Executive Summary

Historically, the walleye *Sander vitreus* fishery in Saginaw Bay was among the largest in the Great Lakes, second to only that in Lake Erie. The walleye fishery collapsed in the mid 1940s, however, due to a series of year class failures. The failures were principally the result of spawning habitat degradation brought about by a series of human activities. The opportunity for recovery began in the 1970s with improving water quality. Walleye fingerling stocking was stepped up by the Michigan Department of Natural Resources (MDNR) in the early 1980s and a sport fishery soon developed. However, the walleye fishery plateaued by the mid 1990s, well short of historic yields. The bay remained heavily dominated by small prey fish species and there was insufficient predation to maintain ecological balance. There was some evidence of walleye natural reproduction but a lack of knowledge about modern day sources of recruitment, and the obstacles to expanding recruitment prevented the formulation of additional management strategies.

The MDNR began a series of research projects designed to obtain answers about the status of the walleye population, including recruitment sources. This research suggested an additional gauge for measuring progress towards walleye recovery based on growth rate. Walleye grow extremely fast in Saginaw Bay because of the abundance of prey resources, and an overall low abundance of walleye and other predators. New recovery objectives were defined as a walleye population sufficiently abundant that the growth of age-3 walleyes declines to 110% of the state average rate (currently 128%). The growth rate objective is superior to an objective based on historic yields, due to fundamental differences between the modern sport fishery and the historic commercial fishery. Current recovery goals are:

- Predator/prey balance
- Walleye population at carrying capacity
- Self-sustaining natural reproduction

Research conducted by the MDNR also led to the conclusion that modern day sources of walleye included natural reproduction from the bay's rivers (particularly tributaries of the Saginaw River), stocking, and immigration from sources outside Saginaw Bay. Natural reproduction on offshore reefs within Saginaw Bay was no longer a significant source of recruitment. The inner bay reefs (which were most important) were degraded by sedimentation. Reproduction in rivers was limited by dams that blocked nearly 2/3 of the watershed's river reaches. Further limitations to natural recruitment are believed to include predation by alewives *Alosa pseudoharengus* on newly hatched walleye fry. Research findings also documented the effectiveness of stocking small fingerlings as a management tool.

Armed with this information, a series of management strategies and options were devised and compiled in this report. The strategies and options listed are designed to specifically address the obstacles limiting natural reproduction.

- Fish Passage–Six different rivers were identified as candidates for either removal of dams or the construction of ladders. The purpose is to restore access to spawning for migrating walleyes.
- Reef Reclamation–If reclamation of reefs could succeed in providing suitable substrate for spawning, then this practice could reclaim some of this historic source of recruitment. Reef reclamation, however, is problematic due to the abundance of predacious alewives in the open water, and a low remaining abundance of reef spawning strains of walleyes within the bay. The approach here is included as an experimental option.
- Increased stocking–Stocking more fingerling walleye is offered as a means to make progress towards increasing predation rates and increasing abundance. Increased stocking alone is not expected to directly contribute to more natural reproduction but can indirectly facilitate natural recruitment via increased predation of alewives.

- Sediment control–Because much of the degradation to spawning habitat was a result of sedimentation and because sediment loads remain excessive in the Saginaw River system, relief is needed to help preserve remaining habitat and to protect any new habitat developed. Partnerships needed to be developed with land management and water quality agencies to ensure that fisheries needs are included for the Saginaw Bay watershed.

Additional strategies are examined in the report but were rejected as not directly addressing the known limiting factors. Research needs are also identified.

This plan advocates an adaptive management approach to recovery, where research and evaluation are used along the way to gauge progress, with strategies adjusted as necessary. However, implementation will have to come on a large enough scale to produce measurable changes. Implementation can take several forms and not all options need to be pursued simultaneously. The more varied the approach, however, the greater the likelihood for success. While some walleye recovery progress has been made, further and complete recovery will not occur without additional management intervention. The magnitude of Saginaw Bay's fishery and the economic activity generated by its fisheries justify further investment by the MDNR, other agencies, and stakeholder groups.