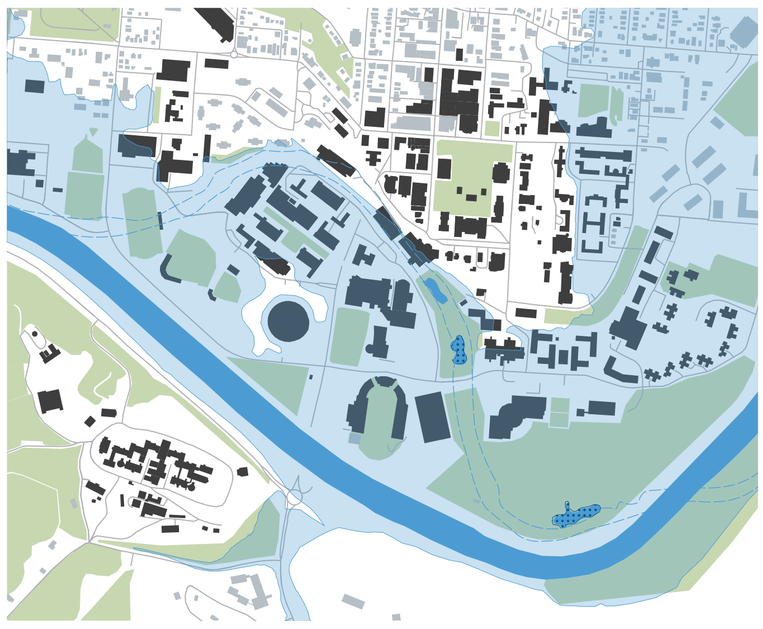
UNIVERSITY OF WISCONSIN-MADISON

Madison, Wisconsin | Founded: 1848 | Campus Size: 940 acres | 37,250 students

Lake Mendota, Lake Monona, and Lake Wingra

Water size: **Lake Mendota: 9,780 acres, Lake Monona: 3,360 acres, Lake Wingra: 340 acres**
Natural or man-made: **Natural**
Shoreline length: **~23,000 feet**
Water-edge type: **Natural and Built**

Located between three lakes, the campus sits on a natural isthmus and borders Lake Mendota. Half urban (seen above) and half natural within the Lakeshore Nature Preserve (to the west), the campus exhibits opposite approaches to the shorelines. The terraces, parks, marinas, and promenade on UW-Madison's vibrant eastern shoreline foster a sense of place, connection, and community, making them popular with students for recreation and relaxation. The three adjacent lakes are equally valued for their academic contributions: the extensive research that has occurred in/on the lakes has led many to consider UW to be the birthplace of limnology.



OHIO UNIVERSITY

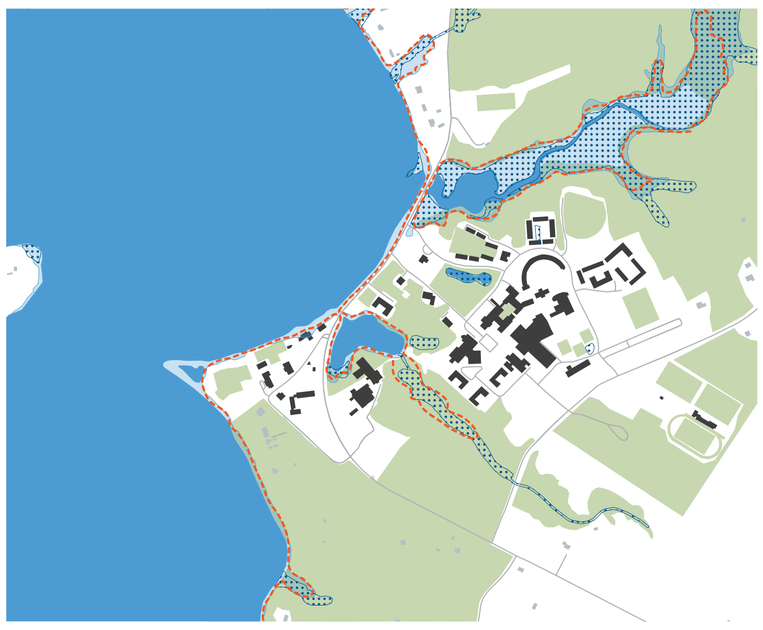
—— Historic River Location

Athens, Ohio | Founded: 1804 | Campus Size: 1,800 acres | 21,650 students

Hocking River

River width: **185 feet at Richland Avenue**
Natural or man-made: **Man-made** (relocation)
Shoreline length: **~14,100 feet**
Water-edge type: **Living** (levee)

Before 1970, the Hocking River was deeply intertwined in Athens' urban fabric. Ohio University's campus was dissected by the river and sat in a floodplain which seasonally flooded. After devastating floods in 1964 and 1968, the Army Corps of Engineers moved the Hocking River south of campus to its present location and levees were constructed to defend the city. Today, recreation trails run along the tops of the levees.



ST. MARY'S COLLEGE OF MARYLAND

St. Mary's City, Maryland | Founded: 1840 | Campus Size: 360 acres | 1,500 students

St. Mary's River

River width: **300-700 feet at Horseshoe Bend**
Natural or man-made: **Natural**
Shoreline length: **~3,700 feet**
Water-edge type: **Living**

Since its founding, St. Mary's College of Maryland has always had a harmonious relationship with St. Mary's River and the nearby Chesapeake Bay. The College and adjacent historic St. Mary's City have actively advocated for clean water policies and the preservation of the land and ecosystems that are the river's watershed. The College's academic programs have capitalized on the adjacency to the river and developed classwork and research initiatives to improve its aquatic health. Likewise, both athletics and student recreation programs enjoy competitive and recreational opportunities that abound on the water.

THE UNIVERSITY OF TENNESSEE, KNOXVILLE

Knoxville, Tennessee | Founded: 1794 | Campus Size: 600 acres | 36,300 students

Tennessee River

River width: **685 feet at Alcoa Highway**
Natural or man-made: **Natural**
Shoreline length: **~8,250 feet**
Water-edge type: **Natural and Built**

Historically, Knoxville has downplayed the adjacent Tennessee River. The shoreline of the river became home to infrastructure facilities for the community, like rail lines, a highway, parking lots, and water treatment facilities. In the 1990s, UT Knoxville was developed for river recreation and engagement. Over the past three decades, they have been restoring Second and Third Creeks, which thread through the campus into the river. Today, the University is exploring opportunities to make a stronger tie to the river, taking steps to connect the core of campus visually and physically with the river.

AYERS SAINT GROSS

2024

COMPARING CAMPUSES

Water

Our 2024 poster explores the relationship between college and university campuses and waterfronts. Looking at how eight campuses engage different bodies of water (wetlands, rivers, lakes, oceans, and bays) helps educate us about how we think about and utilize this unique condition through a higher education lens.

Fostering a respectful, symbiotic relationship with the water helps to ensure a healthy ecosystem. Planning for successful water engagement benefits a campus or community environmentally and economically[1], while supporting public well-being[2]. Thoughtfully planned engagement with water can help to minimize erosion, maximize groundwater recharge, provide a robust recreation asset, decrease water-related infrastructure, allow wildlife to thrive, and more.

Water
100-year Floodplain
Wetlands
Sea Level Rise (2050)
Campus Buildings
Context Buildings
Natural Areas / Parks
Roads

0 mile — ¼ mile — ½ mile — 1 mile

Our thanks to the colleges and universities that provided information. All campus plans and buildings are intended for comparative use only. Recognizing that errors are inevitable, we apologize for any inaccuracies. **Concept** — Jim Wheeler
Graphic Design — Margaret Zivkovich, Angi Kwak; **Content** — Matt Renninger, Courtney Wolff, Cassie Bair, Allison Wilson

[1] *https://www.fema.gov/floodplain-management/manage-risk*
[2] *https://www.washingtonpost.com/brand-studio/wp/2020/03/11/how-living-on-the-water-can-transform-your-health*

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EVOLVING IMPACT OF WATER

Global development has impacted the ability of watersheds to provide ecosystem services. These impacts become especially significant downstream in a watershed and adjacent to water bodies. Three interactions between development and water include:

INTENSIFYING STORMWATER

As development of natural areas has increased, land has lost capacity to slow stormwater runoff and absorb precipitation where it falls. This increase in impervious ground surfaces, combined with more frequent and intense storms and a reduction of surface run-off slowing materials, has resulted in increased stormwater flooding that taxes built infrastructure and the natural environment alike.

CHANGING FLOODPLAINS

As flooding from both precipitation and sea level rise becomes more common, more land area has become susceptible to frequent and volatile flooding. Restricting river floodplains concentrates water and increases its velocity, growing the need for more robust infrastructure. With more frequent and severe flooding, sites once considered low-risk areas for development are now susceptible to flooding as well.

RISING SEA LEVEL

Increases in global temperatures have raised water levels in our oceans and their associated bays and estuaries. Rising water levels put many developed and natural areas at risk. Additionally, a global increase in water temperature causes more volatile and destructive storm systems which bombard our coastlines. If the natural landscapes that protect the shorelines are removed from the ecosystem, the results can be devastating at storm impact.

RESPONDING TO WATER

Communities often respond to water-related crises, or the threat of such crises, with one or more of the following responses. The chosen response(s) are influenced by both external and internal community factors, including existing conditions, history, cost, the level of vulnerability, and the environmental influence. In some cases, a response can amplify a negative impact, resulting in the need for additional response(s).

ADAPT

Adapt structures or landscapes to absorb and/or store water. Communities can embrace their relationship to water by making space for water in two-stage channels, wetland or floodplain meadows, deepened riverbeds, and polder systems or by implementing building and site-level adaptations such as floodable parks/ plazas, green roofs, bioswales, detention/ retention ponds, and permeable paving.

DEFEND

Preserve and/or construct green or grey infrastructure to ensure protection from natural forces. This is often done to protect existing conditions by slowing water's velocity and/ or turbidity via upland planting, edge-water restoration, rip-rap breakwaters, etc., or preventing water's entry completely via sea walls, levees, flood walls, inflatable barriers, and other means.

RETREAT

Relocate facilities outside of water-conflict areas including floodplains. By abandoning or avoiding sites in conflict with natural waterways, this response strategy minimizes continual investment in the infrastructure required by Adapt and Defend responses. This approach can set the stage to Restore.

RESTORE

Return the water's edge to its natural state. Recreating a living edge with protected setbacks fosters the re-establishment of a region's original landscape. Revitalized natural biomes provide habitat for diverse wildlife, control runoff, and temper storm surges. Nature-based solutions also sequester carbon to address the root cause of many waterfront challenges, including climate change.

ENHANCE

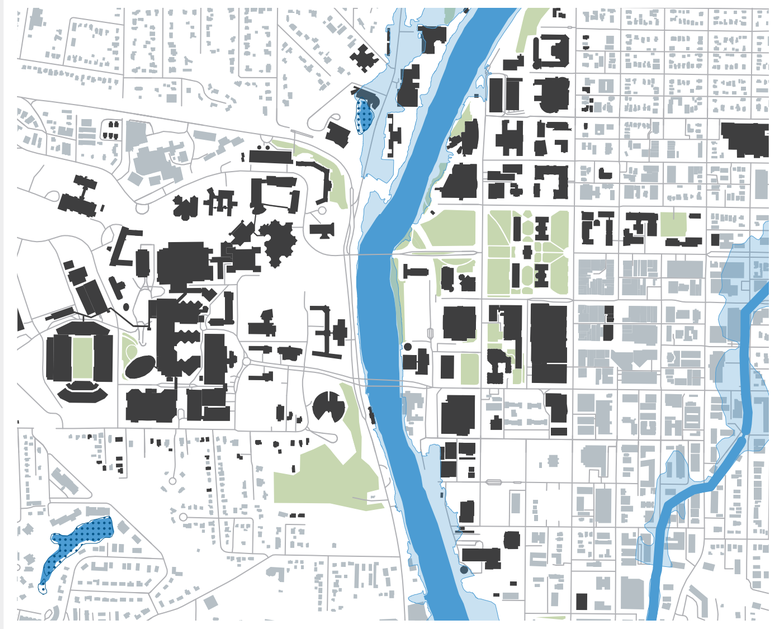
Waterfronts can be enhanced to utilize and increase their value. Adapt, Defend, Retreat, and Restore responses can be layered with additional uses that support health and wellness. For colleges and universities, this often manifests in the form of athletic facilities, parks, walkable waterfronts, natural areas, vistas, and more.

WATER AS A CAMPUS ASSET

A body of water's type, size, and proximity to campus can impact how institutions and their communities interact with them. The table below provides a high-level overview of how this poster's case studies utilize their adjacent water bodies.

	RENEWABLE ENERGY SOURCE	ATHLETICS	RECREATION	INSTRUCTIONAL USE	PLANNING INITIATIVES
UNIVERSITY OF WISCONSIN-MADISON		Rowing, sailing	Rowing, sailing, boating, canoeing, paddleboard, swimming, hiking, beach, fishing, ice fishing, ice boating, ice biking, indigenous winter games	Limnology: Conservation of Aquatic Resources, Ecology of Fishes, Field Marine Biology	Green Infrastructure & Stormwater Management Planning, City Wide Watershed Study, Madison Area Municipal Stormwater Partnership
THE UNIVERSITY OF IOWA	Hydroscience and Engineering, Iowa Flood Center	Women's rowing	Iowa River Trail, kayaking, canoeing	Fluid Flows in Environmental Systems, Hydrology, Water Quality and Flow	Flood Water Response, Naturalization of Shorelines, Campus Water Management
OHIO UNIVERSITY			Walking and cycling at Hocking Adena Bikeway	Animal Diversity, Field Ecology, Ichthyology, Ornithology, Aquatic Biology	Stormwater Management Programs with the City of Athens; Comprehensive Plan addresses the Hocking River
UNIVERSITY OF MASSACHUSETTS BOSTON	Salt Water Pump House (heat exchange and cooling), planning energy production from bay		Extensive open fields, shoreline walkways, and dock for University vessels and recreation boats, John F. Kennedy Library, fishing pier	Water Resources Management, Underwater Research Methods Using SCUBA+, Boating, Physical Oceanography	EPA, COE, MEPA, Energy and Carbon Master Plan, 2023 Master Plan Key
ST. MARY'S COLLEGE OF MARYLAND		Rowing, sailing	Kayaking, paddleboard, sailing, swimming, rowing, canoeing, windsurfing, hydro-sailing, boating, fishing, beach	Marine Science, Environmental Studies, Biology, Coastal Ecosystem Management, Research Vessels	Maryland Department of Environment's Environmental Site Design and Stormwater Management Campus Master Planning
UNIVERSITY OF NORTH FLORIDA			Hiking, boating, fishing	Coastal Fisheries Management, Field Studies in Marine Science, Dolphin Behavioral Ecology	2020-2030 Master Plan (prioritizes wetland conservation and preservation over migration)
THE UNIVERSITY OF TENNESSEE KNOXVILLE	Hydroelectric power - Fort Loudoun Reservoir / Dam (+30 miles down river)	Rowing	Boat tailgating (Navy VOLs), kayaking, rowing, boating, walking / hiking (greenway)	Environmental Stormwater Management, Water Resources, Hydrology	Neyland Drive Waterfront Planning, MS4 Stormwater Permit (including shoreline stabilization)
UNIVERSITY OF CALIFORNIA, SANTA BARBARA			Birdwatching, hiking, kayaking, canoeing, scuba, surfing, sailing and boating, beach	Walking Biology, Applied Marine Biology, Remote Sensing of the Environment	Sea Level Rise Adaptation Strategy

Note: Lists are samplings and are not exhaustive.



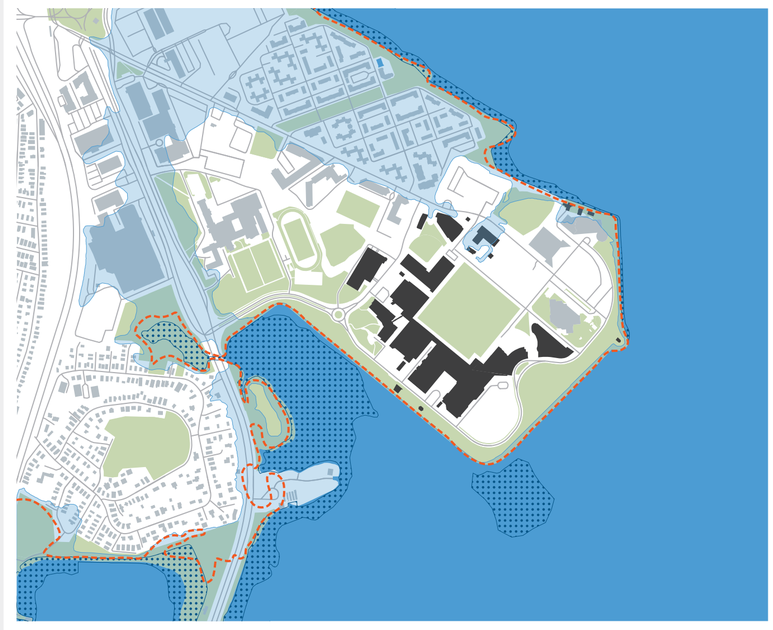
THE UNIVERSITY OF IOWA

Iowa City, Iowa | Founded: 1847 | Campus Size: 2,120 acres | 12,350 students

Iowa River

River width: **350 feet at W. Burlington St.**
Natural or man-made: **Natural**
Shoreline length: **~21,200 feet**
Water-edge type: **Living**

The University of Iowa (UI) campus started on the east side of the river in the old State of Iowa Capitol Building (1842) and migrated west, becoming a campus bisected by a waterway. The University has historically embraced the waterfront opportunity as the river became a major influence in its academic research. Since the construction of the UI's hydraulics research lab on the riverbanks in 1920, the river has been instrumental in dams, spillways, and lock system research that have informed major infrastructure works around the world. Today this academic tradition continues and the University has a goal to reinvigorate the river corridor with passive and active recreational possibilities.



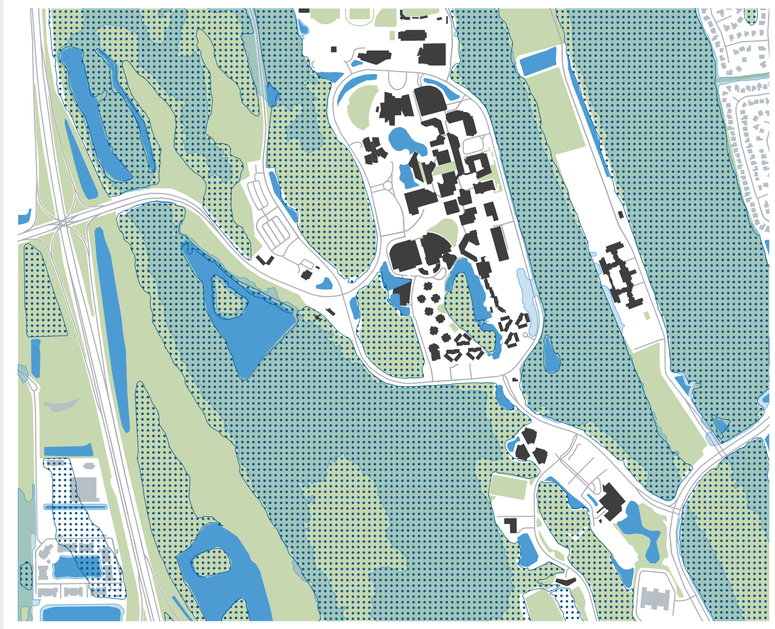
UNIVERSITY OF MASSACHUSETTS BOSTON

Boston, Massachusetts | Founded: 1964 | Campus Size: 90 acres | 16,200 students

Boston Harbor and Atlantic Ocean

Water size: **∞**
Natural or man-made: **Natural**
Shoreline length: **~3,800 feet**
Water-edge type: **Built**

The Columbia Point peninsula, which the University of Massachusetts Boston (UMass Boston) occupies, was created by infill into Dorchester Bay. Today the built shoreline contains the Harbor Walk which extends to downtown Boston. Recent planning of the UMass Boston campus has focused on creating stronger connections and views to the harbor by siting university buildings and open spaces to maximize the University's waterside location.



UNIVERSITY OF NORTH FLORIDA

Jacksonville, Florida | Founded: 1972 | Campus Size: 1,000 acres | 17,000 students

Wetland and Associated Lakes

Wetland size: **Expansive**
Natural or man-made: **Natural**
Shoreline length: **Wetland is the campus**
Water-edge type: **Living**

Located within coastal flatwoods, the University of North Florida's (UNF) campus core was constructed on a series of low ridges surrounded by low wetlands and lakes. 300 acres of the campus wetlands are designated for the Sawmill Slough Preserve to protect the slough's natural water drainage and its native flora and fauna. The campus wetlands drain via the Pablo Creek into the Intracoastal Waterway less than five miles away where UNF manages an additional 1,050 acres of wetlands that support its flagship coastal and marine biology programs.

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

Santa Barbara, California | Founded: 1954 | Campus Size: 1,000 acres | 35,500 students

Pacific Ocean, UCSB Lagoon, and Devereux Lagoon

Water size: **Pacific Ocean: ∞, UCSB Lagoon: 31 acres, Devereux Lagoon: 38 acres**
Natural or man-made: **Natural and Man-made**
Shoreline length: **~20,800 feet**
Water-edge type: **Living**

The University of California, Santa Barbara has two lagoons, the Campus Lagoon (Main Campus) and the Devereux Slough (West Campus). The former was originally an intermittent tidal estuary that was bermed off for "aesthetic" and access reasons during the military era (1940s). Since 2000, UCSB's Cheadle Center for Biodiversity and Ecological Restoration has been restoring the Campus Lagoon areas to native habitats such as freshwater wetlands and bioswales, coastal sand dunes, sage scrub, wildflowers, and coastal salt marsh. Today, the lagoons support student experiential learning and campus management of stormwater runoff, surface flows, and seawater from the Marine Science facilities.