

EDITORIAL

THE NEED FOR GREAT LAKES RESEARCH

The Great Lakes are a valuable international resource, are heavily used, and have resource problems associated with natural variability and conflicts of use. Decision makers in government and private institutions are confronted with numerous goals, often conflicting, from which they must try to achieve fair and balanced policies. Among these Great Lakes goals are: enhancement of commercial and sports fisheries and the health of the entire ecosystem that supports them, rational use of water supply including withdrawals, consumptive use, and diversions of lake water, encouragement of recreation and tourism, and sensible use of the lakes for transportation, waste disposal, hydropower, and mining.

Great Lakes management decisions are being made with insufficient knowledge and information. Increased understanding of how the Great Lakes ecosystems function is a recognized precursor to assessing system response to specific stresses and corrective options. A similar need to understand causality was expressed by the U.S. National Research Council Geophysics Research Board. "When decisions regarding the use of our nation's marine systems must be made, the store of reliable knowledge and predictive capability of our models must be considered the primary source of useful guidance." The U.S./Canadian Great Lakes Science Advisory Board in its 1982 Annual Report expressed a similar line of reasoning. "One purpose of Great Lakes research is to establish the relationships between water quality problems and their causes. Since water quality management strategies are based entirely on the understanding of these relationships, it is improbable that sound management decisions can be formulated in the absence of such research." The goals of the Great Lakes Water Quality Agreement will not be met by attention to water quality alone. The relevant ecosystem includes all first order interacting components—land, air, water, sediments, and man. If research is inadequate, it will be difficult to identify problems, understand the cause-effect relationships, predict ecosystem responses or behavior, and ultimately improve the management of the Great Lakes.

Major Great Lakes resource issues are identified that require resolution over the next decade: (1) toxic chemicals pollution, (2) nutrient overenrichment, (3) habitat modification, and (4) water quantity changes. For each issue there are many management questions that require research to resolve. For example, are the fish safe to eat? Will future consumptive use of water significantly lower lake levels? To what extent are remedial options for dealing with in-place pollutants desirable, feasible, and cost-effective given associated risks and costs? Management questions involve balance among development, utilization, protection, and rehabilitation at acceptable risks and costs.

It is essential that we develop a holistic qualitative and quantitative understanding of the Great Lakes ecosystem, its first order processes, and its variability in space and time due to natural and anthropogenic stresses. Fundamental research is needed with coupled experimental and theoretical approaches with a long lead-time to reduce uncertainty in information and to develop improved understanding and prediction capability. Applied research is needed to apply existing knowledge and predictive capability to improve management and regulatory operations, and to support decisions "now."

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Editor's Note: Eugene Aubert, who led the Great Lakes Environmental Research Laboratory since it was created in 1974, retired from U.S. government service on 1 June 1986.