MIDWEST CLIMATE ADAPTATION SCIENCE CENTER

FY23 Science Priorities

We welcome projects that conduct syntheses, pilot studies, field or lab experiments, quantitative assessments, or adaptation studies. Each project should target one or more issues faced by natural and/or cultural resource managers from federal, state, and/or Tribal government, generate knowledge to address that challenge, and engage resource managers in meaningful ways. Projects can be focused on:

- expansion of current research initiatives
- new climate impact science in response to a management challenge
- applied research in the design and evaluation of climate adaptation

All projects should prioritize climate as the primary driver of impacts to fish, wildlife, lands, and water. Projects addressing management challenges that do not clearly link climate-related changes to research objectives will not be considered.

We especially welcome projects addressing Federal or State trust resources (e.g., endangered species, migratory birds, Regional Species in Greatest Conservation Need), species scheduled for review of protection status, economic or culturally important species, high priority conservation areas, public lands, and Tribal lands/ancestral lands/ceded territory.

From the MW CASC Interim Science Plan, the following 10 priorities have been selected for FY23:

1.3. Assess potential impacts of extreme rainfall on fish and wildlife management infrastructure. Projects may focus on, but are not limited to:

- Function and durability of fish hatcheries
- Suitability of fish passage structures
- Dual considerations (i.e., climate and ecological risk) for dams and culverts
- Utility and risk of water control structures

2.1. Assess the population-level effects of warming winters on cool and cold-water fish in streams and lakes. Projects may focus on, but are not limited to:

- Fine scale vulnerability assessment (e.g., watershed/lakes/streams)
- Culturally or ecologically important, but under-studied species
- Adaptive capacity of inland or stream fishes
- Impacts to fish relatives (i.e., fishes of concern for Tribal communities)

3.2. Determine the future geophysical conditions of inland lakes. Projects may focus on, but are not limited to:

- Advancing mixed methods (e.g., empirical, remote-sensing, process-models, statistical models) to understand and better predict future conditions
- Improving the temporal scale of assessments
- Advancing understanding of future conditions for under-studied lake classes/systems
- Effects of land-use change

4.1. Determine the future composition, ecological function, and distribution of forests. Projects may focus on, but are not limited to:

- Mechanistic models of future forest composition, distribution, and ecological function (e.g., understory dynamics)
- Effects of climate-driven invasive species and native forest pests
- Vulnerability and adaptive capacity of trees of special importance to Tribal communities (e.g., paper birch)
- Forests of the southern MW CASC footprint (e.g., Missouri Ozarks, bottomland forests, Mississippi River Valley)

4.5. Assess climate-driven shifts in the abundance and distribution of priority wildlife species. Projects may focus on, but are not limited to:

- Shifts driven by changes in habitat (e.g., boreal forests)
- Shifts driven by human development in response to climate change
- Climate effects on vital rates, population trends, and community dynamics
- Fine scale vulnerability assessment (e.g., management unit, sub-population)

4.7. Assess the potential for range shifts or local extirpation of focal species from Tribal lands. Projects may focus on, but are not limited to:

- Range shifts/local extirpation of animal relatives from pre-settlement homelands, culturally-important sites, Tribal lands, or ceded territory
- Range shifts/local extirpation of plants of special importance from pre-settlement homelands, culturally-important sites, Tribal lands, or ceded territory
- Populations or areas where management/adaptation might retain focal species on the landscape

5.1. Assess the feasibility of current and potential ecological restoration goals under future conditions. Projects may focus on, but are not limited to:

- Climate-driven constraints on statute, policy, or procedures in land or population management
- Management of designated wilderness areas
- Optimization of resist, accept, direct or other decision frameworks
- Systematic resource allocation analyses for cost-effective restoration

5.4. Provide climate-informed decision support in the selection and application of restoration tools (e.g., prescribed burning, water control). Projects may focus on, but are not limited to:

- Feasibility, risks, and benefits of prescribed burns
- Novel, climate-informed approaches to invasive species management
- Management of high and/or low water conditions (e.g., feasibility assessments, early warning systems)
- Tools to inform selection of seed sources, mixtures, and plant materials (e.g., flood and drought tolerance, phenology)
- Risk characterization or optimization of management interventions (e.g., cost, long-term goals)

5.9. Inform the design of monitoring programs to detect and respond to climate change. Projects may focus on, but are not limited to:

- Cost-effective methods to detect critical weather-climate changes and/or ecological thresholds
- Early warning systems to inform timely management interventions
- Tools and frameworks to monitor and evaluate effectiveness of climate adaptation

5.8. Identify climate adaptation practices that yield co-benefits (e.g., mitigation, economic gain, social resilience). Projects may focus on, but are not limited to:

- Acquisition, protection and/or management of wetlands, grasslands, or forests
- Conservation easements
- Management of public lands in densely populated areas