

Jake R. Walsh, PhD

University of Minnesota – Twin Cities
Department of Fisheries, Wildlife and Conservation Biology
2003 Upper Buford Circle, St. Paul, MN 55108
(651) 717 – 5883 | jransom.walsh@gmail.com | @JakeRWalsh | JakeRWalsh.wix.com/JakeRWalsh

Education

- 2016 PhD in Zoology. Massive impacts on ecosystem services and processes due to an invasive species outbreak. Advisor: M. Jake Vander Zanden. Center for Limnology, University of Wisconsin, Madison, WI.
- 2014 Delta Certificate in Research, Teaching, & Learning. Delta Program, University of Wisconsin, Madison, WI.
- 2010 BS in Biology. Hamline University, St. Paul, MN.

Research Experience

- 2019 - Postdoctoral Research Fellow. Department of Fisheries, Wildlife and Conservation Biology. University of Minnesota, St. Paul, MN.
- 2016 – 2019 Postdoctoral Research Associate. Center for Limnology, University of Wisconsin, Madison, WI.
- 2010 – 2016 Doctoral Researcher. Center for Limnology, University of Wisconsin, Madison, WI, USA.
- 2013 – 2014 Research Intern. Delta Internship Program in Research, Teaching, and Learning. University of Wisconsin, Madison, WI.
- 2009 – 2010 Research Assistant, Honors Thesis. Freshwater Biology. Advisor – Professor Leif Hembre. Hamline University, St. Paul, MN.

Peer-reviewed publications

- Walsh, JR, GJA Hansen, JS Read, and MJ Vander Zanden. (Under review) Air and water temperature models predict differing scenarios of an aquatic invasive species response to climate change. *Ecosphere*. ECS19-0631
- Magee, MR, CL Hein, JR Walsh, and 10 others. (2019) Scientific advances and adaptation strategies for Wisconsin lakes facing climate change. *Lake and Reservoir Management*.
<https://doi.org/10.1080/10402381.2019.1622612>
- Walsh, JR, JR Corman, and SE Munoz. (2019) Coupled long-term limnological data and sedimentary records reveal novel control on water quality in a eutrophic lake. *Limnology & Oceanography* 64:S34-S48. <https://doi.org/10.1002/lno.11083>
- Walsh, JR, EJ Pedersen, and MJ Vander Zanden. (2018) Detecting species at low densities: a new theoretical framework and an empirical test on an invasive zooplankton. *Ecosphere* 9(11):e02475. <https://doi.org/10.1002/ecs2.2475>
- Walsh, JR, MJ Spear, TP Shannon, PJ Krysan, and MJ Vander Zanden. (2018) Using eDNA, sediment subfossils, and zooplankton nets to detect invasive spiny water flea (*Bythotrephes longimanus*). *Biological Invasions*. <https://doi.org/10.1007/s10530-018-1862-5>
- Walsh, JR, RC Lathrop, and MJ Vander Zanden. (2018) Uncoupling indicators of water quality due to the invasive zooplankton, *Bythotrephes longimanus*. *Limnology & Oceanography* 63(3):1313-1327. <https://doi.org/10.1002/lno.10773>.

Peer-reviewed publications continued

- Walsh, JR, RC Lathrop, and MJ Vander Zanden. (2017) Invasive invertebrate predator, *Bythotrephes longimanus*, reverses trophic cascade in a north-temperate lake. *Limnology & Oceanography* 62:2498-2509. doi: 10.1002/lno.10582.
- Walsh, JR, SE Munoz, and MJ Vander Zanden. (2016) Outbreak of an undetected invasive species triggered by a climate anomaly. *Ecosphere* 7(12): e01628.
- Walsh, JR, SR Carpenter, and MJ Vander Zanden. (2016) Invasive species triggers massive loss of ecosystem services through a trophic cascade. *Proceedings of the National Academy of Sciences* 113 (15): 4081-4085.

Awards and recognition

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| 2018 | Center for Limnology "Outreach All Star". University of Wisconsin, Madison, WI. |
| 2015 | University of Wisconsin Vice Provost's Award for Mentoring Undergraduates in Research, Scholarly and Creative Activities (\$2,000) |
| 2015 | Multicultural Graduate Network Peer Mentoring Award. University of Wisconsin, Madison, WI. |
| 2015 | Malueg Scholarship Award (\$1,000). University of Wisconsin, Madison, WI. |
| 2013 | Center for Limnology "Outreach All Star". University of Wisconsin, Madison, WI. |
| 2011 | Outstanding Graduate Work in Zoology (\$500). University of Wisconsin, Madison, WI. |
| 2007 – 2010 | Transfer Achievement Scholarship. Hamline University, St. Paul, MN. |
| 2006 – 2010 | Hamline University Dean's List. Hamline University, St. Paul, MN. |

Grants and fellowships

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| 2019 | Minnesota Aquatic Invasive Species Research Center (2019-2021; \$211,000; co-wrote). University of Minnesota, St. Paul, MN. |
| 2019 | College of Food, Agricultural and Natural Resource Sciences Diversity Scholars Postdoctoral Fellow Award (2019-2021). University of Minnesota, St. Paul, MN. |
| 2018 | Michael D. Guyer Postdoctoral Fellowship. University of Wisconsin, Madison, WI. |
| 2018 | Aquatic Invasive Species Research Grant (co-wrote; \$200,000; 2018 – 2023). Wisconsin Department of Natural Resources, Madison, WI. |
| 2016 | Anna Grant Birge Research Award (\$2100). University of Wisconsin, Madison, WI. |
| 2015 | Anna Grant Birge Research Award (\$1300). University of Wisconsin, Madison, WI. |
| 2015 | John Jefferson-Davis Travel Award (\$600). University of Wisconsin, Madison, WI. |
| 2014 | John Jefferson-Davis Travel Award (\$438). University of Wisconsin, Madison, WI. |
| 2014 | Advance Opportunity Fellowship. University of Wisconsin, Madison, WI. |
| 2013 | Anna Grant Birge Research Award (\$900). University of Wisconsin, Madison, WI. |
| 2013 | Dorothy Powers Grant & Eugene Lodewick Memorial Fund Award (\$6,400). University of Wisconsin, Madison, WI. |
| 2012 | Aquatic Invasive Species Research Grant (co-wrote; \$50,000; 2012 - 2014). Wisconsin Department of Natural Resources, Madison, WI. |
| 2010 | Advance Opportunity Fellowship. University of Wisconsin, Madison, WI. |

Grants and fellowships continued

2009 Fairchild Grant (\$4,000). Hamline University, St. Paul, MN.

Teaching experience

Teaching

2017 Co-Instructor. University of Wisconsin Madison Department of Zoology. Introduction to Limnology Lecture.

2015 – 2016 Guest Lecturer. Introduction to Limnology Lecture. University of Wisconsin Madison Department of Zoology.

2013 Led curriculum revision. University of Wisconsin Madison Department of Zoology. Introduction to Limnology Lab.

2012 Lead Instructor. Introduction to Limnology Lab. University of Wisconsin Madison Department of Zoology.

2011 Co-Instructor. Introduction to Limnology Lab. University of Wisconsin Madison Department of Zoology.

Mentoring

2010 – 2019 Mentored 23 undergraduate students over 90 semesters of independent research. University of Wisconsin, Madison, WI.

2010 – 2015 Mentored 3 high school students over three summer-fall length research projects. University of Wisconsin, Madison, WI.

Trainings and certificates

2019 – Preparing Future Faculty Program. University of Minnesota, St. Paul, MN.

2019 Teaching in Higher Education (one semester). University of Minnesota, St. Paul, MN.

2017 National Research Mentoring Network Postdoc Mentor Training (two-day training).

2013 – 2014 Research Internship: Role-playing real-world conservation challenges. Delta Internship Program in Research, Teaching, and Learning. University of Wisconsin, Madison, WI.

2012 Research Mentor Training (one semester). University of Wisconsin, Madison, WI.

2012 Informal Science Education (one semester). University of Wisconsin, Madison, WI.

2012 Scientific Teaching (one semester). University of Wisconsin, Madison, WI.

2011 Teaching Writing-Intensive Courses (one-day workshop). University of Wisconsin, Madison, WI.

Invited teaching talks

2017 Understanding lakes through the natural experiments of species invasions. Hamline University Biology Colloquium, St. Paul, MN.

2017 Still a eutrophic lake: Studying long-term change in Madison's Lake Mendota. Hamline University Aquatic Biology, St. Paul, MN.

2017 Invasive species harm ecosystem services: What we learned from the spiny water flea invasion into Lake Mendota. Loras College Biology Seminar, Dubuque, Iowa.

Teaching experience - Invited teaching talks continued

2016 Ecological and economic impacts of aquatic invasive species. University of Wisconsin Whitewater Biology Colloquium, Whitewater, WI.

“World of Watershed Management” Role-playing Game

I created a game-based activity for freshwater ecology that can be adapted for any learning environment (e.g., undergraduate courses at any level, graduate courses, citizen groups, K-12 courses). More information can be found on my webpage.

2017 Yahara Watershed Academy – Led role-playing activity. Clean Lakes Alliance, Madison, WI.

2017 Young African Leaders Initiative (yali.state.gov) – Led role-playing activity. Clean Lakes Alliance, Madison, WI.

2014 Implemented into course curriculum for Introduction to Limnology Lab. University of Wisconsin, Madison, WI.

Teaching Interests

Broadly interested in teaching related to biology and environmental sciences, including: introductory level courses for both majors and nonmajors, upper level ecology and natural resource management (with specialties in freshwater systems, invasion ecology, population ecology and modeling, and climate change biology), biostatistics (with a specialty in time series analysis), and geospatial analysis and modeling (with specialties in habitat suitability modeling and remote sensing of water quality).

Equity, inclusivity, and diversity

2019- Circle of Indigenous Nations (Member, currently developing research experience opportunities for Native undergraduates and partnerships for informal undergraduate career mentoring, and other service). University of Minnesota, St. Paul, MN.

2016-2019 Center for Limnology Diversity and Inclusivity Committee (Member, broadened participation in CFL undergraduate research, refocused CFL design for inclusivity, aided in analysis of CFL climate survey, and other service). University of Wisconsin, Madison, WI.

Outreach and science communication

Citizen groups, lake and river associations

2019 Minnesota Aquatic Invasive Species Research Center Research and Management Showcase. University of Minnesota, St. Paul, MN.

2019 Kiwanis Club of Downtown Madison. Aquatic Invasive Species in Madison’s lakes. Madison, WI.

2013 – 2019 Center for Limnology Outreach Committee. University of Wisconsin, Madison, WI.

2014 – 2019 Center for Limnology Open House – Zooplankton of Lake Mendota. University of Wisconsin, Madison, WI.

2019 Clean Lakes Alliance – Yahara Watershed Academy. Aquatic invasive species in Wisconsin. University of Wisconsin, Madison, WI.

Outreach and science communication – Citizen groups continued

- 2018 Green Lake Association – Video interview on aquatic invasive species and water quality. University of Wisconsin, Madison, WI.
- 2018 The American Chemical Society – Aquatic Invasive Species Cruise on Lake Mendota. University of Wisconsin, Madison, WI.
- 2018 Conversations about Conservation: Invasive Species – Led science on tap discussion at Wisconsin Brewing Co. with Upper Sugar River Watershed Association. Verona, WI.
- 2018 Madison Christian Community – Led discussion on aquatic invasive species. Madison, WI.
- 2017 Science on Tap Madison – Aquatic invasive species in the Madison lakes. Madison, WI.
- 2017 International Association of Aquatic and Marine Science Libraries and Information Centers (SAIL region). Madison, WI.
- 2016 – 2017 Clean Lakes Alliance – Provided interview and figures for State of the Lakes Reports 2015 and 2016. Madison, WI.
- 2016 – 2017 Clean Lakes Alliance – Frozen Assets. Madison, WI.
- 2015 – 2016 Clean Lakes Alliance – Limnology 101 Seminar Series. Madison, WI.

Resource managers

- 2018 – AIS Research and Demonstration Grant Annual Meetings. Wisconsin Department of Natural Resources, Madison, WI.
- 2018 Wisconsin First Detector Network – Online webinar on spiny water flea in Wisconsin.
- 2016 Aquatic Invasive Species Monitoring Training. Department of Natural Resources, Stevens Point, WI.
- 2012 – 2014 AIS Research and Demonstration Grant Annual Meetings. Wisconsin Department of Natural Resources, Madison, WI.
- 2011 – 2014 Manitowish Waters Spiny Water Flea Meetings. Manitowish, WI.

Education

- 2018 Boys and Girls Club Dane County – Crash course in limnology. Madison, WI.
- 2018 Open Explorer Expedition with Rochester (MN), Merrill (WI), and Madison (WI) middle school students – Led three day-long field and lab water quality exercises. Madison, WI.
- 2017 Glacier Creek Middle School HydroDynamics - Spiny water flea “light trap”. Madison, WI.
- 2013 – 2015 Wisconsin Institute for Discovery Science Expeditions. University of Wisconsin, Madison, WI.
- 2012 – 2015 Winter Limnology. University of Wisconsin, Madison, WI.
- 2012 – 2015 Grandparents University. University of Wisconsin, Madison, WI.
- 2012 – 2015 Wisconsin State Fair - Limnology Teaching Booth. University of Wisconsin, Madison, WI.

Science Journalism

- Walsh, JR. (2019) A twist in the tale told by the muck at the bottom of Lake Mendota. WisContext (online, editor: Will Cushman).

Outreach – Science Journalism continued

Walsh, JR. (2019) Using theory to address the challenge of detecting invasive species. *The Conversation* (online, editor: Jennifer Weeks, re-printed online and in print in Wisconsin State Journal).

Walsh, JR. (2016) Tiny flea reveals devastating cost of invasive species. *The Conversation* (online, editor: Jennifer Weeks, widely re-printed online).

Media communication

Includes only primary sources where I contributed an interview, see: <http://limnology.wisc.edu/CFL-in-the-news-invasives.htm>, <http://jakerwalsh.wixsite.com/jakerwalsh/news-and-links>.

Live & On Air Interviews	Larry Meiller Show (WPR; 2016), Central Time with Rob Ferrett (WPR; 2016, 2019), Quirks and Quarks with Bob McDonald (CBC; 2016)
Public Radio	Interviews for on-air segments and online articles – Will Cushman (WiscContext, WPR; 2019), Chuck Quirnbach (WPR; 2016), Dan Gunderson (Minnesota PR; 2016), Ken Krall (WXPR; 2016), Sarah Whites-Koditschek (WPR; 2018), Mary Kate McCoy (WPR; 2018)
National Print	Washington Post (Daryl Fears; 2016), New Scientist (Fred Pearce; 2016), El Confidential (Sergio Ferrer; 2016), Weather Channel (Ada Carr; 2016)
Local & Regional Print	MinnPost (Ron Meador; 2016), Milwaukee Journal Sentinel (Lee Bergquist; 2016)
Television	NBC 15 (2015; 2016)

Research presentations

Walsh, Jacob R., Samuel E. Munoz, and Jessica R. Corman. (2018) Drivers of P retention in a eutrophic chain of lakes. Association for the Sciences of Limnology and Oceanography Summer Meeting.

Walsh, Jacob R. and M. Jake Vander Zanden. (2017) Divergent responses in water quality to invasion-induced food web changes in a eutrophic lake. Society for Freshwater Science.

Walsh, Jacob R. and M. Jake Vander Zanden. (2015) Cascading impact of the invasive spiny water flea damages ecosystem services in Lake Mendota. NSF Long Term Ecological Research All Scientists Meeting.

Walsh, Jacob R. and M. Jake Vander Zanden. (2015) Environmental conditions trigger rapid transition from undetected invasion to high density of spiny water flea in Lake Mendota, WI. Ecological Society of America Annual Meeting.

Walsh, Jacob R., Lathrop, Richard C., and M. Jake Vander Zanden. (2014) The impact of the invasive predatory invertebrate, *Bythotrephes longimanus*, cascades into primary production in Lake Mendota, WI. Association for the Sciences of Limnology and Oceanography Joint Aquatic Sciences Meeting.

Walsh, Jacob R. and Malgorzata Golub. (2012) Exploring the drivers of lake phenology: The seasonal timing of lake processes and population dynamics in the North Temperate Lakes. NSF Long Term Ecological Research All Scientists Meeting.

Resource management conferences

- Walsh, Jacob R., and M. Jake Vander Zanden. (2018) Evaluating lake thermal suitability for invasive spiny water flea with projected warming in the upper midwest. Upper Midwest Invasive Species Conference.
- Walsh, Jacob R., and M. Jake Vander Zanden. (2018) Lake suitability for invasive spiny water flea in Wisconsin. Wisconsin Lakes Partnership Convention.
- Walsh, Jacob. R. (2018) Learning about water quality from invasive species in the Madison lakes Wisconsin Lakes Partnership Summer Meeting.
- Walsh, Jacob R., Stephen R. Carpenter, and M. Jake Vander Zanden. (2016) Massive ecosystem services impact by invasive spiny water flea in Lake Mendota, WI. Upper Midwest Aquatic Invasive Species Conference.
- Walsh, Jacob R. (2016) Economic impact of spiny water flea on Madison, Wisconsin lakes - Calculating the ecosystem services cost of an invasive species. Minnesota Aquatic Invasive Species Summit II.
- Walsh, Jacob R. (2016) Spiny water flea detection using lake sediments. Wisconsin DNR Aquatic Invasive Species Statewide Identification and Decontamination meeting.
- Walsh, Jacob R. (2014) Management of the invasive spiny water flea in Wisconsin: impact assessment, early detection, and predicting vulnerable lakes. Wisconsin Lakes Partnership Convention.
- Walsh, Jacob R., Lathrop, Richard C., and M. Jake Vander Zanden. (2012) The spiny water flea invasion into Lake Mendota: Assessing invader impact using distinct historical eras from long-term data. North American Lake Management Society Meeting.

Teaching Research

- Walsh, Jacob R., Stanley, Emily H., and M. Jake Vander Zanden. (2015) World of Watershed Management (WOWM): A role-playing game to teach the complexity of socio-ecological systems and problems. Center for the Integration of Research, Teaching, and Learning Forum. (Awarded scholarship to attend meeting)

Analytical skills

Proficient in statistical program R for data visualization and analysis. Specifically: generalized linear and additive modeling, ecosystem and population modeling, statistics, time series analysis (with specialty in multivariate autoregressive state space models), ecological niche modeling, and spatial mapping and analysis. Proficient in ArcGIS, QGIS, and R for mapping, spatial data creation, and spatial analysis. Experience teaching each of these computational skills in research mentoring and classroom settings.

Professional societies and affiliations

- Ecological Society of America (ESA)
- American Society for Limnology and Oceanography (ASLO)
- Center for the Integration of Research, Teaching, and Learning (CIRTL)

References

- Postdoctoral advisor Gretchen J. A. Hansen. Assistant Professor. Department of Fisheries, Wildlife and Conservation Biology. University of Minnesota, St. Paul, MN. Email: ghansen@umn.edu
- Postdoctoral,
PhD advisor M. Jake Vander Zanden. Professor, Director. Center for Limnology. University of Wisconsin Madison, Madison, WI. Phone: +1-608-262-464. Email: mjvanderzand@wisc.edu
- Postdoctoral advisor Emily H. Stanley. Professor. Center for Limnology, University of Wisconsin Madison, Madison, WI. Phone: +1-608-263-2567. Email: ehstanley@wisc.edu
- Delta advisor Don Gillian-Daniel. Director. Delta Program. University of Wisconsin Madison, Madison, WI. Phone: +1-608-265-9969. Email: dldaniel@wisc.edu
- Research advisor Stephen R. Carpenter. Free-range Scientist (Emeritus Professor). Center for Limnology, University of Wisconsin Madison, Madison, WI. Phone: +1-608-262-3014. Email: steve.carpenter@wisc.edu