Stemming the Tide

Global Strategies for Sustaining Cultural Heritage through Climate Change

EDITED BY
Rebecca Rushfield

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Foreword

Lonnie G. Bunch III, Secretary of the Smithsonian Institution

The first Secretary of the Smithsonian, Joseph Henry, was fascinated by changing weather patterns. Henry believed that collecting abundant climate data could enable scientists to predict the weather days and weeks ahead of time (what today we call meteorology). In 1848, Henry launched one of the first citizen-science programs in the United States, building a vast network of climate observers to record weather and storm data across continent.

Henry would likely be alarmed by the patterns we see today and the threats they pose. In February 2010, one of the Smithsonian's offsite collections storage facilities collapsed from the heavy weight of snow during one of the most severe winter snow storms in the history of the nation's capital. The destructive winds of the June 2012 derecho caused massive tree damage, multi-day power outages, and collapsed tents at the Smithsonian Folklife Festival on the Mall. Tropical Storm Sandy caused severe flooding at the Smithsonian's George Gustav Heye Center in lower Manhattan in New York City.

The global climate crisis has forced the Smithsonian and other cultural heritage institutions to confront alarming realities. Increasingly frequent severe weather events threaten our collections and our infrastructure. Many of our most hallowed heritage sites, including parts of the National Mall, are endangered by rising sea levels. New global realities threaten the livelihoods, health, and safety of the peoples and nations we serve.

It is time for the cultural sector to act deliberately and decisively. We must capitalize on our long legacy of environmental research and public engagement. We must marshal our resources and mobilize our vast networks to take on the challenge that will define the coming century.

In March, the Smithsonian hosted the Stemming the Tide: Global Strategies for Sustaining Cultural Heritage through Climate Change conference for that purpose. The two-day symposium brought together cultural heritage authorities, managers, and advocates from 25 countries to pursue ambitious strategies to address the climate crisis using engagement and collaboration.

This publication shares the proceedings of that conference. In response to this critical need, we aim to make the robust set of ideas, strategies, and resources from Stemming the Tide more widely available. Museums and cultural institutions have a vital role to play in raising awareness, building collaborative solutions, and mitigating the impacts of climate change. It is my hope that disseminating this information will show how the cultural sector can lead on this issue.

Decades ago, as an undergraduate history major at Howard University, I decided to attend the second Earth Day celebration down on the National Mall with a group of my classmates. I remember that we sat on ground not too far from where the National Museum of African American History and Culture would be built, listening to the Beach Boys perform. A group of white students sat immediately in front of us. During the concert one young woman looked at us quizzically and asked, "Why are you black guys here? This is not a civil rights demonstration." I never forgot that ignorant remark. Not just because it was personally offensive, but because she was so patently wrong.

Climate change is the civil rights issue of the 21st century. It is inextricably linked to racial justice, migration, and fair housing. It touches on economic development and opportunity. And we know that the costs of climate change – like those of the COVID-19 pandemic – are borne disproportionately by low income communities and communities of color, both here and around the globe. It is a reminder that our environmental crisis is complex and far-reaching. The constellation of different challenges it brings together – biodiversity, economics, politics, culture – affects us all.

Addressing an interdisciplinary challenge requires an interdisciplinary approach. That is exactly what makes the cultural heritage sector uniquely suited to lead this charge. We have an opportunity to harness the full strength of our research, programs, education, and convening capacity. This is an opportunity to advance groundbreaking research. To weave sustainable practices into every aspect of our operations. To bring together different constituencies and tell the stories that need to be heard.

As a historian of 19th-century America, I have always been struck by the human capacity for hope, even in the grimmest situations. History teaches us that we can build change even in the face of odds that seem overwhelming. It shows us that change happens when we focus on what works – when we collaborate to find solutions and celebrate our successes.

I see this as one of the most important roles of cultural and heritage institutions. Even as we pursue cutting-edge research, institute new operational practices, and retool our educational capacities, we also have a sacred duty to give hope. We must remind people that there is a way forward; that we can use the lessons of resilience to inspire action and resist fatalism.

This publication invites us to put our heads together and lead the cultural heritage sector in addressing the most pressing issue of our time. I hope you will be as heartened as I am by what you find here. Even in the middle of a crisis, the participants in this symposium are embodying Joseph Henry's spirit: gathering data, applying what they know, and equipping the public with the tools to improve the world now and for the generations that follow.

Acknowledgments

Amber Kerr, Chief of Conservation, Smithsonian American Art Museum/Lunder Conservation Center
William G. Tompkins, Director, National Collections Program, Smithsonian Institution

It took many individuals working together to coordinate, organize, and implement a symposium of this scope and complexity. We are indebted to the people who gave of their time and effort, and we recognize that the success of this event would never have been achieved without their contributions.

The objective of the symposium was to empower cultural heritage authorities, managers, and advocates to pursue more ambitious engagement with, and collaborative approaches to, the climate crisis. With 250 registrants and 1,100 live web stream viewers representing 33 states and 25 countries ranging from the United Kingdom, Spain, and Greece to Canada, Mexico, and Trinidad and Tobago, the conference examined the impact of climate change on cultural heritage and communities worldwide, discussed the responsibilities of stewards of cultural heritage in fostering collaborative solutions, addressed urgent questions of equity and inclusion, and identified strategies that leverage cultural heritage for climate action.

The organizing and advisory committees included representatives from national and international organizations in the cultural heritage field, independent consultants, and various personnel from Smithsonian Institution (SI) units. We extend to them our deepest appreciation for their counsel and guidance in establishing the goals of the symposium, contributing to its programming structure, and participating in the selection of invited speakers and moderators. These individuals include Eryl Wentworth and Eric Pourchot, representatives from the American Institute for Conservation (AIC); Rebecca Rushfield for the International Institute for Conservation (IIC); Andrew Potts for the International Council on Monuments and Sites (ICOMOS); and staff from the Smithsonian Institution – Laura Hoffman, Smithsonian American Art Museum (SAAM); Robert Koestler and Dawn Rogala, Museum Conservation Institute (MCI); William Tompkins and Amelia Kile, National Collections Program (NCP); and Catherine Hawks, National Museum of Natural History (NMNH). Other advisors to the organizing committee during the planning stages included SI representatives Carol Butler, Pierre Comizzoli, Alise Fisher, Amy Marino, Scott Miller, and Elizabeth Tunick, as well as outside consultants on climate action Sam Bickersteth, Jenny Newell, and Henry McGhie.

The successful planning, implementation, and coordination of the symposium's programming was carried on the shoulders of two key individuals, Laura Hoffman and Amelia Kile.

They worked tirelessly to maintain communications, keep us on task, and coordinate all the logistics involved with hosting a multi-venue event involving a multitude of volunteers, administrators, speakers, moderators, and staff. And they made it all seem effortless. We are deeply appreciative of their dedication and hard work.

The opening reception for the symposium, with welcoming remarks from Carol Butler, NMNH Assistant Director of Collections, and Stephanie Stebich, The Margaret and Terry Stent Director for the Smithsonian American Art Museum and Renwick Gallery was generously hosted by Kirk Johnson, Sant Director at the National Museum of Natural History. We express our appreciation to them for providing a warm welcome and acknowledge the logistical support of coordinating staff Sam Nystrom and Tina Karl and photographer Michael Barnes.

The measurement of success for any symposium is inextricably linked to the quality of the presentations. We feel most fortunate that the speakers on the first-day's roster not only met the challenges of representing their subject matter to a diverse audience, but did so in an engaging and informative way that inspired and motivated the attendees to actively participate in the discussion groups on the second day. We extend our gratitude to Scott Miller, SI Deputy Under Secretary for Collections and Interdisciplinary Support for his opening remarks and to Andrew Potts for moderating the symposium and introducing the speakers throughout the day.

We extend special recognition to our opening and closing keynote speakers, Ken Kimmel, President of the Union of Concerned Scientists, and Alison Tickell, Founder and Director of Julia's Bicycle. As the opening keynote speaker, Ken provided the scientific foundation for the event. Alison's conclusion to the day's program provided the bridge into the cultural heritage sector and climate action initiatives. The subject matter specialists – Carl Elefante, Nicole Heller, Victoria Herrmann, Isabel Rivera-Collazo, Ashley Robbins Wilson, and Janene Yazzie – representing each of six cultural heritage sectors, were instructive and thought-provoking. We thank them for their participation and their contributions to this publication.

The engaging format of the second day's breakout sessions was due to the consultation and creative implementation of the session moderators: Jean Carroon, Henry McGhie, Jenny Newell, Erin Seekamp, Sarah Sutton, and Meredith Wiggins. Their work was supported by the hosting SI unit representatives and site coordinators: Dave Walker and Meredith Holmgren from the Center for Folklife & Cultural Heritage (CFCH); Danielle Bennett, Antonietta Catanzariti, Christina Elliott, and Lisa Fthenakis from the Freer Gallery of Art and Arthur M. Sackler Gallery (FSGA); Robert Horton, Timothy Nolan, and Jeffrey Stine from the National Museum of American History (NMAH); Cara Fama, Mary Fox, and Kelly McHugh from the National Museum of the American Indian (NMAI); Carol Butler, Kelsey Falquero, William Fitzhugh, and Cailin Meyer from the National Museum of Natural History (NMNH); and Laura Hoffman and Ariel O'Connor from the Smithsonian American Art Museum (SAAM).

The symposium concluded with the public program, "Heritage at Risk: A Dialogue on the Effects of Climate Change," attended by more than 125 people. Moderated by Julian Bickersteth, President of the International Institute of Conservation of Historic and Artistic Works, the program panel of six specialists in the field of cultural heritage included Anthea Hartig, the

Elizabeth MacMillan Director of the National Museum of American History; Alison Tickell, Director of Julie's Bicycle; Nora Lockshin, SI Archives Senior Conservator; Julianne Polanco, California State Parks Historic Preservation Officer; Andrew Potts, ICOMOS Coordinator for Climate and Heritage Working Group; and Sarah Sutton, Principal, Sustainable Museums. All of them graciously shared their knowledge and experience in the open dialogue format of questions from a public audience.

With gratitude for their collaboration and support, we extend our appreciation to the SI staff members across the Institution who contributed to the programming and administration of the symposium: Erin Chapman and Ruth Anna Stolk from Earth Optimism; Katie Desmond, KJ Jacks, and Sam Nystrom from the Office of Special Events and Protocol; Provost John Davis; Senior Program Officer Amy Marino; and Greg Bettwy, LeShawn Burrell-Jones, and Natalia Rawls from the Secretary's Office.

Recognizing the urgency and relevance of this topic, SAAM's Director, Stephanie Stebich, supported this event from its conception, providing the host venue and dedicating the resources and staffing needed to make it happen. We acknowledge SAAM staff contributions by: Kelly DeFilippis, Krista Duncan, Kate Earnest, Amelia Goerlitz, Casey Magrys, Nathaniel Phillips, Donna Rim, Doug Wilde, DeeDee Walker; the work of the EADS team: Laura Baptiste, Gloria Kenyon, Kayleigh Bryant-Greenwell, Amy Fox, Amy Hutchins, Kari Jones, Carlos Parada, Ashley Reese, Sara Snyder, Libby Weiler; the editorial review of Theresa Slowik, and the curatorial advice of Virginia Mecklenburg and Eleanor Harvey.

The symposium presentations as well as the dialogue event were live-streamed on the web, posted on social media, and archived on YouTube. This essential outreach was coordinated by a cast of digital media and audio visual specialists to whom we offer special thanks for their collaboration: Jarold Acosta, Time Alves, Erin Balsco, Marc Bretzfelder, Dan Dockter, Dana Dominguerz, Bryan Ferreira, Jake Fisher, Damian Gessner, Eric Green, Cal Holderbaum, Cat Kutz, and Willy Prost.

A remarkable network of volunteers held the entire framework of the event together both in the preparatory stages and behind the scenes as it took place. Indebted to them for their enthusiasm and service, we express our gratitude to: Leah Bright, Christina Finlayson, Dan Finn, Ram Jacobson, Saki Kunikata, Melissa King, Cheyenne Laux, Katelin Lee, Shu-Wen Lin, Casey Magrys, Gwen Manthey, Catherine Maynor, Melissa Miller, Bonnie Naugle, Shannon Nortz, Miguel Resendiz, Celine Romano, Sarah Saetren, Samantha Snell, Allaire Stritzinger, Keara Teeter, and Jessica Lee Unger.

This publication has come to fruition substantially due to the oversight and editorial contributions of Rebecca Rushfield. She coordinated with the authors, provided guidance, responded to requests, and worked through all the challenges set before her to keep its submission on time. For their collaborative work, we thank Geneva Griswold, Wendy Jessup, Thomas M. Lahiff, and Jerry Podany. In addition, we thank Sarah Beah Jacobson and David Haddock in the Smithsonian's Office of Public Affairs for their writing assistance. We also wish to recognize the editorial and publishing guidance of Ginger Minkiewicz, Director of the Smithsonian

Institution Scholarly Press (SISP) who advocated on our behalf to expedite the publication of this material within a year of the event in an open-access format that will make it available to a broad audience of cultural heritage professionals.

Finally, we want to convey our sincerest gratitude to Secretary Lonnie G. Bunch III for his inspiring foreword to this publication and his words of hope, encouragement, and call for action. He urges the cultural heritage sector to take a leading role to combat the climate crisis as new global realities threaten our institutions, our heritage, and the communities we serve. We are very grateful for Secretary Bunch's leadership, vision, and advocacy.

We hope the information in this publication will provide a framework from which the Smithsonian and other cultural organizations around the world will consider future national and international programming and new collaborative partnerships toward greater sustainability of cultural heritage and the global environment. We acknowledge the collaborative participation of the attendees in the symposium and breakout sessions and that of our readers, as we need all perspectives to enact meaningful changes.

SAAM Smithsonian American Art Museum
Lunder Conservation Center

Smithsonian
National Collections Program

The "Stemming the Tide: Global Strategies for Sustaining Cultural Heritage through Climate Change" symposium was made possible with support from the Smithsonian American Art Museum, the Smithsonian's National Collections Program, and a Provost's One Smithsonian Symposia award. Collaborative support for the program planning and breakout sessions was provided by the American Institute for Conservation (AIC), the International Council on Museums and Sites (ICOMOS), the International Institute for Conservation (IIC), the National Museum of American History (NMAH), the National Museum of Asian Art (NMAA), the National Museum of the American Indian (NMAI), the National Museum of Natural History (NMNH), Smithsonian Earth Optimism, and the Smithsonian Center for Folklife and Cultural Heritage.

Opening Keynote Address – The Importance of Place and Heritage in Achieving Climate Solutions

Ken Kimmell, President, Union of Concerned Scientists
Adam Markham, Deputy Director of the Climate & Energy Program, Union of Concerned Scientists

Introduction

Love of place can generate the energy we need to face the gigantic challenge of climate change. Many years before I came to the Union of Concerned Scientists (UCS), I was an environmental and land use attorney and I frequently represented groups who were trying to preserve land or important buildings. In my very first case I represented the opponents of a proposal to build a massive garbage landfill in an almost pristine forest. It was land atop Webster Lake, known by the Nipmuc People as *Char-gogg-a-gogg-man-chaugg-a-gogg-chau-bun-a-gun-ga-maugg*, that had been used by Native Americans for thousands of years

My client, an old mill town bordering the landfill site, had little money or political resources. The battle lasted for thirteen years. No matter how hard we fought, the developer just kept coming back threatening to destroy this ecologically and culturally important place.

I used to have nightmares that the developer was the Terminator – the movie cyborg played by Arnold Schwarzenegger – who kept coming back no matter what one did. Well that fight is long in the rear-view mirror for me and what gives me nightmares now is climate change. When it comes to threats to the places we love, climate change is the true Terminator.

The Rapid Pace of Climate Change

The climate is changing rapidly, primarily as a result of the burning of fossil fuels – coal, oil and natural gas – and the destruction of natural ecosystems, such as forests, that absorb carbon dioxide (CO_2). January 2020 was the warmest January on record. 2019 was the second hottest year since record keeping began. And the last decade was the warmest ever (NOAA, 2019). Sea levels are rising, putting lives and billions of dollars of coastal property at risk. And extreme precipitation and storm events are becoming more common.

Climate change is the ultimate threat multiplier. For example, Hurricane Michael which hit the Florida Panhandle in 2018 was its first ever category 5 hurricane. It was intensified by ocean temperatures that were 3.6 degrees Fahrenheit (2 degrees Celsius) warmer than the historical average, and it caused damage totaling $18.4 billion in Florida alone. Driven by hotter, drier conditions, wildfires are also dramatically worsening and causing catastrophic losses to communities, natural ecosystems and heritage sites (Figure 1). Glaciers around the world are

FIGURE 1. The 2013 Alder Fire in Yellowstone National Park. As conditions become warmer and drier, the fire season in the western United States has become several weeks longer than in the 1970s, and larger, more intense fires are increasingly frequent. Photo by Mike Lewelling/National Park Service.

melting (Bosson et al., 2018) and coral reefs including the Great Barrier Reef of Australia are in danger of being lost because of coral bleaching caused by warming oceans (Heron et al., 2018).

Climate Threats to Heritage

In 2012, Hurricane Sandy came as a wake-up call to many in the United States. It devastated communities on the New Jersey and New York coasts, also severely damaging the historic sites at Ellis Island and Liberty Island (DOI, 2019). In response to the heritage threat laid bare by Hurricane Sandy, the Union of Concerned Scientists (UCS) published *Landmarks at Risk* to draw national attention to the threat climate change poses to U.S. historic sites (Holtz et al., 2014). The report included case studies of thirty historic places. Two years later, the UCS jointly published, with UNESCO, *World Heritage and Tourism in Changing Climate*, which highlighted the climate vulnerability of thirty-one iconic World Heritage sites across the globe (Markham et al., 2016) (Figure 2).

Today it is recognized that climate change is the fastest growing threat to cultural heritage globally. Sea level rise, together with more extreme storms is causing flooding and erosion damage to vulnerable coasts throughout the world. A 2019 study of Mediterranean World Heritage sites showed that forty-two of the forty-nine sites, including the Roman remains at Arles in the South of France, and the Greek Island of Delos, mythical birthplace of Apollo, are already at risk of coastal inundation or erosion (Reiman et al., 2019). Thawing permafrost and warming soil temperatures threaten an incredible 180,000 known archaeological sites in the Arctic (Holleson et al., 2019) (Figure 3). Wildfires have been become larger and more intense,

FIGURE 2. A "Great House" at Chaco Canyon, New Mexico. The World Heritage site stands at the center of a cultural landscape at risk from climate change and oil and gas developments. Photo by Adam Markham.

FIGURE 3. A 2016 photo of the remains of a large Inuvialuit house on the Tuktoyaktuk Peninsula on Canada's Beaufort Sea coast, which has since been completely washed away. Many Arctic archaeological sites are being lost to sea level rise and coastal erosion. Photo by Max Friesen.

destroying indigenous cultural resources, historic buildings and archaeological sites from Australia to California.

Every imaginable type of cultural site is under threat from climate change—not only historic buildings and archaeological sites, but also museums, libraries, complex cultural landscapes and historic gardens. Intangible heritage including indigenous knowledge and traditions linked to the seasons are at risk too (ICOMOS, 2019).

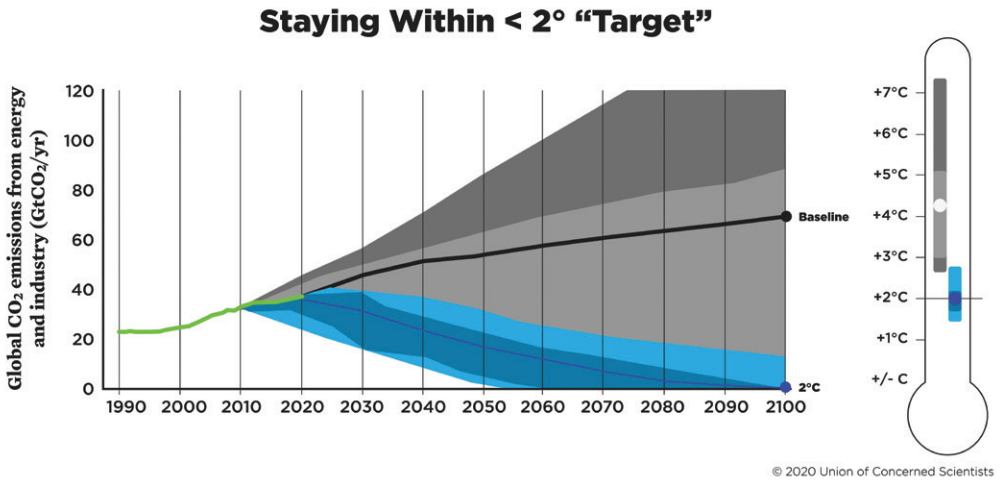

FIGURE 4. Scenarios for global carbon dioxide emissions from energy and industry in gigatons CO_2. The above 2 degrees Celsius baseline represents the average of 56 models. Likely global temperature ranges are depicted to the right. Most pathways for staying below 2°C would require negative emissions. The green line shows historical global annual greenhouse gas emissions from fossil fuel and industry. Sources: Friedlingstein et al., 2019; Huppmann et al., 2018; IPCC, 2018. Image © Union of Concerned Scientists.

Finding Solutions

The 2015 Paris Climate Agreement set a science-based target of "holding the increase in the global average temperatures to well below 2 degrees C and pursuing efforts to limit the temperature increase to 1.5C" (UNFCCC, 2015). Globally, we are now at about 1 degree C above pre-industrial levels, so time is running short.

The Paris Agreement also included individual pledges from virtually every country in the world. These national commitments help to bring temperature increase down, but they don't get us to two degrees C (Figure 4). As the recent report of the Intergovernmental Panel on Climate Change (IPCC) makes clear, two degrees is not the objective. It is a guardrail marking the beginning of a danger zone – a world we would not wish to leave for future generations (IPCC, 2018).

We have a long way to go in a short amount of time. How far do we need to go and how quickly? The best scientists have answered that question with: "Net zero by mid century". (Figure 5) Net zero means that we get our emissions close to zero by dramatically cutting down on burning oil, gas and coal, and use both natural systems and human-created technologies to absorb or remove the rest of the carbon that is emitted.

Achieving the Net Zero Vision

To get to net zero, we need to think about the process as a bridge across a vast body of water, designed and carefully constructed so that it gets us from where we are now to where we want to be. Unfortunately, what we've been doing so far is more akin to haphazardly laying stepping-stones and hoping they will get us to the other side. For example, coal plants have been closed and replaced with natural gas pipelines. Natural gas is a stepping stone because it is cleaner than

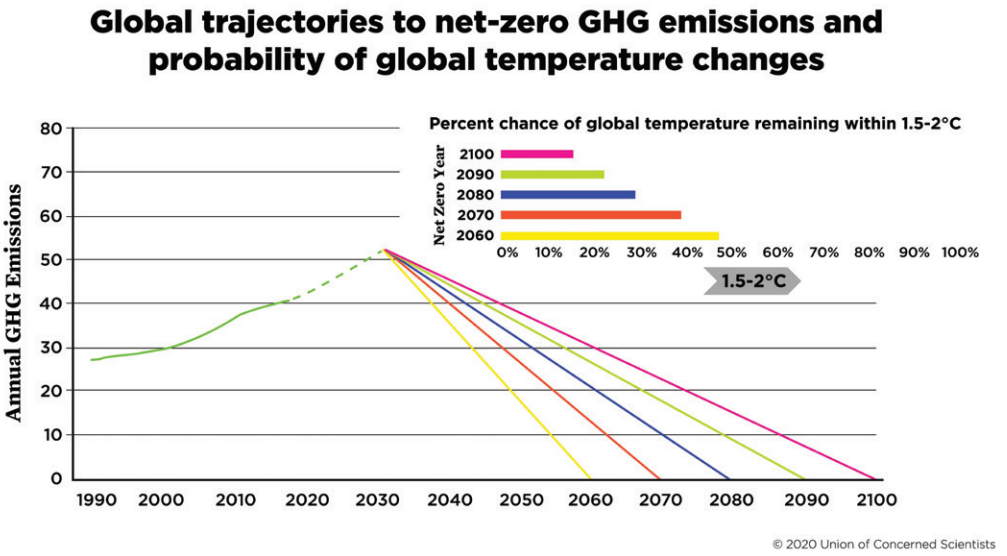

FIGURE 5. The later net zero emissions occur, the lower the chance for global temperature remaining within 1.5 to 2 degrees Celsius. The green line is global annual greenhouse gas emissions from fossil fuel and industry plus land-use change emissions in gigatons carbon dioxide equivalent. Sources: Friedlingstein et al., 2019; IPCC, 2018. Image © Union of Concerned Scientists.

coal and brings us closer to where we need to be, but natural gas won't get us to net zero. We need a bridge and not a series of stepping stones. That bridge has five parts: energy efficiency, carbon free electricity, electrifying end uses, carbon removal, and non CO_2 gases.

Energy Efficiency

In whatever form it is used, energy must be as efficient as possible. Many small energy efficient actions can collectively add up to huge savings, whether these actions be switching to LED light bulbs or constructing new buildings that use no net energy over the course of a year because they are well insulated, incorporate natural light, and have solar panels. There should be appliance standards, so that refrigerators, air conditioners and boilers use significantly less energy. Stronger fuel efficiency standards for non-electric cars and trucks will allow them to travel much farther on every gallon of gas.

Some remarkable progress has been made in the United States where economic growth has already been decoupled from energy use (Figure 6). Working toward energy efficiency will save money (as anyone who has insulated their house or bought a new efficient boiler knows) and will help employment as house weatherization or school and factory insulation cannot be outsourced to workers in another country.

Carbon Free Electricity

The second part of the bridge is carbon-free electricity. The U.S. is about 40% of the way there, but it must reach 100% no later than 2050 – and preferably earlier. To achieve this will require

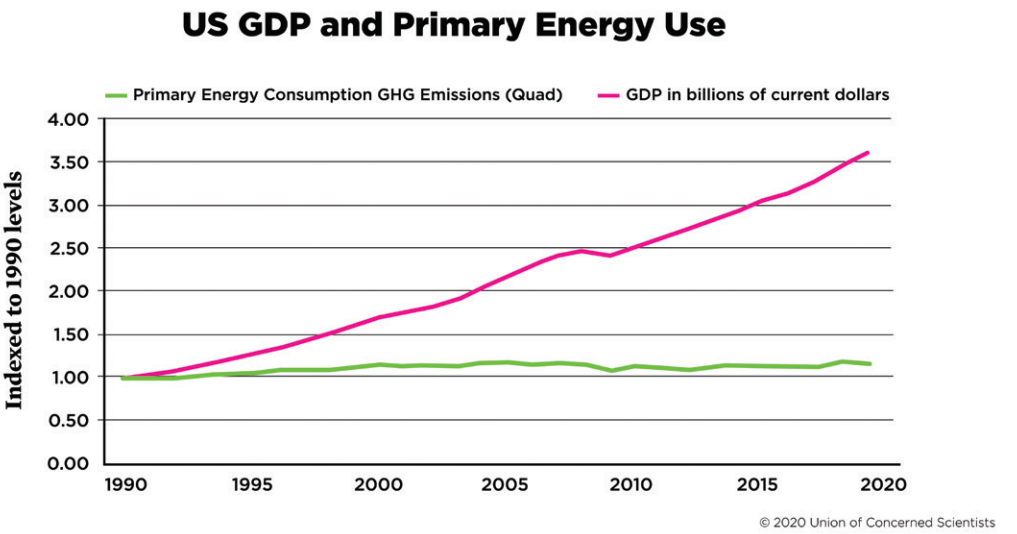

FIGURE 6. Over the past 30 years, the U.S. economy has become more energy efficient and productive, using significantly less energy per dollar of Gross Domestic Product (GDP). Since 1990, the U.S. economy has more than tripled while primary energy use has grown by only 20%. Sources: Energy Information Administration (https://www.eia.gov/totalenergy/data/browser/?tbl=T01.01#/?f=A&start=1990&end=2019&charted=4-6-7-14); U.S. Department of Commerce, Bureau of Economic Analysis. Image © Union of Concerned Scientists.

some combination of the following: a massive increase in renewable forms of energy (solar, wind, hydroelectric) along with new energy storage capabilities, the existing fleet of nuclear power plants (expanding it if it is safe and cost effective to do so), and, if there is a technology breakthrough, natural gas combined with new technologies that capture the carbon emissions at the source.

Progress is being made. (Figure 7) Renewables now provide close to 20% of the total U.S. electric supply, having doubled between 2008 and 2018 (EIA 2019). Many states have adopted 100% clean energy standards, and in many parts of the country solar and wind are now at cost parity with other sources of generation.

This is about accelerating this trend. This can be achieved with a price on carbon, a national clean energy standard that requires utilities to purchase ever higher percentages of carbon free electricity, research and development to lower the costs and improve the duration of energy storage, tax credits for carbon free power sources, and federal investments in a modern grid infrastructure which would include transmission lines to deliver electricity from offshore wind and onshore wind and solar panels in remote locations.

Electrify End Uses

The third part of the bridge follows from the second. Once fossil fuels are no longer part of electric generation, just about everything can be run on electricity. The best example of this is the electrification of cars, trucks and buses, a key imperative as the transportation sector is now the largest source of U.S. greenhouse gas emissions and one of the biggest sources globally.

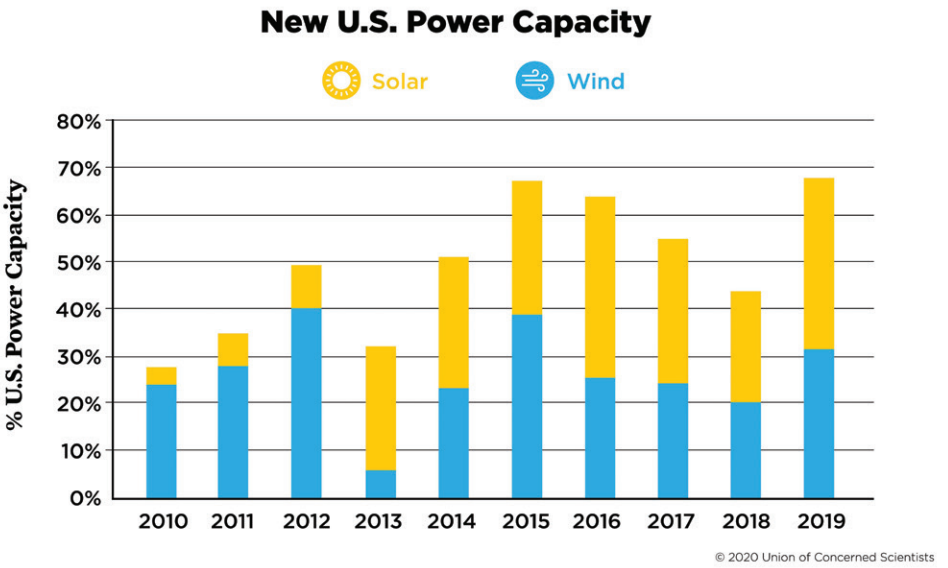

FIGURE 7. Over the past decade, wind and solar power have been growing rapidly, providing more than half of all new electric generating capacity in the United States and reaching a record 69% in 2019. During this time, the cost of wind and solar has fallen by more than 70%, making them competitive with or cheaper than electricity generation from natural gas and coal in many parts of the country. Sources: Data for 2019 based on AWEA, Wind Powers America Annual Report 2019 (https://www.awea.org/resources/publications-and-reports/market-reports), SEIA, Solar Energy Research Data (https://www.seia.org/solar-industry-research-data), and Energy Information Administration, Form 860 data (https://www.eia.gov/electricity/data/eia860m/). Image © Union of Concerned Scientists.

Electric cars with one-charge ranges of 250 miles are already on the market and the technology is improving rapidly – so much so, that many carmakers see electric vehicles as the future. The same is true for electric trucks and buses.

Vehicle electrification is not primarily a technology problem. The issues are cost and convenience (Figure 8). We need a public- private partnership to dramatically lower the cost of batteries. In the meantime, incentives, including rebates and tax credits are needed – especially for people on low or moderate incomes (so that they can afford these cars). A ubiquitous network of very fast charging stations in public places will be needed for the about half of the public that does not have easy access to home charging;

Carbon Removal

The fourth section of the bridge is carbon dioxide removal (CDR). No matter how effectively we cut emissions, we will still have to remove carbon from the atmosphere, because there are some sectors, such as air travel and cement manufacture where it will likely be a long-time before a zero-carbon solution is found. We can divide CDR between natural methods and technology-based ones.

Trees absorb and utilize carbon dioxide through the process of photosynthesis and they provide the biggest natural solution in the CDR toolbox. Existing forests in the U.S. offset about 10% of annual emissions, and we have been reforesting about 1 million acres per year since

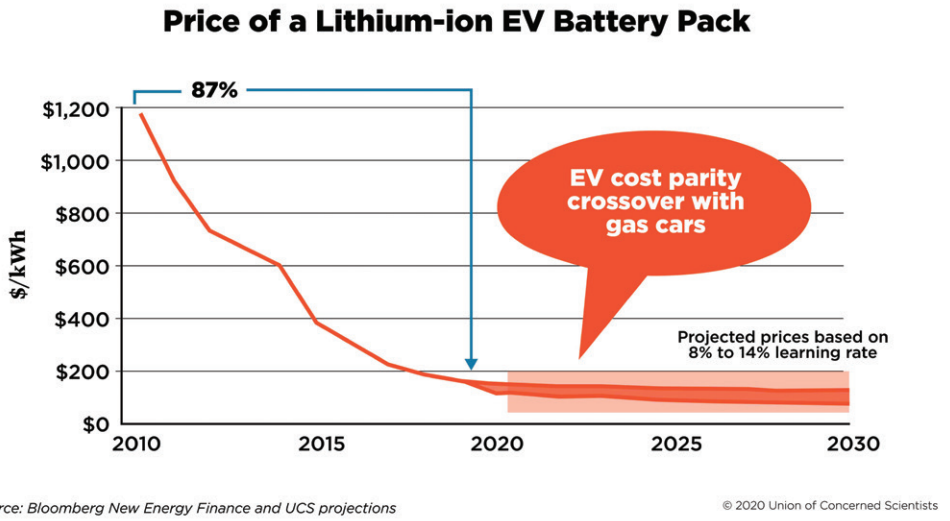

FIGURE 8. Electric vehicle battery pack prices have dropped more than 85% over the past decade. Price parity between gasoline and electric vehicles is anticipated over the next decade with continued learning but is dependent upon vehicle range and vehicle type. Image © Union of Concerned Scientists.

1987. Some estimate that if reforestation and afforestation (introducing trees to areas previously without forests) were increased by two or three times that number, about 45% of emissions could be offset by 2050.

There are other natural ways of removing carbon dioxide from the air. Coastal wetlands, especially mangrove forests and seagrass beds, can absorb prodigious amounts of carbon, so restoring and protecting these vital habitats could be crucial. We can also increase the amount of carbon stored in agricultural croplands and soils using techniques that will also make our soils more productive and cut down on other forms of pollution from agriculture. Unfortunately, forests worldwide are being destroyed at an alarming rate, so the first priority is to preserve existing forests. However, there are also opportunities for reforestation and afforestation in many other countries.

The scale of the climate problem is so big that forests alone can't handle it. Technology to remove carbon dioxide from the air and store or re-use it must be invented. That will require us to think differently and look at carbon dioxide not as a waste product, but as resource. We need ambition of the kind that allowed us to put a person on the moon. What is required is a worldwide project funded by the wealthy countries and a global system of governance that insures that the technology is safe and is available for all.

Non CO_2 Gases

CO_2 is not the only gas of concern. The fifth element of the net-zero bridge requires controlling non-CO_2 greenhouse gases. Non-carbon dioxide greenhouse gases such as the methane that escapes from oil and gas wells and farm operations, and the hydrofluorocarbons (HFCs) used in air conditioning and refrigeration are very dangerous gases because they trap much more heat

than CO_2 in the short-term. The long-term goal of getting CO_2 to net zero is much more difficult if these short-lived gases are permitted to escape and raise the temperature.

Fortunately, there are answers for many of these gases. For methane emissions, new remote sensing technologies can detect pipeline leaks, and lowering emissions is now largely a matter of effective monitoring and good maintenance. In terms of HFCs, as global temperatures rise, demand for air conditioning and refrigeration is likely to ramp-up significantly – articularly in less developed countries. Fortunately, there are substitutes for HFCs and in 2016 a world-wide agreement was made to a phase out their use (https://www.epa.gov/ozone-layer-protection/recent-international-developments-under-montreal-protocol#:~:text=On%20October%2015%2C%202016%2C%20with,over%20the%20next%2030%20years). This on its own could lower temperatures by half a degree Celsius.

Those are actions that will get us from being a planet on the brink of a devastating cycle of floods, fires, droughts, and heat waves to a safer world that we can pass on to our children and grandchildren.

How the Heritage Community Can Help

Heritage community leaders and climate scientists can work together to bring this about. Helen Keller said, "Science may have found a cure for most evils; but it has found no remedy for the worst of them all – the apathy of human beings." The heritage community is anything but apathetic. It has s a sense of urgency that can be seen in calls for action on climate change and cultural heritage (UCS, 2014; Markham et al., 2016; ICOMOS, 2019), in the innovative programs that museums, heritage agencies and institutions are developing, and in the growing array of climate initiatives and mobilizations such as the October 2019 launch of the international Climate Heritage Network. (Figure 9)

UCS has worked to support these initiatives by helping to bring the best climate science and climate policy experts to share the table with the cultural heritage community. For example, it worked with the new Climate Change and Heritage Working Group of the International Council for Monuments and Sites (ICOMOS), to help draft the ground-breaking "*Future of our Pasts*" report on engaging cultural heritage in climate action (ICOMOS, 2019).

It is also working with colleagues at James Cook University in Australia to help develop the Climate Vulnerability Index (CVI), a new rapid assessment methodology designed specifically for World Heritage Sites (Day et al., 2020). This has been tested at the Heart of Neolithic Orkney World Heritage property in Scotland (Figure 10), and our team is planning similar pilot projects in Norway, Tanzania and the United States to work with site managers and stakeholders to undertake a CVI assessment of climate risk.

Afterword

But more than this – much more than this – is needed. I want to tell the end of the story of the Douglas landfill. During this years-long battle, this David vs. Goliath fight before administrative agencies, courts, and the legislature, the town never gave up. It never lost sight of the fact that

FIGURE 9. Kilwa Kisiwani World Heritage site in Tanzania was listed by UNESCO for its importance in the growth of Swahili culture, Indian Ocean trade from Medieval times, and the establishment of Islam in East Africa. It is now threatened by sea level rise and coastal erosion, and its site managers have joined the international Climate Heritage Network to highlight the urgent climate threats and support global solutions. Photo by Will Megarry.

FIGURE 10. Skara Brae in the Orkney islands of Scotland is one of the best preserved Stone Age settlements in Northern Europe, but it is at high risk of damage from increasingly severe winter storms and coastal erosion. Photo by Adam Markham.

democracy was its ally. Residents marched on the Statehouse again and again, creating such a presence that both gubernatorial candidates at that time pledged to protect the land. Eventually, the Commonwealth of Massachusetts took the land by eminent domain and made it part of a state forest. No landfill was ever built there.

A tiny community, so determined to save its beloved place from destruction rose up and for thirteen years never let go. Its residents built power. They organized, they mobilized, and they prevailed in the end. What this demonstrates is that when places people love and cherish are threatened, local communities bring a passion, tenacity and energy that is almost unknown in politics and activism. They do whatever it takes to defeat the Terminator.

Passion, tenacity and energy are needed to take on climate change. It is our challenge to figure out how to harness that passion at all levels of the heritage movement – the love of place, love of culture and heritage, and the love of history – and deploy it on a global scale. Engagement and the skills, resources, and passion we bring can make all the difference in the climate fight. It must be done now, because one thing we are learning the hard way: Time is the most precious commodity of all – and we are running out of it.

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Cultural Landscapes and Historic Urban Landscapes: Planning for Climate Impacts on Communities

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Introduction

The U.S. National Trust for Historic Preservation has been promoting sustainable heritage since its founding days in the 1950s. Birthed into a culture of environmentalism, its preservation goals have remained remarkably consistent over the last seventy years: preserve places that matter, conserve resources, and improve the urban environment (Figure 1). Each passing decade ushered in prevailing initiatives such as the National Main Street Center (1970s), anti-sprawl and urban blight (1980s), and underappreciated heritage recognition (2010s). In this century, social justice and climate resilience are the resounding issues facing our nation and the historic preservation field.

As 40% of greenhouse gas emissions can be attributed to carbon produced by building construction and everyday use (AIA, 2019), the new construction industry has prioritized product sustainability and energy reduction, while those of us that steward the built environment have felt assured that maintenance and reuse is inherently part of the climate solution. We are sustainers. Our mission is the opposite of waste. Yet as the future darkens under ominous climate predications, cultural organizations are discussing how we can make climate action a top priority. We recognize that conservation of land, reduction of waste and reuse of existing buildings is a large part of the solution to create a balanced relationship with the earth. This environmental sensibility was obvious to the patriarch of the professional preservation field, James Marston Fitch, who wrote in *American Building* more than seventy years ago:

> The scale and complexity of such ecological problems may outrun the comprehension, not to say the professional jurisdiction of the average architect. And yet he is an active party of the whole process . . . . Each time he provides a parking space for another auto, each time he cuts down a tree, or replaces a square yard of turf with one of blacktop, or installs a heating plant burning fossil fuels, so each time he modifies the microclimate in which his building stands, sooner or later, he must face the consequences of his acts, if not as an architect, than certainly as a citizen.

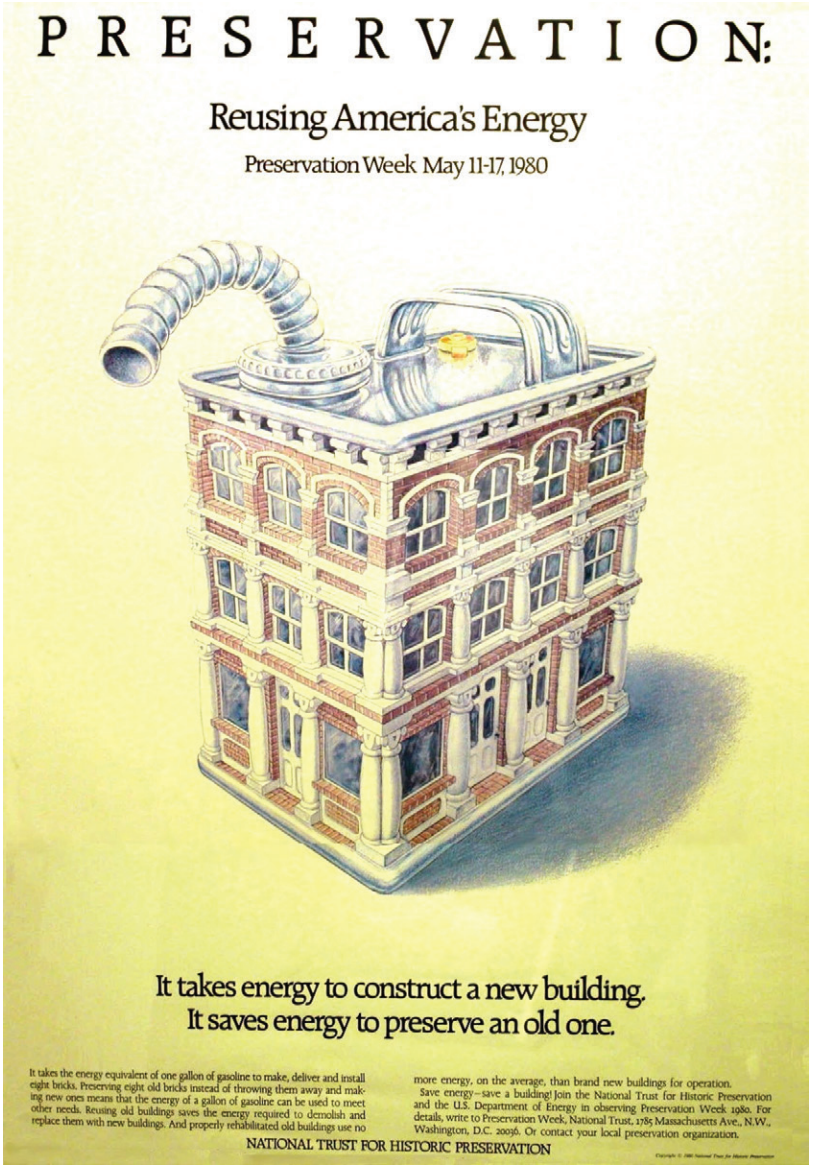

FIGURE 1. Poster for Preservation Week in May 1980. © National Trust for Historic Preservation.

Fitch, and many others, described the unavoidable consequences of carelessly manipulating the environment. Decades later, this conversation is finally at the forefront. Preservationists are faced with responding to a more destructive natural world. To achieve physical resilience, many interconnected solutions in the social, scientific, and economic realms must occur. This heavy lift is further complicated because the exact effects of climate change are unpredictable (De Monchaux, 2016). Though much of this work is beyond our expertise, preservation professions are creating agency for climate action. The convening of the March 2020 *Stemming the Tide* symposium demonstrates that cultural institutions are setting ambitious goals and altering

policy to nurture collective progress. With the places we steward, the stories we tell, the dialogues we have, the art we display, we will shape culture and accelerate climate solutions.

Changing Landscapes at Historic Sites

The National Trust stewards forty-three hundred acres of landscapes nationwide that include over three hundred structures and encompass two hundred seventy years of architectural history. While this is a small collection in comparison with the National Park Service or the UK National Trust, these sites prove to be nimble testing grounds for innovative preservation. They allow the Trust to broadcast efforts and offer an exchange of ideas by publicly presenting our struggles and successes.

Farnsworth House, the modernist icon, part of the National Trust portfolio ignited healthy discourse within the preservation field about acceptable standards for flood mitigation. Designed by Ludwig Mies van der Rohe (1945–51), the Farnsworth House is an hour southwest of Chicago on the banks of the Fox River. The site increasingly floods and the house is often inundated with water, making good stewardship nearly impossible (Figure 2). The National Trust studied the hydrology of the site and many potential solutions (relocation, elevation, lifting, flood proofing, buoyant systems, and barrier systems), creating case-study materials and establishing a methodology for pursuing interventions for buildings that are threatened by the

FIGURE 2. Flooding at the Farnsworth House in Plano, Illinois. Photo by Scott Mehaffey, © National Trust for Historic Preservation.

natural environment. While the Trust was studying how to save this house from floodwaters, it became apparent that all viable options required dramatic change, creating opposition.

The preferred solution, a hydraulic lift,[1] raises the structure during flooding, allowing Farnsworth House to remain on its original site. The lifting equipment is hidden below ground in a new "basement" allowing the visitor experience to be the same when the site is dry. When the river water threatens the building, the lift will be employed, elevating the modernist masterpiece out of harm's way. While the hydraulic lift was the only solution that met the selection criteria[2], critics argued that, despite not being visible, the solution compromised the original. As taking no action will eventually ruin the building, the National Trust is pushing forward, but the controversy hampered fundraising preventing immediate implementation.

Since this preservation "controversy" first hit the media in 2015, the nation has experienced more flooding and climate risk, and response is more widely accepted. Hopefully, the once-controversial hydraulic solution will seem less radical to funders. To defend against environmental or other types of uncontrollable changes, preservationists must adapt to preserve the quality and character of a place – not just the physical materiality. Otherwise some of the greatest places in the world will be lost.

During the public vetting process for flood solutions, another conversation emerged about the conflict between a narrow Period-of-Significance and the need to adaptively interpret the property in a changing social environment. At Farnsworth, the Period-of-Significance listed on the National Historic Landmark is 1951 – the end date of construction. This subverts the physical changes and storylines that occurred during the twenty years of Edith Farnsworth's occupancy, thirty years of Peter Palumbo's ownership, and seventy years of managing the relationship between the house and the river. While the iconic ultra-minimalist design is of primary importance, the other storylines attribute compelling cultural value to the property and need to be equally considered when evaluating interventions. A pluralistic view of history gives historic sites richer and deeper connection points to modern society.

The Tidal Basin in Washington, D.C. is a commemorative public landscape used for recreation and cherished for the picturesque beauty of monuments, water, and cherry trees. Erected on filled tidal wetlands, the basin consistently floods, destroying the infrastructure and functionality (Figure 3). The Ideas Lab was created to tease out innovative approaches that stretch existing notions of permanence. Because of climate disasters, preservation can no longer be limited to saving exactly what we inherited. Many important places will be transfigured and reinvented. By welcoming provocation to test the policies that we previously enacted, preservationists will create new rules for new circumstances, and the places we safeguard will thrive, albeit differently.

The Farnsworth House and the Tidal Basin represent small scale projects that are exploring preservation values in the face of change. At the macro scale of cities, communities, and parks, the solutions will take even longer as many sectors must be engaged. The rest of this paper touches on a just a few of the environmental and social innovations underway that are having a positive effect on the climate.

FIGURE 3. Flooding at the Tidal Basin in Washington, D.C. Photo by Sam Krittner, © National Trust for Historic Preservation.

Regionalism

Historic and vernacular places offer relevant lessons for sustainable design. Architectural and urbanistic devices were designed to modify the impacts of environmental forces. Old buildings, and effective new ones, anticipate the path of the sun, prevailing breezes, and patterns of precipitation. Functional features such as operable windows, wide hallways, plenty of daylight, cisterns, loggias, and courtyards contribute to environmental fitness. Historic structures capitalize on local resources and create site specific design. By doing so, historic buildings have proven their adaptability, accommodating new uses and occupants many times over. They are built to last, built to change, and built suited to the surrounding environment – that is if the environment doesn't dramatically change as illustrated in the case-studies.

Livable neighborhoods provide examples of successful urbanism and ecologic design. They are built at a human scale with walkable streets, accessible community centers, and designated parks, which reduces vehicle pollution and increases community interaction. Their slow evolutions lend them a diversity in scale, size, and inhabitants. The tangible and intangible heritage provides a sense of place for residents.

Current Successful Innovations in Urban Design

While the vernacular past contributes significant examples of responsible climate design, the present showcases inspiring community ingenuity and commitment to resilience. The examples

below demonstrate how communities are combating climate change while maintaining historical continuity and furthering quality of life.

Waterfronts and Abandoned Land for the Public

Cities across the country have invested in ambitious public parks, often on former waterfront industrial sites that contained factories, wharfs, and/or transportation (Figure 4).

Once the land was abandoned, remediation occurred, and the land and waterways became cleaner. At low elevations, often on fill and within the floodplain, the remediated land is ideal for public use and provides a flood barrier to the community. Native plants are selected because they clean the air and water and add appropriate biodiversity that maintains a balanced ecosystem. In the best of these spaces, the history of the industrial community and remnants of past infrastructure are incorporated for the public to absorb while at play. Right-of-ways, vacant lots, and disused sites can be made permeable, protecting the city from floods and heat. This conversion of abandoned and bleak space within the city to benefit public health and social well-being is a textbook example of resilience and adaptation.

Public Art

Streets and parks are shared landscapes that give artists access to a broad public audience. Site-specific artwork succeeds because it makes people part of the exhibit and provides a new

FIGURE 4. Public recreational space overlooking the Mississippi River in Dubuque, Iowa. Photo by Matthew Gilson, © National Trust for Historic Preservation.

FIGURE 5. Napoleon Jones-Henderson's Roxbury Rhapsody celebrates music and community, a commissioned art piece for the Bruce C. Bolling Municipal Building in Roxbury, Boston, Massachusetts. Photo by Alexa Carter, © National Trust for Historic Preservation.

perspective on familiar places. By considering the history, demographics, and context of the area, public art powerfully re-interprets the past (Figure 5).

Many artists work to shift public perception about core values such as clean air, clean water, and clean energy by commenting on humans' presence on earth. Triggering the imagination through art is a powerful way to incite people to care more about their environment and their future. Studio Roosegaarde's carbon neutralizing installations such as the Smog Free Towers are examples of art that cleans the air and promotes social awareness (Studio Roosegarde, *Projects*).

Carbon Reducing Infrastructure

Infrastructure can be improved to help in the climate fight. Carbon recycling and sequestering materials such as brick and concrete are being developed (Zeeberg, 2020). Initiatives such as green roofs have already been successful in adding oxygen and lowering temperatures (National Park Service, *Green Roofs*). In hot climates, roadways can be painted white to create heat sinks, and vertical gardens can be hung almost anywhere (Barboza, 2019).

Viewsheds [the geographical area visible from a location] around cultural properties have always been protected, but as wind and solar technology proliferate, more historic places should allow for sensible change. These visual interruptions should be considered if they will reduce carbon footprints. Supporting clean energy can be advanced as good preservation.

Sustainable Food and Agriculture

Communities and historic sites have a lot of unused acreage in that could be used to provide more local food sources. To enhance social health, farmers are organizing collaborative food networks that integrate sustainable food production, processing, distribution, and waste management. Working with partnering organizations, historic sites (many of which used to be farms) are in a unique position to provide land for community-based jobs and local food networks. Smaller regional growers provide greater crop genetic diversity, and regional supply chains are more economically resilient (Figure 6) [3]. Modern farming at historic sites can be interpretively integrated, connecting the past to the present.

FIGURE 6. Urban community garden in Ames, Iowa, part of the Main Street Program. Photo by Ames Main Street Cultural District, © National Trust for Historic Preservation.

Community Participation

Gone are the days of elite experts coming in to make changes, dictating to the public what it needs. Public design is different than community engagement because it acknowledges that it matters who is doing the work. In the best public design, the community acts as both as the decision maker and the workforce and is often even compensated for spearheading aspects of the project. This encourages more equitable growth by giving agency to community members who advance policies that will reduce disparity in underinvested areas. The definition of "good design" has shifted from building aesthetics to design which encompasses the health and welfare of all citizens.

Social design is the only way to tackle climate change adaptation. With more than one hundred twenty-six million people living and working coastal communities (Morrison, 2020), and others being displaced by natural disasters, massive public programs will have to be coordinated to deal with displacement, adaptation, and relocation. This fraught process will take decades, but it can't succeed without communities making the decisions for their own best interests of if, when, where and how to relocate.

Moving Forward

The transition to more sustainable urban landscapes and cities will be accomplished with an all-hands-on-deck attitude. The building stock will become healthy when new buildings are environmentally designed, old buildings are continually repurposed, and all buildings use affordable, energy efficient technology and renewables. Because they provide carbon sequestering, biofuels, and plant and wildlife diversity, natural landscapes require more safeguards as part of the conservation ecosystem. As cities grow and suburban and rural populations shrink, agricultural belts and abandoned land can be reclaimed as ecological buffers. Currently, the world safeguards 15% of its land and 7% of the ocean. For a healthier and more prosperous planet, more land should be returned to nature. Just as we have set goals for carbon neutral buildings, developments, and renovations by 2030 (AIA, *The 2030 Commitment*), we should also aim to protect 30% of our land by 2030 and aim to use the rest more responsibly (Sala, 2020). Until the government engages in long-term climate thinking, setting goals to limit and monitor environmental performance will be self-imposed by early adopters and grassroots communities

Historic Resources Stepping Up in the Climate Movement

Historic sites, cultural landscapes, and museums are places of trust. The public seeks them for learning and relaxation. As charitable, educational, and community-oriented organizations, historic places are trying to eliminate their climate impacts as part of their communal responsibilities. Many organizations are voluntarily changing their operations to be healthier through place making projects, site specific installations, the elimination of single-use plastics, the installation of water refilling stations, and the adoption of waste-free services.

As historic places evolve to better serve modern communities, maintenance, construction, and operational initiatives should be directed to increasing sustainability. Building systems should rely on original environmentally responsive[4] features, supplemented by renewable energy sources so that they are net-zero or net-positive energy. Historic gardens can plant native species and become pesticide free. Composting and water conservation can be initiated. Guest services can be made more sustainable and gift shops can specialize in local and responsibly made products. There is a hard irony to places of the past leading as future places of innovation. Yet, historic buildings are reminders of continued perseverance and resourcefulness – qualities that are critical to facing the climate crisis.

Conclusion

The interplay between our needs and the needs of our planet, between natural systems and man-made ones is the profound issue of modern times. Because living in a healthy environment is a civil right, all of us share a moral responsibility to formulate a comprehensive solution. It will take decades of accumulated effort. With luck, this growing effort will engender enormous policy changes, and we will radically re-imagine our shared environment while protecting and safeguarding natural and cultural heritage.

Many solutions for a more sustainable world can be retooled from the past. Combining them with new technologies and ingenuity, we can create a planet that supports all of its inhabitants. The current pandemic has made us recognize that modern society and economies can come to a standstill when global problems explode. While few predicted Covid-19, global warming is a recognized catastrophe of equal or greater magnitude that we can still do something about.

Those of us who protect cultural places struggle with how to make bigger impacts and do more, faster. Many small changes add up to make big differences. As professionals within the cultural heritage field, we can broadcast our successes, and through public outreach, normalize the conversation. If there is any hope, it is to reignite faith in the power and impact of collective action to solve longstanding global issues.

The recording of Ashley Wilson's March 5, 2020 symposium presentation can be found at https://www.youtube.com/watch?v=io6snM8g4yg

Notes

1. Fundraising is currently underway to implement the hydraulic solution. See farnsworthhouse.org
2. The Selection Criteria for a successful solution included a.) Leave the building on the site, b.) Fail safe design, c.) Simplicity favored, d.) Precedents, ease of procurement and repair, e.) Ease of use, f.) Ability and ease to test, maintain, and clean, and g.) Minimal environmental impact.
3. Arcadia Farm is a small-scale sustainable grower that operates at Woodlawn, one of the National Trust for Historic Preservation's historic sites. For more information see arcadiafood.org
4. Early features of historic buildings, such as operable window and doors, whole house ventilation, working interior and exterior shutters, awnings, and transoms, sometimes get abandoned.

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Climate Change and Archaeological Sites: A Case Study for Partnering Cultural Heritage and Climate Action

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Introduction

The planet is facing a climate crisis. The changes in climate linked to increased greenhouse gases in the atmosphere are already causing higher temperatures, wildfires, increased storm frequency and intensity, changes in precipitation, and sea level rise. (IPCC, 2014; Allen et al., 2018; Becker, Karpytchev, and Papa, 2019; Woodruff, Irish, and Camargo, 2013; Conde and Saldaña-Zorrilla, 2007; PRCCC, 2013). However, the discourse of climate change communication has phrased the message as predictions of expected impact scenarios by 2050 or 2100. This narrative gives the general public a false sense of security, as if change will happen in the future and is not yet happening. That we have time to talk and think about plans to mitigate it before it occurs. However, climate change is not an event but a process of changing weather patterns. We are already deep into the path of changing conditions leading us towards the scenarios of 2050 and 2100 (Hoegh-Guldberg et al., 2019).

Archaeology has recognized that it stands in an unparalleled position to contribute to the climate conversation (Van de Noort, 2011). The archaeological record has thousands of years of climate change coupled with human response (Sandweiss and Kelley, 2012; d'Alpoim Guedes et al., 2016; Cooper and Sheets, 2012; Graham, Hambly, and Dawson, 2017). This knowledge – which some describe as completed experiments of human–climate dynamics before, during, and after change – can help us understand the nuances of risk in the present and identify traditional solutions and outcomes of response (Jackson, Dugmore, and Riede, 2017). Archaeology can inspire climate action, in particular if it provides compelling stories and locally relevant information (Rockman and Hritz, 2020; Holtorf, 2018; Mackee, Askland, and Askew, 2014; Dawson, 2015; Dawson, Hambly, and Graham, 2017). By providing an understanding of social processes across extended temporal trajectories, archaeological research can explore and contribute to the understanding of the social dimensions of adaptation and resilience (Adamson, Hannaford, and Rohland, 2018; Nelson et al., 2016; ICOMOS, 2019; Graham, Hambly, and Dawson, 2017; Jackson, Dugmore, and Riede, 2018).

The current trend of climate change is a crisis because it threatens the fabric of society. The social sciences are needed to understand and mitigate those impacts (Thomas et al., 2019). This essay presents the Descendants United for Nature, Adaptation and Sustainability (DUNAS)

project as an example of a partnership between communities and researchers to mitigate climate impacts and protect cultural heritage in Puerto Rico.

Climate Change and the Permanence of Archaeology

Given the antiquity of the archaeological record, archaeologists and the public think of it as permanent. Historic records of landscape art and photographs contribute to this perception. Representations of the pyramids of Giza show at least eight centuries of what seem to be unchanged features. Those are 800 years during which records have taught the public that sites are permanent and in which knowledge and social memory failed to warn us that sites could and would change – let alone change within our own lifetimes. Archaeologists are trained to assume this permanence, to study sites without hurry, and to leave things in context for future generations.

Changing climate patterns are rapidly impacting tangible cultural heritage, including archaeological sites and cultural landscapes (ICOMOS, 2019). Sea level rise, coastal flooding, coastal erosion, loss of sea ice, glacial melt, permafrost thaw, warming soils, increased ocean temperatures, increased storm frequency and intensity, more extreme rainfall, increased humidity, increased wind or changes in wind direction, drought, aridification, heatwaves, changes in seasonality, and changes in species distribution driven by climate change are among the variables impacting preservation (ICOMOS, 2019:69–70). These impacts affect both tangible and intangible heritage – moveable heritage (including museums and collections), archaeological resources (including underwater archaeology), buildings and structures, cultural landscapes, associated and traditional communities, and intangible cultural heritage (ICOMOS, 2019:72–89). Climate change is very rapidly destroying many archaeological records (Hollesen et al., 2018) with a speed and significance which has been compared by Thomas McGovern to the burning of the library of Alexandria (McGovern, 2018). During the last centuries before the Common Era, the Great Library of Alexandria, Egypt, was the repository of tens of thousands of papyri containing knowledge from around the known world and was home to many of the scholars of the ancient world whose works are still influential to Western scholarship today. Its collection was burned and pillaged, leading to the destruction of knowledge that had been accumulated over the centuries. McGovern's simile, a known symbol in philosophy (Thiem, 1979; Heller-Roazen, 2002), emphasizes incalculable loss, the extent of which we will never know because we do not know how much there was to begin with.

Downscaled assessments of climate drivers have identified that the most significant impacts expected in Puerto Rico in the present and near future include higher sea temperature, sea level rise, increased frequency and intensity of storms, the flooding and storm surge associated to these, ocean acidification and intensified coastal erosion (PRCCC, 2013 and Ezcurra and Rivera-Collazo, 2018). Addressing storms and coastal erosion in particular, the DUNAS project focuses on the north-central coast of Puerto Rico and two archaeological sites, Oubao Moin and Playa Machuca (Tierras Nuevas). These two sites are highly significant because they constitute one of the few locations on Puerto Rico's coastline that preserves the late Taino settlement pattern. Playa Machuca might be the only coastal ceremonial site with plazas and ball courts that has survived

sugarcane agriculture and modern development. Both sites are located within the Hacienda la Esperanza Nature Reserve which is managed by the non-governmental organization (NGO) Para La Naturaleza (PLN), our ally in this project for heritage and biodiversity conservation.

Significant coastal changes were evident in the study area throughout the duration of the research program which started in 2012. Figure 1a shows the students of 2015 Tierras Nuevas Archaeology Field School of the Department of Sociology and Anthropology's Archaeology Program of the University of Puerto Rico, Rio Piedras Campus having lunch at the beach next to Playa Machuca's Mound A. Figure 1b shows the same place on February 2020, not five years later. The coastline is changing every day, exposing ancient Pleistocene soils as the coast

FIGURE 1. View of Playa Machuca looking east. Both images show the same location: (a) taken in summer 2015 during the Tierras Nuevas Archaeological Project Field School; (b) taken in spring 2020 during a regular field inspection to monitor erosion rate. Photos by Isabel Rivera-Collazo.

migrates south in response to rising sea level. As erosional processes continue, sites are washing out to sea faster than anyone anticipated and faster than research can be undertaken (Rivera-Collazo, 2020).

A parallel problem to this loss of cultural heritage is that of intervention. Excavating sites, recovering materials contexts before they are completely gone, and/or using technology to digitally collect systematic data requires funding, but the process of applying for funding can take at least one year and often multiple years, by which time the sites are gone. Neither funding agencies nor governmental organizations have caught up with the urgency of climate change. Incomplete and outdated archaeological databases further complicate the picture. Given that these databases are often used as the basis for vulnerability assessments to mitigate climate risks, incomplete records lead to severe underestimation of threats (Rivera-Collazo, 2020). Many of the sites that were impacted by Hurricane Maria are completely destroyed now, and we may never know how much was lost because we did not know what we had to begin with.

Other serious threats are the official governmental measures taken to mitigate climate impact. In the case of Puerto Rico, flood control projects carried out without proper consultation with the public, linked with lack of acknowledgement of ancestral ties to the land and outdated bureaucratic processes, have led to the destruction of heritage – including ancestral remains. Large-scale projects for the mitigation of climate drivers including the construction of sea walls, flood-control projects, and river canalization, carried out in a hurry and without community consultation are contributing to the loss of heritage.

One example: Between August and December 2019, the United States Army Corps of Engineers (USACE) completed the canalization of the La Plata River in Dorado, Puerto Rico, completely removing a large archaeological site which held a significant number of ancestral burials. The archaeological excavation conducted by a large contract archaeology firm from the United States did not consult with the communities and left behind large numbers of archaeological remains including bones and possibly burial associated artefacts. USACE did not consult the communities before or during the development of the project, and the communities' voiced concerns and suffering during the project were ignored. Today the site has been completely destroyed. Given that settlement patterns in Puerto Rico favor proximity to rivers and river mouths at the coast, similar impacts are expected from all of the USACE projects that are planned to canalize the rivers of Borikén to mitigate floods.

Lessons from the Past: Why Is Archaeology Relevant?

Heritage is important to the climate change conversation because the changing climate drivers have the potential to impact our food and habitat security, and the practices leading to define what / how we eat and where we live are directly linked to who we are (Figure 2). These practices are deeply rooted in traditional knowledge, registered in history, deposited in archaeological sites, and modulated by colonialism and other historical processes (Wallman, Wells, and Rivera-Collazo, 2018). In the present, our ways of providing food and securing habitat are directly linked to the current rate of climate change (Lewis and Maslin, 2015b, 2015a; Palsson

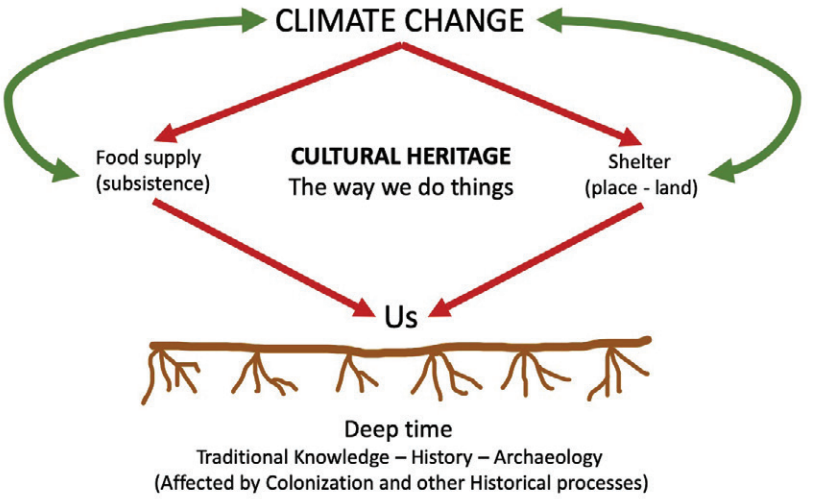

FIGURE 2. Climate change has the potential to impact us because it directly threatens our food and habitat security. The ways in which we procure food and supply our subsistence needs, and the places and ways in which we live, in the present and in the past, are defined by the particular ways in which we do things, and these are different for each culture. Subsistence and settlement are central to who we are and characterize our cultural heritage.

et al., 2013). In the context of changing climates, knowledge of our ancient ways of food and habitat can help us identify different scenarios and alternate response strategies.

For example, during Hurricane Maria, historical knowledge of abandoned cisterns was used to obtain water (Boger, Perdikaris, and Rivera-Collazo, 2019). Accounts of past hurricanes and earthquakes have been widely circulated in social platforms such as Facebook, Twitter and Instagram as examples of success in the face of catastrophes, conveying the message that if our people in the past faced these problems and could overcome them, so can we. In this case, historical memory has contributed to social resilience and recovery. Archaeology can help extend that memory back in time.

Sedimentological and archaeological records in Puerto Rico and other areas of the Caribbean suggest that between the years 800 CE and 1000 CE there was enhanced hurricane activity which the people in Puerto Rico lived through. Assessing the archaeological record of the sites of Tibes in Ponce and Vivi in Utuado, the sedimentological record suggests that hurricanes did impact inhabited sites (Rivera-Collazo and Declet-Pérez, 2017; Curet et al., 2013; Oliver and Rivera Fontán, 2006). In Tibes, L. Antonio Curet identified a flood layer with human remains in it, showing that people perished in the flood (Curet et al., 2013). But, the ceremonial site shows that there was restructuration and reorganization after the flood, as well as adaptation to food procurement and continued occupation. On the site of Vivi, the record also shows the impact of floods (Oliver and Rivera Fontán, 2006). In response, people ceremonially buried their *batey,* but reoccupied the place and built a new ceremonial plaza. These examples show that for local communities social priorities such as living in a specific place are more important

than the threat of natural hazards (Rivera-Collazo and Declet-Pérez, 2017; Rivera-Collazo et al., 2015; Rivera-Collazo, Rodríguez-Franco, and Garay-Vázquez, 2018).

Heritage and Action: DUNAS (Descendants United for Nature, Adaptation and Sustainability)

Climate change, cultural heritage, and coastal geomorphology and ecosystems are deeply intertwined. The study area on the center-north of the island of Borikén in the Archipelago of Puerto Rico, characterized by a high-energy coastline facing the Atlantic Ocean, is marked by large rivers separated by wide coastal plains (Figure 3). Along these coastal plains, sediment transport is dominated river and ocean currents. At the beach, dry sediment is transported landward by constant easterly winds. These conditions create a coastal geomorphology composed of sandy beaches separated from coastal fresh and brackish-water wetlands by aeolian sand dunes covered with coastal vegetation (Bush et al., 1995; Pérez Valentín and Müller, 2020; Barreto, 2017; Barreto-Orta et al., 2019). This setting provides multiple ecosystems which support a very rich biodiversity of native, endemic, introduced and migrant species, and codify long-term human interactions with those coastal environments (Anadón-Irizarry et al., 2012; Helmer et al., 2002).

High-magnitude catastrophic events have strong social and environmental impacts. In 2017, Hurricane Maria caused coastal flooding within the study location. The pressure of the storm surge and river flood damaged the coastal sand dunes and wetland ecosystems (Figure 4). In response, the DUNAS project was created with the goal of restoring natural ecosystems, protecting cultural heritage and supporting resilient communities (see https://www.climatesciencealliance.org/dunas). DUNAS is a partnership between the Climate Science Alliance, University of California-San Diego researchers, the local grassroots groups Yo Amo al Tinglar, VIDAS, the Taino Community of Jayuya and Vida Marina, as well the NGO Para la Naturaleza (PLN).

FIGURE 3. View of the north central coast of Borikén showing the almost flat alluvial coastal plain separated by wide rivers. Map from Google My Maps service. Accessed July 2020.

a. January 2017 b. February 2018

FIGURE 4. View of the DUNAS study area showing the impact of Hurricane Maria to the coastal sand dunes and forest. (a) Study area in January 2017 and (b) in February 2018, five months after Hurricane Maria. The ecosystem restoration project is focused on the portion where the water breached the sand dune barrier seen in (b). Aerial photography from Google Earth Pro (2020 Maxar Technologies). Accessed July 2020.

The logic behind the DUNAS project model is that people who live in coastal settings dominated by sand dunes avoid building structures on top of the dunes because this causes dune crest deforestation which exposes the sand, promoting sand transport and triggering mobilization of stable dunes which removes the substrate below the built structure. Settlements are therefore located behind or downwind from sand dune barriers (Figure 5a). As sea level rises, the sand dunes become eroded and the entire system – beach front, beach terrace, sand dunes – shifts landward. The archaeological record of the study area demonstrates that coastal erosion in the past caused the sand dunes to migrate south over the human settlements, covering portions of the ancient deposits and triggering further shift downwind or possibly site relocation (Figure 5b). In the present, coastal communities are still located over ancient archaeological sites behind the sand dunes. As sea level rise has accelerated, the erosion of coastal sand dunes has accelerated, exposing the ancient buried settlements within their profiles (Figure 5c).

This situation can be used to:

1) Help community members identify the presence of ancient archaeological deposits within the sand dunes and explain how these dunes have migrated in response to ancient sea level rise
2) Illustrate on the field within the communities, the magnitude, speed, and risks of climate-driven coastal erosion
3) Link ancient behavior and present settlement patterns, recovering ancestral links debilitated by colonial discourses
4) Inspire climate action through conversations about climate mitigation and adaptation. By using locally relevant, tangible examples to engage the communities, climate change becomes a reality that is visible and personal rather than a remote scientific discourse.

To restore natural ecosystems, Vida Marina guided the team to build a biomimicry system that uses strategically placed wood planks to imitate the effect of vegetation, creating wind vortices that stimulate sediment deposition, thus speeding the process of sand recovery on the breached dune (Figure 6a). With the advice of Vida Marina and the personnel of PLN, local native plants relevant to the dune and wetland communities were selected and planted to restore the back

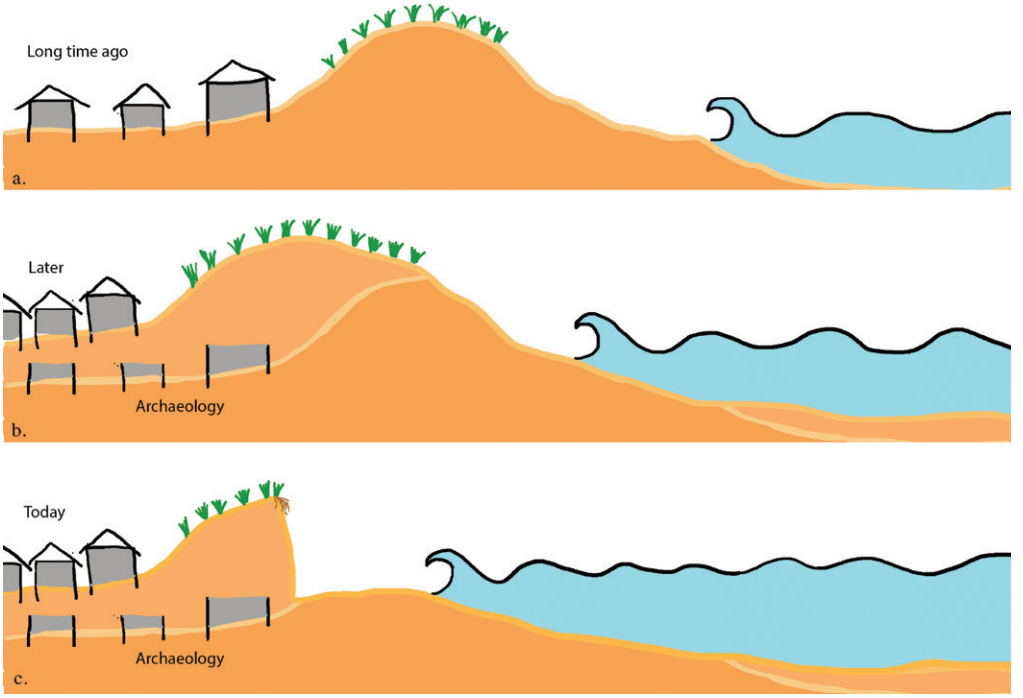

FIGURE 5a–c. Logic of the DUNAS project. As sea level rises, the coastal profile adjusts and retreats, triggering human response and burying ancient settlements. In the present, coastal erosion is destabilizing the sand dunes and exposing the ancient settlements, opening the door to conversations in the field regarding climate impacts. Detailed explanations in the text.

dune and help the recovery of the botanic component of the ecosystem. As the sand and the plants become more stable, other biotic elements including native crabs and wasps are returning to the damaged location,

To protect cultural heritage, undergraduate students from the University of Puerto Rico Rio Piedras' Mayaguez and Aguadilla Campuses, the Bosque Cibales grassroots group, volunteer local residents, and the elders from the Taino Community of Jayuya became partners in a controlled excavation at the Playa Machuca (Tierras Nuevas) archaeological site (Figure 6b). The purpose of this excavation was to recover information about how ancestors living on this coastal location engaged with the local ecosystems (sand dunes, reefs, estuary, wetlands) through time, and how hurricanes in the past affected them. The excavation was coupled with environmental analyses which included on-site and off-site geoarchaeological sampling for a paleoenvironmental reconstruction that will produce a better understanding of the impact of high-magnitude storm events as well as a high-resolution reconstruction of the evolution of the coastal environments through time. All the data collected has been preserved digitally in 3D, which allows it to be shared with the public and used to communicate climate change and climate action.

To protect resilient communities, Taino/Boricua rituals for honoring ancestors were performed throughout the excavation process, and a series of communication activities to share

a. b. c.

FIGURE 6. Images showing activities of the 2019 DUNAS expedition addressing the three main goals of the project. (a) Restoration of natural ecosystems installed a biomimicry system to contribute to sand accumulation. (b) Protection of cultural heritage involved a controlled excavation with the local communities to further learn from the past to incorporate past records to present systems of knowledge. (c) Supporting resilient communities included indigenous rituals and the preparation of an interpretative trail where the lessons from DUNAS can be shared more widely with the public. Photos by Isabel Rivera-Collazo.

knowledge and inspire and maintain climate action were jointly designed (Figure 6c). To insure continuation of the efforts and further empowerment for climate action, training sessions on building biomimicry systems, coastal ecosystem restoration, and climate change impacts, as well as a train-the-trainer module were carried out. An on-site interpretative trail that uses the DUNAS field setting to communicate coastal geomorphology, ecosystem biodiversity, hurricane impacts, ecosystem restoration, cultural heritage, climate change and climate action is being created. This trail can be self-guided or led by an interpreter from either the PLN or the communities. One of the field stations along the trail will include a place for citizen science where participants will be invited to photograph and document the progress of the development of the restored sand dune. 3D scans of artefacts recovered during the 2019 excavation season will be used to support engagement with material culture while simultaneously protecting the archaeological site in situ.

Conclusions

The climate crisis is predominantly a social issue, so the social sciences are needed to understand it and address it. Archaeology can contribute case studies, identify issues, find solutions and look at the long-term processes of human response to change. Archaeology can also help make climate change relevant at the local scale and stimulate climate action though identification with locale. The DUNAS project in Puerto Rico is an example of such an engagement.

Because losing heritage is losing ourselves, a focus on heritage can help move the conversation and raise ambition. We are facing climate change now—not the prospect of it in the future. Cultural heritage and archaeological sites can contribute to identifying solutions now. Locally relevant examples can make the call for action and increased ambition concrete and real. The survival of communities in Puerto Rico is on the line. The global magnitude of climate change

implies that the same hazards are being faced everywhere and that we are all vulnerable. Equity and justice are critical considerations as disadvantaged and marginalized community are the most strongly impacted by climate change. Those who do not yet feel this urgency on a personal level must take a moment to reflect on their privileged situation. Assessing one's own food and habitat security is a good place to start. In order to move forward, climate solutions must partner with cultural heritage including cultural traditions, place connections, and economic conditions.

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The recording of Isabel Rivera-Collazo's March 5, 2020 symposium presentation can be found at https://www.youtube.com/watch?v=Hk3SVOxfn8k

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Built Heritage

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What would our understanding of human civilization be without the henges of England, pyramids of Egypt, cathedrals of Christendom, and thousands-upon-thousands of structures comprising more than 10,000 years of built heritage? That climate change threatens such priceless expressions of the human story is beyond alarming. Without them, human history and culture would be unrecognizable.

Much the same can be said for the other five categories of heritage addressed in the *Stemming the Tide* Symposium. Intangible cultural heritage, archaeological sites, cultural communities, cultural landscapes and historic urban landscapes, and museums and collections are also threatened by climate change. Each heritage field is working to understand its intersection with the global climate action agenda established by the Paris Agreement on Climate Change. However, for built heritage confronting climate change presents a profoundly different challenge. Unique among the six heritage categories, built heritage *contributes significantly* to the *causes* of climate change.

The vast preponderance of heritage buildings are inhabited. With only the rarest exceptions, heritage properties are *living* buildings that provide shelter and serve ongoing social and economic purpose. As occupied structures, most heritage buildings are outfitted with energy-consuming systems. It is crucial to appreciate that from a climate change perspective, heritage buildings produce a troublesome environmental footprint, emitting tons of greenhouse gases (GHGs) every day. As part of the climate change problem, built heritage must play its part in climate solutions or suffer the consequences.

In 2012, Hurricane Sandy ruthlessly exposed the vulnerabilities of coastal heritage sites – most notably the Statue of Liberty and Ellis Island – to the changing climate. Not even the most fervent climate change advocate would question the importance of protecting irreplaceable cultural icons of this caliber. However, the value of millions of less-iconic heritage buildings *is* questioned. Among those focused on building energy use, "conventional wisdom" has it that older buildings perform poorly. Older buildings are *bad* buildings.

To correct this misnomer, it is up to those of us who fully appreciate built heritage to demonstrate clearly and convincingly the value of preserving heritage assets *as* climate action. Using the terms and metrics of climate change, we must show that the preservation and adaptation of historic buildings is essential to any strategy for curtailing the causes of climate change, and, that heritage

value is an asset, not an impediment. The urgency of our mission is accelerated by the aging *modern-era* building stock which is rapidly redefining the scope of built heritage conservation.

As an architect who has helped stake out common ground within the historic preservation and green building fields, I grasp the importance of this moment. To wring out carbon pollution, *everything* about how buildings are designed, constructed, and operated must be retooled. Built heritage faces an existential crisis. It is threatened by both climate change and the D-Day assault that is being launched to combat it.

It is the fifth anniversary of the Twenty-first Conference of the Parties (COP21), the 2015 United Nations event that concluded with adoption of the Paris Agreement. Already, the decarbonization targets and timeframes accepted in Paris are under scrutiny. The UN is working to establish considerably more aggressive GHG reduction targets to cap rising temperatures within tolerable limits (UNEP, 2018:23–28). Cities around the world, including Washington D.C. – home to the Smithsonian Museums on the National Mall – are adopting building-sector-wide policies and programs on climate change.[1] A cascade of actions has begun that will dramatically transform the building sector, including heritage buildings.

Today's pressures to adapt existing buildings to meet climate goals can be harnessed for the benefit of built heritage stewardship. Policymakers, professionals, and individuals devoted to the preservation and interpretation of built heritage are confronted with a truly historic opportunity to advance the heritage conservation agenda by embracing the challenges of climate change. But the door is open only a crack. It is up to we who value heritage to turn the threats of climate change – and climate action – into the promise of a future where built heritage is celebrated in a culturally rich, inclusive, equitable, healthy, prosperous, resilient, and sustainable world.

To Thy Own Self Be True

As an architect practicing *sustainable stewardship*, I worked for years to learn everything I could about both historic preservation and green building. I became deeply engaged in both communities. For all the concerns they share, it has always puzzled me why the fields of preservation and sustainability overlap so haphazardly. Their Venn diagram should nearly coincide. In the last decade, as sustainability has tilted toward climate change, this incongruity remains and, in ways increases.

Both fields are motivated by an extremely powerful sense of mission. Both believe the issues confronting them are of the greatest importance for social, economic, and environmental well-being. Both pride themselves on deploying highly evolved skill sets that yield essential insights. Both foresee a future that would be substantially poorer if their goals were thwarted and immeasurably better if robustly achieved. Both are correct.

We as historic preservation practitioners and advocates must, first and foremost, be ourselves. The lessons of built heritage are acutely relevant to meeting the challenges of climate change. Much of built heritage tells of times before the industrial age, before buildings burned fossil fuels and produced the carbon pollution that is the principal engine of climate change. Built heritage teaches vital lessons about a future without fossil fuels and carbon pollution.

Built heritage is inseparable from social and cultural identity. If climate action is to succeed, everyone must play their part and work together. Build heritage testifies to our shared experiences through every period in our history and from every sector of our polyglot society. The insights of heritage, over time and across cultures, are indispensable in building common purpose and motivating universal action. Today's discourse on climate change frequently gets bogged down in the complexities of climate science and metrics. In contrast, the heritage sector's values-centric framework promotes connection and forges shared outcomes.

The era of climate action does not demand that we abandon our identity or the things we care about – quite the opposite. Now more than ever, it is crucial that we as the stewards and advocates of built heritage express its value as widely and articulately as possible. The factors of climate change reinforce, not diminish, the historic preservation mantra: *the greenest building is one that is already built* (Elefante, 2007).

Speaking the Language of Decarbonization

This said, we heritage proponents must be ready, willing, and able to step outside our comfort zones to learn the terms, factors, and objectives of climate change and climate action. Since the Paris Agreement was inked, the largest global reinvestment program in history has begun, one that vastly overshadows both the New Deal and Marshall Plan[2]. Like it or not, there is nothing of comparable scale that targets heritage conservation goals directly. Our opportunity in the decades to come is to jump aboard the climate action juggernaut. It has left the station and is rapidly gaining speed. To understand how to achieve heritage conservation goals through the climate action agenda, it is essential to appreciate the factors driving climate change as well as the framework for climate action.

Most, but not all, of climate change is driven by the plethora of twentieth-century technologies that utilize fossil fuels and petroleum-based products. While it may be easier to picture gas-guzzling automobiles as the culprit, emissions from buildings actually outpace those from transportation (Global Alliance for Buildings and Construction, 2018: Figure 1).

Buildings are responsible for *direct* emissions of greenhouse gases (mostly from the use of natural gas and oil for heating, cooling, water heating, and cooking) and *indirect* emissions (from consuming electricity generated with coal, natural gas, and oil). These direct and indirect emissions are termed *operational* emissions since they are produced from occupying buildings. Globally, operational emissions in the building sector account for an estimated 28% of total annual global emissions from all sectors, over eleven billion tons (11 gigatons) of carbon dioxide equivalent (CO_2e) at current levels (Global Alliance for Buildings and Construction, 2018).

Constructing buildings requires enormous investments in material and energy resources. The construction industry is responsible for a substantial release of greenhouse gases. Construction-related emissions are frequently termed *embodied,* or *embedded*, emissions. Embodied emissions in the building sector account for another 11% of total global greenhouse gas emissions (Global Alliance for Buildings and Construction, 2018). Taken together, the operational and embodied

emissions from buildings exceed those of the industrial, transportation, or agricultural sectors (Global Alliance for Buildings and Construction, 2018). As the largest contributors to climate change, decarbonizing buildings is a top climate action priority. Heritage buildings are no exception.

In practice, optimizing the energy performance of buildings is complex and quite technical. However, the essential factors are not mysterious: properly managing occupancy patterns; employing the most efficient energy-consuming systems, appliances, and equipment; and improving the effectiveness of the building enclosure in maintaining comfortable interior conditions despite daily weather and seasonal climate fluctuations. Each contributor must be optimized to meet decarbonization goals. It is equally important to understand their interdependencies, adopting what are generally termed *integrated design* principles that define solutions where the whole is greater than the sum of its parts.

Decarbonization principles and practices can be applied successfully to heritage buildings. Much of my building preservation work has been instituted at periods in the service life of heritage buildings when substantial renewal is needed – typically at cycles of 40–50 years – when the time has come to conduct a comprehensive program of repairs and upgrades. The scope of work usually requires significant repairs to all elements of the exterior envelope (walls, roofs, windows, and doors) and wholesale modernization of mechanical, plumbing, electrical, lighting, fire protection, and security systems. When this level of preservation, restoration, and/or rehabilitation occurs, meeting emissions reduction targets is readily achievable.

Even with high-character heritage buildings, where interventions are the most constrained by historic preservation guidelines and regulations, there are opportunities to employ "green building" principles and practices. Nothing about heritage properties negates the value of energy modeling and life-cycle assessment. Indeed, renovation projects benefit from these so-called "green" analysis tools even more than new building design. Our work routinely utilizes super-efficient mechanical and electrical systems like ground-coupled heat pumps and LED lighting, and installs renewable energy technologies like solar hot water and photovoltaic panels. Working with existing buildings – even designated historic buildings – is no excuse for ignoring obligations to meet climate targets.

There is another climate solution unique to the renewal of existing buildings, even designated heritage structures. Keeping existing buildings and conducting renovation programs to repair and upgrade them extends their useful service life, typically for another generation of beneficial habitation. In climate action terms, renovation extends the material and carbon investments embodied in them. Keeping buildings avoids the expenditure of additional material and energy resources. It is a little understood, but enormously important factor in curtailing climate change.

Valuing Built Heritage Conservation as *Avoided* Carbon Pollution

The Plaza Building in Detroit was a vacant mid-century office tower. Quinn Evans was hired to convert The Plaza into apartments. Changing from office to residential required a complete

reworking of the interior and replacement of all building systems. Alternatives were studied to upgrade or replace the exterior window system (curtainwall). Replacement of early modern-era curtainwall systems can significantly improve the insulating performance of the exterior enclosure.

For The Plaza, the additional material manufacturing and construction produced an embodied carbon footprint nearly equal to emissions from one year of annual operation[3]. The embodied carbon footprint for converting the interior to housing equals emissions from more than two years of annual operation. Factored against the resulting reduction in operating carbon, the initial "investment" in embodied carbon can be "recovered" in less than seven years – a relatively rapid recovery. Had the Plaza been demolished and replaced with an entirely new structure, the initial embodied carbon footprint would nearly triple. The recovery period would extend beyond twenty years. While it may seem like a conservation scenario of little value, keeping the structural frame of The Plaza was in fact an extremely valuable climate action strategy resulting in substantial "avoided" carbon emissions.

The calculus for comparing initial embodied carbon investment against ongoing annual operational reductions must be viewed in the context of the total carbon emissions budget and timeframe established in the Paris Agreement and subsequent 2018 Emissions Gap Report.[4] Both embodied and operational carbon count equally against the permissible carbon budget set out in the Emissions Gap Report. For measuring greenhouse gas emissions, a ton is a ton regardless of its source. Investing heavily now for carbon reductions realized beyond 2040 or 2050 may sound constructive. However, once the emissions cap is exceeded, projected operational savings are literally too late. They fail to achieve the existential imperative that motivated the Paris Agreement in the first place – preventing catastrophic climate disruption.

For advocates of heritage building conservation, the climate action framework – 340 gigaton total emissions budget, 65% emissions reductions by 2030, and zero emissions by 2040 – is an enormously powerful validation. Keeping, using, renewing, and adapting existing buildings is, hands down, the most carbon-smart strategy of them all.

Valuing Modern-Era Towers in Climate Action

Modern-era buildings like The Plaza, those ubiquitous glass towers that dominate the skylines of hundreds of cities around the globe, are arguably the single most crucial building typology from both climate action and heritage conservation perspectives. There is particular urgency in raising awareness of modern-era buildings now. The "Penn Station" of glass towers is being demolished as I type these words.

270 Park Avenue in New York City was constructed in the 1960s as the headquarters for Union Carbide. Its design was a triumphant moment in the career of Natalie de Blois, the period's most celebrated female senior designer for Skidmore Owings and Merrill (SOM), one of America's leading architectural firms. This fifty-two story building is being destroyed to make way for a seventy story building. The demolition of Union Carbide is an act of cultural vandalism and waste at a scale that is doubly intolerable in the era of climate change. Throwing away

buildings like Union Carbide absolutely contradicts the decarbonization mandate of the Paris Agreement.

The stewardship of modern-era buildings like The Plaza and 270 Park Avenue is arguably the central challenge for building preservation in the 21st century[5]. Evidence supporting this claim begins with their sheer number. Building activity around the globe skyrocketed following World War II. The skylines of today's cities were created in an avalanche of building that continues to this day. To cite one example, nearly two-thirds of the non-residential building stock in the United States, totaling more than fifty-seven billion square feet was built between 1945 and 2000[6]. Buildings constructed before 1970, including an entire generation of modern-era towers, already meet preservation's fifty-year standard, making them potentially eligible for historic designation. By 2050, the entire modern-era category will.

The glass-clad towers of the 1950s, 1960s, and 1970s are notoriously poor performers[7]. Designed and constructed during a period of plentiful and cheap energy, this generation of buildings was addicted to fossil fuels. Unplug them, and they are certifiably uninhabitable: no elevators; no ventilation; only darkness. Building preservationists understand that alleged performance shortfalls are no justification for tearing buildings down. If they were, hardly a pre-War building would still exist.

Modern-era towers lend themselves to comprehensive renewal. As The Plaza renovation demonstrates, their steel and concrete superstructures readily accommodate new exterior "skins" and adaptive re-use. While nearly every particular differs from traditional buildings, modern-era buildings measure up to the same evaluation criteria that historic preservation professionals have referenced for decades. Modern-era towers materially manifest the culture and technology of their era. They have associations with historically significant persons and events. They make a uniquely modern-era contribution to the evolution of civilization.

While meeting the preservation challenges of modern-era towers, advocates for built heritage are afforded an opportunity to play a crucial role in confronting climate change. If those who care about built heritage do not find value in five-plus decades of modern-era buildings, who will? If those who care about built heritage do not plot the course for the conservation and renewal of modern-era buildings, who will? Who better?

Doing What We Know Best

It is inescapable that protecting built heritage over the next decades will be inexorably intertwined with climate action. Climate action affecting every aspect of building design, construction, and operation – and also building maintenance, repair, restoration, rehabilitation, and adaptive re-use – will pre-occupy governments and industries globally until the goals of the Paris Agreement are reached. The Paris framework charts an historic reallocation of trillions and trillions of dollars to rapidly transition away from the era of fossil-fuel technology.

We who devote our lives to built heritage are tasked with understanding the threats of climate change – to built heritage and far beyond. We are tasked with articulating the value of built heritage in the terms and measures of climate action. We are morally and ethically compelled

to offer everything we can to accelerate comprehensive climate solutions. These supremely consequential challenges will best be met by being ourselves and contributing what we know best.

Much of the language of climate change is "spoken" using data. We must become fluent in the data sets of built heritage. The theater of climate action is largely international and national government commitments. We must become built heritage actors on the climate action stage. But our impact will be greatest when we demonstrate climate relevance in the core factors which have always degraded and destroyed built heritage.

We have always known that the empty upper floors of buildings in historic towns are a tragic waste of cherished resources. Community after community wrings their hands over the economic drag of under-utilized properties while adopting land use plans and building codes that favor development of open land and penalize investment in older buildings. Climate change magnifies the importance of using existing resources to optimum benefit.

We have always known that abandoned buildings still have value. Even in devastated condition, heritage buildings can be reborn for another generation of useful purpose. They carry with them the irreplaceable stories of those whose shoulders we stand on. Climate change amplifies the value of every brick and board that can be restored to use.

We have always known that the greatest strength of communities is that they grow and evolve. Our role has been to provide the skill sets necessary to integrate growth so evolution builds upon the defining strengths of communities. Climate action cannot succeed without also building equity and justice that require understanding that reaches far beyond carbon dioxide molecules. Our cultural competency is desperately needed.

The issues we have addressed for decades have not lost their relevance. To the contrary, climate change magnifies their importance and amplifies our obligation to serve as effective stewards, empathetic collaborators, and nurturing mentors.

The recording of Carl Elefante's March 5, 2020 symposium presentation can be found at https://www.youtube.com/watch?v=GRNJZ5go_w4

Notes

1. Department of Energy and Environment, 2018 sets climate action targets for 2032 for a 50% reduction of annual greenhouse gas emissions, 50% reduction overall energy consumption, and 50% increase in renewable energy production.
2. Morgan Stanley Research, 2019. To cite one example, Morgan Stanley prepared an assessment of five priority decarbonization technologies including renewable energy, electric vehicles, carbon capture and storage, hydrogen fuels, and biofuels, projecting investments exceeding $50 trillion.
3. Estimates of operational and embodied Global Warming Potential (GWP), mostly carbon dioxide emissions, are calculated using computerized life-cycle assessment (LCA) programs. For The Plaza, Quinn Evans employed Tally, an LCA program developed by Philadelphia architects, Kieran Timberlake.
4. Architecture 2030, Edward Mazria's keynote address at the Carbon Positive RESET! Conference in, 2020. Working with data from the UN Environment Programme 2018 Emissions Gap Report, Mazria summarized the updated climate action framework into comprehensible metrics: 340 billon metric ton (gigaton) absolute CO_2e emissions cap, 65% GHG reductions by 2030, zero emissions by 2040.

5. Built heritage conservation organizations, most notably DoCoMoMo (acronym for Documentation and Conservation of the Buildings, Sites, and Neighborhoods of the Modern Movement), have focused on the unique preservation challenges of modern-era buildings since at least the 1980s.
6. Data derived from the United States Department of Energy, Energy Information Agency, Commercial Building Energy Consumption Survey (CBECS), 2012. Data on residential buildings can be found in the corresponding Residential Energy Consumption Survey (RECS), 2015. Lack of federal funding has constrained updates of these crucial databases.
7. For one of the most in-depth critiques of modern-era towers, see Browning et al., 2013.

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From Generation to Generation: Supporting Resilience in Climate Displacement and Migration

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Introduction

Growing up amongst the smog-filled highways and over-crowded shopping malls of Paramus, New Jersey, I took comfort in knowing that the cathedrals built to artists – the Guggenheim, the Whitney, the Museum of Modern Art – were only a stone-throw away. And, on rare weekends, I could escape suburbia to visit the chapel-like galleries of our country's great cultural institutions. Most of these museum trips were made from New Jersey to Manhattan by way of the Bronx. It is there, on a street of broken windows and forgotten histories, that my family's factory has sat from generation to generation. My father and his father, both "Renaissance Men" of small business manufacturing, would bring me to work on Saturdays when the machines were asleep, and the factory floor settled into calm cold. As my father and grandfather welded in a dimly lit corner of the immense space, I would sit at a desk with a sketchbook and colored pencils, meticulously shading in my own version of Van Gogh's monochromatic sunflowers. When the work was done, my father, grandfather, and I would pile into his van with an animated eagerness, finally ready to fulfill that early-morning promise of a trip over the Harlem River to visit the Metropolitan Museum of Art. If I close my eyes, I can still touch the happiness I felt as we ascended the grandiose marble stairs and got lost in the picturing of the past.

My most powerful childhood memory was made in one of those ritual car rides from the Bronx to Manhattan. It was on one of these early morning trips when I was around nine years old, that I first saw the numbers: 176924 inked unforgivingly into my grandfather's forearm. "Is that a tattoo?" I inquired. "Yes," he replied, "Do you know what it is from?" I shook my head hard. He smiled and took a deep breath. It was on that morning ride to the museum that I first learned what the Holocaust was. As the grandchild of Auschwitz concentration camp survivors, I did not grow up hearing blissful stories of their youth. My family's history is filled with cattle cars in Germany and refugee camps in France and with the imagery of mass murder. My grandfather, then only a young teen, was the only one in his immediate family to survive. Yet, in the face of genocide, displacement, and forced migration, my family's traditions have proven resilient.

A continent away from where my grandparents were born and two generations from the extermination of nearly every branch of my family tree, my life is still cradled by their heritage.

I light candles each Friday night in gratitude of good times and can confidently fall back on the social safety net of my community in times of trouble. I'm able to rely on this cultural community because my grandparents' heritage was preserved and empowered at every step of their exodus. My grandparents' history was documented in the USC Shoah Foundation's Visual History Archive, a repository of Holocaust testimony (https://sfi.usc.edu/what-we-do/collections). Their heritage of food, faith, and music was used as a bridge to build relationships with other immigrants in New York City. And the infrastructure that synagogues offered across the United States as physical spaces in which to retain, practice, and foster our traditions allowed me to learn traditional dances and songs at an early age. That documentation of loss, dialogue and bridge building between the home from which they were displaced and the community which received them, and creation of physical space for cultural heritage was key to my community's resilience during the migrations we've experienced over the past sixty years. From the dispersion of Jews across metropolitan suburbs to Hurricane Sandy's displacement, we've been able to move, build, and bounce back together as a cultural community. These keys of cultural heritage support to boost resilience during displacement, migration, and relocation to a new home are critical to consider in century beset with extreme storms, fires, floods, and other disasters intensified by climate change.

Supporting Resilience in Climate Displacement and Migration

Climate change and the extreme weather events it intensifies are today, and will continue to be, the largest catalyst for migration, and the biggest threat of displacement for communities. The Internal Displacement Monitoring Center estimates that the number of new displacements associated with weather events will reach 22 million for 2019, making that year one of the worst years for climate displacement since record keeping began (IDMC, 2019). The United States is not immune to climate-induced displacement of communities. No matter what corner of this country one calls home – the coasts, the mountains, the Great Lakes, or the Great Plains – climate change is already causing billions of dollars in damages and irreplaceable cultural loss.

Ninety-six percent of U.S. residents live in counties that have been hit by a climate change-induced major weather event over the last five years (Environment America, 2015). In 2017, Hurricane Harvey made landfall as a Category 4 hurricane near Rockport, Texas, dumping more than 30 inches of rain on 6.9 million people (Rice, 2018). The historic U.S. rainfall from Hurricane Harvey displaced over 30,000 people and damaged over 200,000 homes and businesses. In 2018, California experienced its costliest, deadliest, and largest wildfires to date, costing 24.5 billion dollars and displacing thousands of households (Querolo and Sullivan, 2019). And in 2019, historic Midwest inland flooding inundated millions of acres of agriculture, cities and towns, and causing widespread damage to infrastructure. Each of these towns, communities, neighborhoods, and individuals hold their own histories, traditions, landscapes, and cultural practices which are at risk to climate impacts.

I've seen and heard the United States and U.S. Territories climate change story first-hand. In 2016 and 2017, my research partner Eli Keene and I traveled across the United States and

U.S. Territories on a research and storytelling project called "America's Eroding Edges". Our journey took us from Alaska to American Samoa, from Mississippi to Miami to hear, see, and experience the country's climate change story. Funded by the National Geographic Society and partnered with the National Trust for Historic Preservation, we interviewed more than 350 local leaders to better understand the effects of sea level rise, erosion, and climate change on U.S. and U.S. Territory coastal communities, and to identify what support was required by communities in need of adaptation and relocation. The results surprised me. Despite being seeped in a strong, resilient cultural community, when I began work on "America's Eroding Edges", cultural heritage wasn't included in my professional research. I had never heard the term "heritage" used as technical vocabulary. I had no idea what the International Council on Monuments and Sites or the National Trust for Historic Preservation were. I was a climate change researcher. I worked with scientists and traditional knowledge holders, activists and policymakers. I had never met a historic preservationist at any climate event, rally, or negotiation I had been to.

But when asked what climate impacts were affecting their communities the most, local leaders quickly moved past the expected answers of financial costs and infrastructure damage to tell me stories of how a rapidly warming world was disrupting their history, culture, languages, traditions, and identities, and how these cultural disruptions affected the physical, mental, and spiritual health of community members.

In Aunu'u Island, American Samoa, community champion Peter Taliva'a showed us how higher tides are flooding taro fields, killing the central staple food of both everyday meals and ceremonies. Without taro, traditional livelihoods and local food supply are limited, causing community members to consider whether they must abandon their village and relocate to the main island of American Samoa. In Miami, Florida, community advocate and biomedical scientist Dr. Kilan Ashad-Bishop explained how sea level rise threats to the city's multi-billion-dollar waterfront are exacerbating gentrification and displacement in the high ground community of historic Little Haiti.

And in the Native village of Teller, Alaska, Mayor Blanche Okbaok-Garnie showed us how thawing permafrost is endangering generations of her family's graves. Teller is one of thirty-one villages at risk of immediate displacement as a consequence of flooding and erosion across the state of Alaska. From hundreds of interviews conducted in the U.S. and U.S. Territories, the one unavoidable takeaway message is: Climate change is, at its core, a story about the looming reality of losing the places and histories that make us who we are.

Too often we forget how the places in our lives define us and our communities. We've become mobile. Some of us move for school, others for jobs. We lose ourselves in the melting pot of big cities. That mobility is a good thing. It exposes us to a wider world and makes us more adaptive to change. But there will come a point in the not so distant future when those places will be affected by climate change beyond the point of saving. The loss and damage of cultural heritage that comes from severing a community's attachment to a place-based identity is emotionally demoralizing in the short-term and hinders long-term community recovery and resilience. Severed social cohesion, dislocated local knowledge on how to absorb shock events, and weakened

cultural practices involving food, faith, and music that play a vital role in building friendships in new hometowns, erode both the adaptability of individuals and the social safety net of communities. And climate change is not race, gender, or income neutral. Its impacts disproportionately affect low-income communities, communities of color, and women. Centuries of economic, social, and environmental injustices have made it difficult for them to secure resources to prepare for and recover from disastrous events (Shepard and Corbin-Mark, 2009).

Back in 2016 and 2017 when I traveled across the United States and U.S. Territories to learn what local leaders needed most to prepare for the potential displacement, migration, and relocation caused by climate change impacts, they shared a common need for resources with which to document cultural loss, opportunities to speak with and connect their community to the communities receiving displaced residents, and physical spaces in their new hometowns in which to house heritage assets and practice cultural traditions. Documentation, dialogue, and dwellings – the same three keystones of my family's resilience.

To support resilient migration for climate-affected communities in the United States and U.S. Territories, at every step of the migration process climate change policies must allocate resources for the documentation, enablement, and physical housing of material and practiced cultural heritage. At present, the damage to and forced displacement of diverse communities and their cultural heritage within the United States and U.S. Territories due to climate change impacts is not readily addressed in any city, county, or state climate policy. The absence of support for the cultural heritage of climate change migrants is dangerous – but it's fixable.

City and state governments could support the documentation of loss and damage by funding programs from their own budgets and offices, or support non-governmental programs that are already focused on cultural heritage documentation and rescue. If pursuing the former option, those governments could empower Cultural Heritage, Cultural Affairs, and Historic Preservation Offices to provide such support at the state and local level through specific climate documentation grant schemes for new residents. If pursuing the latter option, local governments could partner with non-governmental programs like the Smithsonian Cultural Rescue Initiative to support disaster recovery of cultural heritage. The Smithsonian Institution, in partnership with the Federal Emergency Management Agency and fifty-nine national service organizations, runs the Heritage Emergency National Task Force which responds to natural disasters, aiding in the recovery of cultural heritage in U.S. states, territories, and local communities (Smithsonian Institution, 2020). Whether relying on internal capacity or on external capability, such a low-cost migrant heritage grant program embedded within climate change policy would create a number of co-benefits beyond the preservation of important cultural practices and assets of migrants. The creation of oral histories, exhibits, and other forms of documentation can simultaneously educate about climate change, build social connections between city institutions and migrants, and foster in migrants a sense of inclusivity and belonging in their new home.

The establishment of a committed civic forum like a dedicated climate town hall discussion about displacement, migration, and emplacement between city neighborhood leaders and

displaced community leaders is a straightforward first step toward bolstering resilient climate migration. Partnering with already-proven frameworks like the U.S. Global Change Research Program's Resilience Dialogues to initiate dialogues about migration between displaced and receiving communities within regions of high climate displacement vulnerabilities (California, Louisiana, Texas, and Georgia, Florida and the U.S. Caribbean Territories, and Alaska) is a low-cost means of jumpstarting the inclusion of climate migration and cultural heritage into city policy (Luers and Kuperberg, 2016). Using a participatory action approach, these initial dialogues can help to define a replicable and scalable framework for effective displaced-receiving community migration dialogue. The engagement of community stakeholders, adaptation, planning and disaster management practitioners, and researchers from the natural, social, and health sciences is key to the success of this project. Climate and disaster-induced migration is a cross-sectoral challenge. A successful dialogue between displaced and receiving communities requires engaged participants from a diverse array of disciplines, communities, and professions if the safe, empathetic, and successful retreat of coastal residents to inland towns and cities is to be effected.

As migrants adopt new home neighborhoods in receiving cities, it is critical for them to simultaneously build connections to new neighbors and strengthen social ties within their displaced community. This requires mitigating the potential for socio-economic tension and racial discrimination while uplifting and preserving the cultural heritage, identity, and living traditions of climate migrants. Having affordable and easily accessible indoor and outdoor physical spaces in which to practice traditions as a group and sustain the social cohesion of a displaced community is essential for resilient emplacement. Ensuring that climate migrants have space in which to dance, garden, sing, play music, weave, or offer youth culture camp to teach traditions is critical to the resiliency of displaced populations. Migrants rely on these networks in times of shocks – climate-induced disaster or otherwise – for health, social, and economic support. Unlike the documentation of cultural loss and damage that may frame culture as static, communities and their heritage are constantly changing. Creating or opening already existing public space for the practice and sharing of cultural complements documentation of lost heritage by supporting dynamic, living heritage.

Including cultural heritage in climate change policies will require individuals from the cultural heritage community to be active in the writing and implementation of climate policies. Without the efforts and expertise of the heritage field, places that have defined people for centuries will be devastated by climate impacts. Every individual reading this volume on climate change and heritage has a part to play in uplifting and empowering communities in a rapidly warming world. Preservationists can play a critical role in helping communities affected, and displaced, by climate change to survive, and can inspire action by helping make historic buildings accessible to and welcoming of climate migrants. Architects can design flexible structures that can withstand extreme weather along the coastlines or in the United States and U.S. Territories' heartlands so that migrants and receiving communities are safe. Urban and regional planners can re-imagine and design more equitable cities, and design public spaces that build a web of social cohesion between communities. Oral historians can document loss and damage to

intangible traditions. Developers, insurance agencies, and investors can guide, advocate for, and implement carbon-neutral climate-ready cities. Bankers can pioneer climate finance strategies that support a resilient future. The places in the United States and U.S. Territories that residents love and care for need not only preservation expertise, but also pathways to becoming part of our country's climate change solutions. We must work together in big and small ways to step up and support communities.

As early as the coming hurricane season when the next large-scale extreme storm or flood hits, coastal residents will be forced to move. While a handful of communities will be able to accrue adequate resources and have time to plan for a wholesale community managed retreat, most will be displaced without knowing where their next home will be. As families face the physical, mental, and spiritual health challenges of dislocation and seek new homes on safer ground, they are often forced to leave culturally important places, landscapes, traditions, and histories behind. An influx of dislocated people holds the very real potential to tip economic and racial tensions in a receiving community, resulting in discrimination and potential violence. While most research, planning, and discussion of climate-induced managed retreat focuses on the displaced coastal communities, migration is a two-way street. Effective retreat and emplacement inland requires a dialogue between displaced and receiving communities.

There is an immediate need to invest in processes that engage both displaced and receiving communities in planning for climate migration and preservation of cultural heritage. This need will only increase in the years to come. By the end of this century, more than thirteen million U.S. and U.S. Territory residents will be at risk of displacement by sea level rise alone (Hauer et al., 2016). A 2018 United Nations special report, *Global Warming of 1.5 Degrees Celsius*, notes that more than 6,000 scientists have concluded that humanity has until 2030 to contain a climate change catastrophe (United Nations, 2018). The report calls for the "upscaling and acceleration of far-reaching, multilevel and cross-sectoral climate mitigation and by both incremental and transformational adaptation".

Amidst the onslaught of recent climate publications warning that global leaders have done too little too late, it's hard not to feel hopeless and helpless. But then I think about my own family's story of displacement and migration, the strong cultural community that raised me, and how we found hope even in the darkest of times. Each spring, Jewish communities around the world commemorate the people, communities, and cultures lost during the Holocaust. I usually spend Holocaust Remembrance Day listening to the stories of survivors at local events and watching my grandfather's personal testimony on Youtube. This passing down of history from one generation to the next, the preservation of our heritage so that others can rely on its foundation, is known in Hebrew as *l'dor v'dor*. In a word, it means resilience.

Sea level rise, wildfires, and extreme weather events are already causing the displacement and resettlement of communities on every continent. Grounding climate policy in *l'dor v'dor* – safeguarding heritage to build resilience to the climate catastrophes we can no longer avoid – is urgent. We cannot afford climate silence from anyone in the cultural heritage movement. Inaction is not an option. The threat to communities across our shared planet is far too high.

The recording of Victoria Hermann's March 5, 2020 symposium presentation can be found at https://www.youtube.com/watch?v=4r3C5Sccgyo

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Intangible Cultural Heritage*

Janene Yazzie, Sustainable Development Program Coordinator, International Indian Treaty Council

*The following is a word-for-word transcription of the English-language portion of the talk given by Janene Yazzie on Thursday March 5, 2020. An opening greeting and a closing salutation in *Dine'e* have not been transcribed. Because there are no footnotes or references, the accuracy of statements and figures cannot be corroborated. Ms. Yazzie did not submit a revised version of her talk for peer review.

Hello relatives. My name is Janene Yazzie. I'm born for the Black Street Wood People and the Bitter Water clans of the *Dine'e* Nation – also known as Navajo, for those who like to use our English name. I'm from a land of an ancient inland sea where, over time, the transition to a desert ecosystem made our territories to the Western eyes seem valueless. That is, until the discovery of rich oil, gas, coal and uranium deposits. In my language, *dine* means the human beings. More accurately, as we live our lives we hope to become [words in Dine'e] – which means the Five Fingered Holy Earth Surface People. [Dine'e word] literally means the place where our footsteps lie.

Fun fact: If you were to spin a globe and put a pin down randomly, a *Dine'e* has probably been there, so I claim ownership over a large part of our globe. I have with me a [Dine'e word] bag. We also call these our *jish*. Our medicine pouches. We carry within it all of our secrets and all our medicines. And I brought it with me today because I thought it would be appropriate, talking about cultural heritage, to remind me as I'm speaking as well as everyone here that in my culture what lies in this bag as well as the knowledge system and the practices and the communities and the social structures and the science behind everything that goes into it are deeply connected and cannot be separated. Together they represent our cultural heritage. As such, out approach to the subject matter is slightly different. For example, part of my early work was to form the Little Colorado River Watershed Chapters Association. And it was a community led watershed landscape skill decentralized resource management project. We set a small goal for ourselves. We organized ourselves informed by our oral histories as well as the practices of traditional land use management and leadership structures. We worked with our traditional landscapes, learned and revitalized the wisdom in our oral histories to bring back the ceremonial processes such as prayers, crystal gazing, and earth offerings to guide our work. We created pathways for intergenerational teaching of land and animal stewardship techniques. Even taught natural building and forest management as intimately connected and sacred responsibilities

that were bestowed upon our peoples. We identified and harvested medicinal plants and identified and restored natural springs. Always in everything, practicing cultural protocols that make us *Dine'e*. Through this process, we identified and documented evidence of ancient landscape manipulation, and management of irrigations spring restoration, aquifer recharge, livestock and wildlife storage ponds. Basically, recreating the story of the land and our people's relationship with it to inform how do we confront the modern day challenges of climate change, but also the modern day political threat of water rights and water rights security.

We took everything that we learned and everything that we created to inform our positions as we approach water rights negotiations in the Southwest – which, for a long time, was the number one way that the dry Southwest was going to address the impacts of climate change. "Let's just settle the Indians' water rights claims to our water resources." It was an example of how valuing and preserving cultural heritage can inform important, groundbreaking policies discussions, but also how unready the world is in accepting that even in the midst of our shared threat posed by climate change

What we learn is that Western culture is too invested and too dependent on the fruits of colonization and the lifestyles they have generated and the institutional myths that have been developed to support them. I have a tendency of always incorporating a quote from a book that I'm reading, and I'm currently reading "Sapiens" [by Yuval Noah Harari], so bear with me. There is a quote from there that really stuck out to me, and it says: "Ever since the cognitive revolution, sapiens have thus been living in a dual reality. On one hand, the objective reality of rivers, trees and lions. And, on the other hand, imagined reality of God's nations and corporations. As time went by, the imagined reality became ever more powerful, so that today, the very survival of rivers, trees and lions depends on the grace of imagined entities such as the United States and Google." Now there are some things in the book that I kind of have conflict with, but for the most part it's filled with a lot of great seeds of wisdom and of perspective. And this is one of those quotes where I feel a lot of truth, but at the same time feel a lot of conflict. I'm going to share with you an excerpt from the Navajo Nation's *Dine'e* codified fundamental law. This is our natural law and declares and teaches that the four sacred elements of life – air, light and fire, water, and earth and pollen in all their forms – must be respected, honored and protected for they sustain life. And the six sacred mountains – *Sisnaajiní, Tsoodził, Dook'o'oosłiid, Dibé Nitsaa, Dzilná'oodiłii, Ch'óol'í'í* – and all the attendant mountains must be respected, honored and protected, for they as leaders are the foundation of the Navajo Nation. And all creation from Mother Earth and Father Sky to the animals – those who live in water, those who fly – and plant life have their own laws and have rights and freedom to exist. And the *Dine'e* have a sacred obligation and duty to respect, preserve and protect all that was provided. For we were designated as the steward of these relatives through our use of the sacred gifts of language and thinking. And Mother Earth and Father Sky is part of us as the *Dine'e*, and the *Dine'e* is part of Mother Earth and Father Sky. The *Dine'e* must treat the sacred bond with love and respect without exerting dominance for we do not own our mother and our father.

The rights and freedoms of the people to the use of the sacred elements of life as mentioned above and to the use of the land, natural resources, sacred sites, and other living beings must be

accomplished through the proper protocol of respect and offering. And these practices must be protected and preserved, for they are the foundation of our spiritual ceremonies in the *Dine'e* of life way. And it is the duty and responsibility of the *Dine'e* to protect and preserve the beauty of the natural world for future generations.

I like our myths. They mean everything to us. They're the ways that we've built resilience in the face of the horrendous catastrophe. And in this era of climate change, it is the way that indigenous peoples have been finding leadership and going to the front of the climate change movements to provide pathways to alternative futures that were really hard to imagine in populations that did not have the privilege of growing up with these alternative world views. There are so many examples of indigenous peoples on the front lines of climate change that have turned to their cultural heritage to provide answers. And there are also many examples of different nations where it is no longer possible for them to rely on their cultural heritage. The life giving rivers and food systems are too contaminated, are depleted to non-existence. Lands, territories and resources have been taken away, monopolized, extracted for profit and the benefit of urban development hundreds of miles away. Sacred sites have been bulldozed, erased from the earth for a pipeline or border wall, along with the sacred ecosystems that were the real wealth of those lands. Knowledge systems if not erased then were hidden underground for generations because of the real dangers of speaking our language, practicing our prayers, or dancing in our ceremonies. Civil rights that were only recently won. Knowledge systems are now held among a few precious elders who are battling the effects of lives hard lived in sacrifice zones that have them surrounded by the cumulative effects of all forms of resource extraction.

In all of these situations, we don't have the luxury to ignore the real history and ongoing legacy of colonization, and the particular Western cultural heritage – both scientific and religious – that underlies the institutions of power in the developed world. Institutions that have been built on the blood that has been shed of both indigenous peoples and African slaves. To address this reality in a meaningful way means to be clear about those dynamics and the way they still inform climate action from fortress conservation and land grabs for large scale solar, wind and hydroelectricity development, human rights abuses, and lithium mining, and the deafening silence around the issue of voice that still comes with transitioning to a renewable energy future. Especially when so many people still believe nuclear energy is a pathway to that future.

This topic of nuclear energy is a sore topic with me because it impacts our sacred sites and has been. Impacts our sacred soils and water resources. And the impacts in particular on our relatives. There's recently been a study – there's been so many studies, but most people don't know about them. But the most recent one is called the Navajo Birth Cohort Study which shows that it's possible to transfer uranium contamination exposure through the uterus to the fetus, so our babies are being born with uranium in their bodies the equivalent of male adult miners. With female children who develop all the eggs they will carry in their lifetime. That means three generations are already impacted in one pregnancy. And many disposal sites are threatened by the impacts of climate change.

In an era when the world has been galvanized by Greta [Thunberg] to not fail this generation, it would too much to humble and stir us to recognize that we have already failed the next generations – if not four. We must and can do better. Working collectively to not only understand the reality of how we have gotten to this place is a start. Identifying the different dynamics around cultural heritage can improve our strategies. And working together to create a more inclusive dynamic earth-based global culture is one of the visions I hold for the future of our great grandchildren. International Indian Treaty Council and the Indigenous Peoples' Major Group have done much to contribute in building the pathways to this future. To stem the tide, we must work off those best practices which are centered on the understanding that upholding the rights of indigenous peoples is paramount to preserving our cultural heritage, our cultural sites, and our knowledge systems. And our collective future.

Key to this is Article 31. For those of you who have not read the UN Declaration on the Rights of Indigenous Peoples [see https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf], Article 31 in particular is in reference to our traditional knowledge and it states: "Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge, and traditional cultural expressions as well as the manifestation of their sciences, technologies and cultures including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora" and so on. Again, there's not a distinction between tangible and intangible cultural heritage in our communities as they exist as deeply interconnected. In Article 25 of the Declaration it states: "Indigenous peoples have the right to maintain and strengthen their distinctive spiritual relationship with their traditionally owned or otherwise occupied and used lands, territories, waters and costal seas, and other resources. And to uphold the responsibility to future generations in this regard." In presenting these, I am by no means trying to feed into the myth of the "noble savage" – a myth that was largely perpetuated by well-meaning white conservationists. We did not live in an ideal world pre-contact. We were not free from having our own devastating ecological footprint. But, the development of our earth-based knowledge systems and socio-cultural and political structures was disrupted by colonization. What has survived in terms of our cultural heritage has evolved over time so that many things may not look the same as they did five hundred years ago, but some basic elements and principles still do. And if indigenous peoples are given the right to exist in their customary lands, we can do a lot to help inform mitigation and adaptation techniques – especially when we can exchange knowledge with each other.

Andrea Carmen, our Executive Director [of the International Indian Treaty Council] told me this funny story she heard from one of our relatives in the Arctic where they're discussing the fruition of an ancient prophecy of strange animals coming into the territory as a sign of a shift of a changing and disrupted world. The Elder, hearing all the stories and feeling a lot of the fear that was being generated in the space, ended up disrupting the whole conversation. And, standing up, said, "You know, I think we'll all be okay as long as someone tells us how to eat them."

All jokes aside, time is of the essence. Climate change is already leading to forced migration, and we heard a lot of harrowing statistics in Victoria Herrmann's presentation. Ocean

levels have risen four to eight inches in the last one hundred years, and in the last twenty years they have risen at double the rate of the previous eighty – which was a projected rise by two thousand one hundred of three to six feet. Indigenous peoples facing forced relocation include Tuvalu in the Pacific and the Shishmaref in Alaska, and many, many, many more. And we're always confronted with this question in our climate change work: What will the identities of those relocated indigenous peoples and nations be? And the question I ask myself and that keeps me up is: Can we afford to find out when indigenous peoples have knowledge systems and cultural customs that can inform sound, comprehensive and eco-smart climate change solutions?

To begin to start to document these impacts and effects and how to turn it into policy and inform these international negotiations, IITC has conducted a survey called the North American Indigenous Peoples Traditional Knowledge and Climate Change Road to Paris Questionnaire. They received 318,000 responses and it provided input at the COP [Conference of the Parties] where the Paris Agreement was being negotiated, and 98% of respondents said they'd seen the impacts of climate change in their environment, weather, food systems, and our land base. And ninety-six affirmed that their own people's knowledge and practices can be useful in addressing or responding to the impacts of climate change. But indigenous people were still left out of those negotiations. Literally had the doors closed on them. It bears to note also that the position of indigenous peoples in those negotiations was that they were advocating for a one degree cap.

Despite not being successful in that, the Paris decision recognized indigenous peoples' knowledge and practices, establishing a local communities and indigenous peoples platform. It says, and I quote, in Paragraph 135: ". . . recognized the need to strengthen knowledge, technologies, practices and efforts of local communities and indigenous peoples related to addressing and responding to climate change and establishes a platform for exchange of experiences and sharing of best practices on mitigation and adaptation in a holistic and integrated manner." This was then picked up and adopted in a UN Human Rights Council resolution which says: ". . . recognizing further the increasing impacts of climate change on human rights and the specific impacts on the rights and ways of life of indigenous peoples around the world, and recalling the preambles of the Paris Agreement and the Paris Decision, acknowledging that states should, when taking action to address climate change, respect, promote and consider their respective obligation on the rights of indigenous peoples."

In the U.S., there has been little to no movement to actually respond, address or acknowledge any of these advancements. And so the challenge is up to us to turn these milestones into recognized action. Every day around the world we lose more than 350,000 people to lack of access to clean water or to civil strife exacerbated by climate change, or to forced migration. We also lose that many to exposure related illnesses. That is more than the entire population of my nation. Climate change is not the "threat" that needs to be defeated. Corporate capitalism, anthropocentric approaches to development, and greed are the threats we need to address if we truly want to nurture the paradigm shift our world so desperately needs. We cannot build solutions without addressing these things because, although I've heard this in the conference

language throughout the day, it seems to imply that climate change has "evened the playing field". Indigenous peoples and other vulnerable populations that have the smallest carbon footprint remain the most disproportionally impacted because of the legacy of injustice in these institutions. This is why the International Indian Treaty Council continues to build platforms to exercise these rights and develop national and international policies to uphold these rights, and why we're so glad to be part of the Climate Heritage Network. To build a new alliance and new partnerships that can take a different approach to these issues.

That is also why the Indigenous Peoples Major Group has developed the gold standard on rights-based approaches to development. In fact, I will be testifying on the gold standard in the U.S. House of Representative on March 24th and hope we will continue to see the advancement of action to honor and uphold the indigenous peoples' rights no matter what party is in office. But, my hopes aren't that high. We need a people-led movement in order to respond and respect and educate ourselves about these rights, because coming from my nation and the work that I do every day, people are more excited about our knowledge systems than they are about protecting our peoples. They're more committed and there's more resources for extracting and codifying, articulating and publishing those knowledge systems than there is to protecting our children and ensuring that our population has access to clean drinking water or other basic human rights.

If everything that has brought us here is really just a myth we developed to organize ourselves, it is my hope we can recognize the beauty of this era and the challenges we face to develop the myths that will restore our relationship to one another and to the natural world. So let's do it. Let's develop the myths that will hold this together and move us forward.

The recording of Janene Yazzie's March 5, 2020 symposium presentation can be found at https://www.youtube.com/watch?v=hDAO0FC2CeI

Museums Facing Climate Change. All Hands on Deck: Moving Past Climate Science and into Culture

Nicole E. Heller, Curator of Anthropocene Studies, Carnegie Museum of Natural History

> Human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems. . . . Warming of the climate system is unequivocal, and since the 1950s, many observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and the sea level has risen.
>
> —Intergovernmental Panel on Climate Change, 2014

Scientists have understood the basic physics of anthropogenic climate change since the 1890s. Sustained scientific and governmental attention grew through the 20th century, but it wasn't until 1988 that the greenhouse effect really had public attention in the United States. Precipitated by extreme heat, fires and drought that year, the news media started publishing front-page and cover stories about global warming. That same year, endorsed by the United Nations General Assembly, the Intergovernmental Panel on Climate Change (IPCC) was organized to prepare comprehensive reports about the state of knowledge of climate science and the social and economic impacts of climate change. The IPCC reports were intended to aid in ongoing international policy negotiations as part of the United Nations Framework Convention on Climate Change (UNFCCC). Since 1990, there have been five major IPCC assessment reports and a number of special reports. After more than thirty years of intense scrutiny by thousands of scientists the world over, the scientific consensus on climate change is overwhelming (Cook et al., 2016).

Despite this remarkable scientific consensus and three decades of international policy work, not to mention significant personal experience with extreme weather by the public, there remains a popular perception that the science is still under debate, and the extreme weather is just natural variation. This perception works to keep people in many regions and many

professional sectors – including museums – quiet about climate change. Indeed, promulgation of the idea that there is scientific disagreement about climate change is a political tactic manufactured to slow climate action (Orsekes and Conway, 2010). The science of global warming is not controversial. Rather, the controversy lies in the socio-cultural, political and economic dimensions of how to respond to climate change. This distinction about where the controversary lies is crucial for thinking about the role of museums in climate discourse.

There is no doubt that the museum field has been paying attention to climate change (Newell et al., 2017). In recent years, climate change and the related topic of the Anthropocene has become a major theme for museums exhibitions worldwide (see https://mccnetwork.org/exhibitions for a chronology of exhibitions). While these exhibitions draw attention to the issues and offer inspiring and educational content, they often focus narrowly on the science of rising temperatures, melting glaciers, and green technology, in isolation from the moral–political and socio-cultural dilemmas and opportunities of climate change. Essentially, there has been a long-standing mismatch between the problem and the discourse. For decades the climate story has focused on science and put scientists in the lead. But the most relevant story starts where the science leaves off. It is the story about the social life of climate change – namely the politics, morals, cultural norms and social inequities driving the climate emergency.

Given the urgency of the climate emergency and the public facing nature of museums, the museum sector can and should go much further in its engagement with climate change than the creation of temporary exhibitions. The next steps for museums are mainstreaming climate change mitigation and adaptation into all of their operations and bringing institutional policy in alignment with 21st century social and environmental agendas.

Museums and Cultural Production

Museums are not only providers of heritage preservation, research and informal education, they also play significant roles in shaping contemporary cultural norms and community identity. Because of their institutional authority, museums influence what communities consider to be important and relevant. Museums exert this influence through the practices of building and maintaining collections, mounting exhibitions, and creating programming. This special role of museums in cultural production – i.e., the generation and the circulation of shared understandings, forms and practices - suggests two major categories of action for museums vis-a-vis climate change.

Firstly, museums need to walk the climate walk. This means that museums need to address the material relationships between their operations and climate change. Energy assessments are needed to understand sustainability performance with respect to greenhouse gas emissions and changing climate conditions. Mitigation planning is needed to reduce impacts. Adaptation planning is needed to reduce vulnerabilities. What is the museum doing to reduce the energy needs of its buildings, collections, and exhibitions? How are carbon emissions being factored into the investment policies for endowments? Is the museum demonstrating sustainable practices in gift shops and cafes? What is the museum doing to adapt its buildings and collections so

that they are resilient in the face of increased hazards related to extreme heat, extreme rainfall, and sea level rise? This first activity is the foundation for the second.

Secondly, museums need to talk the climate talk. Museums should speak about climate change often and in many different ways. Speaking about climate impacts and a museum's adaptation and mitigation efforts is important and necessary, but the museum must also talk about deeper subjects related to the history and philosophy of the institution itself – its symbols and aesthetics, its collections and collections practices. How has this history been shaped by a culture that is also responsible for the problem of climate change? Inquiry into these deeper subjects allows museums to re-examine the ideals, values, assumptions and cultural norms they promote which may be perpetrating climate change. These inquires need to be structured in ways that support learning and reflection among museum staff and board members as well as dialogue with the public. Through a comprehensive strategy of action and inquiry museums can model and provoke the kind of deep dialogue, self-reflection, transparency and willingness to change which are necessary to support meaningful climate action across society.

Building a New World

Museums have another special capacity that is valuable for addressing climate change. They are spaces of imagination. Fundamentally, dealing with climate change is project about imagining the building of a new world - a sustainable world in which people want to live. There are many opportunities for museums to re-frame the dialogue about climate change from doom and gloom to positive futures. Museums can work with communities to construct empowering narratives of resilience and renewal. In this vein, the fact that the climate is changing due to human activities is good news. If the observed increase in global temperature in recent decades was natural variation as some prefer to imagine and not the result of human actions, then there would be nothing people could do about it. If we accept the reality of human-caused climate change and embrace that reality, then people have the power to join together to fight it using that fight as a force of positive transformation in the world.

Author Naomi Klein expressed the possibilities inherent in climate change:

> "I am convinced that climate change represents a historic opportunity on an even greater scale . . . the chance to advance policies that dramatically improve lives, close the gap between rich and poor, create huge numbers of good jobs, and reinvigorate democracy from the ground up." (Klein, 2014)

Put simply, climate change is a catalyst for change. It is an opportunity to make communities and places healthier and more resilient than they currently are. In my work, I often describe climate change's radically re-orienting effects as 'a rug being pulled out from under us.' Rather than being depressed and hopeless, can museums tap into their communities' shared hopes and values to find empowerment and possibility in climate change? Every institution has its own authentic, unique, and deeply relevant story to explore in facing climate change. It will be

through stories that combine deep, honest self-reflection and creative imagination about change that the seeds of social transformation will sprout.

Museum Activities

Walking the Climate Walk

If museums want to effectively stem the tide on climate change and use their resources to convene dialogue they must get their houses in order first. A few of the big issues facing museums include the high energy use associated with building operations, collection care, and exhibition and travel practices; endowments invested in companies which promote the use of fossil fuel and board members and funders connected to those companies; as well as inequitable labor practices with museum employees. It is beyond the scope of this article to address all of the ways museums can change to achieve more sustainable operations and a reduced carbon footprint. This subject is explored in Henry McGhie's contribution to this volume, and through toolkits and frameworks developed by organizations such as Julie's Bicycle and Sustainability in Conservation. This essay will focus on the relationship between museum climate action and museum climate talk.

Museums have a prominent role to play in convening dialogue on climate change. Museums need to deeply integrate the issue of climate change into their core operations and mission in order to find their authentic voice for leadership and engagement. People are not stupid and when a museum engages with topics in partial or incongruent ways, people notice. If a museum mounts an exhibition about plastic waste and single-use plastic water bottles are on sale at the concession stand, people notice. Such a lack of correspondence between ideas and material practices undermines the value of the museum engagement. For this reason, it could reasonably be argued that a museum should start addressing its role in producing climate change prior to engaging with the public about the problem of climate change in exhibitions and programming.

Another issue for consideration relates to the dynamic between temporary engagement and long-term change. Museums want to be relevant and dynamic in exhibitions and programming, so there is a high premium on temporary engagements and turnover in displays. However, even if an exhibition or program series about climate change is temporary, climate action should not be temporary. In the best museum exhibits, the material choices and aesthetics of display and design correspond to the ideas being presented. The same is true for the museum at large. Climate change is a big idea for the entire museum. How can the museum express those ideas in its aesthetics and material practices? At the Carnegie Museum of Natural History, when the exhibition department developed the temporary exhibition, *We Are Nature: Living the Anthropocene*, about the impacts of humans on the global environment, it made the decision to used recycled materials. This created an aesthetic that worked with the themes of the exhibition (Figure 1). When the exhibition was over, furniture, books and display materials were re-purposed to continue a process of re-use and thrift.

In the process of hosting *We are Nature* the museum learned another important lesson. Museums need to make their sustainability work which goes on behind the scenes visible as part

FIGURE 1. The Carnegie Museum of Natural History's "*We are Nature: Living in the Anthropocene*" used recycled materials, such as re-used wood pallets, in the design to create an aesthetic in which the materials reinforced the ideas under consideration in the exhibition. © Carnegie Institute.

of public engagement. When visitors encountered *We Are Nature*, they were prompted to ask questions about what the museum was doing to address sustainability. Those visitor questions prompted the staff to do a better job of gathering and organizing information about the ongoing sustainability work conducted by the museum's operations departments and to start sharing those facts with staff and visitors. For example, the museum had reduced its greenhouse gas emissions by 2/3 when it shifted its boiler plant from coal to natural gas in 2009. It had also significantly improved the efficiency of lighting and water use. To make these changes visible and emphasize sustainability as part of best business practices, interpretive signs were added to

the museum's halls and talking points were developed to help staff quantify the impacts. The experience with *We Are Nature* demonstrates how engagements, be they temporary or permanent, are most impactful when developed as part of a larger pathway of comprehensive climate change adaptation and mitigation.

Talking the Climate Talk

Since 2008, the Yale Program on Climate Change Communication in partnership with the George Mason University Center for Climate Change Communication has been surveying U.S. adults using a standard set of questions which gauge beliefs, attitudes and policy preferences about global warming (Howe et al., 2015). This longitudinal study shows that public belief and support for action has increased since 2014. In 2020, 72% of people believed global warming was happening; 57% understood that it was human-caused; and 55% understood there is a scientific consensus about the cause of climate change. However, only 35% of respondents said they talk about it occasionally (Figure 2). This imbalance among belief, understanding cause, and conversation about climate change is a problem. How can one fix a problem if one can't talk about it and its causes remain obscured?

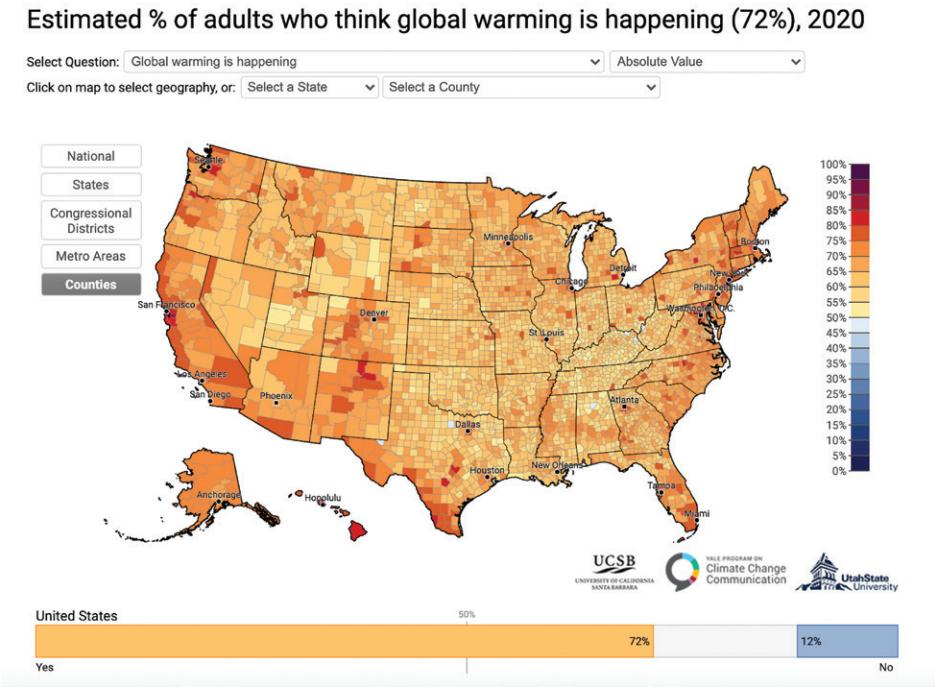
In both rural and urban communities, people systematically undervalue their community's concern about climate change – probably because they are not speaking about it (and because there are vocal minorities sowing dissent). Silence reinforces the impression that climate change is controversial. Research has shown that highlighting scientific consensus about climate change increases acceptance, even among those who are ideologically resistant (Lewandowsky et al., 2012). Overcoming this cycle of silence by getting people talking about climate change – including clearly establishing that there is a scientific consensus about it – may arguably be the greatest role that museums can play to stem the tide.

Going Deep and Making Connections

Making Space for Emotions

In the quest to normalize speaking about climate change, it is important to recognize the significant anxiety and psychological fear people are suffering about it. Oxford's Word of the Year for 2019, chosen to reflect the mood of the times based on evidence of usage, was "Climate Emergency" (https://languages.oup.com/word-of-the-year/2019/). "Eco-anxiety" was a runner up. In response to direct experiences and anticipated ecological loses, climate change is impacting mental health in a multitude of ways (Cunsolo and Ellis, 2018). When planning climate change deliberations in museums, there is a need to tread carefully and situate engagements in the context of the ecological grief and other complex emotions with which people are coping (Lertzman, 2015; Allen and Crowley, 2017).

Making space for the expression of feelings and working to honor and channel strong feelings productively may be particularly needed practices in science museums. Scientists are notorious for not being outstanding public communicators (Olsen, 2009). Sincere in wanting



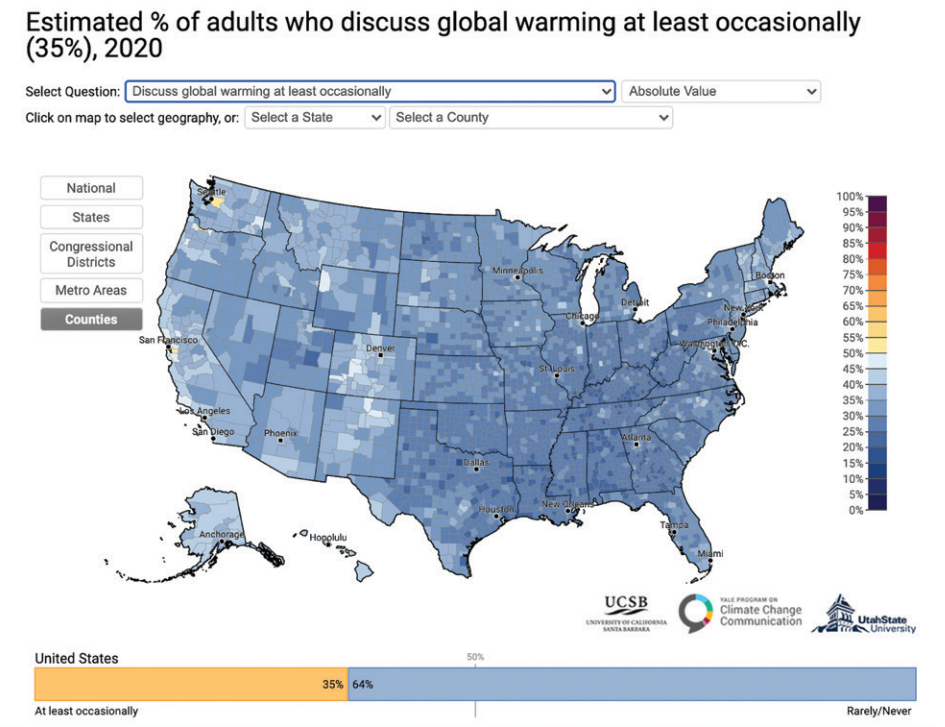


FIGURE 2. Maps show the results of 2020 national survey of American adults conducted by the Yale Program on Climate Change Communication (for details on the methodology, see Howe et al., 2015). (*top*) The majority of U.S. adults believe in climate change. (*bottom*) The majority of adults don't talk about it. https://climatecommunication.ycom-us/

people to understand the urgency of the problem, and standing on a sea of evidence, scientists may unintentionally be overwhelming people. In the face of this wicked global problem, people may just shut down. Acknowledging and holding space for complex mixtures of feelings - grief, fear, anger, hope and joy - in the process of talking about climate change may be a particularly helpful practice for museums to support.

A large portion of the exhibition, *We Are Nature: Living in the Anthropocene*, was dedicated to emotional processing and visitors were provided with opportunities to share their feelings through words and art (Figure 3). Visitors spent long times in this part of gallery and showed remarkable levels of genuine engagement with the content. This aspect of the exhibition has influenced the approach of the education and science teams moving forward. A current collaborative project with learning scientists at University of Pittsburgh Center for Learning in Out of School Environments, is experimenting with how scientific inquiry about climate change can be effectively explored when nestled into engagements that begin in personal emotions, values and sense-of-place.

Addressing Injustice

In normalizing talk about climate change, and doing it in empathic, socially sensitive ways, it is essential to discuss the social inequities embedded in the climate problem. Climate change and related global environmental problems of the Anthropocene tend to be framed in appeals to a unified collective humanity. Universalizing climate change into a collective "we" problem is a tactic to maintain focus on the enormity of the climate crisis and appeal to people's sense of collective action. But this tactic also serves to undermine the real lived experiences of different communities both today and in the past. Research shows time and time again that low resource communities and communities of color are disproportionately experiencing the effects of climate change and related ecological loses. Rob Nixon warns about storytelling that ignores the unevenness of human experience and power and risks becoming "the kind of totalizing gesture that suppresses the radically unequal history of human impacts and hence of human responsibilities" (Nixon, 2017). Kathryn Yusoff draws attention to the way universalist tropes hide histories of racial oppression and dehumanization embedded into the environmental science itself (Yusoff, 2019). Climate change narratives of rupture and end-of-the-world projections beg an examination of the questions "Whose world is ending?" and "Whose world has already ended, perhaps many times over?"

If museums avoid talking about social inequities as part of climate change discourse, this may create an artificial separation of social and environmental agendas. This separation may limit the efficacy of problem-solving to address multiple challenges simultaneously. In the worst case, issues of social justice and climate change can compete with each other for money, time and attention. Treating these issues as separate also diminishes opportunities to identify shared systems of oppression and dominant modes of thinking. For museums, finding alignments and synergies at the intersection of initiatives related to sustainability, diversity, equity, inclusion and access, anti-racism, as well as decolonization is a critical enterprise. How much faster and

FIGURE 3. In the exhibition *We are Nature: Living in the Anthropocene*, visitors were invited to write a response on a Post-it note to the question "What are you feeling about the Anthropocene" and place it in one of nine emotional categories, loosely based on stages of grief. These categories were: Empowered, Motivated, Curious, Depressed, Angry, Guilty, Denial, Disbelief, or Not Concerned. They were also given the opportunity to make art to express their feelings. © Carnegie Institute.

more systemically institutional and societal change will occur when the connections between social justice and environmental problems – historically and in the present – are recognized and addressed in allied ways? Where is that work already happening? What role can museums play in supporting that synergy?

Inspiring New Imaginaries

A third challenge in normalizing talk about climate change is avoiding triggering "climate fatigue." Climate fatigue (or apocalypse fatigue) references the idea that some narratives like stories of doom related to climate impacts have become widespread enough and repeated enough that they are no longer interesting or psychologically safe for the public. Museums may avoid this potential pitfall by taking an approach to climate change that is rooted in the institution's own story – its climate vulnerabilities and culpabilities, its community and sense-of-place, its cultural heritage and social history – all of which can be explored through the imaginative space embodied in collections. Collections can be powerful vehicles for driving reflection about cultural and environmental change, both material and symbolic (Newell et al., 2017). Almost any object, when contemplated slowly and collaboratively can open up a constellation of stories that connect across time and space, people and nature, humanities and science and have relevance to understanding and acting on global change (Mitman et al., 2017). Museums should find different ways of working with objects and communities to cultivate systems- and relational-thinking for deep engagement with topics of sustainability and justice.

Kristin Wehner writes "Collections constitute an inheritance, one that embodies older structures of knowledge, but that also holds great potential to disrupt disciplinary boundaries and established modes of thinking and acting in ways that open up space for new ecological and empathic understandings" (Wehner, 2017). The idea that the museum can use its collections to disrupt established modes of thinking is especially provocative. A starting point might be to examine the composition of a museum collection – the types of objects, the organization, the displays and interpretation. How do systems of knowledge and human choices catalogued in the collection relate to the climate problem? In dialogue with communities, how can those choices be re-considered to imagine pathways of positive renewal and reform? And how might museums through transparent self-reflection function to disrupt established, outdated modes of thinking that are limiting the spread of new ecological and social understandings? The spread of new understandings is essential for creating new cultural norms which are compatible with tackling the problem of global climate change – both its carbon emissions and its social inequities.

Summary Remarks

Climate change is a social–cultural challenge. It is a catalyst for transformative thinking in our society. It can be part of a process of change that dramatically improves peoples' lives, secures the sustainability of ecosystems, and brings greater equity among people within and across nations. Addressing climate change is not about putting on one great show. It's about a systematic

assessment of the entire institution from its material relations to its knowledge production practices, from its object interpretation to its display aesthetics, and from its visitors' engagements to its community relations. The practices of museums, like those of many institutions are implicated in producing and maintaining a crisis of unsustainability and injustice. But, with deep systems-thinking and a willingness to be transparent, vulnerable and courageous, museums can become vital institutions for cultivating imaginations, sensibilities and action for sustainably and justice in the 21st century.

The recording of Nicole Heller's March 5, 2020 symposium presentation can be found at https://www.youtube.com/watch?v=lTy76peLfLQ

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Closing Keynote Address – Julie's Bicycle: An Approach to the Climate and Ecological Crisis in the Arts and Culture

Alison Tickell, Director, Julie's Bicycle

The origins of the climate and ecological crisis are, in large part, the result of the unintended consequences of a particular attitude to science. It sits at the heart of James Smithson's extraordinary act of generosity – a man who had never trodden on U.S. soil bequeathing his fortune to that country because he believed that utilitarian "public science" would flourish better in the United States than in conservative England. Smithson's legacy – more than 100,000 gold sovereigns when he died in 1829 – equivalent to 1/66 of the U.S. economy, built one of the world's leading cultural and scientific institutions.

He believed that "It is in his knowledge that man has found his greatness and his happiness, the high superiority which he holds over the other animals which inhabit the earth with him" (Ewing, 2007:293). And herein lies the sting. His sentiment perfectly captures the unchallenged assumption of the supremacy and legitimacy of an extractive and materialist ideology that was brought to the Americas by Europeans. This ideology has fostered an enduringly uneven global growth model that has dispossessed millions of people of land and livelihoods and degraded the natural world. The climate and ecological crisis is also one of justice: the poorest communities with the least culpability or least capacity to cope are experiencing the most devastating consequences (Meyer and Sanklecher, 2017:1–19). Some 1% of the global population experiences reality as super-consumption (Hardoon et al., 2010:2–6). At the other end of the scale, the figures are persistently distressing; in 2015, 736 million people lived below the international poverty line of US$1.90 a day. In 2018, almost 8% of the world's workers and their families lived on less than US$1.90 per day. Most of these people belong to Southern Asia and sub-Saharan Africa, and more than 160 million children are at risk of living in extreme poverty by 2030 (United Nations, 2017). Decades after the 1992 Earth Summit (United Nations, 1992), climate action is still an ideological and political battleground. Despite all the conferences and commitments, the global response to climate change is still woefully inadequate. An obvious reason is the cost, but it is widely agreed that this is dwarfed by the expense of not taking action (Stern, 2006). Another reason, harder to overcome, is that the call to action is also a reckoning. It exposes the failings of the current global economic order and demonstrates how they drive inequality.

It is no wonder then that, notwithstanding the Paris Agreement, global climate governance, assigned mainly to the United Nations, has not yet succeeded in building the required consensus

for rapid action (Intergovernmental Panel on Climate Change, 2018). The story of climate change is told in the buried histories of human conquest and is anchored in cultural values that underpin human supremacy. The climate crisis is a ***cultural*** crisis. It is the consequence of myths and stories that permeate our lives in profoundly subtle ways and are perpetuated by the dominant culture of many well-intentioned (and some not so well-intentioned) Smithsons.

The root metaphors and narratives – nature as a machine, nature as hostile, nature as something to be exploited, engineered, sold, sentimentalised, improved (what Val Plumwood describes as the "foundational delusion of the West" [Plumwood, 2005:44]) – are as wrong as they are strong. The climate crisis is nature's way of interrupting these pernicious myths. If nature were understood as a web of life, a teacher, a giving parent, creative beyond our wildest imaginations as many indigenous commentators such as Robin Wall Kimmerer in her best seller *Braiding Sweetgrass* have argued (Kimmerer, 2013; Aikenhead and Ogawa, 2007), perhaps climate change would simply be that – change, not crisis.

Narratives about the creative industries (including the arts) that conform to a similar worldview are pervasive. The creative industries are valued – especially by policymakers – as tools of the economy, and the arts and culture are frequently used to reinforce the stories behind any particular worldview. (An obvious example in the UK is how public statues celebrating past slavers, notoriously Edward Colston, became the focal point of the Black Lives Matter protests, which were catalysed by the murder of George Floyd in Minneapolis. This clash of cultural values prompted an angry debate about who is memorialised in our public spaces. These pieces of public art symbolise diametrically opposed versions of history and are particularly painful instances of how cultural values are reinforced through artifacts.)

The power of the arts and culture is notoriously difficult to define as it is ingrained in the intimate experiencing of art, but powerful it undoubtedly is. These experiences can tell us something profound. They can bring people together in mutual love for an artist, for example, and reinforce community and identity. Today that power should be used on behalf of the planet.

Julie's Bicycle (JB) (https://juliesbicycle.com) was founded just before the UK became the first country in the world to enshrine carbon reduction targets into law (UK Climate Change Act of 2008[1]). The arts, like any other sector, have an ecological footprint, and the responsibility for environmental impacts is best focused at their source. Julie's Bicycle set out to understand the nature of the challenge in real terms: What would it take to shift the music industry's ways of working to fit within the ecological constraints of our planet? The arts and culture have much more to offer than reducing the carbon footprint, critical though that is. Unleashing the energy of the creative community, invigorating values that restore our understanding of belonging within nature is the real objective. As the slaver statues show, the arts and culture can reinforce toxic values. But this means that they can also undermine them.

Beyond the arts, the potential of the wider creative industries – design, advertising, film and media, fashion and architecture – to influence change is significant. Julie's Bicycle believes that change needs to come from within the creative industries themselves and involve nothing

less than a systems change (i.e., all of their constituent parts and not just the artists). Julie's Bicycle, which specialises in the arts, has translated the climate crisis into day-to-day currency by creating sector-specific expertise and resources that inspire words *and* action. Its premise is that this will empower the arts to champion ambitious climate action across civil society. In other words, culture changes so that culture can change the world.

In 2008, JB published the first (and still only) report on the carbon footprint of the UK music industry (Bottrill et al., 2008). The report was jointly researched with the Environmental Change Institute, University of Oxford and stewarded by Professor Diana Liverman, the ECI's inspirational and generous head, now at the University of Arizona.

Working closely with the UK music industry, JB generated a new and enduring methodology for the analysis of greenhouse gas emissions. It identified the key impact areas of audience travel (Bottrill, Papageorgiou, and Jones, 2009) and CD packaging (Julie's Bicycle, 2009) with recommendations on how to tackle them. Julie's Bicycle set up high-level music industry interest groups to co-create the "how-to" resources for reducing impacts and commissioned further research. This was converted into industry campaigns, and the Creative Green Tools: carbon calculators for cultural and creative activities such as buildings, tours, festivals, and productions that are used across the globe.[2] Presently, 5,000 organisations and artists, around 2,000 of which are international, are measuring their greenhouse gas emissions.

Those early days created foundational principles, which still guide us:

- Data matters if we are to develop environmental literacy, be accountable, and understand greenhouse gas emissions at a sector level over time.
- Research matters. Change is hard, so doing the right thing and being able to translate this into sector-specific action can make the difference between wasted effort or targeted success.
- Collaboration matters. The tools and instruments of change must be co-created with the people who will be using them.

Over the last decade, JB has expanded beyond music into the performing and visual arts and museums, blending cultural and scientific knowledge to discover how to redesign arts and culture to serve the planet.

Like any other sector, culture is an ecosystem. Changes to one component are felt by all other components. The fundamental changes that climate action demands need to be tackled systemically. There is little point in artists asking for reusable water bottles or designers asking for recycled wood, if the infrastructure doesn't support them. Julie's Bicycle believes that the real opportunity is to *embody* the change. The data and action-research conducted with hundreds of contributing organisations has generated knowledge and skills that can be used to update cultural policy and investment, so that culture aligns with international frameworks and targets. These targets are clear: net zero carbon and the Green New Deal – in the case of JB, the EU Green Deal (Powell et al., 2019) – with a carefully articulated plan to address climate justice in the just transition. Every one of these frameworks can be aligned to the arts and culture.

In 2012, Arts Council England, which annually distributes around £576.5 million (approximately US$716 million)[3] to the arts and culture, embarked upon the largest program of environmental literacy for the sector anywhere in the world. It also became the first national arts funding body to make environmental requirements a condition of funding. All the National Portfolio organisations that the Arts Council funds (currently some 828 receiving core support over multiple years) were asked to measure environmental impacts using the Creative Green Tools and to submit a policy and action plan. The data collection and policies formed a small part of a rich program of research, resource development and knowledge sharing that was evaluated annually. Julie's Bicycle was initially contracted to run the program for three years. By the completion of the current contract (2022), the program will have run for a decade. Results show an annual 4.5% reduction in energy use across 1,200 creative organisations. This is equivalent to more than £16million in energy savings, alongside improved well-being and creative inspiration (Julie's Bicycle and Arts Council England, 2018). Over time the partnership has evolved to be more demanding as 2018–2022 outputs include developing targets for the Arts Council's largest energy users.[4] The endurance of the program is key to its success.

A decade of data-gathering and collective learning has generated credible and robust evidence, which makes a good case for action. Hard data helps us to plan and to scale. Starting from the basics – carbon footprints – the Arts Council's deceptively simple policy is demonstrating how a sustainable cultural sector might actually work.

During the seven-years partnership between Arts Council England and JB, the sector grew significantly yet still reduced its environmental impacts, saving money in the process (Buckley, Johnston, and Tickell, 2016:6) For JB, the partnership also created the financial certainty that enabled us to continue honing our work, learning alongside our creative partners in the field. Over the last thirteen years, we have co-created the largest sustainable culture resource library anywhere in the world, with more than two million web site visitors, developed a culturally specific awards program – Creative Green Certification (https://juliesbicycle.com/creativegreen-certification) – and worked with friends around the world on projects that will contribute to this new field of sustainable culture. All of this work inspires deeper exploration and connections between climate and social justice and between empathy and biodiversity. There is a large repertoire of new knowledge amongst cultural professionals now expert in sustainable practice who have learnt on the job. This vital perspective on culture, seen through the lens of our environment, has stimulated much debate and passion, and spread a dialogue about the purpose of the arts more widely.

Arts Council England's intervention is only one – albeit effective – approach. During the last decade, both Scotland and Wales, devolved nations in the UK with their own national arts funding bodies, have committed to inspiring programs (https://www.creativecarbonscotland.com and https://arts.wales)[5] that combine accountability and compliance with inspirational creative content.

However, internationally, there is a need to build sustainability into arts policies. Julie's Bicycle's 2014 research partnership with the International Federation of Arts Council and Culture

Agencies (IFACCA), the global network of national cultural strategy and funding bodies, recommended that national cultural policies make explicit reference to environmental sustainability and build a global network to rapidly exchange ideas and resources with regional centres of excellence (International Federation of Arts and Julie's Bicycle, 2014). The arts are hampered by a lack of evidence – data – to make a case for ambitious changes in cultural policy. This lack also prevents cultural voices from contributing to solutions and speaking to power. Climate Heritage Network (http://climateheritage.org) has recently succeeded in getting cultural heritage representation on the Intergovernmental Panel on Climate Change (IPCC), which is a significant step in the right direction. In 2017, frustrated at the glacial pace of policy change, JB and the World Cities Culture Forum (http://www.worldcitiesscultureforum.com), a network of some 40 global cities, embarked on a program for cultural leaders in cities to connect to their climate and environment counterparts in government and align their goals. In many cities, climate action has been more ambitious than national ambitions (World Culture Cities Forum and Julie's Bicycle, 2017), but an overall patchy application of national policies and resources, notwithstanding some inspirational examples[6], suggests that cultural policymakers have not reached consensus that the climate crisis matters enough. A major shift led by industrialised economies needs to take place, whereby cultural funding speaks to existing international targets to reduce carbon emissions as set out in the Paris Agreement (World Economic Forum, 2019). As these targets become legally binding, it would be wise to understand the consequent obligations for the arts in the years ahead. Better still, the cultural community could embrace this opportunity to inspire climate action and hope at a time when inspiration is desperately needed through bold and farsighted policy.

But policy on its own isn't enough. In 2018, JB launched Creative Climate Leadership (https://www.creativeclimateleadership.com; Portus, Johnston, and Badiali, 2020), funded by the European Union, which has brought together groups of exceptionally talented creative people from more than 25 countries including Zimbabwe, Indonesia, Hong Kong, Palestine, South Africa, the United States, Taiwan, Colombia, and Mexico. They include artists like Philip Kusasa, who has designated his local forest in Ndau a "living museum" in order to protect and preserve his cultural heritage, and Lucy Davies, who runs boot camps on climate change for theater directors and has set about making the Royal Court Theatre, London net zero carbon by 2021. In early 2020, JB with partners EcoArts and the University of Arizona ran a Creative Climate Leadership program in the Arizona desert days before the March pandemic lockdown. The group of exceptionally committed artists and activists that gathered provide a glimpse into the future, where respect for people in relation to one another and to nature, coupled with a holistic understanding of Mother Earth, is at the heart of the art.

The last few months have plunged the cultural community into its own great reckoning. In the UK, before the COVID-19 pandemic, the creative and cultural sector was contributing £111.7 billion to the economy – this was greater than the automotive, aerospace, life sciences, oil and gas industries combined – and employed more than 2 million people. It was growing at five times the rate of the economy as a whole (Oxford Economics, 2020). Rescue and recovery

from the pandemic must not be a return to "business-as-usual." In November 2021, the UK will host the international climate summit, COP26 (https://ukcop26.org/), where countries will be asked to increase their climate change ambitions, which currently fall dismally short.[7] If ever there was a moment for the arts and culture to mobilise, this is it.

A chemist himself, James Smithson said of chemistry that it was a science consisting of "isolated points, thinly scattered, like lurid specks on a vast field of blackness" (True, 2014). Were he alive today, I suspect he would have a very different view not just of chemistry, but also of the world and our place in it. This "vast field of blackness" is, in reality, interconnected and dynamic. The arts are too, weaving together our experiences of body, soul, and sense into ways of knowing that resonate deeply. Putting this in service to Mother Earth is the clarion call. This call is absolute.

A recording of Julie Tickell's March 5, 2020 presentation can be found at https://www.youtube.com/watch?v=6val4OF441M

Notes

1. s://www.legislation.gov.uk/ukpga/2008/27/contents
2. https://juliesbicycle.com/resource_hub/introducing-the-creative-green-tools
3. £407 million per year in 828 arts organisations, museums and libraries currently invested in the ACE National Portfolio, including £336 million of grant-in-aid and £71 million of National Lottery funding, £97.3 million of National Lottery funding per year in Arts Council National Lottery Project Grants and £72.2 million per year in Arts Council Development Funds (https://www.artscouncil.org.uk/about-us/how-we-invest-public-money).
4. https://juliesbicycle.com/ace-spotlight and https://juliesbicycle.com/course-ace-accelerator
5. Supported by Creative Carbon Scotland, the 121 organisations receiving Regular Funding from the funder Creative Scotland are also required to submit annual energy data and an annually updated Carbon Management Plan. This is used to track the progress of the sector in reducing its emissions. From 2019 onwards, each organisation receiving regular grant funding from the Cultural Services division of the City of Edinburgh Council will be required to develop and submit a Carbon Management Plan that sets out the aims and objectives to reduce the organisation's carbon emissions. Creative Carbon Scotland is supporting the organisations in developing their Carbon Management Plans and meeting their funding requirements. (https://www.creativescotland.com/funding/latest-information/funded-organisations/regular-funding-2018-21, accessed June 19, 2020).
6. The Greater London Authority recognises its duty to demonstrate leadership in the field of event sustainability management by conducting its event related activities in line with its Event Sustainability Policy. The priority areas identified within the Policy include: monitoring energy and waste; reducing carbon emissions, waste and environmental impact of transport use; and promoting energy efficiency, clean technology and sustainable food options.

   In Bologna, the Regulation for the Care and Regeneration of Urban Commons guidebook has facilitated a unique approach which is fast-tracking citizen engagement with city policy. It acts as a public collaboration to create innovations in public policy, with a focus on green governance – for example management of green areas as public space, and conservation and protection of the urban commons such as air and water.

   Aarhus, Denmark as the first city, region and capital of culture (http://www.aarhus2017.dk/en) created a policy model for sustainable development in the culture sector. The objective was to widen

the scope of working with sustainability by adapting the Sustainable Development Goals.The Aarhus Sustainability Model (http://www.aarhussustainabilitymodel.com) is a tool, guide and inspiration to anyone working with arts and culture.

The Manchester Arts Sustainability Team (MAST) is a network of 30 organisations working with Manchester Climate Change Agency and Manchester City Council contributing to the city's climate change targets. MAST has achieved an annual reduction of 7% annually since 2011 and has been awarded an URBACT leadership award to adapt the programme for cities across Europe.

Pioneered in Taipei, the policy of access to trees as a civic right and the protection of trees by the government as natural and cultural heritage has been taken up by other cities across Taiwan. Taipei City Government is the only city government which assigns tree protection to the Department of Culture. Taipei City government created a new law to protect trees based on certain size and age criteria, which are deemed rare, or ecologically, biologically or geographically significant to the local community, history or culture.

City of Toronto's target to divert 70% of its waste. In recognition of the landfill waste produced by plastic water bottles, the City of Toronto implemented a program in 2012 which prohibits the sale and distribution of bottled water at all City facilities and civic squares, including city owned cultural sites and festivals.

All City of Melbourne grant applicants are required to respond to the Council's environmental goals. In addition, key performance indicators related to environmental outcomes are included in all funding agreements and in city events.

Supported by Creative Carbon Scotland, the 121 organisations receiving Regular Funding from the funder Creative Scotland are also required to submit annual energy data and an annually updated Carbon Management Plan which is used to track the progress of the sector in reducing its emissions. From 2019 onwards, each organisation receiving regular grant funding from the Cultural Services division of the City of Edinburgh Council will be required to develop and submit a Carbon Management Plan that sets out the organisation's aims and objectives to reduce its carbon emissions. Creative Carbon Scotland is supporting the organisations in developing their Carbon Management Plans and meeting their funding requirements.

7. https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement and https://climateactiontracker.org/global/temperatures

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Foreword to the Breakout Sessions

Amber Kerr, Chief of Conservation, Smithsonian American Art Museum/Lunder Conservation Center

The goals of this publication are to raise awareness of the intersection of cultural heritage and climate change, and to identify the impact of climate change on cultural heritage and the strategies being implemented to leverage cultural heritage for climate action.

Each person invited to speak on the first day of the symposium as the selected representative for a cultural heritage category was tasked with broadening the audience's knowledge base and raising awareness about the related impacts and climate change strategies for that category through their presentation and submitted paper. The audience, comprised of individuals from varied backgrounds, levels of experience, and professional knowledge came together to learn from the speakers and each other while building common goals for climate action strategies across cultural heritage sectors.

The lectures from the first day helped set the foundational groundwork for the second day of breakouts sessions. These sessions were designed to cultivate discussions on key issues for each of the six cultural heritage categories, and to consider new strategies for sustaining cultural heritage through climate change. Registrants to the symposium were required to select a breakout session to participate in on the second day. Each breakout session was administered and moderated by a professional who is engaged in climate action within that cultural category. Each moderator was supported by a museum representative from the hosting Smithsonian Institution unit as well as by the subject matter specialist who spoke on the first day of the symposium. The following units provided the host locations for the breakout sessions:

Smithsonian Hosting Unit	Subject Matter Category
Center for Folklife and Cultural Heritage (CFCH)	Intangible Cultural Heritage
Freer/Sackler Galleries (FSG)	Archaeological Sites
National Museum of American History (NMAH)	Built Heritage (Buildings and Structures)
National Museum of the American Indian (NMAI)	Cultural Communities
National Museum of Natural History (NMNH)	Cultural Landscapes and Historic Urban Landscapes
Smithsonian American Art Museum (SAAM)	Museums and Collections

Attendees participated in an open discussion using participatory exercises and inclusive conversations structured on the United Nations Talanoa Dialogue[1] format which involves the

sharing of ideas, skills and experience through storytelling, and the National Park Services Structure of Strategy[2] which describes goals and objectives to guide actions under four integrated components: science, adaptation, mitigation, and communication. The objective for each breakout group was to consider three key questions:

1) **Where are we now?**
   Applying strategic exercises, moderators sought to challenge participants to identify key issues resulting from climate change for that cultural segment. They then generated discussion points to outline the factors that are contributing to positive climate action and define the scope and challenges within that sector for mitigating the top key issues identified.
2) **Where do we want to get to?**
   In group discussions, the participants were asked to consider the pathways which that cultural sector could follow to take action to address, mitigate, and adapt to climate change in the next ten years.
3) **How do we get there?**
   Having identified resources within the cultural segment, participants were asked to consider strategic partnerships and develop strategies to deploy and achieve the desired climate action goals within the coming decade.

The following section presents collective summaries from the breakout sessions, providing cultural stories, strategies, and collaborative pathways for readers to use to build upon the published materials presented by the subject matter specialists during the first day of the symposium.

The information and recommendations presented in the summaries of the breakout sessions will provide a framework that the Smithsonian will use when considering future national and international programming and institutional change toward the sustainability of cultural heritage. We also hope that it will also serve as a catalyst for further discussions and ideas for climate action across all cultural heritage sectors.

Notes

1. Talanoa is a participatory dialogue format used by the United Nations Framework Convention on Climate Change to explore and accelerate multi-stakeholder participation and dialogue ahead of the COP24 in Katowice (Poland). https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement/2018-talanoa-dialogue-platform
2. National Park Service. 2010. National Park Service Climate Change Response Strategy. National Park Service Climate Change Response Program, Fort Collins, Colorado. https://www.nps.gov/subjects/climatechange/upload/NPS_CCRS-508compliant.pdf

BREAKOUT SESSION

Cultural Landscapes and Historic Urban Landscapes Workshop

Cultural Landscapes and Heritage Workers in a Climate-Changing World

Jenny Newell, Manager of Climate Change Projects, Australian Museum

We all have deep knowledge of specific cultural landscapes – the ones closest to our hearts, the ones that are the location and support for our daily lives, the ones that are the focus of our work and our practices of care. Whether a rock art site at the heart of a community's ongoing cultural practice for tens of thousands of years, a huge temple complex in a forest attracting thousands of tourists every day, or a neighbourhood's community garden with a small group of devotees, we understand these places of intertwined natural and built significance. We know their layers of meaning, and the roles they play in the bedrock of our lives and our identities. We also know – although perhaps uneasily or not fully acknowledged – that these landscapes are not static. They are subject to a wide range of human impacts, including the potent impacts of climate change. We can see the impacts of the sudden abundance each year of scorching days, the desiccation of a drought, the infestation by new insect pests, the erosion by a steadily rising tide, the damage of another flood, the ravages of a firestorm or a cyclone worse than anyone has known. A group of cultural heritage workers, students, and academics gathered at the National Museum of Natural History on March 6, 2020 to consider how we can best support our cultural landscapes and our communities in the midst of the climate crisis. This essay is a summation of our discussions about where we are as heritage professionals caring for landscapes, where we want to be, and how to get there.

The ICOMOS definition of a cultural landscape is a "landscape altered by people." This equates, to *all* landscapes. Even landscapes that don't appear to our limited sight to have the imprint of humans have been transformed. In Australia, First Nations peoples' management of hunting grounds over 60,000 years through gentle firestick burning of vegetation has created the continent's landscapes and fire-attuned species. In this era of the Anthropocene – from the rise of intensified extractive processes in the Global North from the Industrial Revolution onwards and especially since the "Great Acceleration" of human impacts after 1945 – there are no landscapes that have not been altered by such human activities as the burning of fossil fuels, removal of forests, spread of industrialised agriculture, and pollution to varying degrees of all the places in which people and their fellow species live and breathe. Even the landscapes most isolated from people – such as those at the Poles – are altered by them. The culturally driven climate crisis is rapidly melting the strata of ice and the snow there is becoming laced with toxic microplastics. Looking to the cultural roles of landscapes, most of them – whether urban,

rural, wilderness, mountain, or ocean – are foundational to the cultural life of a community somewhere, part of the grounding and nurturing of a people for generation upon generation, part of their survival[1]. In many cultures, the land, waterways, rocks, animals and plants are kin.[2]

During the workshop we organised our discussion around the three driving questions within the Talanoa Dialogue, an equitable framework for establishing shared ways forward that the Fijian Presidency of COP23 used to guide international climate discussions (United Nations Climate Change Conference, 2017). The three questions –"Where are we?" "Where do we want to go?" and "How do we get there?" – helped us clarify our thoughts as we considered our relationships to cultural landscapes. This essay captures the essence of our answers. While not all the nuances, complexities and pertinent, often poignant, examples from the participant's own experiences could be conveyed, we have attempted to get to the core of what we as heritage professionals want to communicate to our peers about the priorities within our practices of care as the climate crisis worsens. We also convey a recognition of the central value of cultural landscapes for the communities integral to them.

Where Are We?

Where are we? We are standing in landscapes that sustain us and our communities. We are standing as cultural heritage workers in culturally rich places for which we carry some degree of responsibility. For some of us, maintaining the well-being of cultural landscapes and the people associated with them is the main focus of our daily lives. For others of us, we are engaged in practices of care at a remove – whether through policy-making, analysis, or working with the people and the issues surrounding cultural sites. All of these landscapes are bringing growing challenges for us because all, we increasingly recognise, are under threat. Kenneth Kimmell, President of the Union of Concerned Scientists, has stated, "Every imaginable type of site is under threat from climate change." Whether one of the world's 180,000 documented archaeological sites, or ancient living rice paddy systems in the Philippines, or the buildings of significance on our skylines, all are experiencing impacts and these will intensify in coming years. Kimmell has said, "Climate Change is the bulldozer coming to destroy the places we love."[3] Through global ecological, social, political and economic systems, we are all interlinked and intermingled (as Covid-19 has demonstrated). Working to support the sustainability of environments and communities world-wide, ends up supporting the well-being of our local environments and communities. The UN Global Goals for 2030 (the Sustainable Development Goals) powerfully encapsulate the ways in which all of us are responsible for each other and give us a plan of action. As heritage professionals, the place we are in now is one that recognises our responsibilities as members of professional and cultural communities, and as members of an intermingled planet. We recognise the threats to the landscapes and people we value both near and far from us. We know where we want to go, with strength, together.

Where Do We Want to Go? And How Do We Get There?

In the face of increasing challenges we aim to extend effective care to cultural landscapes and their associated people. Here, we identify six areas that are essential to extending this care

successfully to a site of cultural significance. We suggest the tools, methods and pathways that heritage workers can deploy to better understand the dynamics of the sites we care for, and the challenges they and their associated communities face.

1. Working as custodians to protect the cultural landscapes in our care. Fully valuing and supporting the healing of landscapes when damaged.

As we do with the people in our lives, we can take the places in our lives for granted. It is often that it is not until a special person – or a special landscape – is in danger or is hurt or damaged that we wake up to the depth of our connection and the depth of their significance to us. Extreme events that cause damage may be an awakening that brings community engagement and resources in to help repair and heal. And, as with people, we should be alert to threats to landscapes and work to support their well-being and protection.

2. Understanding the sites we care for and their dynamics and relationships through research, observation, listening and reflecting.

To understand a place fully, we need to spend time there observing, listening, and documenting using the best set of tools within our reach. This involves informing ourselves about the land and water forms and people and other species associated with these sites. This requires taking the time to listen to people who have long-term knowledge of the place and asking the questions that elucidate stories. It also involves taking the time to research safe and sustainable infrastructure and facilities for the site, develop best practices for disaster-preparedness methods and equipment, and bring a diversity of documentation, mapping and interpretive tools to deepen understanding of the site. Finally, we need to give ourselves the time to comprehend and take into respectful account the many layers and many interconnections within the place.

We now have access to a wide variety of digital tools with which to better monitor environmental conditions, drone-mounted cameras to better document sites from the air, and more sophisticated data visualisation methods such as Geographic Information System (GIS) for landscape mapping and analysis. More accessible computer modelling tools such as the Climate Risk Maps and "Vulnerability Atlas" developed by the NOAH's ARK project are emerging to assist with understanding specific threats and their management.[4] Social research methods such as cultural mapping and community knowledge or resource mapping (creating sketch or collage maps or topographic maps modelled in clay) give groups the tools with which to identify areas of significance and set priorities for current and future management.[5] Consultancies – local and international – offer extensive skill sets for heritage and ecosystem conservation using best-practice techniques.

3. Responding to change.

> In cultural heritage it is against our nature to plan for loss. We plan with the idea of losing nothing. We don't have the luxury for that kind of naiveté. (Andrew Potts, Climate Heritage Network [Potts, 2020])

We cannot expect the sites we care for – whether an ancient stone circle or a working rural landscape – to be static. We expect fluidity in biological systems, but tend to expect cultural systems to continue unchanged. We need to accept that sites will alter over time and are at increasing risk of slow or rapid degradation and loss due to climate change. Custodians of cultural landscapes need to develop sustainable, adaptive approaches to loss *now* – not later. It is important to actively assess existing patterns of operations for how well they are accommodating the growing rates of risk.[6] As Andrew Potts of the Climate Heritage Network has pointed out, "the active process of planning for loss is extremely eye-opening to people and galvanises climate action" (Potts, 2020).

How we help people understand the changes that have been occurring and that are coming to our local places is crucial. It is never going to be a simple matter of presenting the facts. That has never been enough. What will make substantial and sustained impact is listening, understanding, and connecting to what really matters to them. It is important to find ways to reach out that either establish one as a reliable, trusted supporter or that make the most of the messengers people already trust. As George Marshall has highlighted through his research, it is hard for humans to confront existential threats, and we tend to avoid or deny such threats in preference to facing them (Marshall, 2015). It is hard for people to focus on the future, especially when day-to-day survival is a struggle. Finding the wherewithal for challenged communities to deal with additional, deepening struggle calls for as much innovative, smart, well-attuned, and ideally, well-funded support as we can muster.

We need flexibility in our own methods of supporting the cultural landscapes we work with. We need to be "vectors of accelerated change" in caring for our landscapes, while providing the support that ecosystems require to remain as unaltered, as functioning, as possible. We may be helped by disruptors – by positive and negative pathways to change such as an unexpected major donation or a sudden drop in funding. These periods of disruption help us to step back, reflect and think creatively about the direction we are taking.

As part of understanding the changes our sites are subject to, it is important to recognise that people and nature are interdependent and cultural systems can't be isolated from biological systems. We need to help our communities understand that the changes we are experiencing in natural systems have been caused by changes in the way we consume nature, and, as First Nations people have said in many different ways over thousands of years, if we don't care for nature, nature can't care for us. Minimising the intensity of destructive change requires acting now to radically reduce the greenhouse gas emissions of our own activities and those of our organisations. Joining with the UN Global Goals and working to obtain net zero emissions as rapidly as possible will help slow the severity of the changes underway.[7]

4. Ensuring community access to cultural resources of a site in the face of change.

We want to work to support ongoing access to the physical, emotional and cultural shelter and enrichment that communities and individuals receive from cultural landscapes. We acknowledge that this work may become more challenging as threats and damage to landscapes become

more intense. The complexity of interests in any one site, along with the complexity of stories, can make decision-making about the best way to maintain access to cultural resources – along with financial and other resources – challenging.[8] Catastrophic events can inspire climate action. In addition to bringing the community together to decide on whether to rebuild, retreat, or reconfigure, the period after a disaster can bring expert help and external funds to the site. It is also a period of reflection and redesign, and can provide the chance to build back better, addressing the community's and the site's well-being and sustainability, and addressing the social and environmental justice.

A post–Civil War African American community in Princeville, North Carolina, near the River Tar is thought to be the oldest African American chartered town. The town is outside a 100-year floodplain, but with increasing hurricane activity floods have been occurring with increasing frequency (https://www.nytimes.com/2016/12/09/us/princeville-north-carolina-hurricane-matthew-floods-black-history.html and Campbell, 2017). After a major flood in 2016, half of the community wanted to stay, remaining connected to the deep history and the social value the place holds for them. The other half wanted to move away (Campbell, 2017). The state held a five-day workshop with landscape architects, city planners, emergency services staff, Army Corp of Engineers and residents. As a result, the state purchased a new parcel of land nearby. The town voted to restore some crucial buildings like the Town Hall that are the substance of the town's centre, and rebuild others on higher ground. Andrew Fox, a landscape architect who attended the workshop, proposed a "heritage walk" between the two sites, because "greenways and trails are typically a good use of property in floodplains"(Campbell, 2017). Roy Cooper, the town's head of hurricane recovery said that care was taken that the new land was not too far from the river, or it "wouldn't be Princeville anymore" (Campbell, 2017).

5. Creating connections, not just communications.

We aim to create significant connections with the people associated with the sites we care for and with our peers. We aim not just to communicate but to connect, creating sustained relationships. We want to do this through meaningful story-sharing, respectful listening, being open to learning, and real collaboration.

Cultural heritage stewards, as people with platforms that are recognised as independent, knowledge-based, non-partisan, and committed to prioritising social and environmental well-being, are trusted as leaders of conversations. From this basis, we can take action to help create deeper meetings between people around cultural sites. Telling the stories that matter is a central mission for many museums, heritage sites and heritage organisations, whether stated in those words or not. Through tours, talks, workshops, performances or discussions, local stories have a particular power as they are personally relatable and relevant. It is through the narratives of significance that people hear from older generations, peers, or the story-tellers of cultural groups other than their own that they form rapport with, and gradually gain a comprehension of the many-dimensioned values of their landscapes. These stories reach people emotionally, supporting sustained, memorable learning. This is impactful learning and it is likely to inspire

the learner to take action in support of places under threat.[9] We need to shift the story – shift the narrative from the concept of people being separate from nature to an understanding that we are part of it.[10] We need to shift the story from one of human "progress" fuelled by consumption of nature to one in which sustainability is only possible through the actionable care of nature.

When addressing climate change impacts it is important to acknowledge that we are looking at the issues we've helped to create. It is our job to make sure we include the community in the present and future care of the site. Taking the approach of "I'm teaching, but we're also learning this together" is an acknowledgement of the reality of the learning relationship. It brings into the open the authority and expertise of knowledge-holders outside the institution such as residents, cultural community members, and others with access to long-term experience and stories of the site.

It is important to create connections not just communications within our own organisations as well. Within organisations we are best served by bridging divides between disciplines, departments, and hierarchies. The challenges ahead call for innovation and collective effort. This can only be effected if we listen and try to understand the language, mental models, and modus operandi of colleagues and community members who think differently from us. Working beyond our professional and personal comfort zones is not easy, but it is increasingly important. These new dialogues can be effected through easy-to-initiate means like reading groups, blogs, and workshops. Broad reach can be achieved through symposiums (including bringing new conversations into existing professional gatherings) and physical or online discussion series. Curating exhibitions, producing books, setting up a year of action (for example, "Zero Waste" or "A Year of Climate Action") are larger-scale, longer-term activities that can be considered. We encourage them to be taken up at local, state and federal levels. There are many powerful ways forward to deepen modes of understanding.

Our institutions are often imposing, classical edifices. They have traditionally been built to keep the outside out, rather than to be in conversation with it. It is very powerful when our institutions open up to their immediate environment. Doing so helps to demonstrate the message that the interconnection between people and nature is foundational to our place in the world.

The Natural History Museum (London) is an example of how museum grounds can be used to message about priorities. The new Urban Nature Project has transformed the museum's garden into a habitat for the insects, birds and small mammals that live in London, bringing urban wildlife into view and into value. (https://www.nhm.ac.uk/about-us/urban-nature-project.html) At the Smithsonian's National Museum of the American Indian, the grounds showcase a range of tribal landscapes including the original wetland of the Potomac where the Smithsonian rests, bringing something of that lost cultural landscape back into consciousness.[11]

6. Providing leadership, demonstrating best practices for care of cultural sites and their communities. As representatives of cultural institutions, we have the authority and visibility to provide leadership in caring for cultural landscapes and historic urban environments. We can lend our expertise to the governing entities, funding bodies, user groups and others with a stake in

the sites. We aim to ensure that this expertise and care is brought into play in risk assessment and decision-making around cultural sites. We can use our influence to drive and inform policies that help connect people and places. Stepping up to advocacy to local, state and national government and regulatory bodies can bring pressure to create tax incentives for taking climate action or pass legislation and regulations that ensure effective networks of responsibility to protect a landscape.[12] Architects and urban planners can lead through action, putting effort into reusing existing building stock – this being the strategy with the smallest carbon footprint – and into using sustainable solutions and materials such as bamboo and carbon-absorbing concrete in new construction. While cultural institutions are increasingly incorporating greater sustainability in their operations, there are often considerable hurdles to reducing carbon footprints. These include rigid, long-term tie-ins to fossil fuels in government or corporate-managed energy and transport contracts, staff inertia, and lack of funds for sourcing sustainable conservation and exhibition materials and less emissions-heavy means for touring objects and exhibitions. A few determined individuals in an institution are often what it takes to create the needed leaps towards carbon neutrality.

There are new means to enrich urban historic landscapes. Ashley R. Harris, a heritage architect, has pointed out that in Mexico City pillars supporting a motorway fly-over are being planted with greenery which is watered with run-off from the roadway. Billboards that absorb carbon are being developed. Greening urban cultural landscapes create healthier, calmer environments with more breathable air.

Creating visibility for the economic value of heritage sites allows heritage to be prioritised within government. Monetising the value for community resilience, tourism and other industries raises the value that governments, in particular, place on cultural landscapes. Further, as part of this assessment of value, a major part of planning must be the cost of safeguarding landscapes from serious climate impacts. It is important to highlight that set against these short-term costs, doing nothing carries costs that we – organisations, governments and society as a whole – can't afford.

In Conclusion

There is powerful action we can take to protect the places we love. These places are central to the grounding of our identities as individuals and groups and form the basis of our well-being. They are the soil into which we put down roots, connecting us to other people and other times. Over and above providing emotional and psychological bedrock, they provide resources for living across many scales for individuals, communities, regions and nations. Listening, reflecting, and sharing allow us to create meaningful, sustained connections with communities and their places. Emphasising relevant local information about the impacts of global warming and local climate stories helps empower communities to take action to protect their landscapes of significance. As Carl Elefante has said, we need to keep bringing our messaging and our actions back to the landscape, because "the love of place, history and culture is a powerful driver of action" (Elefante, 2020).

As heritage workers we are reducing our carbon footprints and designing approaches to support sites in transformation. We are helping our institutions see that the short-term costs of decarbonisation and disaster-preparedness may be high, but we can't afford the cost of "Business As Usual."

All of us can act in ways that are effective in opening up our organisations to their surrounding landscapes, communities and histories, and to work to cross our habitual boundaries and leave our comfort zones. We can strive to create connections to others using a multitude of face-to-face and digital means. This helps us create effective networks of hearts, minds and hands across scales from local to state to national, to best engage with the sites we care for and support their resilience. We are stepping up to leadership to grow the movement and change the story. We are joining with others to advance advocacy for strong policies and regulation for decarbonisation and conservation.

No matter which landscape is of special significance to you, as these years of climate change pass, that landscape will need more from you – more care, more action – on all levels from the most personal to the most wide-reaching. As someone who cares about cultural landscapes and the people they support, you can take heart in our growing power to create positive change, and our growing capacity to work together. We know where we want to go. We know how to get there. We have already begun.

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Workshop Participants

Yiannis Avramides, Brenda Barrett, Julia Blakely, Elizabeth Brabec, Kate Christen, Wendy Cousler, Kelby Cox, Clara Deck, Sara De La Torre Beron, Jenn Donato, Brenda Ekwurzel, Salim Elwazani, Dan Finn, William Fitzhugh, Jerry Foust, Christopher Fullerton, Jere Gibber, Dylan House, Christiana Johnnides Brotsis, Casey Magnysc, Michele Manatt, Jenny Newell, Raina Regan, Rodney Swink, Bill Tompkins, Andrea Vale, Joella van Donkersgoed, Emmett Whelan, Ashley Wilson

Notes

1. There is a wealth of First Nations accounts, media commentary and scholarship from around the world speaking to these points. Here, I share just one voice: Bernadette Dimentieff, one of the Gwinch'in leaders opposing oil drilling in the Arctic National Wildlife Refuge. She has said of their cultural landscape: "We have a spiritual and cultural connection to the Porcupine caribou herd, and we will stand strong in unity for the protection of their calving grounds and the Gwich'in way of life. We are rich in our culture, we are rich in our way of life. Look out across this country and understand

this is a prime example of why we continue to fight for protection of these places. These lands, these waters, these animals are our survival." Interview with Bill McKibben (Dimentieff, 2020).

2. As is the case within many Indigenous cultures, including within the Americas, Pacific and Australia. The workshop group unfortunately had no Indigenous participants, though we had the benefit of hearing from Janene Yazzie (Sustainable Development Program Coordinator, International Indian Treaty Council, Co-Convenor, Indigenous Peoples Major Group for Sustainable Development) at the conference, as well as previous learning from First Nations colleagues and writers that we were able to bring into consideration. One of the pre-readings was Cavanagh, 2020.
3. The rise in the intensity of fires in Australia has meant many cultural heritage sites of staggering age and significance have been lost. One site lost in the 2018 bushfires was Baloon Cave in Queensland, with layers of handprints and other images built up over many generations destroyed when a walkway made of recycled plastic combusted and created a fireball beneath the works. Dale Harding, a member of a working group to care for the site, said the paintings had been an ongoing cultural work, providing a link between his Bidjara, Ghungalu and Garingbal ancestors over millennia and their descendants today. He said, "It's the foundation and the basis of who I identify as and who my family, my community – we all connect back to that. My elders describe the rock art panels, but also the whole network, as being a cathedral, a university, a hospital. All of these kinds of things come into that depending on who you are and how you have access to the knowledge that's contained in those cultural sites." Dale Harding quoted by Alex Easton (2020).
4. These tools for managing risks from natural disasters and other climate impacts support managers of European built heritage and cultural landscapes to preserve heritage sites. "Global Climate Change Impact on Built Heritage and Cultural Landscapes (NOAH'S ARK)," https://cordis.europa.eu/project/id/501837/reporting; overview http://ec.europa.eu/research/headlines/pdf/noah.pdf
5. Work carried out by Eleanor Sterling and her team at the Center for Biodiversity & Conservation, American Museum of Natural History, New York, on biocultural approaches to conservation provides good examples of the effective use of cultural mapping, community knowledge mapping and resource asset mapping carried out in (and by) communities around the world to establish biocultural indicators of and strategies for wellbeing and resilience. See, for instance, Sterling et al., 2017.
6. A good guide to support this disaster-preparedness for museums and heritage sites is Henry McGhie's *Museums and Disaster Risk Reduction: Building resilience in museums, society, and nature,* available for download at https://curatingtomorrow236646048.wordpress.com/2020/07/18/new-guide-museums-and-disaster-risk-reduction/
7. Good books to read on achieving zero carbon and a liveable future: Christiana Figueres & Tom Rivett-Carnac, *The Future We Choose: Surviving the Climate Crisis,* Knopf, 2020; Paul Hawken (ed.), *Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming*, Penguin, 2017; Damon Gameau, *2040: A Handbook for Regeneration Based on the documentary* 2040*, Pan Macmillan Australia*, 2019.
8. For instance, the discussions around what best to do with `AlUla, an oasis settlement in Saudi Arabia with evidence of use from prehistoric times to the 1980s, has been debated, with a variety of potentials for hands-off, more occupied or tourism-centric uses. The site is being restored and a consortium of the French and Saudi Governments is building large, gleaming tourist facilities nearby. https://experiencealula.com/en/Discover_AlUla/About_AlUla/Pages/default.aspx ; see also www.afalula.com.
9. Isabel C. Rivera-Collazo is protecting archaeological sites on a shore in Puerto Rico, because "losing heritage is losing ourselves." She says: "I don't need polar bears. I take people to beach and show them the eroded dunes. I say: 'These are the remains of the ancestors – the sea level rise is coming – what are we going to do?'" They have set up a cultural trail with backpacks for visitors to understand the history and what climate action they can take. They have researched methods that mimic the resilience of naturally occurring ecosystems, placing wooden stakes in the sand which, like trees, help to keep the shore in place. Rivera-Collazo, 2020.

10. For good commentary on the role of 'shifting the story' as one of the four key climate actions we need, see Nathan Scolaro's interview with Anna Rose (Scolaro, 2019).
11. The NMAI also underlines the importance of environmentally sustainable practice through achieving LEED (Existing Building) certification for the building and landscape; a project successfully led by the museum's staff. https://americanindian.si.edu/visit/washington/architecture-landscape
12. Developers who build on floodplains, for instance, should be required to pay a bond to help residents cope with the inevitable floods. Those who pollute upstream should be bound by law to compensate those downstream.

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BREAKOUT SESSION

Archaeological Sites Workshop

Ancient Knowledge, Future Wisdom: Sustaining Archaeological Sites in a Changing Climate

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Introduction

Climate change challenges the stewardship of cultural heritage (Fatorić and Seekamp, 2017; Rockman et al., 2016; ICOMOS, 2019). Yet, the memories embedded within heritage resources can enhance recovery following climatic impacts and foster climate resilience (Rockman and Hritz, 2020). Archeological sites and resources extend our collective memory of ecological change and human adaptation to disturbance (Hudson et al., 2012; Rockman, 2012; Mackee et al., 2014; Nelson et al., 2016; Jackson et al., 2017, 2018; Hegmon and Peeples, 2018; McGovern, 2018; Rivera-Collazo et al., 2018; Thomas et al., 2019). The archeological record reveals that societies have restructured following periods of storms and floods (Dugmore et al., 2006; Redman et al., 2011; Rivera-Collazo et al., 2015; Rivera-Collazo and Declet-Pérez, 2017). People's connections to a place often hold more weight than the risks posed by natural hazards. This is demonstrated by the evidence of settlements that were reconstructed in adjacent locations following destructive storm and flooding events (Rivera-Collazo et al., 2015). Therefore, it is often the intergenerational transfer of disaster experience and knowledge that enhances climate change resilience (Thomas et al., 2019). This ancient knowledge provides the future with necessary wisdom (Lafrenz Samuels 2016; Erlandson 2012) (Figure 1).

This essay provides an account of the discussions and prioritization exercises that took place on March 6, 2020 during the archeological sites breakout session at the *Stemming the Tide* Symposium. The objectives of the breakout session were to invite participants to think about archaeology as a community of practice and identify: (a) Where is it now? (b) Where does it want to be in 10 years? and (c) How can it get there? Before beginning the session, the concept of archaeology as a community of practice was defined to include all those individuals who engage with archaeology and its products from scientists generating archaeological data,

FIGURE 1. Image of Lorenzo Andrés López-Rivera holding the "Ancient Knowledge, Future Wisdom" sign at the first Annual Walk for Climate Action, organized by Enlace Latino de Acción Climática in Cataño, Puerto Rico (May 2016). Photo courtesy of I. Rivera-Collazo.

to museum curators conveying archaeological artifacts and messages, to journalists translating stories for the general public, and to employees of governmental and non-governmental organizations that regulate the legalities of cultural heritage. The breakout session began with a review of Dr. Isabel Rivera-Collazo's March 5, 2020 presentation, including the points summarized in the opening introductory paragraph of this essay. Additionally, the participants were reminded of her comment that equity and justice are critical considerations and, as such, climate change solutions must recognize cultural traditions, place connections, and economic conditions (Rivera-Collazo, 2020).

Methods

To answer the questions embedded within the breakout session objectives, a variety of focus group techniques were employed including facilitated group discussions, participant interviewing

and reporting, small group discussions and reporting, and nominal group process techniques to rank the importance and urgency of discussion points (Krueger and Casey, 2014). At the beginning of the session, participants were asked to focus their thinking creatively on how to create more relevant and ambitious engagement with issues related to climate change. Additionally, they were asked to reflect upon who has the authority, acceptance, and/or ability to create change.

After sharing the ground rules for discussion, the participants were instructed to participate in a "speed-dating" type exercise to stimulate dialogue for Objective 1 – "Where are we now?" Each participant was provided with a worksheet and asked to interview another participant about what they believed to be the most pressing climate change issue and to expand upon (a) why the issue matters, (b) to whom it matters, and (c) who should care more about it, as well as to identify a positive climate action witnessed within the field of archaeology. After five minutes, the pair would switch roles. After three sets of paired interviews, participants were instructed to summarize the most pressing climate change issues identified in the interviews. This continued until an exhaustive list of issues was compiled on a sheet of poster paper. Using the same process, an exhaustive list of positive climate actions was written on another sheet of poster paper. Using stickers, participants were then instructed to vote for (a) the one issue they thought was most urgent and (b) the one issue they thought had the most viable solution.

Next, participants were divided into groups of 3-4 to discuss Objective 2 – "Where do we want to be in 10 years?" Each group was asked to address the following prompts (a) How should the archaeological community address climate change by 2030? and (b)How does that vision fit within contemporary society? Following the discussions, each group presented their 10-year vision.

In the final part of the session, participants asked to select one of the 10-year visions they had not helped to create and to work in small groups to discuss Objective 3 –"How do we get there?" Each of the new working groups was asked to brainstorm a pathway for implementation, identifying: (a) What resources are available within the archaeological community for meeting this vision and (b) What strategies can be deployed to achieve this vision, thinking specifically about who has the authority and/or the ability to create change. Following the discussion, each group reported the resources and strategies they had identified and their exhaustive lists were documented on poster paper. Using stickers, participants were then instructed to vote for (a) the resource they thought was most available and (b) the strategy they thought was the most feasible to implement

Results

Where Are We Now?

More than twenty distinct climate change issues were identified as being most pressing to archaeology as a field. They were condensed into fourteen themes (Table 1). Several of the issues were interrelated. For example, the lack of a standardized vulnerability assessment methodology hindered the ability to prioritize sites for climate action (e.g., adaptation, emergency

TABLE 1. Most pressing climate change issues facing the archaeology field, ranked by urgency and viability for addressing by 2030

Theme	Description	Urgency to Address by 2030	Viability to Address by 2030
Inability to prioritize	Need for processes that help prioritization of adaptation and recovery actions, particularly what to save given rapid loss.	5	–
Resources to respond	Need for more resources to facilitate disaster response (e.g., emergency excavation), as preservation is secondary to human lives, yet there are limited to no response plans and coordination.	4[a]	–
Awareness of climate change impacts	Need to enhance awareness of climate change threats to archaeological sites (both within the field and external to the field).	3	3
Mapping archaeological sites	Need for mapping of site locations and vulnerabilities in ways that address confidentiality concerns to increase data sharing.	2	4
Effects of climate change impacts on archaeological sites	Need for enhanced understanding of climate change impacts on archaeological sites (e.g., effects of changing precipitation cycles, sea level rise, wildlife, microbial influences following melting).	1[b]	–
Engagement with climate scientists	Need for more collaboration with climate scientists (two-way learning).	1	7
Site management capacity	Need to enhance management capacity (e.g., observing and tracking change, threats, and impacts).	1	3
Enhanced data utilization	Need for enhanced data utilization to inform policy and help enhance understanding of how prior civilizations reacted to climate change.	1	–
Standardized vulnerability assessment	Need for a standardized vulnerability assessment methodology.	–	1
Adaptation of techniques	Need to adapt excavation fieldwork, particularly given variation in precipitation that lead to shorter digging seasons or emergency excavations.	–	–
Exacerbating impacts	Need to better understand how climate change exacerbates other impacts (e.g., tourism, armed conflict).	–	–
Inadequate legal framework	Need to influence policy that addresses the inadequate legal framework for protecting sites.	–	–
Preservation concerns	Need for processes that minimize loss (e.g., objects, stories) when forced migration or displacement occurs.	–	–

a. This theme was condensed to include the "need for resources to respond" and the "need for response plans and coordination," both of which received 2 "urgency" votes.

b. This theme condensed all specific climate change impacts; effects of changing precipitation cycles received 1 "urgency" vote.

excavation). Additionally, the group discussion about the need for mapping site locations revealed interrelated concerns about the inability to mitigate loss if the location of sites and their vulnerabilities to climate impacts are unknown. Without adequate location mapping, cultural heritage agencies and first responders are hard pressed to plan, prioritize, or target a response. Questions remained about whether that information can be standardized and disseminated, given that many agencies are unwilling to share datasets due to looting concerns or do not trust scholars to handle or use the information. This being particularly true in areas endangered by armed conflicts or affected by colonial and discriminatory conflicts over the ownership of the ancestral past. Overall, the most urgent issue identified was the complexity surrounding prioritization of intervention on archaeological sites for adaptation and recovery actions (n = 5), while the issue seen as most viable to address by 2030 was engagement with climate scientists (n = 7).

Participants identified a number of positive climate actions within the archaeology field. These included: local grassroots community actions, citizen science projects that provide opportunities for locally relevant community action, development of systems for mapping vulnerabilities, ICOMOS' efforts to have heritage better represented in the Intergovernmental Panel on Climate Change (IPCC), archaeological knowledge being integrated with climate change policy, a movement toward more efficient use of resources for preventive measures, "greening" of materials (e.g., increasing sustainable collections practices), and signs of a shift in the archaeological discipline to deal with socially relevant issues of modern concern.

Where Do We Want to Be in 10 Years (2030)?

Subdivided into groups, the participants identified four visions that could move archaeology towards more relevant and ambitious engagement with climate change: (1) an international coalition, (2) direct engagement with the natural heritage field, (3) a new focus for archaeological training, and (4) adapting existing approaches (Figure 2). Several themes were consistent across these visions: (a) the need to elevate awareness about climate impacts to archaeological sites through professional training, collaboration and outreach, and (b) the need to avoid "reinventing the wheel" by leveraging existing organizations and efforts.

Creating an international coalition involves engaging multiple interested parties to speak with a single voice for archaeology and serve as a "one-stop shop" for resources and training for practitioners and communities – which would help with the adoption of standardized mapping terminology. This coalition could also advocate for awareness and coordination among governmental agencies and serve as a repository for disaster preparedness plans, best practices in the context of climate change, and sample management plans for communities.

The idea of direct engagement with the natural sciences fields called attention to the need to better communicate the climate change–archaeology message. Participants felt that collaboration with natural science experts could enable them to make the general public and policy makers understand that the risks to cultural heritage are as urgent as the risks to the environment. They also felt that the field of archaeology needs to become comfortable with loss, and

FIGURE 2. Four visions for the archaeological field to empower more relevant and ambitious climate change engagement by 2020.

that strategies are needed to help communities deal with loss. Other capacity building efforts were identified. These included: the education of the next generation of archaeologists, the ability to secure new sources of funding for heritage issues related to climate change, and the need for open source mapping resources.

A renewed focus for archeological training would have a three-tiered approach. Firstly, interdisciplinary training for practitioners and researchers so that they will be less isolated and more engaged with climate science, enabling archaeological projects to include the consideration of climate change threats. Secondly, information gathering and better documentation of places – particularly in areas where there is a high risk of archaeological loss (e.g., the coast of Scotland). The group focusing on this emphasized that the field is becoming salvage

archaeology whether it wants to or not. Thirdly, enhanced communication, collaboration and engagement with policy makers and stakeholders within local communities in which archaeological work is taking place. These efforts will help practitioners, communities, and policy makers better understand what is at stake and what resources are needed to anticipate and respond to climatic impacts.

The group that focused on adapting existing approaches insisted that standardization of mapping and the creation of repositories of information were the most urgent and viable activities. There are existing structures which address these concerns such as the Heritage Emergency National Task Force (HENTF) or Julie's Bicycle. Working through and within existing structures will avoid duplication of work, support format consistency, and retain already engaged stakeholders. Conferences, associations, and funded projects must work together to maximize resources rather than duplicate effort. An important component of this effort would working with traditional funding agencies to make climate change a priority of archaeology funding. These agencies might invite scholars to explicitly address climate change.

How Do We Get There (Pathways Planning)?

Participants brainstormed about the multiple resources that are available within the archaeological community for meeting the 2030 visions, as well as the multiple strategies that could be deployed to achieve those visions (Table 2). Due to time limitations, the resources and strategies the groups reported they had identified, were only compiled generally and not in a way that aligned with specific visions. However, the resources and strategies identified could likely foster the attainment of any of the visions.

The strategies identified were: funding, training, information sharing, convenings, partnerships, advocacy, and outreach. Some of the specific resources available cut across multiple strategies (Table 2). For example, universities provide training and are recipients of funding, and thus direct research priorities. In terms of university-led training, participants suggested new professional training programs, academic majors, and curricula that combine cultural heritage and the climate crisis. For information sharing, participants identified technology companies, such as ESRI. Participants also recommended leveraging other existing platforms, such as tDAR (the Digital Archaeological Record), DINAA (Digital Index of North American Archaeology), and Arches (Getty).

Participants identified three types of convenings. The first would bring together heritage experts, social and natural scientists, and local residents to share best practices. The second would bring together various organizations such as the Union of Concerned Scientists, the American Institute of Architects, and the American Society of Archaeology to develop shared talking points, foster funding strategies that integrate climate change and archaeology, and expand outreach. For the third, archaeological organizations such as the Society for American Archaeology, the World Archaeology Congress, and the Archaeological Institute of America, along with other professional organizations would serve as convening resources and policy advocates.

TABLE 2. Strategies identified to meet 2030 archaeological community of practice visions and the resources to leverage to implement the strategies

Resources	Strategies						
	Funding	**Training**	**Information Sharing**	**Convenings**	**Partnerships**	**Advocacy**	**Outreach**
Universities	✓	✓	–	–	–	–	–
NGOs and private foundations	✓	–	–	✓	–	–	✓
Professional archeological organizations	–	–	–	✓	–	✓	–
Other professional organizations	–	–	–	✓	–	✓	–
Corporate sponsorships	✓	–	–	–	–	-	–
Existing funding programs	✓	–	–	–	–	-	–
Federal agencies	✓	–	–	–	–	–	–
Technology companies & platforms	–	–	✓	–	–	–	–
Local & state governments	–	–	–	–	✓	–	–
Local communities	–	–	–	–	✓	–	–

In terms of funding, participants identified possible corporate sponsorships and existing funding programs such as the American Association for the Advancement of Science (AAAS), the National Academy of Sciences, the National Science Foundation (NSF), the National Endowment for the Arts (NEA), the National Endowment for the Humanities (NEH), and the National Oceanic and Atmospheric Administration (NOAA)/Sea Grant. Additionally, participants identified as potential research and project funders, federal agencies such as the Department of Energy and the Department of Defense which manage lands containing archaeological sites. Other specific strategies for funding included: incentivizing cross-disciplinary research such as the National Geographic Society's ethical conversations around ancient DNA, and promoting the development of creative strategies that leverage resources and multiply existing capacities similar to SCAPE in Scotland (the Scottish government funds three positions in which people work with communities to write grants for specific projects and a university provides office space and computing resources).

In terms of partnerships, participants identified both local and state governments, explaining that local government partnerships would focus more on resilience projects and risk

mitigation, while in state government partnerships resilience offices would provide expertise and direct research priorities. The participants identified local communities as key partners and emphasized that researchers must (a) recognize the value of the contributions of community leaders, (b) develop clear ethical and communication guidelines, (c) recognize traditional knowledge and prioritize cultural values, and (d) co-create trainings for community-driven field work. Additionally, participants noted that mobilizing youth in community-based partnerships could foster continuation of these partnerships.

When tallied, the participants' votes for the resources most readily available to mobilize were: archaeological organizations (6), local communities (3), universities (3), local governments (2), corporations (1), and NGOs and private foundations (1). The tally of participants' votes for the most feasible strategies to meet the 2030 archaeological community of practice visions was: collaboration convenings (6), new curricula, academic programs, and professional trainings (4), outreach to develop common talking points (2), convenings of funders (2), partnerships with local communities and organizations (1), and incentivizing cross-disciplinary research (1).

Conclusions

Climate change threatens many archaeological sites (Daly, 2014; Hollesen et al., 2018; and Reimann et al., 2018), making it imperative that the field reflect on both the most urgent issues as well as the issues with the most viable solutions, and develop strategies that leverage available resources to meet near-term solutions and visions (Jackson et al., 2017 and Rockman and Hritz, 2020). Participants in the archaeological sites breakout session at the *Stemming the Tide* symposium identified the need for processes which help prioritize actions for adaptation and mitigation, and disaster response and recovery as the most urgent issues. They also identified the need for meaningful engagement with climate scientists as the problem most easily overcome. Prioritization frameworks for the support of archaeological site conservation are emerging within the academic literature (Carmichael et al., 2018). However, additional efforts are needed as these frameworks must be inclusive of, and adaptable to, local values, as well as informed by downscaled climate projections and vulnerability assessments.

When charged with envisioning where the field needs to be by 2030, participants identified: the need for an international coalition, direct engagement with natural heritage, and the restructuring of education and training programs so that they emphasize climate change and community engagement, with a focus on adapting existing approaches. The participants agreed that the most feasible next step would be the organization of a coalition that will leverage the strengths of existing professional archaeological organizations and create opportunities for convening funders, natural and social scientists, and local and indigenous communities. It seems that such a diverse coalition could not only impact training programs, but could also more fully center local and indigenous values and priorities in practice (Poulios, 2014). Additionally, as evidenced by disaster stabilization and recovery efforts in conflict zones, the involvement of local authorities in archaeological projects can promote continuity of community engagement

and heritage conservation, (Lione et al., 2018). As strategic and emancipatory climate action is spurred by diverse networks and communal pressure (Delina, 2019), the suggested coalition would promote change within and beyond the archaeological community of practice. Such a pathway will ensure that, in the effort to sustain archaeological sites in a changing climate, ancient knowledge becomes future wisdom.

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Workshop Participants

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BREAKOUT SESSION

Built Heritage Workshop

Buildings and Structures

Jean Carroon, Principal, Goody Clancy

Introduction

This paper explores the important role that built heritage in the form of buildings has in mitigating climate change and advancing climate action. It does not attempt to address the complex requirements of heritage monuments and sites – although many of the concerns and ideas expressed might also apply to these. This article builds upon a breakout session held on March 6, 2020 at the Smithsonian Institution's National Museum of American History, which followed a daylong symposium on March 5th that explored the intersection of cultural heritage and climate change. The breakout session focused on built heritage and continued the exploration with discussions about where we are now in stewarding built heritage and understanding its role in climate change, where we want to be, and how we will get there. The thirty-two participants in the session offered diverse experiences in fields including technical building management, building conservation, object curation, heritage policy, and climate action advocacy and policy. This paper expands upon the participants' observations and ideas for identifying critical links between built heritage and climate change, mitigating negative climate impacts and promoting the benefits of stewardship, and sharing these strategies and raising awareness about the key issues they address.

Framing the Issues: Where Are We Now?

Climate change is the most urgent issue of our time. Beyond its global existential threat, climate change exacerbates systemic inequities because it disproportionately impacts the health, economies, and cultures of vulnerable populations. Built heritage – buildings and structures – plays an oversized and active role in mitigating these impacts physically and culturally. Preservation and reuse of our built heritage (versus demolition and new construction) can substantially slow climate change through reduced consumption of raw materials and operational energy. Built heritage connects us to stories, supporting emotional well-being through memory and placemaking.

Existing buildings are at the nexus of climate change, both contributing to it through operations and being impacted by its increased storm events, flooding, insect spread, and temperature and humidity changes. For those charged with stewarding and interpreting our built heritage, the duality of this nexus can be overwhelming. Professionals in the built heritage

world are being asked to rapidly and dramatically expand their expertise. They must now respond to new environmental conditions while working to reduce and neutralize greenhouse gas (GHG) emissions created through building operations. Layered upon this expansion of scope related to physical stewardship is an escalating imperative to educate and motivate staff and visitors about climate change and the need for immediate action. Is it any wonder, then, that the participants in the March 6 workshop used words such as "difficult," "scary," and "challenging" to describe where we are now?

"Disconnect" was another pervasive theme in describing where we are now in addressing climate change: disconnect between leadership and those they lead; between scientific knowledge and general public knowledge; between consumption patterns and the 50-year-old mantra "Reduce, Reuse, Recycle"; between valuing heritage and protecting it; between valuing heritage and investing in it; and between the importance of built heritage in climate action and the role it is currently playing – which is neither highly visible nor highly valued. At the heart of much of the conversation was recognition and dismay about living in a culture that promotes consumption even as it relates to the collection of objects. Many challenged whether museums should be collecting as many objects as they do. For example, the Library of Congress adds more than 10,000 objects every day (Library of Congress, 2020). Expanding collections require expansion of specialized containment and buildings, both of which are resource and energy intensive. Ironically, this preservation of objects can and has been used as a reason not to preserve the biggest object of all: an existing building. As collections grow and require more space, their existing homes are sometimes undervalued or maligned for their age or quirkiness. In 2014, the Museum of Modern Art demolished the adjacent Folk Art Museum to build a new addition, a move which was described by design writer Martin Pedersen as a stand-in for larger issues including a turning away from cultural preservation (Pedersen, 2014). Is it also a turning away from sustainability? MoMA claims that the 40,000 square foot addition has enabled an overall reduction in operational energy.[1] The disconnect illustrated in this example is MoMA's significant consumption of materials and the destruction of an influential work of architecture – which were partially justified by reduced operational consumption. With dismay, workshop participants acknowledged the complexity of the issues, but still held to the value of challenging material consumption as an essential redirect towards a healthier world. This challenge consistently underscores the critical importance of reusing existing buildings to avoid building new ones and evaluating material consumption impacts against operational impacts.

Natural resource extraction and processing account for more than 90% of global biodiversity loss and water stress, and around half of global GHG emissions.[2] Extraction of raw materials, which has increased more than 240% in the last fifty years and is set to double again before 2060, is largely driven by construction (OECD, 2018). Recognition of the resulting environmental and social impacts, including escalating GHG emissions and human toxicity factors (OECD, 2018), has brought "embodied carbon" front and center in the building industry. Embodied carbon (kg CO2 equivalents/kg) is the amount of carbon consumed to extract, refine, process, transport, and fabricate a material or product. Although not the complete picture of

why material reduction is critical, it creates an important focus in the building industry on the impact of consumption. This focus should automatically make the reuse and protection of existing buildings a priority in climate action to the benefit of heritage buildings, but here another disconnect occurs between what is known and what is perceived. The perception of existing buildings – as energy hogs and difficult to modify – is largely negative. Indeed, in his welcoming remarks to the symposium, Dr. Scott Miller, Deputy Under Secretary for Collections and Interdisciplinary Support, outlined the many steps being taken to make Smithsonian facilities models for sustainability, noting that it is "really difficult, particularly in old buildings." The truth of his comment cannot be denied, but it underlines the common bias that fails to account for the increasing opportunities for GHG reductions in building operations and the much greater environmental damage of new construction. Our existing buildings are both the victims and the beneficiaries of current technologies and needs. Some modifications, such as more efficient lighting, are becoming easier as product innovations become mainstream. Others, like adequate facilities for recycling, might be more challenging – and the latter may be an imperfect and possibly temporary solution to a deeper problem of container design and waste management.

As we strive to make our facilities more sustainable, we must acknowledge that even positive actions, like energy retrofits, have immediate negative environmental impacts from material consumption. The question we must ask is **not** how to make every building net zero carbon (which is shorthand for emitting no GHG), but rather how much GHG and embodied carbon are we investing to reduce operational carbon emissions, and when is the carbon investment paid off by operational carbon savings? If the carbon investment to create a net zero building, whether new construction or renovation, will take thirty or more years to pay back, we can't afford it right now. The next three decades are critical and demand immediately effective actions. Methodologies such as Life Cycle Assessment (LCA) facilitate the compilation and evaluation of environmental impacts of a product or service throughout its life cycle. Applying LCA to our decisions and policies about existing buildings is essential if we are to avoid the same pitfalls that have rationalized our excessive consumption and resulting GHG for too long.

Framing the Issues: Where Do We Want to Be?

The disconnects identified in the workshop about where we are now launched robust and wonderfully idealistic descriptions of where we want to be, reaching far beyond heritage buildings. Central themes were about values, equity, and government/leadership.

Theme 1: Values That Support a Healthier World

First and foremost, we want to live in a world that values the layered stories that every building (and object) has and where these stories are routinely shared, expanded, challenged, and taught through whatever media is available. In valuing heritage buildings or any buildings, the norm should be repair and maintenance supported through widespread financial incentives and professional and vocational training. While re-use and preservation should be the norm, more flexibility in what this means would allow a less binary approach. We need to move

beyond choosing between restoration or demolition to consider different approaches to re-use, including treating buildings as repositories of materials which can be salvaged and re-used. It goes without saying that we want to see societies which universally value our planet and strive to live lightly and in harmony on it as we continue to learn what this means. We believe that, if the planet is valued, existing buildings and objects will be valued because a sustainable world values what already exists.

Theme 2: Equity Is a Basic Right

We cannot address sustainability of heritage buildings without considering the social milieux in which they reside. The *17 Sustainable Development Goals* of the United Nations strive to provide a blueprint for shared prosperity in a sustainable world; a world where all people can live productive, vibrant, and peaceful lives on a healthy planet. Workshop participants universally agreed they supported this (United Nations, 2020). As we steward our built heritage, we must seek ways to embrace actions that further equity through employment, training programs, education, and what we purchase from whom, whether objects or services. We must strive to create incentives for stewardship that benefit everyone and distribute resources that facilitate the stewardship of heritage buildings equitably across socio-economic sectors.

Theme 3: Government/Leadership Is Necessary

We envision a world where our government and leaders in all sectors acknowledge the reality and peril of climate change and proactively seek solutions to it while educating the public to gain wide-spread support. We want a world where faith and trust in government exists, where we know leaders are speaking for universal good, not personal gain. We believe that trust in government stimulates public service from individuals and action from communities. This action can respond to and support policies and funding that increase stewardship. Government, business, and citizen action can redirect us away from our current take-make-waste extractive model to a circular economy that focuses on society-wide benefits, including extending the service life of buildings and designing out waste and pollution.

From Framing to Action: How Do We Get There?

BE LOUD!

Tell the story through social media, exhibits, lectures, symposia, articles, and advocacy. Make sure that climate change and climate action are included in every narrative and weave heritage into the telling. Refer to the powerful and succinct outline of climate change and cultural heritage presented by ICOMOS in *The Future of Our Pasts: Engaging Cultural Heritage in Climate Action* (Markham et al., 2019) to understand the many opportunities that exist for cultural heritage to be part of the solution. Connect climate action to health and when possible make the issues youth friendly. Remember or discover *Captain Planet and the Planeteers* (https://en.wikipedia.org/wiki/Captain_Planet_and_the_Planeteers).

Challenge consumption in all its forms, including collections. Help disconnect consumption from comfort. Celebrate durability, material reuse, and waste reduction as part of the cultural and environmental story which leads a circular economy.

Make the embodied and operational carbon story of buildings visible and keep the story as simple as possible. Manufacturers, architects, engineers, and contractors are all becoming more literate about embodied carbon and the rapid carbon payback that simple changes like switching to LED fixtures can have. Kilograms of CO_2 saved are abstract, but they can be converted into more understandable equivalents using a greenhouse gas equivalencies calculator (https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator).

Demonstrate what a new world can look like. When greening a heritage building, learn from your peers and share your stories and data. With limited staff and/or resources, it can be daunting to know how to prioritize actions and what you should be measuring in terms of operational energy and water. Seek local sources first and reach beyond the known resources for heritage buildings. Assistance with information and funding opportunities can often be found at energy companies, local municipal sustainability offices, chapters of the Green Building Council, and professional groups of engineers and architects. By connecting with "sustainability" groups, heritage professionals can educate and be educated, which is essential for making sure that heritage has a seat at the table.

BE FLEXIBLE

How we steward our built heritage will always generate energetic dialogue and differences of opinion. Climate change is a catalyst for thoughtful review of what stewardship is and can be. Too often we steward by trying to recreate or freeze the past without embracing new opportunities to extend service life and mitigate environmental and social harm. Should we not celebrate opportunities for new technologies like photo voltaic panels and green roofs? And the reinvention of old technologies like sunshades and wind turbines? Is it always wrong to replace windows? Or to add insulation underneath siding, hence thickening the wall? How radical is a protective and sacrificial coating over masonry when we know it has been done for millennia and might now include insulation? Can we add density and diversity to communities by allowing ancillary units that are attached or free standing? As we address our post–World War II building stock, what are the options for changing the glass enclosures and adjusting the megalithic forms of the Heroic (Brutalist) building stock? In the coming years, we may have more questions than answers, but climate change is a bridge to more holistic conversations that might help move us toward more holistic solutions.

BE POLITICAL

Heritage policy and protection have traditionally been the result of passionate activists, from individuals fighting for a single building to whole communities protesting against urban renewal or other kinds of "development." Heritage professionals know that valuing the past is essential in creating the future. We know it will help create healthier more equitable communities.

Bringing attention to initiatives like tax incentives, demolition and waste penalties, and carbon taxes, which support stewardship and heritage, may seem like a "been there, done that" experience, but that doesn't change the importance of the exercise and of the new lens of climate action with which to describe the results. Engage in your communities as climate activists. Think big. Perhaps someday all governments will have a Minister of Culture.

BE INCLUSIVE

We must make the world a world worth preserving; one where our attitudes toward people are as sustainable as those towards our built and natural environment. Valuing human life means provision of basic rights (food, water, shelter, healthcare, employment). Creative cross connections are possible. Philadelphia's Rebuild Program (https://www.phila.gov/programs/rebuild) uses tax revenues from soda sales to fund training programs for women and minorities in design and construction and to renew community assets such as parks, recreation centers, and libraries.

BELIEVE

Ibram X. Kendi, a leading scholar on racism, has said "you have to believe change is possible in order to bring it about" (Rimmer, 2020). A healthy world is a journey, not a destination. There is no definitive solution that magically facilitates living lightly and equitably on our planet. Climate change is a powerful catalyst and we have an opportunity – indeed, an imperative – to reimagine the world and create the rapid transformations which history tells us are possible. The awakening of the heritage community and those who interact with it will be a strong and positive force for change and action. A sustainable world respects and values what already exists. A sustainable world respects and values people and embraces heritage in all its forms as an essential contributor to human health and wellbeing. Rather than being discouraged or overwhelmed by dystopic predictions, let us celebrate the opportunity for the 21st century to be one of positive, dramatic change, replacing the industrial or tech revolution with an earth revolution. It will be an exciting century, driven by necessity, but full of opportunity.

Workshop Participants

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Notes

1. https://www.moma.org/magazine/articles/224, accessed June 26, 2020.
2. https://www.unenvironment.org/news-and-stories/story/changes-building-and-construction-have-great-potential-slow-global-warming, accessed June 28, 2020.

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Resources

Architecture 2030, https://architecture2030.org/existing-buildings-operation/

Association for Preservation Technology International – Technical Committee on Sustainable Preservation, https://www.apti.org/sustainable-preservation

Carbon Leadership Forum - Focus Group on Reuse, http://carbonleadershipforum.org/focus-groups/

CLIC Project (Circular models Leveraging Investments in Cultural heritage adaptive reuse), www.clicproject.eu

Ellen MacArthur Foundation, www.ellenmacarthurfoundation.org

Historic England, https://historicengland.org.uk/research/current/threats/heritage-climate-change-environment/

Historic Environment Scotland, https://www.historicenvironment.scot/about-us/what-we-do/climate-change/

Institute of Historic Building Conservation, www.Ihbc.org.uk

London Energy Transformation Initiative, https://www.leti.london

National Trust for Historic Preservation, https://savingplaces.org

World Green Building Council, https://www.worldgbc.org/embodied-carbon

Zero Net Carbon Collaboration, https://www.znccollaboration.org

BREAKOUT SESSION

Cultural Communities Workshop

The Front Lines: A PDIA Approach to Empowering Cultural Communities

Meredith Wiggins, Science and Technology Policy Fellow, American Association for the Advancement of Science

The Future of Our Pasts: Engaging Cultural Heritage in Climate Action (ICOMOS, 2019), outlines four major ways that cultural heritage aligns with the goals of the Paris Agreement. Cultural heritage enhances adaptive capacity, can help to mitigate climate change, helps us plan for loss and damage, and builds the capacity of communities for both climate action and climate resilience. Although historic preservation and museum specialists have the perspective, experience, and skillsets necessary to aid living communities in the recording and protection of their cultural heritage during times of crisis (as well as in understanding the long-term drivers of human action and interaction with the environment over millennia), our expertise is often underutilized and our potential contributions underexplored and undervalued (Rockman and Hritz, 2020). Furthermore, while cultural heritage has recently been recognized by the Council of the Europe as "an important source of societal resilience and an asset in climate action" (Council of Europe, 2020b), it is neither expressly factored into climate policy, nor are the needs of at-risk communities systematically addressed by cultural institutions.

Article 27 of the Universal Declaration of Human Rights (1948), the UNESCO Declaration on Cultural Diversity (UNESCO, 2001), and the Council of Europe's Faro Convention (Council of Europe, 2020a) enshrine and ground cultural heritage (including its transmission) as a human right. However, as climate change increases the frequency and magnitude of extreme weather events, as it widens the areas experiencing slow-onset factors and second-degree effects (St. Amand, Sandweiss and Kelley, 2020), and as it escalates conflicts worldwide and causes mass-migration (Anzellini, Desai, and Leduc, 2020), the ability of communities to practice, protect and transmit their cultural heritage and ways of knowing are under continual threat (Chilton, 2012, Chilton, 2018, and Declaration Team, 2018).

The participants in the Cultural Communities breakout session at the Smithsonian Institution's *Stemming the Tide* symposium came together on March 6, 2020 to identify opportunities, challenges, and practical solutions to mobilize the cultural heritage sector for climate action in support of cultural communities. The group used the guiding questions of the Talanoa Dialogue (Where are we now? Where do we want to go? How do we get there?) to frame the discussion, and Harvard University's Problem Driven Iterative Adaptation (PDIA) Methodology (Andrews, Pritchett and Woolcock, 2012) to identify where experts, communities, and institutions could

take immediate action. The first day of the two-day symposium served to shine a light on the exceptional work being undertaken around the world and highlight gaps in knowledge, practice and ambition. The individuals who gathered the next day at the Cultural Communities breakout session at the National Museum of the American Indian comprised professionals from different parts of the Smithsonian, other Federal agencies, local government, and academia and non-profits. The group worked together to identify the places where immediate action could be taken to achieve "rapid and far-reaching" transitions in support of Cultural Communities (IPCC, 2018). What follows below is a summary of the group's discussions and suggestions.

Where Are We Now?

> Climate Change impacts and extreme weather events that climate change intensifies are the greatest catalyst of human migration worldwide, and the biggest threat to Cultural Communities. (Victoria Herrmann, "Stemming the Tide" symposium, March 5, 2020)

It is impossible to consider what role individual experts, heritage bodies, and large institutions can play in supporting the future of cultural communities without first acknowledging that our field has a "stake in and impact on '*the Past*'" (Chilton, 2018). We as experts cannot promote the role of cultural heritage in societal resilience without first recognizing the part cultural heritage can play in widening divisions in communities – through the prioritization of material in museum collections, through cultural appropriation and the appropriation of sacred lands, through preservation practices which validate narratives of Colonial power, and through the use and commodification of indigenous and traditional knowledge. The collection, display, and curation of cultural heritage is never neutral. Even when difficult legacies are openly and honestly debated, institutions can still inadvertently valorize oppression (Zetterstrom-Sharp and Wingfield, 2019). However, when undertaken alongside and within communities, the act of collection presents an opportunity for dialogue, understanding and empowerment.

Climate change is a systemic challenge (European Environment Agency, 2016), and the kinds of risks it exacerbates extend far past the environmental to the social and political (Kabui, 2019). The most recent illustration of this comes in the ongoing narrative of the year 2020. From climate stress to global pandemic (WWF, 2020) to the protests around the world that stemmed from the killing of George Floyd, these events are not isolated, and the fact that so many of the protest gatherings centered around monuments to Confederate and Colonial power is also not coincidental. Cultural heritage is all around us and cannot be disentangled from the human-environment systems that we inhabit and perpetuate. Explicit acknowledgement of the cultural dimensions of current events recognizes that culture and heritage are fundamental to social justice (ICOMOS and Europa Nostra, 2020). Culture's role in the ongoing climate crisis must be to strengthen resilience, bring communities together, and showcase models of sustainability that have stood the test of time (Pender and Lemieux, 2020).

Climate change exacerbates existing inequalities (Thomas and Warner, 2019) and weakens the fabric of communities, affecting social resilience. Ongoing climate-related displacement is divorcing people from the landscapes and practices they know, affecting their physical health and well-being as well as their mental health and social stability. In 2019, 24.9 million people worldwide were internally displaced because of environmental disasters – three times the number displaced because of conflict (Internal Displacement Monitoring Centre, 2020). In 2019, in the United States alone, a total of nine hundred sixteen thousand people were internally displaced due to storms. Thirty-seven thousand of them are categorized as permanently displaced. As people are being separated from the places and spaces they know, practitioners, institutions and governments have a duty to help safeguard all types of cultural heritage (Wiggins, 2018), and to equip local communities to take action themselves and give support to whatever actions they take (Herrmann, 2017). This is especially true for more vulnerable and marginalized communities, communities of color and indigenous populations.

Where Do We Want to Go?

> . . . valuing cultural heritage can inform groundbreaking policy discussions.
> (Janene Yazzie, "Stemming the Tide" symposium, March 5, 2020)

Through group dialogue, the participants identified a number of specific issues facing cultural communities and the institutions that wish to support them. They then used PDIA to ask, "What is the problem?" Summaries of the discussions follow each problem-turned-question.

1. How can practitioners make people aware of how the climate crisis affects their lives and of why what we do can help?

An overarching concern was framed around communicating the relevance of arts, culture and heritage to the present dialogue around the climate crisis. Current political value systems prioritize extractive economies over human societies, perpetuating historical injustices in the process. Solutions based upon unsustainable models of economic "growth" are touted even as resources dwindle and knowledge is lost. Cultural communities do not see a way to harness their own power, express their discontent, or affect change at any level. Furthermore, in the climate crisis physical displacement is now changing and will continue to change what "community" means, adding to trauma, conflict, and confusion over representation. The role of museums to communicate, of practitioners to empower, and of arts and culture to inspire and galvanize is so little utilized, and the "Cultural Community" of practice has such little capital in this arena.

2. How do we stimulate community-driven action and inter-group support?

Lack of resources, apathy, and laws and regulations were highlighted as the major barriers to community-driven action. When resources to assist cultural communities do exist and are known, they are difficult to navigate or come from sources that are not familiar or trusted. In

general, cultural communities do not feel empowered and are wary of outside intervention. Sometimes, inter-group communication is also lacking, and some cultural practices actively prohibit action. In terms of legal and regulatory issues, it was reiterated that bureaucratic processes hamper progress, as do laws which devalue or ignore cultural heritage and/or climate change.

3. How do we support cultural communities who already have been, or someday will be, displaced from their lands?

Historical, social, political and environmental factors have created a situation in which communities are not aware of available resources and are afraid of sharing their knowledge only to have it used in unexpected or unsanctioned ways. The lack of support and lack of prioritization both in policy and by institutions means that some communities do not feel a sense of urgency.

4. How can large institutions like the Smithsonian collaborate, demonstrate, and lead on climate and sustainability?

Large cultural institutions have incredible power and should be using it to provide leadership, but many are disjointed, and most are slow-moving. There is often a disconnect between lofty goals and concrete actions which is sometimes related to corporate funders' priorities. Furthermore, little if any money is being explicitly allocated to "Sustainability" – an umbrella term defined by the workshop participants as referring to everything from conservation and recycling of exhibition materials to the cutlery used in museum cafés. Lastly, it was noted that cultural communities do not have a formal place in cultural institutions' structures. This can be another barrier to building trust, accessing help, and reinforcing a culture of sustainability for the future.

Overarching Discussions and Themes

Throughout the workshop discussion, it was stressed that it is past time to support communities, represent our field effectively, and demonstrate sustainability in our practices and our institutions. The ties between culture, identity and land must be understood and protected. The dangers of forgetting history or losing the context of the past and having it retold by others must be avoided. Though this is a complex issue, large institutions have civic duties and must put more effort into effectively representing and supporting the many and varied cultural communities they serve. Lastly, it was noted that practitioners must find ways of supporting communities without "being in the way."

Throughout the discussions, and in each of the breakout groups, themes of equitability, justice and human rights were raised, and the role of cultural heritage in bringing society together, teaching us about human resilience, and providing models of sustainability for the future was stressed. In the context of museum collections, the obligation to public history and the importance of telling "Other" stories, new stories, and contested stories was raised. The fundamental need for prior and informed consent as well as the need for community-led action was also an important theme.

There was agreement that the loss of cultural heritage and ways of knowing is of universal importance to humanity's past, present and future. In terms of climate change and cultural

communities, cultural heritage should be prioritized in support plans for communities as well as factored into disaster risk reduction strategies. Lastly, it was agreed that although the scale of this issue means that generic one-size-fits-all solutions are impractical, much can be done on the policy and institutional stage as well as by cultural communities and practitioners themselves.

How Do We Get There?

> [We must] make climate action a 'usual' part of the practice of cultural heritage, and . . . make cultural heritage a 'usual' part of the practice of climate action. (Andrew Potts, "Stemming the Tide" symposium, March 5, 2020)

Using PDIA, the participants attempted to get to the root of the issue by examining the problems they had identified and asking: Why does it matter? To whom does it matter? Who needs to care more? How do we get them to give it more attention? In this way, the challenges could be broken down into smaller units and the actors disentangled from actions, making it possible to identify which actors could effect change at different levels. Then, after creating Ishikawa or fishbone diagrams (Figure 1), the participants were able to explore the "change space" where they had the Authority, Acceptance and Ability to act (Figure 2).

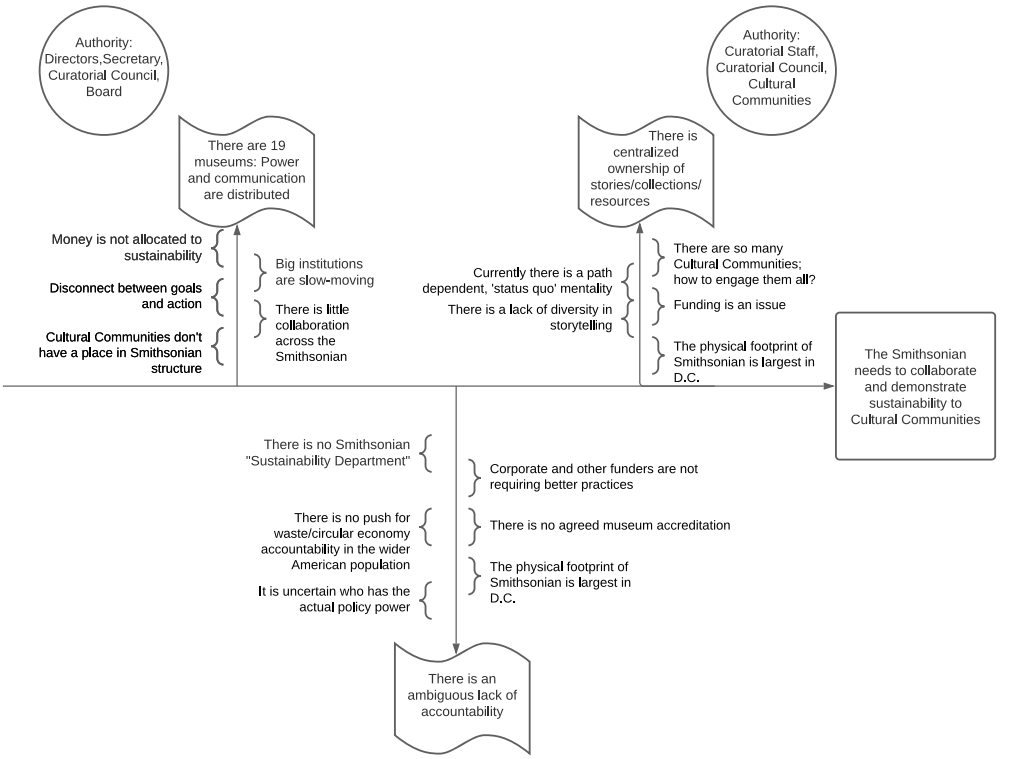

FIGURE 1. The Ishikawa or Fishbone diagrams actors and potential actions by asking "Why is this the case?" about each of our problems. Graphic by Meredith Wiggins.

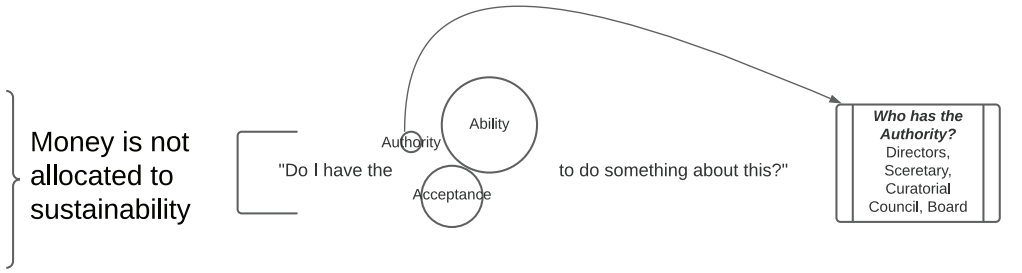

FIGURE 2. Analyzing the "change space" by breaking the problem down and thinking about the question "Do I have the Authority/Acceptance/Ability to act?" Here, it was agreed that participants' "Authority" was low, so individuals with authority were identified to take action to alter the change space. Graphic by Meredith Wiggins.

Where participants did not have sufficient authority (as in the example in Figure 2), the PDIA process allowed them to pinpoint the individuals or groups who could act on these issues. By doing this, they began the process of creating recommendations for concrete action at the strategic or institutional level, while also being empowered to leave the breakout session with tangible steps they could take in their own work. The main recommendations for how the Smithsonian and other large institutions can move forward to support cultural communities in the climate crisis are outlined below. These have been aligned with the themes introduced at the beginning of this paper.

Adaptation

Although cultural communities are disparate groups with unique needs, their empowerment must begin with formal recognition at the institutional level. The hopelessness and distrust felt by communities can be partially addressed in this manner and strong bridges between experts and cultural communities be built. Large institutions must offer themselves as trusted partners and commit expert resources to aid in documentation, curation and advice. It is especially important that lasting relationships be formed so that partnerships can be sustained even when particular individuals move on. Lastly, cultural communities must self-identify and highlight their challenges for two reasons: because any dialogue must be community-led and because as constituents their voices often carry more political weight than those of museum workers or federal employees.

Mitigation

Large institutions must lead by example. The Smithsonian Institution is the world's largest museum, education and research complex, yet it does not expressly allocate funds to sustainability. The Directors, Secretary, Curatorial Council and Board could address this by creating a Smithsonian Sustainability Department which would work across all nineteen museums and the Zoological Park to ensure collaboration and sharing and help set standards, work streams, and goals. Furthermore, the Smithsonian could use its expertise and knowledge to create new international

standards for Sustainability Accreditation for Museums and Archives which would take into account recycling and redirecting of materials as well as circular economy accountability. At the very least, it should phase out single-use materials by a set time. These actions would benefit the Smithsonian itself as well as be attractive to corporate funders and the general public.

Planning

Policy (and legal) reform are needed. Large institutions like the Smithsonian should use their voices to demand it. Until there is recognition of the link between ongoing loss and damage and climate change (including its second-degree effects), more irreplaceable knowledge will be lost. Cultural heritage must be fully integrated into risk management plans and broader climate policy. This must include the provision of mandated support for cultural communities so that they can record, safeguard, share, and transmit their cultural heritage and ways of knowing. Furthermore, where necessary climate or sustainability action by authorities threatens the heritage of cultural communities – for example, in regions that played a part in historical fossil-fuel production – recognition of the principles of Just Transition (Smith, 2017; ICOMOS 2019:19) should be used to avoid magnifying inequalities.

Capacity Building

The sector has a responsibility to think differently about the future of our "Cultural Community of Practice," as well as that of museums. The history of museums is bound up with colonialism, power, and stasis. If we are not explicit about this legacy then we are complicit in the damage it causes. The future of museums must be ambitious, embracing diverse and contested stories, valorizing unheard voices, and using expertise to support communities on the move. Well-known and well-loved museums must use their power and reach to champion the voiceless and share knowledge. Furthermore, they must find new ways of communicating and new places to communicate from. They must make strong **vocal and monetary** commitments at all levels to moving conversations out of the museum and into the street, back to the community, across the globe, and into the digital domain. Accessibility must be made an explicit priority. Changes in both media and geography will draw in new audiences, inspire new types of experts, highlight relevance, and promote action. A platform on an international stage – as part of UN75, the United Nations 75th anniversary global dialogue initiative (https://www.un.org/en/un75) or COP26, the 26th UN Climate Change Conference (https://www.ukcop26.org) – could be an ideal next step toward making this a reality.

Lastly, at national and international conferences, conversations about these three critical themes need to happen: Ways to better share information in our field, Ways to build lasting trust with cultural communities, and most importantly, Ways to engage new audiences and draw them into allyship with the climate crisis and cultural communities' causes. "Path dependence" cannot be the status quo anymore. Experts and institutions must not just be proactive, they must be radical.

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I am grateful for the experts who attended the Cultural Communities Breakout Workshop, without whom the thoughts presented above would have no context or weight. Thank you to our hosts, facilitators, and to our subject matter expert, Dr. Victoria Herrmann. Thank you all for sharing your knowledge with me.

Workshop Participants

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BREAKOUT SESSION

Intangible Cultural Heritage Workshop

Intangible Cultural Heritage

Sarah W. Sutton, Principal, Sustainable Museums

> Cultural heritage does not end at monuments and collections of objects. It also includes traditions or living expressions inherited from our ancestors and passed on to our descendants, such as 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." The description recognizes that, "While fragile, intangible cultural heritage is an important factor in maintaining cultural diversity in the face of growing globalization, an understanding of the intangible cultural heritage of different communities helps with intercultural dialogue, and encourages mutual respect for other ways of life.
>
> —UNESCO, 2001

This workshop examined the current professional and climate change dimensions of work in Intangible Cultural Heritage (ICH) in the United States for the purpose of strengthening the role of ICH in climate action. In this paper, three definitions are particularly important for context:

- By **ICH** we mean, as described in *The Future of Our Pasts: Engaging Cultural Heritage in Climate Action* (published by the Climate Change and Cultural Heritage Working Group of the International Council on Monuments and Sites), "the entirety of knowledge derived from the development and experience of human practices, representations, expressions, knowledge and skills; and associated objects and spaces that communities recognize as part of their cultural heritage."
- By **climate action** we mean those steps people take to develop resilience to the impacts of climate change, adapt their behaviors to that changed climate, and mitigate human impacts that contribute to a changing climate. The particular skills, knowledge, understanding, and beliefs of people, that we call ICH contribute significantly to each practice of climate action: resilience, adaptation and mitigation.

- By **we**, this paper means the workshop participants. We were cultural heritage professionals. Some were Indigenous and some had significant experience working alongside Indigenous peoples. In this paper "we" reflects broadly accepted comments by, and conclusions from, those in the group.

To organize the work, the Climate Change and Intangible Cultural Heritage workshop and this paper used the preparatory phase of the Talanoa Dialogue: "Where are we now? Where do we want to go? and How are we going to get there?" This collaborative planning approach was established in 2018 during the 23rd Conference of the Parties (COP23), where the governing body of the United Nations Framework on Climate Change Convention (UNFCCC) gathered to support the development of guidance for nations in preparing climate action commitments and plans to achieve the goals of the 2015 Paris Agreement.

Although the lack of awareness or recognition of the value of ICH is much less pronounced within the cultural heritage profession than in the public sector, the recognition of the value of tangible *and* intangible cultural heritage in climate action is increasing only slowly. We are anxious that the cultural heritage profession ally tangible and intangible cultural heritage resources for climate action, and that the cultural heritage profession become integrated into every approach to climate action. We are also anxious that climate action workers outside of the cultural heritage profession understand the great risks to tangible and intangible cultural heritage from climate change, and the great value of ICH as a resource in climate action. Stories of cultural losses to climate change are often treated more as a soft and mournful closure to an evening news report than as the lead story and hard evidence of cause for concern. For example, mention of the loss of a sacred mound to sea level rise is presented as a sad story rather than evidence of climate change and a call to action, and opportunities for traditional ecological knowledge to guide adaptation to a changing climate are treated more often as interesting and isolated techniques than as long-standing, proven approaches. For example, cultural burning to control fires often appears as an add-on to a story about the deployment of the National Guard to fight wildfires.

To create such a significant shift requires a change in perception of climate change research and discourse from the purely scientific to approaches which are far more integrated with the humanities. Public discourse and education rarely recognize the richness of the humanities, particularly ICH, for its climate change stories, evidence, and knowledge. Research approaches and public policies emphasize modern science over traditional knowledge and numbers-driven evidence over humanities-driven evidence. The inclusion of tangible and intangible cultural heritage in the climate change discussion can expand its power to attract, engage and affect a wider population beyond the sciences, and create expanded dialogue and action. It often creates more effective, inclusive solutions. We hope this workshop and report accelerate that progress. These are our recommendations for establishing ICH as an equally recognized sector of the climate-heritage conversation, and as a valued resource for climate action by any individual or sector.

Talanoa Dialogue: Where Are We Now?

The discussion examined the current experiences of the participants as cultural heritage professionals who feel a lack of exposure to climate science, strong inclinations toward the humanities (but not as applied to climate), and deep respect for what can be learned from ICH studies for all aspects of public and scientific engagement for the benefit of all. We are painfully aware of our perceived professional short comings and of the need for the cultural heritage sector to understand and advocate for ICH protection and engagement more broadly and skillfully.

Observations and Recommendations

1. Separateness, Variation, and Change

Observation: There is an inappropriate separateness between the domains of nature and culture management, as if culture as evidenced by structures, knowledge or experience has no connection to the land, air, water and species it describes or that surround it. That separateness is an historic one that the *status quo* perpetuates. There is also an unnatural separateness between tangible and intangible cultural heritage in the practice of cultural heritage management, as if one can understand an object without knowing about its origins, its intended purpose, and its past uses. Enduring colonization perpetuates this separateness in collections, conservation, preservation, and interpretation. Economic and political power structures foster another kind of separation that dominates the cultural heritage profession and its work, expanding the separation of ICH from the cultures themselves, creating barriers to professional participation by cultural representatives, and limiting cultures' access to resources for protecting and nurturing or reviving practices.

> Recommendation: Identify and reduce or eliminate this separateness by overtly reinforcing (while honoring community protocols) the integration of ICH and tangible cultural heritage and the integration of nature and culture, by cultural heritage professionals, cultural communities, and the public.

Observation: There is also separateness within cultural groups. The "fractured nature of communities themselves" affects how those outside of a group engage in this work.

> Recommendation: Since "cultural groups are not monolithic in options and values", the ICH profession must build its members' awareness of, and the skills for, navigating "messiness." (quotes from Michael Mason, Director of the Smithsonian Center for Folklife and Cultural Heritage)

Observation: All workshop participants recognized that effectively or appropriately supporting cultural communities requires first protecting their environments and resources from the impacts of climate change (such as extreme heat or precipitation, drought and sea level rise) and then supporting the engagement of ICH practices for resilience, adaptation and mitigation.

Recommendations: Cultural heritage professionals should prioritize cultural communities' roles in documenting and sustaining the vitality of ICH, and protecting the sites and cultural communities where ICH is grounded.

Observation: Time naturally fosters changes within cultures, and cultural heritage professionals regularly document change over time. Climate change accelerates change within culture heritage – sometimes to the point of complete disruption and loss. As an example of change, during the Symposium we abandoned a long-held social practice of shaking hands to greet each other and used the "COVID elbow bump" to minimize contact and a potential method of spread of the corona virus.

Recommendation: Prioritize the practice of identifying and documenting climate-driven changes and threats to ICH.

2. Tools, Approaches and Appreciation

Observation: There is a constellation of tools, approaches, and appreciation at work in ways that can seed public and professional awareness of the value of ICH in climate action.

Recommendations: (1) Aggressively and dramatically expand the continuation and revitalization of languages, crafts, and traditional knowledge to begin to meet the need of protecting at-risk ICH. (2) Democratize technology by making technology more accessible and deployable in collecting and sharing ICH in order to support in-community collecting and perpetuation. This can range from language podcasts to "citizen curators" becoming documentarians. (3) Use previous Diaspora experiences to improve the capacity of cultural heritage professionals to identify and share effective adaptive and restorative practices in climate action.

Observation: Participant Katrina Lashley shared that the phrase "document, dialogue, dwelling" literally and metaphorically describes critical aspects of this work: *Document,* for supporting the record of cultural heritage as it is shared within and outside of the culture. *Dialogue,* to inform the work of those not of the culture by developing shared respect and understanding. *Dwelling*, as the recognition that ICH dwells within the culture in communities and homes as long as it is nurtured and respected, and outside of the culture through paper, print, audio, and digital materials captured online and in museums, libraries, archives, historic sites, galleries, and performing arts institutions.

Recommendation: There is value in naming "document, dialogue and dwelling" as channel markers in our work to activate ICH for climate action.

Observation: "While most human rights are affected by climate change, cultural rights are particularly drastically affected, in that they risk being simply wiped out in many cases." "Those with pronounced cultural connections to land, sea, natural resources and ecosystems including indigenous, rural and fisher peoples, face disproportionate devastation of their individual and collective lives" (Bennoune, 2020. 3-4).

Recommendation: The risks to, and loss of, ICH from climate change are grave and should be treated as such. Climate scientists regularly remind us that climate change is not something to be believed in, as in, "Do you believe in climate change?" The question is wrong. The discussion of the value of ICH in climate action, and the need to protect ICH from climate impacts, must be resolutely reframed, making it clearly unacceptable and disrespectful to treat stories and examples of ICH as mournful afterthoughts or unusual anecdotes.

Observation: When we step back to consider those who value cultural heritage but will not be part of protecting and sharing it, we realize that *they* are also an audience for whom this work is important.

Recommendation: Develop public understanding, and foster expanded relationships that buttress public awareness, values, and attitudes that protect ICH and engage with it for wider benefits to all including climate action.

Talanoa Dialogue: Where Are We Going?

What messages would we send to Smithsonian and other cultural leaders and funders, about where they could take us all if they were to lead and support cultural heritage professionals in the future? The mission of the Smithsonian is "the increase and diffusion of knowledge - shaping the future by preserving our heritage, discovering new knowledge, and sharing our resources with the world." Our recommendations demonstrate how the Smithsonian could lead the alignment of tangible cultural heritage and intangible cultural heritage professionals and cultural communities with climate action, in direct support of its own mission and for the well-being of the United States and the World.

Observations and Recommendations

1. The Smithsonian can lead on intangible cultural heritage and climate action.

Observation: The Smithsonian has a privileged position as a seat of cultural policy-making. That position is also a responsibility.

Recommendation: Though climate issues traditionally reside with the National Oceanic and Atmospheric Association (NOAA) and other federal agencies, the Smithsonian, through its mission and collections can make a powerful case for the humanities *and* sciences to be included in the United States Global Change Program. The Smithsonian can invite the National Archives and the Library of Congress to join with it and the National Park Service as allies to the NOAA and other agencies in a cooperative approach to climate change (Personal communication with J. Linden). As a partner with the Smithsonian, the NOAA can lead the science while the Smithsonian leads on culture. The Smithsonian can activate ICH work, demonstrating how ICH is a broadly engaging, culturally sensitive, programmatically powerful method of illustrating climate change causes and impacts, that highlights ways of building resilience and adapting to climate change while mitigating it.

2. The Smithsonian can champion ICH as evidence of climate change causes and impacts.

Observation: Cultural heritage professionals and their peers in other professions regularly overlook active use of ICH to document, adapt to, and cope with climate change. Within moveable heritage, namely collections and archives, there are troves of climate information and climate change-related evidence that illustrate change and risk in ways that are broadly engaging to humanists, while also valuable to scientists. For example, retroactive cataloguing of mid-twentieth century birdsong recordings can document migration of species or last known locations of species. Similarly, for example, cultural data and traditional knowledge of a landscape and region combined with contemporary scientific evidence supports a Multiple Evidence Based approach to understanding climate change and human response. This approach for climate study is encouraged by the United Nation's Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). It "weaves together the distinct threads of Indigenous and scientific knowledge" and "preserves the integrity of each knowledge system." (Raygorodetsy, 2017: 258.)

Recommendations: (1) Explicitly align ICH and climate action within the cultural heritage profession and cultural communities, making it a recognized and reputable field of endeavor. (2) Prioritize re-examination of ICH collections and development of cultural heritage collections, to strengthen climate research and communication. (3) Value living cultures that maintain "direct and intimate relationships with their living sacred [spaces] . . . and even anticipate the effects of climate change" as extraordinary resources for significantly advancing efforts to mitigate and adapt to climate change. (Raygorodetsy, 2017:255)

3. The Smithsonian and the cultural heritage sector must champion ICH to facilitate adaptation and mitigation in the face of climate change.

Observation: Much of the public fails to see climate change as a crisis. Repeatedly we see resilience qualities appear within communities when faced with imminent threats. But the moment of crisis is too late for a sufficient response. Because ICH has evidence and tools for adaptation to and mitigation of climate change, the ICH profession must be encouraged and enabled to activate resilience in advance of the need, so the public can respond before and not only after disaster strikes.

Recommendation: The Smithsonian and the cultural heritage sector can prioritize **documenting** how regional ICH can inform adaptation or mitigation with tested examples, **dialogues** that value and share ICH adaptation and mitigation approaches, and identifying **dwelling** spaces – whether to understand and discover ICH where it naturally resides, or to care for it in safe, yet accessible ways as deemed most appropriate.

Observation: Documentation and protection is not enough. We must also examine how to create a culture that nurtures and values ICH by describing and supporting the values of the cultural community. Our knowledge of how ICH works can help us understand cultural risk and losses by protecting places, recognizing traditional cultural knowledge, and building upon

the needs and values of those places so that each voice and tradition can contribute to the path forward. This is particularly evident in agriculture, land management, building construction, and regulation of environmental practices such as hunting and gathering food and materials.

Recommendation: Facilitate cross-sector recognition of the value of culture, language and values residing within Indigenous communities so that these practices can become part of the wider community's approach to resilience, adaptation and mitigation. This requires a stronger voice than cultural communities alone can offer, and a louder voice so that those outside the communities hear it. This is where the Smithsonian's voice would be so effective.

4. The Smithsonian and the cultural heritage sector can help the nation and the world take care to acknowledge losses.

Observation: Explicitly recognizing the value of lost places, practices, and expectations creates emotional space for the new places, practices and expectations to become accepted, even desired and desirable for individuals and communities. Climate change is already forcing communities to move to higher, safer, unfamiliar ground. This separation of people from their homes and other familiar and valued places, from the places of traditional agriculture, harvesting and hunting, from places of spiritual value and community identity is a stunning loss to many, and a damning result of anthropogenic climate change. Recognition of the causes of climate change requires that some communities also leave behind coal and oil fields as the nation moves into a clean energy future. The generations of workers who built identities, families, communities, and futures in those fields value their history and accomplishments, as do many outside their communities. To shift to new identities and futures, in communities that will look, feel and operate differently, is a stunning loss to many, but necessary for mitigating climate change.

Recommendation: Each of us must acknowledge and process loss if we are to transcend the devastation, avoid its repetition, and find new meaning. The Smithsonian and the cultural heritage sector can lead this by celebrating and documenting the process, engaging communities in this work, and actively channeling this participation into a regenerative approach for communities and the planet.

Talanoa Dialogue: How Are We Going to Get There?

This new work must take place both inside and outside cultural communities and the cultural heritage profession. Each of the two sectors must determine what within its sphere of influence must change and what outside that sphere must be changed.

Observations and Recommendations

1. Within Our Spheres: Changes in Attitude and Practices

Recommendations: (1) Individuals *must* refute the argument of any museum or other institution that climate action is outside of its mission. As charitable, educational, community-focused institutions, their mission *is* to serve the community and to identify and share strengths, abilities

and resources for common good and action. This work advances communities' health and well-being. By holding institutions accountable for this approach through accreditation and recognition, the cultural heritage profession will establish this as being part of *expected* work and *good* work – not as extra work. (2) Institutions must shift from providing service-to-collections to service-to-communities. ICH professionals working with and within cultural communities must see the role of cultural institutions as an act of service *and* as *active* service. This recognition of the value of service aligns with the perception of climate change work as necessary and appropriate.

Observation: Cultural communities and the profession require skilled, knowledgeable cultural community members able to develop, re-examine and re-describe collections for climate change and adaptation. This will build the expanded and more diverse cultural heritage work force required to meet the need.

> Recommendations: Training programs and funding in the profession must emphasize investment in intentional training and deployment of climate-literate, culturally literate cultural heritage workers. This includes both new workers and those who must to be re-trained from a practice focused on objects and documentation as the priority to a practice focused on community. These conscious practitioners will respect boundaries yet be able to work across organizations, cultural communities, and sectors. They will be invested in the growth of reciprocal relationships and will be invested in continuous learning and sharing.

Observation: As we look for ways to do this work, digitization is often a first choice, but it can be a poor one. Researchers must recognize the digitization challenges of ICH, and the cultural communities and the profession must support each other in creating technological approaches to collecting, examining and sharing ICH.

> Recommendation: The Smithsonian and the cultural heritage sector must invest in developing new tools, protocols, and ways of sharing learning for both cultural communities and practitioners. One example would be an adaptation for ICH of the Climate Vulnerability Index developed at James Cook University as a tool for assessing the risk of loss or damage at World Heritage sites due to climate change impacts. (Day, Heron, and Markham, 2020)

Observation: In digital capture and sharing, there is increased opportunity for violations of knowledge transfer protocols. This can occur within cultural communities and between a community and a researcher. The causes may be a failure to attach protocol or sacredness to content, and wider access diluting controls.

> Recommendations: (1) Recognize that the format of digital sharing comes from outside of the cultural communities and its practice must be exercised with great caution. Taking care to connect messages or instructions to content through symbols or visual labeling can signal that there are important aspects of its ownership and access that must be recognized

before proceeding. (2) Explore an expansion of the use of Traditional Knowledge labels (https://localcontexts.org/labels/traditional-knowledge-labels), designed originally for object collections, to support ICH including traditional ecological knowledge (Cristen and Anderson, n.d.). These symbols can be a valuable intermediary step to prevent inappropriate sharing and can signal shareable traditional practices for use in adapting to, and mitigating, climate change.

Observation: Climate change increases the risk of interruption of ICH if cultural communities are forced to relocate, if distinctive species used for traditional practices are lost, and if sacred places are lost or become inaccessible. Contrasting experiences or interpretations of experiences can foster disagreements over knowledge and evidence, making that knowledge suspect as a tool for climate action.

Recommendations: (1) Expand and accelerate recognition of the increased climate change risks to ICH and the value of ICH for creating solutions. (2) Community elders and ICH professionals must recognize that risk of climate-driven relocations is signaling that the issues surrounding *documentation, dialogue* and *dwelling* are urgent. Those within the cultural communities and those outside of the communities must prioritize collaborative protection and action over individual needs.

Observation: ICH professionals must be conscious of the dangers of blind efforts to revitalize or sustain traditional practices. In some cases, there is not enough research on how colonization has affected those practices. The gaps in tradition brought about by forced removal, generational separation, and lack of use or opportunity leave spaces for infill that can be inappropriate. Climate change disruption will only exacerbate this as forced migrations separate traditions from original conditions, content from context, and community members from each other.

Recommendations: Temporal knowledge gaps are opportunities for youth to become active agents shaping their own part of heritage and revitalization. ICH work must engage them broadly and deeply, both as community members and as future cultural heritage professionals.

Observation: For reasons of health, safety, well-being and enrichment, at the least awareness-building around ICH and climate action is required by the public. Actionable invitations to join in this work through social science, the arts and humanities is preferrable.

Recommendation: Museums must not remain as spaces separate from cultural communities or they will be useless to them. Cultural heritage professionals at museums and cultural centers must advocate for them as critical community spaces for connections and dialogue that support resilience, adaptation and mitigation.

Observation: Most cultural communities do not have their own museum, cultural center, or archival infrastructure. Fostering local development of this infrastructure privileges their needs,

increasing the chances that ICH for climate action is shared in meaningful and valuable ways for the benefit of all.

Recommendation: Research, exhibits, collections should be centered within cultural communities. Then the community can choose whether to extend the work and knowledge outside the community rather than have that decision made for them. This approach can support the adaptation of professional practices and can widen the reach of ideas based on reciprocal stewardship. This centering can take the form of mobile and pop-up museums, archives and libraries, Story Corps-like opportunities, and traditional and professional learning opportunities.

2. Alongside Our Spheres: Policy

Observation: Lack of heritage education puts ICH and all cultural heritage at risk and steals from all communities and cultures the resources to mitigate and adapt to a changing climate and to become resilient.

Recommendation: The Smithsonian and the cultural heritage profession must call for a mandate for heritage education that fosters awareness of the value of ICH for health and well-being. This would build the path for more young people to become grounded in this work, carrying and sharing it into the future.

Observation: Existing preservation and planning policies are often at odds with ICH and cultural community values with damaging results. Even worse, policies fail to appreciate non-standard solutions present in the cultural community such as traditional land use or community design approaches

Recommendation: The cultural heritage profession can lead the development of dynamic, flexible practices for planning and regulation at the local level that give cultural communities agency to navigate the political process and affect change, promoting the development of new and better methods to protect and activate ICH in the process.

Observation: Most political leaders are unaware of the value and impact of cultural institutions. Most also have little or no genuine and positive engagement with cultural communities. The most sustainable changes will be created when this dialogue reaches beyond cultural communities to policy leaders at every level.

Recommendation: Cultural communities and cultural heritage professionals must collaborate on consistent messaging to, and attempts at engagement with, policy leaders which highlights the role and value of ICH in understanding and adapting to climate change.

Observation: As the United States' population and economy experiences the fall-out from the COVID-19 pandemic, many are examining how the recovery can move the nation to a better state than it was before the pandemic. This is resilience. Just as ICH can support resilience,

adaptation and mitigation in the work of individuals and communities, if recognized and valued it can do the same for a nation.

Recommendations: (1) A recovery that supports the transition of work toward resilience, adaptation and mitigation must put into use the wealth of knowledge within ICH, particularly in agriculture, environmental health and management, renewable energy, and medicine or well-being. (2) The ICH profession cannot champion a climate-focused recovery alone. Such recovery requires public and governmental participation. The Smithsonian could amplify this work and lead the sector in reinforcing the value of ICH. Then the sector could confidently bring its resources alongside those of other sectors advocating for responsive planning and implementation.

Observation: It is important to bring high-level climate work to the community level so that the cultural heritage profession and the public can recognize the connection between the actions and interests of individuals and the will of nations to lead and act on the national and international level.

Recommendation: Cultural heritage professionals must partner with Indigenous peoples to participate in the work of the United Nations Framework on Climate Change Convention (UNFCCC), not only as observers but also as actors in sharing solutions and advocating for inclusion in the development of Intended Nationally Determined Contributions.

3. Alongside Our Spheres: Funding

Observation: Funding is critical for expanding and adapting practices.

Recommendation: The Smithsonian and the cultural heritage profession must advocate for investment in ICH as a critical resource for climate change engagement through:

- Development of cultural community members' skills, abilities, awareness, knowledge and resources so they can identify, direct and implement much of this work.
- Sustained ICH knowledge and understanding of agriculture, building, and land and resource management to empower local populations to adapt to climate change and mitigate human impacts on climate.
- Testing and documentation of examples of co-stewardship and reciprocal stewardship to describe best practices.
- New knowledge and growing demonstration collections that remain in the community with some objects traveling out of the community to raise awareness and be used for climate adaptation and mitigation.
- Developing, testing, sharing, and expanding tools and approaches that not only facilitate identification and protection for ICH, but shares them in appropriate ways that build appreciation for the ICH its richness for the benefit of all.
- The equal participation of cultural heritage professionals and Indigenous community representatives in national and international development of thoughtful approaches to climate mitigation and adaptation.

Conclusion

The workshop participants concluded that Intangible Cultural Heritage surrounds and sustains the stories of our pasts, presents, and futures, yet is often overlooked as the public and cultural heritage professionals focus on physical structures and familiar landscapes as the primary repositories of cultural heritage. With or without the impacts of a changing climate, it is our moral and social responsibility to acknowledge, support, and protect ICH for individual and shared appreciation, sustenance, and benefit. This is best done in alliance with efforts to protect and share the built and natural environments and moveable tangible heritage, as they are inseparable.

With threats to ICH exacerbated by the impacts of a changing climate, and with increasing need for ICH guidance toward solutions, we must accelerate awareness of, and responsibility for, valuing and protecting ICH. We must expand our engagement with all aspects of ICH as a living resource for mitigation, adaptation, and resilience. War, disaster, and forced migration place ICH at risk. Mitigation, adaptation and peace depend upon its presence. We must prepare and enact social and professional practices and expectations that continually adapt to the needs and opportunities associated with climate change and the Intangible Cultural Heritage we value and depend upon.

Acknowledgments

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The comments, observations, and suggestions collected here benefit from a wide range of experience and perspectives, and yet emphasize United States indigenous populations. The intangible cultural heritage of peoples who have immigrated to the country or were brought here by force should be acknowledge in a longer discourse.

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BREAKOUT SESSION

Museums and Collections Workshop

Museums and Collections

Henry McGhie, Founder, Curating Tomorrow

Introduction

This essay explores how museums and collections can more meaningfully address climate change. It is based on discussions which took place during a workshop held at the Smithsonian American Art Museum on March 6, 2020. The thirty five participants included museum curators, conservators, directors, and museum and heritage consultants. The participants worked at a variety of levels in their organizations, and in a wide variety of organizations from very large museums to very small ones (most of them in the United States), as freelancers, and as part of museums and collections support organizations. Throughout the workshop, the participants worked in small groups. The points made here have been distilled from the groups' notes and aim to capture and reflect the main themes of the day. This essay is therefore not a typical one based on a review of literature, but is a distillation of the participants' personal and collective experiences and their ambitions for the future regarding museums, collections and climate change.

During the workshop, participants considered three questions regarding museums, collections and climate change: Where are we now? Where are we trying to get to? How do we get there? These three questions formed the basis of the "Talanoa Dialogue," which was used in advance of COP24, the UN Climate Change conference held in Katowice, Poland in December 2018.[1] The "Talanoa Dialogue" was based on a Fijian method of solving differences through dialogue and conversation in an inclusive, respectful manner.[2] The "Talanoa Dialogue" approach was presented at the beginning of the workshop and participants were asked to adopt its principles in order to promote a positive and constructive discussion. In terms of the question of where we are trying to get to, the year 2030 was chosen as a point in the future that was far enough away to enable significant change to happen, but close enough to give more shape to the abstract concept of 'the future.'

Museums, Collections and Climate Change: Where Are We Now?

In terms of how museums and collections contribute to addressing climate change, the participants identified a number of positive contributions and negative impacts.

Positive Contributions

Museums and collections are making a number of positive contributions to climate action – or at least have the potential to do so. They preserve cultural heritage that can be used for a wide variety of purposes linked to climate action – education, research, building partnerships. As climate change will impact all museums and all aspects of life and the environment, climate change is relevant to all museums and all museums are relevant to climate change.

Museums can play an important role in raising public awareness of climate change. They can be powerful broadcasters and incorporate climate change into their public communications, exhibitions, events, and educational programs. Climate change is linked to other issues relating to social and environmental rights and justice, but it is not always clear how. Museums can help people explore the connections between climate change, social and environmental issues, and human rights. Longstanding museums increasingly feature climate change in their work. New museums such as the Museum of Tomorrow in Rio de Janeiro or the forthcoming Biotopia in Munich are framed around sustainability. New forms of museums, such as the Climate Museum in New York City, have emerged. This broadening of the mission and purpose of museums and the increasing variety of forms of museum present opportunities to engage more people with, and in, issues related to climate change.

Many museums are working to reduce their energy use in storage areas and to address other negative environmental impacts such as waste. There have been some successes in the workshop participants' museums and the wider sector. For example, the Phipps Conservatory in Pittsburgh has reduced its carbon emissions by 56% since 2005.[3]

Many people who work in the museum sector are passionate about the need for action and the need for change, and are doing what they can with the knowledge or information they have. This commitment from museum staff is one of the biggest agents for change in the sector. The Coalition of Museums for Climate Justice, based in Canada, is an example of leadership through networking for museums and museum professionals interested in museums' contributions to climate action. Fostering good practice is recognized by awards like the Sustainability Excellence Awards of the American Alliance of Museums. Sustainability and climate change are increasingly prominent in museum conference programs and training events, reflecting and supporting the increasing level of interest and importance given to climate change by museum staff and the public.

Negative Impacts

Climate change poses many challenges for museums and museum practice. Many museums are, or will be, threatened in a wide variety of ways by the impacts of climate change. Their slowness to change puts them at even greater risk.

Museums generate vast quantities of a variety of kinds of waste, some of it from temporary and touring exhibitions. Museums have very large carbon footprints. Preserving collections in environmentally controlled stores uses a lot of energy and many museums have yet to shift to

renewable energy sources. One workshop participant spoke of a "culture of wastefulness" and another mentioned a "culture of unsustainability." Several participants noted that sustainability initiatives are often "quick wins" such as installing LED lights or installing recycling bins, but deeper-rooted challenges such as the sources of energy used or the acceptance of sponsorship money from fossil fuel industries remain unresolved.

Museums can be inspiring and they can be trailblazing in terms of climate-related programming. But, by and large, regarding climate action they are followers rather than leaders. Boards and directors can be reluctant to take positions regarding sustainability or they may form funding partnerships (notably with fossil fuel companies) that strain relationships with staff and public, as these positions and relationships undermine the museums' claims of concern about sustainability issues and commitment to climate action. Regulatory frameworks such as those which stipulate certain conditions for exhibitions and loans are often responsible for increasing the museums' carbon footprints. Museums often define success by (unsustainable) growth – how big they are, how many visitors they receive, how much money they bring in – and are often rather competitive with one another about these things. Rather than capitalizing on the embodied carbon in existing buildings, a museum building boom has created many glamorous new buildings,

Good Intentions, But Lack of Momentum

While museums can be places for public education and raising of awareness, there is no clear definition or shared purpose of what they are trying to achieve regarding climate education. This hampers their ability to evaluate success or build momentum. There is no sector-wide approach, so each institution does "its own thing," making it difficult to build momentum or demonstrate a clear position of what museums are about.

There is a general lack of information and lack of climate literacy among museum staff. Staff members want to contribute to climate action, but they don't have access to practical tools and other forms of support. One participant noted that it is important to work on sustainability and climate change in ways that are not overwhelming or exhausting for staff or visitors

Workshop participants were asked to consider if they thought museums are in first gear, fifth gear, neutral or reverse regarding their contributions to climate action. Most responses said that they are in first gear in terms of advocacy and partnerships, in neutral in that change is not moving fast enough, and in reverse in terms of the growth in the physical footprints of their buildings, their increasing greenhouse gas emissions, and their wasteful practices related to travelling and temporary exhibitions.

Where Do We Want to Get To?

Participants in the workshop were asked to imagine the year 2030 with climate change addressed or on the road to being addressed. They were asked to describe that world and the role museums were playing in that world. The following visualizations are distillations of the small group discussions at the Stemming the Tide workshop.

Vision 1

We want to live in a world where caring about our impact on the world around us is the default position and, conversely, where the world around us supports us enabling us to achieve our potential to contribute to society and the world. We want to live in a world where kindness, tolerance and sustainability are the priorities. We want to be on a path to a post-carbon world, where climate action is knitted into everyday life and decisions. We want to be reaching the Brundtland Commission definition of "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987). We want to go farther than that and are leaving the world in a better state than we found it. We occupy carbon neutral buildings and lead low or zero carbon lives which are supported by policies that encourage and enhance climate action. Our leaders at all levels have the will and the ability to address climate change.

Vision 2

In terms of museums, we want a world where museums have incorporated climate action, rather than climate awareness, into all activities including decision making and hiring as well as in exhibitions and programs. Where all activities negatively affecting the climate have been addressed as far as reasonably possible, offsetting what cannot yet be achieved. Museums' own contributions to climate action are incorporated into exhibitions and other activities. Museums are undertaking adaptive acclimatization and have adopted a "post-control" approach so they are not bound by the tyranny of environmental controls which may be unsustainable, unrealistic and sometimes unnecessary (Michalski, 2007).

It is a world where all museums have climate action implicitly and explicitly included in all missions and strategic plans, backed by clear plans for achieving science-based climate action which have been scrutinized by both the public and by funders and other stakeholders. All buildings and collections storage facilities are carbon neutral and are resilient to climate impacts. Museums are carbon negative, or are on the road to becoming so, generating renewable energy, and playing a key part in the circular economy. The boom-and-bust phase of travelling exhibitions is a thing of the past, and to reduce carbon footprints more use is made of digital and local exhibitions. A robust and resilient infrastructure supports positive climate action in terms of programming and supporting research.

Museums truly serve everyone, and have strengthened their position in society in the face of climate impacts. Museums work with stakeholders to debate, imagine and help create the futures that they want to see, notably helping give voice to, and promoting meaningful participation for, marginalized groups. Museums are part of a sector that is more than the sum of its parts, and where institutions work together in a spirit of true collaboration, sharing information, metrics and standards. In summary, museums, as cultural institutions, are focused on supporting cultural transformation to achieve a desirable future.

How Are We Going to Get There?

The final question explored during the workshop was "How do we get there?" Participants were asked to explore how the museum sector can make the shift between "Where we are now?" and "Where do we want to get to?"

Commitment and Action

Participants maintained that museums and museum workers will contribute best to climate action when they shift their mindsets and practices and acknowledge the difference their work makes both negatively and positively in, for, and to the world. Museums must acknowledge that they are not neutral and become "climate positive" (doing good) rather than "climate negative" (doing harm). Good work is happening in museums. Good work needs amplification, acceleration, and support. The most important step museums can take to get to the desired future is to address climate change.

This is not accomplished with a one-off exhibition, a single event, or a stand-alone dialogue with hypothetical plans to be enacted in the future. It involves a firm commitment and embedding climate action across all activities, everywhere, every day, by everyone. This process will be helped by revising policy instruments like museum association codes of practice and associated legislation regarding insurance to change some of the standards that are applied to environmental controls and loans. Museums' missions, policies, staff recruitment and management should have climate change and sustainability embedded within them. Unsustainable behavior at any level should be addressed, and all decisions, be they about Director travel, relationships with funders and donors, or use of resources by staff, should be measured against how they support climate action. To ensure consistency of message, sustainability must become an institution-wide effort. One workshop participant noted that if museum merchandise relating to sustainability-themed exhibitions is sustainably sourced itself, this will reinforce the exhibitions' themes and help visitors make sustainable choices in their own lives.

Museums in a Circular Economy

Recognizing that they must address their own carbon footprints, museums need to shift away from a model of growth and consumption. This means reducing carbon footprints and other greenhouse gas emissions as far and as fast as possible. This means reducing waste but, much more importantly, it means reducing consumption of materials and energy by prioritizing renewable materials and shifting to green/renewable energy sources. This means prioritizing climate action over business as usual and recognizing that, as large consumers of materials, museums share the responsibility for the current climate crisis. Publicly funded museums have a special duty to make positive contributions and reduce negative impacts. One workshop participant suggested that museums could look to embrace a mindset that 'less is more.'

Climate-Positive Practices

Such a transformation will mean letting go of some deeply held museum "traditions" relating to the management of collections in terms of conservation and environmental parameters for storage and exhibition. Some museum workers will find these shifts in practice threatening or upsetting. Nonetheless, these shifts are necessary. It will require humility, courage, and commitment to create a sector that is truly helping to build sustainable futures, but these transformations will benefit the museums and those who make use of them. Balancing the competing goals of preservation of collections and climate action will require collective decision-making or cross-museum agreement and will provide many opportunities for staff to collaborate for common goals.

Programming and Partnerships

There was wide agreement among workshop participants that museums should enhance their programming relating to climate change. Museums can draw upon the rich cultural and natural heritage reflected in their collections to increase people's understanding of the resilience of communities and nature and the ways in which they are threatened by climate change. They can draw on research about effective educational and engagement methods that support meaningful action rather than just increase understanding or awareness. Museums should use their positions in society to advocate, build bridges, and speak truth to power. They should help their patrons and other stakeholders contribute to climate action by offering suggestions as to how they can reduce their personal climate impacts or offset the impact of their museum visit. Museums can work more with local partners to share exhibitions and thus reduce waste and greenhouse gas emissions from travel. Climate change education, training and inspiration is not just about the public, but about staff too. A number of workshop participants noted that museums can draw upon information and stories relating to their collections to inspire staff to make more sustainable choices through their work. Several participants suggested that museums could save energy in their collection storage by redistributing less used/lower valued collections to community groups or smaller museums which have need of them.

Tracking and Transparency

Workshop participants acknowledged that museums should set clearly defined sustainability goals and targets. To quantify, track and report progress in meeting these goals and targets, they should measure greenhouse gas emissions and waste. The use of clear, shared metrics across the sector and the sharing of data among peers will help drive action. By sharing the development of this language and associated metrics among institutions, their use will spread beyond the walls of individual institutions and throughout the culture of museum workers. Clear shared metrics reported in a standardized way will help the sector to tell a compelling story about its collective efforts, rather than a disjointed story. Museums should not only report on their

sustainability successes, but also be honest about the challenges they continue to face and the steps they are taking towards addressing these challenges. Some participants recommended that museums include climate change statements and information in exhibits which explain where the resources in the exhibit came from and where they will go when the exhibit is taken down, demonstrating a real commitment to playing a positive role in climate action.

Key Transformations to Enact Now

The participants proposed four key transformations that should be put in place now in order to set the direction for the journey ahead.

Partnerships for Ambition

Partnerships between museums, museum and community, museums and other sectors are crucially important for accelerating the pace of change. Partnerships benefit from having identified points of contact and clear organization among stakeholders. Climate change education and awareness-raising activities should be regarded as a form of partnership with the wider society.

Effective Policies, Missions and Plans for Results

New policies, missions and commitments that address climate justice in every plan and action are a key transformation that will help the sector and its institutions set a course of action. These need to be accompanied by plans for implementation and processes for review and reporting. Support from museum associations, funders and special interest groups will help to build museum staff confidence and abilities. Several participants called for more events at which museum staff can talk through sustainability issues, share the journey, learn from one another's successes and mistakes, and put concrete plans in place.

Reduce the Sector's Greenhouse Gas Emissions and Waste, Now

Addressing the sector's production of waste and consumption of energy was seen as critical to reducing the negative impacts of museum work. Several participants wanted museums to become net producers of energy and for museum workers to become part of the circular economy, turning the waste from one process into the building blocks of another process. Focusing on using a museum's own collections and working locally would help build partnerships and stronger relationships with local communities and reduce the negative impact of travelling and touring exhibitions through lower emissions linked to transport and reduced waste from exhibition materials.

Environmental Controls for a Sustainable Environment

Many participants saw addressing museum sector requirements for environmental controls for collections as the most important challenge for the sector. Protecting collections at the cost of the planet is not an acceptable price to pay.

"Take Aways" from the Workshop

The concluding discussion highlighted the importance of partnerships. Participants wanted support from one another and from the wider sector. There was a general feeling that acting locally is one way to address climate impacts, but that this needs to be matched by shared goals and language and a concern for the wider world. Clear leadership from the museum sector is needed to help provide this. The importance of considering the lifecycle of everything connected to a museum – collections, waste, energy, shops, restaurants – was seen as something for participants to consider as a whole when they returned to their institution. One participant noted in a comment that sums up the sentiment of the workshop discussions:

> We generate more stuff. Our gift shops are full of trash. We are responsible for things we send out to the world. We have to Marie Kondo our stuff (see https://konmari.com/category/konmari-philosophy/). That's our responsibility.

Coda

This coda is based on an hour-long gallery-based activity that formed part of the workshop at the Smithsonian American Art Museum (SAAM). Workshop participants were encouraged to reflect on the galleries and artworks and consider how they related, or could be related, to climate change and climate action. This coda is presented as a celebration of the amazing collections of the Smithsonian American Art Museum and the myriad ways that SAAM, like every museum, can play a part in climate action with programming that supports climate education, awareness and action, and in addressing its own climate impacts.

The museum occupies one of the oldest public buildings in Washington D.C. It was originally the home of the Patent Office and housed models of newly patented technologies. Although redeveloped significantly over time (and damaged by a fire on one occasion), this building has held onto its embodied carbon for nearly two centuries. Like many museums, it faces challenges in terms of the collection environment because it occupies an old building not designed for the purpose of housing artworks.

The Smithsonian American Art Museum contains many artworks that speak to climate change both directly and indirectly. For example, galleries of artworks by George Catlin speak to how the human societies and communities and the landscape of the United States have changed dramatically over time as a result of colonization, expansionism and land-use change. The *Experience America* exhibition, presenting artworks from the Depression Era, many of which were produced under a government-funded scheme to provide work for artists, give a snapshot of life and aspirations in manufacturing and agricultural industries and communities. These galleries contain many artworks that give cause for reflection on the relationship of people, society, industry and the environment over the period of mass production and industrialization which came at the expense of a sustainable natural environment. The galleries can encourage reflection on changing industries and the need to support industries

and communities as they transition to environmentally and socially sustainable futures. The museum's Galleries for Folk and Self-Taught Art speak very poignantly of the place of art and making art in the lives of people, often as they encountered difficult circumstances or were rendered voiceless in society. One room explores "the creative act as a negotiation with an uncontrollable world." This resonates very strongly with the topic of climate change. The artworks are an endless source of inspiration for discussions of difficult or challenging topics such as climate change. They offer direct and oblique entry points that help people explore, individually and collectively, the futures they want to create and inhabit. Together, the galleries help us explore the human experience of America, of community, and how we came to occupy the unsustainable present. These explorations can help frame discussions about more sustainable futures. The simple exercise of asking workshop participants to reflect on climate change through artworks generated a lot of discussion and could be replicated in other museums for both museum workers and visitors.

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Workshop Participants

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Notes

1. https://unfccc.int/files/bodies/cop/application/pdf/approach_to_the_talanoa_dialogue.pdf#page=1
2. https://www.climatechangenews.com/2018/12/10/talanoa-dialogue-explained
3. https://www.phipps.conservatory.org/press-room/press-releases/phipps-conservatory-achieves-56-reduction-in-carbon-emissions

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Overarching Global Agendas

About the Sustainable Development Goals, https://www.un.org/sustainabledevelopment/sustainable-development-goals/

Paris Agreement, https://unfccc.int/process-and-meetings/the-paris-agreement/what-is-the-paris-agreement

Sustainable Development Goals Knowledge Platform, https://sustainabledevelopment.un.org/

Professional Bodies

American Institute for Conservation and the Foundation for Advancement in Conservation, https://www.culturalheritage.org/about-us

International Centre for the Study of the Preservation and Restoration of Cultural Property, https://www.iccrom.org/

International Council of Museums, https://icom.museum/en/

International Institute for Conservation of Historic and Artistic Works, https://www.iiconservation.org/

Policy Links Between Museums and Climate Change

International Council of Museums (ICOM). 2019. Resolution No. 1 "On Sustainability and the Adoption of Agenda 2030," Transforming Our World. Resolutions Adopted by ICOM's 34th General Assembly. ICOM. https://icom.museum/wp-content/uploads/2019/09/Resolutions_2019_EN.pdf

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Sources of Information on Environmental Sustainability Practice

American Institute for Conservation and Foundation for Advancement in Conservation. *Life Cycle Assessment*: https://www.culturalheritage.org/about-us/foundation/programs/life-cycle-analysis

American Institute for Conservation Sustainability Committee. Sustainability Practices Wiki: https://www.conservation-wiki.com/wiki/Sustainable_Practices

Climate Literacy and Education Network (CLEAN). Collection of climate and energy educational resources (700+ peer reviewed resources): https://cleanet.org/index.html

Climate Outreach. Resources and social sciences research advice for effective climate change communication: https://climateoutreach.org/

Coalition of Museums for Climate Justice. Lists of resources (websites, articles, toolkits): https://coalitionofmuseumsforclimatejustice.wordpress.com/resources/

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Museum and Climate Change Network. *Climate Change Exhibits*: https://mccnetwork.org/exhibitions

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Networks and Groups

Coalition of Museums for Climate Justice – mainly Canada, 1,034 Twitter followers, produces newsletter and regular blog: https://coalitionofmuseumsforclimatejustice.wordpress.com/

Museums and Climate Change Network – information on previous climate change exhibitions, more than 2,000 website visitors in 2019: https://mccnetwork.org/about-us

We Are Still In – climate justice, U.S., 57+ signatory institutions: https://www.wearestillin.com/

Training Resources for Staff

Alberta Museums Association. Training videos for museums: https://icom.museum/en/news/videos-taking-action-on-climate-change/

We Need to Talk about Climate Change workshop facilitation pack: https://enduringconnections.com/wp-content/uploads/2017/06/CLIMATE-CHANGE-FACILITATORS-PACK.pdf