



- ANNEX -



WHITE PAPER

Cultural Heritage and Climate Change: New challenges and perspectives for research



March 2022

JPI Cultural Heritage & JPI Climate



Annex I

REFERENCES

SECTION 1

- Allam, Z.; Jones, D., 2019. Climate Change and Economic Resilience through Urban and Cultural Heritage: The Case of Emerging Small Island Developing States Economies, *Economies*, Volume 7, Issue 62. DOI: 10.3390/economies7020062
- Anderson, D.G.; Bissett, T.G.; Yerka, S.J.; Wells J.J.; Kansa E.C.; Kansa S.W.; Noack Myers K.; DeMuth R.C.; White D.A., 2017. Sea-level rise and archaeological site destruction: an example from the southeastern United States using DINAA (digital index of north American archaeology). *PLoS One*. DOI: 10.1371/journal.pone.0188142
- Barr S., Cultural Heritage, or How Bad News Can Also Be Good In The Interconnected Arctic – Uarctic Congress 2016 pp 43-57. DOI: 10.1007/978-3-030-05523-3_4
- Barr S., 2019 Cultural Heritage, or How Bad News Can Also Be Good. In: Sellheim N., Zaika Y., Kelman I. (eds) Arctic Triumph. Springer Polar Sciences. Springer, Cham.
- Barr, B.W., 2017. "An ounce of Prevention is Worth a Pound of Cure", *Resources*, 6(2), p.18. DOI: 10.3390/resources6020018
- Bayliss, P. and Ligtermoet, E., 2018. Seasonal habitats, decadal trends in abundance and cultural values of magpie geese (*Anseranus semipalmata*) on coastal floodplains in the Kakadu Region, northern Australia. *Marine and Freshwater Research*, 69(7), pp.1079-1091. DOI: 10.1071/MF16118
- Bertolin, C., 2019. Preservation of Cultural Heritage and Resources Threatened by Climate Change In *Geosciences*, Volume: 9, Issue: 6, 250. DOI: 10.3390/geosciences9060250
- Brewer, J. and Riede, F., 2018. Cultural heritage and climate adaptation: a cultural evolutionary perspective for the Anthropocene In *World Archaeology*, Volume 50, Issue 4. DOI: 10.1080/00438243.2018.1527246
- Brimblecombe, P., Hayashi, M. and Futagami, Y., 2020. Mapping Climate Change, Natural Hazards and Tokyo's Built Heritage, *Atmosphere*, 11(7), p.680. DOI: 10.3390/atmos11070680
- Britton, K., & Hillerdal, C, 2021. Archaeologies of Climate Change: Perceptions and Prospects, *Études/Inuit/Studies*, 2019, Volume 43, Issues 1/2, pp.265-288.
Retrieved May 26, 2021, from <https://www.jstor.org/stable/26945913>
- Carmichael, B., Wilson, G., Namarnyilk, I., Nadji, S., Brockwell, S., Webb, B., Hunter, F. and Bird, D., 2018. Local and Indigenous management of climate change risks to archaeological sites, *Mitigation and adaptation strategies for global change*, 23(2), pp.231-255. DOI: 10.1007/s11027-016-9734-8
- Casey, A. and Becker, A., 2019. Institutional and conceptual barriers to climate change adaptation for coastal cultural heritage, *Coastal Management*, 47(2), pp.169-188. DOI: 10.1080/08920753.2019.1564952
- Claudia, T. and Luigi, P., 2016. A novel paradigm to achieve sustainable regeneration in Historical Centres with Cultural Heritage, *Procedia - Social and Behavioral Sciences*, Volume 223, 2016, pp.693-697. DOI: 10.1016/j.sbspro.2016.05.243



- Coelho, G.B., Silva, H.E. and Henriques, F.M., 2020. Impact of climate change in cultural heritage: From energy consumption to artefacts' conservation and building rehabilitation, *Energy and Buildings*, 224, p. 110250. DOI: 10.1016/j.enbuild.2020.110250
- Daly C., 2014. A framework for assessing the vulnerability of archaeological sites to climate change: theory, development, and application, *Conservation and Management Archaeological Sites*, 16(3), pp.268–282. DOI: 10.1179/1350503315Z.00000000086
- Dastgerdi, A.S., Sargolini, M. and Pierantoni, I., 2019. Climate change challenges to existing cultural heritage policy, *Sustainability*, 11(19), p. 5227. DOI: 10.3390/su11195227
- Fatorić, S. and Seekamp, E., 2017. Securing the future of cultural heritage by identifying barriers to and strategising solutions for preservation under changing climate conditions, *Sustainability*, 9(11), p. 2143. DOI: 10.3390/su9112143
- Fatorić, S., Seekamp, E., 2018. A measurement framework to increase transparency in historic preservation decision-making under changing climate conditions, *Journal of Culture Heritage*, 30, pp.168-179. DOI: 10.1016/j.culher.2017.08.006
- Gandini, A., Egusquiza, A., Garmendia, L., San-Jose, J.-T., 2018. Vulnerability assessment of cultural heritage sites towards flooding events. IOP Conf. Ser. Mater. Sci. Eng. 364, p.012028. DOI: 10.1088/1757-899X/364/1/012028
- Ghahramani, L., McArdle, K. and Fatorić, S., 2020. Minority community resilience and cultural heritage preservation: A case study of the gullah geechee community, *Sustainability*, 12(6), p.2266. DOI: 10.3390/su12062266
- Goldberg, J., Birtles, A., Marshall, N., Curnock, M., Case, P. and Beeden, R., 2018. The role of Great Barrier Reef tourism operators in addressing climate change through strategic communication and direct action, *Journal of Sustainable Tourism*, 26(2), pp.238-256. DOI: 10.1080/09669582.2017.1343339
- Graham, E., Hambly, J., Dawson, T., 2017. Learning from loss: eroding coastal heritage in Scotland, *Humanities*, 6, 87. DOI: 10.3390/h6040087
- Haugen, A., Bertolin, C., Leijonhufvud, G., Olstad, T. and Broström, T., 2018. A methodology for long-term monitoring of climate change impacts on historic buildings, *Geosciences*, 8(10), p.370. DOI: 10.3390/geosciences8100370
- Henderson, J., 2019. Oceans without History? Marine Cultural Heritage and the Sustainable Development Agenda, *Sustainability*, Volume 11, Issue 18. DOI: 10.3390/su11185080
- Henderson, M. and Seekamp, E., 2018. Battling the tides of climate change: The power of intangible cultural resource values to bind place meanings in vulnerable historic districts, *Heritage*, 1(2), pp.220-238. DOI:10.3390/heritage1020015
- Holtorf C, Conservation and Heritage As Creative Processes of Future-Making In International Journey of Cultural Property, May 2020, Volume 27, Special Issue 2: Authenticity and Reconstruction, pp.277-290. DOI: 10.1017/S0940739120000107
- ICOMOS Climate Change and Heritage Working Group, 2019. The Future of Our Past: Engaging Cultural Heritage in Climate Action. ICOMOS.
- IPCC, 2014. IPCC Fifth Assessment Report (AR5). WGII: Impacts, Adaptation and Vulnerability.
- Jahed, N., Aktas, Y., Rickaby, P. and Bilgin Altinoz, A.G., 2020. Policy Framework for Energy Retrofitting of Built Heritage: A Critical Comparison of UK and Turkey, *Atmosphere*, Volume 11, Issue 6, Article 674. DOI: 10.3390/atmos11060674
- Kelman, I. and Næss, M.W., 2019. Climate change and migration for Scandinavian Saami: a review of possible impacts, *Climate*, 7(4), p.47. DOI:10.3390/cli7040047



- Kittipongvises, S., Phetrak, A., Rattanapun, P., Brundiers, K., Buizer, J.L. and Melnick, R., 2020. AHP-GIS analysis for flood hazard assessment of the communities nearby the world heritage site on Ayutthaya Island, Thailand, *International Journal of Disaster Risk Reduction*, 48, p.101612. DOI: 10.1016/j.ijdrr.2020.101612
- Kohler, T.A.; Rockman, M., 2020. The IPCC: A Primer for Archaeologists, *American Antiquity*, Volume 85, Issue 4, pp.627-651. DOI: 10.1017/aaq.2020.68
- Lafrenz Samuels, K., 2017. Introduction-New Challenges for Cultural Heritage: Supporting Biodiversity in the Face of Climate Change, *Culture, Agriculture, Food and Environment*, Volume 39, Issue 2. DOI: 10.1111/cuag.12099
- Leissner J., Kilian R., Kotova L., Jacob D. et al, 2015. Climate for culture: assessing the impact of climate change on the future indoor climate in historic buildings using simulations, *Heritage Sciences*, 3(1), 38. DOI: 10.1186/s40494-015-0067-9
- Mosoarca, M., Onescu, I., Onescu, E., Azap, B., Chieffo, N. and Szitar-Sirbu, M., 2019. Seismic vulnerability assessment for the historical areas of the Timisoara city, Romania. *Engineering Failure Analysis*, 101, pp.86-112. DOI: 10.1016/j.engfailanal.2019.03.013
- National Heritage Science Forum, 2021. Heritage Science and Societal Challenges: a blueprint for action. Report. National Heritage Science Forum. Available at: https://www.heritagescienceforum.org.uk/documents/NHSF_SocietalChallenges_Blueprint.pdf
- Oakes, R., 2019. Culture, climate change and mobility decisions in Pacific Small Island Developing States, *Population and Environment*, 40(4), pp. 480-503. DOI: 10.1007/s11111-019-00321-w
- Ombati, M., 2019. Ethnology of Select Indigenous Cultural Resources for Climate Change Adaptation: Responses of the Abagusii of Kenya. In *Climate Change, Disasters, Sustainability Transition and Peace in the Anthropocene* (pp.125-151). Springer, Cham. DOI: 10.1007/978-3-319-97562-7_6
- Orr, S.A., Richards, J. and Fatorić, S., 2021. Climate Change and Cultural Heritage: A Systematic Literature Review (2016–2020), *The Historic Environment: Policy & Practice*, Vol. 12(3-4), pp.1-43.
- Pomeroy, A., 2016. Understanding the place of intangible cultural heritage in building enduring community resilience: Murupara case study. *New Zealand Sociology*, 31(7), p.183. DOI: 10.3316/informit.561353969321388
- Powell, R.B., Ramshaw, G.P., Ogletree, S.S. and Krafte, K.E., 2016. Can heritage resources highlight changes to the natural environment caused by climate change? Evidence from the Antarctic tourism experience. *Journal of Heritage Tourism*, 11(1), pp. 71-87. DOI: 10.1080/1743873X.2015.1082571
- Rajčić, V., Skender, A. and Damjanović, D., 2018. An innovative methodology of assessing the climate change impact on cultural heritage. *International Journal of Architectural Heritage*, 12(1), pp.21-35. DOI: 10.1080/15583058.2017.1354094
- Reimann, L., Vafeidis, A.T., Brown, S., Hinkel, J. and Tol, R.S., 2018. Mediterranean UNESCO World Heritage at risk from coastal flooding and erosion due to sea-level rise, *Nature communications*, 9(1), pp.1-11. DOI: 10.1038/s41467-018-06645-9
- Rick, T.C.; Sandweiss, D.H., 2020. Archaeology, climate, and global change in the Age of Humans, *Proceedings of the National Academy of Sciences of the United States of America* (PNAS). DOI: 10.1073/pnas.2003612117
- Rockman, M. and Hritz, C., 2020. Expanding use of archaeology in climate change response by changing its social environment. *Proceedings of the National Academy of Sciences*, 117(15), pp.8295-8302. DOI: 10.1073/pnas.1914213117
- Samuels, K.L., 2016a. The cadence of climate: Heritage proxies and social change, *Journal of Social Archaeology*, Volume: 16, Issue 2, pp.142-163. DOI: 10.1177/1469605316639804



Samuels, K.L., 2016b. Transnational turns for archaeological heritage: From conservation to development, governments to governance, *Journal of Field Archaeology*, Volume 41, Issue 3, pp.355-367. DOI: 10.1080/00934690.2016.1174031

Seekamp, E. and Jo, E, 2020. Resilience and transformation of heritage sites to accommodate for loss and learning in a changing climate, *Climatic Change*, Volume 162, pp.41-55. DOI: 10.1007/s10584-020-02812-4

Serdeczny, O.M.; Bauer, S.; Huq, S., 2018. Non-economic losses from climate change: opportunities for policy-oriented research, *Climate and Development*, Volume 10, Issue 2. DOI: 10.1080/17565529.2017.1372268

Sesana, E., Bertolin, C., Gagnon, A.S. and Hughes, J.J., 2019. Mitigating climate change in the cultural built heritage sector, *Climate*, 7(7), p.90. DOI: 10.3390/cli7070090

Sharifi, A., 2016. A critical review of selected tools for assessing community resilience, *Ecological indicators*, 69, pp.629-647. DOI: 10.1016/j.ecolind.2016.05.023

St Amand, F.; Childs, S.T.; Reitz, E.J.; Heller, S.; Newsom, B.; Rick, T.C.; Sandweiss, D.H.; Wheeler, R., 2020. Leveraging legacy archaeological collections as proxies for climate and environmental research, *PNAS*, Volume 117, Issue 15, pp.8287-8294. DOI: 10.1073/pnas.1914154117

Stephenson, V. and D'Ayala, D., 2014. A new approach to flood vulnerability assessment for historic buildings in England, *Natural Hazards and Earth System Sciences*, 14(5), pp.1035-1048. DOI: 10.5194/nhess-14-1035-2014

Xiao, X., Seekamp, E., Eaton, M., Van der Burg, M.P., Fatorić, S., McCreary, A., 2019. Optimising historic preservation under climate change: decision support for cultural resource adaptation planning in National Parks, *Land Use Pol.*, 83, pp.379-389. DOI: 10.1016/j.landusepol.2019.02.011

SECTION 2.1

Cassar, M. (2005). Climate Change and the Historic Environment. Centre for Sustainable Heritage, University College London, London. Electronic document, <http://discovery.ucl.ac.uk/2082/1/2082.pdf>.

Climate for Culture 2017 Climate for Culture. Electronic document, <https://www.climateforculture.eu/index.php?inhalt=home>.

Erlandson J.M. (2008). Racing a Rising Tide: Global Warming, Rising Seas, and the Erosion of Human History. *The Journal of Island and Coastal Archaeology* 3:167–169. 2012
As the World Warms: Rising Seas, Coastal Archaeology, and the Erosion of Maritime History. *Journal of Island Conservation* 16:137–142.[Google Scholar](#)

Hambrecht, G., & Rockman, M. (2017). International Approaches to climate change and Cultural Heritage. *American Antiquity*, 82(4), 627-641. doi:10.1017/aaq.2017.30

Harvey, D. & Perry J. (2015). *The Future of Heritage as Climates Change: Loss, Adaptation and Creativity*. Routledge, New York.[Google Scholar](#)

Hollesen, J., Matthiesen, H., Fenger-Nielsen, R. (2019). Predicting the loss of organic archaeological deposits at a regional scale in Greenland. *Sci Rep* 9, 9097 <https://doi.org/10.1038/s41598-019-45200-4>

ICOMOS, (2019). *The Future of Our Past: Engaging Cultural Heritage in Climate Action, Heritage and Climate change outline*.

<https://www.icomos.org/en/focus/climate-change/59522-icomos-releases-future-of-our-pasts-report-to-increase-engagement-of-cultural-heritage-in-climate-action>

IPCC (2013). *Climate Change 2013, The Physical Science Basis. Summary for Policymakers*. A report of Working Group I of the IPCC. Intergovernmental Panel on Climate Change, 22 p. https://www.ipcc.ch/site/assets/uploads/2018/03/WG1AR5_SummaryVolume_FINAL.pdf

Markham, A., Wiser, J. (2015). A Heritage Coalition's Call to Action' on Climate Change and Cultural Heritage. In *Forum Journal*, 29:19–23. National Trust for Historic Preservation. Electronic document, http://muse.jhu.edu/journals/forum_journal/v029/29.4.markham.html.

Rockman, M. (2012). The Necessary Roles of Archaeology in Climate Change Mitigation and Adaptation. In *Archaeology in Society: Its Relevance in the Modern World*, edited by

Rockman M. & Hritz C. (2020). Expanding use of archaeology in climate change response by changing its social environment. *PNAS, Special Feature Perspective*, 14, 2020 117 (15) 8295-8302, <https://www.pnas.org/content/117/15/8295>

Sabbioni C., Brimblecombe P., Cassar M. eds. (2012), *The Atlas of Climate Change Impact on European Cultural Heritage* (Anthem Press, London, 2012).[Google Scholar](#)

Sesana E., Gagnon A.S., Ciantelli C., CassarJ, Hughes J.J. (2021) 1Climate change impacts on cultural heritage: A literature review. *WIREs Climate Change*, 12-4, <https://onlinelibrary.wiley.com/doi/10.1002/wcc.710>

Union of Concerned Scientists 2015 *The Pocantico Call to Action on Climate Impacts and Cultural Heritage*. Electronic document, <http://www.ucsusa.org/sites/default/files/attach/2016/04/Pocantico-Call-to-Action-on-Climate-Impacts-Cultural-Heritage-4-11-2016.pdf>

SECTION 2.2

Barnikel F., 2004: The value of historical documents for hazard zone mapping, *Natural Hazards and Earth System Sciences*, Vol.4, No.4, 599-613 DOI: [10.5194/nhess-4-599-2004](https://doi.org/10.5194/nhess-4-599-2004)

Bulteau T., Idier D., Lambert J., Garcin M., 2015: How historical information can improve estimation and prediction of extreme coastal water levels: application to the Xynthia event at La Rochelle (France). *Nat. Hazards Earth Syst. Sci.*, Vol. 15, pp 1135-1147 <https://doi.org/10.5194/nhess-15-1135-2015>

Chuine, I., Yiou, P., Viovy, N., Daux V., Seguin B., Le Roy Ladurie E., 2004. Grape ripening as a past climate indicator. *Nature*, 432, 289–290 <https://doi.org/10.1038/432289a>

Climate for Culture European Project, 2009-2014: Damage risk assessment, economic impact and mitigation strategies for sustainable preservation of cultural heritage in times of climate change, European Project <https://www.climateforculture.eu>

Daux, V., 2013 : Reconstruction du climat à partir de la composition isotopique de l'oxygène et du carbone des cernes d'arbres, *La Météorologie*, 80, 14-22.

Day, J.C., Heron, S.F., Markham, A., 2020: Assessing the climate vulnerability of the world's natural and cultural heritage. *Parks Stewardship Forum* 36(1): 144–153, <https://escholarship.org/uc/ps/>

Fatorić, S. & Egberts, L., 2020: Realising the potential of cultural heritage to achieve climate change actions in the Netherlands, *Journal of Environmental Management*, 274, 11.

IPCC, 2007: 4th Assessment Report, Geneva, 103 p.

IPCC, 2014: 5th Assessment Report Geneva, 161 p.

GAINS: The Greenhouse Gas and Air Pollution Interactions and Synergies, <http://gains.iiasa.ac.at/H>

Gomez-Heras, M., McCabeb, S., 2015: Weathering of stone-built heritage: A lens through which to read the Anthropocene, *Anthropocene*, 11, 1-13, <http://dx.doi.org/10.1016/j.ancene.2015.12.003>

Harkin, D., Hyslop, E., Hazel, H., Tracey, E., 2019: A Guide to Climate Change Impacts on Scotland's Historic Environment, *Historic Environment Scotland*, Longmore House, Edinburgh, 54 p. www.historicenvironment.scot/impacts-guide

ICOMOS Climate Change and Cultural Heritage Working Group. 2019: The Future of Our Past: Engaging Cultural Heritage in Climate Action, July 1, 2019. Paris: ICOMOS, 110 p. <https://openarchive.icomos.org/id/eprint/2459/>

Ionescu, A., Lefèvre, R.-A., Brimblecombe, P., Grossi, C.M., 2012: Long-term damage to glass in Paris in a changing environment, *Science of the Total Environment*, 431, 151-156.

IPCC, 2007: 4th Assessment Report, Geneva, 103 p.

IPCC, 2014: 5th Assessment Report Geneva, 161 p.

Lefèvre, R.-A., 2014: The impact of climate change on slow degradation of monuments in opposition to extreme events, in: *Climate Change as a Threat to Peace: Impacts on Cultural Heritage and Cultural Diversity*, Sabine von Schorlemer & Sylvia Maus (eds.), Technische Universität Dresden, Peter Lang (Publ.), 83-100.

Lefèvre, R.-A., 2021: The French Cultural Heritage facing Global Climate Change, ICOMOS Int., 95 p. <http://openarchive.icomos.org/id/eprint/2412/>

Leissner, J., Kilian, R., Kotova, L., Jacob, D., Mikolajewicz, U., Broström, T., Ashley-Smith, J., Schellen, H.L., Martens, M., van Schijndel, J., Antretter, F., Winkler, M., Bertolin, C., Camuffo, D., Simeunovic, G,

Vyhlídal, T., 2015: Climate for Culture: assessing the impact of climate change on the future indoor climate in historic buildings using simulations. *Herit. Sci.*, 3, 38, doi:10.1186/s40494-015-0067-9

Lipfert, F.W., 1989: Atmospheric Damage to Calcareous Stones. Comparison and reconciliation of recent experimental findings, *Atmospheric Environment*, 23, 415-429.

Markham, A., Osipova, E., Lafrenz Samuels, K., Caldas, A., 2016: World Heritage and Tourism in a Changing Climate. *United Nations Environment Programme, Nairobi, Kenya, Union of Concern Scientists, Cambridge, USA and United Nations Educational, Scientific and Cultural Organization, Paris, France*, 104 p. <http://whc.unesco.org/document/139944>

MULTI-ASSESS Project, 2002-2005: Model for MULTI-pollutant impact and ASSESSment of threshold levels for cultural heritage, www.corr-institute.se/MULTI-ASSESS

Noah's Ark European Project, 2003-2007: Global Climate Change Impact on Built Heritage and Cultural Landscapes, European Project <http://noahsark.isac.cnr.it/deliverables.php>

Rockman, M., Morgan, M., Ziaja, S., Hambrecht, G., Meadow, A., 2016: Cultural Resources Climate Change Strategy, *US National Park Service, Washington DC*, 60 p., www.nps.gov/climatechange

Sabbioni, C., Brimblecombe, P., Cassar, M., 2010: The Atlas of climate change impact on European cultural heritage, London, Anthem Press, 160 p.

Sesana, E., Gagnon, A.-S., Ciantelli, C., Cassar, J., Hughes, J.-J., 2021: Climate change impacts on cultural heritage: A literature review, *Wires Climate change*, 29 p., Wiley online library, <https://doi.org/10.1002/wcc.710>

Teruel, C., Fatoric, S., Manders, M., 2020: The impacts of climate change on cultural heritage in the Netherlands: A preliminary assessment of exposure, <https://repository.tudelft.nl/islandora/object/uuid:73f6506d-c07e-481a-8f43-735a5ea87a43?collection=research>

Tidblad, J., Kucera, V., Henriksen, A.A., Kreislova, K., Yates, T., 2001: UN-ICP Materials: dose-response functions on dry and wet acid deposition effects over 8 years of exposure, *Water, Air, Soil Pollution*, 130, 1457-1462.

UN-ICP Materials Programme, 1997-2001: International Co-operative Programme on Effects on Materials including Historic and Cultural Monuments, www.coor-institute.se/icp-materials/web/page.aspx

UNESCO-WHC, 2007: Climate change and World Heritage. Report 22 on predicting and managing the impacts of climate change on World Heritage and Strategy to assist States Parties to implement appropriate management responses, <https://whc.unesco.org/uploads/activities/documents/activity-397-1.doc> <http://whc.unesco.org/fr/series>

SECTION 2.3

Carmichael, B., Wilson, G., Namarnyilk, I., Nadji, S., Cahill, J., Brockwell, S., Webb, B., Bird, D., & Daly, C. (2020) A Methodology for the Assessment of Climate Change Adaptation Options for Cultural Heritage Sites. *Climate* 8:88

Casey, A., Becker, A. (2019) Institutional and conceptual barriers to climate change adaptation for coastal cultural heritage. *Coast Manage* 47(2):169-188

CHERISH (2021) Climate Change and Coastal Heritage. Retrieved from [Home - CHERISH \(cherishproject.eu\)](#)

Daly, C., C. Engel-Purcell, C. Chan, J. Donnelly, M. MacDonagh & Cox, P., 2020. Climate Change Adaptation Planning, a National Scale Methodology, *Journal of Cultural Heritage Management and Sustainable Development*. <https://doi.org/10.1108/JCHMSD-04-2020-0053>

Daly, C., Fatorić, S., Carmichael, B., Hollesen, J., Pittungnapoo, N., Adetunji, O., Nakhaei, M., & Herrera, A., 2021. Climate change adaptation policy and planning for cultural heritage in low- & middle-income countries, *Antiquity*. Submitted.

Dawson, T., Hambly, J., Kelley, A., Lees, W., & Miller, S., 2020. Coastal heritage, global climate change, public engagement, and citizen science, *PNAS*, 117(15), pp.8280-8286.

Dawson, T., Nimura, C., López-Romero, E. & Daire, M.Y., 2017. Public Archaeology and Climate Change. Oxbow Books, Oxford & Philadelphia.

Fatorić, S. & Biesbroek, R., 2020. Adapting cultural heritage to climate change impacts in the Netherlands: Barriers, interdependencies and strategies for overcoming them, *Climatic Change*, 162(2), pp.301-320.

Fatorić, S., Seekamp, E., 2017a. Are cultural heritage and resources threatened by climate change? A systematic literature review, *Climatic Change* 142(1), pp.227-254.

Fatorić, S., Seekamp, E., 2017b. Securing the future of cultural heritage by identifying barriers to and strategising solutions for preservation under changing climate conditions, *Sustainability*, 9, p.2143.

Fatorić, S., Seekamp, E., 2017c. Evaluating a decision analytic approach to climate change adaptation of cultural resources along the Atlantic Coast of the United States, *Land Use Policy*, 68, pp.254-263.

Fusco Girard, L., Gravagnuolo, A., 2017. Circular Economy and Cultural Heritage/ Landscape regeneration. Circular business, financing and governance models for a competitive Europe, *Bollettino Del Centro Calza Bini*, 17(1), pp.35-52.

HERACLES n.d. Heritage Resilience Against Climate Events on Site
Retrieved from: [Heracles Project \(heracles-project.eu\)](#)

Holtorf, C., 2018. Embracing change: how cultural resilience is increased through cultural heritage, *World Archaeology*, 50(4), pp.639-650.

ICOMOS Climate Change and Cultural Heritage Working Group (2019) The Future of Our Past: Engaging Cultural Heritage in Climate Action. Paris: ICOMOS Available at <https://indd.adobe.com/view/a9a551e3-3b23-4127-99fd-a7a80d91a29e>

Intergovernmental Panel on Climate Change, IPCC (2014) IPCC Fifth Assessment Report: Climate Change 2014, Working Group II: Impacts, Adaptation and Vulnerability. Cambridge University Press.

Leissner, J., Kilian, R., 2015. Climate for Culture Brochure Built Cultural Heritage in Times of Climate Change. Retrieved from: 2015_ClimateforCulture_Brochure.pdf (network.uni)

Martens, V. V. 2016. *Preserving Rural Settlement Sites in Norway? Investigations of Archaeological Deposits in a Changing Climate*. PhD Thesis.



- Pian S., Regnault H., Daire M.Y., Proust J.N., Shi B., Menier D. & López-Romero E., 2011. Integration of the risk of heritage loss into the vulnerability assessment of the South Brittany coast (France): implications for coastal vulnerability analysis. EspacesTemps.net. <https://www.espacestempes.net/articles/integration-of-heritage-loss/>
- Phillips, H., 2015. The capacity to adapt to climate change at heritage sites – The development of a conceptual framework. Environmental Science and Policy 47, pp.118-125.
- Sabbioni C., Brimblecombe, P and Cassar M. (eds.), 2010. The Atlas of Climate Change Impact on European Cultural Heritage: Scientific Analysis and Management Strategies. Anthem Press.
- Sesana, E., Gagnon, A.S., Bertolin, C., & Hughes, J. (2018) Adapting cultural heritage to climate change risks: perspectives of cultural heritage experts in Europe. Geosciences 8:305
- STORM n.d. Safeguarding Cultural Heritage through Technical and Organisational Resources Management. Retrieved from: [Home - STORM Project \(storm-project.eu\)](#)

SECTION 2.4

ARCH – Saving Cultural Heritage. <https://savingculturalheritage.eu/>

Van Bavel, Bas et al, *Disasters and History: The Vulnerability and Resilience of Past Societies*, 2020.

Benzerzour, M., Masson, V., Groleau, D., Lemonsu, A.. (2011) "Simulation of the Urban Climate Variations in Connection with the Transformations of the City of Nantes since the 17th Century." *Building and Environment* 46, no. 8 (August 2011): 1545–57. DOI:[10.1016/j.buildenv.2011](https://doi.org/10.1016/j.buildenv.2011.06.001)

Bomers, A., (2020), Hydraulic modelling approaches to decrease uncertainty in flood frequency relations. Enschede. DOI:[10.3990/1.9789036549288](https://doi.org/10.3990/1.9789036549288)

Bomers, A., B. van der Meulen, R. M. J. Schielen, & S. J. M. H. Hulscher, (2019), Historic flood reconstruction with the use of an Artificial Neural Network. *Water Resources Research*, 55, 9673-9688. DOI:[10.1029/2019WR025656](https://doi.org/10.1029/2019WR025656)

Campbell, Bruce M. S. (2016), *The great transition. Climate, Disease and society in the late-medieval world*. Cambridge.

Cook Edward R. M. fl. (2015), " Old world megadroughts and pluvials during the common era", *Science Advances* 1:10.

Crumley, C. L. (2017). Historical ecology and the study of landscape, *Landscape Research*, 42(sup1), S65–S73. DOI:[10.1080/01426397.2017.1399994](https://doi.org/10.1080/01426397.2017.1399994)

Cultural Heritage Agency of the Netherlands. Heritage and Environment Project (archived – mostly in Dutch) <https://wadadminfrontend.archiefweb.eu/?iid=cec918a6-176b-4bec-98fd-e648d289fba6&ctid=4a87215f-de29-4dcf-b2d8-d43dff37a5d&caid=490ddc85-7bc7-4e4b-b2de-24d0d402686a#archive>

Cultural Heritage Agency of the Netherlands, (2018), Manual Water, Heritage and Environment. Amersfoort. https://www.cultureelerfgoed.nl/binaries/cultureelerfgoed/documenten/publicaties/2018/01/01/manual-water-heritage-and-environment/rce_manual_water_heritage_and_environment.pdf

Fatorić, S. & Egberts, L. (2020). Realising the potential of cultural heritage to achieve climate change actions in the Netherlands, *Journal of Environmental Management*, 274, 11.

Floods of the Past, Design of Tomorrow - Project Introduction. <http://dspace.library.uu.nl/handle/1874/339513>

Frischmann C.J., Mehra M., Allard R., Bayuk K., Gouveia J.P. and Gorman M.R. (2020). Drawdown's 'System of Solutions' Helps to Achieve the SDGs. In: W. Leal Filho, A. Azul, L. Brandli, A. Lange Salvia and T. Wall (Eds.), *Partnerships for the Goals. Encyclopedia of the UN Sustainable Development Goals*. Cham: Springer. DOI:[10.1007/978-3-319-71067-9_100-1](https://doi.org/10.1007/978-3-319-71067-9_100-1)

Garnier, E, (2019) *Lessons learned from the past for a better resilience to contemporary risks* DISASTER PREVENTION AND MANAGEMENT, Volume: 28 Issue: 6, Special Issue: SI Pages: 778-795

Hamdi, Y; Garnier, E; Giloy, N; Duluc, CM; Rebour, V (2018) Analysis of the risk associated with coastal flooding hazards: a new historical extreme storm surges dataset for Dunkirk, France NATURAL HAZARDS AND EARTH SYSTEM SCIENCES Volume: 18, Issue: 12 Pages: 3383-3402

Jansma, E., (2020), Hydrological disasters in the NW-European Lowlands during the first millennium AD: a dendrochronological reconstruction. *Netherlands Journal of Geosciences*, Volume 99, e11. DOI:[10.1017/njg.2020.10](https://doi.org/10.1017/njg.2020.10)



Kosian, M.C. & R.J. van Lanen, (2019), The Importance of History for Modern Climate Adaptation Strategies. *Proceedings of the 22nd International Conference on Cultural Heritage and New Technologies* 2017. Vienna. https://www.chnt.at/wp-content/uploads/eBook_CHNT22_Kosian_Lanen.pdf

Lanen, R.J. van & M.C. Kosian (2020), What wetlands can teach us: reconstructing historical water-management systems and their present-day importance through GIScience. *Water History*, Volume 12, Issue 2 (June 2020), pagina's 151–177. DOI 10.1007/s12685-020-00251-7 <http://waterheritage.nl/wp-content/uploads/2020/08/What-wetlands-can-teach-us.pdf>

Ljungqvist, FC, Seim, A, Huhtamaa, H. (2021). Climate and society in European history. *WIREs Clim Change*. 2021; 12: e691. <https://doi.org/10.1002/wcc.691>

McNeill, J.R. & Engelke P.O. (2016) *The Great Acceleration: An Environmental History of the Anthropocene Since 1945*, Cambridge (Mass.): The Belknap Press of Harvard University Press.

Rebollo, V., V. Latinos, I. Balenciaga & R. Roca., (2020), Good Practices in Building Cultural Heritage Resilience. Deliverable 7.2 ARCH Saving Cultural Heritage. https://savingculturalheritage.eu/fileadmin/user_upload/Deliverables/ARCH_D7.2_GoodPractices.pdf

Redman, C. L. & Kinzig, A. P. (2003), " Resilience of past landscapes. Resilience theory, society and the Longue Durée", *Conservation Ecology* 7(1):14.

Tierney, Kathleen J. (2014), *The social roots of risk: producing disasters, promoting resilience*. Stanford.

Toonen, W.H.J. (2013), *A Holocene flood record of the Lower Rhine*. Utrecht.

Wetfutures. Wetland Futures in Contested Environments: an inter- and transdisciplinary approach to wetland heritage in the Netherlands, United Kingdom and Ireland. <http://www.wetfutures.eu/>

Turner, S., Kinnaird, T., Koparal, E., Lekakis, S. & Sevara, C. (2021). Landscape archaeology, sustainability and the necessity of change. *World Archaeology*, <https://doi.org/10.1080/00438243.2021.1932565>

Wilkinson, K. (Ed.). (2020). *The Drawdown Review 2020. Climate Solutions for a New Decade*. Project Drawdown, International.

SECTION 2.5

- Adger, W.N., Barnett, J., Brown, K., Marshall, N. and O'Brien, K., 2013. Cultural dimensions of climate change impacts and adaptation. *Nature Climate Change*, 3(2), pp.112-117. <https://doi.org/10.1038/nclimate1666>
- Aktürk, G. and Lerski, M., 2021. Intangible cultural heritage: a benefit to climate-displaced and host communities. *Journal of Environmental Studies and Sciences*, pp.1-11. <https://doi.org/10.1007/s13412-021-00697-y>
- Ballard, C., Wilson, M., Nojima, Y., Matanik, R. and Shing, R., 2020, April. Disaster as opportunity? Cyclone Pam and the transmission of cultural heritage. In *Anthropological Forum* (Vol. 30, No. 1-2, pp.91-107). Routledge. <https://doi.org/10.1080/00664677.2019.1647825>
- Degroot, D., Anchukaitis, K., Bauch, M., Burnham, J., Carnegy, F., Cui, J., de Luna, K., Guzowski, P., Hambrecht, G., Huhtamaa, H. and Izdebski, A., 2021. Towards a rigorous understanding of societal responses to climate change. *Nature*, 591(7851), pp.539-550. <https://doi.org/10.1038/s41586-021-03190-2>
- Fatorić, S. and Egberts, L., 2020. Realising the potential of cultural heritage to achieve climate change actions in the Netherlands. *Journal of Environmental Management*, 274, p.111107. <https://doi.org/10.1016/j.jenvman.2020.111107>
- Herrmann, V.S., 2017. Culture on the move: towards an inclusive framework for cultural heritage considerations in climate-related migration, displacement and relocation policies. *Archaeological Review from Cambridge* 32(2), pp.182-196. <https://doi.org/10.17863/CAM.23647>
- Hiwasaki, L., 2017. Local Knowledge for Disaster Risk Reduction Including Climate Change Adaptation. In I. Kelman et al. (eds) *The Routledge Handbook of Disaster Risk Reduction Including Climate Change Adaptation* (pp.227-237). Routledge.
- Holtorf, C., 2018. Embracing change: how cultural resilience is increased through cultural heritage. *World Archaeology*, 50(4), pp.639-650. <https://doi.org/10.1080/00438243.2018.1510340>
- Kim, H.E., 2011. Changing climate, changing culture: adding the climate change dimension to the protection of intangible cultural heritage. *International Journal of Cultural Property*, 18(3), pp.259-290. <https://doi.org/10.1017/S094073911100021X>
- Nakashima, D. and Krupnik, I. eds., 2018. *Indigenous knowledge for climate change assessment and adaptation*. Cambridge University Press.
- O'Brien, G., O'Keefe, P., Jayawickrama, J. and Jigyasu, R., 2015. Developing a model for building resilience to climate risks for cultural heritage. *Journal of Cultural Heritage Management and Sustainable Development*, 5(2), pp.99-114. <https://doi.org/10.1108/JCHMSD-06-2013-0021>
- Sesana, E., Gagnon, A.S., Ciantelli, C., Cassar, J. and Hughes, J.J., 2021. Climate change impacts on cultural heritage: a literature review. *Wiley Interdisciplinary Reviews: Climate Change*, e710. <https://doi.org/10.1002/wcc.710>

Cover illustration:

Bryggen, the old wharf of Bergen, Norway
© Skjalg Ekeland.