



USGS NSF GRIP Opportunity

USGS Center:	Upper Midwest Environmental Sciences Center
Project Title:	Quantifying nutrient retention and transformation in rivermouths
Project Hypothesis or Objectives:	<p>Rivermouths and other areas of the Great Lakes nearshore zone are the interface between the Lakes and the human communities that surround them. These areas provide abundant ecosystem services, including those related to provisioning services (food and water supply), cultural services (recreation and tourism) and regulating services (water quality regulation). Across much of the Great Lakes, changing land use practices, improved waste-water management programs and the invasion of dreissenid mussels have resulted in low-productivity open water environments and an increased reliance of the entire food web on nearshore processes. This is because nearshore habitats are often the direct recipients of terrestrial nutrient inputs (e.g., rivermouths) or are regularly exposed to terrestrial inputs (e.g., nearshore zones that are periodically flushed with river plume waters) that stimulate primary producers. Although nutrients (especially N and P) stimulate primary production, the load, timing, ratio and form of nutrients delivered to the nearshore strongly influences the processes and thus services these nearshore areas provide. In the Great Lakes, nutrient loading estimates are made using data from river gages that are located outside the upstream extent of lake influence. However, some recent results have implied that rivermouths alter relationships between landscape nutrient sources (e.g., agriculture) and nutrients available to nearshore food webs. Natural rivermouths are often highly complex systems with associated wetland complexes, and we hypothesize these rivermouth ecosystems can retain significant amounts of N and P. In this project, a multidisciplinary group is attempting to estimate the potential for restoration activities within rivermouths and coastal wetlands to retain or transform nutrients being delivered from the upstream watershed by measuring rates of nutrient uptake and transformation in rivermouths that have been intensely altered and those that have been minimally disturbed.</p>
Duration:	12 months
Internship Location:	La Crosse, WI or Green Bay, WI

- Area of Discipline:** Biology, ecology, aquatic ecology, biogeochemistry.
- Expected Outcome:** The project will benefit the USGS by assisting in the completion of Great Lakes Restoration Initiative project #62 (Larson, lead PI). Accomplishing the objectives of GLRI 62 are needed to accomplish objectives in the USGS GLRI Science Framework.
- The project will benefit the intern by providing them an opportunity to gain experience participating in a collaborative effort and the opportunity to co-author a manuscript (or several).
- Special skills/training Required:** Experience in small boats is preferable (although boater safety training will be provided), as is experience on large lakes ecosystems. Experience in measurement of nutrient processing rates would be a plus.
- Duties/Responsibilities:** Duties will be determined in part by when the intern will be able to begin working on the project, but will ideally include assisting the lead PI and other project PI's in site selection, methods development, leading a field crew to collect samples and process rates post-retrieval. The intern will also be asked to lead or participate in the development of manuscripts associated with the project, although completion of manuscripts may take longer than the actual duration of the internship.
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