Wisconsin recreational inland fisheries are socially and economically important. Walleye (*Sander vitreus*) is a coolwater species that is experiencing reduced productivity as a result of the combined effects of climate change, shoreline development, aquatic invasive species, overharvest, and competition with warmwater species. The state has heavily invested in stocking to resist the loss of this highly popular target species, with limited success. The benefits of this continued financial investment in terms of angler welfare are unclear. We have developed an integrated social ecological systems model of the Wisconsin inland lake fishery to evaluate the effects of climate change on the distribution of fishing effort targeting three of the most popular inland target species: walleye, largemouth bass, and bluegill. Increasing water temperatures influenced the simulated growth and natural mortality of each of these species in age and size structured population models. An angler decision sub-model chooses fishing sites, catches, and harvests fish. The decision model is parameterized by a discrete choice experiment, angler diary data, and a DNR survey of walleye anglers. As heterogeneous simulated anglers shift their fishing activity to compensate for changing fishing conditions, we observed the emergent effects of walleye decline under different climate scenarios. Future work will investigate the effects of different management strategies that adapt to this change.

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Title: Integrated modeling of recreational fisheries for climate adaptation in Wisconsin

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Wisconsin’s recreational fisheries are experiencing a number of social and ecological changes. Interactions of warming waters, increasing shoreline development, aquatic invasive species, and high levels of harvest are resulting in changes to fish communities that will be difficult or potentially impossible to reverse. Of particular significance is the loss of socially and economically important coolwater species such as walleye (*Sander vitreus*) in many lakes. Understanding and adapting to the ramifications of these changes requires integrating what we know about changing aquatic ecosystems with the dynamic behavior of recreational anglers. We are developing a simulation model that integrates projected changes in water temperature, fish population dynamics, and recreational angler behavior to investigate their emergent effects on the Wisconsin inland lake fishery under different climate scenarios. Within this model, population dynamics and growth of walleye and bluegill populations are parameterized by empirical data specific to particular lakes or watersheds. Across days and years, simulated recreational anglers with different preferences choose fishing sites based on empirically derived tradeoffs between travel time and fishing quality. In this step of model development, we are testing the simulation’s ability to efficiently replicate landscape patterns of fishing effort and harvest. This development of a simple but effective baseline model will allow us to test key biological and social assumptions, evaluate management alternatives, and propose strategies for climate adaptive fisheries management.