

Technical Assessment of Interim Science Agenda: Survey Responses – Summary version

Prepared by:

Sarah Skikne

Midwest Climate Adaptation Science Center
Institute on the Environment
University of Minnesota

With helpful feedback from:

Jessica Hellmann

Jess Del Fiacco

Elissa Welch

Midwest Climate Adaptation Science Center
Institute on the Environment
University of Minnesota

Kristen Voorhies

Midwest Climate Adaptation Science Center
U.S. Geological Survey

Mark Miazga

Office of Measurement Services
University of Minnesota

Thomas Kenote

(working group member)
Sustainable Development Institute
College of the Menominee Nation

Susan Galatowitsch

(working group member)
Department of Fisheries, Wildlife and
Conservation Biology
University of Minnesota

Jeremy Guest

(working group member)
Institute for Sustainability, Energy,
and Environment
University of Illinois Urbana-
Champaign

Gabe Filippelli

Ellen Ketterson

(working group members)
Environmental Resilience Institute
Indiana University

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Background and objectives

The Midwest Climate Adaptation Science Center's (MW CASC) Strategic Science Agenda will guide the MW CASC's work through 2026, and is currently at an interim stage.

We are conducting a technical assessment to support the revision and finalization of these science priorities. This exercise will ensure that MW CASC research priorities are informed by current scientific understanding, technical complexity, and opportunity for impact, and that they capture the full range of relevant issues and are attentive to emerging concerns.

Here, we report on the first stage of our technical assessment: a survey of technical experts from the region, including university, state, Tribal and federal researchers and other experts. Our goal was to identify topics that are missing or underrepresented from the Interim Science Agenda, as well as emerging topics for future iterations of the Agenda.

In the next stage of the assessment, the USGS will revise the interim list based on the findings reported here. In the final stage, we will invite experts to group sessions to characterize the updated list of science priorities along three axes: (1) state of knowledge / amount of uncertainty, (2) technical complexity and feasibility of answering the question, and (3) opportunity for impact. This information will help the USGS focus and prioritize their efforts to strategically impact climate adaptation science in the region.

More details can be found in the [full report](#) of survey results.

Methods

The main part of the survey consisted of seven questions:

- Two questions asking respondents to list important research topics over two time frames: <5 years and 10+ years. These questions were meant to solicit research topics that were top-of-mind for respondents.
- Five questions on missing topics (one for each management challenge). Respondents were instructed to read the existing science priorities and then list what was missing.

We sent the survey out to >150 individuals and listservs, including ~50 experts identified by survey respondents. The survey was open from June 6 to July 9, 2022.

Respondents provided 264 unique, usable answers in response to the seven main survey questions. Each answer could be composed of >1 comments, which were separately coded.

We conducted a two-part analysis of responses:

1. **Qualitative assessment of underrepresented themes:** Many respondents listed similar themes that were missing or underrepresented in the interim science agenda. We tracked

these patterns as we noted them, but did not formally assess the extent to which they could be encapsulated by the existing science priorities.

2. Formal assessment of the relationship between existing priorities and survey responses:

We categorized all comments into one of three categories:

- (1) comments that were encapsulated by and supported the existing priorities
- (2) comments that suggested research topics that could be included by editing or expanding existing science priorities. We suggest revisions to the existing science priorities based on these comments.
- (3) comments that suggested new research topics which could not be readily encapsulated by revisions to existing science priorities.

Respondents

We received usable responses from 68 respondents.

Geography

- Minnesota and Wisconsin had the most respondents.

Institutions

- University of Illinois, Indiana University, University of Minnesota and The Nature Conservancy were the most common institutions.

Expertise and experience

- Respondents reported a median of 20 years of experience in their field.
- The most common areas of expertise were “terrestrial species / habitats” and “management / restoration”.
- Respondents most often gained their expertise via field research.
- 25% of respondents reported expertise in “tribal communities” and/or gained expertise via “native stewardship or traditional ecological knowledge”.

Summary of results

Missing or underrepresented themes identified in qualitative assessment

- Adaptation Effectiveness
- Climatology & hydrology
- Connectivity & Fragmentation
- Ecosystem functions
 - Carbon storage
 - Nutrient storage & cycling
 - Productivity
 - Generic ecosystem functioning
- Great Lakes
- Groundwater
- Impacts of other sectors on natural resources
- Agriculture
- Carbon emissions / mitigation in other sectors
- Human resettlement
- Impacts of & responses to other sectors adapting
- Interactions between multiple stressors
- Interactions between terrestrial & aquatic systems
- Pests & pathogens
- Public health

- Social science
 - Decision science
 - Environmental justice & equity
 - Policy analysis
 - Behavior, identities, perceptions, acceptance
- Social & economic impacts
- Collaboration, coordination & engagement
- Soil
- Traditional Ecological Knowledge
- Tribal concerns & partnerships

Suggested revisions based on formal assessment

See the [full report](#) of survey results.

New topics based on formal assessment

Management Challenge 1

- Ecosystem functioning, incl. in terrestrial systems
- Impacts on environmental justice, communities, cultural resources, & recreation
- Physical science, climatology, hydrology
- Impacts to plants (incl. terrestrial) & forests
- Impacts of flooding on human communities
- Climate refugia
- Ecosystem responses
- Species interactions that provide resistance or resilience
- Wastewater discharge during droughts
- Directing ecological transformation

Management Challenge 2

- Impacts on ecosystem functions
- Impacts on connectivity
- Physical science, climatology, hydrology
- Southern species migrations

Management Challenge 3

- Physical science, climatology, hydrology
- Hydrological impacts on terrestrial systems
- Impacts on the Great Lakes
- Impacts to ecosystem function
- Water policy & management
- Drinking water
- Conditions needed to restore peatlands
- Conservation prioritization of fish species & habitats
- Ecological mechanisms by which climate change will impact aquatic systems

Management Challenge 4

- Forest management, reforestation & restoration, including policy
- Management & restoration (non-forest or generic)
- Agriculture
- Natural / evolutionary adaptation
- Carbon sequestration
- Interactions between multiple stressors
- Impacts of changes to pollinators / insects
- Fire
- Range shifts *into* the region & responses
- Determinants of range limits
- Projections & impacts of windstorms
- Seed & plant material sourcing

Management Challenge 5

- Landscape connectivity
- Decision science
- Rural & urban impacts & solutions
- Adaptation effectiveness
- Adaptation sufficiency & portfolios
- Tribal concerns & supporting tribes
- Policy, governance & socioeconomic barriers to & facilitation of adaptation
- Environmental justice of impacts & adaptation
- Traditional Ecological Knowledge

- Collaboration, coordination & engagement
- Impacts of other sectors mitigating
- Impacts of other sectors adapting & potential responses
- Impacts of human resettlement
- Workforce
- Alternative future climates
- Protected areas & range shifts
- Learning