MACH
Megalopolitan Coastal Transformation Hub
coastalhub.org

What is MACH?

The Megalopolitan Coastal Transformation Hub, or MACH, brings together academics, policymakers, and community leaders to research climate change impacts and responses in the Philadelphia–New Jersey–New York region and beyond.

MACH is a consortium of 13 institutions whose mission is to conduct the scientific research needed to develop effective, evidence-based responses to climate change risks. Funded initially by a grant from the National Science Foundation's Coastlines and People (CoPe) program, and led by a team at Rutgers University, MACH is guided by four primary goals:

1. To do science that is useful and used.
2. To do science that advances understanding of how coastal climate hazards, landforms, and human decisions interact.
3. To train the next generation of leaders in trans-disciplinary climate research and engagement.
4. To learn how to do the first three goals better.

Understanding and responding to the risks of climate change is a complex and long-term endeavor requiring the knowledge and initiative of a wide array of specialists, leaders, and community members. This is why MACH takes an integrated approach, bringing together researchers in a wide range of disciplines—climate and sea-level scientists, philosophers, anthropologists, engineers, economists, and others—and involving diverse stakeholders.

MACH aims to provide insights that not only benefit local underserved communities but also contribute to a broader understanding of climate-related challenges faced by urban coastal areas around the world. We do this by prioritizing stakeholder engagement, ensuring that our research is guided by, and benefits, those who are most vulnerable to climate change impacts.

MACH Summer Course participants with Fish and Wildlife Service representatives at Good Luck Point, NJ.

MACH Focus Areas

At the core of our approach is the understanding that climate action requires not only creating cutting-edge solutions today but also developing the next generation of knowledge, tools, and, above all, people who can work across traditional boundaries and navigate the uncertainties that lie ahead. To this end, our work is organized into six overlapping focus areas:

Coastal Climate Risk

Understanding climate risk goes beyond simply analyzing climate-related phenomena like sea level rise, extreme precipitation, and heat waves. It also requires examining how these events can affect regions, communities, and individual households differently. A key challenge is navigating an uncertain future, particularly since multiple climate-related phenomena, such as heavy rainfall and sea-level rise, can occur simultaneously and amplify each other's effects. Risk management strategies must be flexible enough to adapt to various scenarios while respecting the values and needs of all those affected.

Housing, Insurance, and Mortgage Markets

Changing climate conditions will have a profound effect on housing and other real estate assets in the region's densely populated coastal areas. Our researchers are investigating how climate risks affect property, insurance, and mortgage markets; the economic costs of climate hazards; and the market impacts of policy interventions.

Adaptation Strategy Design

This group focuses on how decisions about allocating resources for climate adaptation are made. They specifically examine how the economic benefits of protecting high-value areas are balanced against the social benefits of protecting people and places in greatest need.

Municipal Finances

Similarly, climate change will impact local government revenues and expenditures. Research in this focus area provides information on climate-related financial risk to inform future municipal budget allocation decisions.

Household Decision-Making

People living in flood-prone areas—especially those in renter-dominated households—are more vulnerable to the impacts of climate change. This line of research examines how perceptions of climate change and related risk at the household level are factored into decision-making.

Transdisciplinary Research and Co-Production Design

Sustaining research involving numerous institutions and disciplines, with robust stakeholder engagement, is a challenge. This focus area reflects on MACH's design and governance. Our goal is to share lessons learned with the broader research community on how to effectively conduct this type of work.

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