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## **Physical processes and fish recruitment in large lakes: Phase II**

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### **ABSTRACT:**

The first phase (2007-2015) of the Great Lakes Fishery Commission's "Physical Processes and Fish Recruitment in Large Lakes" research theme successfully attracted research proposals to the Fisheries Research Program and generated useful products to support fisheries management. For this reason, beginning in 2016, we sought to expand the theme in a way that that would continue to support past theme activities (e.g., biophysical modeling, marine-freshwater science integration) but also more fully help the GLFC achieve its long-term vision of implementing ecosystem-based approaches to fisheries management. Doing so also would ideally encourage and facilitate new physical-biological coupling research endeavors and illustrate a way to assess ecosystem change and its impact on Great Lakes fisheries. Toward this end, we created a database to be made available to the public that was informed by the Great Lakes research and management community. Input on the database was gathered at a two-day workshop attended by 40+ Great Lakes researchers, managers, and stakeholders. Many outcomes emerged from this workshop. Most prominently, we collectively identified impediments to implementing ecosystem-based management (EBM), including high anticipated costs, a lack of EBM success stories to garner agency buy-in, and 3) difficulty in establishing common objectives among groups with different mandates (e.g., water quality vs. fisheries production). In discussing solutions, we determined that a comprehensive, research-ready database – a prototype of which was presented at the workshop – would offer a cost-effective means to support EBM approaches by facilitating research that could help identify useful ecosystem indicators and management targets and allow for management strategy evaluations that account for risk and uncertainty when contemplating future decision-making. In addition to confirming support at the workshop for a comprehensive, user-friendly, publicly available database, we solicited information on data to include and ways to improve our database so that it is used. Herein, we provide the first version of the Great Lakes Recruitment and Ecosystems (GLaRE) database in both SQLite and Microsoft Access formats. This relational database contains 1,585 long-term fisheries and environmental datasets from across the Great Lakes basin, which can be easily queried use SQL, R, or Python programming languages. In addition to providing GLaRE database, we describe its structure and content, as well as how it can be used to support ecosystem-based approaches to fisheries management within the Great Lakes basin.-