

## *Professor Mary Bremigan*

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### **My Background**

1997 - present. Associate professor, Department of Fisheries and Wildlife, Michigan State University.  
Appointment: 50% research, 25% teaching, 25% extension.

### **Education**

Ph.D. 1997 Department of Zoology, Ohio State University.

*Zooplankton dynamics and gizzard shad recruitment in Ohio reservoirs: exploring the generality of food web theory.*

M.S. 1992. Department of Zoology, Ohio State University.

*Predator gape and zooplankton size: exploring size-dependent recruitment mechanisms in fishes.*

B.S. 1988. Department of Biology, University of Notre Dame.

My undergraduate experience at the University of Notre Dame's Environmental Research Center (UNDERC) prompted me to attend graduate school.

During graduate school, I had the pleasure of working at the Aquatic Ecology Laboratory at Ohio State University.

### **AWARDS and SCHOLARLY ACTIVITIES**

2001. Chosen as a Lilly Teaching Fellow, MSU.

1999. Chosen as a participant for the MSU Faculty Writing Project.

1999. Chosen as a participant for the DIALOG program conference (Dissertations Initiative for the Advancement of Limnology and Oceanography).

1998. Top Fin award, Fisheries Division, Michigan Department of Natural Resources, presented to the Watershed Approach to Re-engineering Committee.

1996. Presidential Fellowship, The Ohio State University.

1996. Darwin Award recipient. Presented by the faculty of the Department of Zoology, the Ohio State University, for the best graduate student presentation at a state or national meeting.

1995. Best Student Paper Award - Honorable Mention (top 6 of 84 presentations). Annual Meeting of the American Fisheries Society.

1995. American Fisheries Society, J. Frances Allen Scholarship Runner-Up.

1993. Best Student Paper Award - Honorable Mention (top 5 of 70 presentations). Annual Meeting of the American Fisheries Society.

1993. Skinner Travel Award, Annual Meeting of the American Fisheries Society.

1992. Best Fisheries Paper, Ohio Fish and Wildlife Conference.

## **SERVICE**

2003 - present. Co-chair of Smallmouth and Largemouth Bass Regulations Committee, Fisheries Division, Michigan Department of Natural Resources.

2003 - present. Member of Curriculum Evaluation and Review Committee, Department of Fisheries and Wildlife, Michigan State University.

2002 - present. Associate Editor, Transactions of the American Fisheries Society.

2001 - present. Member Scientific Advisory Committee, Michigan Environmental Council.

2000 - present. Secretary, Michigan Chapter, North American Lake Management Society.

2001, 2002, 2003. Panel member for the NSF sponsored Graduate Fellowships program, Environmental Biology, Washington, D.C.

1999 - 2001. Member of Graduate Studies Committee, Department of Fisheries and Wildlife, Michigan State University.

1998 - 2003. Member of Inventory and Assessment Committee, Fisheries Division, Michigan Department of Natural Resources.

2000 - 2001. Member of Internal Coolwater Regulations Review Committee, Fisheries Division, Michigan Department of Natural Resources.

1998 - 1999. Chair of Internal Coldwater Regulations Review Committee, Fisheries Division, Michigan Department of Natural Resources.

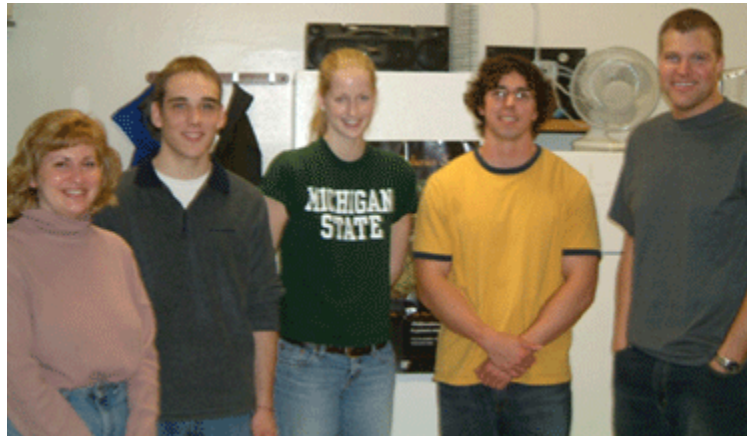
1998 Member of Curriculum Committee, Department of Fisheries and Wildlife, Michigan State University.

1997. Member of Watershed Approach to Re-engineering Committee, Fisheries Division, Michigan Department of Natural Resources.

1989-present. I have reviewed manuscripts for Canadian Journal of Fisheries and Aquatic Sciences, Ecology, Ecological Applications, Ecosystems, Environmental Biology of Fishes, Fisheries Bulletin, Hydrobiologia, Limnology and Oceanography, North American Journal of Fisheries Management, and Transactions of the American Fisheries Society.

## RESEARCH INTERESTS

I enjoy conducting research that draws upon basic ecological theory to address applied management questions. By investigating how fish populations and aquatic food webs vary across time and across systems, along abiotic and biotic gradients, my research seeks to classify aquatic systems (e.g., lakes or reservoirs) that can be managed similarly. I am particularly interested in determining how landscape features underlie differences in the structure and function of aquatic foodwebs. With this understanding, we can then determine how changes in landscape features (due to human activities such as changes in land use from forested to urban, or development of lake shorelines) affect aquatic ecosystems. Within this context, I often investigate factors influencing the early life history of fish, because understanding fish recruitment is fundamental to fisheries management. Projects in my lab integrate field sampling, historic data analysis, small-scale experiments, and statistical modeling to generate mechanistic understanding of the processes linking fish recruitment, food web dynamics, and landscape features in north temperate and midwestern U.S. lakes and reservoirs.



**BREM LAB**

**Aaron Jubar**

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MS Student

Research topic: Quantifying effects of shoreline development on littoral fishes and habitat: toward a framework for lake ecosystem conservation.

**Nancy Nate**

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PhD Student

Research Topic: Quantifying fish growth rates from historic data: relationships to landscape features and implications for management.

**Tyler Wagner**

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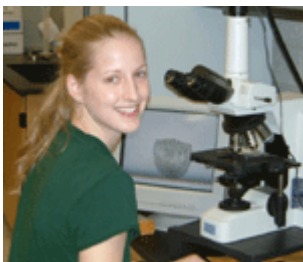
PhD Student

Research Topic: Inland Lake Management: the importance of accounting for spatial and temporal variability and uncertainties in the decision-making process.

**Current Undergraduates**

**Remy Brim**

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**Brian Elkington**

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**Tyler Roasa**

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## BREM LAB ALUMNI

### Graduate Student Alumni

**Matt Balge**, MS student, co-advisor Dr. Doran Mason, NOAA-GLERL

MS title:

Current position: PhD Student, University of Minnesota

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**Todd Wills**, MS 2002

MS title: Evaluation of habitat enhancement structures in four reservoirs of the AuSable River, Michigan.

Current position: Research Biologist, Fisheries Division, Michigan Department of Natural Resources

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**Kristi Arend**, MS 2001, Ohio State University, co-advisor: Dr. Roy Stein, Ohio State University

MS title: Do vertical gradients affect larval fish depth distribution and prey electivity among reservoirs that vary in productivity?

Current position: PhD Student, Cornell University

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**Steve Hanson**, MS 2001

MS title: The effect of Euroasian watermilfoil reductions on largemouth bass diet and growth.

Current position: Professional Consultant, Lake Management

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**Rahman (Ray) Valley**

MS title: The effects of macrophyte structural heterogeneity and fish prey availability on age-0 largemouth bass foraging and growth.

Current position: Research Biologist, Fisheries Division, Minnesota Department of Natural Resources

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### Undergraduate Research Alumni

**Steve Hanson**, BS 2000

Research topic: Largemouth bass diet in relation to Sonar® application.

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**Justin Chiotti**, BS 2002

Research topic: Predicting characteristics of gizzard shad populations along a productivity gradient. (Received the Best Student Presentation Award in Organismal Biology).

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**Abby Mahan**, BS 2001

Research topic: Interactions between larval yellow perch and zooplankton in Green Bay, Wisconsin.

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**Pete Hrodey**, BS 2002

Research topic: Determining the percent biomass and relative abundance of aquatic invertebrates colonizing habitat enhancement structures.

## **PUBLICATIONS**

### **Landscape and Food Web Ecology of Midwestern U.S. Reservoirs**

Bremigan, M.T. and R.A. Stein. 2001. Variability in larval gizzard shad recruitment across Ohio reservoirs: exploring causal mechanisms and implications for fisheries management. *Ecological Applications* 11:1425-1437.

Bremigan, M. T. and R. A. Stein. 1999. Larval gizzard shad success, juvenile effects, and reservoir productivity. *Transactions of the American Fisheries Society* 128:1106-1124.

DeVries, D.R., M.T. Bremigan, and R.A. Stein. 1998. Prey selection by larval crappie and larval gizzard shad: the importance of gape limitation and comparison between northern lakes and southern reservoirs. *Transactions of the American Fisheries Society* 127:1040-1050.

Schaus, M.H., M.J. Vanni, T.E. Wissing, M.T. Bremigan, J.E. Garvey, and R.A. Stein. 1997. Nitrogen and phosphorus excretion by detritivorous gizzard shad in a reservoir ecosystem. *Limnology and Oceanography* 42:1386-1397.

Bremigan, M.T. and R.A. Stein. 1997. Experimental assessment of the influence of zooplankton size and density on gizzard shad recruitment. *Transactions of the American Fisheries Society* 126:622-637.

Stein, R.A., M.T. Bremigan, and J.M. Dettmers. 1996. Understanding reservoir systems with experimental tests of ecological theory: a prescription for successful management. Pages 6-22 in L.E. Miranda and D.R. DeVries, editors. *Multidimensional Approaches to Reservoir Fisheries Management*. American Fisheries Society Symposium 16.

Bremigan, M.T. and R.A. Stein. 1994. Gape-dependent larval foraging and zooplankton size: implications for fish recruitment across systems. *Canadian Journal of Fisheries and Aquatic Sciences* 51:913-922.

### **Effects of Eurasian Watermilfoil (and control efforts) on North Temperate Lakes**

Bremigan, M.T., P.A. Soranno, S.M. Hanson, K.S. Cheruvilil, and R.D. Valley. To be submitted to *Journal of Aquatic Plant Management* in March 2004. Response of aquatic vegetation and largemouth bass to whole-lake control of Eurasian watermilfoil using low-dose fluridone. Submitted to *North American Journal of Fisheries Management*.

Valley, R. D. and M. T. Bremigan. 2002. Effects of herbicide control of Eurasian watermilfoil on age-0 largemouth bass piscivory and growth. *Journal of Aquatic Plant Management* 40:79-87.

Valley, R. D. and M. T. Bremigan. 2002. Effects of macrophyte bed architecture on largemouth bass foraging: implications of exotic macrophyte invasions. *Transactions of the American Fisheries Society* 131:234-244.

### **Effects of Landscape Context on North Temperate Lakes and Reservoirs**

Nate, N.A., M. Bozek, M. Hansen, C. Ramm, M. Bremigan, and S. Hewett. 2003. Predicting walleye presence from physical and biological features of northern Wisconsin lakes. *North American Journal of Fisheries Management* 23:1206-1213.

Seelbach, P.W., M.J. Wiley, P.A. Soranno and M.T. Bremigan. 2002. Predicting characteristics of aquatic ecosystems from landscape-scale information. Pages 454-478 in K. Gutzwiller, editor. *Applying Landscape Ecology in Biological Conservation*. Springer-Verlag, New York, NY.

### **Additional Fish Recruitment Work**

Wills, T.C., M.T. Bremigan, and D.B. Hayes. 2004. Variable effects of habitat enhancement structures across species and habitats in Michigan reservoirs. *Transactions of the American Fisheries Society* 133:398-410.

Bremigan, M.T., J.M. Dettmers, and A.L. Mahan. 2003. Taxonomic and size selection of zooplankton by larval yellow perch in Green Bay, Lake Michigan: implications for recruitment success. *Journal of Great Lakes Research* 29:501-510.

Garvey, J.E., R.A. Stein, R.A. Wright, and M.T. Bremigan. 2002. Exploring ecological mechanisms underlying largemouth bass recruitment along environmental gradients. Pages 7-23 in D. P. Philipp and M. S. Ridgway, editors. *Black bass: ecology, conservation, and management*. American Fisheries Society, Symposium 31, Bethesda, Maryland.



## SCIENCE PRESENTATIONS

Wills, T.C., M.T. Bremigan, and D.B. Hayes. 2004. Varying effects of artificial structures in Michigan reservoirs: the role of natural habitat. Michigan and Wisconsin Chapters of the American Fisheries Society, Marinette, WI.

Cheruvellil, K.S., N.A. Nate, P.A. Soranno, and M.T. Bremigan. 2003. A field-test of the unimodal relationship between fish growth and macrophyte cover in lakes. Ecological Society of America, Savannah, GA.

Wills, T.C., M.T. Bremigan, and D. B. Hayes. 2002. Does natural habitat mediate smallmouth bass (*Micropterus dolomieu*) use of half-log habitat enhancement structures? American Fisheries Society, Baltimore, MD.

Wills, T.C., M.T. Bremigan, and D. B. Hayes. 2002. Does natural habitat mediate smallmouth bass (*Micropterus dolomieu*) use of half-log habitat enhancement structures? Michigan Chapter, American Fisheries Society, Muskegon, MI.

Wills, T.C., M.T. Bremigan, and D. B. Hayes. 2001. Effects of half-log habitat enhancement structures on smallmouth bass (*Micropterus dolomieu*) in two Michigan reservoirs. Midwest Fisheries and Wildlife Conference, Des Moines, IA.

Chiotti, J.A. and M.T. Bremigan. 2001. Predicting characteristics of gizzard shad populations along a productivity gradient. Midwest Fisheries and Wildlife Conference, Des Moines, IA.

Soranno, P.A., M.T. Bremigan, K.S. Cheruvellil, S.M. Hanson, K.L. Rogers, R.D. Valley, and J.D. Madsen. 2001. The role of macrophytes in mediating pelagic and littoral zone foodweb interactions: implications for shallow lake management. North American Lake Management Society, Madison, WI.

Arend, K.K., C.A. Doherty, R.A. Stein, and M.T. Bremigan. 2001. Fish recruitment in reservoirs: quantifying the interactive effects of depth, turbidity, and zooplankton. Ecological Society of America, Madison, WI.

Soranno, P.A., M.T. Bremigan, K.S. Cheruvellil, S.M. Hanson, K.L. Rogers, R.D. Valley, and J.D. Madsen. 2001. The importance of macrophyte cover in lakes to littoral and pelagic foodwebs. Ecological Society of America, Madison, WI.

Bremigan, M.T., P.A. Soranno, K.S. Cheruvellil, S.M. Hanson, K.L. Rogers, R.D. Valley, and J.D. Madsen. 2001. Control of Eurasian watermilfoil using Sonar herbicide: effects on littoral and pelagic zone foodwebs. Aquatic Plant Management Society, Minneapolis, MN.

Mahan, A.L., M.T. Bremigan, and J.M. Dettmers. 2001. Interactions between larval yellow perch and zooplankton in Green Bay, Lake Michigan. International Association for Great Lakes Research, Green Bay, WI.

Bremigan, M.T. and P.A. Soranno. 2001. Integrating fisheries and limnological perspectives to evaluate indirect effects of Sonar herbicide control of Eurasian watermilfoil on Michigan lakes. Invited presentation to the Michigan chapter of the American Fisheries Society, Higgins Lake, MI.

Mahan, A.L., M.T. Bremigan, and J.M. Dettmers. 2000. Interactions between larval yellow perch and zooplankton in Green Bay, Wisconsin. Poster: Midwest Fisheries and Wildlife Conference, Minneapolis, MN.

Bremigan, M.T. 2000. When do gizzard shad rule the world?: Variability in recruitment and subsequent effects of a highly influential species in reservoir ecosystems. Invited presentation to the Department of Zoology, Southern Illinois University, Carbondale, IL.

Bremigan, M.T. 2000. Variable gizzard shad recruitment and its effects on sportfish recruitment: multi-system management along a productivity gradient. Invited presentation to the annual Larval Fish Conference, Gulf Shores, AL.

Gonzales, M.J., M.Vanni, M. Bremigan, D. Bunnell, W. Renwick, P. Soranno, and R. Stein. 2000. Reservoir zooplankton assemblages along a productivity gradient. American Society of Limnology and Oceanography, Copenhagen, Denmark.

Bremigan, M.T., R.A. Stein, and J.E. Garvey. 2000. Variable gizzard shad recruitment and its effects along a reservoir productivity gradient. Poster: American Society of Limnology and Oceanography, Copenhagen, Denmark.

Valley, R.D. and M.T. Bremigan. 2000. The structure-altering effects of invasive macrophytes and their potential influences on largemouth bass recruitment: implications for management. Poster: American Fisheries Society. St Louis, MO.

Valley, R.D. and M.T. Bremigan. 2000. The effects of Eurasian watermilfoil, and its management, on largemouth bass recruitment. Aquatic Plant Management Society. San Diego, CA.

Bremigan, M.T. and P.A. Soranno. 2000. The indirect effects of the herbicide Sonar? on lake food webs. Invited presentation to the Michigan Chapter of the North American Lake Management Society, Lansing, MI.

Valley, R.D. and M.T. Bremigan 1999. Largemouth bass recruitment: effects of prey abundance and macrophyte assemblages. Midwest Fish and Wildlife Conference, Chicago, IL.

Bremigan, M.T. 1999. Variable recruitment of gizzard shad, a strong interactor in reservoirs: exploring causal mechanisms and implications for food webs. DIALOG (Dissertations Initiative for the Advancement of Limnology and Oceanography) conference, Bermuda Biological Station, Bermuda. Oral presentation and poster.

Bremigan, M.T. 1998. Variability in larval gizzard shad success across a reservoir trophic gradient: implications for food web dynamics and fisheries management. Invited Presentation to the Department of Zoology, Miami University, Miami, OH.

Bremigan, M.T. 1997. Variability in larval gizzard shad success across a reservoir trophic gradient: implications for food web dynamics and fisheries management. Invited presentation to the Department of Biology, Ball State University, Muncie, IN.

Bremigan, M. T. 1997. Statistical applications in aquatic ecology. Invited presentation to the undergraduate mathematics seminar, Ball State University, Muncie, IN.

Bremigan, M. T. and R. A. Stein. 1997. Variability in larval gizzard shad success across a reservoir trophic gradient: implications for food web dynamics and fisheries management. American Fisheries Society Annual Conference, Monterey, CA.

Bremigan, M. T. 1997. Variable recruitment of gizzard shad, a strong interactor in reservoirs: exploring causal mechanisms and implications for food webs. Invited presentation to the Department of Fisheries and Wildlife, Michigan State University, East Lansing, MI.

Bremigan, M. T. 1996. Zooplankton dynamics and gizzard shad recruitment in Ohio reservoirs: exploring the generality of food-web theory. Invited presentation to the Department of Fisheries and Aquatic Sciences, University of Florida, Gainesville, FL.

Bremigan, M. T. and R. A. Stein. 1996. Characterization of ecological conditions underlying gizzard shad recruitment across a productivity gradient in Ohio reservoirs. American Fisheries Society Annual Conference, Dearborn, MI.

Bremigan, M.T. and R.A. Stein. 1995. Variability in larval gizzard shad survival in Ohio reservoirs: exploring causal mechanisms and implications for fisheries management. American Fisheries Society Annual Conference, Tampa, FL.

Stein, R.A. and M.T. Bremigan. 1995. Fish community structure within small, onstream impoundments: ecological theory, experimental exploration, and management options. Third National Reservoir Symposium, Chattanooga, TN.

Bremigan, M.T. and R.A. Stein. 1994. The role of zooplankton size in fish-zooplankton interactions. Ecological Society of America Annual Conference, Knoxville, Tennessee.

Bremigan, M.T. 1994. Fish-zooplankton interactions in Ohio reservoirs: patterns and processes. Aquatic Ecology Laboratory Seminar Series, OSU.

Bremigan, M.T. and R.A. Stein. 1993. Differential effects of zooplankton size on potential recruitment success of gizzard shad and bluegill. American Fisheries Society Annual Conference, Portland, OR.

Bremigan, M.T., R.A. Stein, and D.R. DeVries. 1992. Exploring gizzard shad dominance and its impact on reservoir fish communities. Ohio Fish and Wildlife Conference, Columbus, OH.

Bremigan, M.T. and R.A. Stein. 1991. Fish gape and prey size: evaluating a size-dependent recruitment mechanism. MidWest Fish and Wildlife Conference, Des Moines, IA.