of security and protective systems (loss of power, fire response systems, environmental system) • Disruption of supply chain • Compromise or loss of functionality of building or shelter • Availability reduction of temporary storage • Lack of timely response due to access, reduction of resources and/or personal • Damage and loss due to extended emergency temporary storage without adequate stabilization treatment • Civil unrest or crime 	<ul style="list-style-type: none"> • Fire (response made difficult) • Earthquake (lack of available resources to respond, existing response systems overburdened) • Severe weather events (extreme temperatures, windstorms, tornadoes, hurricanes, etc.)

Example #2: Hazard – Temperature extremes, Hazard Event – Extreme and/or prolonged high or low temperatures

EXAMPLE CAUSES				
Stalled wind patterns Urban heat island effect				
EFFECTS				
Desiccation of porous material (extreme hot or cold) <ul style="list-style-type: none"> • Deformation (warping/shrinkage/expansion cycles. (extreme hot or cold) • Structural weakening • Increase in corrosion and decay (extreme heat: if water/humidity is present) • Increase in chemical alterations (extreme heat) 	Softening (extreme heat) <ul style="list-style-type: none"> • Softening (extreme heat) • Loss of structural integrity • Deformation • Increase in soiling 	Deformation/subsidence/heaving (extreme heat or cold) <ul style="list-style-type: none"> • Loss of structural integrity • Subsidence 	Embrittlement (extreme heat or cold)	Freeze expansion (extreme cold)
Table continued on next page				

CASCADING HAZARD EVENTS	COMPOUNDING HAZARD EVENTS
<ul style="list-style-type: none"> • Dramatic increase/decrease in absolute humidity • Decrease in relative humidity • Cyclic presence of “dew” leading to, for example, salt efflorescence and/or soiling) • Interior condensation • Increase in biological growth • Loss or reduction in some utilities (brown outs, black outs, water restrictions. Some leading to loss of systems in security and HVAC) • Internal or external flooding (burst pipes, extreme cold) • Increase risk of fire/explosion • Disruption in supply lines • Civil unrest and crime (extreme heat) 	<ul style="list-style-type: none"> • Severe weather • Supply disruptions (such as strikes or accidents at utility systems)

Understanding Risk Levels

Hazards are complicated and ever-evolving events and situations that will likely become more prevalent and long lasting as the climate warms. One of the keys to adapting to these hazard challenges is assigning a level of risk to the hazards. As noted above, risk is a measure of the possibility or probability of adverse effects upon a cultural resource. If hurricanes are a hazard to a cultural resource, the severity of the impact may vary depending on several factors that include proximity to the coast, elevation, building or site structure, emergency response infrastructure, or recovery time from a previous event. For example, the normal disaster support structure may be stretched beyond its usual capacity to respond and, as such, increases the risk posed by a hazard. When a utility provider shuts down the local power grid due to wildfire threats, for example, customers including heritage resources like museums, cannot maintain functioning HVAC systems essential to the care of some cultural resources. One California museum’s adaptive response to this type of situation was to install solar panels with battery backup to run the museum’s environmental systems and protect the collection while providing a clean-air cooling center for the community thereby lowering a part of the risk from that hazard.

Risk, like a hazard, is fluid and changes from event to event. Think of the risk as existing on a sliding scale that may change from one season to another or will likely change along with the warming of the climate. It would be easy enough to apply High, Moderate, or Low levels of risk to any given hazard. However, would the risk level change based on cascading and compounding issues?

Climate Hazard Risk Assessment Map

There is an interactive companion map aligned with these learning modules, the Climate Hazard Risk Assessment Map (Climate Risk Map). It uses FEMA data to identify current hazards and National Oceanic and Atmospheric Administration (NOAA), as well as commercial Climate Check data, to identify potential climate change hazards for the near, mid, and late century at the state, *census tract*, and site levels (Climate Check only for site level).

The Climate Risk Map is a doorway to understanding the likelihood and timing of climate impacts now or within the following timeframes:

- Current: existing weather conditions
- Next Year (FEMA): predictions for next year based on historical data
- In the 21st century: future predictions, now through 2099
 - Early Century
 - Now–2050: Climate Check
 - Now–2044: NOAA
 - Mid-Century
 - 2035-2064: NOAA
 - Late Century
 - 2070-2099: NOAA

The NOAA climate models can be viewed via two scenarios: representative concentration pathways (RCPs) 4.5 and 8.5. **RCPs** are a prediction model adopted by the United Nations Intergovernmental Panel on Climate Change (IPCC) which is “based entirely on greenhouse gas (GHG) concentrations in the atmosphere” (not emissions). The pathways describe different climate futures, all of which are considered possible depending on the volume of GHG emitted in the years to come.²

- **RCP 4.5:** A moderate stabilization pathway (prediction model) in which radiative forcing (the difference between incoming and outgoing energy in the Earth’s biosphere) stabilizes shortly after the year 2100. RCP 4.5 is more likely than not to result in a global temperature rise of between 2.6°F/ (2°C) and 5.4°F/ (3°C) by 2100. (The “4.5” refers to watts per meter squared of energy, used to calculate possible temperature change.)³
- **RCP 8.5:** A high climate change scenario or stabilization pathway characterized by increasing greenhouse gas emissions (GHG) over time, and factors in the highest GHG concentration levels of all the scenarios by the year 2100. Radiative forcing continues to increase after 2100. Under RCP 8.5, the worst-case scenario projects average global temperature change could reach as high as 8.8°F/4.9°C.

This module’s [activities](#) will take you through the steps of finding your location on the map and exploring “layers” of information that identify the types of hazards expected during certain timeframes. The Climate Risk Map will prompt you to enter an address, then it will display on an overlay map the various types of hazards facing the site, sorted by hazard score, for that location. In addition, additional information about how to use the map and about the data sources can be found in the [User Guide](#).

² n.d. “How do shared socioeconomic pathways (SSPs) compare to representative concentration pathways (RCPs)? United States Department of Agriculture Climate Hubs. <https://www.climatehubs.usda.gov/hubs/northwest/topic/what-are-climate-model-phases-and-scenarios>.

³ United States Department of Agriculture Climate Hubs. <https://www.climatehubs.usda.gov/hubs/northwest/topic/what-are-climate-model-phases-and-scenarios>

The images below show the Map displaying the potential for sea level rise (Figure 1) and drought (Figure 2) for Manns Harbor, North Carolina. You can choose the layer to turn on to have a visual of the risk level for that hazard based on the location. It also displays the risk to that hazard for all the area around the address or location you have selected. This can be helpful in understanding hazards in the context of your region.

There may be community-based information already for the area where Cultural Resources exist. Doing research to understand what data already exists for the city, county, or region will inform you of other risks not identified on the Map.

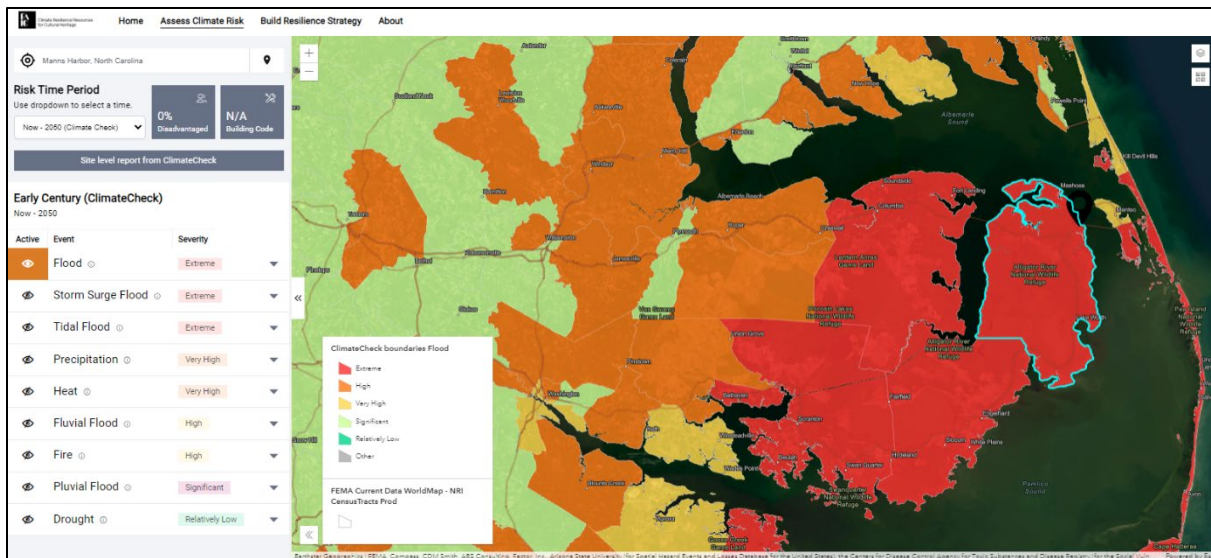


Figure 1. Flood risk map for Manns Harbor, NC projected for Now–2050 (Climate Check).

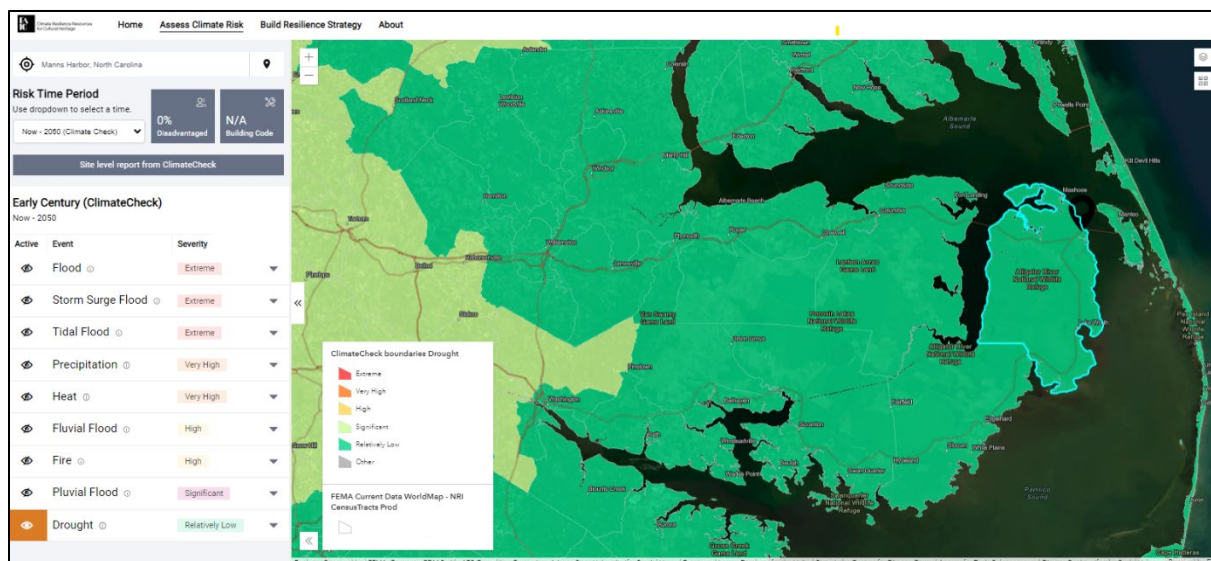


Figure 2. Drought risk map for Manns Harbor, NC projected for Now–2050 (Climate Check).

Listed on the Map, under the Next Year (FEMA) risk time period, are hazards that are not directly related to climate change but nevertheless pose a real hazard and risk for certain areas. These hazards include avalanche, earthquake, landslide, tsunami, and volcanic activity. It is important to also take these hazards seriously as potential compounding or cascading hazards that can create a more problematic response and recovery from the initial hazard event.

The modules and the Climate Risk Map can be a combined resource for both Cultural Resource stewards and community advocates to develop a clearer understanding of the hazards and risks impacting cultural resources. The Map also provides mapping for the locations of disadvantaged communities (identified through the [Climate and Economic Justice Screening Tool](#) (CEJST) and on building code data by county where available from the [FEMA Building Code Adoption Tracking](#) (BCAT).

Other hazard and risk resources can be utilized to examine the hazards that may exist for both immediate and long-term evaluation. The [U.S. Climate Resilience Toolkit](#), NOAA's [Forecast and Hazard Map](#), and the [Climate for Resilience and Adaptation](#) are just a few of the tools available to supplement the Climate Risk Map to help create a resilience strategy for all cultural resources and communities.

Activities

1. Without yet using the map, what current hazards do you view as impacting your community, site, collection, building, etc.?
 - List three-to-five potential hazards to your cultural resource and community.
 - Compare these hazards for differences/similarities. Imagine these hazards interacting with others:
 - What compound hazards can you identify?
 - What cascading effects can you imagine?
2. What hazards have changed over time?
 - What would be considered a new hazard, something appearing within the last five years?
 - For the old hazards, do any present differently now? How so?
3. Do you have a sense of the level of risk for each hazard you listed? Remember that risk is the measure of the degree to which a hazard will have an impact on a cultural resource.
4. [Explore the Climate Hazard Risk Assessment Map](#). Do the hazards you listed in the previous questions match up with those defined in the online map? How do potential future hazards or compound hazards compare?
5. List the 3 to 5 cultural resources under your care. This can include resources both tangible (objects, manuscripts, buildings, landscapes, monuments, etc.) and intangible (oral traditions, performing arts, social practices, rituals, festive events, knowledge and practices concerning nature and the universe, or the knowledge and skills to produce traditional crafts, etc.).

Take one of the cultural resources and work through this list of hazards and cascading or compounding impacts created in activities 1 – 3 using the climate hazards and risk levels indicated on the map for your location. With the map as a resource,

- Are there any changes in the hazards and the risk levels you predicted for your site?
- Are there more impacts identified?
- Is there more detail provided?
- Does the process raise more questions or eliminate some imagined concerns?
- Can you picture ways that this process will help you explain the climate risk to others, or clarify it for yourself?

Next Steps

1. [Begin exploring the Climate Hazard Risk Assessment Map.](#)
2. Familiarize yourselves with [Learning Module 4. Assessing Vulnerabilities of Culture Heritage to Climate Change Impacts and Related Events](#) and the [Climate Risk Vulnerability Assessment Tool for Cultural Heritage.](#)

Resources for Further Study

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Citation

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Overview

This module provides:

- [Terms and definitions](#)
- [Core concepts and approaches](#)
 - [Climate Risk Vulnerability Assessment Tool for Cultural Heritage](#)
 - [Overview](#)
 - [Assessment Tool](#)
 - [Assessment Notes](#)
- [Activities](#)
 - [Part 1: Introduction to the Assessment Tool](#)
 - [Part 2: Assessment Practice](#)
 - [Part 3: Begin Identifying Your Vulnerability Assessment Team and Their Support Information](#)
- [Next steps](#)
- [Sources for further study](#)
- [Citation](#)

Terms and Definitions

(The terms below are adapted from the [U.S. Climate Resilience Toolkit](#).)

ADAPTIVE CAPACITY: The ability of a person, asset, or system to adjust to a hazard, take advantage of new opportunities, or cope with change.

HAZARD: An event or condition that may cause injury, illness, or death to people and/or damage to assets. Natural hazards are often amplified by climate change and the degree of vulnerability to the hazard.

RISK: The potential for negative consequences where something of value is at stake. In the context of the assessment of climate impacts, the term *risk* is often used to refer to the potential for adverse consequences of a climate-related hazard. Risk can be assessed by multiplying the probability of a hazard by the magnitude of the negative consequence or loss. (Risk = Hazard × Exposure × Vulnerability.)

RISK EXPOSURE: The presence of people, assets, and ecosystems in places where they could be adversely affected by hazards as well as the influence of the intensity and frequency of any given hazard or combination.

SENSITIVITY: The degree to which a system, population, or resource is or might be affected by hazards.

STRESSOR (Climate): A condition, event, or trend related to climate variability and change that can exacerbate hazards.

VULNERABILITY: The susceptibility to hazards that encompasses exposure, sensitivity, potential impacts, and adaptive capacity.

Climate Risk Vulnerability Assessment Tool for Cultural Heritage

Overview

In Learning Module “[2. Understanding Vulnerabilities to Climate Change Impacts and Repercussions](#),” you read about crossing the street as an introduction to the concepts of risks and hazards, and the language that informs and describes vulnerability. To reduce our risk resulting directly or indirectly from hazards, we **mitigate** the **intensity** of the hazard, mitigate the negative effects of the hazard (reduce our **vulnerability**), and/or **adapt**. All of these often have similar effects.

To **mitigate** intensity and negative impact in our street-crossing scenario we might redirect some traffic to other routes; we might reduce speed limits or install crosswalks, pedestrian overpasses, stop signs, or traffic lights. We, as pedestrians, might **adapt** by showing more caution than previously or we might **adapt** by changing our route to cross at another corner or street and thus avoid the hazard, or at least face a less intense hazard. An important thing to remember here is that some mitigation and adaptation is our responsibility, and some is part of a cooperative action within our community.

Regardless of how you choose to address the hazards you have identified (and the many variables surrounding them), you will bring a more proactive caution into play once you are aware of the hazards and your vulnerability. You will anticipate possible threats directly or indirectly growing from the major hazard, and you will consider how unrelated hazards can make life more complicated as you cross the street. You may even decide to become more active in advocating for more **mitigation** at the corner or crosswalk.

In the end, to safely cross the street requires identifying the hazards, becoming aware of our exposure and our vulnerabilities so that we can determine our risks. We can then employ adaptive behaviors and pursue mitigating efforts to make it safely across.

Although the steps required to cross a street appear far less complicated than those required to properly manage and preserve heritage resources in the face of the climate crisis, the two scenarios have much in common if we are to achieve our goal...getting to the other side safely.

Assessment Tool

Now it's time to practice applying your understanding of the impact of climate, vulnerability, and the need to build resilience for cultural heritage. You'll do this by assessing your site and materials using an **assessment survey tool**: [Climate Risk Vulnerability Assessment Tool for Cultural Heritage](#) (Tool). The vulnerability assessment tool associated with this module allows any user to develop a picture of the status (with

respect to any given hazard) of a site, collection, building, or other cultural heritage sites and materials. You explored the tool in the second learning module, now it's time to begin customizing the tool to focus on your situation. This process will prepare you for the next learning module when you will identify your vulnerability assessment team, invite them to help you in exploring the tool and applying it in some sample situations to build your skills.

Assessment Notes

We have established that climate change is dynamic and everywhere, though its effects are unevenly distributed. Understanding how those impacts interact with cultural materials, buildings, operations, and community can be complex because of the many variables. It becomes more manageable to assess vulnerability to climate hazards by using existing Excel templates and the institution's own knowledge to identify specific vulnerabilities and explore them for actionable responses.

Beginning this process is easiest by reading through the following example pages, exploring the scenario listed below. Then, using the abstract sample case and placing it in different geographic regions on the Climate Risk Map, use the linked Vulnerability Assessment to see how vulnerabilities change with location and circumstance.

By running this "test," you will familiarize yourself with the tool interactions, language, structure, and results. You will then want to schedule time with your planning team to begin filling in the assessment aligned with your site or cultural resource. You can come back to it at any time, updating it as new issues arise or data becomes available, and as you understand more about your situation and the hazards you face or will face. This exercise is also useful, in part or whole, when you update and maintain your resilience strategy on a yearly basis.

Things to consider:

- You may choose to conduct a quick and general screening at first, as a way to examine the greatest or most obvious climate threats and their impacts, to familiarize yourself with how these tools work.
- Even if you advance to a finer, more detailed review process, you will likely not have time or need to include every contingency. As you deepen the work, some threats and impacts will have decreasing value, and you may choose to not focus on them now. For efficiency, consider and document when to move to the next stage of the assessment or when to conclude it. You will learn how to use this more effectively and efficiently as you go. So do not let minor details sap your energy or focus.
- There is no "right" amount of time to spend on the assessment. You will likely, and should, revisit it during your planning process.

Activity Part 1: Introduction to the Assessment Tool

Download the [Climate Risk Vulnerability Assessment Tool for Cultural Heritage](#). This has been adapted from the Heritage Preservation and the Risk Evaluation and Planning Program at the Foundation for Advancement in Conservation.

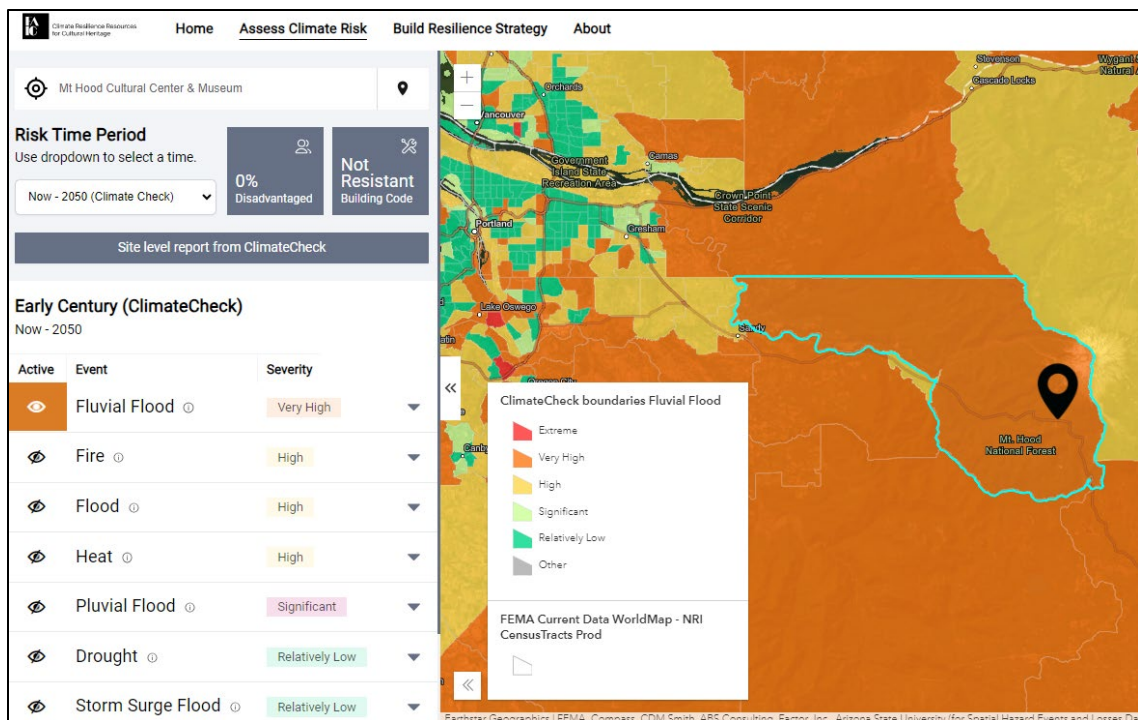
- **The Hazards column (highlighted in yellow)** lists the climate hazards that the Cultural Resources you are helping to protect may be vulnerable to.

- **The next five columns (highlighted in grey)** combine into an equation that calculates a relative vulnerability rating based on the likelihood of the hazard occurring, multiplied by the risk of the damage, to equal its vulnerability.
- **Implications for Cultural Resource (highlighted in brown)** describes how the hazard can affect the cultural heritage being considered.
- **User Comments on Site-Specific Considerations for Scoring (highlighted in grey)** allows you to add in your comments.

Now let's walk through preparing to use the Tool.

Activity Part 2: Assessment Practice

1. Identify and describe the at-risk Cultural Resource (tangible or intangible), and consider its history, modifications, and current condition.
2. Using what you know from the Climate Risk Map, and your understanding of events or conditions that are already occurring, select the primary, cascading, and collateral hazards that may have had damaging effects on cultural heritage (include combinations of hazards as well).
3. Make sure you have a copy of the [Climate Risk Vulnerability Assessment Tool for Cultural Heritage](#) to help you identify pertinent vulnerabilities. This is how, for example, you will determine if the Cultural Resource is more vulnerable to fire than water. It is also how you can explore under what conditions would the vulnerabilities change? For example, though the current risk may be fire, if extreme heat becomes the dominant risk in 10 years, then what will be the priorities?
4. Next, find the Hazards (in column B) identified for your site, and choose a rating hood for the likelihood of the hazard (Column C, scale 1–5, 5 being most likely), then choose the risk of damage (column E) to arrive at the relevant vulnerability rating on the Vulnerability Assessment spreadsheet.



- After completing the process, you will have comparative vulnerability ratings for the appropriate hazards for your site. As an example: the resource may be most vulnerable to water, but if it is situated in an area that has a low likelihood of flooding as a hazard, then the vulnerability rating will be low. If the Resource is somewhat vulnerable to fire, and the likelihood of fire hazard is high, then the weighted assessment would list fire over water in the hierarchy. The calculations make the comparisons easier to follow.
- Develop a relevant vulnerability hierarchy (what is most likely and what is the greatest threat).

A Climate Scenario Activity

The following is a case study representing a sample situation, simplified, to help you build your skills for anticipating vulnerabilities, impacts, and paths to recovery. Like the example of the everyday occurrence of crossing the street. The following is meant to help you see what direction your own assessment might take. From the street-crossing exercise you already have important skills to deploy: the ability to break down events into very small steps and to see how each part links to other parts. You can call this approach “chunking” or “chaining” events and impacts, or simply dissecting a big situation into all the tiny parts you might not otherwise notice. The very deliberate process of thinking through the details makes it easier to notice all the connections between problems and between solutions.

First, we’ll describe the situation, then we’ll offer some ways to think through it.

No matter where this Cultural Resource might exist it represents:

- A small Cultural Resource with limited financial and staff reserves.

2. A wide variety of materials and sensitivities which can fit almost any range of hazards we want to place it in.
3. Limited knowledge among the staff or volunteers regarding preservation practices keeps the approach very pragmatic and direct.

Collections Components and Structural Characteristics

The Historic House and its associated grounds/landscape of value (such as a battlefield, a sacred site, exterior archaeological remains) also have additional structures of related heritage value (such as slave quarters, agricultural or manufacturing facilities of historic importance).

- The House contains a small collection of historic artifacts and archives of a wide range of materials, so it has sensitivities to temperature and humidity, at risk of mechanical or biological damage to collections, but to differing degrees.
- The house structure(s) is of mixed construction material and of a range of dates. There is a mix of wood, brick and stone construction, perhaps even rammed earth. Roofing is also varied.
- There is no HVAC system and effective insulation is difficult in most areas of the buildings.
- The exterior collection is a mix of materials presenting a wide range of sensitivities: industrial remains, archaeological remains, exterior artifacts such as totem poles and/or sculpture. Some of it is art, some of it has religious significance, some of it is civic monuments.

Institutional Activities and Resources

The site/place/structure acts as a cultural center where the community can undertake the exploration or practice of cultural traditions/ceremonies. Perhaps, for example, they have a reconstructed meeting lodge which the local Native American community now uses for traditional ceremonies.

- Staff is limited. Many are volunteers with limited knowledge of preservation practices.
- Security is minimal and limited to door locks and neighborhood eyes on the property.
- Resources for training or supplies are very limited.
- There is limited earned income, primarily derived from tourism.
- Gift and grant funding is low and hard to come by; contributions come mainly from the local community and are small.

Climate Setting (Note: this is the same example used in Module 2)

This House is set in a rural area in a region increasingly prone to heavy, extreme weather like flooding, for example, in or near an old riverbed or lowland area prone to rapid flooding now that storms often contain more water and move more slowly through the region due to climate change. Or it could be located in an area prone to extreme windstorms and high heat. Or it could be in a coastal area, say around Florida or New Orleans where regular inundation due to sea level rise or tidal surge or extreme storms or hurricanes will be a problem.

Assessment Practice

Using the outline of a site as described above and focusing only, for the moment, on the exposure of the site and collection to flooding, consider the vulnerabilities listed in the yellow (bold) and white sections in the chart below.

Then, add an overnight freeze after the flooding. Consider the vulnerabilities from the compounding or cascading effects listed in the blue (italics) sections in the chart below.

Water Impact					
The force of water if it is rushing	The presence of water if it is rising on the landscape and in the structure		The presence of water that remains long enough to		
Knocking down structures, scouring roads and foundations <ul style="list-style-type: none"> • Breaking down fences, pulling down trees, moving cars <ul style="list-style-type: none"> ○ Dragging these into the building and across access roads 	Where will it come in first? <ul style="list-style-type: none"> • Lowest level doorways and windows • Mechanical openings or conduits • Groundwater seeping up through the basements and cellar holes 	How will it get out? <ul style="list-style-type: none"> • Where will it get trapped and not be able to flow out without assistance – either via pumping or creating a new pathway? • Who has keys to open doors to let out the water or let in the firefighters to help you pump? 	• Soak wood, plaster, carpet, objects <ul style="list-style-type: none"> • Create humidity and mold • Weaken a foundation • Limit access to vehicles, equipment, and people to begin recovery 		
<p><i>Freeze: Standing water freezes in place, mechanically damaging building materials and objects, damaging or killing plants, and blocking access, airflow, and water egress.</i></p> <ul style="list-style-type: none"> • <i>Damage to objects, building structures and foundations not designed for freezing</i> • <i>Ice dams or icicle build up along roofs and gutters, windowsills, porch, and door overhangs</i> • <i>Slipping and access hazards at bulkheads, steps, sidewalks, roadways, rooftop access</i> <p><i>Thaw: When the ice and snow melt, there is a new surface water influx that repeats the flood impact.</i></p>					
Mechanical Systems Impact					
What systems will be affected, and how does that impact recovery and lasting conditions?					
When will the electricity be back on so you can pump water, or run fans and dehumidifiers?	Can the system meet increased humidification needs?	Is there a well for water? Will a flood contaminate your drinking water?	Is the furnace or the electrical panel in the basement and can the water reach it to ruin it?	Can computers and other technology be affected? Was the information backed up or will you lose data and Internet access?	
<p><i>Freeze: Can the system sustain heating during extreme cold, or cold at temperatures beyond the system's design?</i></p>					
The Aftermath					

Is the access road still intact and safe?	Is it safe to work at the site (what did the water carry and leave)?	If there is destruction, where will the ruined material go?	Who will help with the clean-up, assessment, repair?	What will you need (money, equipment, expertise, materials, people) <ul style="list-style-type: none"> • Where will objects be cared for (here, a conservation studio, etc.?) • How will the building be cared for? • How will you get the supplies? • Who can help you do the recovery? 	Who else in the community was affected? <ul style="list-style-type: none"> • Can you pool, coordinate, or compete for efforts and resources in recovery? • In the list of priorities, where does your site fall if the entire community, or much of it, is also affected by the flooding?
<p>Freeze:</p> <ul style="list-style-type: none"> • <i>How long will it take for water to recede after freezing for you to access the building and site?</i> • <i>Is there alternative access capacity?</i> 					

Activity Part 3: Begin Identifying your Vulnerability Assessment Team and Their Support Information

As a reader of this and other modules, you have taken it upon yourself to understand hazards, risks, and vulnerabilities all with an eye towards developing a climate resilience strategy. However, no assessment can be done in a vacuum. Understanding the hazards, risk, and vulnerability is a team effort. The following is a list (not comprehensive) of suggested avenues for developing an assessment team. People with varied interests and perspectives will help identify and define the various threats posed from climate change to a site, building, or collection.

- Assemble a vulnerability assessment team that is made up of individuals who are knowledgeable about the cultural heritage aspects being surveyed. The team should include those experienced in conservation, preservation, and/or various systems-related platforms that can assist in developing a plan for response, adaptation, and mitigation. The team might consist of the following:
 - Collections staff (registrar, curators, conservators, preparators, etc.)
 - Facilities staff
 - Administrative staff
 - Board members
 - Community participants/partners
 - Architect
 - Structural engineer
 - Security personal
- Gather supportive documents/information, such as:

- Floor plans of the facility and/or plans of the site (a general facilities report or an emergency preparedness plan would be of value here as well)
- Flood rating (if applicable for the site/resource) for the building and surrounding area
- Material of the building and/or the monument, structure, collection, etc.
- The fire rating of building and surrounding area
- Insulation level (tightness of building envelope) which greatly impacts heating and cooling needs (see Passive House or Phius also (https://web.archive.org/web/20121005015936/http://www.passivhaustagu.ng.de/Passive_House_E/passivehouse_definition.html))

Next Steps

1. Finalize identifying and organizing your vulnerability assessment team.
2. With identified assessment team, begin using the [Climate Risk Vulnerability Assessment Tool for Cultural Heritage](#).
3. [Review your Climate Resilience Strategy](#): The particular importance of the climate resilience planning and preparation process is to attend to the section of resilience strategies and goals, then use the focus areas as outlined above to consider your planning approach.

Sources for Further Study

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Citation

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Overview

This module provides:

- [Terms and definitions](#)
- [Introduction](#)
 - Overview of planning and preparation for well-being (social dimension)
 - Overview of site planning and preparation (practical dimension)
- [Activities](#)
- [Next steps](#)
- [Sources for further study](#)
- [Citation](#)

Terms and Definitions

(The terms below are adapted from the [U.S. Climate Resilience Toolkit](#).)

ADAPTATION: The process of adjusting policies, practices, and attitudes to new climate conditions in order to reduce risks to valued assets.

CLIMATE ACTION PLAN: An implementation document that includes strategies to reduce contributions to the drivers of climate change (e.g., reduce/eliminate greenhouse gas emissions). Often the goal is to become carbon neutral.

CLIMATE RESILIENCE STRATEGY: A planning document that coordinates an organization's response to the effects of climate change. The plan assesses vulnerabilities and prioritizes actions for managing risks to assets, operations, and site infrastructure and to be better prepared for more changes.

GREENHOUSE GAS[ES] (GHG): Gases emitted through both anthropogenic (burning of fossil fuel, extractive industries, etc.) and non-anthropogenic (volcanic eruptions, wildfires, etc.) activities. Anthropogenic emissions include carbon dioxide (CO₂), methane (CH₄), ozone (O₃), hydrochlorofluorocarbons (HCFC), hydrofluorocarbons (HFC), and nitrous oxide (N₂O) as the main components. Concentration levels of these gases beyond the ability of the environment to absorb are detrimental to a healthy climate.

RESILIENCE: The ability to recover effectively and to successfully adapt to challenges through flexibility and adjustments to external and internal needs.

Introduction

In Module 1, resilience was defined as the ability to recover effectively and to successfully adapt to challenges through flexibility and adjustment to external and internal needs. In Module 4, the reader is asked to determine their, or their institution's, vulnerabilities. Now it's time to plan how to prepare to limit the exposure and damage, and to recover from any damage or stress you cannot mitigate or avoid. The ability to

achieve resilience will be different for each person, site, resource, or community. Resilience has practical and social dimensions.

Most heritage and cultural resource professionals may not be aware of the possible solutions or directions that they can pursue to achieve resilience. Many of the reference models may not be from the heritage field. This module provides a variety of available models and resources to help you develop your own solutions to planning and preparation for climate resilience.

The *social dimension* of resilience includes supporting or restoring the well-being of staff, volunteers, peers, and community members, and it means understanding the strengths and needs of the people and networks you'll depend upon. It also includes making and nurturing connections so that you have working relationships in times of stress. We'll examine those community connections in this module where we will focus on staff, volunteers, and aid workers.

The *practical dimension* includes preparedness activities such as identifying material needs, finding and storing supplies, creating evacuation and response plans, and preparing buildings, landscapes, and communities for challenging events or ongoing change. We will focus on your building and property, and on the systems connected most closely to your site in this module and examine community infrastructure in Module 6.

This module provides resources for making plans and preparing people and places to limit your vulnerability to the climate threats you have identified. Please choose among them for the resources most appropriate to your situation. Perhaps by examining these you may be reminded of a resource or a source of information in your community or region that can be of help and should be added. It is important to remember that all the work you do will be based on available data, and that new data is continually emerging. Because of this, it will be critical to establish a schedule of review, update, and dissemination of all new information.

A Reminder: What's in a Resilience Strategy?

The suggested approach and potential sections of the Resilience Strategy itself that could be included are outlined below.



Based on what you learned in your vulnerability assessment, you are developing an understanding of where your greatest concerns are or should be. Now you'll look at those concerns and how they impact collections care and conservation, business continuity, mechanical systems, and your site infrastructure. Each of these has social and practical dimensions.

For example, if you identify surface flooding from rainfall or storm surge and sea level rise that may affect the main access road to your site, your practical considerations are maintaining vehicle access for staff (and volunteers), contractors, cultural heritage responders, as well as aid workers, first responders, community members, travelers and commerce using the road. Your social dimensions are planning business continuity and community services if the road should become unusable. Making a plan to protect the road or to use an alternative access route are practical approaches. Making a plan for staff to shift to remote working and to publicly announce alternate routes for community users is the social dimension.

It should also be noted that response and adaptation are processes and not end results. Staff, volunteers, and aid workers will have their own homes and neighborhoods that will need their focus as well. Any plan needs to take this into consideration. How does the plan you develop recognize and support the broader needs of the staff, volunteers, and aid workers?

When Hurricane Maria hit Puerto Rico in 2017, the island was left completely without power. The staff at the Museo de Arte de Ponce began daily drives to collect diesel for the generator and they shared that power with the community. The staff communicated with each other and with the community through handwritten notes left on doorways or with neighbors, and undertook bicycle trips to the local radio station to get updates. Such a powerful example of the staff's commitment to other staff and to the community demonstrates the lengths we find ourselves going to respond to disasters. No one plans to bicycle to the radio station, but that example helps us understand that we must plan

for the practical and the social dimensions of situations such as these, and that solutions may be low-tech and simple as often as they may be complex. The staff at Museo de Arte de Ponce demonstrated unplanned resilience responses that are a model for all. (See an ICOM 2019 [presentation by the museum's past director describing Museums in a Time of Disaster, beginning at 22 minutes](#)¹.)

Social Dimension of Planning and Preparation

One might argue that there are both good and inadequate plans when it comes to climate resilience. However, it is often the planning process itself that makes the difference. Collaborative and community action forms the basis for how a successful plan can be developed and implemented. Community collaboration brings together people with a shared interest and purpose.

The Confederated Salish and Kootenai Tribes (CSKT) of the Flathead Reservation in the Montana region of the United States recognized the importance of addressing climate change issues and created the Climate Change Strategic Plan (2016) to address the climate challenges facing them.

The forward of the plan noted that, “By preparing for further environmental changes, we can mitigate threats to our way of life” (CSKT 2016, iii). A shared risk of the loss of human life, culture, the natural environment, and all the traditions that define them, as the Salish and Kootenai people, mandated that they act. The plan sets out a list of objectives based on the climate impacts and the vulnerabilities facing the community.

Not all the models of climate plans (both climate action [reducing our contributions to climate change] and climate resilience [preparing for and recovering from climate-driven disasters]) are created equal, and some may not include actions aimed at protecting cultural heritage. Nevertheless, these plans offer great insight into the process of prioritization and goal development. According to the Center for Climate and Energy Solution, 33 states in the continental United States have climate action plans. Not surprisingly, most of these plans have the reduction of greenhouse gas emissions as the primary goal. The city of Chattanooga, Tennessee, released its own climate action plan in March 2023 with a primary goal to “reduce disparities among socially and economically vulnerable communities” (Chattanooga 2023, 3). The city of Chattanooga prioritized, in addition to becoming net-zero carbon by 2050, working in collaboration with “transportation authorities, housing authorities, design and construction representatives, utilities, academia, regulatory agencies, nonprofit and conservation organizations, philanthropic entities, and public health authorities” (58). It is helpful to see first if your community has already developed a plan and what resources are available locally to ensure your cultural heritage climate action plan to enhance any existing plans.

In 2019, the city of Saint Paul released its *City of Saint Paul Climate Action & Resilience Plan*. It lays out its goals of becoming a carbon-neutral city by 2050 with the

¹ International Council of Museums. 2019. “Museums in Times of Disaster.” Filmed September 2019 at ICOM Kyoto 2019, Kyoto Japan. Video, 1:13:25. <https://icom.museum/en/news/icomkyoto2019-rewind-plenary-sessions/>.

understanding that response, adaptation, and mitigation will be key to the long-term success of the city and its people. Figure 1 shows an excerpt from the Saint Paul plan describing the main hazards, who is most vulnerable, and some of the physical impacts the community can expect. It is a great way to define and describe the issues in a visually clear and concise manner.





HAZARD	VULNERABLE POPULATIONS	IMPACTS
 <p>Heavy Rain Events</p>	<ul style="list-style-type: none"> • Older adults, especially those living alone and/or have low-incomes • Residents with limited English proficiency • Residents with mobility limitations (access to transportation, ambulatory difficulties) • Residents who lack property, rental, or homeowner insurance (typically low-income) 	<ul style="list-style-type: none"> • Drowning or injury • Mold or waterborne disease • Economic loss • Property damage • Travel limitations
 <p>Extreme Weather Events</p>	<ul style="list-style-type: none"> • Older adults, especially those living alone and/or have low-incomes • Residents with limited English proficiency • Residents with mobility limitations (access to transportation, ambulatory difficulties) • Residents who lack property, rental, or homeowner insurance (typically low-income) • Homeless and those in unstable housing 	<ul style="list-style-type: none"> • Property damage • Injury or death • Travel limitations
 <p>Poor Air Quality Days</p>	<ul style="list-style-type: none"> • Older adults, especially those living alone and/or have low-incomes • Younger children • Residents with respiratory illnesses • Those who work outside • Residents living near high-volume traffic corridors (interstates, arterial roads) 	<ul style="list-style-type: none"> • Asthma attacks • Severe allergies • Cardiovascular health
 <p>Extreme Heat</p>	<ul style="list-style-type: none"> • Older adults, especially those living alone and/or have low-incomes • Younger children • Residents with respiratory illnesses • Those who work outside • Low-income residents with no or limited access to air conditioning • Homeless and those in unstable housing 	<ul style="list-style-type: none"> • Heat stress • Heat stroke • Cardiovascular health • Dehydration

Figure 1. Graphic from the City of Saint Paul Climate Action & Resilience Plan.

Practical Dimension of Planning and Preparation

Resilience requires adaptation that incorporates physical sites, care for collections, care for people (community, staff, and volunteers), business continuity, heritage continuity, and action in the community.

Emergency preparedness plans are a great place to start for outlining plans to meet the challenges of climate change adaptation. These plans should have lists of collaborative partnerships with first responders, architects, construction contractors, conservators, local government officials, and support networks. The plans should also have a list of activities or priorities to ensure proper preparation, response, and recovery. There are abundant resources for creating emergency preparedness plans on the internet. See the list of resources at the end of this document for a few examples.

The list of activities of an emergency plan that impact a climate resilience strategy might include (this is a reference with suggestions, not a complete list):

- Create, train, and support an emergency (climate) response team.
- Know the vulnerabilities and prioritize response.
- Develop contingency plans for closing museum/site, financial recovery, and paying for staff.
- Establish funds (grants, donations, etc.) for preparations (materials, fuel, conservation of objects).
- Evaluate insurance needs.
- Recognize and account for the need to address several (climate) emergencies simultaneously (if the director is managing conversations with agencies, who manages conversations with utilities and contractors?).
- Keep in contact with other cultural groups and share all (climate) response information.
- Review/update, review/update, review/update!

The appropriate response for your site is more specific than that list can suggest, but its categories of actions can stimulate your thinking. To help build the repertoire of responses, it's helpful to look at other resilience strategies or plans. Unfortunately, there are very, very few in the cultural sector, so we must combine what we know about disaster response, and about our buildings, collections, landscapes, intangible resources, and our staff, volunteers, and community, with others' responses, to fashion the unique actions for our sites.

As you review others' Climate Action Plans, Emergency Preparedness Plans, and Climate Resiliency Plans, they may seem very similar and appear overlapping. They do have a lot in common. However, it is probably best understood as each being much like a different maintenance policy with each providing a different level of coverage for both short-term and long-term protection. The chart below provides some examples of similarities and differences.

	Emergency Preparedness Plan	Climate Action Plan	Climate Resilience Strategy
Identify, train, and deploy staff	✓	✓	✓
Identify, train, and deploy contractors	✓	✓	
Identify First Responders; offer site orientation	✓		
List of Hazards and Vulnerabilities	✓	✓	✓
Community Collaboration Strategy		✓	✓
Emergency Tools and Supplies	✓		✓
Review/Update	✓	✓	✓

Immediate Response	✓	✓	✓
Recovery	✓		✓
Mitigation Strategy		✓	✓
Adaptation		✓	✓

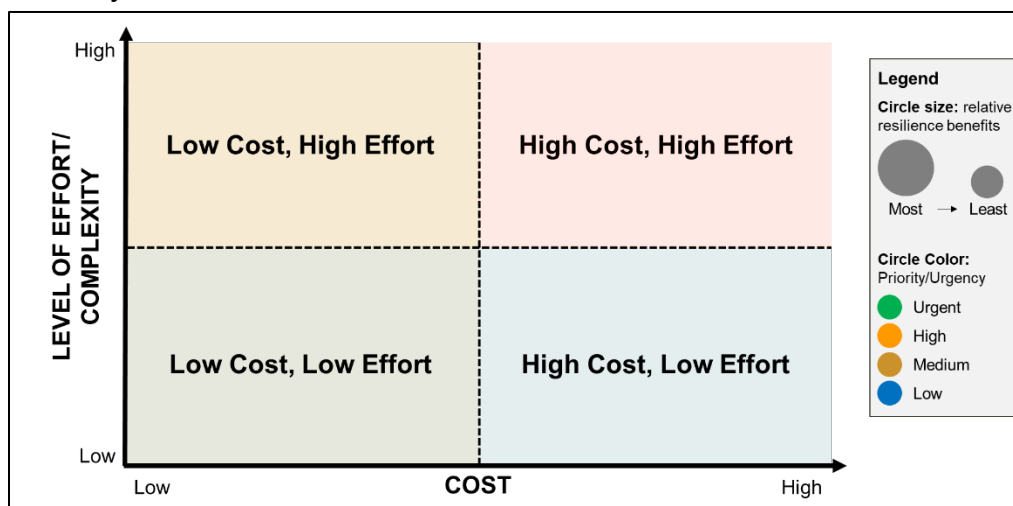
Collecting and Prioritizing Steps

As you build awareness of your vulnerabilities, you will naturally form ideas of how to respond. As these ideas surface, they will start to overlap, and you might feel you are losing track of what to do when or feel as if everything must be done right away. We know that it cannot, so consider using a scatter chart to manage this. You can use these charts to collect ideas and place them in relationship to each other as a way to (and remember) many options together, then make choices of which to pursue and when based on how they combine conveniently and how they must be sequenced due to available time, information, funding, and opportunity. In the Activity section of this module, there are four scatter charts for you to consider before creating your own.

Activity: Scatter Chart

When you are ready to explore prioritizing potential responses, gather together those who understand the institution’s climate risks and are familiar with the site’s landscape and built environment (architecture and mechanical systems). With them, try this activity first with one major hazard and some potential responses. That first exploration will make it easier to conduct the activity again with additional major hazards and potential responses.

Explain to the group that together you will identify potential activities to make your institution, people, and community more resilient, and that you will be organizing the ideas by a few factors:



- urgency (signaled by color),
- resilience impact (signaled by circle size),
- cost (signaled by movement left to right as costs increase), and
- time/complexity of implementation (signaled by movement from bottom to top as these increase).

Example #1: Prioritization re: High Risk of Flood

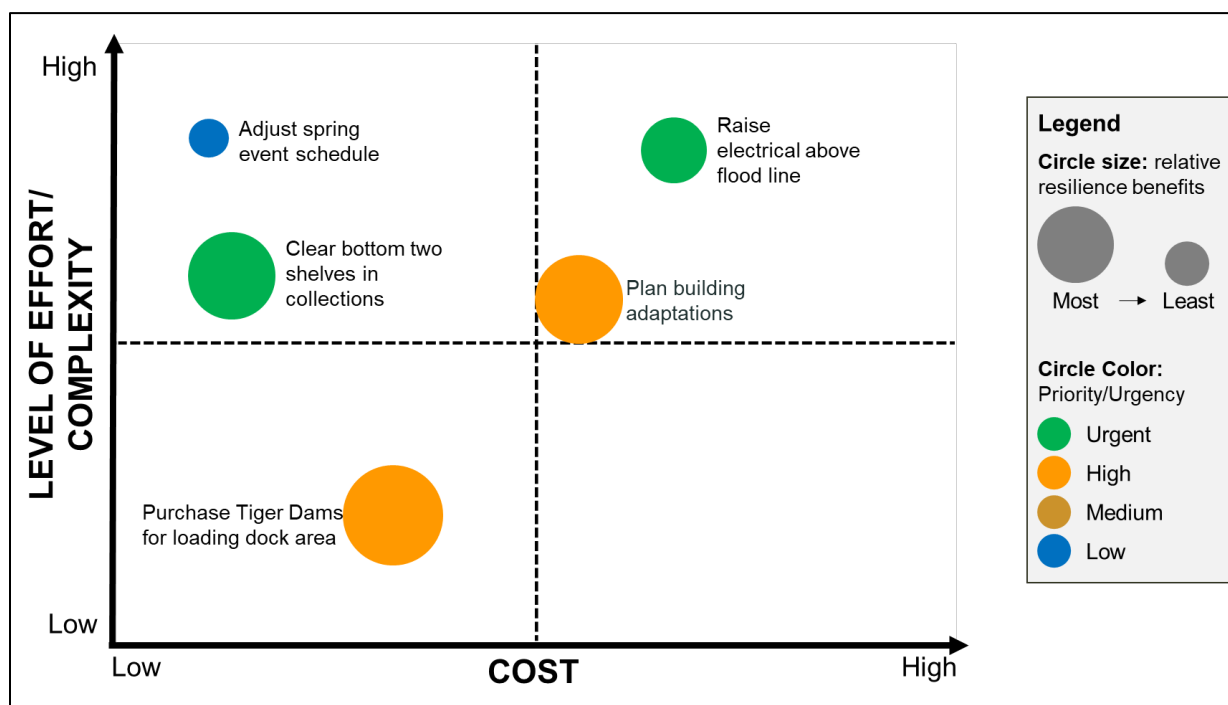
In the example below, with a high risk of flooding, **raising electrical** outlets, fuse boxes, battery storage, etc., above expected flood levels during the life of the space is a large (high impact) circle of high priority (green) in the upper right corner because it is complex and expensive to do. This placement does not indicate whether to do the work, just the cost and importance of it. Deciding when to do which activity comes later.

Clearing the bottom two shelves in storage protects collections in the case of water infiltration before any collections moves can be made. So that's high impact and may or may not be expensive or complex, depending upon your institution, but it certainly is urgent.

Having **solar batteries that support basic energy needs** is very valuable, but perhaps not quite as urgent as the other two greens, or as easy to implement.

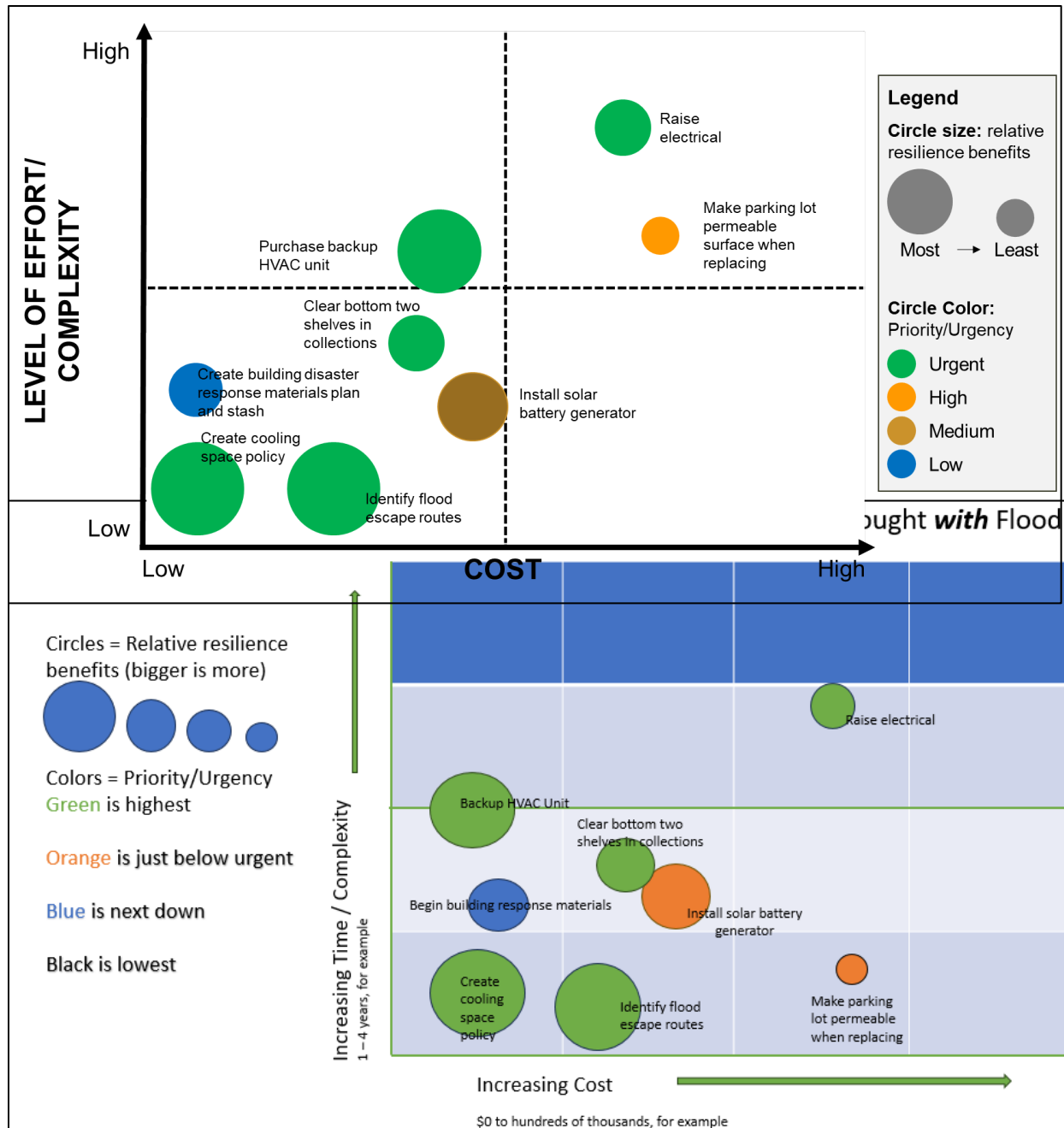
Purchasing flexible dams such as the Tiger Dam used at Vizcaya in Miami (inflatable with water), enable a trained crew to install a barrier when surges or overflows are expected. For some sites where a dam is effective, and they are exposed to flooding, this is a high priority; for others without those opportunities or hazards, it would not be.

Note how the same activities appear differently between charts. The Tiger Dams are missing from heat and drought charts. Clearing the lowest two shelves in collections storage appears as an early priority for sites with flood risk, and a late low priority for those with less risk (though please note that droughts increase the risk of flooding when the rains do come).



Example #2: Prioritization re: High Risk of Heat, Drought, and Flood
 In this example, with different concerns, the chart might look like this:

The situation changes though when you have some compounding effects, where multiple hazards overlap—very common—and they have cascading and compounding impacts.



Implicit in adaptation is the recognition that situations change. It is important to remember that regular review of any plan is essential to long-term resilience. It is valuable to have the information gleaned from the Climate Risk Map on potential hazards for midcentury and late century. However, the margin of error on any plan

begins to widen as new information around climate change emerges and new solutions appear. The resources laid out in this, and other documents, should serve as a guide to what may work, or even not work, for the cultural heritage site, collection, or knowledge you are charged with protecting.

Next Steps

- Use the Climate Risk Assessment Scatter Plot activity packet [here](#).

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Citation

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Heritage**

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Climate Resilience Resources for Cultural Heritage

Module 5 Climate Change Risk Scatter Plot Activity



**NATIONAL
ENDOWMENT
FOR THE
HUMANITIES**


Held in Trust is a cooperative agreement between the National Endowment for the Humanities (NEH) and the Foundation for Advancement in Conservation (FAIC).


Environment
& Culture
Partners



Overview

Goal: Together, identify potential activities to make your institution, people, and community more resilient, and that you will be organizing the ideas by a few factors.

 **Step 1: Gather Data** Use information collected using the Climate Hazard Risk Assessment Map, Climate Check site-level report (recommended), and Site-level Vulnerability Assessment Survey.

 **Step 2: Identify and Gather colleagues** Those who understand the institution's climate risks and are familiar with the site's landscape and its built environment (architecture and mechanical systems).

 **Step 3: Try this activity first with one major hazard.**

 **Step 4: Then consider it again with additional major hazards.**

 **Step 5: Repeat steps 3 to 4 as needed.**

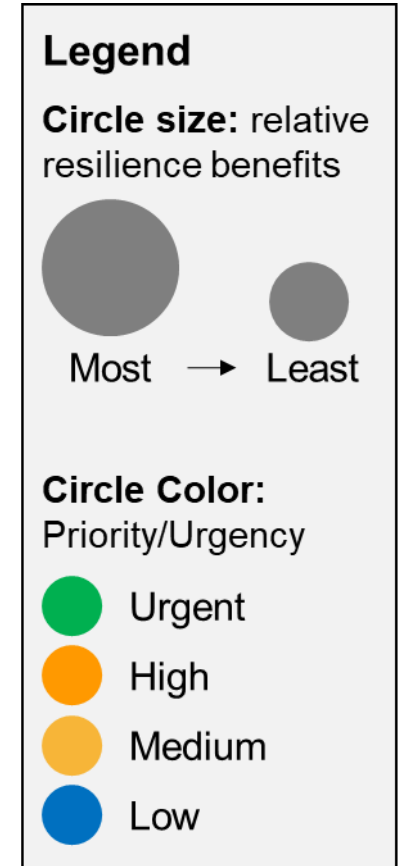
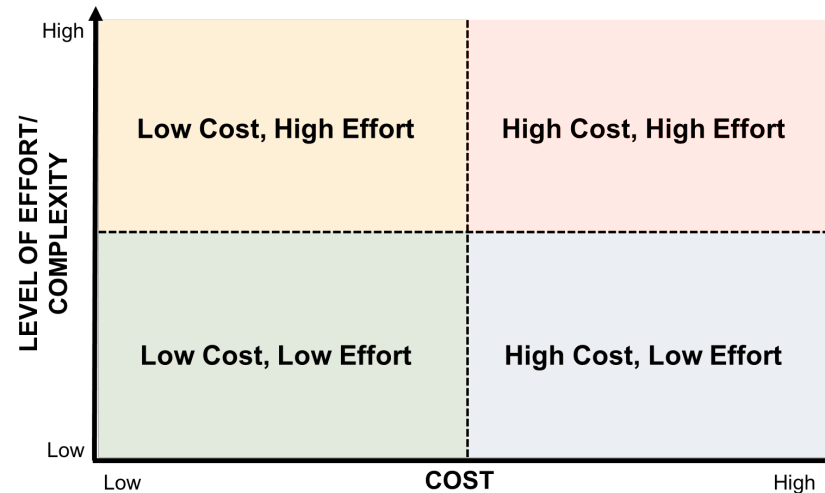
 **Step 6: Update your Climate Resilience Strategy accordingly.**

Suggestion:

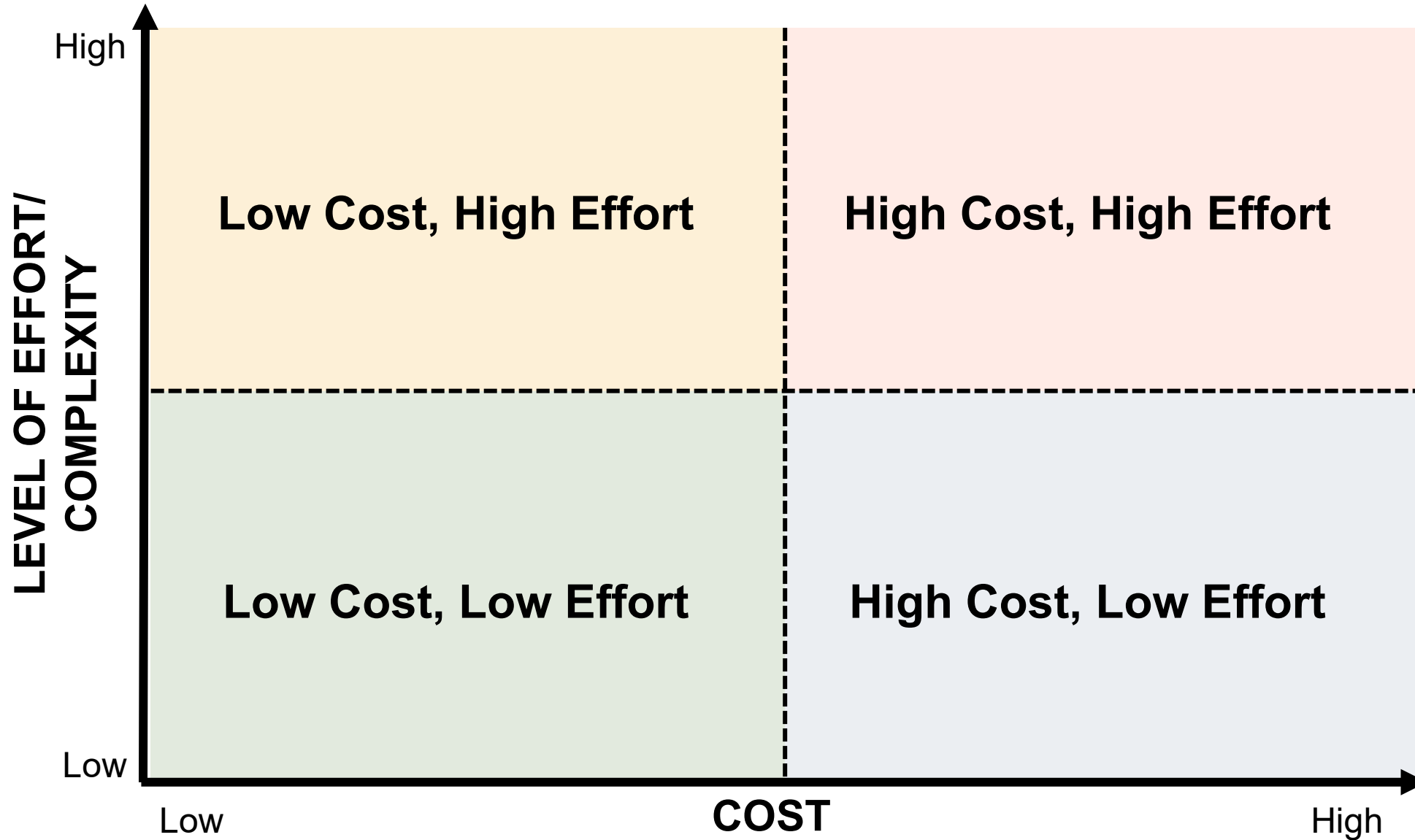
Use a white board or online jam board with sticky notes.

Instructions

1. Together, identify potential activities to make your institution, people, and community more resilient.
2. Identify a scale for your axes. Examples:
 1. Cost: \$0 to \$500, \$0 to \$500,000
 2. Level of Effort/Complexity: Individual to Org-wide
3. Prioritize them according to:
 1. **Urgency** (signaled by color);
 2. **Resilience impact** (signaled by circle size),
 3. **Cost** (signaled by movement left to right as costs increase), and
 4. **Complexity of implementation** (signaled by movement from bottom to top as complexity increases)
4. Adjust as necessary as you add additional hazards.



Prioritization Framework: Cost vs Level of Effort



Legend

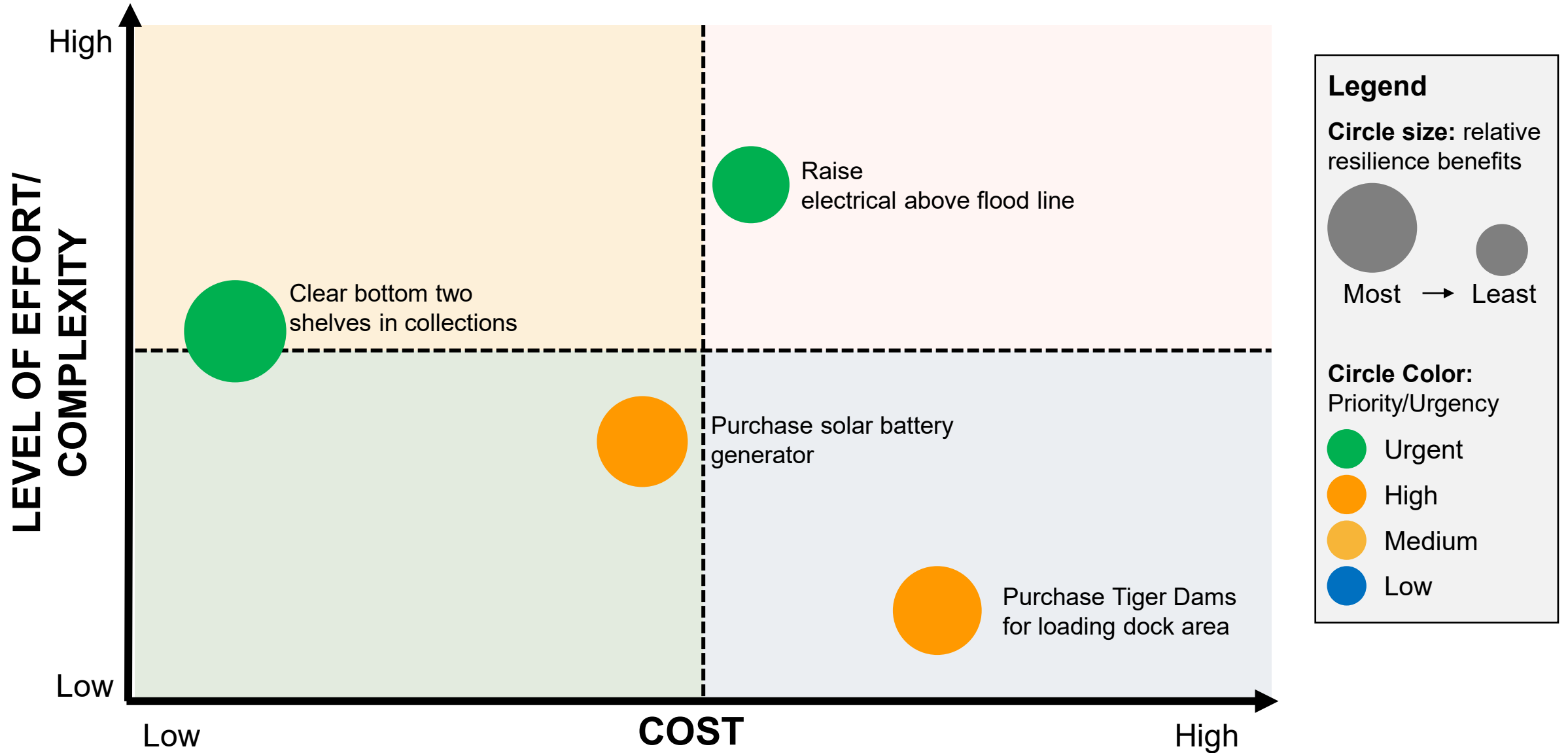
Circle size: relative resilience benefits

Most → Least

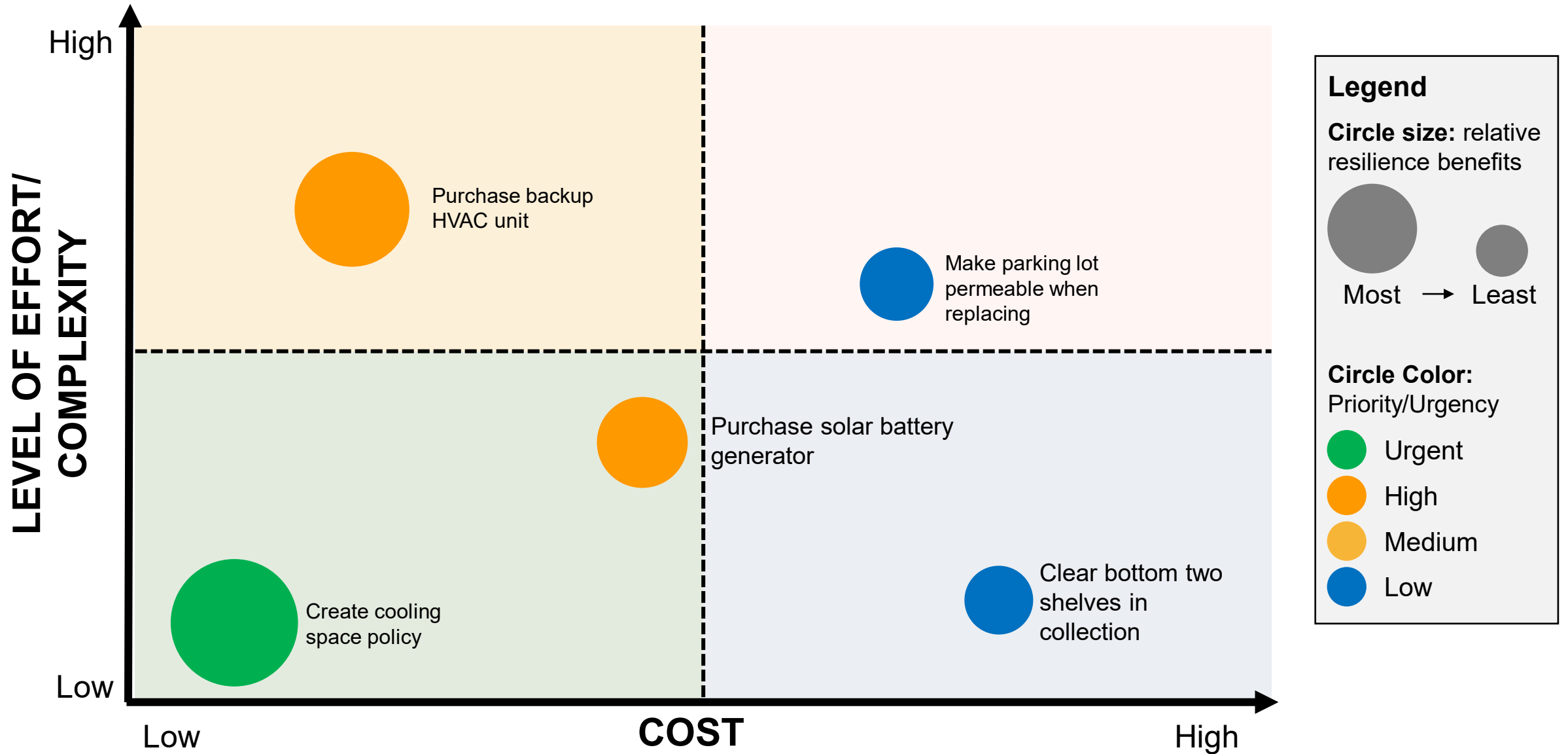
Circle Color: Priority/Urgency

- Urgent
- High
- Medium
- Low

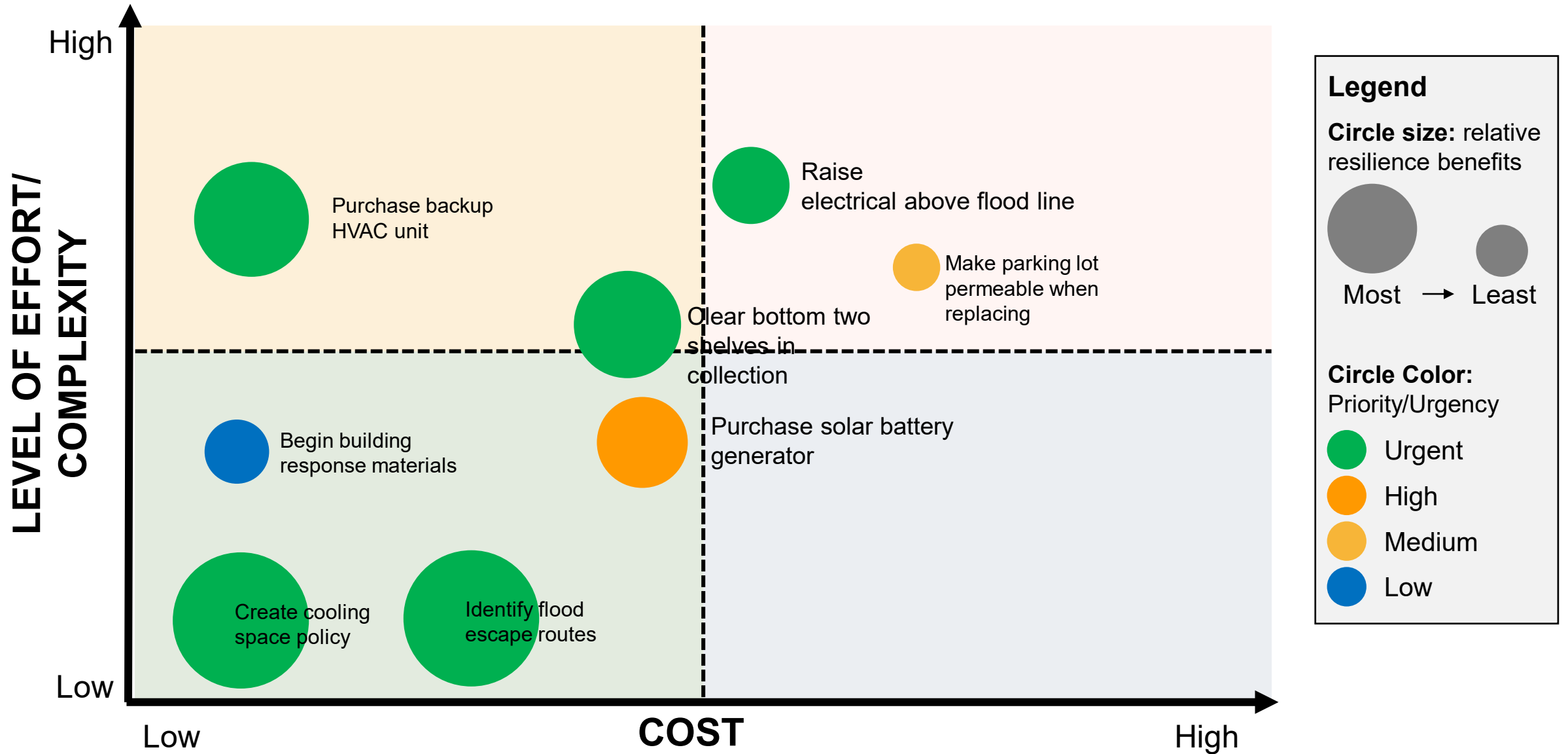
Example: High Risk of Flood



Example: Risks of Heat and Drought



Example: Risks of Flood, Heat, and Drought

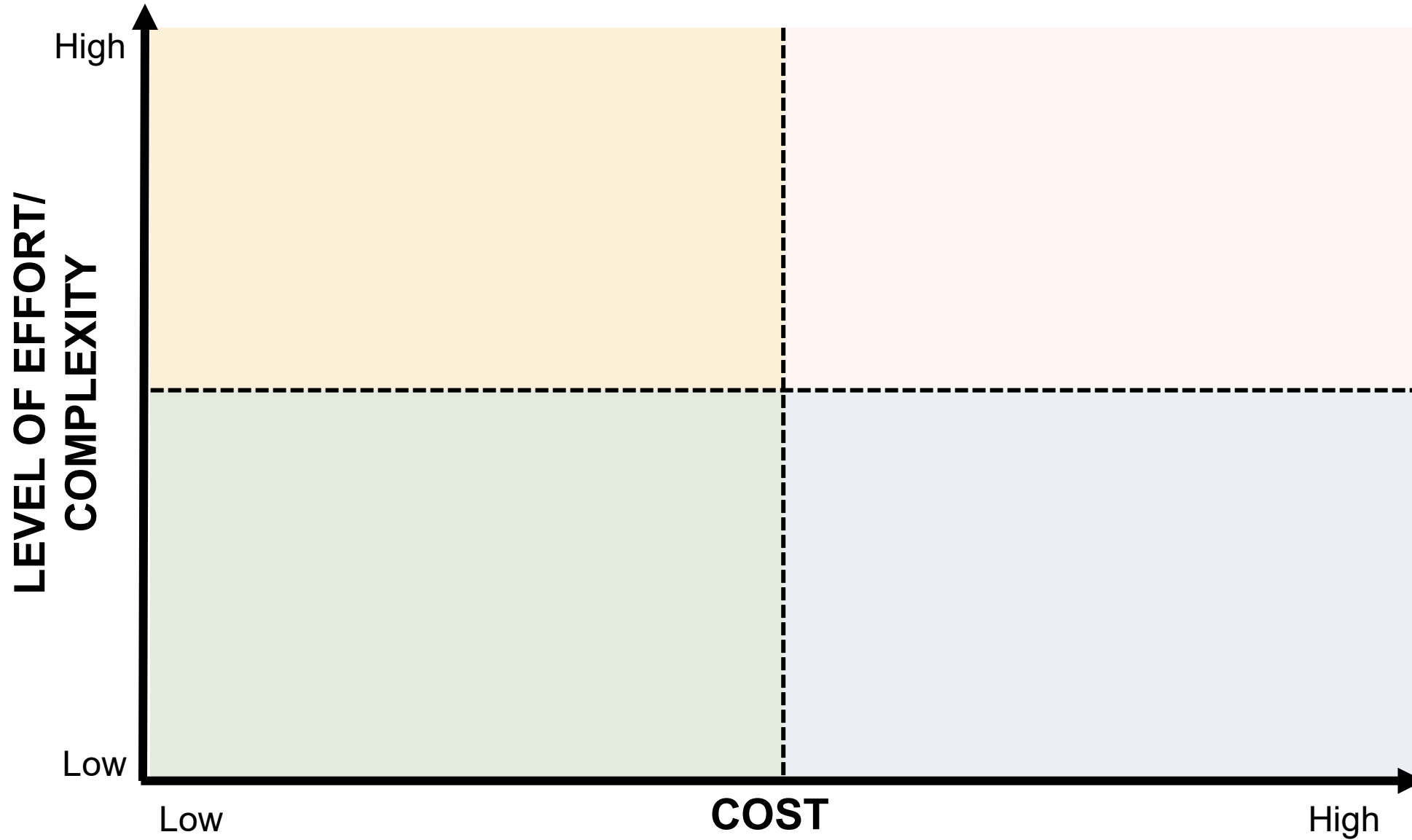


Explanation

- **Raising electrical** outlets, fuse boxes, battery storage, etc., above expected flood levels during the life of the space is a large (high impact) circle of high priority (green) in the upper right corner because it is complex and expensive to do. This placement does not indicate whether to do the work, just the cost and importance of it. Deciding when to do which activity comes later.
- **Clearing the bottom two shelves** in storage protects collections in the case of water infiltration before any collections moves can be made. So that's high impact and may or may not be expensive or complex, depending upon your institution, but it certainly is urgent.
- Having **solar batteries that support basic energy needs** is very valuable, but perhaps not quite as urgent as the other two greens, or as easy to implement.
- Purchasing flexible dams such as **Tiger Dams** used at Vizcaya in Miami (inflatable with water), enable a trained crew to install a barrier when storm urges or coastal overflows are expected. For some sites where a dam is effective, and the site is exposed to flooding, this is a high priority; for others without those opportunities or hazards, it would not be.
- Note how the same activities appear differently between charts and how different activities change their urgency and level of effort according to the cascading and/or compounding nature of hazards.
- Implicit in adaptation is the recognition that situations change. It is important to remember that regular review of any plan is essential to long-term resilience. It is valuable to have the information gleaned from the Climate Risk Map on potential hazards for midcentury (and late century as well). However, the margin of error on any plan begins to widen as new information around climate change emerges and new solutions appear.

Activity

Conduct Your Prioritization



Legend





Circle size: relative resilience benefits

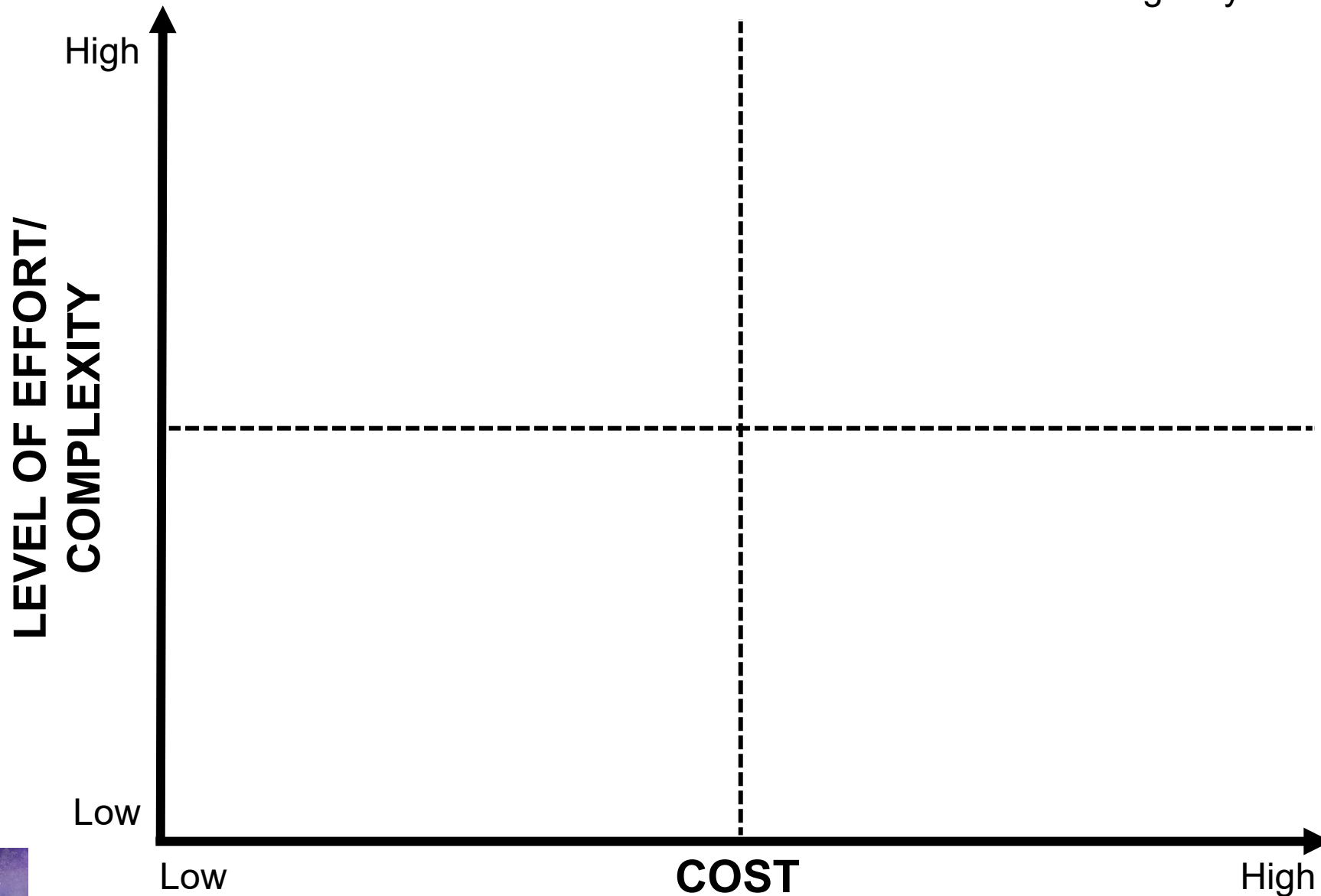
Most → Least

Circle Color: Priority/Urgency

- Urgent
- High
- Medium
- Low



[Add Hazard(s)]

Place Urgency    







Legend

Circle size: relative resilience benefits

  → Most → Least

Circle Color: Priority/Urgency

-  Urgent
-  High
-  Medium
-  Low

Citation

Climate Resilience Resources for Cultural Heritage. 2024. "Climate Change Risk Scatter Plot Activity." Climate Resilience Resources Module 5. Foundation for Advancement in Conservation, March 13, 2024. <https://www.resilience.culturalheritage.org/pages/build-resilience-strategy>





Overview

This module provides:

- [Terms and definitions](#)
- [Core concepts and approaches](#)
 - [Overview of community-integrated planning and preparation](#)
- [Activities and examples](#)
 - Resilience conversations
 - From scenarios to real-life situations
 - Telling the story
- [Sources for further study](#)
- [Citation](#)

Terms and Definitions

BELIEFS: Ideas that are held to be true whether or not evidence exists to support them.

COMMUNITY: A body of individuals who share a degree of common interests or identify and live in a particular area of a larger society or are scattered within that society. Community can also be defined as an area, such as the community around the cultural resource, the South Bay, the Lower East Side, a particular housing development or neighborhood, etc.

CULTURAL RESOURCES: Tangible and intangible evidence of human activity or appreciation, which includes any archaeological resource, building or structure, heritage setting, collection, and native/traditional communities of knowledge. Cultural Resources are often non-renewable and as such require protection and preservation.

CULTURAL SITE: A space incorporating an area of land or a building that represents, or houses, or shares, aspects of the culture and heritage of the community, region, and/or nation.

DEMOGRAPHICS: Statistical data referring to a population and/or particular groups within a population.

RESILIENCE: The ability to recover effectively and to successfully adapt to challenges through flexibility and adjustments to external and internal needs.

UNIVERSAL VALUES: (U.N. definition for Heritage sites): Possessing a cultural and/or natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity.¹

¹ UNESCO World Heritage Centre. n.d. "UNESCO World Heritage Centre - Compendium." https://whc.unesco.org/en/compendium/action=list&id_faq_themes=962.

VALUES: A person's or group's set of principles or standards of behavior.

Introduction

In Learning Module [“4. Assessing Vulnerabilities of Culture Heritage to Climate Change Impacts and Related Events.”](#) you planned how to limit the exposure of and damage to your site and buildings, and to recover from any damage or stress you cannot mitigate. Now it is time to think about how your resilience work depends upon the community you are in and how that community can benefit from your efforts. Again, there are social and practical dimensions to consider.

The social dimension of this work includes supporting or restoring the well-being of staff, volunteers, peers, and community members, with the emphasis on the most vulnerable community members. An understanding of the strengths and needs of partnerships and networks is critical. And making connections and nurturing them so that you have working relationships that are ready for immediate response is also important. This means being able to recognize new opportunities for collaboration that may seem unlikely at first but will help solidify and shift perspectives regarding Cultural Resources.

We are all affected by climate change. Cultural heritage institutions and stewards of all kinds do not exist outside of the communities in which they reside. They can be and may already be the touchstones around which everyone can prepare, respond, adapt, and mitigate the climate hazards that are upon us. Sometimes, the mere location of a well-known building, historic site, or community arts center can help direct people and resources in times of need. For example, during a time of crisis, where there is a shortage of protective equipment at hospitals, people wishing to donate essential items can easily be offered the option to deliver them to a well-known building/museum/site in town. During a flood, a cultural site might serve as shelter, staging, and other key functions that are outside the scope of its usual mission. The generous parking area at a cultural center can become a staging area for utility trucks in advance of an ice storm, or for food and supply distribution after a hurricane, fire, or other community-wide disaster. Most importantly, the Cultural Resource must reframe its mission to act appropriately under dire emergency circumstances to:

- 1) preserve human life;
- 2) ensure the safety of its surrounding vulnerable community members;
- 3) serve as a tool/shelter/accessory for enhancement of emergency services;
- 4) dignify the experience of those affected through culturally competent and emotionally intelligent approaches to crisis management;
- 5) preserve cultural bonds between the community, the collections, the site, and the cultural stewards;
- 6) encourage engagement;
- 7) equitably mobilize internal resources;
- 8) evaluate and reevaluate steps 1 through 7 through continuous community conversations; and
- 9) ensure staff/organization have the relevant skills for the situation to avoid causing accidental harm and putting them and others at risk.

The practical dimension includes your site's capacity to support community infrastructure as appropriate, and to be independent of it as needed. Most importantly, maintaining a flexible approach to needed actions is key. Oftentimes there seems to be a disconnect between what actions are needed and what is seen as the traditional role of a heritage resource, resulting in a social impasse. Some managers may be reluctant to engage in activities that are seen as outside of the Cultural Resource's traditional mission. A flexible approach, the use of common sense, and a willingness to do things differently can contribute significantly to the resilience of a community overburdened by climate disparities.

This module provides resources for the planning that aims to limit a community's vulnerability to the climate threats that have been identified. Please choose among the resources that are most appropriate to your situation. By examining these you may be reminded of a resource or a source of information in your community or region that can be of help and should be added to your plan.

Overview of community-integrated planning and preparation

We are all affected by climate change. When one of us is at risk, everyone's risks escalate and that includes institutions, neighborhoods, a city, a watershed, etc. Those who have been through disasters speak about the importance of pre-crisis connections among individuals and institutions that are able to help quickly and thoughtfully ("neighbors helping neighbors" or "friends from before"). The building of this pre-need atmosphere of partnership, trust, and mutual support requires cultural organizations to work with members of the community (outside of staff or volunteers) in order to foster genuine feelings of agency and security, and the sense that the full community is included.

It is not always easy to understand the needs of a community, especially during a crisis. Certainly, every heritage group may already have a good sense of their own needs. But Cultural Organizations are members of communities and as such should develop a sense of how their cultural practices work in conjunction with the larger community to address natural disasters. Alignment of needs and flexibility of practices is critical for positive outcomes during and after a disaster and as we strive to cope with the challenges presented by the climate crisis. It is critical that partners align their various needs while remaining flexible in their practices.

Every institution's path will be distinctive, so there are many right ways to approach this work. To help orient you, here are important principles and practices that any organization can use to begin developing the approach to its strategic framework.

1. Create a baseline for understanding the commonalities between the needs of your community and the needs of your organization. How can your organization or institution contribute to meeting those needs.

- Define and identify:
 - i. The communities most affected by disasters.
 - ii. The communities and their resources the organization will reach out to, engage with and work with to create a resilience strategy.

- Convene a meeting of staff, volunteers, and concerned community members to establish a baseline understanding of the community's needs and concerns.
 - Discuss equitable access to the Cultural Resource and what it can contribute.
 - Explore future impacts of climate change on vulnerable populations in the community. (Explore the Climate Risk Map to evaluate if the community is at risk under the Justice 40 Initiative.)
- 2. Identify what your organization offers that might directly address current and immediate issues in the community.** To start, if a cultural institution can develop resilience, then that cultural organization will need fewer resources, resulting in more resources available to the community. By being more transparent about their efforts to build resiliency, and more willing to adapt to the effects of the climate crisis, the Cultural Resource not only raises awareness but promotes such actions within the community. And if the Resource openly recognizes how it might be contributing to the problem and makes a public effort to reduce that contribution, it is also setting a positive example.
- 3. Provide training for staff and volunteers to develop skills in community outreach and the ability to identify risk factors and develop resiliency.** This training can involve cultural competency, emotional intelligence, community organizing, listening campaigns, surveys, focus groups, among other skills in order to fully capture and enhance a Cultural Site's relationships with its surrounding community. Some of these conversations may already be happening within the Cultural Resource's regular activities, but staff may not be aware that every event, meeting, activity is an opportunity to engage, follow up, and encourage/empower participants.
- 4. Acknowledge that any conversation has to be both multi-level and multi-directional and even multilingual.** There will be people at different stages of understanding. Everyone will need the ability to feel safe in expressing their concerns. Ideas and solutions can come from any direction and addressing the unprecedented nature of the climate crisis is going to require new ways of thinking. Working with any community to develop resiliency starts with addressing this *partial* list about the community itself:
- a. What are the values, beliefs and needs of the community?
 - b. What threatens it (beyond climate issues)?
 - c. How is it changing?
 - d. What are the demographics? Are they changing?
 - e. How does the community define itself?
 - f. How do others (maybe those outside of the community) see it?
 - g. How does the community see/feel about the Cultural Resource and its staff?
 - h. How does the Cultural Site's location within the community make it an asset for resiliency and climate action?
 - i. Is the Cultural Site capable of serving as an overflow emergency site to increase community capacity for aid?

- j. What is the baseline of support for building resiliency and adaptation? In what way is a Cultural Site willing to help a distressed community in an emergency?

What key language differences exist and how do these play a role in developing rapport? (Is the Cultural Site willing to introduce translation to languages, other than English, familiar to the community to create access to the surrounding Cultural Site or asset during a climate emergency?) For example, will a Cultural Site in the middle of a Haitian immigrant neighborhood be interested in allocating resources to create a channel for communication with folks who speak Creole Haitian even though they are not necessarily its main patron, but makeup the main surrounding community?

5. Work in some of the areas listed above may go far beyond what many in the cultural field are trained to do. Cultural organizations are accustomed to working with historians, conservators, preservationists, architects, engineers, and government officials. However, a new and important approach is going to have to involve the participation of social service agencies, social justice and equity organizations, churches, schools, and health care groups to achieve a more holistic picture of the community and its needs. It is imperative to ask the following questions.

- What is the community perspective of the Cultural Resource?
- What is the community's expectation of the Cultural Resource during the climate issue?

Examples of Community Organizing Techniques

Three points of contact:

1. Good First impression. Fostering good first impressions by being friendly, receptive, non-judgmental, and caring is the best way to showcase not only community service but also to display openness to communicate with visitors you wish to build a relationship with.

2. Create an Invitation. Following the initial point of contact it is ideal to build upon those initial conversations through activities such as: coffee with the staff, meet the curators, show-and-tell, and other ways to get to know your patrons and neighbors. It is also crucial to ensure that contact information is captured for those who are potential stakeholders and or key connectors to the community outside the asset.

3. Follow through with opportunities for interaction. Request input on the Cultural Site's activities, suggestions, advisory board appointments, etc., to give importance to the relationship and make it mutually beneficial. This step takes time and community members and or interested patrons must be approached intentionally but also highlighting their importance in building resiliency for their institution or asset. "Ask your most faithful most often" -- those who are most engaged will recognize the importance of the work and will more than likely already be anticipating issues or may have opinions about how to do things differently. It is important that those who stick around and are willing and able are given an opportunity to engage at whichever level they chose.

Different levels:

a. Primary Leadership. Active Participation in Cultural Site activities, focus groups, key informant interviews, fundraising, emergency preparedness activities.

b. Secondary Leadership. Semi-active participants who have some interest and whose leadership can be developed to be more like the primary leaders. Some may have identified goals or aspirations within the organization and would likely want to move into primary status.

c. Tertiary Leadership. Participants who want to be the muscle of operations, oftentimes these are the folks who are willing to move boxes, secure pieces, lock doors, etc.

It is also very important that the Cultural Resource's outreach staff and ambassadors or interested folks connect consistently to emergency agencies and personnel and engage with their training and information programs. Staff and volunteers can:

- Take the online course [FEMA Incident Command Center Training](#) to engage more effectively with FEMA during a disaster.
- Build relationships with your local Office of Emergency Services.
- Attend local Public Information Officer Briefings and or be in touch with crisis command center or Public Information Office for your local county.

- 6. Look for already existing community groups, emergency consortiums, preservation or conservation groups and begin a conversation of collaboration, communication, and cooperation.** The Foundation for Advancement in Conservation has an emergency response network, the [Alliance for Response \(AFR\)](#), in areas across the country. Check your area and if such an alliance does not exist, start one by convening a roundtable conversation about disaster awareness due to climate change in your community.

Resilience Planning Process Examples

The Hague

The city's [Resilience Plan](#) is a true model of community-focused urban resilience planning. It was developed with the support of the [Rockefeller Resilience Cities Network](#). Many of its components provide examples of avenues to take in considering the approaches most responsive to your community's needs. Though this plan is much more intense and complex than you can pursue as a single institution in your community rather than the governing body for it, reviewing this can help your planning team imagine what is possible. The Hague plan states it well, "Complex urban challenges require multiple partners to solve.... We have a great deal of experience we can share with other cities in our region and the world, but also we must be ready to learn – from other cities, from different sectors, and of course from our own resilient and innovative citizens."² The resilience plan focused on five activities, all of which a cultural resource can support:

1. Ensuring a Connected and Inclusive Society
2. Preparing Everyone for a New Economy
3. Adapting to Climate Change
4. Improving Risk Awareness and Emergency Preparedness
5. Engaging Partners in the City and Beyond

The charts in this resource suggest simple and clear ways to organize your responses (page 19 for example).

The City and County of Honolulu

The [City and County of Honolulu Resilience Plan](#) is a true model of community-focused island resilience planning. It too was developed through Rockefeller support that

² The Hague. 2019. "The Hague Resilience Strategy." May 2019.

https://resilientcitiesnetwork.org/downloadable_resources/Network/The-Hague-Resilience-Strategy-English.pdf, 32.

enables such a robust plan. But it also has examples that may be translatable in some fashion to your situation. Reading it helps a planning team begin to define potential pathways for resilience connections to the community.

Activities

The activities below are suggestions for how to move forward with building community connections including examples of work by others and storytelling that are key to success. You may have already started working in this direction. Explore the ideas and concepts presented above in the context of these activities listed below and those you may have already begun. First, consider ways to expand your relationship with neighbors, then consider steps for emergency organizing. And third, consider the examples in the “[Telling the Story](#)” below for some insight into what responses might suit your cultural site.

Get to know your neighbors

1. Co-create exhibits based on local community resilience stories. Human interest exhibits humanize disasters and response, and help locals identify with, and feel more connected to, the Cultural Resource.
2. Work with cultural producers (artists, musicians, writers, etc.) to organize programs that expand on the exhibitions themes and engage with the community.
3. Reformat opening hours a few days each week in ways that enable shift workers and others to visit more comfortably.
4. Offer regularly scheduled free days for admission to exhibits, programs, etc.
5. Host conversations around challenges such as equity in the arts, community identity, and open dialogues where everyone gets to know each other. Consider events around historic buildings, archives, sites, and community practices (such as commemoration of Dia de los Muertos [Day of the Dead]).

Resilience Conversations

Developing climate resilience is quickly becoming the work of communities and—by extension—should be the work of Cultural Sites committed to their communities. Are museums, zoos, aquariums, and historical sites helping? What if they actively participated in planning and implementing community resiliency in the face of a changing climate? For Cultural Sites this would be self-preservation, mission fulfillment, and demonstrating their relevance.

Keeping History Above Water

Blogpost about the potential for a cultural institution's role in community resilience building: <https://historyabovewater.org/museums-climate-resilience/>.

American Alliance of Museum's Future of Museums

Blogpost about museums and engagement for resilience—whether it's COVID 19, climate, social unrest, etc.: <https://www.aam-us.org/2021/05/01/inside-out-outside-in-a-resilience-model-for-museums-offers-strategies-to-address-challenging-realities/>.

“For museums, the choice is either resilience or irrelevance. When museums see themselves not only as serving their community but as their community, they will

undoubtedly be resolute, fortitudinous, adaptive, and unrelenting despite the challenges they face.” —LaNesha DeBardelaben, President and CEO, Northwest African American Museum, Seattle, Washington.³

Emergency Relief Organizing

Support the Cultural Site’s Board/Management as they develop a list of priorities for their institution based on community needs.

Resource and Connection Discovery

Conduct a discovery process for resource mapping and information gathering about communities surrounding the Cultural Site—inventory of places, spaces, people, etc.

From Scenarios to Real Life Situations

Create table-top and what-if scenarios where staff members are able to share their ideas about who, what, why, when, how to respond to emergency situations as they will most likely be the experts with practical know-how and intimate knowledge about the facility and its assets. This also helps gauge whether a Cultural Site’s staff and volunteers and stakeholders would like to play an active or passive role.

Real Life Scenario One

During the Thomas Fire in California, the Community of the Ventura Avenue—a mostly renter, mostly immigrant disadvantaged neighborhood of approximately 15,000 people—was devastated. There was no real emergency evacuation plan, and only two main thoroughfares led to danger. Many of these folks ended up in the dark for days without access to utilities or essential protective N-95 breathing masks. People, especially those who didn’t speak English, had no information for up to three days about where to seek shelter, attain supplies, and get triaged for injuries. The Bell Arts Factory—a local non-profit community art gallery in the neighborhood served as a locally accessible staging location for emergency supplies as well as a distribution hub for the local community comprised mostly of Mexican immigrants and service workers who couldn’t get a reprieve from the disaster; many had to choose between protecting their health and putting food on the table as they couldn’t afford to take time off. During this time, the local school district remained closed and whilst they had much needed cafeteria food and supplies, these were inaccessible due to “risk management processes.” The school opened a couple of weeks later, but the public had lost trust in their leadership during the emergency. Ultimately, the public built enough resiliency that they took emergency supplies to the school administrators to distribute to families.

Be active and plan to avoid the next big public health crisis. For example, during the pandemic, low-income folks and farmworkers didn’t have access to essential items including diapers. This diaper shortage in low-income households made them more vulnerable to other types of disease; hence, it became a public health collaboration to

³ Ackerson, Anne W., Gail Anderson, and Dina A. Bailey. 2021. “Inside Out, Outside In: A resilience model for museums offers strategies to address challenging realities.” *Museum Magazine*, May 1, 2021. <https://www.aam-us.org/2021/05/01/inside-out-outside-in-a-resilience-model-for-museums-offers-strategies-to-address-challenging-realities/>.

gather diaper donations and distribute them to these folks. *Intentionally Building Social enterprise through unlikely collaborations*: <https://www.telesurenglish.net/analysis/As-SoCals-Thomas-Fire-Burns-Working-Communities-Self-Organize-to-Meet-Basic-Needs-20171218-0024.html>.⁴

Real Life Scenario Two

During the Pandemic, the Port of Hueneme was looking for a way to help. The Port, known for its workforce development, imports and exports, was not anyone's first choice for emergency relief. However, when its customer Del Monte Fresh Produce was trying to figure out what to do with cancelled orders of bananas and other produce from school districts and restaurant closures, immediate action had to be taken. Rather than dump the hundreds of thousands of pounds of produce into landfills and the ocean, the Port's outreach manager reached out to local street vendors, swap-meet vendors, and asked about their capacity for mobilizing produce. The vendors not only had access to their own personal trucks/vans, carts, but they also knew people who sold different products and whose open-air swap-meets and markets had been shut down by covid. This is how the community resource ledger was started—a vendor who sold toiletries and had their products stashed in their garage became the most important provider of essential items for the local community without Costco memberships but in need of hand sanitizer and toilet paper. Another vendor sold grains and beans and supplied these to other community members in need.

The Port began arranging public events in different places, churches, lodges, and at the Bell Arts Factory. Eventually local health clinics joined in and provided protective equipment and other goods and information; however, the Port leadership also recognized the importance of the local vendors and purchased items to give away at the events from the street vendors creating impact at the micro-economy level. All of this occurred and keeps occurring to the point that the local neighborhood council is now leading their own events and has taken resiliency to the local resident level after they learned how to incorporate it through the Port's emergency relief organizing, which was learned by the Outreach Manager during the Thomas Fire at the Bell Arts Factory. <https://keyt.com/news/2020/06/08/feeding-the-frontline-covid-19-program-reaches-milestone-feeds-10000th-family/>.⁵

Telling the Story

Each Cultural Resource, community, or person has a story to tell about both successes and failures. We all can learn from each other's efforts and build a stronger community response in the process. What is your story?

⁴ Gabriel, Elliott. 2017. "As SoCal's Thomas Fire Burns, Working-Class Communities Organize to Meet Basic Needs." teleSUR English, December 18, 2017.

<https://www.telesurenglish.net/analysis/As-SoCals-Thomas-Fire-Burns-Working-Communities-Self-Organize-to-Meet-Basic-Needs-20171218-0024.html>.

⁵ Buttitta, Joe. 2020. "Feeding the Frontline: COVID-19 program reaches milestone, feeds 10,000th family." News Channel 3-12, June 8, 2020. <https://keyt.com/news/2020/06/08/feeding-the-frontline-covid-19-program-reaches-milestone-feeds-10000th-family/>.

The Natural History Museum of Los Angeles County (NHM)

- Has written a Statement on Climate Change and is available to read on their website: <https://nhm.org/statement-climate-change>.
- The NHM and La Brea Tar Pits, on the water-conservation front, have eliminated individual plastic water bottles, installed water bottle refill stations so visitors can bring in reusable bottles and be instantly hydrated. They have also installed a cardboard compactor to more efficiently recycle the boxes that show up on their doorstep. There are energy efficient lightbulbs installed in exhibition spaces. And the Nature Gardens were built to be both beautiful and water wise. The plants are irrigated using a highly efficient smart controller; the mulches conserve moisture and composted soil captures and keeps the rain when it falls.

The Museum of Contemporary Art, Los Angeles (MOCA)

- Created an Environmental Council focused on climate, conservation, and environmental justice in furtherance of the museum's mission: <https://www.moca.org/about/environmental-council>.
- At MOCA, artists are the heart of the museum and are integral stakeholders in their sustainability goals. By engaging artists in rethinking exhibition design and fabrication practices, the museum is moving towards a greener tomorrow.
 - For the exhibition Pipilotti Rist: Big Heartedness, Be My Neighbor, MOCA worked with Rist's studio to ensure an environmentally-responsible exhibition and to achieve a low carbon footprint by sourcing local recycled material, shipping works by ocean freight, reducing post-exhibition waste and serving a climate-conscious menu for the opening night dinner.
 - The exhibition's gift shop, The Big Hearted Neighborhood Shop, offered a combination of upcycled gear and exhibition apparel from Bella + Canvas, an environmentally conscious apparel company based in Los Angeles.
 - A carbon emissions audit was undertaken for the exhibition to determine the baseline and reduce impact; in addition to emissions reductions, MOCA contributed to a Strategic Climate Fund as part of the exhibition's environmental strategy.
 - MOCA also has an Environmental Newsletter: https://www.moca.org/storage/app/media/Environmental-Council/MOCA_Environmental_Newsletter_20230706_01.pdf.

Climate Action 8x8

- Art Galleries in New York collective action on Climate Change: <https://www.galleriescommit.com/climateaction8x8>.

PACT Partners for Arts Climate Targets

- <https://www.visualartspact.org>.

Changing Climate Management Strategies Workshop, Getty

- <https://www.getty.edu/projects/managing-collection-environments-initiative/changing-climate-management-strategies-sustainable-collection-environments-and-monitoring-object-response/>.

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Overview

This document provides:

- [Terms and definitions](#)
- [Core concepts and approaches](#)
 - Introduction
 - “Friends from Before” and “Planning with Friends”
 - Emergency Preparedness Plans
 - Mental Health and Wellbeing
- [Activities](#)
 - Activity One: Building Your “Friends from Before” List
 - Activity Two: Imagine Who First, Who Next?
 - Activity Three: Collect Community Knowledge
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Terms and Definitions

COMMUNITY: A group of individuals who share a degree of common interests or identify and live in a particular area of a larger society or are scattered within that society. Community can also be defined as an area, such as the community around the cultural resource, the South Bay, the Lower East Side, a particular housing development or neighborhood, etc.

CULTURAL RESOURCES: Tangible and intangible evidence of human activity or appreciation, which includes any archaeological resource, building or structure, heritage setting, collection, and Native/Traditional communities of knowledge. Cultural Resources are often non-renewable and as such require protection and preservation.

RESILIENCE: The ability to recover effectively and to successfully adapt to challenges through flexibility and adjustments to external and internal needs.

ROLODEX: A small file for holding physical business cards, and or information written on index cards which can be easily stored and accessible during times when there is no power. Usually, a Rolodex is a cylindrical device to which paper cards attach to.

Introduction

In the previous Learning Module, 6. Developing Community Involvement, you were introduced to ideas about community connections and the reciprocal responsibilities of protecting Cultural Resources and the communities in which those exist. This module explores how collaboration can build resilience by strengthening the concept of “Friends from Before” (helpful people you have identified and who are willing to lend their particular expertise or skills when needed). You will also explore how pooling of resources helps develop cooperative responses within the community. Emergency

preparedness and response plans already adopted by many Cultural Resource organizations can be useful models for developing a system of pooled physical and professional resources for a Climate Resilience Strategy.

Building a collaborative team is an integral part of building a resilience strategy. The most recent *National Climate Assessment (5)* noted that “many deeply rooted community ties, pastimes, Traditional Knowledges, and cultural or spiritual connections to place are at risk. Cultural heritage—including buildings, monuments, livelihoods, and practices—is threatened by impacts on natural ecosystems and the built environment.”¹ It has become imperative that communities collaborate on climate action and plan for resilience. However, to paraphrase the old saying, the planning process is as important as the plan itself. Collaboration among community groups and individuals establishes the base from which all efforts are launched. Although it is important that Cultural Resource groups lead by example in many respects, it should be clear that resilience cannot be achieved in a vacuum. Planning for climate events across the community helps ensure that as many individuals, organizations, government officials and staff have agency during the process and influence on the outcome.

Equally important is transparency, which ensures that all ideas, opinions, concerns, and objectives, clearly defined by the groups, are addressed. A common agenda that works towards securing a community’s best response to climate change should be a goal. Understanding why you have come together helps everyone begin on the same footing.

A collaborative effort should define the geographic, cultural, economic, and sometimes political boundaries of the community, and then define what the community concerns and priorities are around climate change resilience. The material provided in earlier modules has helped you understand your community’s climate risk, the vulnerabilities of your Cultural Resource and of the community. That material will help you begin to organize what kind of responses are appropriate. Now it’s time to coordinate your specific efforts with the community. This module therefore focuses on providing pathways for connections through activities, while offering a few additional resources for community collaboration.

“Friends from Before”

As with any type of institution, there are many friends, supporters, visitors, etc. that are interested and willing to help. It is important to know that all of these are stakeholders and can have a role to play if they so desire. Getting to know the stakeholders in contexts that are more than just the patron or visitor creates positive rapport, but it can also start developing your “Friends from Before” database. Many organizations use donor patron databases to keep track of engagement with people interested in their work. A formal or informal accounting of relationships or “**rolodex**” helps identify who to call, when to call, and what to ask for. Most often, people will be willing to provide their contact information to keep in touch with a Cultural Resource.

¹ USGCRP, 2023: Fifth National Climate Assessment: Report-in-Brief. Crimmins, A.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, B.C. Stewart, and T.K. Maycock, Eds. U.S. Global Change Research Program, Washington, DC, USA. <https://doi.org/10.7930/NCA5.2023.RiB>, 54.

The good and helpful people you know will often know the other good and helpful people you need (“cultivating the base”). Occasionally keeping in touch by inviting these people to events at the institution and gathering feedback or input from them can help strengthen the relationship.

All of this is useful during a climate crisis, as it means warm rather than cold calls to people who are familiar with your institution’s purpose, work, resources, and facilities. Additionally, many of these people can provide positive insights regarding potential functions that the institution may not be aware it can offer. For example, an attorney who does estate planning and volunteers with your organization may be willing to set up a clinic at your location to help those who have lost all documentation or need legal advice (a service not necessarily provided in an institution’s charter but during an emergency is a much-needed resource).

During an emergency these “Friends from Before” can be the foundation for effective collaboration because they already know your institution and its work.

Planning with Friends

Your institution can formalize plans and strengthen relationships that build upon a “Friends from Before” network that extends beyond the heritage community. Additionally, “seed planting” conversations can go a long way, where staff ask potential experts for “in case of an emergency, how can we get in touch with you?”

Consider:

- Who are the potential community partners?
- What experience do they have in climate crisis or disaster response?
- What expertise do they possess? Are they, for example, professionals or retired, nurses, attorneys, mechanics, etc.?
- What is their interest in helping with the Cultural Resource’s emergency or resilience needs?
- What other connections, training, or established relationships do they have which can be useful?
- What critical resources may be available?
- How can we create a living stakeholder contact list which can be used for emergency and resilience planning?
- Who is responsible for maintaining this list?

Consider what training a Cultural Resource might provide to its community. Coordinate with partners on training development and design.

- Salvage training for family heirlooms.
- De-escalation techniques.
- Building preservation techniques.
- Climate resilience training.

Emergency Preparedness Plans

A climate resilience plan has a long arc of preparedness, response, adaptation, and mitigation compared to most of the plans created for Cultural Resources. Culture Resources have emergency preparedness plans that incorporate many of the ideas and tools laid out in the other Climate Resilience Resource Modules.

Emergency Plans
“Friends from Before”

- Emergency management (city, county(parish), state(territory), federal)
- Law enforcement (city, state, federal)
- Fire
- EMT
- Public health (hospitals, clinics)
- Mental/behavioral health
- Youth-serving organizations
- Nonpublic and public schools

Emergency plans are designed to provide a set of procedures aimed at dealing with an immediate crisis such as those dealing with the [10 agents of deterioration](#). These procedures usually lay out the actions needed to address whatever crisis is at hand including how to handle objects (if it relates to a collection), phone trees (for all of staff and usually board members), lists of contractors/services, neighbors, volunteers, emergency first-responders, and local government officials. It is the connections to neighbors, volunteers, first responders, and government officials that represent the emergency preparedness group

of “Friends from Before.”

Reviewing the experiences of others can stir ideas translatable to your planning process. Here are some examples of disaster experiences and responses that may provide resilience planning ideas and pathways. After reviewing these, consider experiences closer to your community. Explore whether those stories and records from those events can benefit the planning and resilience development for your local conditions.

- Montana’s community response to train derailment highlights community mobilization support, importance of communications, types of medical access planning, etc. [TRAUMA: WHEN YOUR PLANS GET DERAILED \(umt.edu\)](#).²
- FEMA’s After-Action Report from hurricanes Irma and Maria suggest planning approaches to improve responses. [After-Action Report/Improvement Plan Template \(noaa.gov\)](#).³

² Morkrid, Shirley M. and Darren Young. 2022. “Trauma: When Your Plans Get Derailed.” Rocky Mountain Rural Trauma Symposium, September 15, 2022.

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- Community Recovery Planning after Paradise fires suggests planning approaches before and after disasters. Paradise’s long-term recovery plan centers community healing and public safety - Western City Magazine.⁴

⁴ Curtis, Colette. 2023. “Paradise’s long-term recovery plan centers community healing and public safety.” Western City, January 1, 2023. <https://www.westerncity.com/article/paradises-long-term-recovery-plan-centers-community-healing-and-public-safety#:~:text=The%20Paradise%20Town%20Council%20adopted,heal%20from%20the%20trauma%20experienced>.

Mental Health and Wellbeing

Recovery from any climate event is not a linear process. It is also different for everyone experiencing it, whether they are helpers, have been directly affected, or both. Recovery from a climate event can be a slow process where those working on projects can go through periods of heroic work followed by periods of ennui and disillusionment before some measure of success is achieved. Keep in mind those who are doing the work and the toll it might take on their mental health and wellbeing. Although it is not always easy to know who needs help or when, there are places that can provide help.

Who to help as well as how, when, and why apply to:

- staff;
- visitors trapped by an event;
- family members;
- community members; and
- visitors during post-disaster events:
 - the person experiencing distress, and
 - those present during the experience.

Resources

Mental Health FIRST AID® (MHFA) from the National Council for Mental Wellbeing® has many resources including the ALGEE Method.

<https://www.mentalhealthfirstaid.org/2021/04/algee-how-mhfa-helps-you-respond-in-crisis-and-non-crisis-situations/>.

ALGEE Method

- **A – Approach, assess for risk of suicide or harm.** Try to find a suitable time or place to start the conversation with the person, keeping their privacy and confidentiality in mind. If the person does not want to confide in you, encourage them to talk to someone they trust.
- **L – Listen nonjudgmentally.** Many people experiencing a challenge or distress want to be heard first, so let the person share without interrupting them. Try to have empathy for their situation. You can get the conversation started by saying something like, “I noticed that ...” Try to be accepting, even if you don’t agree with what they are saying.
- **G – Give reassurance and information.** After someone has shared their experiences and emotions with you, be ready to provide hope and useful facts.
- **E – Encourage appropriate professional help.** The earlier someone gets help, the better their chances of recovery. So, it’s important to offer to help this person learn more about the options available to them.
- **E – Encourage self-help and other support strategies.** This includes helping them identify their support network, programs within the community, and creating a personalized emotional and physical self-care plan.

Sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA), the **Disaster Distress Helpline (DDH)** "is the first national hotline dedicated to providing year-round disaster crisis counseling. This toll-free, multilingual,

crisis support service is available 24/7 to all residents in the U.S. and its territories who are experiencing emotional distress related to natural or human-based disasters.”⁵ The helpline is 1-800-985-5990 and more information can be found here: <https://www.samhsa.gov/find-help/disaster-distress-helpline>.

Climate event scenarios can bring out frustrations among the victims. Consider de-escalation training for Cultural Resource staff, volunteers, community collaborators, and others in the community to lessen or eliminate confrontations.

Calling on your most faithful most often has been a key strategy to ensure that many activities and actions get done. Everything from fundraising to post crisis or emergency cleanup can be achieved when people recognize the importance of the mission of the cultural asset. Whilst not everyone will be able to provide resources, they can in fact be a human resource and that is critical to have during an event. Additionally, some of these folks will have their own set of relationships and connections which can supplement and relieve other response duties such as basic security to making rounds to ensure that items are intact or take inventory. These are your base of “Friends from Before” that can be activated much more quickly as they are in direct contact with your organization or cultural asset.

⁵ Substance Abuse and Mental Health Services Administration (SAMHSA). n.d. “Disaster Distress Helpline.” <https://www.samhsa.gov/find-help/disaster-distress-helpline>.

Healing is not always a straight path: A Conservation Story by Jerry Podany

In mid-January of 1995 I joined a team of Japanese collections-care colleagues from Tokyo to respond to the damage caused by the Great Hanshin earthquake which occurred some days earlier in the southern part of Hyōgo Prefecture. We traveled from Tokyo to Kobe, which was 17 kilometers from the epicenter of the magnitude 6.9 event, overnight. Our intention was to offer any help we could to museums and collections that had been badly affected by the strong ground motions. Not knowing exactly what we would find, we prepared for the worst and for efforts to stabilize works of art, artifacts, and archives. The goal was to do what we could to prevent further damage from aftershocks, secondary threats, and overzealous, untrained responses. The vans were full of basic needs: packing blankets, plastic sheeting, adsorbent material, straps, tape, etc. But one of the colleagues added a box full of restoration materials (inpainting material, adhesives, etc.). My initial response was that such material reflected an intention to undertake unnecessary actions that would reduce our time for basic stabilization, but I didn't say so. I assumed priorities would surface when we arrived and as the work progressed.

It was the early morning hours when we arrived in Kobe, and we were greeted by a city still in shock and suffering considerable devastation. The earthquake had not spared cultural property. The Prefecture Museum had literally broken free of its foundation pillar supports and rotated, the Archaeological Museum had significant damage, and many of the delicate objects in exhibition cases, that had been thrown several feet across the floor or overturned, were badly damaged.

That afternoon we visited a small museum in a neighborhood just outside of Kobe city limits. As we walked to the front entrance, I was astonished to see row after row of pairs of shoes, neatly lined up on the entrance steps. It turned out that the museum, much valued by the surrounding community, had opened its doors to those in the community whose houses had been so damaged by the earthquake that they could no longer be safely inhabited. These people were suddenly homeless. So, the museum had emptied several galleries and offered shelter.

The collection had suffered some damage, mostly paintings that had fallen from walls or storage racks. As we preceded with the survey, I noticed that one of the Japanese conservators was leaning over a painting and many residents had gathered around. He was the same colleague who had packed the restoration materials, and he was applying a localized tissue facing to a tear the painting had suffered when it fell. As he carefully applied a temporary adhesive and smoothed the rice paper patch over the ripped area, the mood of those community members who looked on tangibly changed. He had applied a band aid and in the face of such overwhelming loss had begun a healing process. The community was responding as if they were being healed. Something of great importance to them had been hurt by the same disaster that had hurt them. And by bandaging that painting the conservator was also bandaging the community.

I returned to the survey, to establishing priorities, to stabilizing immediate needs...but I had also learned that more was possible, and much more was needed, than prevention. And that my colleague had understood all along the healing powers of his actions, not just for the painting, but for the community.

The Great Hanshin earthquake occurred on January 17th, 1995. It had a moment magnitude of 6.9 and a minimum intensity of XI-XII in the Modified Mercalli Intensity Scale. It was a major earthquake. Of the 6,434 people who perished in the earthquake, approximately 4,600 were from Kobe. Total property loss was around \$100 billion with 152,297 buildings damaged or lost.

Activities

Activity One: Build Your “Friends from Before” List

Begin making your list of people to contact if an emergency were to happen by brainstorming the people or organizations that are the most faithful and reliable, with the capacity and skills to be helpful.

- Examine the list of climate threats for your site, what resources and services are you most likely to need? Who can provide that?
- Consider the articles (above) relating experiences in Montana (the train derailment) and California (the wildfires). Based on those examples, what additional friends should you make for your list?
- Look for two, three, or four names to fill every category. This redundancy provides alternatives if one cannot help you right away.

Activity Two: Imagine Who First, Who Next?

Each emergency and disaster has a unique aspect to it; each unfolds differently everywhere and individually. Looking at your list, how can you build in chains and layers of connections? Here are four examples.

Necessary Layers

- Review the federal, state, and local agencies required for specific aspects such as financial and emergency aid.
- Review connections to aid agencies but be prepared to work without them if they are delayed or overwhelmed (American Red Cross, etc.).
- Review financial layers such as your bank, your insurers, credit opportunities. Consider multiplying your options.

A Deep Bench

Based on your vulnerabilities and the kinds of support you may need, and expecting that many others would be calling for these or similar supports simultaneously, how deep can you make your aid options for each need (e.g., three resources for plywood, four lenders for temporary water barriers, and five HVAC and plumbing repair companies)?

Prepare for Dependencies

Your anticipated cascading effects can give you clues to dependencies during and after the disaster. For example, if you know water damage and power outages lead to mold growth, then you can plan which actions to schedule first: remove as much water as possible (plumbers or handpumps or deconstruction); next or also, create ventilation (restored or temporary power, and/or natural ventilation); then address materials-specific needs with curatorial teams and/or relocation.

Each of those actions depends upon access, tools, and materials, and human or generated power. If you have no power for pumps and there is too much water to bail, then can you create a physical drainage path or do you need to relocate collections? All

must be considered in your planning so that when one approach is blocked because of a missing dependency, you already know of another path to take.

Who First/Who Else, and Where Else?

The impact areas for climate-driven vulnerabilities change for each occurrence. Whether the occurrence is an event such as a flood or fire, or a draining condition such as drought, heat dome, or extended cold, it's impossible to predict ahead of time exactly who will need help and who can give it. Your efforts to build a deep bench and to plan dependencies help you consider whom to contact first, and how to adapt if that contact is unable to help at the moment, either because they are affected or already working for others. Consider:

- What is the actual geographic impact area? Which of your “Friends from Before” or neighbors are outside that geographic area? Ask for their help first. If your list is geographically restricted now, begin widening it.
- What is the service or aid need? Are there other types of organizations to work with. If FEMA or the Red Cross isn't here yet, what helpers can fill that service until they arrive?

For materials and supplies, consider that those you commonly use may not be available from the usual sources once a disaster warning is announced, after it has begun, or during recovery. Explore where to source alternative materials from related fields to add to your lists.

- Grocery stores often receive supplies on wooden pallets. Meet and work with local grocery chains to ensure some pallets are always available. The wood can be repurposed.

Activity Three: Collect Community Knowledge

Your community members have lived an intergenerational experience that can support developing your roster of stories.

- Consider researching and developing an exhibit with them and hosting a public discussion of previous disaster experiences and responses.
 - This event, however, may trigger stress, anxiety, or worse among participants. Consider engaging trauma health professionals in planning and delivering these programs. The American Psychological Association and your local health department will have listings of professionals to contact.
- Use what you learn from these conversations to identify who to include in your roster of “Friends from Before” and to support the process of understanding how to plan for waves of responses: whom to contact first, what activities should be immediate, interim, or follow-up, and creating a deep bench of friends so that rather than call on any affected by the disaster, you have others to reach out to.

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Terms and Definitions

(Many of the terms listed have varied definitions. The terms and definitions listed below are a description of how these terms are used in this document. The aim was not to establish an “approved” definition, but merely to clarify how the term is used in this context.)

ADAPTATION: The process of adjusting policies, practices, and attitudes to new climate conditions in order to reduce risks to valued assets.

CLIMATE CHANGE: A change of climate, attributed directly or indirectly to human activity, that alters the composition of the global atmosphere.

COMMUNITY: A body of individuals who share a degree of common interests or identify and live in a particular area of a larger society or are scattered within that society. Community can also be defined as an area, such as the community around the cultural resource, the South Bay, the Lower East Side, a particular housing development or neighborhood, etc.

CULTURAL RESOURCE: Tangible and intangible evidence of human activity, creativity, and/or appreciation, which includes any archaeological remains, building or structure, heritage setting, collection, works of art or craft, and native/traditional communities of knowledge. Cultural Resources are often non-renewable and as such require protection and preservation.

DEBRIEF (aka “HOT WASH”): The immediate evaluation of a group’s or a community’s performance following training for or responding to an emergency/disaster event. The purpose is to identify successes or needs for change.

RESILIENCE: The ability for organizations and their communities to recover effectively, and to successfully adapt to challenges, through flexibility and adjustments to external and internal needs created by a changing climate’s impacts and events.

Introduction

The climate crisis is a dynamic, unprecedented series of challenges. No one solution, or even a group of solutions, will be optimum at any given moment or for any extended period of time. To remain prepared and to keep your plan relevant it’s important to continually review the latest scientific findings and the most recent efforts and accumulated experiences to update your resiliency plans, actions, and policies. Readers of Learning Modules one through seven have seen tools and ideas for building resilience. Those tools and the information you used with those tools are not static: they offer varying approaches for varying times and situations. Although the strategies are different, the concepts are the same: initial outreach and relationship building, assessment of resources, manpower, response coordination, and the resuming of operations.

Strategies are most effective when reviewed, tested, updated, and well communicated. The review of data, guidelines, shifting schedules, and updates to Resilience Plans will be necessary to ensure Cultural Resources and communities are current in their approach to climate change. A reliable way to incorporate this work in the life of your organization and community is to choose a week every year when you gather as an institution or entity, especially with community members, to review the strategy and prioritize updates. This is an important time to establish an activity that includes the community and assures the sharing and review of plans, to test scenarios and systems, and build the skills, knowledge, and abilities of “friends from before” and “neighbors helping neighbors” in preparation for whatever challenges or opportunities greet your community. The first of May (May Day) every year is already the day when cultural institutions often review their disaster plans, so it is a very appropriate time for this work. Or there may be a state designated time for this: California has Shakeout Day for earthquake preparedness; your community may have an anniversary or commemoration that fits with preparedness planning; and the U.S. federal government has declared September to be [National Preparedness Month at Ready.gov](https://www.ready.gov/national-preparedness-month). Collaborate with the community to set a schedule of review and responsibilities. Every community is different, so choose a time that works for your community. The staff and volunteers of Cultural Resources may work to their strength as researchers and presenters to allow communities (however you have defined them) to meet and discuss what has changed and how. And then address whether and how the community might adapt.

Debrief and Review after Events: “Hot Wash”

Evaluation of actions, a debrief, is important in order to assess the performance of the crisis response. A commonly used term by some agencies and organizations is “Hot

Wash.” A debrief meeting is usually scheduled approximately two weeks after an event when everyone has had time to reflect, and the environment is stable enough after the crisis. A good practice is to have it as potluck or a type of friendly gathering for those who have participated in emergency response with your organization. Once convened, a conversation with all participants of the crisis response is held with the goal of assessing what went well and what needs improvement with a focus on preservation of assets and preservation of life. A debrief meeting, or hot wash, is a tool that can be used after any event; oftentimes findings inform the plan of action for future crisis or events.

Although the debrief is chiefly viewed as an after-event activity, it could be used as a mechanism for review and maintenance of various plans and strategies. Schedule a debrief to evaluate a drill to assess its effectiveness. Schedule a debrief for different groups within an institution or community to evaluate what plans or parts of plans are still needed. Don't wait for an emergency to understand how a debriefing session can work for you, an institution, and community.

No matter when or why you need to debrief, focus the conversation on conditions, activities, sequences, and impacts, rather than personalities or mistakes and blame. Evaluate all parts and actions in the spirit of learning and adapting to situations. Emergencies are highly stressful and to effectively evaluate them everyone needs a safe space to express concerns and successes without incrimination. And everyone needs this debrief to help them understand not just the challenges of this event but ways to take steps to improve response quality, efficiency, or effectiveness, and to understand how to build skills for next time. Positive feedback with next steps helps ensure continuous improvement.

Keeping Abreast of Guidelines and Data

The maps, models, and associated climate or disaster projections are based on the most current and reliable data. However, the models and projections will change as more data becomes available. Like the hurricane projections that change with each passing hour as new information on wind speeds, direction, and water temperature flow in, the data that informs the models on climate change is constantly updated. As you prepare for your plan review, collect updated versions of the information already in the plan, and then conduct at least a brief online and word-of-mouth scan to uncover any new resources or data updates to consider.

The data that allows us to interpret changes in the physical environment and adapt to those changes is only a part of our knowledge of the impacts of climate change. Our understanding of mental health and wellbeing associated with climate related trauma has strengthened over the last decades. It is important that, along with the data regarding climate change, we continue to keep updated on ways for all of us to cope with the work and the results. If mental health support is not already covered in your plan, consider exploring how to provide this support during the discussions, and asking those providers to review your plan with you and incorporate these health practices into the updated version. Take care to capture names and contact information of providers to include in your plan.

Resources

The resources listed below are meant to be a guide (or sample) to what is generally available to help the reader find additional information, data, and resources on climate change impacts. This list will, like your plan, change over the years. The user of this document will have their own resources to choose from as well. Consider adding the names of some of these resources and your own to your Climate Resilience Plan. It is important to remember that these resources will need to be updated along with the rest of the plan on the schedule you ultimately settle on.

Government and Quasi-governmental Organizations

- Federal Emergency Management Administration ([FEMA](https://www.fema.gov/)). FEMA's "mission is **helping people before, during and after disasters**. Our core values and goals help us achieve it."¹ FEMA provides current and near-term data on weather related hazards. [The Hazard Risk Assessment Map](#) associated with these modules provides FEMA hazards data in graphic form to evaluate site specific, local, regional, and national risks. This information is based on historical data and can be valuable for near-term evaluation of risks.

<https://www.fema.gov/>

- National Association of Tribal Historic Preservation Officers ([NATHPO](https://www.nathpo.org/)). Tribal Historic Preservation Officers (THPOs) perform the functions of a State Historic Preservation Officers (SHPO) on tribal lands. The National Association of THPOs provides a detailed sampling of regulations, emergency resources, conferences, and grants to support preparedness.

<https://www.nathpo.org/>

- National Network for Ocean and Climate Change Interpretation ([NNOCCI](https://nnocci.org/)). Organization dedicated to "evidenced-based communications methods and providing the social and emotional support needed to engage as climate communicators."²

<https://nnocci.org/>

- National Oceanic and Atmospheric Administration ([NOAA](https://www.noaa.gov/)). "NOAA's mission to better understand our natural world and help protect its precious resources extends beyond national borders to monitor global weather and climate, and work with partners around the world."³ NOAA's projection models provide hazard information examining likely climate hazards for both low emission and high

¹ Federal Emergency Management Agency (FEMA). n.d. "About Us." Last modified July 7, 2023.

<https://www.fema.gov/about>.

² National Network for Ocean and Climate Change Interpretation (NNOCCI). n.d. "National Network for Ocean and Climate Change Interpretation." <https://nnocci.org/>.

³ National Oceanic and Atmospheric Administration (NOAA). n.d. "About our Agency." Last modified January 19, 2024. <https://www.noaa.gov/about-our-agency>.

emission future scenarios. It is important to keep abreast of the projections. As more information is learned, models and the associated projections are updated to provide a more accurate prediction of outcomes.

<https://www.noaa.gov/>

- [Ocean Literacy](#). Organization dedicated to educating on the interconnectedness of the world's oceans to climate, weather, humans, and the inhabitability of Earth to a diversity of life.

<https://www.marine-ed.org/ocean-literacy/overview>

- Smithsonian Cultural Rescue Initiative ([SCRI](#)). SCRI's "mission is to protect cultural heritage threatened or impacted by disasters and to help U.S. and international communities preserve their identities and history."⁴

<https://culturalrescue.si.edu/>

- State Historic Preservation Offices (SHPO). SHPOs handle a great many duties and responsibilities involving local preservation efforts throughout the United States and Territories. The local preservation office will have valuable information on historic easements, zoning requirements, building codes, and overlay districts.

- United Nations Educational, Scientific and Cultural Organization ([UNESCO](#)). Providing information and guidance on the intersection of culture and climate change, defining culture as "the ultimate renewable resource to tackle climate change."⁵

<https://www.unesco.org/en/climate-change/culture?hub=365>

- United Nations Intergovernmental Panel on Climate Change ([IPCC](#)). "The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change."⁶ This UN body provides regular reports on the impact of climate change and future scenarios that guide governmental and private entities in evaluating risk. The most recent report, [Climate Change 2023: Synthesis Report](#), provided data highlighting the precarious nature of our climate based on an increased emissions of greenhouse gases.

<https://www.ipcc.ch/>

⁴ Smithsonian Cultural Rescue Initiative (SCRI). n.d. "Who We Are." <https://culturalrescue.si.edu/who-we-are>.

⁵ United Nations Educational, Scientific and Cultural Organization (UNESCO). n.d. "Culture and Climate Change." <https://www.unesco.org/en/climate-change/culture?hub=365>.

⁶ Intergovernmental Panel on Climate Change (IPCC). n.d. "IPCC — Intergovernmental Panel on Climate Change." <https://www.ipcc.ch/>.

Non-Profit Organizations

- Yale Program on Climate Change Communication ([YPCCC](https://climatecommunication.yale.edu/)). YPCCC “conduct[s] scientific studies on public opinion and behavior; inform the decision-making of governments, media, companies, and advocates; educate the public about climate change; and help build public and political will for climate action.”⁷
<https://climatecommunication.yale.edu/>
- Foundation for Advancement in Conservation ([FAIC](https://www.culturalheritage.org/)): “The American Institute for Conservation and the Foundation for Advancement in Conservation work together to promote the preservation and protection of cultural heritage.”⁸ Under the leadership of FAIC, the Climate Resilience Resources for Cultural Heritage Project developed documents and an interactive map to aid cultural resource groups in designing their own resilience plan.
<https://www.resilience.culturalheritage.org/>

Science Organizations

- Union of Concerned Scientists ([UCS](https://www.ucsusa.org/)). “The Union of Concerned Scientists is a national nonprofit organization founded more than 50 years ago by scientists and students at the Massachusetts Institute of Technology. [The UCS mission] puts rigorous, independent science into action, developing solutions and advocating for a healthy, safe, and just future.”⁹
<https://www.ucsusa.org/>

Health Organizations

- American Psychiatric Association ([APA](https://www.psychiatry.org/patients-families/climate-change-and-mental-health-connections)). “The American Psychiatric Association is to be the premier psychiatric organization that advances mental health as part of general health and well-being.”¹⁰ APA works, in part, to advance the research and recognition that climate change and the associated impacts have a dramatic impact on the mental, as well as physical, health of people.
<https://www.psychiatry.org/patients-families/climate-change-and-mental-health-connections>
- [Health Care Without Harm \(noharm.org\)](https://www.noharm.org/). “Health Care Without Harm works to transform health care worldwide so that it reduces its environmental footprint,

⁷ Yale Program on Climate Change Communication. n.d. “About | The Program.” Last modified March 31, 2023. <https://climatecommunication.yale.edu/about/>.

⁸ American Institute for Conservation (AIC) and the Foundation for Advancement in Conservation (FAIC). n.d. “About Us.” <https://www.culturalheritage.org/about-us>.

⁹ Union of Concerned Scientists (UCS). n.d. “About | Who We Are.” <https://www.ucsusa.org/>.

¹⁰ American Psychiatric Association (APA). n.d. “APA’s Vision, Mission, Values, and Goals.” <https://www.psychiatry.org/about-apa/vision-mission-values-goals>.

becomes a community anchor for sustainability and a leader in the global movement for environmental health and justice.”¹¹

<https://noharm.org/>

Conferences and Symposia

- Keeping History Above Water ([KHAW](#)). A conference began in 2016 in Newport, Rhode Island, sponsored by the Newport Restoration Foundation. The conference has met in a variety of locations across the country and focuses on increasing awareness of the vulnerability of historic resources and coastal communities to sea level rise.
<https://historyabovewater.org/>
- United Nations Framework Convention on Climate Change (UNFCCC) – Conference of the Parties ([COP](#)). COP is an annual meeting of member nations held in various locations to discuss status of and actions towards climate change. The COP28 conference (2023) held in Expo City, Dubai, United Arab Emirates, became the first COP to recommend that countries “transition away from fossil fuels in energy systems, in a just, orderly and equitable manner.”¹²
<https://unfccc.int/process/bodies/supreme-bodies/conference-of-the-parties-cop>

Stories

The stories below represent actions that some in the Cultural Resource field have undertaken in response to emergency preparedness and climate action. A key thing to remember is that even though the stories have been organized into categories of preparedness, adaptation, and response, these categories are very fluid. These categories and the associated stories exist on a spectrum where it is difficult sometimes to know where one ends and another begins. It can be helpful to think about stories in this way to encourage everyone to view the circular nature of this work.

Preparedness

Vizcaya Museum and Gardens in Miami, Florida, has a history of surviving and rebuilding after hurricanes. That experience and the knowledge that more is to come have, together, engendered a strong orientation toward mitigation and resiliency. Vizcaya is a 50-acre property built in the early 20th century along the coast of Biscayne Bay. The house, ten acres of formal gardens, and the historic village of buildings used to support the property are modeled after Baroque-era European precedents. Vizcaya is open to the public, welcoming over 300,000 guests a year for daytime admissions, community programs and events. The gardens and grounds are especially vulnerable as they include architectural elements, sculptures and ornamental plantings. The nearby

¹¹ “Health Care Without Harm.” n.d. <https://noharm.org/>.

¹² The United Nations Climate Change Conference. 2023. “COP28 Agreement Signals ‘Beginning of the End’ of the Fossil Fuel Era.” UN Climate Change News. Press release, December 13, 2023.
<https://unfccc.int/news/cop28-agreement-signals-beginning-of-the-end-of-the-fossil-fuel-era>.

mangrove shoreline and native forest are also part of the historic design, and they support resiliency in the face of climate change.

To prepare for inevitable storm events, the Vizcaya team has created a multi-pronged preparedness approach. Here are just a few of their tactics:

Architecture and Collections

- A glass roof covering the mansion's interior courtyard, installed in the 1980s, was replaced with a reinforced aluminum structure with impact glass, which provides increased protection from hurricanes and tropical storms and improves the growing conditions for plants in the courtyard.
- Armor Screens (impact-resistant flexible screens) and impact-resistant glass panels are being installed to protect the historic windows and doors of the estate while preserving the historic look of the property.
- Windows and doors in flood-prone spaces have been protected with "aquarium glass" panels that resist hydrostatic pressure.
- HVAC components are being elevated above flood levels.
- A detailed plan has been created for what to do with all collection items in preparation for a storm. This allows staff to react quickly and effectively once a storm is forecast.
- Collections and architectural features have been digitized to enable their repair in the event of storm damage.
- The most fragile and vulnerable outdoor sculptures have been replicated in cast stone and placed in storage to preserve them and lessen the likelihood of major storm impacts.

Gardens and Grounds

- Canopy trees are maintained on two-to-four-year cycles, promoting tree health, limiting damage to the garden sculpture collections, and minimizing post-event clean-up. Formalized risk assessments have been completed on 31 garden canopy trees that will inform mitigation and succession plans to reduce long-term risk.
- Replacing storm-damaged plantings with saltwater tolerant plants in the native forest reduces future costs of replacement and care while supporting native biodiversity.
- Nurturing the mangrove forest strengthens the shoreline, benefiting the institution and its neighbors.
- Staff established a FEMA-compliant disaster response plan for tree damage mitigation, removal, and vegetative debris management.
- Tiger Dam inflatable flood barriers (see below) have been acquired to create a temporary barrier against storm surge. They are stacked, pumped full of seawater and anchored to protect the site. Test deployments occur quarterly to ensure they are functional and to train staff and contractors.
- Seawalls have been erected on site and are being heightened by the addition of glass panels.
- Garden restoration plans include upgrading utility and garden infrastructure to resist saltwater flooding, storm surge and groundwater upwelling forces while increasing efficiency.

- Upgrading and adding infrastructure to orchid greenhouses will increase airflow and reduce ambient air temperature, allowing the permanent orchid collection to better resist hotter summer temperatures.



Tiger Dam deployment in Vizcaya’s gardens. Courtesy Vizcaya Museum & Gardens, Miami, FL;

Adaptation and Response

The Vermont State Office buildings in Waterbury, Vermont, experienced a devastating flood in 2011 from Tropical Storm Irene (see image below).¹³ Not only was there three to five inches of rainfall, the Winooski River running near the Historic Core of the 1800s State Hospital flooded, inundating 20 of the office buildings and displacing 1500 workers. The repair and recovery plan included adaptation to the buildings and the landscape, to reduce damage during continued flood events from climate change. During the reconstruction process, all new buildings were built above the 500-year flood plain. To meet that same safety metric, the [lower levels of the historic structures](#)¹⁴ were reinstalled with no interior framing on the first floor, and the basements were abandoned and filled. The adjacent parking area was lowered to create substantial water catchment

¹³ Nemethy, Andrew. 2012. “State Office Complex Replacement Could Cost \$108 Million to \$142 Million.” *VTDigger*, March 9, 2012. <https://vtdigger.org/2012/03/09/state-office-complex-replacement-could-cost-108-million-to-142-million/>.

¹⁴ Engineering Ventures. 2023. “Waterbury State Office Complex, Waterbury, VT.” Last modified December 18, 2023. <https://www.engineeringventures.com/portfolio/waterbury-state-office-complex-waterbury-vt/>.

space. When storms in 2023 dropped nine inches of rain (more than double the rainfall of 2011) and the river overflowed again, [the complex remained dry](#).¹⁵



<https://vtdigger.org/2012/03/09/state-office-complex-replacement-could-cost-108-million-to-142-million/>

Response and Recovery

Response and recovery go hand-in-hand as communities grapple with what at times seems unsurmountable loss. The importance and impact of local participation in recovery cannot be underestimated, especially if a cultural or Indigenous group is involved. The fire on Maui, Hawai'i, in August 2023 was likely caused by high winds due to weather and hurricane action in the Pacific. The winds blew down powerlines igniting the non-native grasses that are a legacy of plantation times. Those grasses were extremely dry, as were the woods around them, due to changes in weather attributed to climate change. The experience is a valuable example of an historic community at risk of climate change impacts, the failure of infrastructure to provide firefighting resources, and the importance of planning recovery with the community, not for the community.

¹⁵ Freeman French Freeman. 2023. "Designing for Resilience: Lessons from the Waterbury State Office Complex." Freeman French Freeman | Vermont Architects. September 18, 2023.

https://ffinc.com/news_post/designing-for-resilience-lessons-from-the-waterbury-state-office-complex/.

Many visitors know Lahaina as a popular vacation destination, but Kaniela Ing, who grew up in the area and co-founded the Native Hawaiian-focused organization Our Hawaii, underscored that the town's significance long predates Western interest.

He said the fire is a "scorching warning" of what's to come if indigenous communities aren't protected from the impacts of climate change.

"Our home is on fire right now. There needs to be more action and more investment," said Ing, who's seventh-generation Kānaka Maoli, or indigenous Hawaiian. "People hit first and worse by the climate crisis tend to be Black, indigenous, and low income. Yet we're the keepers of the knowledge of how to build a society that wouldn't cause ecological collapse and societal doom."

A large banyan tree in Old Lahaina marked the place where King Kamehameha's first palace stood. Much of that tree has now been burned in the fires, according to the town's website.

John-Mario Sevilla, 60, grew up in Maui and would often visit Lahaina with his family. He remembers sitting in church there as the ocean breeze blew in the open windows and watching the traditional dancing under the banyan tree.

He acknowledged the fire has likely wiped out many of the places he remembers.

"It's a tragic loss for everyone who lives there and for the whole island," he said. "The whole island will be impacted by it."

As residents begin to process the damage and destruction caused by the fires, Ing said it's critical to consider indigenous communities when making decisions about next steps for the community.

"When native folks are resourced to do this kind of work, it's generally to stop the bad and not necessarily build the good," Ing said. "There needs to be a lot of intention and hard intervention there to make sure that federal resources and philanthropic resources go to support native folks, not to stop acute harm like this, but actually, lead us on the positive path forward."

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Activities

Scheduling a debrief ("hot wash"):

Notify all participants, volunteers, and people who may have had a role or may have insight on the response. Time is critical: it is better to have access to anecdotal data and active and emotional responses sooner than later. Have the debrief conversation in a well-lit, open environment such as a room with lots of windows or air to allow people to

¹⁶ Venkatraman, Sakshi, and Kimmy Yam 2023. "Wildfire decimates Lahaina, once the capital of the Hawaiian Kingdom." NBC News, August 9, 2023. <https://www.nbcnews.com/news/asian-america/wildfire-decimates-lahaina-capital-hawaiian-kingdom-rcna99098>.

feel at ease. Make sure to have tissues or other types of emotional support items and take steps to ensure that mental health is considered since some participants may tend to get emotional during the discussion. Once everyone is reacquainted, the following topics can be discussed:

- Who and what is impacted by this event?
- How were they impacted?
- What, if any, damage was done?
- Who is impacted by these losses?
- Considering what we know, what could be done to reduce future losses of these kinds?
- What resources are essential in case this happens again?
- Who needs to know about what we did and how we responded?

It is important to note that learning the lessons from any climate event that results in loss should be handled very, very carefully to avoid retraumatizing people, and to acknowledge that the immediate aftermath of an event is not necessarily the time to make big or permanent decisions. Instead, emphasize that a debrief is really a time to gather information that will help later decision-making. Do acknowledge that the way people may want to, or even be able to, take part is highly individual and should not be coercive. Give people opportunities to provide feedback anonymously, and by written answers as well as verbally, and in individual as well as group discussions. It is important not to force any issues and not to “over generalize” based on individuals' responses.

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“A number of scientific developments have enabled deeper understanding of climate processes and their responses to human influence. Observational records have lengthened, and new observing systems have come online. New scenarios of socioeconomic development, and their associated emissions and land-use changes, drive updated climate projections from Earth system models. Large ensemble simulations from multiple models have enabled scientists to better distinguish anthropogenic climate change from natural climate variability. More targeted model evaluation techniques are using observations to narrow the estimated range of future climatic changes. Finally, advances in methods for extreme event attribution enabled scientists to estimate the contributions of human influence to some types of individual extreme events in near-real-time.”¹⁷

Citation

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¹⁷ U.S. Global Change Research Program. 2023. “New Data and Analysis Methods Have Advanced Climate Science.” In *Fifth National Climate Assessment: Report-in-Brief*, edited by Crimmins, Allison R., Christopher W. Avery, David R. Easterling, Kenneth E. Kunkel, Brooke C. Stewart, and Thomas K. Maycock, Chapter 3. Washington, DC: USGCRP. <https://nca2023.globalchange.gov/chapter/3/>.