

LETTERS

Worldwide, important cultural heritage sites, such as this historic lighthouse in the Outer Banks, are put at risk by rising sea levels.

Edited by **Jennifer Sills**

Rising seas endanger maritime heritage

In coastal regions, anthropogenic sea level rise, extreme weather, and coastal erosion have led to mass migrations (*1*), leaving cultural heritage sites behind. Coastal heritage resources preserve humanity's long history of maritime dispersals, adaptations, cultural diversity, and resilience. Communities, institutions, and governments worldwide must work to monitor and protect these valuable sources of information.

Coastal heritage resources are already at risk (*2*, *3*) under conservative Intergovernmental Panel on Climate Change (IPCC) predictions of sea level rise by 2100, which range from 0.29 to 1.1 m (*4*). Global sea level rise averaged 0.48 cm per year over the past decade and reached 0.81 cm in 2023 (*5*), more than quadrupling the 1993 rate (*5*). Other projections range from 2.3 to more than 4 m (*1*, *6*). A collapse of the Greenland and Antarctic ice sheets could lead to even greater sea level rise in the decades and centuries to come.

Endangered coastal heritage sites range from historic lighthouses to iconic cultural centers such as Hawai'i's Pu'uhonua o Hōnaunau National Historic Park (*7*, *8*). Marine erosion has already damaged Native American shellmound complexes in Florida and Georgia (*7*).

Heritage resources provide ancestral cultural connections to Indigenous and descendant communities and contain invaluable scientific information. Cultural heritage sites provide insight into human survival and sustainability in dynamic island and coastal settings, including earlier periods of rapid sea level rise, as well as the nature of ancient ecosystems and the organisms they contained (*9*). These data can be used to help restore modern ecosystems and conserve endangered species (*9*).

Global stakeholders must do more to reduce greenhouse gas emissions and atmospheric carbon dioxide levels and work with descendant communities to help protect priceless coastal heritage. Effective programs such as Florida's Heritage Monitoring Scouts and Scotland's Coastal Archaeology and the Problem of Erosion (SCAPE) Trust partner academics, agencies, and volunteers to evaluate and mitigate the effects of sea level rise and coastal erosion on heritage resources (*10*, *11*). Along North America's Pacific Coast, archaeologists have worked extensively with descendant communities, government agencies, and nongovernmental organizations to record, monitor, and carbon-14 date endangered archaeological sites (*7*). Expanding these efforts and initiating similar collaborations in vulnerable regions can help save coastal and maritime heritage resources.

Jon M. Erlandson[1]*, Scott M. Fitzpatrick[1,2], Kristina M. Gill[3], Patrick V. Kirch[4], John T. Ruiz[4], Victor D. Thompson[5], Jason Younker[2,6]

[1]Museum of Natural and Cultural History, University of Oregon, Eugene, OR, USA. [2]Department of Anthropology, University of Oregon, Eugene, OR, USA. [3]Department of Anthropology, University of Hawai'i at Manoa, Honolulu, HI, USA. [4]Southern Owl Clan, Coastal Band of the Chumash Nation, Santa Barbara, CA, USA. [5]Department of Anthropology, Georgia Museum of Natural History, University of Georgia, Athens, GA, USA. [6]Coquille Indian Tribe, North Bend, OR, USA.
*Corresponding author. Email: jerland@uoregon.edu

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REFERENCES AND NOTES

1. United Nations (UN), "Surging seas in a warming world: The latest science on present-day impacts and future projections of sea-level rise" (UN Technical Brief, UN, 2024).
2. M. J. Rowland, *Aust. Archaeol.* **34**, 29 (1992).
3. L. A. Reeder-Myers, *J. Isl. Coast. Archaeol.* **10**, 436 (2015).
4. IPCC, "Climate change 2023: Synthesis report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change," Core Writing Team, H. Lee, J. Romero, Eds. (IPCC, 2023).
5. G. C. Johnson, R. L. Lumpkin, *Bull. Am. Meteorol. Soc.* **105**, S156 (2024).
6. J. T. Overpeck *et al.*, *Science* **311**, 1747 (2006).
7. J. M. Erlandson, *J. Coast Conserv.* **16**, 137 (2012).
8. A. Johnson, L. Marack, S. Dolan, Hawai'*i J. Isl. Coast. Archaeol.* **10**, 232 (2015).
9. S. M. Fitzpatrick, J. M. Erlandson, K. M. Gill, Eds., *Sustainability in Ancient Island Societies: An Archaeology of Human Resilience* (Univ. Press Florida, 2024).
10. S. E. Miller, E. J. Murray, Oregon's Marine Archaeol. Sites

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