

Enabling Resilience to Great Lakes Coastal Hazards through the Wisconsin Coastal Atlas

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February 25, 2023

The Wisconsin Coastal Atlas (<https://wicoastalatlus.net/>) enables people to explore, analyze and understand coastal issues along the Great Lakes. It is intended for use by coastal resource managers, planners, researchers, educators and citizen scientists. The atlas includes six elements: maps, catalog, tools, learn, topics and about. These six elements work together to provide access to resources that can help people address specific coastal management issues on the Great Lakes, such as building community resilience to coastal hazards.

The Maps element (<https://www.wicoastalatlus.net/maps/>) of the atlas provides a gallery of interactive maps with customized perspectives related to specific coastal issues in Wisconsin. An example of an interactive map that addresses resilience to coastal hazards is the “Wisconsin Shoreline Inventory and Oblique Photo Viewer” (<https://no.floods.org/wcmp>) developed by the Association of State Floodplain Managers with support from the Wisconsin Coastal Management Program. The viewer lets users explore how the Great Lakes coasts of Wisconsin have changed since 1976 by viewing oblique photos and classification of beach and bluff conditions.

The Catalog element (<https://www.wicoastalatlus.net/catalog/>) of the atlas provides pathways to discover, assess, and download geospatial data for the Great Lakes coasts of Wisconsin. The most robust catalog resource is “GeoData@Wisconsin” (<https://geodata.wisc.edu/>), which combines map-based spatial searches with keyword searching and faceted browsing. The Coastal Collection of GeoData@Wisconsin, developed by the Wisconsin State Cartographer’s Office and Robinson Map Library at the University of Wisconsin-Madison with support from Wisconsin Sea Grant, provides access to over 1,500 Great Lakes-related geospatial data sets.

While the resources in the Maps element allow users to explore spatial and temporal patterns to gain new insights about coastal issues, the resources in the Tools element (<https://www.wicoastalatlus.net/tools>) allow users to conduct analyses to guide decision-making about these issues. Examples of resilience tools features in the atlas include the “Wisconsin Flood Resilience Scorecard” (<https://www.seagrant.wisc.edu/our-work/focus-areas/coastal-communities/flood-resilience-scorecard/>) developed by the Wisconsin Department of Health Services and Wisconsin Sea Grant, the “Plan Integration for Resilience Scorecard” (<https://coastalresiliencecenter.unc.edu/pirs/>) developed by researchers at Texas A&M University and the University of North Carolina-Chapel Hill and the “Resilient Great Lakes Coasts” framework (<http://resilientgreatlakescoast.org/>) developed by researchers at the University of Michigan and Michigan Tech.

The Learn element (<https://www.wicoastlatlas.net/learn>) of the atlas serves as a repository for place-based learning resources that promote a stronger understanding of Great Lakes Literacy Principles (<https://www.cgl.org/great-lakes-literacy-principles/>). An example of place-based learning resources that promote coastal resilience are “Great Lakes Quests” (<https://www.seagrant.wisc.edu/our-work/focus-areas/education/great-lakes-quests/>). The Quests are virtual learning activities about coastal topics and places in Wisconsin. They are inspired by the century-old British tradition of letterboxing, in which clue-driven activities encourage people to get out in nature to find a hidden container that holds a notebook and a stamp. Each Quest contains interactive educational components including links to external content, inquiry-based questions and quizzes. Each correct quiz answer reveals a clue that spells a word or phrase that is significant to the coastal topic. Coastal resilience-themed Quests (<https://arcg.is/HurbW>) cover the topics of bluff erosion, coastal flooding, harbor infrastructure, green stormwater infrastructure, beach health and dune protection.

The Topics element (<https://www.wicoastlatlas.net/topics>) of the atlas provides quick access to maps, tools, data and learning resources relevant to specific coastal management issues on the Great Lakes. At this point there are eight topics relevant to coastal resilience in the atlas – water levels, flooding, bluff erosion, port/harbor/marina infrastructure, beaches, nearshore freshwater habitats, green infrastructure and climate adaptation.

The Wisconsin Coastal Atlas, however, is more than just a web portal that provides access to coastal maps, tools, data and learning resources – it is also a research project that is helping to build a coastal spatial data infrastructure for Wisconsin. The primary motivation of the research described in the About element (<https://www.wicoastlatlas.net/about>) is demonstrating that a coastal web atlas can serve as an interoperable resource at multiple scales. The atlas leverages local government data and integrates it to address regional and statewide issues. In addition, the atlas shares data at broader scales ranging from the Great Lakes to global. The latter is demonstrated through active collaboration with the International Coastal Atlas Network (<https://ican.iode.org/>), which utilized coastal erosion as a use case to show that individual atlases could be searched to access geospatial data as part of a broader global network of coastal atlases.