Ex Situ Preservation of Historic Monuments in the Era of Climate Change

Shelby D. Green

Cultural heritage (historic buildings, landscapes, and natural monuments) is being threatened by all manner of evils—attacks by belligerents seeking military advantages, increased consumptive uses, and significantly, the idiosyncratic effects of climate change. Climate change portends sea level rise and coastal erosion threats that will inundate coastal areas and the historic structures located there. Melting permafrost and changes in soil composition threaten the loss of buried archaeological evidence and compromise the integrity of ancient buildings designed for a less malevolent climate.

State and local governments have been undertaking measures to build sustainable communities to mitigate the coming changes in the climate, by limits on the volume and siting of new construction, building green infrastructure, growing renewable energy sources, and by relocating populations from climate-sensitive areas. As with measures to protect populations from the effects of storm surges, heat and flooding, the preservation of cultural heritage may also require barriers, fortifications, and strict enforcement of maintenance requirements. But as sea levels rise and as the next superstorm looms, protection of cultural heritage may require its relocation, that is, preservation ex situ.

This article explores the challenges of ex situ preservation of historic monuments—the fact of immovability, the fragility of aging structures, and the importance of locational context for historic and cultural value—suggesting that preservation may mean seeing our monuments from a different vantage.

ARTICLE CONTENTS

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BY SHELBY D. GREEN[†]

I. INTRODUCTION

John Ruskin, the famous nineteenth century advocate of preservation, once wrote: "When we build, let us think that we build forever. Let it not be for present delight, nor present use alone; let it be such work as our descendants will thank us for, and let us think, as we lay stone to stone, that a time is to come when those stones will be held sacred."[1] The very sage path laid out must be reconciled with the fact of a changing world—plant life evolves, species die, structures decay. Not only from the natural evolution of things; but significantly from a rapidly changing climate.

What is happening! When we finally looked up a few decades ago, we saw a climate disaster approaching. At least that is what the scientists are predicting, and at least as it pertains to the world we have made. We built too close to the sea, on lots that were too large and too far from work. We took down too many trees. Too much pollution from automobiles, from industry and from development heated up the air. The effects of these improvident acts are indeed worrisome, from rising sea levels of up to 3 feet in the next century from rapidly melting glaciers and snow. There will be more wind storms and burning temperatures.[2] Paradoxically, there will be

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[1] JOHN RUSKIN, THE SEVEN LAMPS OF ARCHITECTURE 186 (D. Appleton and Company ed., 1898).

[2] Valerie Masson-Delmotte et al., *Global Warming of 1.5°C*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (2018), *available at* http://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf (last visited Mar. 20, 2019). According to this source, climate changes include: 1. Temperature increases: (last year the warmest since record keeping and projected 3°C to 8°C by 2100; 2. more precipitation and drought; 3. sea level rises: more than 8 inches since record keeping started and projected at 1 to 4 feet by 2100; 4. ocean acidification from CO2; 5. wind storms. The impacts include changes in: 1. hydrology and water resources (shift in timing of spring snowmelt, more drought, flooding, higher water temps); 2. agriculture: lower crop yields; 3. forests: increased risk of fires; 4. recreation: longer warm seasons; 5. energy: reduced heating demand, but increased cooling demand 6. transportation: increased road surface damage (buckling; snow removal; brush fires 7. coastal regions: more erosion; damage to beaches; pollution; loss of cultural sites; 8. aquatic ecosystems: shifts in species, increased competition among species; 9. health: more heat-related stress (affecting the poor and elderly); increased vector born illness; 10. emergency responses; 11. urban living: increased incidence of flooding ($1 trillion per year); more infrastructure breakdowns.

In 2018, the Intergovernmental Panel on Climate Change ("IPCC"), offered dire predictions for the world if the mean global air temperature rises by more than 1.5°C, that include hot extremes, heavy precipitation along with the probability of drought, increased sea level rise, along with a sea ice-free Arctic Ocean in summer. These climate changes in turn, portend, saltwater intrusion, flooding and damage to infrastructure, loss and extinction of species, limited food availability.

both frequent floods and deathly drought.[3] We might see deluges from massive amounts of precipitation (as much as 10% increase by the 2020's and by as much as 21% by the 2080's).[4] Too much water in some places and too little in others will lead to all kinds of weird results: water rationing, lower crop yields, rising sea levels, coastal erosion and saltwater intrusion. Dry forests will lead to increased risk of wildfires. The expected disruptions to life can be described in terms of more this and more that—more costs for energy, for cooling, for delivering water, for mending roads, for fire suppression, for emergency services, for insurance; more illness from heat, pests, poison ivy; more pollution in the air and rivers, and oceans; more dislocations of people and commerce and life; more damage to beaches; more loss of cultural resources—monuments, landscapes. Equally concerning is the loss of predictable weather patterns; climate is becoming more erratic. Severe weather events are becoming more severe.[5]

Who will be impacted? Everyone. But some will suffer more than others. Individuals who cannot afford sturdy housing or must labor out of doors. Also, cities with their micro-climates: locales with distinct climate conditions,[6] and because of the interconnectedness of infrastructure, both

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[3] *Governor's Conservation Executive Orders and Proclamations*, CALIFORNIA WATER BOARDS (Jan. 31, 2018), https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/executive_orders.html (explaining that California has experienced both; the State declared a state of emergency on account of drought, which called for among other things, a 25% statewide reduction in water consumption); *see also Torrential downpours sweep southern California*, WATCHERS (Sept. 16, 2015), https://watchers.news/2015/09/16/torrential-downpours-sweep-southern-california/; CITY OF N.Y., PLANYC: A STRONGER, MORE RESILIENT NEW YORK 30 (2013), https://www.nycedc.com/sites/default/files/filemanager/Resources/Studies/Stronger_More_Resilient_NY/_Prologue_Intro_11_FINAL_singles.pdf (explaining that NYC floodplain could expand 23% by 2020s and by 2050's ¼ of city.); *see also*, *Climate Risk Information*, NEW YORK CITY PANEL ON CLIMATE CHANGE 3 (Feb. 17, 2009), http://www.nyc.gov/html/om/pdf/2009/NPCC_CRI.pdf.

[4] Erika Spanger-Siegfried, et al., *Encroaching Tides: How Sea Level Rise and Tidal Flooding Threaten U.S. East and Gulf Coast Communities over the Next 30 Year*, UNION OF CONCERNED SCIENTISTS (October 2014), https://www.ucsusa.org/sites/default/files/attach/2014/10/encroaching-tides-full-report.pdf (last visited Mar. 20, 2019) (explaining that some parts of the country seem perpetually under water: Wilmington, N.C. (90 days a year); parts of Washington D.C. (flooding 30 days a year, quadrupled since 1960)).

[5] *Extreme Weather, National Climate Assessment* https://nca2014.globalchange.gov/highlights/report-findings/extreme-weather (predicting increases in prolonged periods of excessively high temperatures, heavy downpours, and in some regions, severe floods and droughts); *see also Fast Facts: Hurricane Costs*, OFFICE FOR COSTAL MANAGEMENT, https://coast.noaa.gov/states/fast-facts/hurricane-costs.html (last visited Jun. 7, 2019) (a recent NOAA study found sea levels rising at more than double the rate estimated during the 20th century, increasing to more than 0.13 inch annually. NOAA made six projections of sea level rise, from low to extreme and found the global mean level under the lowest projection could rise to 2.3 inches by 2020 and 3.5 inches by 2030. The extreme projections show a 4.3 inch rise by 2020 and a 9.4 inch rise by 2030. The prediction means coastal cities will become engulfed (recall the South Street Seaport in New York City, Galveston, Texas, the French Quarter in New Orleans). The sea level rise makes hurricanes more severe (more category 4 and 5, more than 130 mph) with more rain. Superstorm Sandy caused more than $71 billion in damages.

[6] *See New York City Regional Heat Island Initiative: Mitigating New York City's Heat Island with Urban Forestry, Living Roofs, and Light Surfaces*, N.Y. State Energy Research and Development Authority (May 2007), https://cmsapps.nyserda.ny.gov/emep/project/6681_25/6681_25_project_update.pdf. As a consequence of urban development, environmental conditions vary from those in nearby regions. Population density and development leads to the urban heat island effect—an attribute of the

natural and man-made that transport people,[7] as well as networks that facilitate living and transacting business, such as telephone communications for banking and emergency services.[8] This infrastructure is ailing and fragile and deficient; it will eventually fail to support growing urban populations—hundred-year old pipes were designed to serve a fraction of the population it currently serves. When one system fails, there is a cascading effect on other systems: No power means no food is delivered, no surgeries are performed, no subway trains operate.

More than half the world's population and more than 80% of the United States' population, lives in urban areas. And, this level is increasing.[9] Threats from climate change are ominous and formidable. The IPCC's Fifth

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urban micro-climate. It occurs when naturally vegetated surfaces are replaced with impervious surfaces that absorb, retain, and re-radiate more solar energy than do grass and trees. The rate of this effect depends on "the physical properties of different surface types, their configuration within the urban fabric, regional meteorology, [and] localized microclimate." *Id.* As average air temperatures rise, so does the urban heat island effect. The environmental variations include temperature, light, wind speed and moisture.

See also Michael Catalano, *New York City Microclimate Policy: Applying Green Infrastructure to Mitigate Environmental Health Impacts caused by the Urban Heat Island Effect and Heat Waves: A Platform for Climate Change Resiliency in New York City*, 3 (July 31 2012), available at https://commons.pratt.edu/sesresearch/wp-content/uploads/sites/157/2016/11/2013_Catalano_M_Report.pdf ("Microclimates [may be] created naturally by geographical changes in the environment such as coastal zones, topographical differences in altitude, and [by] manmade environments."); R. GEIGER, THE CLIMATE NEAR THE GROUND 488-94 (Harvard University Press ed., 1975) (stating generally that an urban micro-climate is said to refer to discrete areas, where as a consequence of urban development, environmental conditions vary from those in nearby regions. ; Evyatar Erell, et al., *Urban Micro Climate: Designing the Space Between Buildings Conference Paper* 15-17 (June 23–24, 2011), pdf available for download at https://www.researchgate.net/publication/255989068_Urban_Microclimate_-_Designing_the_Spaces_Between_Buildings; *Microclimates*: *National Meteorological Library and Archive Fact Sheet 14,* MET OFFICE, https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/library-and-archive/library/publications/factsheets/factsheet_14-microclimates.pdf (last visited June 7, 2019).

[7] Roads, bridges, and rail lines, water (pipes and pump stations), waste (sewage treatment plants) and light (power plants).

[8] Susan L. Cutter and William Solecki, *Chapter 11: Urban Systems, Infrastructure, and Vulnerability*, CLIMATE CHANGE IMPACTS IN THE UNITED STATES, 286 (2014), available at http://nca2014.globalchange.gov/report/sectors/urban. On August 8, 2007, an intense rainfall and thunderstorm event in New York City during the morning commute dumped between 1.4 and 3.5 inches of rain within two hours, starting a cascade of transit system failures – eventually stranding 2.5 million riders, shutting down much of the subway system, and severely disrupting the city's bus system. *Id.* at 286. In August 2003, a blackout in power grid in the northeast caused shutdowns of water treatment plants and pumping stations, and interruptions in communication systems for air travel and control systems for oil refineries. *Id.* The lack of air conditioning and elevators stranded urban residents in over-heated high-rise apartments. *Id.*

[9] *Climate Change and Cities*, SECOND ASSESSMENT REPORT OF THE URBAN CLIMATE CHANGE RESEARCH NETWORK, 5 (2015), https://climate-adapt.eea.europa.eu/metadata/publications/second-assessment-report-of-the-urban-climate-change-research-network/uccrn_2015_secondassessmentreport.pdf*; see also* Cutter and Solecki, *supra* note 8, 284 ("Approximately 245 million people live in U.S. urban areas, a number expected to grow to 364 million by 2050."); PETER CALTHORPE, URBANISM IN THE AGE OF CLIMATE CHANGE (2011) (Since 2000, many major cities have increased their share of new home construction while regional levels have declined. In 2008, the city of Portland issued 28% of all building permits compared to 9% in the region. In Denver, that level was 32%, compared to 5% in the region. In Sacramento, 27% compared to 9% in the region. New York City issued 63% of all building permits and Chicago issued 45%.).

Assessment concludes that the period 1983 to 2012 "was very likely the warmest 30-year period of the last 800 years in the Northern Hemisphere, … and very likely the warmest 30-year period of the last 1400 years."[10] Ocean warming accounted for 90% of the energy accumulated between 1971 and 2010.[11] Along with oceanic warming, is a notable uptake in CO2, causing increased acidification of the ocean,[12]--the warming waters has led to rapid melting Arctic ice, which in turn has led to rising sea levels at a rate larger than that during the previous two millennia.[13] None of these observations portend good for either human-kind, plant-life, or what humans have built. Instead, the projections are dire. Increased floods, changes in precipitation, melting permafrost and changes in soil composition threaten the loss of buried archaeological evidence and compromise the integrity of ancient buildings designed in a specific climate. Sea level rise and coastal erosion threaten to inundate coastal areas and structures, including those that are historic and located in coastal lowlands.[14]

It seems that Ruskin was concerned about historic monuments, but by their original composition, their location, they are at risk. Historic buildings and structures, artwork, monuments, historic documents are often irreplaceable and may be lost forever if hit by a climate or weather disaster. As we create new monuments, their location—fortified in construction and away from shores—must be in the forefront of our minds. But, what about existing monuments? How do we treat them in our larger disaster planning? Do we leave them in place to succumb to the inexorable forces of nature or do we remove them for their preservation? This article takes up the dialogue on the subject of *ex situ* preservation of historic monuments—those in the immediate path of an attack by a malevolent climate and those exposed to passive, though rapidly changing, climate and urges continued exploration of the idea of removing or fortifying historic monuments against a rapidly approaching natural world. Part II discusses how the world is responding to

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[10] IPCC, *Climate Change 2014: Synthesis Report*, 40 (2014), https://ar5-syr.ipcc.ch/ipcc/ipcc/resources/pdf/IPCC_SynthesisReport.pdf

[11] *Id.*

[12] *Id.* at 125–26.

[13] *Id.* at 42.

[14] *See* UNESCO, CASE STUDIES ON CLIMATE CHANGE AND WORLD HERITAGE (2007), available for download at https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwipnc3it9jiAhXpYd8KHXenAWUQFjAAegQIAxAC&url=https%3A%2F%2Fwhc.unesco.org%2Fdocument%2F106621&usg=AOvVaw3I5HZ63H_1MJ1vCQEqlHm4 (noting impacts of climate change on specific heritage sites, such as in the City of London and Venice from effects of high tides, storm surges). *See also* Susan Shearing, *Here Today, Gone Tomorrow? Climate Change and World Heritage* 9 (Oct. 2007); Daly, Cathleen, *Climate Change and the Conservation of Sites*, vol. 13 (no. 4); REVIEW OF IMPACTS THEORY CONSERVATION AND MANAGEMENT OF ARCHAEOLOGICAL SITES 293-310 (2011); NICHOLAS ROBINSON, DAVID HODAS, JAMES GUSTAVE SPETH, CLIMATE CHANGE LAW: MITIGATION AND ADAPTATION (2009); WORLD HERITAGE IN DANGER: A COMPENDIUM OF KEY DECISIONS ON THE CONSERVATION OF NATURAL WORLD HERITAGE PROPERTIES VIA THE LIST OF WORLD HERITAGE IN DANGER (IUCN ed., 2008); May Cassar, *Climate Change and the Historic Environment* (2005), available at http://discovery.ucl.ac.uk/2082/1/2082.pdf.

climate change. Part III discusses the traditional methods of discovering and preserving historic artifacts. Part IV describes the effects on historic properties from various development imperatives. Part V considers alternative methods of historic preservation, including reproductions. Part VI makes the case for *ex situ* preservation, with examples of successful relocation of structures. In the conclusion, I offer thoughts on continuing the discussion to pursue the *ex situ* approach.

II. THE STORIES OF CLIMATE CHANGE

These days, there is perhaps no more oft-told story than that of climate change, perhaps more so than the Civil War or World War II. Conceiving responses to climate change as waging war may be an apt approach, as the necessary responses may be the same kind of maneuvers used in battle—that is, strategies for resilience and sustainability must be tactical and come from all fronts. In this regard, there have been responses in the form of appropriations, strategic policies and new laws and directives. Unprecedented sums for disaster relief, mitigation and adaption have been spent and are planned to be spent by the federal and state governments in fighting climate change.[15] From the federal executive branch, there are task forces (after Katrina and Sandy);[16] directives on sustainability;[17] and directives to agencies (requiring climate change impact assessments for federal funding).[18] The Department of Homeland Security and the Federal Emergency Management Agency ("FEMA") have adopted new standards for FORTIFIED BUILDINGS.[19] The EPA has promulgated a Sustainable Design and Green Building Toolkit for Local Governments.[20] HUD, EPA

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[15] *See* Nicole Smith and Jessica Grannis, *Understanding the Adaptation Provisions of the Sandy Disaster Relief Appropriations Act (H.R. 152)*, GEORGETOWN CLIMATE CHANGE CENTER (May 2013), https://www.georgetownclimate.org/files/report/GCC_Sandy_Relief_Act_Analysis.pdf; *see generally*, FEMA, *Integrating Hazard Mitigation Into Local Planning, Case Studies and Tools for Community Officials* (March 1, 2013), http://www.fema.gov/media-library/assets/documents/31372; PlaNYC, Progress Report 2013, CITY OF NEW YORK, 49, http://s-media.nyc.gov/agencies/planyc2030/pdf/planyc_progress_report_2013.pdf (stating that New York State's plan for recovery is estimated at $19 billion).

[16] Adaptation strategies are reflected in the Hurricane Sandy Rebuilding Task Force (Chaired by then HUD Secretary, Shaun Donovan and including additional members from 33 executive department agencies and offices). It encouraged resiliency in building and regional coordination of infrastructure investment. *Hurricane Sandy Rebuilding Task Force*, HUD, https://www.hud.gov/sandyrebuilding (last visited July 1, 2019).

[17] President's *Planning for Federal Sustainability in the Next Decade*, 80 Fed. Reg. No. 57, March 25, 2015.

[18] *See generally* Sarah Adams-Schoen and Edward Thomas, *A Three-Legged Stool on Two Legs: Recent Federal Law Related to Local Climate Resilience Planning and Zoning*, 47 URB. LAW. 525 (Summer 2015).

[19] The Resilience Star™ promotes home design features, specifically, the IBHS FORTIFIED Home,*Engineering Resilience: The RESILIENCE STAR™ Home Pilot Project,* https://www.dhs.gov/blog/2013/11/18/engineering-resilience-resilience-star%E2%84%A2-home-pilot-project; *see also* WIND RETROFIT Guide for Residential Buildings, FEMA, P-804 (2010).

[20] EPA, *Sustainable Design and Green Building Toolkit for Local Governments* (June 2013).

and DOT have united to create a sustainable communities program.[21] There are legions of toolkits, guides and prescriptions prepared by think tanks,[22] offering materials for resiliency and sustainability.[23] Private industry and trade associations have also weighed in on the need for sturdier construction of buildings.[24]

Cities are requiring,[25] and others are encouraging,[26] resiliency and sustainability measures. Hundreds have adopted climate action plans, climate mitigation plans and/or resiliency plans; some carrying out state mandates;[27] others under their own local land use powers.[28] These plans and strategies touch on all aspects of life in the city,[29] including the built world, energy usage, water usage, diversion and treatment, transportation efficiency, communications and emergency services, the natural environment, comprehensive planning and public relations.[30] They include updated building codes that require fortifications—some adopting FEMA's

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[21] *Leveraging the Partnership: DOT, HUD, and EPA Programs for Sustainable Communities* (Apr. 2010), https://www.epa.gov/smartgrowth/leveraging-partnership-dot-hud-and-epa-programs-sustainable-communities.

[22] *See* INTERNATIONAL COUNCIL FOR LOCAL ENVIRONMENTAL INITIATIVES, http://www.icleiusa.org/; *Resilience Strategies for Communities at Risk*, URBAN LAND INSTITUTE (2014), http://uli.org/report/white-paper-resilience-strategies-communities-risk/; U.S. GREEN BUILDING COUNCIL (LEED), http://leed.usgbc.org/leed.html (discussing energy efficiency and design).

[23] INTERNATIONAL COUNCIL FOR LOCAL ENVIRONMENTAL INITIATIVES, http://www.icleiusa.org/

[24] INSTITUTE FOR BUSINESS & HOME SAFETY 5 (2008), https://fortifiedhome.org/fortified-home-or-commercial/. The Institute for Business & Home Safety ("IBHS") promulgated fortified building standards for resiliency to all events, including winds and wildfires, such as dry floodproofing (using seals, veneers, film); wet floodproofing (employing flow through mechanisms); structural design to withstand winds; elevation of appliances, furnace, water heater, compressor, and electrical systems; sturdier roof structures, secondary barriers, and improved connections between roof and structural materials.)

[25] Elizabeth C. Black, *Climate Change Adaptation: Local Solutions for a Global Problem*, 22 GEO. INT'L ENVTL. L. REV. 359, 378 (2010) (discussing the two primary tracks that cities could use in accomplishing these dual goals of increasing green space and encouraging green building. "Carrots" include tax incentives, grants and fee waivers, expedited permitting and density bonuses. "Sticks" include zoning and building code requirements.)

[26] *Id*. at 380–82.

[27] *State of N.Y., NYS 2100 Commission: Recommendations to Improve the Strength and Resilience of the Empire State's Infrastructure* (2013), available at https://www.governor.ny.gov/sites/governor.ny.gov/files/archive/assets/documents/NYS2100.pdf.; *California Climate Action Plan*, STATE OF CAL., www.climatechange.ca.gov (last visited on Mar. 29, 2019).

[28] *See e.g.*, CITY OF CHI., ILL., CHICAGO CLIMATE ACTION PLAN (2008), available at http://www.chicagoclimateaction.org/filebin/pdf/finalreport/CCAPREPORTFINALv2.pdf; CITY OF SAN DIEGO, CAL., CLIMATE ACTION PLAN (2016), available at https://www.sandiego.gov/sites/default/files/final_july_2016_cap.pdf; *see generally*, U.S. CONFERENCE OF MAYORS, TAKING LOCAL ACTION: MAYORS AND CLIMATE PROTECTION BEST PRACTICES (2018), available at http://www.usmayors.org/wp-content/uploads/2018/06/climateawards2018.pdf; PlaNYC, *supra* note 3.

[29] The Chicago and San Diego plans address energy efficient buildings, clean/renewable energy sources, improved transportation options, reduced waste and industrial pollution, and adaptation (managing heat, innovative cooling, air quality, managing stormwater, green design, preservation, planting trees, engaging the public, adopting businessplans). Chicago Climate Action Plan, *supra* note 28; San Diego Climate Action Plan, *supra* note 28.

[30] *See generally* GEO. CLIMATE CEN., 20 GOOD IDEAS (2014), available at https://www.georgetownclimate.org/files/report/GCC-20%20Good%20Ideas-July%202014.pdf.

standards, others developing their own.[31] In some states, insurance incentives are offered for fortifying structures.[32] Fortification of buildings includes elevations (of sites, structures, and critical systems), the use of wind and water resistant materials,[33] fire safe design and emergency back-ups.[34] Cities are also fortifying public infrastructure, elevating roads and bridges, installing permeable pavements and green alleys,[35] reconfiguring and narrowing sidewalks, modifying curbs and gutters,[36] fortifying sewage systems,[37] utilizing buffers and setbacks from seashores,[38] demolishing rickety buildings[39] and even deciding not to rebuild roads and bridges.[40] Many communities are revising their land development standards to require the incorporation of green infrastructure,[41] which uses, among other things,

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[31] "On May 4, 2007, an EF-5 tornado struck the City of Greensburg, Kansas, destroying more than 90 percent of its building stock." When the community began its future, it determined to create a model sustainable rural community—the Long-Term Community Recovery Plan, aided by FEMA. The program led created a blueprint for all new development and for rebuilding: the 'Greensburg Sustainable Comprehensive Master Plan', under which hazard mitigation would be integrated into the recovery plan or land development code. Power lines would be buried to reduce damage and decrease the frequency of power outages; back-up generators for critical facilities would be installed with regular testing; The requirement to use native species would be incorporated into the local land development code and a tree ordinance and the use of native plants and trees for ornamental plantings would be required to decrease vegetation damage and as a brace against winds. Building codes would be strengthened to reduce wind related damages. Safe rooms in accordance with FEMA guidelines would be built. FEMA Hazard Mitigation Guide, http://www.fema.gov/media-library/assets/documents/31372 at § 5-9.

[32] *See e.g.*, Ala. Code § 27-31D-2 (2018); Shelby D. Green, *Building Resilient Communities in the Wake of Climate Change While Keeping Affordable Housing Safe From Sea Changes in Nature and Policy*, 54 WASHBURN L.J. 527, 551 (2015).

[33] URBAN GREEN COUNCIL, BUILDING RESILIENCY TASK FORCE 14 (2013), available at http://issuu.com/urbangreen/docs/brtf_executive_summary.

[34] PlaNYC, *supra* note 3, at 126, 129 (hookups for access to generators, anti-backflows, and faucets in common areas).

[35] Spanger-Siegfried et al., *supra* note 4.

[36] *See generally* JOSH FOSTER ET AL., CTR. FOR CLEAN AIR POLICY, THE VALUE OF GREEN INFRASTRUCTURE FOR URBAN CLIMATE ADAPTATION (2011), available at www.ccap.org_assets_The-Value-of-Green-Infrastructure-for-Urban-Climate-Adaption_ccap-Feb-2011.pdf (describing the principles and efficacy of green infrastructure measures).

[37] *See, e.g.*, "New York Rising Community Reconstruction Plan," published by the Governor's Office of Storm Recovery ("GOSR").

[38] Spanger-Siegfried et al., *supra* note 4, at 7, 13, 14 (steep slope mountain ridge protection; maximum grading allowances; preservation of green space).

[39] Kellen Zale, *Urban Resiliency and Destruction*, 50 IDAHO L. REV. 85, 85–86 (2014) ("Destruction allows cities to eliminate outdated, underutilized, and vacant buildings; create the necessary physical space for redevelopment and innovation; and redirect the city's economic resources to best meet the needs of residents. As one government official recently explained: 'By tearing down houses, we are building neighborhoods. We are opening up land to stop the decline in property values, stimulate many types of economic development, and help our neighborhoods grow and prosper.'").

[40] Green, *supra* note 32, at 552 n.182; *see generally*, Robert R.M. Verchick & Lynsey R. Johnson, *When Retreat is the Best Option: Flood Insurance After Biggert-Waters and Other Climate Change Puzzles*, 47 J. MARSHALL L. REV. 695, 697 (2013) (explaining that retreat involves the removal of people and property and restricting development in existing communities).

[41] *See* Foster et al., *supra* note 36 at app. 1-6. *See also* NAT'L RES. DEF. COUNCIL, available at https://www.nrdc.org/sites/default/files/philadelphia-green-infrastructure-retrofits-IB.pdf(describing a three-pronged strategy: 1) invest in greening public property and rights-of-way, integrating green infrastructure into public space improvements, including street, sidewalk, and park projects; 2) require green infrastructure investments for new development and redevelopment on private property; permit regulations that require new development and redevelopment projects that disturb more than 15,000

natural wetlands for the infiltration of wastewater, onsite vegetated swales as opposed to curbs, rainwater harvesting (cisterns), low-water use plants, xeriscaping, rain gardens, tree wells, and tree canopies.[42]

Cities are adopting measures on energy usage,[43] aiming for energy efficiency from a number of different angles including new standards, the most common of which is the LEED standard; [44] adopting requirements for reflective coatings, green and cool roofs;[45] supporting energy star qualified homes;[46] encouraging geothermal, solar and wind energy; [47] low-impact hydro-power, alternative fuels and smart grids;[48] and green banks.[49] To limit water waste, cities are employing metered water use;[50] advanced plumbing technologies;[51] and filtration by soil and roots runoff capture systems.[52] Transportation systems are being upgraded and cities are investing in measures to facilitate less polluting means of transportation; installing

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square feet of land to install/maintain green infrastructure sufficient to manage the first inch of stormwater that falls on the site; and 3) encourage voluntary retrofits by existing private parcel owners); *see also* CITY OF PORTLAND, ORE. BUREAU OF PLANNING & SUSTAINABILITY, CLIMATE ACTION PLAN 2009: YEAR TWO PROGRESS REPORT (2012) [hereinafter 2009 PORTLAND CLIMATE PLAN PROGRESS REPORT], available at https://www.portlandoregon.gov/bps/article/393345. (describing a comprehensive green infrastructure program, using bioswales and rain gardens); INT'L COUNCIL FOR LOCAL ENVTL. INITIATIVES & WORLD WILDLIFE FUND, MEASURING UP 2015: HOW U.S. CITIES ARE ACCELERATING PROGRESS TOWARD NATIONAL CLIMATE GOALS 35 (2015), available at https://www.worldwildlife.org/stories/measuring-up-2015-how-us-cities-are-accelerating-progress-toward-national-climate-goals.

[42] San Diego plans to cover 35% of the city with tree canopies by 2035. *See* SAN DIEGO CLIMATE ACTION PLAN, *supra* note 28 at 15; *see also* CITY OF KEENE, N.H. COMPREHENSIVE MASTER PLAN 123 (2010) (requiring zoning ordinance that ensures walkability, green infrastructure, sustainable building, and permeable pavements).

[43] *See* N.Y. ENERGY PLANNING BD., THE ENERGY TO LEAD: 2015 NEW YORK STATE ENERGY PLAN 18-23, 69-77 (2015).

[44] Leadership in Energy and Environmental Design (LEED). In Atlanta, Georgia, all city-funded projects over 5,000 square feet or over $2 million dollars must meet the LEED Silver standard. CITY OF ATLANTA, GA., DIV. OF SUSTAINABILITY & U.S. DEP'T OF ENERGY, *ATLANTA: POWER TO CHANGE SUSTAINABILITY PLAN EXECUTIVE SUMMARY 2010–2011 (2010)*, http://clatl.com/images/blogimages/2010/10/26/1288116274-atlsustainplan.pdf. Constructing "green buildings" has become a strategy for increasing the energy efficiency, leading to LEED.

[45] To reduce the urban heat island effect, Chicago will add 6,000 buildings with cool roofs by 2020, which is expected to reduce temperatures by an average of 7 degrees. CHICAGO CLIMATE ACTION PLAN, *supra* note 28, at 22.

[46] *See Learn How Portfolio Manager Helps You Save,* ENERGYSTAR, available at http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager/learn-how-portfolio-manager (last viewed Mar. 29, 2019).

[47] CAL. PUB. RES. CODE § 25980 (striving to balance the interest in solar panels against shade from trees, trees must be allowed to stand); PUB. RES. § 25984 (trees planted before the installation of solar collectors are protected). Homes must be removed from flood prone areas. LOCAL GOV'TS FOR SUSTAINABILITY USA, LOCAL GOVERNMENTS, EXTREME WEATHER AND CLIMATE CHANGE 5 (2012) (describing plan adopted in King County, Washington to demolish chronically flooded homes); CITY OF PHX., ARIZ., *Phoenix shows community-wide climate progress with a 7.2% reduction in GHG Emissions*, available at https://www.phoenix.gov/oep/environment/climate (last viewed Mar. 29, 2019).

[48] CITY OF CINCINNATI, OHIO, GREEN CINCINNATI PLAN (2013), (describing a planned net-zero emissions police station).

[49] *Id*. at 8.

[50] PlaNYC, *supra* note 3, at 27.

[51] *Id.*

[52] 2009 PORTLAND CLIMATE PLAN PROGRESS REPORT, *supra* note 41, at 41.

charging stations for electric cars;[53] and facilitating biking and walking as desirable modes of transportation.[54]

While the prescriptions may seem somewhat scattershot, common notions on what actions must be taken up in defense of climate change seem to have emerged. They all appear to embrace the need for fortifying for achieving resilience and sustainability. However, historic monuments and structures present particular issues that require particular attention.

III. HISTORIC MONUMENTS AND PRESERVATION REGIMES

Nearly all nations have enacted laws to protect or conserve historic monuments that commemorate or celebrate their cultural heritage. These laws vary in ways that are suited to and respond to their own traditions of governance and historical development. In the United States, nineteenth and early twentieth century preservation initiatives focused "on the homes of the great and the places where political and military history were made."[55] One of the first efforts occurred in 1816 when the city of Philadelphia purchased the deteriorating Independence Hall from the Commonwealth of Pennsylvania. Then in 1850, New York State acquired and preserved Hasbrouck House, which had served as George Washington's headquarters during the Revolutionary War (1782-83).[56] Shortly thereafter, the Mount Vernon Ladies' Association of the Union, a non-governmental[57] organization, organized to save Mount Vernon, George Washington's home in Virginia, overlooking the Potomac River.[58] By 1895, twenty houses had been preserved as museums in the United States.

One of the early and notable Congressional acts to protect historic places was the 1893 Sundry Civil Appropriations Act that authorized the Secretary of War to spend up to $25,000 for monuments and tablets identifying troop positions and movements at Gettysburg. When railroad construction threatened to divide this historic battlefield, Congress later authorized the Secretary of War to acquire land to permanently protect this landscape. The railroad challenged the validity of the use of eminent domain for the acquisition, but in *U.S. v. Gettysburg Electric R. Co*., the U.S. Supreme Court declared protection of the lands of "one of the great battles of the world" a valid public purpose and, thus upheld this use of the government's

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[53] Assemb. B. 2565 ch. 529, 2013 Leg. (Cal. 2014).

[54] 2009 PORTLAND CLIMATE PLAN PROGRESS REPORT , *supra* note 41, at 20, 26 (calling for bike paths/lanes, walkability; already there are more than 300 miles of bikeways).

[55] Gordon Gray, Remarks at Beauty for America: Proceedings of the White House Conference on Natural Beauty (May 24-25, 1965) (Transcript available in the Library of Congress at p. 78).

[56] *Washington's Headquarters State Historic Site*, PARKS, RECREATION, AND HISTORIC PRESERVATION, https://parks.ny.gov/historic-sites/17/details.aspx (last visited Apr. 5, 2017).

[57] ELSWYTH THANE, MOUNT VERNON IS OURS (1966).

[58] 54 U.S.C. §§ 320301-03 (2012) (formerly 16 U.S.C. §§ 431-33 (1906)).

condemnation power.[59] The marking of other prominent Civil War battlefields followed in the succeeding years.

The nation's interest in the historic was not limited to man-made structures and places, but extended to the natural world. In 1846, the Smithsonian Institution was chartered and in 1889, Congress authorized the first prehistoric reserve to protect western landscapes.[60] In 1906, Theodore Roosevelt signed into law the Antiquities Act of 1906,[61] which permits preservation of cultural and natural heritage on federal public lands. He promptly proclaimed Devils Tower in Wyoming as a national monument and before he left office, he had proclaimed eighteen, including the Grand Canyon.[62] By 1933, concern for the "usable past" had preserved some 400 sites as house museums, which aimed to inventory all the nation's most important historic structures. However, in order to know how and what to preserve, it was essential to identify the precious monuments. The nation went about this task starting in 1935, with the enactment of the Historic Sites Act ("HSA"), which declared the national policy "to preserve for public use historic sites, buildings and objects of national significance for the inspiration and benefit of the people and charged the Secretary of the Interior to restore, reconstruct, and maintain the same."[63] Perhaps the most important initial function of the HSA was the dissemination of knowledge and information regarding historic resources.[64] The Historic American Buildings Survey (HABS)[65] was launched and aimed to mark and educate the public about historic properties. It was originally funded by the Depression-era Works Progress Administration and had an important role in locating historic sites of national significance.[66] Under HABS, architects and historians were put to work memorializing historic properties through

[59] United States v. Gettysburg Elec. Ry. Co., 160 U.S. 668, 681 (1896).

[60] *See* Leslie E. Barras, *Section 106 of the National Historic Preservation Act: BACK TO BASICS*, MICH. HISTORIC PRESERVATION NETWORK, https://www.mhpn.org/wp-content/uploads/2012/08/NTHP-Back-to-Basics-Technical-Report.pdf (last visited Mar. 09, 2019).

[61] 54 U.S.C. §§ 320301-03 (2012) (formerly 16 U.S.C. §§ 431-433 (1906)).

[62] Two other statutes served to protect natural artifacts and those associated with indigenous peoples: 16 U.S.C. §§ 470aa-470mm (1979) (Archaeological Resources Protection Act of 1979), and 25 U.S.C. § 3001, *et. seq* (2006) (Native American Graves Protection and Repatriation Act of 1990).

[63] 54 U.S.C. §§ 320101-06, 102303, 102304 (2014).

[64] See John H. Sprinkle, Jr., *"An Orderly, Balanced and Comprehensive Panorama … of American History": Filling Thematic Gaps within the National Park System*, 27 GEORGE WRIGHT F. 269, 269–71 (2010) (discussing the motivations and impact of the HSA on survey efforts).

[65] *Historic American Buildings Survey/Historic American Engineering Record/Historic American Landscapes Survey*, LIBRARY OF CONGRESS, http://www.loc.gov/pictures/collection/hh/ (last visited Mar. 9, 2019).

[66] See Lisa Pfueller Davidson & Martin J. Perschler, *The Historic American Buildings Survey During the New Deal Era: Documenting "a Complete Resume of the Builders' Art"*, 1 CRM J., 49, 52–54 (2003).

photography and measured drawings.[67] That survey is kept at the Library of Congress.[68]

As part of the first formal "listing" of historic properties, the National Survey of Historic Sites and Buildings was developed under the HSA to establish a guide for evaluating important properties for possible inclusion within the National Park System.[69] In some cases, the National Park Service ("NPS") acquired specific historic sites and in other cases, worked to "restore, reconstruct, rehabilitate, preserve and maintain historic or prehistoric sites."[70] The NPS was granted the general authority to expend funds in support of preservation efforts on lands and buildings it owned. Additionally, NPS was empowered to make grants to non-federal owners of nationally significant properties.[71] Although broad, the NPS's acquisition authorities were certainly not unlimited.[72] For example, no property owned by a religious institution, owned by an educational institution, or administered for the benefit of the public could be acquired without the owner's consent.[73] Beginning in the 1950's, the nation began formally recognizing historic properties of "exceptional value," what came to be known as "National Historic Landmarks" ("NHL").[74]

A. Specific National Legislation

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[67] *Id*.

[68] In fact, the HABS records are the most widely used collection within the entire Library of Congress. See *Heritage Documentation Programs*, NAT'L PARK SERV., http://www.nps.gov/hdp/about.htm (last visited Mar. 09, 2019). This work also continues to inform current preservation efforts. See, e.g., Sally Zimmerman, *A Documentary Legacy: The Historic American Buildings Survey and Historic New England,* 16 HISTORIC NEW ENG. 26, 26–29 (2015) (discussing the role HABS documentation plays in regional preservation efforts).

[69] *See* DIANE LEA, *America's Preservation Ethos: A Tribute to Enduring Ideals, in* A RICHER HERITAGE: HISTORIC PRESERVATION IN THE TWENTY-FIRST CENTURY, 1, 8 (Robert E. Stipe ed., 2003).

[70] *See* 54 U.S.C. § 320102(g) (2014); John Fowler, *Federal Historic Preservation Law: National Historic Preservation Act, Executive Order 11593, and Other Recent Developments in Federal Law*, 12 WAKE FOREST L. REV. 31, 32–34 (1976). The restore, reconstruct, rehabilitate, and preserve standards laid out in the HSA were later adopted by the Secretary of the Interior as the appropriate preservation treatment approach, although not until 1992. *See A History of the Secretary of the Interior's Standards, Tech. Pres. Serv*., NAT'L PARK SERV., http://www.nps.gov/tps/standards/history-of-standards.htm (last visited Mar. 09, 2019) (charting the evolution of the Secretary of the Interior's standards).

[71] See Mary Ann King & Sally K. Fairfax, *Public Accountability and Conservation Easements: Learning from the Uniform Conservation Easement Act Debates*, 46 NAT'L. RESOURCES J. 65, 81 (2006) (noting that "federal grants to states for preserving historic sites … have a long provenance"). *But see* Gregory E. Andrews, Historic Preservation in the Private Sector, in The American Mosaic: Preserving a Nation's Heritage 208, 209 (Robert E. Stipe & Antoinette J. Lee eds., 1987) (explaining limitations on federal funding for preservation efforts during this period).

[72] *See* Historic Green Springs Inc. v. Bergland, 497 F. Supp. 839, 846 (E.D. Va. 1980) (noting that this acquisition authority is limited to properties of national significance).

[73] 54 U.S.C. § 320102(e) (2014).

[74] 54 U.S.C. § 320101 (2014) (re-codification of Historic Sites Act of 1935). Some popular examples of NHLs are Elvis's Graceland in Nashville, Tennessee, Thoreau's Walden Pond in Concord, Massachusetts, the John D. Rockefeller Estate, Kykuit, in Sleepy Hollow, and Washington Irving's Sunnyside in Tarrytown, N,Y; *see National Historic Landmarks Program*, NATIONAL PARK SERVICE, https://www.nps.gov/orgs/1582/index.htm.

It was in the wake of rapid economic growth following World War II, as recounted in the report of a Special Committee on Historic Preservation under the auspices of the United States Conference of Mayors with a grant from the Ford Foundation, that prompted the federal historic preservation regime in the United States. The report found that more than half the buildings listed on that Survey had been demolished.[75] In 1966, the National Historic Preservation Act[76] was enacted. While most state legislatures have enacted statutes to enable local governments to protect historic buildings and places, some pre-dating the NHPA,[77] it would become the federal policy to encourage the balancing of modern societal needs with preservation; be a national preservation leader; manage and care for prehistoric and historic resources under its control; and foster both non-federal governmental and private preservation activities.[78] The NHPA's purpose was to cause agencies to stop and consider adverse effects to historic property that might occur in the course of some federal undertaking.[79] The act also directed the Secretary of the Interior to establish a list or registry of historic properties, sites, and objects. The National Register of Historic Places now includes more than 95,000 listings of historic properties of national, state, and local significance.[80]

The range of historic properties that are celebrated and protected by historic preservation laws is almost infinite—churches, old schoolhouses, warehouses, mills, houses (dogtrot styled in Houston), landscapes (the Harriet Tubman Underground Railroad), natural phenomena (the Grand Canyon), railway terminals, the Statue of Liberty.

B. Historic Properties as Part of the Environment

The National Environmental Policy Act (NEPA) was signed into law by President Richard Nixon on January 1, 1970, which formally expressed the nation's concern about protecting the natural environment. NEPA declared the national policy to "use all practicable means and measures, including

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[75] *See* NATIONAL TRUST FOR HISTORIC PRESERVATION, WITH HERITAGE SO RICH (New York Random House 1999).

[76] National Historic Preservation Act, 54 U.S.C. § 300101 (2014).

[77] CHARLESTON, S.C., CODE OF ORDINANCES § 54-230; NEW ORLEANS, LA., VIEUX CARRÉ ORDINANCE § 65-8 (enacted in 1936).

[78] The Act also established preservation grants-in-aid for survey, planning, and preservation activities; authorized State Historic Preservation Offices (SHPOs) in every state, territory, and the District of Columbia; created the Advisory Council on Historic Preservation "ACHP") for policy guidance and oversight within the executive branch; and established the Section 106 planning process for federally sponsored projects affecting historic properties. Subsequent changes to the law by Congress created the Historic Preservation Fund (HPF), authorized tribal and local government preservation programs, and mandated federal preservation program responsibilities. Other preservation-oriented legislation provided federal tax incentives for rehabilitation of commercial historic properties.

[79] More on the mechanics and limits of this process is discussed infra.

[80] *What is the National Register of Historic Places*, NPS https://www.nps.gov/subjects/nationalregister/what-is-the-national-register.htm (last visited July 1, 2019).

financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans."[81] This statement of national policy serves to guide the interpretation of NEPA's provisions.[82] "NEPA's coverage extends to important historic, cultural, and natural aspects of our national heritage."[83]

C. Historic Properties Affected by Transportation

In 1966, the Transportation Act was enacted, stating that "It is declared to be the national policy that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."[84] The Act directed the Secretary of Transportation to cooperate and consult with the Secretaries of the Interior, Housing and Urban Development, and Agriculture, and with the States to develop transportation plans and programs that include measures to maintain or enhance the natural beauty of the lands traversed.[85] Substantively, the act prohibits the Secretary from approving:

> any program or project . . . which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance as determined by the Federal, State, or local officials having jurisdiction thereof, or any land from an historic site of national, State, or local significance as so determined by such officials unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreational area, wildlife and waterfowl refuge, or historic site resulting from such use.[86]

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[81] 42 U.S.C. § 4331(a) (2012).

[82] *See* 40 C.F.R. §§ 1500-08 (2018).

[83] According to the NEPA regulations, in considering whether an action may significantly affect the quality of the human environment, an agency must consider, among other things, "[u]nique characteristics of the geographic area such as proximity to historic or cultural resources," 40 C.F.R. § 1508.27(b)(3)) (2018), and "the degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places." 40 C.F.R. § 1508.27(b)(8) (2018). The NEPA regulations also require that "[t]o the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with environmental impact analyses and related surveys and studies required by the . . . National Historic Preservation Act . . ." 40 C.F.R. § 1502.25(a) (2018).

[84] Department of Transportation Act, Pub. L. 89-670, 80 Stat. 931 (1966) (codified at 23 U.S.C. 138(a) (2012)).

[85] *Id.*

[86] *Id.*

In *Citizens to Preserve Overton Park, Inc. v. Volpe,*[87] the Supreme Court pointed out that preservation of natural and historic properties is the paramount concern under the Act.[88] An alternative is feasible if it can be constructed as a matter of sound engineering. Prudence assesses safety or operational problems; addresses whether the alternative will meet the project's needs; weighs the severity of social, economic, environmental impacts, and considers the severity of impacts to environmental resources protected under other statutes, and the existence of extraordinary costs.[89] Avoidance alternatives include no action or no build, relocation, alternative actions (e.g., different mode of transportation), alignment shifts, and design changes.

If the analysis of avoidance alternatives determines that there is no feasible and prudent alternative, then the FHWA may only approve the option that causes the least overall harm to the Section 4(f) property.[90] In determining least overall harm, the FHWA may consider factors, such as the ability to mitigate adverse impacts; the relative severity of remaining harm, after mitigation; and the relative significance of each section 4(f) property.

IV. MECHANICS FOR PRESERVATION

The traditional method of preserving historic monuments is *in situ*: to maintain them in their original guise, protect them from the effects of nearby activities and to prohibit alterations and demolitions. This method is carried out on both the federal and local levels.

A. Section 106 and 110(f)

Section 106 of the NHPA requires federal agencies to assess and consider the impacts of major federal projects on historic resources as part of the decision-making process.[91] The Advisory Council on Historic Preservation (ACHP), issues regulations, advises agencies regarding compliance with this consultative process, and can become directly involved at the request of the agency head.[92] In the case of NHLs, the NPS must also be invited to participate in any consultation regarding a property so

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[87] Citizens to Preserve Overton Park v. Volpe, 401 U.S. 402 (1971).

[88] *Id.* at 412–13 (remanding for a finding required under the Act).

[89] *Environmental Review Toolkit*, FED. HIGHWAY ADMIN., www.environment.fhwa.dot.gov/4f/4fAtGlance.asp (last visited Mar. 9, 2019); *see also* 23 C.F.R. § 774.17 (2018).

[90] 23 C.F.R. § 774.3(c)(1) (2018).

[91] 54 U.S.C. § 306108 (2014).

[92] *See generally* ADVISORY COUNCIL ON HISTORIC PRESERVATION, www.achp.gov (last visited Mar. 9, 2019) [hereinafter ACHP].

designated.[93] Although section 106 is purely a procedural provision,[94] it has more than merely salutary effects, as consultation may cause a rethinking about the wisdom of a project.[95]

Under section 110(f), federal agencies must, to the fullest extent possible, undertake the planning and actions necessary to minimize harm to any NHL.[96] While this section seems to impose higher duties upon agencies in the case of NHLs, the courts nevertheless have interpreted it as not imposing substantive protections beyond what is found under section 106 of the NHPA.[97]

B. Environmental Impact Statements Under NEPA

In achieving the national policy of protecting the human environment, NEPA regulations[98] require that agencies prepare a "detailed statement" of the environmental impacts of any "major federal action significantly affecting the quality of the human environment."[99] This "detailed statement" is known as an Environmental Impact Statement (EIS).[100] And, despite finding that an undertaking does threaten the environment, the federal government can yet proceed, so long as the threats have been identified in the EIS. Perhaps the value of adherence to this procedure, is that by exposing a project to public view, an agency might rethink going forward if the negative environmental effects are severe.[101]

V. PRESERVATION AT THE STATE AND LOCAL LEVELS

On the local level, historic preservation ordinances exist in thousands (nearly 2,500) of municipalities around the country, by state enabling acts,

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[93] *Section 106 Consultation Involving National Historic Landmarks*, ADVISORY COUNCIL ON HISTORIC PRESERVATION (Apr. 26, 2002), https://www.achp.gov/digital-library-section-106-landing/section-106-consultation-involving-national-historic-landmarks. Although the 2014 re-codification of the NHPA, 54 U.S.C. 300101, no longer contains the Section 106 or 110 denominations, we continue to use these references for convenience.

[94] Nat'l Trust for Historic Pres. v. Blanck, 938 F. Supp. 908, 925 (D.D.C. 1996) (holding that federal agency was not required to expend additional funds to preserve historic resources, only to plan for their long-term preservation).

[95] Consider the story of the African American Burial Grounds in New York City. During the construction of a federal office building, the grounds were discovered. After much public discourse about the importance of preserving the site, the proposed office building was relocated and the grounds were proclaimed a National Monument. *See* Edward Rothstein, *A Burial Ground and Its Dead Are Given Life*, N.Y. Times (Feb. 25, 2010), https://www.nytimes.com/2010/02/26/arts/design/ 26burial. html.

[96] *See generally* ACHP, *supra* note 92.

[97] The Presido Historical Ass'n v. Presidio Trust, 811 F.3d 1154 (9th Cir. 2016); Nat'l Trust for Historic Pres., 938 F. Supp. at 925.

[98] *The NEPA Review Process*, Nat'l Preservation Inst., https://www.npi.org/NEPA/process (last visited June 8, 2019) (first promulgated by the Council on Environmental Quality (CEQ)).

[99] 40 C.F.R. § 1508.5 (2018).

[100] *See* 40 C.F.R. § 1508 (2018).

[101] Robertson v. Methow Valley Citizens Council, 490 U.S. 332 (1989); Presidio Historical Ass'n v. Presidio, 811 F.3d 1154 (9th Cir. 2016).

state registers, then local laws.[102] There are many common features. First, there is a declaration of the importance of preserving monuments; often some mention of the improvement of the quality of our aesthetic lives.[103] Others mention the importance of economic viability by protecting vibrant, eclectic and connected communities.[104] The ordinances describe the criteria for landmarking: having "historical, architectural, archaeological, or cultural value."[105] For, example, the Charleston, South Carolina Ordinance provides:

> In order to promote the economic and general welfare of the city and of the public generally, and to ensure the harmonious, orderly and efficient growth and development of the municipality, it is deemed essential by the city council of the city that the qualities relating to the history of the city and a harmonious outward appearance of structures which preserve property values and attract tourist and residents alike be preserved; some of these qualities being the continued existence and preservation of historic areas and buildings; continued construction of buildings in the historic styles and a general harmony as to style, form, color, proportion, texture and material between buildings of historic design and those of more modem design; that such purpose is advanced through the preservation and protection of the old historic or architecturally worthy structures and quaint neighborhoods which impart a district aspect to the city and which serve as visible reminders of the historical and cultural heritage of the city, the state, and the nation.[106]

The New York City Landmarks Preservation Act states its aim to: "foster civic pride in the beauty and noble accomplishments of the past" by protecting property"having a special character or a special historical or aesthetic interest or value" whose destruction and alterations would mean "the irreplaceable loss to the people of the city of the aesthetic, cultural and historic values represented by such improvements and landscape

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[102] *See Historic Preservation Resources-National,* DIGITAL GEORGETOWN, https://repository.library.georgetown.edu/handle/10822/761776 (last visited June 9, 2019).

[103] *See e.g.,* DENVER, COLO., ORDINANCES, ch. 30, § 30-1; N.Y.C., NY., Admin. Code, Landmarks Preservation Law § 25-301.

[104] *See* N.C. GEN. STAT. §§ 160A-400.1-400.14 (2018) (allowing local governments to create historic preservation commissions and to designate local historic districts and landmarks. In the statute, the General Assembly sets forth its finding that, "The historical heritage of our State is one of our most valued and important assets. The conservation and preservation of historic districts and landmarks stabilize and increase property values in their areas and strengthen the overall economy of the State.").

[105] N.Y.C., NY., ADMIN. CODE § 25-30 (2018).

[106] CHARLESTON, S.C., ORDINANCES, § 54-230 (2018).

features."[107] The Code of the City of New Orleans,[108] provides that the "preservation of such buildings in the Vieux Carre section of the city, as in the opinion of the Commission, shall have architectural and historical value and which should be preserved for the benefit of the people of the city and state.". The Denver Landmark Preservation Law, states:

> It is hereby declared as a matter of public policy that the protection, enhancement, perpetuation and use of structures and districts of historical, architectural or geographic significance, located within the city or its mountain parks, is a public necessity, and is required in the interest of the prosperity, civic pride and general welfare of the people. [109]

A. The Designation Process

Local ordinances protect the exteriors of historic buildings, some interiors that are open to the public, as well as groups of properties, that is, historic districts.[110] The New York City Landmarks Preservation Law protects historic properties that are at least 30 years old: first by designation, then by regulating alterations and demolitions.[111] This ordinance and by extrapolation, all local ordinances were upheld by Supreme Court in *Pennsylvania Central Transp. v. New York City*.[112] The Court found the enactment and operation of the ordinance to be an exercise of the city's police powers and was not a taking of property. There, the owners of the Grand Central Terminal sought to alter the elegant beaux-arts structure by building an office tower in its place.

It was the 1963 demolition of Pennsylvania Station, designed by McKim, Mead, & White, the venerable and beautiful beaux-arts structure only 53 years old and constructed in its place, Madison Square Garden, designed by Charles Luckman Associates, that operated to raise the consciousness of New Yorkers and Americans in general to the importance of historic preservation. The razing of Pennsylvania Station led to the enactment of the New York City Landmarks Preservation Law in 1965 which provided protection for structures designated significant to the city. One of the first structures designated as a landmark under the new law was Grand Central Terminal. Penn Central Transportation Company, the owners

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[107] N.Y.C., NY., ADMIN. CODE § 25-301(a) (2018).

[108] N.Y.C., NY., ADMIN. CODE § 65-6 (2018).

[109] CHARLESTON, S.C., ORDINANCES, ch. 30, § 30-1 (2018).

[110] For example, as of 2016 in New York City, there are around 35,000 landmarks and several hundred historic districts. Richard S. Aldrich, et al., *New York City Landmarks Law*, THE NEW YORK PRESERVATION ARCHIVE PROJECT, http://www.nypap.org/preservation-history/new-york-city-landmarks-law/#new-york-city-landmarks-law1 (last visited on Mar. 9, 2019).

[111] *Id*.

[112] Pennsylvania Central Transport Co. v. City of New York, 438 U.S. 104 (1978).

of Grand Central, filed an application with the Landmarks Preservation Commission in 1968 to build a 55-story office tower on top of the 1913 terminal. Their justification was the desire to benefit from the site's development rights above the terminal. The request garnered much public attention and many prominent citizens, including the architect, Philip Johnson and public interest advocate, Jane Jacobs, publicly rallied against the plans. The owner's request was denied because the addition would have been destructive to the historic and aesthetic features of the landmark. But, it took the sustained and concerted effort of a host of other influential people, including Jacqueline Kennedy Onassis, Bess Myerson, former consumer advocate for New York City, and Ed Koch, U.S. Congressman from New York, to preserve the Grand Central Terminal. The case was appealed all the way to the U.S. Supreme Court as the owners believed the denial constituted a taking of the company's property without just compensation. In 1978, the Supreme Court sided with New York City, ruling that the city's "objective of preserving structures and areas with special historic, architectural, or cultural significance is an entirely permissible governmental goal." It declared that states and cities may enact land use restrictions or controls to enhance the quality of life by preserving the character and desirable aesthetic features of the city.[113] Historic preservation laws, despite charges that they unconstitutionally burdened some landowners more than others, accord with law, because individual buildings had been designated in accordance with a comprehensive scheme for protecting historic resources. The court stated: "In contrast to discriminatory zoning, which is the antithesis of land use control as part of some comprehensive plan, the New York City law embodies a comprehensive plan to preserve structures of historic or aesthetic interest wherever they may be found in the city."[114] This decision cemented the right of cities to protect their historic resources through regulation and the New York City ordinance has served as a model for many other jurisdictions in the country.

The New York City landmarks law is administered by a Commission, whose members must consist of persons with a diverse array of expertise, including history, architecture, art, as well as real estate business.[115] Under the act, anyone can nominate a structure for designation as a local historic landmark.[116] After nomination, the Commission conducts extensive research to verify the merits of the property. If the Commission decides to go forward, a public hearing is held.[117] A majority vote of the Commission holds, but the city council must approve the Commission's decision.

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[113] *Id*.

[114] *Id.* at 132.

[115] N.Y.C., NY. CHARTER, ch. 74, Landmarks Preservation Commission § 3020 (2019).

[116] *Suggest a Landmark*, NYC LANDMARKS PRESERVATION COMMISSION, https://www1.nyc.gov/site/lpc/designations/suggest-a-landmark.page (last visited on Mar. 9, 2019).

[117] *Id.*

The New York City landmarks law, while widely followed, is not the only form of local ordinance, as the New York State Office of Parks and Recreation and Historic Properties, as part of its participation in the Certified Local Governments Program, under the National Park Service, has promulgated a model preservation ordinance.[118] The model ordinance proposes a choice of forms for local governments, one such as under the New York City law, where the Commission has the power to designate a structure (although subject to approval by the city council) and another, under which a commission makes findings and recommendations to a town board or council for designation.[119]

B. Limits and Duties After Designation

After a property has been designated as an historical landmark, the owner becomes subject to specific duties and limitations. First, an owner must maintain the structure—make reasonable efforts to preserve the historic attributes. Most ordinances contain provisions for the imposition of penalties and fines to ensure that the property does not fall into a state of disrepair, such that it must be demolished. Some historic districts aim to preserve the *tout ensemble,* that is, the total appearance or effect of something. In historic preservation districts, it refers to the complement of buildings, their styles, sizes, uses, street layout, landscaping, that create a community whose characteristics can be discerned from a distance. It "describes an 'associational harmony,' which places a focus "on shared human values and the community's need for cultural stability."[120]

The owners of the properties are further constrained against alterations and/or demolition of the historic structure or buildings within districts, without board or commission approval, in the guise of a certificate of appropriateness ("COA") from the Commission. Some ordinances provide accessible guidance for owners about what sorts of changes require a COA, what kinds of changes may be allowed without first seeking a COA, what types of materials are acceptable.[121]

While this limitation seems to be the most contentious between owners and Commission, it seems that the ordinances that contain the most instruction and most flexibility to owners are the ones that achieve the best

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[118] *Certified Local Government Program and Local Preservation Tools*, NATIONAL PARK SERVICE, www.nps.gov/clg (last visited on Mar. 9, 2019).

[119] *See* GREENBURGH, N.Y. ORDINANCE, ch. 235-1, (2019).

[120] James P. Karp, *The Evolving Meaning of Aesthetics in Land-Use Regulation*, 15 COLUM. J. ENVTL. L. 307, 309 (1990).

[121] *See Community Planning and Development,* DENVER: THE MILE HIGH CITY, https://www.denvergov.org/content/denvergov/en/community-planning-and-development/landmark-preservation/lower-downtown-design-review-board.html (last visited on Mar. 9, 2019).

results.[122] But this injunction only takes effect once the designation is formal. Under many ordinances, until that time, an owner is free to make changes and even preemptively demolish the structure. Some ordinances, however, like that in the District of Columbia, contain cross-check provisions, which essentially delay any application for a building permit to alter and/or demolish a structure until the Historic Preservation Commission has had a chance to review it for its historic merit.[123]

VI. THE IMPERATIVES OF RELOCATING HISTORIC MONUMENTS

Buildings, even entire communities, of all stature, sizes, and construction have been moved over time. Barns and other agricultural buildings have been moved for greater efficiency. Inner city townhouses have been set back out of the path of development. Rosa Parks' tiny, wood framed house, having fallen into disrepair, was moved abroad to protect it from demolition. Lighthouses, while no longer serving their historic missions as beacons for wayward ships, nonetheless have been moved away from the shore. There may be unstoppable activities such as dam construction, which would destroy a building. Sometimes the end of educating the public about the past, has prompted moves of buildings and structures to museums where the building may be more accessible to a larger segment of the public.

Moving the building out of its remote location for any of these reasons risks affecting its historical significance as visitors can no longer experience the building in context. A building left *in situ* will retain its historic integrity, while moving it may cause destructive change or damage to the fabric and reduce its heritage value, as the surroundings cannot be taken with it. Indeed, some building types cannot be moved at all without losing integrity—slab huts, mud brick, pies, early concrete, stone or brick buildings—and will not be restored on reassembly. "A contemporary reconstruction of the original building is not the real thing."[124] Below, I

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[122] *See* Tad Heuer, *Living History: How Homeowners in a New Local Historic District Negotiate Their Legal Obligations*, 116 YALE L. J. 768 (2007) (for a study of the problems of implementing an historic district ordinance).

[123] Embassy Real Estate Holdings v. D.C. Mayor's Agent for Historic Pres., 944 A.2d 1036 (D.C. App. 2007). The historic preservation ordinance in the Town of Weston, Massachusetts imposes a waiting period of 12 months before all or part of "significant" buildings can be destroyed. Buildings qualifying for a demolition delay must have been constructed by 1945 and be deemed "significant" by the Weston Historical Commission. The aim is to give the historical commission some time to explore preservation solutions for threatened properties. The law requires the historical commission to be notified of the filing of an application for a demolition permit and within 21 days thereafter the commission must hold an "initial determination meeting" to decide whether the building is historic. If the commission so determines, then it begins a process of looking for alternatives to demolition. Town of Weston, Bylaws, Article XXVI, https://weston.org/DocumentCenter/View/150/General-By-Laws-of-the-Town-of-Weston-PDF?bidId=.

[124] *Moved Bldgs. for Museums: not an easy solution,* AUSTL. GOV'T: DEP'T OF ENV'T & ENERGY, http://www.environment.gov.au/resource/moved-buildings-museums-not-easy-solution-0 (last visited Mar. 9, 2019).

discuss some of these examples of moving historic structures, some regrettable and some heroic.

A. Development Pressures: Urban Renewal and Indiscriminate Razing

Urban renewal was urged on by the effects of the Great Depression, which caused society to see and evaluate the plight of poor. The elimination of slums and redevelopment of central cities became prominent objectives. The goal of building new housing went hand in hand with slum clearance. In 1941, the Federal Housing Administration (FHA) adopted plans for slum clearance and urban redevelopment; but the clearance wiped away all that was valuable and historic along with that which was ugly. It was indiscriminate.[125] The original Act focused on clearance and redevelopment of a "predominantly residential" character.[126] Subsequent legislation embraced rehabilitation and conservation, carved out certain service projects that were not predominantly residential (such as hospital and university expansions), and encouraged citywide planning and code enforcement.[127] The theory was that by knocking down relatively low-quality housing and commercial buildings, the overall building quality would appear to improve.[128] Improving the physical condition of specific areas was believed to benefit the city "through a virtuous circle (e.g., less blight, less outmigration, and higher property values across the city), or at least by short-circuiting the process of deterioration."[129] Urban renewal attempted to make central-city locations more attractive to businesses as well as to residents, on the premise that firms and workers were willing to pay more to locate there

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[125] William J. Collins & Katharine L. Shester, *Slum Clearance And Urban Renewal In The United States*, *Working Paper 17458*, NATIONAL BUREAU OF ECONOMIC RESEARCH 4-7 (Sept. 2011) http://www.nber.org/papers/w17458 ("In 1949, Congress authorized the Housing and Home Finance Agency (HHFA) to assist locally planned urban renewal projects with grants of two-thirds (or in some cases three-fourths) of the net project cost to the city, where the net cost was defined as the difference between the total cost of acquiring and clearing properties and the income received from selling the cleared land."); *see also* Henry W. McGee, Jr. & Donald C. Bryant, Jr., *Gentrification and the Law: Combatting Urban Displacement*, 25 WASH. U. J. URB. & CONTEMP. L. 43 (1983), available at http://openscholarship.wustl.edu/cgi/viewcontent.cgi?article=1439&context=law_urbanlaw, (citing to D. MANDELKER, C. DAYE, O. HETZEL, J. KUSHNER, H. MCGEE, & R. WASHBURN, HOUSING & COMMUNITY DEVELOPMENT 520 (1981); Chester W. Hartman, *Relocation: Illusory Promises and No Relief*, 57 VA. L. REV. 745, 745 (1971)).

[126] *Id.* at 4–5.

[127] A project typically began with "the creation of a Local Public Agency (LPA) that was 'enabled' under state legislation to undertake urban renewal activities and to exercise eminent domain powers. The LPA would identify an urban renewal area (typically characterized by 'blight' or signs of deterioration), hold public hearings, seek approval from the local government (e.g., city council), and then seek approval from the federal agency to proceed with specific project planning within that area. The project plans would include detailed information on current and proposed land use, changes in streets and utilities, aid for displaced residents and businesses, and estimates of the costs. Once approved, a combination of federal loans and grants would allow the project to proceed." *Id.* at 5.

[128] *Id.* at 6.

[129] *Id*.

for higher levels of "productive amenities," thus raising property values.[130] All the while, communities, their cultural references, their monuments were destroyed.[131]

The general consensus is that urban renewal was a social policy and fiscal failure.[132] One estimate indicates that over two million persons were displaced by urban renewal and highway programs between 1964 and 1972.[133] As the negative effects of urban renewal became to be visible, many community leaders, residents, and professionals began to oppose the program. Jane Jacobs, author of THE DEATH AND LIFE OF GREAT AMERICAN CITIES, is one of the most notable. Of the redevelopment projects throughout the country, she observed:

> But look what we have built with the first several billions: Low-income projects that become worse centers of delinquency, vandalism and general social hopelessness than the slums they were supposed to replace. Middle-income housing projects which are truly marvels of dullness and regimentation, sealed against any buoyancy or vitality of city life. Luxury housing projects that mitigate their inanity, or try to, with a vapid vulgarity. Cultural centers that are unable to support a good bookstore. Civic centers that are avoided by everyone but bums, who have fewer choices of loitering place than others. Commercial centers that are lackluster imitations of standardized suburban chain-store shopping. Promenades that go from no place to nowhere and have no promenaders. Expressways that eviscerate great cities. This is not rebuilding of cities. This is the sacking of cities.[134]

As a New York City resident with no affiliation with any government agency, Jacobs stated what she viewed to be the results of urban renewal, specifically the physical erosion of urban life. In her suggestions of how to

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[130] *Id.* at 4–7. These amenities were found to have an "ambiguous effect on wages, however, because for any given rent level, workers are willing to accept lower wages to have access to the amenity, but firms are willing to pay higher wages."

[131] *See* Collins & Shester, *supra* note 125 at 6.

[132] Amy Lavine, *Urban Renewal and the Story of Berman v. Parker*, 42 URB. L. 423, 469 (2010); JOHN R. LOGAN & HARVEY L. MOLOTCH, URBAN FORTUNES: THE POLITICAL ECONOMY OF PLACE 167–69 (2007); William Alonso, *Cities, Planners, & Urban Renewal*, URBAN RENEWAL: THE RECORD AND THE CONTROVERSY 437, 442–43 (James Q. Wilson ed., 1966).

[133] Donald C. Bryant, Jr. & Henry W. McGee, Jr., *Gentrification and the Law: Combatting Urban Displacement*, 25 WASH. U. J. URB. & CONTEMP. L. 43, 47 n.9 (1983); *see also* Chester W. Hartman, *Relocation: Illusory Promises and No Relief*, 57 VA. L. REV. 745, 745 (1971) (offering similar assessments based on date from the National Commission on Urban Problems and National Association of Home Builders).

[134] JANE JACOBS, THE DEATH AND LIFE OF GREAT AMERICAN CITIES 6 (New York: The Modem Library, 1961).

improve the problems within cities, Jacob's offered a different approach, which led the New York Times to describe her book as "perhaps the most influential single work in the history of town planning."[135] She reminded anyone interested in the progress of inner city development that "Cities have the capability of providing something for everybody, only because, and only when, they are created by everybody."[136] Others who objected to the deleterious effects of urban renewal were African-Americans outraged by massive population dislocation in the "renewed" neighborhoods. They labeled the program "negro removal." Because urban renewal condemned blighted areas, which housed a considerable number of African-Americans, the community suffered from relocation and displacement, ultimately destroying its sense of cohesion.

During the 1960s, many civil rights leaders organized sit-ins against the program. Architects also questioned the merits of urban renewal as city streetscapes changed so dramatically. James Marston Fitch, professor of Architectural History at Columbia University, described the program in his book, AMERICAN BUILDING I: THE HISTORICAL FORCES THAT SHAPED IT.

> When urban renewal reaches a scale where whole sections of the city are reconstructed, we are no longer dealing with isolated architectural containers for one or another special function - housing, shops, schools - but with complex urban tissue in its entirety. Such tissue, to be viable, must support a whole spectrum of human need - social and private, somatic and psychic - which lies far below the reach of simple plastic or pictorial manipulation. And yet such superficial manipulation of urban forms can quickly inhibit, even drastically reduce, the life-supporting properties of urban tissue."[137]

Fitch looked at architecture and urban renewal from a social point of view. Architecture has participants - the people who live or work within the environment the designer creates. However, since urban renewal involved subsidization from federal, state and local governments, "major design decisions tend[ed] naturally to turn on the question of maximum profits"[138] and overlook the needs of the people occupying the buildings. As a result, Fitch argued, many urban renewal projects "fell short of their promise."[139] Despite these protests from influential voices within the architectural

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[135] Robert Fulford, *When Jane Jacobs Took On the World*, N.Y. TIMES, Feb. 16, 1992, §7.
[136] *Id*.
[137] JAMES MARSTON FITCH, AMERICAN BUILDING I: THE HISTORICAL FORCES THAT SHAPED IT 289–90 (Houghton Mifflin Company ed., 2d ed., 1966).
[138] *Id.* at 284.
[139] *Id.*

community, cities across the country continued to use the urban renewal program, moved by the push for redevelopment (in Philadelphia, Boston, and New Haven), to revitalize obsolete business districts (in Baltimore and Cincinnati) and to keep jobs from migrating to the suburbs. Some (Hartford, Cleveland, and San Francisco) viewed urban redevelopment as a device for obtaining federal grants to be used for replacing congested downtown districts with new and efficient work environments.[140]

Preservationists began criticizing the seeming indiscriminate erasure of all that was good and worthy of celebration along with all that was thought unrecoverable. They believed that by saving some of the structures within the cities, the disengagement from the past could be avoided. Thus, preservationists urged planners to focus more on rehabilitation than demolition and planners began to listen. The force of this appeal became stronger with the enactment of the NHPA in 1966. At the same time, the passage of the Demonstration Cities and Metropolitan Development Act of 1966[141] enhanced the powers of preservation within urban renewal projects. Title VI, entitled Preservation of Historic Structures, "amend[ed] the urban renewal law to provide recognition of historic and architectural preservation in urban renewal plans and to authorize preservation activities and planning therefor as eligible project costs." Not only was preservation to be included in redevelopment projects, but funding was to be provided as well. Legal challenges had a firm footing.[142]Ada Louise Huxtable, architecture critic for the New York Times, commented:

> there has been a near-total reversal of attitudes toward the past. Preservation, the woolly, sentimental cause of those little old ladies in tennis shoes, is now endorsed by astute developers everywhere in an avalanche of imaginative recycling of old structures of diversity and dignity. This is being done with taste, wit, educated judgment, and a firm grasp of such esoterica as historical and cultural relevance and urban variety and enrichment. It isn't just a movement; it's a mild stampede.[143]

While displacement has declined since the abandonment of urban renewal programs, certain populations are still being forced out of their communities under both federally-funded community development

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[140] ALEXANDER GARVIN, THE AMERICAN CITY: WHAT WORKS, WHAT DOESN'T 127 (The McGraw-Hill Companies ed., 1996).

[141] Demonstration Cities and Metropolitan Development Act of 1966, Public Law 89-754, 80 Stat. 1255.

[142] Watch v. Harris, 603 F.2d 310 (2d Cir. 1979).

[143] ADA LOUISE HUXTABLE, KICKED A BUILDING LATELY? xiii–xv (Quadrangle Books ed., 1976).

programs and housing rehabilitation projects and private development projects.[144]

VII. PRESERVATION CHALLENGES ON THE INTERNATIONAL LEVEL

In an era of ubiquitous and eternal warfare, historic monuments are at great risk. Often, because of their cultural associations, they are the first targets of belligerents. The desire for rude martial advantage will often prevail over sentimental and pacific concerns. The author, Robert Bevan, comments that the destruction of buildings—historic, symbolic, or merely utilitarian, "is often the result of political imperatives rather than simply military necessity." Architecture, he maintains, "is not just maimed in the crossfire; it is targeted for assassination or mass murder." Culturally significant buildings are destroyed as a part of genocide, as political propaganda, to demoralize an enemy. The fire-bombing of Dresden and the wholesale cultural annihilation of Warsaw by Nazi occupiers are cases in point.[145] The Mostar Bridge, that once served as the literal and metaphoric pathway between Muslim and Christian cultures, was deliberately destroyed during the war in Serbia in 1993. It was a way of demoralizing the people.[146] The 2015 wanton destruction of the 2000 year-old Tempel of Bel, in Palmyra, Syria, with its colonnaded avenues and many stone carved temples, by the Islamist military group ISIS, left only the "ruins of memory."[147]

Since 1899, international conventions have enjoined against the deliberate destruction of cultural monuments. The 1899 Hague Convention with Respect to the Laws and Customs of War on Land,[148] among other things, prohibited the pillaging of towns and the destruction or intentional damage to religious, charitable and educational institutions, historical monuments, and works of art or science.[149] The 1907 Hague Convention annexed many of the articles and provisions of the 1899 version, but stressed the necessity of giving notice to the enemy of protected properties by marking the buildings with distinctive particular and visible signs, so that troops and military activities could avoid them.[150] The 1954

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[144] *See* Henry W. McGee, Jr., *Seattle's Central District, 1990-2006: Integration or Displacement?*, 39 URB. LAW. 167 (2007).

[145] ROBERT BEVAN, THE DESTRUCTION OF MEMORY: ARCHITECTURE AT WAR 284 (2006).

[146] *Id.* at 284.

[147] Heidi Stalla, *What We Lost in Palmyra*, WILSON Q., Fall 2015, at 4, available at https://wilsonquarterly.com/quarterly/transitions/what-we-lost-in-palmyra/ (indicating that the destruction was part of a propaganda campaign).

[148] *See* BRUCE G. TRIGGER, A HISTORY OF ARCHEOLOGICAL THOUGHT 29–30, 36 (1994); L.V. PROTT & P.J. O'KEEFE, LAW AND THE CULTURAL HERITAGE 34 (1984).

[149] Convention with Respect to the Laws and Customs of War on Land, art. 23, 27–28, 56, July 29, 1889, 32 Stat. 1803, T.S. 403.

[150] Convention with Respect to the Laws and Customs of War on Land, art. 27, 56, Oct. 18, 1907, 36 Stat. 2277, T.S. 539. The Roerich Pact was signed into effect in Washington, D.C., in 1935, largely as a Pan-American rather than an international treaty. The pact purported to adopt a universal flag to be used in times of danger to preserve national and private immovable monuments during times of war and

Hague Convention stressed the importance of cultural property[151] to all humankind, that "damage to cultural property belonging to any people whatsoever means damage to the cultural heritage of all mankind, since each people makes its contribution to the culture of the whole world."[152] In this respect, the Convention imposes the obligation upon nations to keep and safeguard cultural property during peacetime and to refrain from locating strategic or military equipment near cultural property and the targeting of cultural property, except in cases of military necessity.[153]

The haunting atrocities and excesses of war led to the 1949 Geneva Convention, which aimed to redress war crimes against nations and people, but it did not expressly cover destruction of cultural property—those things that yet define and sustain a people.[154] Some limited protection for historic references and monuments came in the 1977 Protocols I and II, additions to the Convention. Article 53 of Protocol I, pertaining to international armed conflict and Article 16 of Protocol II, pertaining to non-international armed conflict, both prohibit acts of hostility directed against historic monuments, works of art, or places of worship, and the use of such property for military purposes. Article 53 of Protocol I also prohibits reprisals against such property.[155]

The proscriptions and prescriptions, though altogether clear and comprehensive, only work if they are respected. As even signatories violate their terms, it seems that only international customary law, to the extent that it can be shown that the destruction of cultural property is prohibited by principles of universal recognition, may provide a basis for actions against non-signatories. In the meantime, it may be left to individual ingenuity and determination to protect them.

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during peace. Treaty on the Protection of Artistic and Scientific Institutions and Historic Monuments, Apr. 15, 1935, 49 Stat. 3267, T.S. 899. It specified that historic monuments, museums, scientific, artistic, educational, and cultural institutions so marked, should be considered as neutral and thus respected and protected by belligerents. *Id*. at art. 1. The Roerich Pact built upon the Hague proscriptions.

[151] Convention for the Protection of Cultural Property in the Event of Armed Conflict, May 14, 1954, 249 U.N.T.S. 240. Defined to include includes significant architectural monuments, art works, whether religious or secular, books or manuscripts of artistic or historical significance, museums, large libraries, archives, archaeological sites, historic buildings, and other objects of artistic, historical, or archaeological interest, as well as scientific collections and refuges created specifically to shelter cultural property during hostilities.

[152] *Id.* at Preamble.

[153] Two Protocols were adopted, requiring efforts to repatriate cultural property illegally taken during hostilities and the setting up of a legal regime for enforcement of the provisions. The Second Protocol also provided enhanced protection in the case of cultural heritage of the "greatest importance for humanity;" that such property should not be used for military purposes and gives it absolute immunity from attack, except under narrow circumstances. It goes on to provide for sheltering of movable cultural property in times of conflict.

[154] Geneva Convention Relative to the Protection of Civilian Persons in Times of War, Aug. 12, 1949, 75 U.N.T.S. 287.

[155] Protocol Additional to the Geneva Conventions of 12 August 1949 and Relating to the Protection of Victims of International Armed Conflict, June 8, 1977, art. 53(c), 1125 U.N.T.S. 3 [hereinafter "Protocol I"].

A. The Invasion of Iraq

In anticipation of the American invasion in March 2003, the staff of the Iraq Museum closed the galleries to the public and began the task of protecting the museum and its contents.[156] They were able to save important parts of the collections but they could not prevent the looting of 15,000 art objects at the unprotected museum. Thinking that the war would be short-lived, the staff wrapped the displayed artifacts and locked them in the basement. But, this was a miscalculation on many fronts, as the stored objects disintegrated on account of inundation of the floor.[157] The National Library and Archives of Iraq failed to take any precautions before the American troops entered Baghdad, leaving the facilities unguarded to looters, who set the buildings on fire. Sixty percent of state archives' records and documents were lost and 25% of the library's book collection.[158] Other nations, such as Lebanon, fared better that Iraq, and some worse, in protecting cultural artifacts from loss and injury from armed conflict.[159]

VIII. THE PRESSURES FROM CLIMATE CHANGE

Alas, even as we think there may be an appeal to humans to avoid deliberate destruction of historic structures and places, there is no meaningful plea to nature for any relief, particularly as it pertains to largely immovable structures, existing in the open environment. Those that reside along the coasts are most immediately threatened by changing and sometimes erratic weather patterns, leading to increased storm surges and flooding. As recounted in the introduction of this paper, climate change threatens communities with flooding, searing heat, and torrential rains and paradoxically, drought. The impacts on people (in terms of loss of life, health and shelter) is clear, but that on historic monuments is equally so. Monuments placed along the coast could be swept into the ocean; they will bear the brunt of storm surges. Extreme cold and rapid warming promise frost heave that will undermine the foundations of structures. Searing heat can cause fragility and cracking of facades. Cultural landscapes will likely find increased extremes of wetting and drying, increased risk of subsidence and decay of stonework and erosion, and losses of indigenous vegetation.[160]

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[156] René Teijgeler, *Preserving Cultural Heritage In Times of Conflict*, *in* PRESERVATION MANAGEMENT FOR LIBRARIES, ARCHIVES, AND MUSEUMS 145 (G.E. Gorman & Sydney J. Shep ed., 2006), available at https://www.academia.edu/35977152/Preserving_cultural_heritage_in_times_of_conflict.

[157] *Id.*

[158] *Id.*

[159] *Id.* at 146.

[160] *Id.* Mature trees lost to extreme weather cannot be replaced with trees of equal age. Even so, what trees should be replanted? Are trees that are more resilient to new temperature or rainfall conditions more resilient and suitable? Cultural landscapes require assessments in different time periods, both long and short term views.

The feared extreme and frequent flooding will not be confined to the coasts, but may include riverine flooding like that which nearly destroyed the historic Ellicott City, Maryland, twice in as many years. It is predominantly a 19th Century mill town dating to 1772, with more than 200 18th century and 19th century buildings. The town was listed on the National Register of Historic Places in 1978. The Ellicott City Station is a National Historic Landmark within the city. Many of the historic buildings were damaged in the 2016 flood.[161] The first event, in 2016, was called a one-in-a thousand year event. But remarkably, less than two years later, the same area observed even more rain in another event.[162] Once the water found its way to the river, water levels along the Patapsco River near the city skyrocketed. In under 3 hours, the river rose over 16.5 feet to a new record high of 24.36 feet from 4:15 to 5:30 pm; the river rising nearly 3 feet every 15 minutes, going from no record to major flood stage in a little over an hour. In a world of climate extremes rainfall amounts have increased and are likely to increase further. Heavy downpours are increasing across the country, but especially in the Midwest and northeast. From 1958 to 2012, there has been a 71% increase in the amount of precipitation that falls during very heavy events.

Superstorm Sandy in 2011 wreaked unheard of damage to New York City's people, infrastructure and historic monuments alike.[163] The massive recovery efforts prompted the state and local governments to think about their planning and development policies and laws and to prioritize their historic and cultural heritage.[164] Cultural heritage will need to be singled out

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[161] NOAA, *supra* note 5; *See* Jeff Halverson, *The Second 1000-Year Engulfed Ellicott City. Here's How it Happened,* Washington Post (May 28, 2018), https://www.washingtonpost.com/news/capital-weather-gang/wp/2018/05/28/the-second-1000-year-rainstorm-in-two-years-engulfed-ellicott-city-heres-how-it-happened/.

[162] *Id.*

[163] While the Statue of Liberty still stood when Sandy abated, other historic structures that could not evacuate were hit hard. The Fraunces Tavern, a gathering place for revolutionary war-era patriots (George Washington, Alexander Hamilton, John Adams) flooded and the electrical system corroded from salt water intrusion. The Palmer Tennis House in Rye, the third oldest indoor court in the country lost its roof and its truss system weakened. Green-Wood Cemetery, a National Historic Landmark and the resting place of many luminaries (Leonard Bernstein, Horace Greeley, eight victims of the Triangle Shirtwaist Factory Fire) lost many trees and felt damage to the Breithaupt Mausoleum. The Lehigh Valley Barge, the only surviving all-wooden example of the Hudson River Railroad Barge, had ripped planking and walkways and sheathing. Lookout Hill, a centerpiece of the 1870 Prospect Park, designed by Fredrick Law Olmsted and Calvert Vaux (who also designed New York City Central Park) lost more than 500 trees and suffered severe damage to wooded slopes. The historic South Street Seaport was all but disintegrated. *See Governor Cuomo Announces $6.2 Million in Grants for Historic Properties Damaged By Superstorm Sandy,* STATE OF N.Y. (Aug. 4, 2015), https://www.governor.ny.gov/news/governor-cuomo-announces-62-million-grants-historic-properties-damaged-superstorm-sandy.

[164] *See* John Travis Marshall & Ryan Max Rowberry, *Urban Wreckage and Resiliency: Articulating A Practical Framework for Preserving, Reconstructing and Building Cities*, 50 IDAHO L. REV. 49 (2014); *see also* Shelby D. Green, *Zoning Neighborhoods for Resilience: Drivers, Tools and Impacts*, 28 FORDHAM ENVTL. L. REV. 41 (2016); Shelby D. Green, *Building Resilient Communities in the Wake of Climate Change While Keeping Affordable Housing Safe from See Changes in Nature and Policy*, 54 WASHBURN L.J. 527 (2015).

as a priority in land use planning at the landscape scale. If this is not done now, communities are likely to fail to observe change caused by climate change that is outside normal ranges before the damage is irreparable.[165]

IX. PROTECTION FROM CLIMATE CHANGE BY EVASION

Stopping the floods and the torrents of rain happens only in the fairy tales, where there are sentient demons and omnipotent saviors. In the present world, lacking both (climate happens and is erratic), protection of cultural property must be adaptive and may involve a form of retreat. It may embrace radical new thinking about conservation. Mark Twain's home in Hartford and Thomas Edison's lab in New Jersey, may need to be moved.

A. Traditional Theories of Preservation

The traditional scientific thought is that monuments should be preserved *in situ*, that is, where they stand. This is important for preserving context, which gives significance to the monument. While most historic preservation ordinances embrace preservation and conservation aims, it may be useful to note the slight difference between the two as we explore effective responses to the looming threats identified above. Preservation usually signifies keeping a structure in its original form—no new materials, paint, windows, footprint. Conservation seems to embrace these, but also seems to impose some obligation to protect from loss and damage—from neglect, intentional acts and now from effects of time and nature, so far as possible. Both aim to safeguard the physical fabric from loss and depletion, based on the belief that material culture possesses important scientific and aesthetic information as well as the power to inspire memory and emotional responses. These values are realized by maintaining the integrity of the structure—of form, composition, or context. It is generally accepted that abandoned buildings, particularly in hostile climates, decay more rapidly than one that is used regularly. Professor Frank G. Matero, explains:

> Beginning with the Sixth International Congress of Architects in Madrid in 1904 and later with the creation of the Charter of Athens following the International Congress of Restoration of Monuments (1931), numerous attempts have been made to identify and codify a set of universal principles to guide the conservation and interpretation of structures and sites of historic and cultural significance. Despite their various emphases and differences, all these documents identify the conservation process as one

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[165] *See generally* Robert Z. Melnick, *Climate Change and Landscape Preservation: A Twenty-First Century Conundrum*, 40 APT BULL. 35 (2009).

> governed by absolute respect for the aesthetic, historic, and physical integrity of the structure or place and requiring a high sense of moral responsibility. Implicit in these principles is the notion of cultural heritage as a physical resource that is at once valuable and irreplaceable and an inheritance that promotes cultural continuity in a dynamic way.[166]

The Charter for the Protection and Management of the Archaeological Heritage,[167]states that

> "[t]he overall objective of archaeological heritage management should be the preservation of monuments and sites *in situ*, including proper long-term conservation and curation of all related records and collections etc. Any transfer of elements of the heritage to new locations represents a violation of the principle of preserving the heritage in its original context. This principle stresses the need for proper maintenance, conservation and management. It also asserts the principle that the archaeological heritage should not be exposed by excavation or left exposed after excavation if provision for its proper maintenance and management after excavation cannot be guaranteed."[168]

This principle is "based on the recognition of the importance of the interplay between the site, its story and its context."[169] Preservation of historic artifacts *in situ* is preferred "because the site of a historic event is authentic, context defines significance, heritage is finite," but "many sites cannot be preserved in situ."[170]

Archeologists have long realized that certain imperatives—the demands of economic development and private acquisitiveness, have forced monuments to be moved. Professor Lipe states:

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[166] Frank G. Matero, *Heritage, Conservation, and Archaeology: An Introduction*, ARCHAEOLOGICAL INST. OF AM. (June 18, 2008), available at https://www.archaeological.org/news/hca/89.

[167] INT'L COUNCIL ON MONUMENTS AND SITES, *Charter for the Protection and Management of the Archaeological Heritage* (1990), https://www.icomos.org/charters/arch_e.pdf (Prepared by the International Committee for the Management of Archaeological Heritage (ICAHM) and approved by the 9th General Assembly in Lausanne in 1990).

[168] *Id.* at art. 6.

[169] EUSEBIO DIZON ET AL., MANUAL FOR ACTIVITIES DIRECTED AT UNDERWATER CULTURAL HERITAGE: GUIDELINES TO THE ANNEX OF THE UNESCO 2001 CONVENTION 20 (Thijs J. Maarleveld, Ulrike Guérin & Barbara Egger eds., 2013).

[170] *Id.*

> It seems inevitable that population growth, economic development, and elite acquisitiveness will pose enormous threats to the in situ archaeological record throughout the world during the 21st century. The protective infrastructure created in the 20th century is in most places inadequate to cope with the magnitude of these threats, but it offers a base upon which to build. Although there surely will be huge losses, there are also some aspects of economic growth that may create contexts for at least partially effective responses. Those dedicated to archaeological conservation must redouble their efforts to strengthen protective laws and public policies, to expand public involvement in archaeological conservation, and to direct their energies toward preserving and studying archaeological sites rather than engaging in struggles among groups that approach conservation from different perspectives. Archaeologists must be conservative in their own uses of the archaeological record, so that future research can continue to build on prior work. And we must do a better job of conserving those archaeological sites and materials that are put on public display in parks and monuments, even as the demand for access to these sites rapidly increases.[171]

While the risks of being located along the coasts are great in an era of climate change, the preservation of monuments up high and inland is also challenged by other climate effects—extreme heat, drought, waterlogging from torrential rains --as well as the deliberate destructive acts of belligerents—think Palmyra, the Buddhas.

X. FORWARD-THINKING: DISASTER PLANNING AND PRESERVATION BY ADAPTIVE REUSE

As climate change and its effects are undeniable, at least to some, the world is responding. What seems to make the most sense is comprehensive disaster planning—one that includes components for protecting not only humans, but our monuments as well. FEMA has adopted comprehensive disaster planning guides for communities at risk.[172] Relevant to the issues in this paper is its guide for historic properties. The guide stresses the need for an initial assessment of the harm presented by a disaster, then what

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[171] William D. Lipe, *Conserving the In Situ Archaeological Record*, CONSERVATION PERSP. (Getty Conservation Inst., Los Angeles, Cal.), Spring 2000, at 17, 20, available at http://www.getty.edu/conservation/publications_resources/newsletters/pdf/v15n1.pdf

[172] FED. EMERGENCY MGMT. AGENCY, FEMA 386-6, INTEGRATING HISTORIC PROPERTY AND CULTURAL RESOURCE CONSIDERATIONS INTO HAZARD MIGRATION PLANNING (2005) [hereinafter FEMA 386-6], available at https://www.fema.gov/pdf/fima/386-6_Book.pdf.

historic properties lie in the path of catastrophic rains, wind, earthquakes,[173] then the development of a specific plan for historic property, which might exist alongside or be incorporated into a larger municipal comprehensive plan. FEMA specifies using GIS technology[174] to help locate and catalog and map such properties. In the guide, FEMA reminds planners of the particular issues associated with historic structures—those owing to "vernacular historic construction methods,"[175]meaning that some historic buildings built without the aid of an architect or engineer can sometimes better withstand damage from certain types of disasters than modern construction techniques. This is because their essential structural system may be better able to sustain lateral vibration and pressures than buildings constructed more recently.[176]

A. Adaptive Reuse Options for Preserving in Place

While a church may no longer be used for weekly services, it may be ideal for special occasions, such as weddings, study classes or community gatherings. Many shuttered factories can be redeployed as affordable housing or office complexes.[177]

The energy required to move a building could be put into caring for it *in situ*. A local community group with the guidance of a conservation management plan, might provide documentation, weekend working bees, signage, or manage designated open days. Use by sympathetic groups or individuals may help to preserve a place. Isolated locations are popular as artists' or writers' retreats and provide welcome shelter for naturists and hikers.

B. Property-Specific Measures for Preserving Historic Properties in Place

Property-specific, meaning reconfiguring or fortifying the property against the forces of nature, are being considered as the next set of important measures. At the core of these adaptation measures is the notion that we must have regard for what and how we build—requiring, among other

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[173] *Id.*

[174] *Id.* at 2-6, to 2-8, 2-28.

[175] *Id.* at 2-3.

[176] For example, a 19th century stone or brick masonry bank barn in the mid-Atlantic region is reinforced with heavy timber contains high structural capacity. Others were able to withstand the seismic force of an earthquake by dissipating it throughout a larger area of the building, such as houses built in the San Francisco Bay Area during the 19th century. *Id.*

[177] In San Francisco, the Clocktower Building, formerly a factory, is now used as New York loft-style apartments. The former Jessie Street Substation is now the Contemporary Jewish Museum, which presents a brilliant blue, steel cubic structure against a historic brick façade. The former Arc Light Company Station B building is now a sleek glass structure inserted into the original masonry building. "Adaptive reuse enables buildings with great bones to enjoy new life." *Adapt, Transform, Reuse*, S.F. BAY AREA PLAN. & URBAN RESEARCH (SPUR) (July 4, 2013), https://www.spur.org/publications/urbanist-article/2013-07-04/adapt-transform-reuse.

things, fortified infrastructure and buildings that meet stringent standards and codes to improve housing quality for resiliency to extreme weather; [178] as well as land filling to raise elevations for new development to protect against flooding. Elevation provides the best protection from flood damage short of relocating the property to an area that is less prone to flooding. Next to demolition and relocation, elevation is the method most favored by FEMA for reducing flood damage to a building. In fact, some communities are now requiring the elevation of buildings that have been substantially damaged and buildings that are being substantially renovated. A substantial renovation is a measure of the cost of repairs relative to the market value of the structure before improvement or damage; the maximum threshold value under FEMA guidelines is 50% and could be as low as 25 to 40% in some communities.[179] In the wake of Hurricane Sandy, New York City amended its building codes to require compliance with FEMA flood insurance program and to incorporate FEMA guidelines into buildings and codes, imposing stricter requirements for increased elevation.[180]

While elevations reduce safety risks and damage to structures, they can be costly and risky, and also may alter the original characteristics of historic structures. Raising a structure may alter the landscape—the vistas created by the original setting by adding non-original features, such as stairs and stilts. It may alter the appearance and scale, disrupt the building's relationship with surrounding buildings and if it requires steps, it may lead to a new setback, thereby changing the historical orientation and relationships to surroundings. If the structure is fragile, then raising it runs the risk of physical damage to it. Elevating an historic structure may also render it inaccessible to many unable to navigate a steep set of stairs, thereby excluding a large segment of the society from a cultural resource.

Elevation might also entail moving the structure upland. The same issues about views and landscapes are raised. The locational context might be compromised as the structure is relocated, even for a short distance.

The story of the preservation of the Farnsworth House, located in Plano, Illinois is a very interesting case. The Farnsworth House is a modernist structure designed by Ludwig Mies van der Rohe in 1945 and completed in 1951. It was designated as a National Historic Landmark in 2006 and transitioned to National Trust for Historic Preservation as a stewardship site

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[178] URBAN GREEN COUNCIL, *supra* note 33.

[179] Patricia Skinner, *Elevation Provides the Best Protection*, LA. ST. UNIV. COLL. OF AGRIC. (June 2, 2016), https://www.lsuagcenter.com/topics/family_home/home/design_construction/design/remodeling%20renovation/preventing%20flood%20damage/elevating%20moving%20home/elevation-provides-the-best-protection.

[180] *See Id.* The four main components of the stricter building codes pertain to the lowest floor; enclosures; materials and utilities and equipment.

in 2010.[181] Although Mies van der Rohe designed the home on stilts to avoid damage in case of flooding, in recent years, there have been disastrous "100-year floods" that have inundated the home three times over the last 18 years, smashing the large plate-glass windows, with over five feet of water inside. Faced with either moving the home or undertaking some invasive preventative measures, the National Trust for Historic Preservation developed a plan that included aspects of both, using a set of hydraulic jacks and a sizable hole in the ground. The Farnsworth house would be temporarily moved so that a pit could be dug underneath it, and then put back, atop hydraulic jacks able to lift it above any abnormally high flood waters. The proposal is estimated to cost from $2.5M to $3M.[182]

Floodproofing includes the introduction of foundation dampers, water channeling devices, and filling basements with sand or gravel, tying hurricane clips to the roof to metal connectors, and replacing deteriorated original foundations of unreinforced masonry with brick with a new foundation, with concrete footings, with steel ties.[183] Significantly, site-specific adaptation measures include the removal of critical systems to ceiling levels or at least to Base Flood Elevation.[184]

C. Land-Specific Measures for Preserving Historic Properties in Place

1. Beach Nourishment

Beach nourishment has become the dominant beach policy management in some coastal states, particularly Florida since the 1980s. This response to sea level rise has not been without challenge, by landowners who claim an intrusion of property rights,[185] and by environmental groups who are concerned about the environmental impacts.[186] The property rights claims relate to loss of view and of land by the dunes created by nourishment. The

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[181] Ashley R. Wilson & Jenna Cellini Bresler, *Farnsworth House Flood Mitigation, The Search for a Flood Solution*: *Keeping History Above Water*, NAT'L TR. FOR HIST. PRES. (Oct. 30, 2017), http://historyabovewater.org/wp-content/uploads/2017/04/Ashley-Wilson-and-Jenna-Bresler.pdf .

[182] Spencer Peterson, *Inside the Plan to Save Mies Van Der Rohe's Farnsworth House*, CURBED (Apr. 30, 2014), https://www.curbed.com/2014/4/30/10107328/mighty-mies. For more on accessibility of historic structures, *see* Thomas C. Jester and Sharon C. Park , 32 PRESERVATION BRIEFS, Making Historic Properties Accessible, https://www.nps.gov/tps/how-to-preserve/preservedocs/preservation-briefs/32Preserve-Brief-Accessible.pdf.

[183] FEMA 386-6, *supra* note 172, at 3-13, 3-15.

[184] *See* FEMA, Base Flood Elevation, https://www.fema.gov/base-flood-elevation

[185] Borough of Harvey Cedars v. Karan, 70 A.3d 524 (N.J. 2013) (ruling that in takings claim based on loss of view from beach nourishment dunes, non-speculative, reasonably calculable benefits that increase the property's value at the time of the taking—such as shielding the property from destruction by storm surges—should be considered in determining just compensation regardless of whether those benefits are enjoyed to a lesser or greater degree by others in the community).

[186] *See generally* Thomas K. Ruppert, *Eroding Long-Term Prospects for Florida's Beaches: Florida's Coastal Construction Control Line Program*, 1 SEA GRANT L. & POL'Y J. 65, 66–67 (2008).

environmental concerns relate to impacts on sea life, such as sea turtles, as well as to marine ecosystems generally, including coral reefs.[187]

Professor Thomas K. Ruppert claims that the efficacy of beach nourishment is not certain, as severe storms can undo the replenished area,[188] raising questions about the financial feasibility of nourishment[189]— the federal government is estimated to have contributed about $ 680 million to nourishment in Florida through 2002, not including emergency funding after hurricanes for dune construction and not including the large amount of nourishment and federal funding provoked by the active hurricane seasons of 2004 and 2005. He states that "Through the fiscal year 2006, over $ 582 million has been appropriated by the [Florida] Legislature for beach erosion control activities and hurricane recovery." Local governments also spend considerable funds for beach nourishment, and even private parties spend substantial funds trying to keep sand on the beach. In the end, it is not even certain that there is enough sand for nourishment.[190]

2. Living Seawalls and Gates

Adaptation measures, though conceding to the inexorable push of nature, are yet defensive. In the case of precious property located along the coast, defensive measures aim to minimize wave action, reduce erosion, and protect against storm surge. This "armoring" or "grey" infrastructure, includes seawalls, tide gates, and levees. Alternatively, "green," infrastructure measures, such as salt marsh restoration and the creation of new offshore reefs, are employed. Scientists now believe that in the face of rising seas, hard armoring can actually exacerbate coastal erosion and beach loss, diminishing both the protective function of natural shorelines and the beaches we treasure. In addition, by bouncing waves back into the ocean, seawalls can harm local wildlife and increase the impacts of storms. In any case, hard armoring usually does not protect against infiltration of saltwater from below,[191] which may have deteriorating effects on historic structures.

XI. *EX SITU* PRESERVATION

When holding back the sea is not feasible, removing the structure to a new place may be the only way to preserve it. There are both practical and legal constraints against this approach. Some monuments, carved into a mountain cannot be moved. The removal of the Abu Simbel temple in

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[187] *Id.* at 72.

[188] *Id.* at 72, 97.

[189] ROBERT E. DEYLE, FLA. ST. U., SEA LEVEL RISE ADAPTATION OPTIONS FOR LOCAL GOVERNMENTS (2012) (stating nourishment can cost $4.3 million per mile and require repetition every two to six years).

[190] Ruppert, *supra* note 186, at 73; *see also* FLA. STAT. § 161.144 (2018) (declaring that the Florida Legislature recognizes that the sand resources are an "exhaustible resource").

[191] Spanger-Siegfried et al., *supra* note 4, at 42.

Egypt, discussed below, was an unusual feat. Houses and lighthouses may be more manageable physically, but the legal constraints may be formidable.

A. Limits on Removal of Historic Structures by National Park Service Protections

Under the NHPA, the NPS maintains the National Register of Historic Places, and is also responsible for identifying NHLs. The NPS has promulgated criteria that must be satisfied for listing on the register and for recognition as an NHL. There are four general criteria. Criterion A reflects association with events that have made a significant contribution to broad patterns of history, whether single events, a series of activities, or trends. Criterion B is applied to property that is associated with the lives of persons significant in our past. Generally, the property should be illustrative, rather than commemorative, of the individual's achievements. Under Criterion C, a property may be determined significant for its architecture, landscape architecture, engineering or artwork. As such, it must either "embody distinctive characteristics of a type, period, or method of construction," or "represent the work of a master," or "possess high artistic value," or "represent a significant and distinguishable entity whose components may lack individual distinction." Finally, a property may be eligible for the National Register under Criterion D if it has yielded, or is likely to yield, information that is important in prehistory or history. Usually, Criterion D is appropriate for the assessment of archaeological sites, but it may also apply to buildings, objects or structures.[192] In addition, the property must evince integrity—of location, design, setting, materials, workmanship, feeling, and association.[193]

The NPS also has adopted criteria for the treatment of historic property.

> Preservation: "…[T]he act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to

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[192] *See* U.S. DEP'T OF INTERIOR, NAT'L PARK SERV., NATIONAL REGISTER BULLETIN: HOW TO APPLY THE NATIONAL REGISTER CRITERIA FOR EVALUATION (1995), https://www.nps.gov/nr/publications/bulletins/nrb15/Index.htm [hereinafter HOW TO APPLY CRITERIA].

[193] *See* U.S. DEP'T OF THE INTERIOR, NAT'L PARK SERV., NATIONAL REGISTER BULLETIN: HOW TO COMPLETE THE NATIONAL REGISTER REGISTRATION FORM (1997).

> make properties functional is appropriate within a preservation project."
>
> Rehabilitation: "…[T]he act or process of making possible an efficient use for a property through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values."
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> Restoration: "…[T]he act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project."
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> Reconstruction: "…[T]he act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location."[194]

Some buildings that are relocated can satisfy these requirements even though no longer situated at their original location.[195] Section 60.14 (Criteria for evaluation) states:

> Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories: . . . (b) A building or structure removed from its original location which is significant primarily for architectural value, or

[194] 36 C.F.R. § 68.2(a)–(d) (2018). The NPS has also promulgated specific regulations that apply to the rehabilitation of historic properties which must be satisfied to be eligible for Historic Tax Credit; *see generally* 36 C.F.R. § 67 (2018).

[195] 36 C.F.R. § 60.4 (2018).

> which is the surviving structure most importantly associated with a historic person or event . . . .

Section 60.14 (b), provides that, "Properties listed in the National Register should be moved only when there is no feasible alternative for preservation. When a property is moved, every effort should be made to reestablish its historic orientation, immediate setting, and general environment."[196]

While the regulations provide that "[a] property removed from its original or historically significant location can be eligible if it is significant primarily for architectural value or it is the surviving property most importantly associated with a historic person or event,"[197] they however caution that moving a property destroys the relationships between the property and erases or upsets the connection to those events or persons that make the property historic, through the loss of landscaping and foundations and risks the disturbance of associated archeological deposits.[198] Achieving the primary purpose of the National Register of preserving historic properties "as living parts of their communities," may mean moving buildings to artificial groupings, but this may destroy the integrity of location and setting, and can create a false sense of historic development, even though it might otherwise be useful for purposes of interpretation, protection and maintenance.[199] The NPS gives a number of examples of movements that may impact eligibility for listing through the loss of historic features: moving a property from one location on its original site to another location on the property, during or after its period of significance; moving many resources from their original location; moving a portable resource, such as a ship or railroad car, to a place incompatible with its original function away from a place that is critically linked to its historic location or route.[200] But, properties that are moved prior to their period of significance; or a portable resource, such as a ship or railroad car, that is moved within its natural setting (water, rails, etc.), or a property that is raised or lowered on its foundations, may be eligible.[201] A moved property significant under Criteria A or B must be demonstrated to be the surviving property most importantly associated with a particular historic event or an important aspect of a historic person's life, that is, most closely associated with the event or with the part of the person's life for which he or she is significant.[202] In this meaning, a moved building occupied by an business woman during the

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[196] 36 C.F.R. § 60.14(b) (2018).
[197] HOW TO APPLY CRITERIA, *supra* note 192, at 29.
[198] *Id.*
[199] *Id.*
[200] *Id.*
[201] *Id.*
[202] *Id.* at 30.

majority of her productive career would be eligible if the other extant properties are a house she briefly inhabited prior to her period of significance.[203] Likewise, a moved building associated with the beginning of rail transportation in a community is not eligible if the original railroad station and warehouse remained intact on their original sites.[204] The Bulletin explains that "moved properties must still have an orientation, setting, and general environment that are comparable to those of the historic location and that are compatible with the property's significance."[205] This means that a property that is an exemplar of a mid-19th century rural house type can be eligible after a move, so long as it is placed on a lot of a size and character that recalls the basic qualities of the historic time and surroundings.[206] A rural house that is moved out of its context to an urban area and a bridge to dry land would fail this requirement.[207] The significance of such structures is so dependent on the site, that any move will cause the property to lose its integrity and prevent it from conveying its significance.[208] In other words, moving a farm structure that is significant only as an example of the type of construction found in the local area could be moved within that local area if the new setting is similar to that of the original location, but a "19th century rural residence that was designed around particular topographic features, reflecting that time period's ideals of environment, is not eligible if moved."[209]

The regulations also address the special category of properties that were designed to be moved or one frequently moved during its historic use, such as automobiles, railroad cars and engines, and ships. These must be located in a historically appropriate setting in order to retain integrity of setting, design, feeling, and association. Thus, a ship docked in a harbor, a locomotive on tracks or in a railyard, and a bridge relocated from one body of water to another are eligible. By the same token, "a ship on land in a park, a bridge placed in a pasture, or a locomotive displayed in an indoor museum are not eligible."[210]

An artificially created grouping of buildings, structures, or objects is not eligible unless it has achieved significance since the time of its assemblage. This is so because the assemblage would not be revealing the conditions at the time of construction, but an image created to mimic the true conditions; moving a temporally unconnected structure to one place or associating parts

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[203] HOW TO APPLY CRITERIA, *supra* note 192, at 30.
[204] *Id.*
[205] *Id.*
[206] *Id.*
[207] HOW TO APPLY CRITERIA, *supra* 192.
[208] *Id.*
[209] *Id.* at 31.
[210] *Id.* at 31.

of structures to a new building or place causes a loss integrity of design, setting, materials, workmanship, and location.[211]

As the guidance from these regulations make plain, integrity has a primacy seemingly above all else. It has long been the view of preservationists that moving a historic building should be taken as a last resort. While technology and great care in handling may minimize injury to the physical integrity of the structure, there may yet be losses of the building's integrity of context, i.e., the natural features which surround it, the immediate landscape, and its place within a cultural setting; loss to its original district; the elimination of one element in the composition of the neighborhood. Indeed, the building relocated may not fit within the new location; but may be regarded as an intrusion in the new surroundings.

The overriding goal of preservation is to protect from dissipation historic buildings, structures, sites and objects. Also important is supporting historic properties for continued use. In some circumstances, both goals can be accomplished by moving a building to a site where it may be better utilized, generate income, and be carefully maintained all the while retaining its significant historic associations. The NPS believes that the addition of new materials or to the design of historic properties, need not necessarily result in the loss of its historic character. [212] Working with experienced preservation architects, can ensure that new materials are well-integrated and do not obscure historic design elements.[213]

Economic benefits which derive from the continued use of the original materials, savings in labor, and capitalizing upon the value of land, are all obvious justifications for preserving in place. The losses from relocation (economic and social) are equally glaring: risk of fabric erasure; opposition by the general public (including both old and new neighbors); the threat of ineligibility for or delisting from the National Register; and the associated costs (direct expenses, plus resultant disqualification from rehabilitation tax credits). Yet, in numerous cases, relocations of an historic building has spared significant historic resources for use and appreciation by future generations. Even the Secretary of the Interior recognizes that, when other options have failed, moving a threatened building may be necessary in order to save it, as demonstrated by several of the cited examples.[214]

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[211] *Id.*

[212] Anne E. Grimmer and Kay D. Weeks, Technical Preservation Services, Preservation Brief 14, New Exterior Addition to History Buildings: Preservation Concerns, https://www.nps.gov/tps/how-to-preserve/briefs/14-exterior-additions.htm. (Recognizing that attaching a new exterior addition usually involves some degree of material loss to an external wall of a historic building, but it should be minimized.)

[213] *Id*.

[214] *See* U. Dep't of Interior, *Moving Historic Buildings* (1979), https://www.nps.gov/tps/how-to-preserve/preservedocs/Moving-Historic-Buildings.pdf; *see also* Picture This: Moving the Otis Mason House https://savingplaces.org/stories/picture-this-moving-the-otis-mason-house#.XQblq4hKg2w (recounting a move of an historic house to save it).

B. Relocating Out of Harm's Way: Abu Simbel

While the international movement for protecting heritage coalesced after the world wars, one event that aroused particular international concern during peacetime was the decision to build the Aswan High Dam in Egypt, which promised to flood the valley containing ancient treasures, the Abu Simbel temples. In 1959, UNESCO made an appeal to the governments of Egypt and Sudan to save the temples, then launched an international campaign which involved dismantling and moving the temples to dry ground.[215] In 1954, an international committee of experts determined that a new dam over the Nile River was necessary to facilitate greater farm operations in order to produce sufficient food for the growing Egyptian population.[216] A dramatic rise in population pressed for increased food production and abundant electricity. President Nasser determined that land reclamation was an integral part of the nation's agronomic policy. That same economic necessity meant the destruction of the historic relics. The old dam had ceased to be effective in controlling the flooding. A new dam would also generate electricity to support industrial activity in the nation.[217]

When the new dam was proposed, experts predicted that it would back up the Nile for more than 400 miles into Egypt and over 300 miles into Sudan, covering the area known as lower Nubia. Nubia had been the site of at least six different civilizations between 3800 B.C. and 600 A.D. The dam threatened the site and the numerous artifacts found there, including the famous temples of Abu Simbel and Philae Island, situated in the Nile River.[218] These temples were culturally significant because of their historical method of construction and their detailed artistic features. They were hewn into the side of a mountain. One chamber reached as far as 61 meters.

The international rescue efforts saved the temples of Abu Simbel and Philae Island as well as twenty other Nubian temples. To encourage nations to participate in these efforts, Egypt offered to allow the removal of six temples and half of artifacts discovered, with some exceptions.[219] To relocate the temples, they had to be cut into pieces and put together again on new sites. Twenty-six countries participated directly in the excavation and

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[215] Kanchana Wangkeo, *Monumental Challenges: The Lawfulness of Destroying Cultural Heritage during Peacetime*, 28 YALE J. INT'L L. 183, 207 (2003).The campaign cost about $80 million, half of which was donated by some fifty countries.

[216] Before dams, farmers could plant but once per year after the Nile had flooded and left behind its rich silt. A new dam would enable farmers to plant three crops instead of just one. *Id.* at 202.

[217] *Id.* at 203. .

[218] Abu Simbel, one of six temples erected in Nubia during the reign of Ramses II, consists of two massive rock temples—the larger one in honor of Egypt's then three state deities and features four large statues of Ramses and the smaller, dedicated to the goddess Hathor, as personified by Nefertari, Ramses' wife. The temples are believed to have been carved out of the mountainside during 13th century BC, as a lasting monument to Ramses and his queen and to intimidate his Nubian neighbors. *Id.* at 205–209.

[219] *Id.* at 206.

preservation efforts and forty-seven countries contributed a total of $25.5 million, while private individuals and groups donated $7.5 million.[220]

Construction on the Aswan High Dam started in 1960 and was completed after eleven years in 1971. It is 3600 meters long and 111 meters high. It has 12 turbines, which generate over 10 billion kilowatts of electricity every year.

Because they were hewn out of single pieces of stone, the temples had to be sawed into more than 3,000 ten to forty-ton blocks. The reassembled monument is 65 meters higher and 200 meters back from the river on an artificial hill made from a domed structure. The removal and reassembly of the temple is considered by many to be one of the most remarkable feats of archaeological engineering.

C. Relocating On-site: Lighthouses

One of the most famous moves of lighthouses involved the one on Cape Hatteras, North Carolina, a National Historic Landmark. The relocation of the lighthouse was not without contention.[221] There were alternative avenues for protecting the lighthouse, including the installation of various barriers to abate the shoreline's erosion, the construction of new seawall, ultimately creating an island for the structure.

Cape Hatteras lighthouse was completed in 1870 and located at a distance thought safe from the ocean, 1,500 feet from the ocean. Over time, storm-driven tides caused erosion of the shore and the gradual westward migration of the Outer Banks put the lighthouse at just 120 feet from the ocean's edge. Before a relocation was decided upon, a type of barrier was considered: a "floating foundation," yellow pine timbers were placed in fresh water on compacted sand, with a brick and granite foundation on top of them. This would work as long as the sand surrounding the foundation remained in place, and the timbers remained bathed by the fresh water in which they were placed in 1868. But, if a storm eroded the sand or the fresh water was disturbed by saltwater intrusion, the timbers would rot and the foundation would eventually fail. Another measure considered was installing sheetpile "groins" (walls built perpendicular to the shore) to try to protect the tower. When these were not successful in holding back the encroaching tides, efforts to stabilize the coast by beach nourishment and new groins were tried, but failed. In 1987, when the lighthouse was only 630 feet from the shore, the National Park Service began planning for relocation, after rejecting the construction of additional seawalls. Many more years of debate and opposition occurred. In 1996, based upon the recommendation of the North Carolina State University, the NPS managers began the planning and funding process to move the lighthouse. Funding

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[220] *Id.* at 208.

[221] MOVING AMERICA'S LIGHTHOUSE (Naka Productions 2000).

was finally appropriated by Congress beginning in fiscal year 1998. NPS hired the International Chimney Corp. of Buffalo, New York, aided by Expert House Movers of Maryland, among other contractors for the project. The relocation meant moving the 4,830 ton structure by lifting it off its foundation, transferring the load to a transport system, moving the tower along a prepared move route, and installing it on the new foundation. [222]

> [T]he original foundation . . . was replaced by temporary shoring beams and supports. Then a steel beam mat was inserted over the timber mat with temporary posts on top, as cross beams and main… After it was lifted, the tower moved along to its new location 2,900 feet to the southwest on steel mats starting on June 17, 1999. Steel track beams became rails and roller dollies permitted the support frame to move along the track. Three zones of hydraulic jacks kept the lighthouse aligned. Push jacks, clamped to the track pulled the frame forward 5 feet at a time. The lighthouse was equipped with sixty automated sensors to measure the transfer of the load, tilt, vibration, and shaft diameter. A weather station was installed at the top to monitor wind speed and temperature. The Principal Keeper's Quarters, Double Keepers' Quarters, oil house, cisterns, and sidewalks, which were moved during February, March, and April, awaited the lighthouse. On July 9, 1999 the lighthouse was carefully placed onto its new foundation, which … consists of a 60' x 60' steel-reinforced concrete slab 4 feet deep, 5 feet of brick, and 1 1/2 to 2 feet of rock. The light station was whole once again with all the buildings being in the same relative position as they were originally.[223]

The lighthouse, thus moved, stood approximately 1600 feet away from its original spot, the same relative distance from the ocean when it was built. The original site was restored, but marked by stones that revealed the spot where lighthouse was originally constructed outlining the circle beneath which lay the old foundation.[224]

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[222] *Moving the Cape Hatteras Lighthouse*, NAT'L PARKS SERV., https://www.nps.gov/caha/learn/historyculture/movingthelighthouse.htm (last updated Apr. 14, 2015)

[223] *Id.*

[224] In December 2012, it was reported "The land on which the [Gay Head] light tower [in Massachusetts] is situated [was] eroding at a rate of nearly two feet per year and only 50 feet remained between the tower and the approaching cliffs. A buffer of thirty feet was needed to move the lighthouse. Over a three-day period in May 2015, after a concrete pad at the new site had been prepared, the tower was moved to its new foundation. International Chimney Corporation, which moved Sankaty Head Lighthouse on Nantucket in 2007, Highland Lighthouse and Nauset Lighthouse

XII. THE SECOND BEST THING: VIRTUALITY AND DIGITIZATION.

The Colosseum still stands, but like all things, it has proven susceptible to the ravages of time and wear. Short of rebuilding, preservation strategies may be limited to verbal narratives and visual technology. In 2013, the European Union under the FP7 PEOPLE research framework, funded the "Initial Training Network for Digital Cultural Heritage ["CH"]: Projecting our Past to the Future" with the acronym ITN-DCH. It was the first and one of the largest Marie Curie fellowship projects in the area of the e-documentation/e-preservation and CH protection funded by the European Union. The Project started on the 1st of October 2013 and its consortium comprising of fourteen full partners and ten associate members covering the entire spectrum of European CH actors, ranging from academia, research institutions, industry, museums, archives and libraries. The project aimed to train twenty fellows (500 person months) in the area of CH digital documentation, preservation and protection in order to create a strong academic profile and market oriented skills which will significantly contribute to their career prospects. The consortium and the fellows training program is supported by a prestigious advisory board. ITN-DCH aims, for the first time worldwide, to analyze, design, research, develop and validate an innovative multi-disciplinary and inter-sectorial research training framework that covers the entire lifecycle of digital CH research for a cost–effective preservation, documentation, protection and presentation of cultural heritage. CH is touted as "an integral element of Europe and vital for the creation of a common European identity and one of the greatest assets for steering Europe's social, economic development and job creation." ITN-DCH will cover all aspects of CH ranging from tangible (books, newspapers, images, drawings, manuscripts, uniforms, maps, artefacts, archaeological sites, monuments) to intangible content (e.g., music, performing arts, folklore, theatrical performances) and their inter-relationships. The project aims to boost the added value of CH assets by re-using them in real application environments (protection of CH, education, tourism industry, advertising, fashion, films, music, publishing, video games and TV) through research on (i) new personalized, interactive, mixed and augmented reality enabled e-services, (ii) new recommendations in data acquisition, (iii) new forms of representations (3D/4D) of both tangible /intangible assets and (iv) interoperable metadata forms that allow easy data exchange and archiving.

Among the partners on this project is the National Technical University of Athens, Laboratory of Materials Science and Engineering (LMSE), of the

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on Cape Cod in 1996, and Cape Hatteras Lighthouse, supervised the relocation and employed the services of Expert House Movers. Gay Head Lighthouse, Massachusetts at Lighthousefriends.com." *Gay Head Lighthouse*, LIGHTHOUSE FRIENDS, http://www.lighthousefriends.com/light.asp?ID=627 (last visited Apr. 7, 2019).

School of Chemical Engineering, which has set about the task of preserving ancient historic monuments and has six main areas of research focus:

> (a) the use of sustainable materials and construction technologies aiming to increase the lifetime of infrastructure and monuments (b) the impact assessment of environmental loads on structures (c) the implementation of integrated diagnosis of the decay of building materials using high measuring techniques (d) the planning of interventions for the protection of monuments using compatible materials and techniques (e) the application of quality control of building materials and works for sustainable construction (f) the strategic planning for the protection of cultural heritage and integrated environmental management for the protection of monuments using GIS. The development of expert systems providing scientific support on decision making on management of monuments and historic buildings, using intervention necessity indices and risk thresholds.[225]

Other schools have developed programs in photogrammetry and geodesy and geoinformatics, geoengine;[226] and virtual archaeology.[227] The visualization group at the University of Warwick states:

> The Visualisation team, ... is working to create "Real Virtuality": high fidelity virtual environments which provide the same perceptual response from viewers as if they were actually present, or 'there' in the real scene being portrayed (also known as there-reality). A human's perception of the real world is more than just what we see, and thus real virtuality may need to include visual, aural, smell, touch and even taste, to achieve the appropriate level of perceptual realism. Real virtuality has applications in many fields. In particular, cultural heritage: Computer reconstructions of heritage sites provide us with a means of visualising past environments, allowing us a glimpse of the past that might otherwise be difficult to appreciate. However, it is essential that these reconstructions

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[225] *Marie Curie Initial Training Network on Digital Cultural Heritage*, available on DocPlayer, http://docplayer.net/47994142-Marie-curie-initial-training-network-on-digital-cultural-heritage-our-story.html (last visited Apr.13, 2019).

[226] *See generally,* University of Stuttgart, www.uni-stuttgart.de/.

[227] *See generally*, University of Murcia,. https://www.um.es/en/web/digitalmed/contenido/centro/conocenos/presentacion.

> incorporate all the physical evidence for a site, otherwise there is a very real danger of misrepresenting the past.[228]

The Competence Center for Cultural Heritage Digitization, Darmstadt, Germany focuses on:

> (a) Fast and economic digitization technologies for an accurate virtual reproduction of heritage objects. (b) State-of-the-art scanning and lighting technologies to capture the exact geometry, texture, and optical material properties and, (c) the CultLab3D project - the world's first automatic modular 3D digitization pipeline – which focuses mostly on the digitization of three-dimensional artifacts in 3D with millimeter accuracy in an automated process. [229]

For a photo-realistic rendering of the objects, their geometry, texture and optical material properties are incorporated. By automating the entire scanning process, the aspect of fast and efficient 3D mass digitization is implemented for the first time.[230]

XIII. CONCLUSION

Historic structures and cultural heritage define a people and societies. As the writer, Milan Kundera states, "[t]he first step in liquidating a people … is to erase its memory. Destroy its books, its culture, its history…"[231] This is what the Croatians set out to do during the Bosnian Conflict, what the Nazis did in Poland, what the Allies did in Dresden. The threats from climate change are no less demoralizing than the deliberate acts of belligerents. While it takes armies to repel other armies, it may take an army of resolve, planning and effort to preserve and keep safe that which makes us human. But, given a rapidly changing world with such ominous portents, our monuments may need to remind us of ourselves from another vantage.

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[228] *Visualisation Research*, UNIV. OF WARWICK, https://warwick.ac.uk/fac/sci/wmg/research/visualisation/research. (last visited Apr. 13, 2019).

[229] CULTLAB3D, www-old.igd.fraunhofer.de/en/Institut/Abteilungen/Digitalisierung-von-Kulturerbe (available in English at, www.cultlab3d.de/) (last visited on Apr. 13, 2019).

[230] *Id.*

[231] Milan Kundera, GOODREADS, https://www.goodreads.com/quotes/7636634-the-first-step-in-liquidating-a-people-said-hubl-is (last visited Apr. 7, 2019).