Climate change and the Mediterranean Historic Cities and other sites, with a focus on UNESCO listed heritage

JoAnn Cassar

Department of Conservation and Built Heritage

University of Malta

Rotary Club Malta

6th UNESCO Cities for Peace Conference: UNESCO HISTORIC CITIES,
Sustainability and Historic Cities: Challenges and Opportunities.
Valletta, Malta, 4 to 6 April 2025.

L-Università ta' Malta

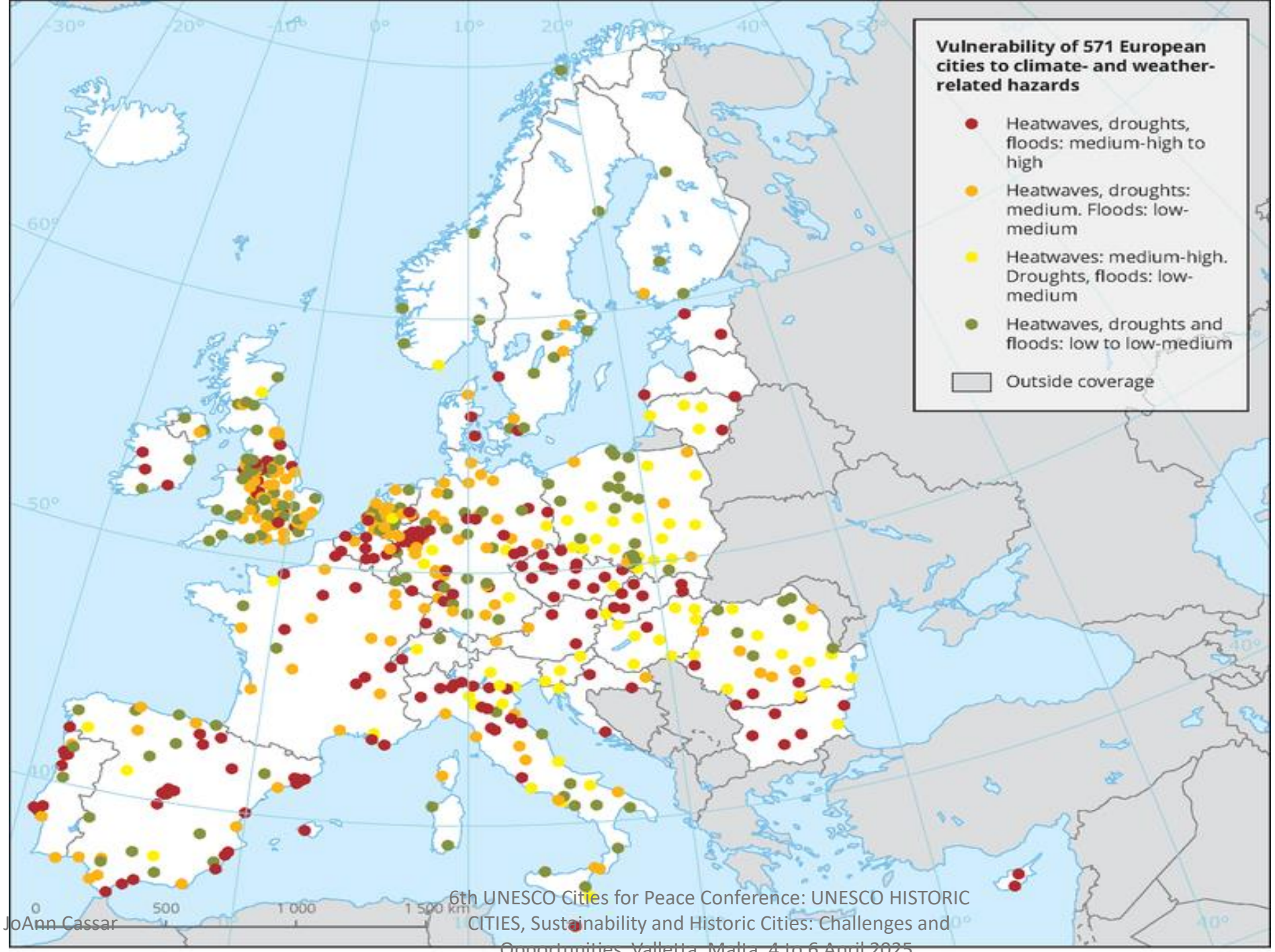
Outline of the presentation

- Threats to European cities due to climate change - heatwaves, droughts and floods
- Climate change and the Mediterranean
- Mediterranean coastal cities and sea level rise
- Mediterranean coastal UNESCO sites are vulnerable
- Slow interactions with the environment – gradually causing damage
- Threats to Heritage today
- Changing events in a changing climate
- Climate adaption – what can be done?
- Commitment and coordination are key

Threats to European cities due to climate change Heatwaves droughts and floods

- Cities shelter more than half of world's population.
- In the EU, over 75% of the population already lives within urban areas.
- It is expected that this proportion will grow up to 82% by mid-century.
- Inevitably, a large concentration of population, assets and economic activities, frequently achieved through rapid urbanisation in previous decades, implies more risks linked to the various impacts of climate change.

Tapia et al., 2017



https://www.eea.europa.eu/en/analysis/maps-and-charts/vulnerability-of-571-european-cities

© JoAnn Cassar

[illegible] Conference – UNESCO HISTORIC
[illegible] Historic Cities: Challenges and
[illegible] Valletta, Malta, 4 to 6 April 2025.

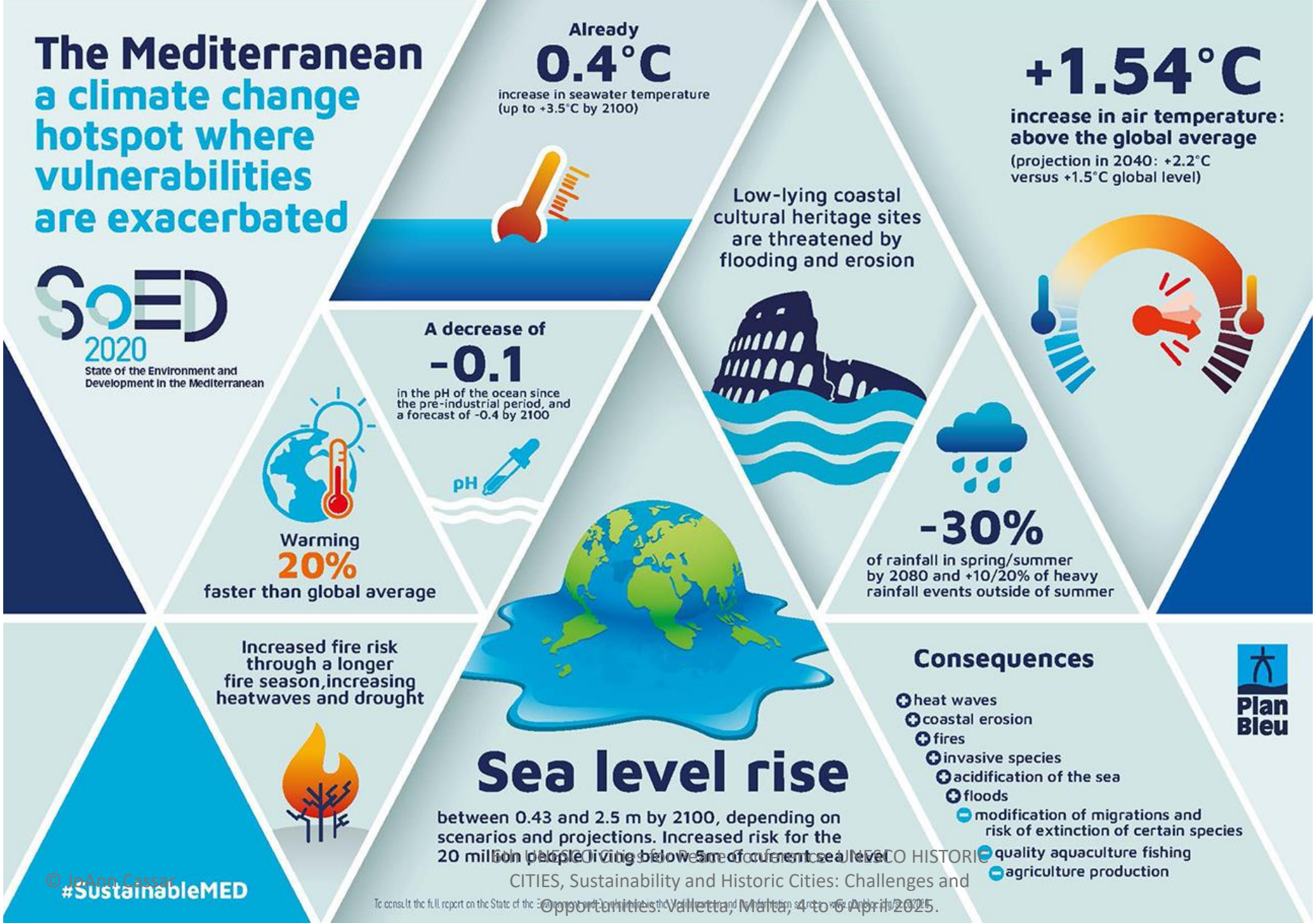
https://whc.unesco.org/en/news/2053

https://www.foxweather.com/earth-space/drought-reveals-ancient-spanish-village

Climate change and the Mediterranean

- The Mediterranean is home to more than 510 million people
- The region is warming 20% faster than the global average.
- Coastal zones face heightened disaster risks, including flooding and erosion.
- 2°C global warming will reduce precipitation by ~10 to 15%.
- An increase of 2°C to 4°C would reduce precipitation by up to 30% in Southern Europe.

https://www.unep.org/unepmap/resources/factsheets/climate-change



https://www.unep.org/unepmap/resources/factsheets/climate-change

Mediterranean coastal cities and sea level rise

- The population of Mediterranean increased from approximately 475 million inhabitants in 2010 to 512 million inhabitants in 2018.
- This represents 6.7% of the world population.
- Almost one third of the Mediterranean population lives in the coastal area and more than 70% in cities.

https://planbleu.org/wp-content/uploads/2021/04/SoED_Summary.pdf

https://www.eea.europa.eu/en/analysis/maps-and-charts/mediterranean-coastal-cities

Mediterranean coastal UNESCO sites are vulnerable

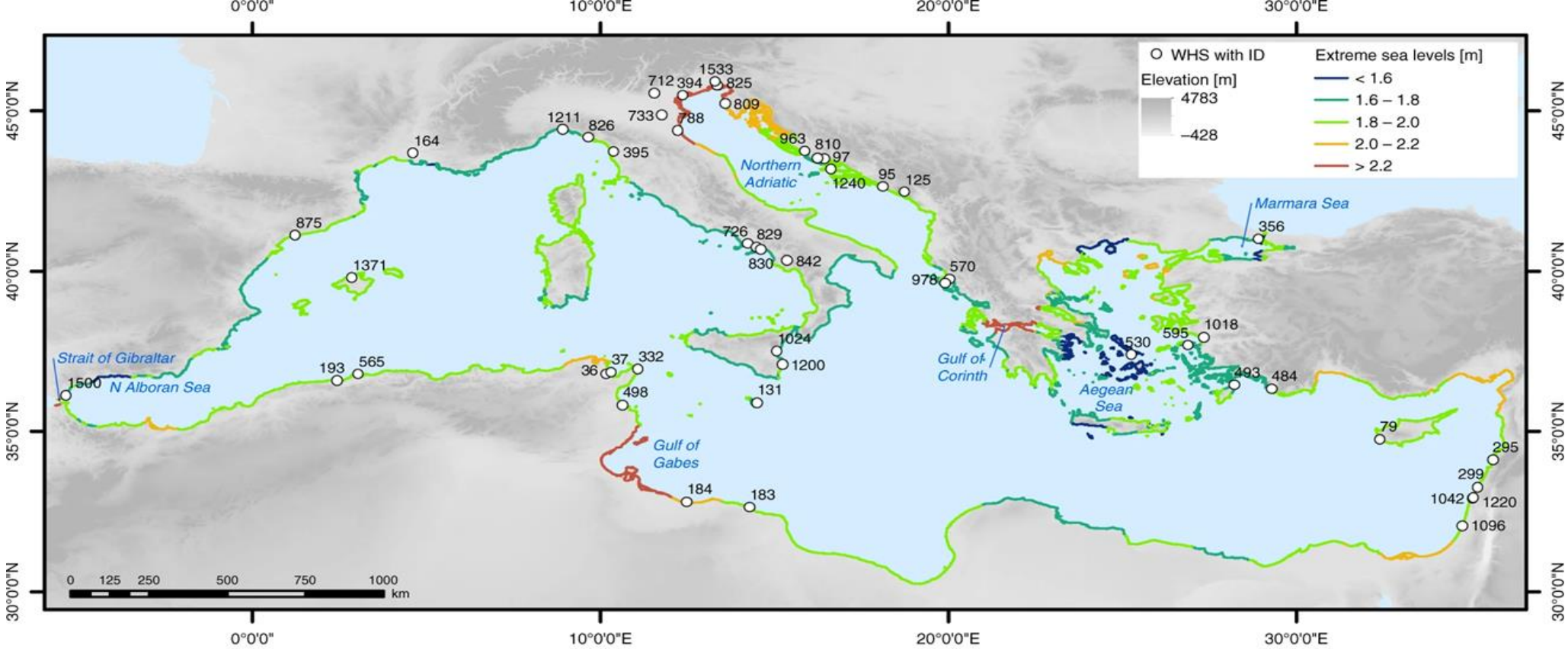
- Coastal UNESCO World Heritage sites increasingly at risk from sea-level rise – many these are historic cities; other are archaeological sites.

- 49 such sites are located in low-lying coastal areas of the Mediterranean.

- 37 of these are at risk from a 100-year flood.
- 42 are at risk from coastal erosion, already today.

- Adaptation is urgently needed.

https://www.nature.com/articles/s41467-018-06645-9



36	Medina of Tunis
37	Archaeological Site of Carthage
79	Paphos
95	Old City of Dubrovnik
97	Historical Complex of Split with the Palace of Diocletian
125	Natural and Culturo-Historical Region of Kotor
131	City of Valletta
164	Arles, Roman and Romanesque Monuments
183	Archaeological Site of Leptis Magna
184	Archaeological Site of Sabratha
193	Tipasa
295	Byblos
299	Tyre
332	Punic Town of Kerkuane and its Necropolis
356	Historic Areas of Istanbul
394	Venice and its Lagoon
395	Piazza del Duomo, Pisa
484	Xanthos-Letoon
493	Medieval City of Rhodes
498	Medina of Sousse
530	Delos
565	Kasbah of Algiers
570	Butrint
595	Pythagoreion and Heraion of Samos
712	City of Vicenza and the Palladian Villas of the Veneto
726	Historic Centre of Naples
733	Ferrara, City of the Renaissance, and its Po Delta
788	Early Christian Monuments of Ravenna
809	Episcopal Complex of the Euphrasian Basilica in the Historic Centre of Poreč
810	Historic City of Trogir
825	Archaeological Area and the Patriarchal Basilica of Aqui leia
826	Portovenere, Cinque Terre, and the Islands (Palmaria, Tino and Tinetto)
829	Archaeological Areas of Pompei, Herculaneum and Torre Annunziata
830	Costiera Amalfitana
842	Cilento and Vallo di Diano National Park with the Archeological Sites of Paestum and Velia, and the Certosa di Padula
875	Archaeological Ensemble of Tárraco
963	The Cathedral of St James in Šibenik
978	Old Town of Corfu
1018	Ephesus
1024	Late Baroque Towns of the Val di Noto (South -Eastern Sicily)
1042	Old City of Acre
1096	White City of Tel-Aviv --the Modern Movement
1200	Syracuse and the Rocky Necropolis of Pantalica
1211	Genoa: Le Strade Nuove and the system of the Palazzi dei Rolli
1220	Bahá'i Holy Places in Haifa and the Western Galilee
1240	Stari Grad Plain
1371	Cultural Landscape of the Serra de Tramuntana
1500	Gorham's Cave Complex
1533	Venetian Works of Defence between 15th and 17th centuries: Stato da Terra – western Stato da Mar

https://www.nature.com/articles/s41467-018-06645-9

Slow interactions with the environment – gradually causing damage

- Rain
- Sun
- Other temperature and humidity changes
- Wind
- Frost
- Marine environment
- Biological growth
- Pollution
- Tourism

Threats to Heritage - today

- Earthquakes
- Floods
- Storms
- Hurricanes
- Tsunamis
- Volcanic eruptions
- Landslides
- Sink holes

- Security issues
- War and Conflict
- Fires
- Theft and Looting
- Terrorism
- Deliberate destruction
- Vandalism
- Tourism pressures

- Decay and Collapse
- Erosion
- Corrosion
- Structural damage
- Desertification
- Biological attack
  - plants
  - microorganisms
  - insects
  - rodents

https://timesofmalta.com/article/storm-aftermath-pictures-flowing-valleys-aggressive-waves.1012965

https://www.avvenire.it/attualita/pagine/50-anni-avvenire-2009-l-aquila-piegata-terremoto

Changing events in a changing climate

- Rainfall – amount and frequency
- Extreme temperatures
- Wind – increase in strength and frequency
- Frost cycles - changes
- Salt cycles - changes
- Migration of new species
- Soil chemistry - modifications

- Rising sea levels
- Melting glaciers
- Floods
- Storms
- Landslides
- Changing rain patterns
- Desertification

Climate adaptation

- Our historic cities, and sites, are important economic drivers.
- Their loss will impact the livelihoods and well-being of millions of people as well as irreparable loss to our heritage.
- Catastrophic events on heritage are coupled with ongoing slow onset changes and present deterioration processes.
- The consequences for the whole cultural heritage sector have not yet been adequately dealt with or investigated.
- These are now a major source of concern.

What can be done?

Commitment and coordination are key

- Risk assessments for vulnerable heritage, and adaptation strategies (both short-term and long-term) must be designed and carried out.
- A greater need for restoration and conservation must be based on sound research and the sharing of data among multidisciplinary teams.
- The basics of heritage conservation - assessment, diagnosis, documentation, monitoring, and preventive action - are urgently needed.

BUT

- Adaptation is only possible if it tackled seriously, immediately and in a concerted fashion.
- A roadmap could be the first step.

Six Chapters of the Adaptation Roamap

Chapter 1:
Build Your Adaptation Roadmap

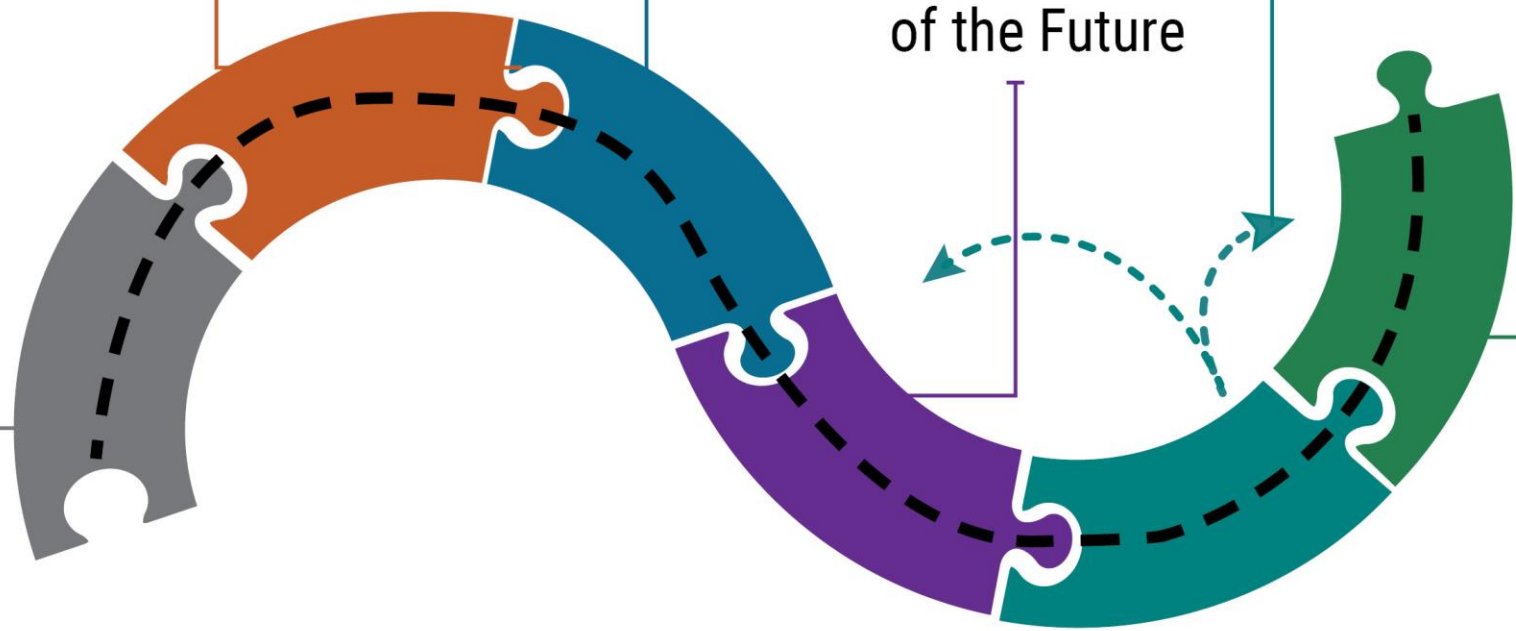
Chapter 2:
Center People in Decision-Making

Chapter 3:
Set Local Context and Sense of Place

Chapter 4:
Shape a Shared Vision of the Future

Chapter 5:
Bring Together Shared Solutions

Chapter 6:
Pathways Approach to Implementation



https://www.adaptingtorisingtides.org/project/adaptation-roadmap/

There is plenty of guidance available


Cover photo:
Gloria, 6, at Newtok Village cemetery, Alaska. Once suitable for building houses, the melting permafrost means the swampy ground is no longer good for housing.
Newtok, Alaska, USA
(Photo © Vlad Sokhin / Panos)
The UNESCO STRATEGY FOR
ACTION
ON CLIMATE CHANGE
The UNESCO Enhanced Plan of Action for the Strategy for Action on Climate Change (through 2011) is structured around three main strategic objectives:
1 building, making available and maintaining the climate change knowledge base: science, assessment, monitoring and early warning;
2 promoting mitigation of and adaptation to climate change, including through enhanced education and public awareness; and
3 moving towards a climate-neutral UNESCO.
UNESCO and the World Meteorological Organisation are the co-conveners for the cross-cutting area within the United Nations System for climate knowledge: science, assessment, monitoring and early warning
Climate Action Toolkit for World Heritage Properties
Joint Capacity Development Project by UNESCO, ICCROM, ICOMOS and IUCN
unesco
ICCROM
ICOMOS
IUCN
89635
URBAN DEVELOPMENT SERIES KNOWLEDGE PAPERS
Climate-resilient, Climate-friendly World Heritage Cities
WORLD BANK GROUP
The Future of Our Pasts:
Engaging cultural heritage in climate action
Outline of Climate Change and Cultural Heritage
ICOMOS
international council on monuments and sites

Thank you

joann.cassar@um.edu.mt

https://www.um.edu.mt/ben/buildheritage/