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# William F. James

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## Achievements

### Lake management and restoration applications

- Developed and improved alum dosage techniques to inactivate mobile phosphorus in sediment. These have been used in many lake management applications.
- Designed and implemented numerous monitoring plans to quantify phosphorus sources to lakes and management strategies to control phosphorus, reduce algal blooms, and increase light habitat for native submersed aquatic plants.

### Eutrophication diagnostics

- Constructed numerous detailed hydrological and nutrient budgets for evaluation of eutrophication problems and TMDL development.
- Accomplished at lake and tributary loading empirical models to evaluate lake responses to loading reduction scenarios.

### Scientific analytical tools for diagnosing water quality problems

- Developed laboratory techniques for quantifying internal phosphorus loading from intact sediment cores for use in phosphorus budgets and TMDL analysis.
- Analytical techniques for assessing sediment particle size distribution, vertical variations in sediment mobile phosphorus pools, and phosphorus equilibrium characteristics between suspended sediment and the water column
- Developed techniques for measuring sediment oxygen demand, nitrification, and denitrification.

### Scientific research

- Produced 51 peer-reviewed publications in international journals.
- Research emphasis is on phosphorus and nitrogen cycling, phosphorus exchanges between sediment and water, lake, reservoir, and large river eutrophication and biogeochemistry, sedimentation, sediment-water fluxes, eutrophication management using aluminum sulfate to control internal phosphorus loading from sediment, cyanobacteria management, and aquatic plant management.

### Academic and professional

- Developed and currently teach BIO-450 (Aquatic Ecology and Management) as part of the Environmental Sciences Program at UW-Stout. Developed and currently teach the BIO-750 (Advanced Limnological Approaches) graduate level course for the Professional Sciences Masters – Conversation Biology.
- Undergraduate advisor (6 students) for the Aquatic Biology concentration of the Environmental Sciences Program at UW-Stout.
- Graduate advisor (2 students) for the Professional Science Masters – Conservation Biology Program at UW-Stout.

- Provided funding and supervised undergraduate (7 students) and graduate (2 students) student research internships in aquatic ecology between 2012 and present. Students participate in various research projects that are conducted out of UW-Stout.
- Academic advisor for the Environmental Sciences Program and Professional Sciences Masters– Conservation Biology advisory committee at UW-Stout.
- Red Cedar River Basin committee
- Associate Editor for the Journal *Lake and Reservoir Management*

## Skills and assets

- Research funding acquisition skills. Developed proposals and procured ~ \$600,000 in funding to conduct research on lake eutrophication and management at the University of Wisconsin–Stout.
- Research skills. Designed and conducted experimental and field research in aquatic ecology and management as a professor at UW-Stout.
- Supervisory, management, and training skills. Managed and mentored over 50 students and full-time staff in limnological research and water chemistry at the USACE Eau Galle Aquatic Ecology Laboratory for 25 years.
- Contacts and networks with Federal, state, and local agencies.
- Project management skills: stakeholder coordination, proposal writing and budgeting, scope of work development, execution, analysis, presentation, and recommendations.
- Expertise in lake and tributary models FLUX and BATHTUB, phosphorus export coefficient models, resuspension models.
- Fluent with database management and spreadsheet (Excel, PowerPoint), digitizing and contour plotting (Surfer, Didger), and statistical (SAS) analysis programs. Skilled in data reduction, statistical analyses, and graphic presentation.
- Proficient at report writing, public speaking and presentation, and publication.
- Analytical skills in water and sediment chemistry, field sampling and processing, hydrology and flow monitoring, field and laboratory instruments, and data loggers.
- Laboratory skills in experimental determination of phosphorus and nutrient fluxes between sediment and water, including diffusive and equilibrium processes, and sediment phosphorus fractionation methodologies (loosely-bound, iron-bound, labile organic, aluminum-bound, calcium-bound, refractory organic phosphorus forms)

## Recent projects and success stories

- Examination of sediment phosphorus fluxes and potential contributions to harmful algal bloom development in the western basin of Lake Erie. This important project is part of a broader research collaboration with federal, state, and local agencies to determine drivers of cyanobacterial bloom development in this great lake (conducted out of UW-Stout; participation of 2 students; 2013)
- Analysis of phosphorus dynamics and rehabilitation options in hypereutrophic Lake Desair, WI. Students participate in field sampling and laboratory research to identify important nutrient sources driving algal blooms in this system (conducted out of UW-Stout; participation of 3 students; 2012 to present)
- Experimental research on aluminum sulfate dosage and application strategies to control sediment phosphorus diffusive flux in Minnesota and Wisconsin Lakes. This research has produced significant new findings that will change the way scientists manage lakes with aluminum sulfate (conducted out of UW-Stout; participation of 3 students; 2012 to present)
- Phosphorus budget and sediment diffusive flux analysis in relation to cyanobacteria blooms in the Wisconsin River system. Students in the Environmental Sciences Program at UW-Stout are participating in this important State-sponsored research

project that will lead to the development of a TMDL (conducted out of UW-Stout; participation of 3 students; 2012 to present)

- Research on phosphorus fluxes from bottom and resuspended sediment in Lake of the Woods, MN, is part of an overall TMDL being developed for this important system that has become impaired with cyanobacterial blooms (conducted out of UW-Stout; participation of 2 students; 2011 – present).
- Lac Courte Oreilles, an oligotrophic lake located in northern Wisconsin, has been the subject of TMDL development to protect it from increasing phosphorus loading pressure in recent decades. Research on sediment-water nutrient interactions and fluxes is an important component of the project (conducted out of UW-Stout; participation of 3 students; 2012 – present).
- Phosphorus budget and internal phosphorus loading analysis (diffusive phosphorus fluxes from sediment) for Cedar Lake, WI, was instrumental in identifying the importance of vertical phosphorus transport of internal loads to surface water and is resulting in a change in management from aeration to alum treatment (conducted out of UW-Stout in 2012; 1 student; 2008 – present).
- Eutrophication diagnostics of urban Half Moon Lake, an important recreational and aesthetic resource for the City of Eau Claire, Wisconsin, led to practical management alternatives to reduce phosphorus loading and improve water quality (conducted out of UW-Stout since 2012; participation and involvement of 5 students; 2000 – present).
- Linked an empirical resuspension model with a submersed macrophyte growth model to forecast effects of fetch reduction via construction of islands on resuspension and light attenuation. Results are being used by the USACE St. Paul District to re-establish vegetation in shallow lakes for waterfowl habitat (2009 – 2011).
- Research on diffusive fluxes of phosphorus from bottom sediment, phosphorus equilibrium exchanges, and recycling potential of suspended sediment loads with the Metropolitan Council Environmental Services of St. Paul, MN, was instrumental in understanding phosphorus dynamics for the Lower Minnesota River water quality model (2006 – 2008).
- Work on nitrate retention and denitrification in backwaters of the upper Mississippi River has led to management options to reduce nitrate transport to the Gulf of Mexico (2003 – 2006).
- Research on soil phosphorus partition coefficients was important in the development of a distributed watershed nutrient runoff model (GSSHA-NSM; 2003-2005).
- An innovative assay approach was used to provide local agencies with alum concentration requirements to control internal phosphorus loading in several Wisconsin and Minnesota lakes (2003 – present).
- Developed techniques for quantifying biologically labile (subject to recycling) and refractory (subject to burial) phosphorus species and loads to improve our understanding of the bioavailability and recycling potential of watershed particulate runoff (2002 – 2003)
- Watershed nutrient loading analysis of the Yellow River basin (including Lake Wisconsin, WI) provided state agencies with important information for TMDL development (2000-2002).

- Research on Lake Pepin and the Upper Mississippi River provided federal, state, and local agencies with a better understanding of important phosphorus sources and sinks and the importance of sediment phosphorus recycling to the system (1995 – 2005).
- Partnered with the Wisconsin Department of Natural Resources in an integrated ecosystem restoration of Big Muskego Lake, WI. This large shallow system was successfully restored to a clear water state via carp removal and lake drawdown to desiccate and consolidate sediment from resuspension (1997 – 2002).

## Employment history

- Professor (academic staff) and Research Aquatic Ecologist (Discovery Center), University of Wisconsin–Stout, Menomonie, WI 54751. June, 2012 to present.
- Research Aquatic Biologist, U.S. Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory – Eau Galle Aquatic Ecology Laboratory, Spring Valley, WI 54767. November, 1979 to December, 2011.

## Awards

- 2011 - Awarded the James LaBounty Best Research Paper of the Year (2011) given annually by the North American Lake Management Society for publication in the journal *Lake and Reservoir Management*.
- 2008 - Research and Development Achievement Award for improving scientific understanding of soil phosphorus equilibrium processes for use in watershed models. U.S. Army Engineer – Engineer Research and Development Center.
- 2008 – Achievement Medal for Civilian Service for research on phosphorus dynamics in the lower Minnesota River system. U.S. Army Engineer – Engineer Research and Development Center.
- 2000 – Partnership Minnesota certificate of commendation in recognition of partnership efforts with State and local agencies on phosphorus and eutrophication research on Lake Pepin, Upper Mississippi River.

## Scientific societies

- North American Lake Management Society
- American Society of Limnology and Oceanography
- Aquatic Plant Management Society

## Other affiliations

- Associate Editor for the Journal *Lake and Reservoir Management*

## Education

- B.S. Botany, Kent State University, Kent, OH (1977)
- M.S. Limnology, Kent State University, Kent, OH (1983; Dr. G. D. Cooke, advisor; Dr. R. Carlson and Dr. R. Heath, committee)