



NSF Efforts in Climate and Health: Promoting collaboration across perspectives

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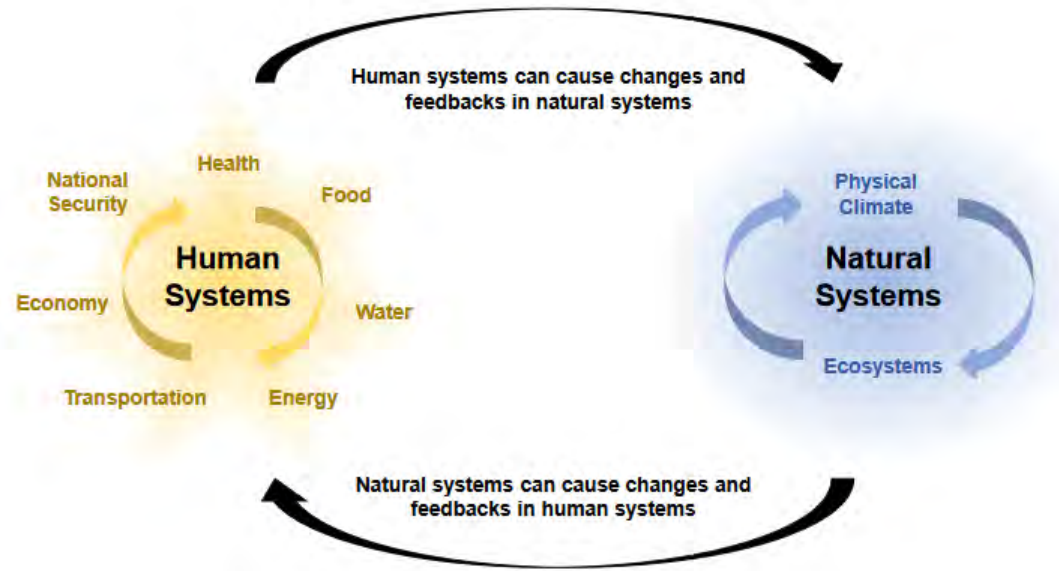
Climate and Human Health

Framing the issue

- ❖ NASEM Report on Global Change Research Needs and Opportunities for 2022-2031
- ❖ NSF Environmental Research and Education (ERE) Advisory Committee 2021 Report:
Environmental and Human Health Research Priorities

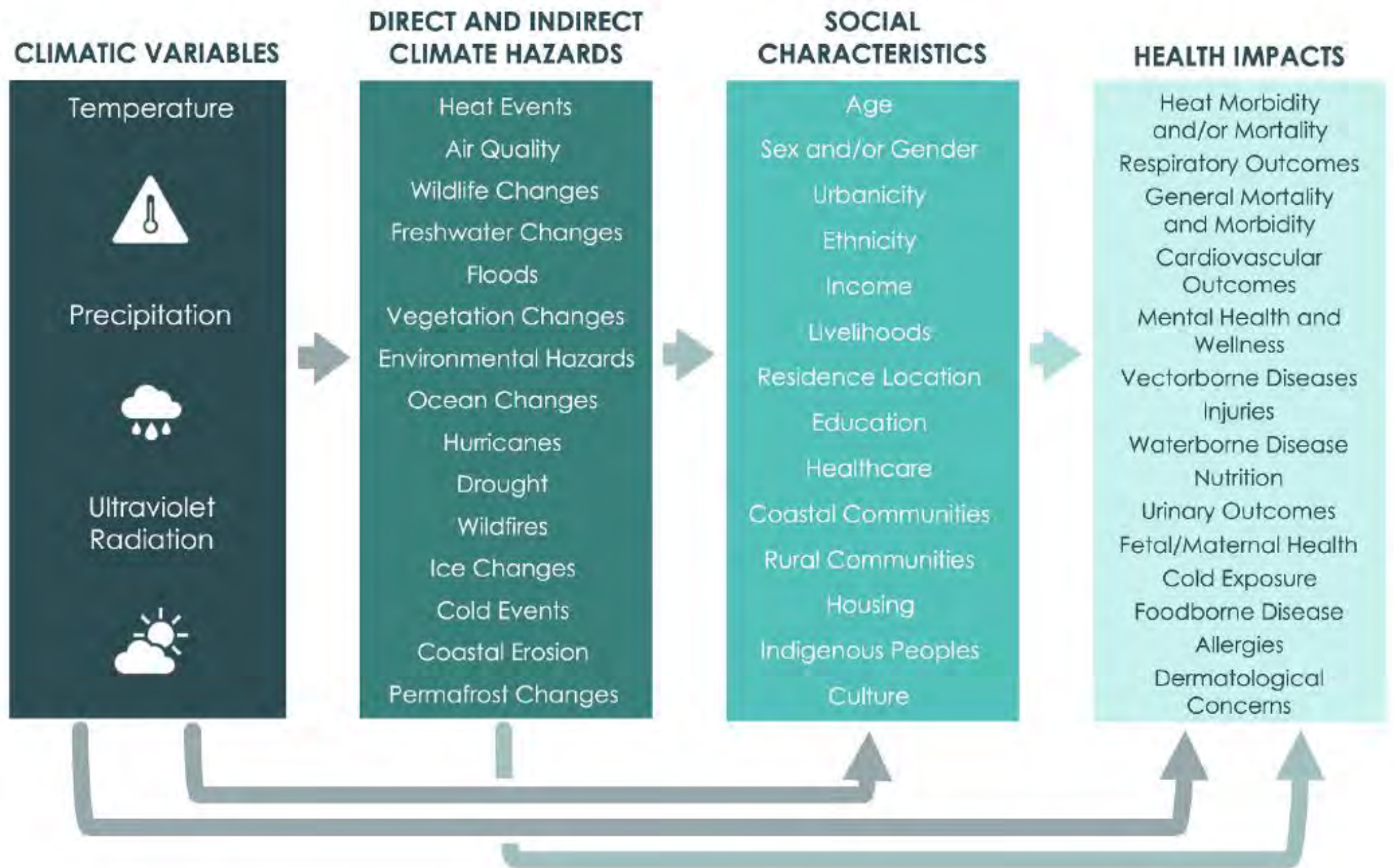
Relevant NSF Efforts

- ❖ NSF-NIEHS Oceans and Human Health
- ❖ Navigating the New Arctic
- ❖ Field campaigns: air quality, water quality, etc.



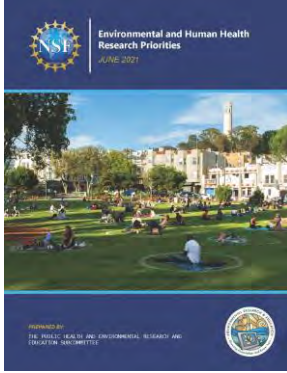
NAS (2021)

- Focus first on urgent risks to American well-being
- Explore complex interactions between global change and human systems
- Decision support for mitigation and adaptation strategies
- Crosscutting research needed to support management of climate risks
- Enable USGCRP to support a risk management paradigm



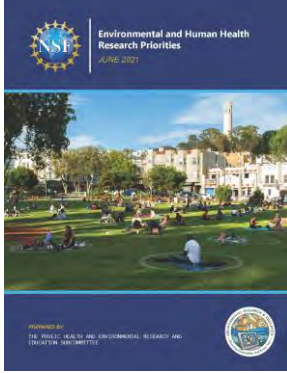


2021 Report: Advisory Committee Environmental Research and Education



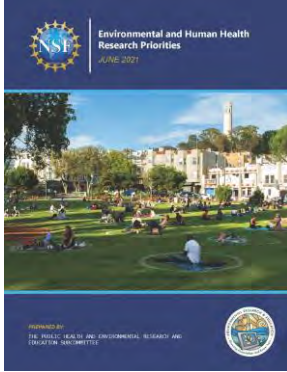
https://www.nsf.gov/ere/ereweb/reports/AC-ERE-Environmental-and-Human-Health-Report_June7-508.pdf

- Impacts of environmental change on health
- Feedbacks between health, infrastructure, and the environment
- Forecasting
- Interacting environmental and social stressors
- Engagement



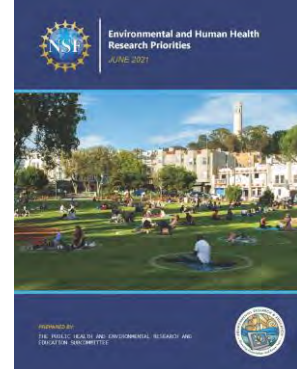
Impacts of environmental change on health

- How are accelerating anthropogenic changes to the Earth's natural systems—biodiversity loss, **climate change**, land use change, pollution, and resource scarcity—threatening human health?
- What is the scale of these threats? Which populations are at greatest risk and/or most vulnerable, and which dimensions of health are most impacted?
- How do inequities in environmental threats lead to inequities in human health?



Feedbacks between health, infrastructure, and the environment

- How does human health, including inequities, consequences of poverty, and societal impacts of disease outbreaks, feedback to affect air and water quality, resource use, and biodiversity?
- What are the drivers and mechanisms underlying positive nature-human health relationships?
- How can advances in understanding the health-environment nexus lead to innovations in engineering, design, and policy solutions?



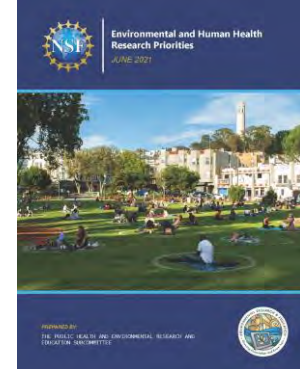
Forecasting

- How do we improve capabilities for understanding and forecasting connections between environmental change and human health?
- How can we develop better warning systems and anticipate blind spots?
- How can we prioritize investments that anticipate and prevent adverse health impacts among the most vulnerable populations?



Interacting environmental and social stressors

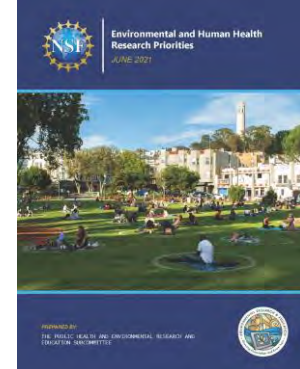
- What is the relative role of education, wealth, social capital, and knowledge in building resilience to multiple and compounding socioenvironmental and health stressors?
- How can we integrate responses to multiple stressors in a way that is sustainable and equitable?
- How do changing inequities in environmental conditions interact with health disparities?





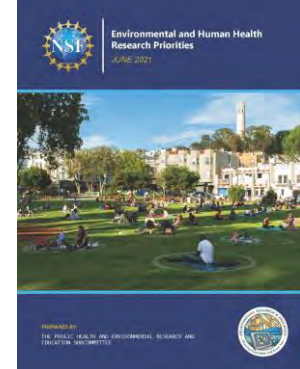
Engagement

- How does public understanding of complex socioenvironmental systems intersect with health?
- Are there existing or new models of engagement that show potential for helping to solve environmental and health crises?
- Which actors, communities, and stakeholders have been excluded from participation in environmental and human health research and decision-making, and how can these barriers be overcome?





Recommendations



- Environmental and public health research should be an integral component of convergent research and institutions should foster the kinds of teams that can perform this work.
 - Environment and Human Health research must be convergent across NSF-funded disciplines, public health, and biomedical sciences.
- Interagency collaboration is essential for facilitating and supporting environmental and public health research.
 - The research community would benefit from more clarity about NSF's role in public health research.
 - Environment and Human Health often falls at the intersection among agencies, which has left gaps in the research portfolio.
 - NSF can play a critical role in filling these gaps with interagency coordination.



NIEHS-NSF Oceans & Human Health Program

- Partnership between NIEHS and NSF GEO/OCE
- Funding spans two decades
 - 2004: four Centers
 - 2012: two Centers, eleven R01s
 - 2018: three Centers, four R01s (~\$30 M)
- Promotion of interdisciplinary collaborations:
 - Strong hypothesis-driven research projects comprising health sciences and natural sciences
 - Improve our knowledge of the impact of marine and lacustrine environments on human health
 - Consistent stakeholder engagement



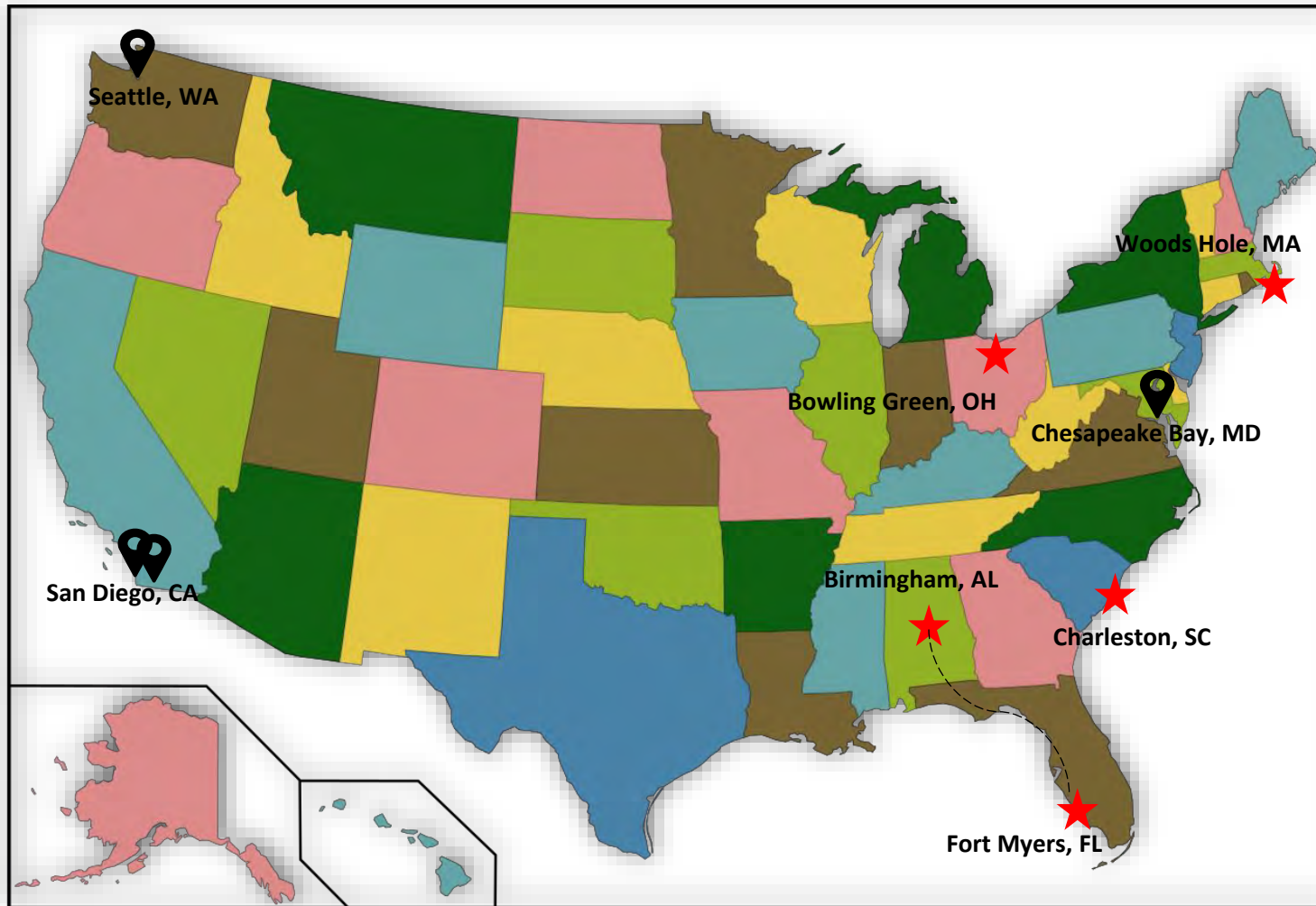
Image (NASA) Lake Erie algal bloom



National Institute of Environmental Health Sciences
Your Environment. Your Health.

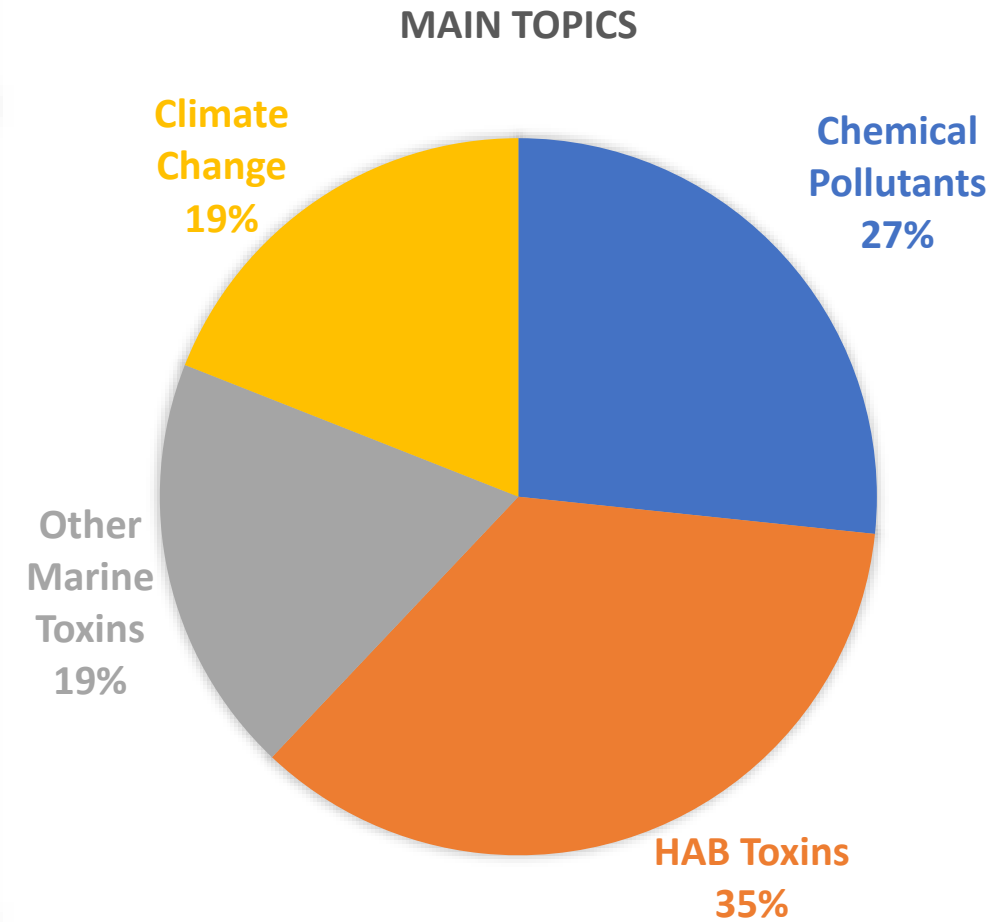


NIEHS-NSF Oceans and Human Health Centers and Grants Active (2018-2023)



R01

Centers



Slide courtesy Dr. Hedy Edmonds GEO/OCE



NIEHS-NSF Oceans and Human Health Centers

- [Woods Hole Center for Oceans and Human Health](#)
- Greater Caribbean Center for Oceans and Human Health
- [Lake Erie Center for Fresh Waters and Human Health](#)
- [Center for Oceans and Human Health and Climate Change Interactions at the University of SC](#)
 - enhance knowledge of the role climate change may play in affecting Vibrio bacterial infections and production of toxins from freshwater cyanobacteria, and their resulting effects on ecosystem and human health.



Navigating the New Arctic (NNA) Major Goals and Key Components

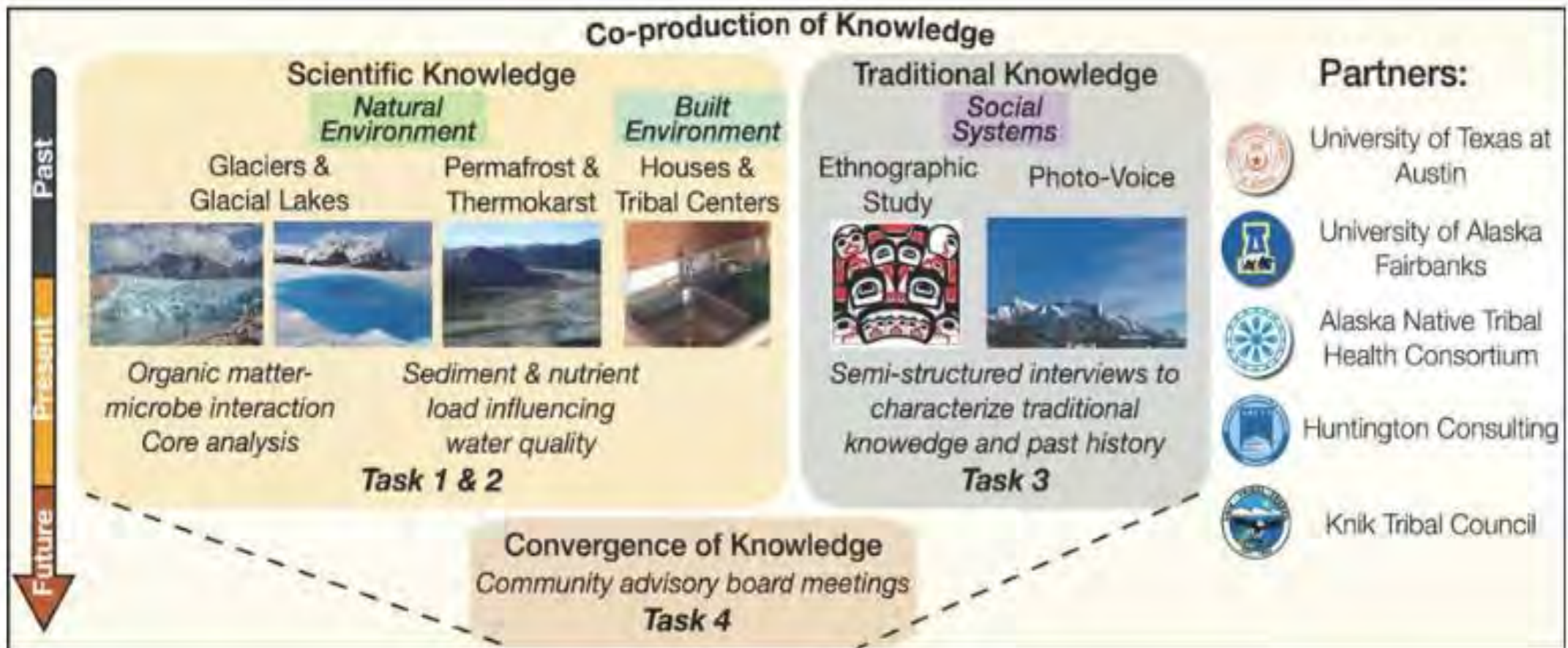
- Improved understanding of Arctic change and its local and global effects
- New and enhanced research communities
- Research outcomes to inform U.S. national security and economic development needs
- Enhanced efforts in formal and informal education





Water Quality in Alaska Native Communities

- ❖ historic, current, and future water quality in 4 Alaskan regions.
- ❖ ethnographic understanding of water quality, and
- ❖ iterative communication of process and results with communities





Fairbanks Winter Air Study: Indoor and Outdoor Air Quality

<https://fairair.community.uaf.edu/>



Intensive Observation Period:
January 17 through February 25, 2022

<https://alpaca.community.uaf.edu/alpaca-field-study/>



