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**CESU Final Report Summary for St. Marys River Coordinator and Working Group for the
International Upper Great Lakes Study**

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Purpose: The coordinator and working group for the St. Marys will provide information for this site relating to ecosystem impacts of changing water levels and flows for managing the system in a sustainable manner.

Location: St. Marys River, Lake Superior, US and Canada

Methods: Obtain, synthesize and evaluate data and information on environmental resources. Collect and evaluate ecosystem attributes that are priorities for river conservation and water management. Develop performance indicators for select ecosystem affected by river flows and water levels. Provide justification and documentation for select performance indicators. Maintain regular communications on working group progress and report final products, accomplishments and limitations. This includes: river and channel hydraulics, fisheries, aquatic communities, lamprey and river quality. A descriptive model of ecosystem change in response to stressors developed by Davies and Jackson was applied to the St. Marys River, along with using comprehensive reviews of the river environment, a conservation assessment using more than 40 river experts and a workshop of St. Marys River biologists. Observations of change in the river ecosystem were collected, and then organized in the six classes of condition using the specification for environmental attributes in Davies and Jackson.

Results: Using the pattern of observed and reported changes relative to the ecosystem status classes, we concluded that the St. Marys River currently has moderate changes in the structure of the biotic community and some change in ecosystem function (Class 4). Some changes were rated minimal or evident (Classes 2 and 3), and a fair number of observations indicate major change in the ecosystem. However, all environmental attributes showed change in the class 4 level and the changes noted cluster around this level. Class 4 is marked by moderate change in ecosystem structure and minor functional change. Changes in community structure involved replacement of some sensitive and specialized taxa by more tolerant taxa and nonnative species. Small fishes, some birds, wetland plants, and salmonid fishes have shifted toward more tolerant taxa and nonnative species that are more generalized in environmental needs. The altered community compositions indicate some significant change in ecosystem structure and function such as altered food webs and benthic invertebrate composition. Large changes in abundance may be seen in some taxonomic groups such as bacteria, some birds, and a variety of non-native species. Our conclusion is that the St. Marys River has experienced moderate biological structure change without major ecosystem functional breakdown. However, many species of different taxonomic groups are in the process of colonizing the river

and increasing in abundance. The St. Marys River is approaching a point where major ecosystem functional change can occur given the strong alteration of water flows and paths combined with increasing water temperatures. Controlled water releases may be used to flush sediment in a manner approaching conditions prior to river regulation to maintain a more natural and productive environment. Proper implementation of flushing flows is necessary to maintain ecological integrity while allowing for control of flow for other purposes during the remainder of the year.

Researchers: Mark B. Bain (Cornell Univ.), and Kristin Arend, Geoffrey Steinhart, Ashley Moerke, and Pariwate Varnakovida of Lake Superior Univ.

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