

# Marcus W. Beck, Ph.D.

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## *Education*

**Ph.D., Conservation Biology, Fisheries and Aquatic Biology track** Jun. 2013  
**Statistics minor**

Conservation Biology Graduate Program, University of Minnesota, Twin Cities, MN  
Thesis title: Minnesota macrophytes: Linking aquatic plants, lake health, and human activities  
Advisors: Drs. Bruce Vondracek, Lorin Hatch

**M.Sc., Conservation Biology, Fisheries and Aquatic Biology track** Jun. 2009

Conservation Biology Graduate Program, University of Minnesota, Twin Cities, MN  
Thesis title: Development of an ecological assessment method for Minnesota lakes  
Advisor: Dr. Lorin Hatch

**B.Sc., Zoology *summa cum laude*** Dec. 2006

Department of Zoology, University of Florida, Gainesville, FL  
Thesis title: Reproductive characteristics of the green treefrog *Hyla cinerea*: effects of agricultural contaminants.  
Advisor: Dr. Krista McCoy

**A.A., Zoology** Apr. 2004

Santa Fe Community College, Gainesville, FL

## *Professional Appointments*

**Scientist** Sep. 2017 - Present

Biology Department, Southern California Coastal Water Research Project

**Post-Doctorate Researcher** Dec. 2015 - Sep. 2017

Ecosystem Dynamics and Effects Branch, Gulf Ecology Division, United States Environmental Protection Agency

**Post-Doctorate Research Fellow** Jul. 2013 - Nov. 2015

Oak Ridge Institute for Science and Education, Ecosystem Dynamics and Effects Branch, Gulf Ecology Division, United States Environmental Protection Agency

**Research Fellow** Sep. 2012 - Jun. 2013

Water Resources Center, Conservation Biology Graduate Program, Department of Fisheries, Wildlife, and Conservation Biology, University of Minnesota

**Research Assistant**, University of Minnesota Sep. 2007 - Sep. 2012

Conservation Biology Graduate Program, Department of Fisheries, Wildlife, and Conservation Biology, University of Minnesota

**Intern**  
Minnesota Department of Natural Resources

**Creel Clerk**  
Florida Fish and Wildlife Conservation Commission

**Undergraduate Researcher**  
Department of Zoology, University of Florida

**Biological Technician**  
Florida Integrated Science Center, United States Geological Survey

## Teaching Experience

**Workshop Co-Instructor** **Nov. 2016**  
 R, SWMPr, SWMPrats for non-beginners, System Wide Monitoring Program, National Estuarine Research Reserve System, NOAA. ([link](#))

**Workshop Co-Instructor** **Oct. 2015**  
An Introduction to SWMP, System Wide Monitoring Program, National Estuarine Research Reserve System, NOAA. ([link](#))

**Workshop Co-Instructor** **Nov. 2014**  
 NERRS/SWMP Data Analysis (Time-series) Workshop, System Wide Monitoring Program, National  
 Estuarine Research Reserve System, NOAA. ([link](#))

**Workshop Co-Instructor** **May 2013**  
Using Available Software for Basic Analysis, Restoring Minnesota, University of Minnesota. ([link](#))

**Primary Instructor**, University of Minnesota **Jan. 2012 - May 2012**  
FW 5604 (Fisheries Ecology and Management), Department of Fisheries, Wildlife, and Conservation  
Biology, University of Minnesota

**Undergraduate Advisor**, University of Minnesota **Mar. 2009 - May 2011**  
Justine Koch (Gustavus Adolphus College), Kristan Maccaroni (University of Minnesota)

**Teaching Assistant**, University of Minnesota  
ESPM 4061/5061 (Water Quality and Natural Resources), Department of Environmental Sciences,  
Policy, and Management, University of Minnesota

## Service

**Reviewer**  
*Acta Oecologica*, 2015 • *Aquatic Botany*, 2011, 2014 • *Aquatic Sciences*, 2015 • *Development in Practice*, 2012, 2013 • *Ecological Indicators*, 2010 • *Ecological Modelling*, 2016 • *Ecological Research*, 2012 • Elsevier book chapter, 2014 • *Engineering Computations*, 2016 • *Environmental Management*, 2010 • *Environmental Modelling & Software*, 2015 • *Estuaries and Coasts*, 2014, 2015 • *Estuarine, Coastal and Shelf Science*, 2016(2), 2017 • *Frontiers in Plant Science*, 2017 • *Geocarto International*, 2017 • *Hydrobiologia*, 2012 • *International Journal of Tropical Biology and Conservation*, 2013 • *International Journal of River Basin Management*, 2013 • *Journal of Applied Phycology*, 2015 • *Journal of the North*

*American Benthological Society*, 2011 • *Lake and Reservoir Management*, 2013, 2014, 2015, 2017 • *Limnology & Oceanography*, 2013 • *Marine Ecology*, 2014 • *Marine Pollution Bulletin*, 2014 • Minnesota Department of Natural Resources, 2011 • *North American Journal of Fisheries Management*, 2010, 2011, 2012, 2016 • *Polar Biology*, 2011 • *The R Journal*, 2016(3) • *Remote Sensing*, 2014, 2015, 2016(2), 2017 • *rOpenSci*, 2016 • *Science of the Total Environment*, 2011 • USEPA Office of Research and Development, 2014, 2015 • *Water Research*, 2015, 2016

**Graduate Student Representative** Jan. 2013 - May 2013  
Department of Fisheries, Wildlife, and Conservation Biology, University of Minnesota

**Student Activities Committee Co-Chair** Jun. 2010 - Aug. 2012  
2012 annual meeting of the American Fisheries Society

**Fundraising Coordinator** spring 2011, spring 2012  
Conservation Biology Graduate Program, University of Minnesota

**Seminar Coordinator** 2009, fall 2011, spring 2012  
Conservation Biology Graduate Program, Department of Fisheries, Wildlife, and Conservation Biology, University of Minnesota

**Student Representative** Aug. 2009 - Aug. 2012  
Minnesota Chapter of the American Fisheries Society

**Student Club Officer** Sep. 2010 - May 2012  
Fisheries and Wildlife Club, Department of Fisheries, Wildlife, and Conservation Biology, University of Minnesota

**Lab Volunteer** summer 2005  
Florida Museum of Natural, University of Florida

### *Peer-reviewed Publications*

1. **Beck, M.W.**, Cressman, K., Griffin, C., Caffrey, J. **In review**. Water quality trends following anomalous phosphorus inputs to Grand Bay, Mississippi, USA. *Gulf and Caribbean Research*.
2. Bokde, N., Martínez Álvarez, F., **Beck, M.W.**, Kulat, K. **In review**. A novel imputation methodology for time series based on pattern sequence forecasting. *Pattern Recognition Letters*.
3. **Beck, M.W.**, Bokde, N., Asencio-Cortés, G., Kulat, K.D. **In review**. R package imputeTestbench to compare imputation methods for univariate time series. *The R Journal*.
4. Murrell, M.C., Caffrey, J.M., Marcovich, D.T., **Beck, M.W.**, Jarvis, B.M., Hagy, J.D. **In press**. Ecosystem and plankton metabolism in a warm temperate estuary: Comparison of seagrass with adjoining bare habitat. *Estuaries and Coasts*.
5. **Beck, M.W.**, Hagy, J.D., Le, C. **In press**. Quantifying seagrass light requirements using an algorithm to spatially resolve depth of colonization. *Estuaries and Coasts*.  
[doi.org/10.1007/s12237-017-0287-1](https://doi.org/10.1007/s12237-017-0287-1)
6. **Beck, M.W.** **In press**. NeuralNetTools: Visualization and analysis tools for neural networks. *Journal of Statistical Software*.

7. Sutula, M., Kudela, R., Hagy, J.D., Harding, L.W., Senn, D., Cloern, J.E., Bricker, S., Berg, G.M., **Beck, M.W.** 2017. Novel analyses of long-term data provide a scientific basis for chlorophyll-a thresholds in San Francisco Bay. *Estuarine, Coastal and Shelf Science*. 197:107-118.  
[doi.org/10.1016/j.ecss.2017.07.009](https://doi.org/10.1016/j.ecss.2017.07.009)
8. **Beck, M.W.**, Lehrter, J.C., Lowe, L.L., Jarvis, B.M. 2017. Parameter sensitivity and identifiability for a biogeochemical model of hypoxia in the northern Gulf of Mexico. *Ecological Modelling*. 363:17-30. [doi.org/10.1016/j.ecolmodel.2017.08.020](https://doi.org/10.1016/j.ecolmodel.2017.08.020)
9. **Beck, M.W.**, Alahuhta, J. 2017. Ecological determinants of *Potamogeton* taxa in glacial lakes: assemblage composition, species richness, and species-level approach. *Aquatic Sciences*. 79(3):427-441.  
[doi.org/10.1007/s00027-016-0508-x](https://doi.org/10.1007/s00027-016-0508-x)
10. Le, C., Lehrter, J.C., Hu, C., MacIntyre, H., **Beck, M.W.** 2017. Satellite observation of particulate organic carbon dynamics in two river-dominated estuaries. *Journal of Geophysical Research: Oceans*. 122(1):555-569. [doi.org/10.1002/2016JC012275](https://doi.org/10.1002/2016JC012275)
11. **Beck, M.W.**, Murphy, R. 2017. Numerical and qualitative contrasts of two statistical models for water quality change in tidal waters. *Journal of the American Water Resources Association*. 53(1):197-219. [doi.org/10.1111/1752-1688.12489](https://doi.org/10.1111/1752-1688.12489)
12. Bajer, P.G., **Beck, M.W.**, Cross, T.K., Koch, J., Bartodzieik, B., Sorensen, P.W. 2016. Biological invasion by a benthivorous fish reduced the cover and species richness of aquatic plants in most lakes of a large North American ecoregion. *Global Change Biology*. 22(12):3937-3947. [doi.org/10.1111/gcb.13377](https://doi.org/10.1111/gcb.13377)
13. **Beck, M.W.** 2016. SWMPPr: An R package for retrieving, organizing, and analyzing environmental data for estuaries. *The R Journal*. 8(1):219-232.
14. Le, C., Lehrter, J.C., Schaeffer, B.A., Hu, C., Murrell, M.C., Hagy, J.D., Greene, R.M., **Beck, M.W.** 2016. Bio-optical water quality dynamics observed from MERIS in Pensacola Bay, Florida. *Estuarine, Coastal and Shelf Science*. 173:26-38. [doi.org/10.1016/j.ecss.2016.02.003](https://doi.org/10.1016/j.ecss.2016.02.003)
15. **Beck, M.W.**, Hagy, J.D., Murrell, M.C. 2015. Improving estimates of ecosystem metabolism by reducing effects of tidal advection on dissolved oxygen time series. *Limnology & Oceanography: Methods*. 13(12):731-745. [doi.org/10.1002/lom3.10062](https://doi.org/10.1002/lom3.10062)
16. **Beck, M.W.**, Hagy, J.D. 2015. Adaptation of a weighted regression approach to evaluate water quality trends in an estuary. *Environmental Modeling and Assessment*. 20(6):637-655.  
[doi.org/10.1007/s10666-015-9452-8](https://doi.org/10.1007/s10666-015-9452-8)
17. **Beck, M.W.**, Tomcko, C.M., Valley, R.D., Staples, D.F. 2014. Analysis of macrophyte indicator variation as a function of sampling, temporal, and stressor effects. *Ecological Indicators*. 46:323-335.  
[doi.org/10.1016/j.ecolind.2014.07.002](https://doi.org/10.1016/j.ecolind.2014.07.002)
18. **Beck, M.W.**, Wilson, B.N., Vondracek, B., Hatch, L.K. 2014. Application of neural networks to quantify utility of indices of biotic integrity for biological monitoring. *Ecological Indicators*. 45:195-208. [doi.org/10.1016/j.ecolind.2014.04.002](https://doi.org/10.1016/j.ecolind.2014.04.002)
19. Vondracek, B., Koch, J.D., and **Beck, M.W.** 2014. A comparison of survey methods to evaluate macrophyte index of biotic integrity performance in Minnesota lakes. *Ecological Indicators*. 36:178-185. [doi.org/10.1016/j.ecolind.2013.07.002](https://doi.org/10.1016/j.ecolind.2013.07.002)

20. **Beck, M.W.**, Vondracek, B. Hatch, L.K. 2013. Between- and within-lake responses of macrophyte richness metrics to shoreline development. *Lake and Reservoir Management*. 29(3):179-193. [doi.org/10.1080/10402381.2013.828806](https://doi.org/10.1080/10402381.2013.828806)
21. **Beck, M.W.**, Vondracek, B., Hatch, L.K., and Vinje, J. 2013. Semi-automated analysis of high-resolution aerial images to quantify docks in glacial lakes. *ISPRS Journal of Photogrammetry and Remote Sensing*. 81:60-69. [doi.org/10.1016/j.isprsjprs.2013.04.006](https://doi.org/10.1016/j.isprsjprs.2013.04.006)
22. **Beck, M.W.**, Vondracek, B., and Hatch, L.K. 2013. Environmental clustering of lakes to evaluate performance of a macrophyte index of biotic integrity. *Aquatic Botany*. 108:16-25. [doi.org/10.1016/j.aquabot.2013.02.003](https://doi.org/10.1016/j.aquabot.2013.02.003)
23. **Beck, M.W.**, Claassen, A.H., and Hundt, P.J. 2012. Environmental and livelihood impacts of dams: Common lessons across development gradients that challenge sustainability. *International Journal of River Basin Management*. 10(1):73-92. [doi.org/10.1080/15715124.2012.656133](https://doi.org/10.1080/15715124.2012.656133)
24. **Beck, M.W.**, Hatch, L.K., Vondracek, B., and Valley, R.D. 2010. Development of a macrophyte-based index of biotic integrity for Minnesota lakes. *Ecological Indicators*. 10:968-979. [doi.org/10.1016/j.ecolind.2010.02.006](https://doi.org/10.1016/j.ecolind.2010.02.006)
25. **Beck, M.W.**, and Hatch, L.K. 2009. A review of research on the development of lake indices of biotic integrity. *Environmental Reviews*. 17:21-44. [doi.org/10.1139/A09-001](https://doi.org/10.1139/A09-001)

### *Software<sup>1</sup> and Websites*

1. Bokde, N., **Beck, M.W.** 2017. imputeTestbench: Test bench for the comparison of imputation methods, v3.0.1. CRAN R package. ([link](#))
2. **Beck, M.W.** 2017. WRTDStidal: Weighted regression for water quality evaluation in tidal waters, v1.1.0. CRAN R package. ([link](#))
3. **Beck, M.W.** 2016. Jabbrev: Convert journal names from long to short formats, v0.0.1.9000. R package. ([link](#))
4. **Beck, M.W.** 2016. SWMPPr: An R package for the National Estuarine Research Reserve System, v2.2.0. CRAN R package. ([link](#))
5. **Beck, M.W.** 2016. Aggregation of SWMP parameters within/between reserves. Shiny Web Application. ([link](#))
6. **Beck, M.W.** 2016. ggord: A take on ordination plots with ggplot2, v0.11.9000. R package. ([link](#))
7. **Beck, M.W.**, Villarroel, P., Padfield, D. 2016. rStrava: Functions to access data from Strava's v3 API, v0.10.9000. R package. ([link](#))
8. **Beck, M.W.** 2016. CTDplot: Plot CTD water quality data along an estuarine axis, v0.0.4.9000. R package. ([link](#))
9. **Beck, M.W.** 2015. WtRegDO: Supplementary package to support the manuscript "Improving estimates of ecosystem metabolism by reducing the effects of tidal advection on dissolved oxygen time series", v0.0.7.9000. R package. ([link](#))

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<sup>1</sup>version numbers with .9000 indicate under development

10. O'Brien, T.D., **Beck, M.W.** 2015. Time series and data analysis information and tool resource for NERRS/SWMP. Website. ([link](#))
11. **Beck, M.W.** 2015. Trends in SWMP parameters. Shiny Web Application. ([link](#))
12. **Beck, M.W.** 2015. Monthly and annual summary of SWMP parameters. Shiny Web Application. ([link](#))
13. **Beck, M.W.** 2015. NeuralNetTools: Visualization and Analysis Tools for Neural Networks, v1.5.0. CRAN R package. ([link](#))
14. O'Brien, T.D., **Beck, M.W.** 2014. NERRS/SWMP data analysis workshop for time series. Website. ([link](#))

### *Outreach and Non-Technical Documents*

1. **Beck, M.W.**, DeCicco, L. 2016. EGRET plotFlowConc using ggplot2. US Geological Survey, Office of Water Information Blog. ([link](#))
2. **Beck, M.W.** 2012 - Present. R is my friend - numerous posts. R-bloggers: R news and tutorials contributed by R bloggers. ([link](#))
3. **Beck, M.W.** 2012. 2nd annual bike across Minnesota fundraiser June 1<sup>st</sup> through 4<sup>th</sup>: Mission accomplished! The Cons Bio Blog, Conservation Biology Graduate Program, University of Minnesota. ([link](#)).
4. **Beck, M.W.** 2012. Biking for bread. The Cons Bio Blog, Conservation Biology Graduate Program, University of Minnesota. ([link](#)).
5. **Beck, M.W.** 2011. Are values and conservation inseparable? The Cons Bio Blog, Conservation Biology Graduate Program, University of Minnesota. ([link](#)).
6. **Beck, M.W.** 2011. What I do: An exercise in hyperbole. The Cons Bio Blog, Conservation Biology Graduate Program, University of Minnesota. ([link](#)).

### *Invited Presentations*

1. **Beck, M.W.**, Senn, D., Novick, E., Bresnahan, B., Hagy, J.D., Jabusch, T. 2016. Four decades of water quality changes in the upper San Francisco Estuary. *Poster presentation*. Interagency Ecological Program Annual Workshop, Folsom, CA.
2. **Beck, M.W.**, Hagy, J.D. 2015. Adaptation of a weighted regression approach to evaluate water quality trends in an estuary. *Oral presentation*. Coastal and Estuarine Research Federation Biennial Conference, Portland, OR.
3. **Beck, M.W.**, O'Brien, T.D. 2015. SWMPPrats: A community of practice for NERRS data analysis. *Oral presentation*. NERRS research coordinators virtual meeting, USEPA NHEERL ORD, Gulf Breeze, FL.
4. **Beck, M.W.** 2014. The search for truth in numbers: Quantitative approaches for evaluating trends in water quality data. *Oral presentation*. Biology Department seminar (PCB 3930/4922/5924), University of West Florida, Pensacola, FL.

5. **Beck, M.W.**, Vondracek, B., Wilson, B., and Hatch, L.K. 2013. Understanding indicators of lake health and the utility of a plant-based index. *Oral presentation*. Gulf Ecology Division seminar series, USEPA NHEERL ORD, Gulf Breeze, FL.
6. **Beck, M.W.**, Vondracek, B., Hatch, L.K., and Wilson, B. 2013. Minnesota macrophytes: Linking aquatic plants, lake integrity, and human activities. *Poster presentation*. Doctoral Research Showcase, University of Minnesota, Minneapolis, MN.
7. **Beck, M.W.**, Vondracek, B., and Hatch, L.K. 2012. Between and within lake responses of macrophyte richness metrics to shoreline development. *Oral presentation*. MN Department of Natural Resources Fall research meeting, Itasca State Park, MN.
8. **Beck, M.W.**, Vondracek, B., Hatch, L.K. 2011. Biological assessment of aquatic macrophytes in Midwest glacial lakes. *Oral presentation*. University of Minnesota Water Resources Graduate Program student symposium, Stillwater, MN.
9. **Beck, M.W.** 2009. Perspectives on sustaining Minnesota's lakes: Biological monitoring, IBIs, and stressor identification. *Oral presentation*. University of Minnesota Water Resources Graduate Program seminar, St. Paul, MN.
10. **Beck, M.W.** 2009. The Minnesota macrophyte IBI for lake assessment. *Oral presentation*. Habitat research meeting, Minnesota Department of Natural Resources, St. Paul, MN.
11. **Beck, M.W.**, Hatch, L.K., Vondracek, B., Valley, R.D. 2009. Development of a macrophyte-based index of biotic integrity for Minnesota lakes. *Oral presentation*. Aquatic plant assessment meeting, Minnesota Pollution Control Agency, St. Paul, MN.
12. **Beck, M.W.**, Hatch, L.K., Vondracek, B., Valley, R.D. 2009. Development of a macrophyte-based index of biotic integrity for Minnesota lakes. *Oral presentation*. Fisheries research meeting, Minnesota Department of Natural Resources, Cloquet, MN.

### *Contributed Presentations*

1. **Beck, M.W.**, O'Brien, T.D., Cressman, K., St. Laurent, K., Eslinger, D. 2016. SWMPPrats.net: A web-based resource for exploring SWMP data. *Poster presentation*. National Estuarine Research Reserve System annual meeting, Williamsburg, VA.
2. **Beck, M.W.**, Hagy, J.D., Le, C. 2016. Quantifying seagrass light requirements using an algorithm to spatially resolve depth of colonization. *Oral presentation*. Gulf Estuarine Research Society biennial meeting, Pensacola Beach, FL.
3. **Beck, M.W.**, O'Brien, T.D., Bundy, M.H. 2016. Integrated analysis tools for the NERRS System-Wide Monitoring Program Data. *Oral presentation*. National Water Quality Monitoring Council biennial meeting, Tampa, FL.
4. Cressman, K., Caffrey, J., **Beck, M.W.**, Griffin, C. 2016. Understanding long-term changes by linking monthly chlorophyll measurements to high-frequency water quality data. *Oral presentation*. National Water Quality Monitoring Council biennial meeting, Tampa, FL.
5. Senn, D., Otten, T., Stewart, R., Bresnahan, P., **Beck, M.W.**, Hagy, J.D., Guerin, M., Jabusch, T., Kendall, C., Novick, E., Trowbridge, P., Young, M. 2016. Probing archived samples and historic data for improved understanding of nutrient cycling and ecosystem response in the Bay-Delta. *Oral presentation*. Interagency Ecological Program Annual Workshop, Folsom, CA.



6. **Beck, M.W.** 2015. An overview of Shiny applications using R and RStudio. *Oral presentation*. USEPA Data Analytics and Visualization Community of Practice, USEPA NHEERL ORD, Gulf Breeze, FL.
7. Hagy, J.D., **Beck, M.W.**, Murrell, M.C. 2015. Improving estimates of ecosystem metabolism by reducing effects of tides on DO time series. *Oral presentation*. Coastal and Estuarine Research Federation Biennial Meeting, Portland, OR.
8. Bundy, M.H., **Beck, M.W.**, O'Brien, T.D. 2015. Synthesis of NERRS System-Wide Monitoring Program data: Using integrated analysis tools to detect trends. *Oral presentation*. Coastal and Estuarine Research Federation Biennial Meeting, Portland, OR.
9. **Beck, M.W.** 2015. SWMPPr: An R package for estuarine water quality time series. *Oral presentation*. USEPA R User Group meeting, USEPA NHEERL ORD, Gulf Breeze, FL.
10. **Beck, M.W.**, Hagy, J.D., Murrell, M.C. 2014. A novel approach for evaluation of water quality trends in Gulf Coast estuaries. *Oral presentation*. Bays and Bayous Symposium, Mobile, AL.
11. Murrell, M.C., Hagy, J.D., Aukamp, J., **Beck, M.W.**, Beddick, D., Craven, G., Duffy, A., Jarvis, B.M., Marcovich, M., Yates, D., Caffrey, J. 2014. Environmental drivers of ecosystem and plankton metabolism in Pensacola Bay, Florida. Bays and Bayous Symposium, Mobile, AL.
12. Hagy, J.D., Jarvis, B.M., Murrell, M.C., **Beck, M.W.**. 2014. Modeling remediation of aquatic life impacts of episodic and diel cycling hypoxia via nutrient loading rate reduction. Bays and Bayous Symposium, Mobile, AL.
13. **Beck, M.W.** 2014. ggplot2 redux. *Oral presentation*. USEPA R User Group meeting, USEPA NHEERL ORD, Gulf Breeze, FL.
14. **Beck, M.W.**, Tomcko, C.M., Valley, R.D., and Staples, D.F. 2014. Analysis of macrophyte indicator variation as a function of sampling, temporal, and stressor effects. *Poster presentation*. Joint Aquatic Sciences Meeting, Portland, OR.
15. **Beck, M.W.**, Hagy, J.D. 2014. Adaptation of a weighted regression approach to evaluate water quality trends in Tampa Bay, Florida. *Oral presentation*. National Water Quality Monitoring Council biennial meeting, Cincinnati, OH.
16. **Beck, M.W.**. 2014. The nuts and bolts of Sweave/Knitr for reproducible research. *Oral presentation*. USEPA R User Group meeting, USEPA NHEERL ORD, Gulf Breeze, FL.
17. **Beck, M.W.**, Vondracek, B., Hatch, L.K., and Wilson, B. 2013. Evaluating the utility of a plant-based index of lake condition using neural networks. *Oral presentation*. Ecological Society of America annual meeting, Minneapolis, MN.
18. **Beck, M.W.**, Vondracek, B., Wilson, B., and Hatch, L.K. 2013. Understanding indicators of lake health and the utility of a plant-based index. *Oral presentation*. Conservation Biology Graduate Program seminar, University of Minnesota, St. Paul, MN.
19. Vondracek, B., Koch, J.D., and **Beck, M.W.** 2013. A comparison of survey methods to evaluate macrophyte index of biotic integrity performance in Minnesota lakes. *Oral presentation*. Minnesota chapter of the Am. Fisheries Society annual meeting, St. Cloud, MN.



20. **Beck, M.W.**, Vondracek, B., Wilson, B., and Hatch, L.K. 2013. Understanding indicators of lake health and the utility of a plant-based index. *Oral presentation*. Conservation Biology Graduate Program seminar, University of Minnesota, St. Paul, MN.
21. **Beck, M.W.** 2012. Effects of shoreline development on aquatic macrophytes: Summary of analyses. *Class lecture*. Ecological Modeling (FW 8200), University of Minnesota, St. Paul, MN.
22. **Beck, M.W.**, Vondracek, B., Hatch, L.K., and Vinje, J. 2012. Image analysis techniques to evaluate effects of lakeshore development on aquatic habitat. *Oral and poster presentation*. Am. Fisheries Society annual meeting, St. Paul, MN.
23. **Beck, M.W.**, Vondracek, B., Hatch, L.K., and Vinje, J. 2012. Image analysis techniques to evaluate effects of lakeshore development on aquatic habitat. *Oral presentation*. Water Resources Conference, St. Paul, MN.
24. **Beck, M.W.**, Vondracek, B., Hatch, L.K., 2012. Identifying covariates of a lake assessment index to improve biological assessment. *Oral presentation*. Minnesota chapter of Society for Conservation Biology annual meeting, St. Paul, MN.
25. **Beck, M.W.**, Vondracek, B., Hatch, L.K. 2011. Image analysis techniques to evaluate effects of nearshore lake development on aquatic macrophytes. *Oral presentation*. Midwest Fish and Wildlife Conference, Des Moines, IA.
26. **Beck, M.W.** 2011. R is my friend: Or how I learned to stop worrying and love the machine. *Oral presentation*. Conservation Biology Graduate Program breakfast seminar, University of Minnesota, St. Paul, MN.
27. **Beck, M.W.**, Vondracek, B., Hatch, L.K. 2011. Image analysis techniques to evaluate effects of nearshore lake development on aquatic macrophytes. *Poster presentation*. Water Resources Conference, St. Paul, MN.
28. **Beck, M.W.**, Vondracek, B., Hatch, L.K. 2011. Image analysis techniques to evaluate effects of nearshore lake development on aquatic macrophytes. *Oral presentation*. Am. Fisheries Society annual meeting, Seattle, WA.
29. **Beck, M.W.**, Vondracek, B., Hatch, L.K. 2011. Image analysis techniques to evaluate effects of nearshore lake development on aquatic macrophytes. *Oral presentation*. Minnesota chapter of the Am. Fisheries Society annual meeting, Sandstone, MN.
30. **Beck, M.W.**, Hatch, L.K., Vondracek, B., Valley, R.D. 2010. Development of a macrophyte-based index of biotic integrity for Minnesota lakes. *Poster presentation*. Midwest Fish and Wildlife Conference, Minneapolis, MN.
31. Koch, J.D., **Beck, M.W.**, Carlin, J. 2010. A comparison of survey methods to evaluate macrophyte index of biotic integrity performance in Minnesota lakes. *Poster presentation*. Midwest Fish and Wildlife Conference, Minneapolis, MN.
32. **Beck, M.W.**, Hatch, L.K., Vondracek, B., Valley, R.D. 2010. Development of a macrophyte-based index of biotic integrity for Minnesota lakes. *Oral presentation*. International Congress for Conservation Biology, Edmonton, Alberta.
33. **Beck, M.W.**, Vondracek, B., Hatch, L.K. 2010. Assessing the health of Minnesota's lakes using indices of biotic integrity. *Oral presentation*. Joint meeting of the Minnesota chapters of Am. Fisheries Society, Society for Conservation Biology, and The Wildlife Society, Nisswa, MN.

34. **Beck, M.W.**, Hatch, L.K., Vondracek, B., Valley, R.D. 2009. Development of a macrophyte-based index of biotic integrity for Minnesota lakes. *Oral presentation*. Water Resources Conference, St. Paul, MN.
35. **Beck, M.W.**, Hatch, L.K., Vondracek, B., Valley, R.D. 2009. Development of a macrophyte-based index of biotic integrity for Minnesota lakes. *Poster presentation*. Land Conservation and Clean Water Summit, Chaska, MN.
36. **Beck, M.W.**, Hatch, L.K., Vondracek, B., Valley, R.D. 2009. Development of a macrophyte-based index of biotic integrity for Minnesota lakes. *Oral presentation*. Symposium for best student paper, Am. Fisheries Society annual meeting, Nashville, TN.
37. **Beck, M.W.**, Hatch, L.K., Vondracek, B., Valley, R.D. 2009. Development of a macrophyte-based index of biotic integrity for Minnesota lakes. *Oral presentation*. Minnesota chapter of the Society for Conservation Biology annual meeting, St. Paul, MN.
38. **Beck, M.W.**, Hatch, L.K., Vondracek, B., Valley, R.D. 2008. Development of a macrophyte-based index of biotic integrity for Minnesota lakes. *Poster presentation*. Water Resources Conference, St. Paul, MN.
39. **Beck, M.W.** 2008. The index of biotic integrity: A review. *Class lecture*. Water quality and natural resources (ESPM 4061), University of Minnesota, St. Paul, MN.
40. **Beck, M.W.**, Hatch, L.K., Vondracek, B., Valley, R.D. 2008. Development of a macrophyte-based index of biotic integrity for Minnesota lakes. *Oral presentation*. Conservation Biology Graduate Program seminar, University of Minnesota, St. Paul, MN.
41. Hatch, L.K., **Beck, M.W.**, Vondracek, B. 2007. Ecological assessment method development for Minnesota lakes. *Oral presentation*. North Am. Lake Management Society annual meeting, Orlando, FL.

### *Honors and Awards*

US EPA Gulf Ecology Division Green Award	May 2017
ORISE post-doctorate research highlights ( <a href="#">link</a> )	Feb. 2015
LaBounty Best Paper Award nomination, N. Am. Lake Management Society	Oct. 2014
Interdisciplinary Doctoral Fellowship, University of Minnesota <b>\$22500</b>	Sep. 2012
Best student paper award, MN chapter for Society of Conservation Biology	Mar. 2012
Carolyn Crosby Fellowship, University of Minnesota <b>\$1000</b>	Jan. 2012
Travel award, Conservation Biology Graduate Program <b>\$300</b>	Sep. 2011
Best student paper award, MN chapter of Am. Fisheries Society <b>\$200</b>	Feb. 2011
Travel award, Minnesota chapter of Am. Fisheries Society <b>\$65</b>	Feb. 2011
Fenske Memorial Award finalist, Midwest Fish and Wildlife Conference	Dec. 2010
Travel award, Strategic Env. Research and Development Program <b>\$700</b>	Jul. 2010
Travel award, Conservation Biology Graduate Program <b>\$300</b>	Jul. 2010
Travel award, Graduate and Professional Student Assembly <b>\$200</b>	Jul. 2010
Travel award, Minnesota chapter of Am. Fisheries Society <b>\$103</b>	Mar. 2010
Finalist in best student paper symposium, Am. Fisheries Society	Sep. 2009
Travel award, Conservation Biology Graduate Program <b>\$400</b>	Sep. 2009
Travel award, Graduate and Professional Student Assembly <b>\$165</b>	Sep. 2009
Conservation Biology Graduate Program summer fellowship <b>\$3500</b>	summer 2008

Phi Beta Kappa Honor Society	<b>Dec. 2006</b>
Dean's list for academic excellence duration of undergraduate education	<b>2004 - 2006</b>
Florida Bright Futures undergraduate scholarship <b>\$5250</b>	<b>2003 - 2006</b>

### *Professional Society Membership*

Coastal and Estuarine Research Federation	<b>Sep. 2013 - Present</b>
Society for Conservation Biology	<b>Feb. 2008 - Present</b>

### *Technical Training and Additional Experience*

Expert knowledge in R, RStudio, R Shiny, Git, GitHub, L<sup>A</sup>T<sub>E</sub>X, Sweave, knitr  
 Workshop participant, Master R Developer, San Francisco, CA  
 Webinar participant, The Grammar and Graphics of Data Science  
 Workshop participant, New Tools for Water Quality Data Access and Trend  
 Analysis. An Overview of the USGS R Packages: dataRetrieval and EGRET  
 Webinar participant, Revolution Analytics Introduction to R for Data Mining  
 Workshop participant, An Introduction to the Fundamentals of Linear  
 Quantile Regression in R  
 Workshop participant, Aquatic Plant Identification, Itasca State Park, MN  
 CPR and first aid certification