MI Resilient Watersheds Project

Building a more resilient Michigan. Together.

JANUARY 2025 NEWSLETTER

Quarterly Highlights

We are off to an exciting start! A few highlights to share:

- **Watershed Working Groups** met to identify shared goals, priorities, and scope.
- **Project Team** is collecting data, knowledge, and models. We've initialized model runs on the high-performance computer at Pacific Northwest National Laboratory.
- Our partners represent **over 30 communities**, organizations, and entities committed to building a resilient MI. Know of someone we can bring to the table? **Let us know!**
- Our website is live! Find us at **mifloodresilience.org**

Who We Are

The MI Resilient Watersheds Project arose from the passion and long-standing commitment of the members of our project team to seeing our research have tangible, positive impacts on the communities where we work and live.

With funding support from the U.S. Department of Energy's Office of Science, we kicked off our efforts to co-create flood resilient communities in Michigan in September 2024.

Thank you - our partners, collaborators, and supporters, for joining us on this journey. We look forward to working with you.

- Wendy Robertson, MI Resilient Watersheds Project

Introducing iFlood

We are excited to launch iFlood, a citizen science tool to identify flooding events and improve flood prediction. Reports help improve our predictive models, so become a reporter today.

1. Go to: iflood.org/submit-a-report
2. Fill out the form (use 'Michigan' for location).
3. Upload images or video.
4. SUBMIT the form.

iFlood
IMPROVING FLOOD PREDICTIONS

Want to be more involved?

- Propose a site - know a place with recurring flooding? Work with us to install a staff gage.
- 'Adopt' a gage - commit to send reports at a site over a range of flood conditions.
- Check out our website for resources or request an in-person training for a group.

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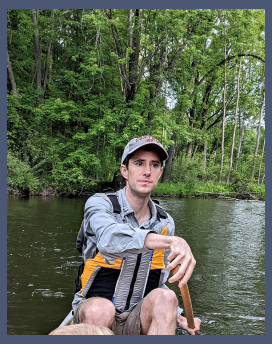
Partner Spotlight: Dr. Rod Lammers, Central Michgan University



What do you do? I'm an Assistant Professor of Environmental Engineering at Central Michigan University. In my research and teaching I work to improve management of our water resources, especially in heavily impacted urban areas. I want to make real-world changes that improve water quality, reduce flood risk, and improve the ecological health of our waterways.

Why is researching flood resilience important to you? I grew up on a river and have always been fascinated by them. Rivers provide so much value to people, but also pose these real hazards from flooding. I want to help protect river ecosystems and also better protect people and our society from the negative impacts of floods.

What aspect of this project excites you most? I'm a bit of nerd and enjoy coding and computer modeling. This project will give me plenty of opportunities for both!

What movie, book, or podcast do you recommend to our readers? The Control of Nature by John McPhee. This book highlights three examples of how people try (and sometimes fail) to bend nature to our will. It is a fascinating topic, and McPhee is an excellent writer (I've never read a boring book of his).

Events & Opportunities

Save-the-Date: Our next Community of Practice meeting is scheduled for Friday March 21st at 11:00 AM.

iFlood: we have iFlood training resources on our website. mifloodresilience.org/iflood has a quick guide and video tutorial. Have a group to train? Email us to schedule an in person training with one of our project team.

Website: would you like your organization included on our partner page? Reach out via email for details.

Community Input Requested

As we organize our Community of Practice meeting for 2025, we'd like your input on what topics and guest speakers we should invite. Please use this link:

https://forms.office.com/r/fpgjWVfvx5

or the QR code below for a short (2 question) survey on topics we can cover at CoP meetings this year.

MI Resilient Watersheds Community of Practice - Guest Speaker Topics

mifloodresilience.org

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Expert Explains: How can we tell if a climate model is trustworthy?

Dr. Daria B. Kluver, Climate Scientist, Central Michigan University

First, let's talk about what climate models do. Climate models simulate the global physical processes that determine the large-scale climate, such as ocean temperatures and currents, atmospheric chemistry, ice sheets, and soil and plant interactions with the atmosphere. Climate model simulations represent these processes at the scale of years to centuries, so the outputs of long climate simulations are represented as averages and trends in atmospheric variables over large regions.

Scientists evaluate the accuracy of atmospheric model predictions by comparing simulations to what actually happened (observations) and looking for error (random differences) and bias (consistent differences). This process is called validation and because climate simulations last decades, climate modelers use a tool called hindcasting. In a hindcast, a climate simulation is run over a historical period and the output is compared to observations based on historical climate data. Then, the climate model's future predictions are assumed to have a similar accuracy as the hindcast. When a simulation does not match observed data, scientists can apply corrections to the simulation to reduce error and biases in future simulations.

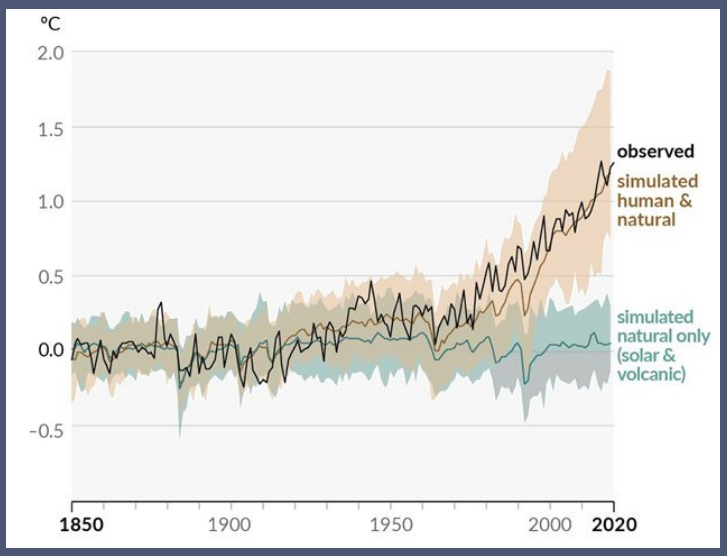

Figure 1. Global annual average surface temperature anomaly (Celsius) from 1850 to 2020. (Intergovernmental Panel on Climate Change AR6, 2021)

For example, the black line in Figure 1 represents the observed global annual average surface temperature from 1850 to 2020. Two types of climate models ran hindcasts to simulate these temperatures, one with only natural changes in the climate system (solar changes and volcanic activity) and one with natural changes as well as human-induced changes (land cover change, air chemistry changes, etc.). After validation, it is evident that only climate models that include both human activities and natural causes of climate change can accurately simulate global temperatures. Excluding human activities introduces a bias (consistent difference) that makes the simulations inaccurate, and the inaccuracies can't be accounted for by random error. This justifies scientists' confidence in future simulations that include both natural and human influences on climate.

When scientists run simulations with a new climate model, they will often first publish the error and bias comparisons from hindcast simulations and the ways that the model was corrected for errors and biases before running future simulations. While these forerunning results and peer-reviewed papers aren't always featured by news outlets discussing the latest predictions from future climate simulations, they are available, and they give the scientific community who builds and analyzes outputs from climate models confidence that the models are accurately representing atmospheric conditions they simulate.