

REUBEN P. KELLER

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ACADEMIC POSITIONS:

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- Loyola University Chicago, School of Environmental Sustainability** August 2011-present
Full Professor (Assistant until June 2017, Associate until June 2023)
Received Loyola's highest faculty award - *Faculty Member of the Year* (2024)
- University of Chicago, Program on the Global Environment** September 2009-August 2011
Henry Chandler Cowles Lecturer
- University of Cambridge, Department of Zoology, Cambridge, UK** October 2006-August 2011
Affiliated Researcher, working with Dr. David Aldridge
- University of Notre Dame, Center for Aquatic Conservation** November 2006-August 2009
Post-doctoral Research Associate with Prof. David M. Lodge

EDUCATION:

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- University of Notre Dame, Department of Biological Sciences, Notre Dame, IN, USA**
Dissertation: *Ecological and Bioeconomic Risk Assessment for Invasive Species* (Ph.D. October 2006)
Committee: DM Lodge (Advisor), GA Lamberti, JL Tank, G Belovsky
- Monash University, Melbourne, Australia**
BA & BSc(Hons), November 2000 (majors: Biology, Statistics, Geography, Philosophy).
Honors thesis: *An Experimental Study of the Ecological Effects of the Introduced Freshwater Fish Oriental Weatherloach* (*Misgurnus anguillicaudatus*). Advisor Prof. P.S. (Sam) Lake.

EDITED VOLUMES:

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- Keller RP, M Cadotte & G Sandiford** (eds). 2015. *Invasive Species in a Globalized World: Ecological, Social, and Legal Perspectives on Policy*. University of Chicago Press.
- Keller RP, DM Lodge, M Lewis & J Shogren** (eds). 2009. *Bioeconomics of Invasive Species: Integrating Ecology, Economics, Policy and Management*. Oxford University Press.

PEER REVIEWED PUBLICATIONS:

* = graduate / ^ = undergraduate student advisee of Keller

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- Angell NR*, T Campbell, V Brady, AW Bajcz, AC Kinsley, A Doll, J Dumke, **RP Keller** & NBD Phelps. 2024. Quantifying the effectiveness of three aquatic invasive species prevention methods. *Management of Biological Invasions* 15: 371-396.
- Henry T*, B Harris, B Smith, **RP Keller** & JT Lamer. 2024. Distribution of invasive scud, *Apocorophium lacustre* (Vanhoffen, 1911) in the Illinois Waterway, USA: Do habitat and water quality variables influence spatial distribution and relative abundance? *Aquatic Invasions* 19:211-232.
- Cranberg C* & **RP Keller**. 2023. Historical trends of aquatic invasive species distribution and establishment in Illinois, USA. *Biological Invasions* 25:3361-3368. <https://doi.org/10.1007/s10530-023-03130-3>
- Camacho-Cervantes M, **Keller RP** & M Vilá. 2023. Could non-native species boost their chances of invasion success by socialising with natives? *Philosophical Transactions of the Royal Society Series B* 378: 20220106. <https://doi.org/10.1098/rstb.2022.0106>

- Keller RP** & DM Lodge. 2022. Invasive Species. *In* K Tockner & T Mehner (editors). Encyclopedia of Inland Waters, 2nd Edition. Elsevier, Oxford, UK.
- Egly RM, RD Polak, ZA Cook[^], HD Moy[^], JT Staunton[^] & **RP Keller**. 2021. Development and first tests of a lab-scale electric field for investigating potential effects of electric barriers on aquatic invasive invertebrates. *Frontiers in Ecology and Evolution, section Biogeography and Macroecology* 9:631732. <https://doi.org/10.3389/fevo.2021.631762>
- Egly R, EM O'Shaughnessey* & **RP Keller**. 2021. Updated occurrence data and species distribution modeling of the invasive scud *Apocorophium lacustre* in the Mississippi River, Great Lakes, and Upper St. Lawrence River Basins. *Freshwater Science* 40:162-174. <https://doi.org/10.1086/713071>
- Newcomb TJ, PW Simonin, FA Martinez, WL Chadderton, JM Bossenbroek, B Cudmore, MH Hoff, **RP Keller**, BD Ridenhour, JD Rothlisberger, ES Rutherford, S Van Egeren and DM Lodge. 2021. A best practices case study for scientific collaboration between researchers and managers. *Fisheries* 46:131-138. <https://doi.org/10.1002/FSH.10536>
- Roura-Pascual N, B Leung, W Rabitsch, L Rutting, J Vervoort, S Bacher, S Dullinger, K-H Erb, JM Jeschke, S Katsanevakis, I Kuhn, B Lensner, AM Liebhold, M Obersteiner, A Pauchard, GD Peterson, HE Roy, H Seebens, M Winter, MA Burgman, P Genovesi, PE Hulme, **RP Keller**, G Latombe, MA McGeoch, GM Ruiz, R Scalera, MR Springborn, B von Holle and F Essl. 2021. Alternative futures for global biological invasions. *Sustainability Science* 16:1637-1650. <https://doi.org/10.1007/s11625-021-00963-6>
- O'Shaughnessey EM*, R Egly, B Harris, B Smith & **RP Keller**. 2020. Current status of crayfish diversity and distribution in the southern basin of Lake Michigan and the Greater Chicago Region. *Journal of Great Lakes Research* 47:1065-1073. <https://doi.org/10.1016/j.jglr.2021.05.001>
- O'Shaughnessey E* & **RP Keller**. 2019. When invaders collide: competition, aggression, and predators affect outcomes in overlapping populations of red swamp (*Procambarus clarkii*) and rusty (*Faxonius rusticus*) crayfishes. *Biological Invasions* 21: 3671-3683. <https://doi.org/10.1007/s10530-019-02079-6>
- Lockwood JL, DJ Welbourne, CM Romagosa, P Cassey, NE Mandrak, A Strecker, B Leung, OC Stringham, B Udell, DJ Episcopio-Sturgeon, MF Tlusty, J Sinclair, MR Springborn, EF Pienaar, AL Rhyne & **RP Keller**. 2019. When pets become pests: the role of the exotic pet trade in producing invasive vertebrate animals. *Frontiers in Ecology and the Environment* 17: 323-330. <https://doi.org/10.1002/fee.2059>.
- Cole E*, **RP Keller** & K Garbach. 2019. Risk of invasive species spread by recreational boaters remains high despite widespread adoption of conservation behaviors. *Journal of Environmental Management* 229: 112-119. <https://doi.org/10.1016/j.jenvman.2018.06.078>
- Keller RP**, A Masoodi & RT Shackleton. 2018. The impact of invasive aquatic plants on ecosystem services and human well-being in Wular Lake, India. *Regional Environmental Change* 18: 847-857. <https://doi.org/10.1007/s10113-017-1232-3>
- Bacher S, T Blackburn, F Essl, P Genovesi, H Jaakko, J Jeschke, G Jones, **RP Keller**, M Kenis, C Kueffer, A Martinou, W Nentwig, J Pergl, P Pyšek, W Rabitsch, D Richardson, H Roy, W-C Saul, R Scalera, M Vila, J Wilson, S Kumschick. Socio-economic impact classification of alien taxa (SEICAT). 2018. *Methods in Ecology and Evolution* 9: 159-168. <https://doi.org/10.1111/2041-210X.12844>
- Keller RP**, G Habeeb[^], T Henry[^] & J Brenner*. 2017. Non-native amphipod, *Apocorophium lacustre* (Vanhoffen, 1911), in the Illinois River and Chicago Area Waterway System. *Management of Biological Invasions* 8: 377-382.

- Kopf RK, DG Nimmo, P Humphries, LJ Baumgartner, M Bode, NR Bond, AE Byrom, J Cucherousset, **RP Keller**, AJ King, HM McGinness, PB Moyle & JD Olden. 2017. Confronting the risks of large-scale invasive species control. *Nature Ecology and Evolution* 1: 0172. <https://doi.org/10.1038/s41559-017-0172>
- Keller RP** & S Kumschick. 2017. Promise and challenges of risk assessment as an approach for preventing the arrival of harmful alien species. *Bothalia – African Biodiversity and Conservation* 47: a2136. <https://doi.org/10.4102/abc.v47i2.2136>
- Essl F, P Hulme, J Jeschke, **RP Keller**, P Pysek, D Richardson, WC Saul, S Bacher, S Dullinger, R Estevez, C Kueffer, H Roy, H Seebens, W Rabitsch. 2017. Scientific and normative foundations for the valuation of alien invasive species impacts: Thirteen core principles. *BioScience* 67:166-178.
- Jacobs AI* & **RP Keller**. 2016. Straddling the divide: invasive aquatic species in Illinois and movement between the Great Lakes and Mississippi Basins. *Biological Invasions* 19: 635-646. <https://doi.org/10.1007/s10530-016-1321-0>
- Cole E*, **RP Keller** & K Garbach. 2016. Assessing the success of invasive species prevention public outreach and education efforts at changing the behaviors of recreational boaters. *Journal of Environmental Management* 184: 210-218. <https://doi.org/10.1016/j.jenvman.2016.09.083>
- Lodge DM, PW Simonin, SW Burgiel, **RP Keller**, JM Bossenbroek, CL Jerde, AM Kramer, ES Rutherford, MA Barnes, ME Wittmann, WL Chadderton, JL Apriesnig, D Beletsky, RM Cooke, JM Drake, SP Egan, DC Finnoff, CA Gantz, EK Grey, MH Hoff, JG Howeth, RA Jensen, ER Larson, NE Mandrak, DM Mason, FA Martinez, TJ Newcomb, JD Rothlisberger, AJ Tucker, TW Warziniack & H Zhang. 2016. Risk analysis and bioeconomics of invasive species management to inform policy and management. *Annual Review of Environment and Resources* 41: 453-488. doi: 10.1146/annurev-environ-110615-085532.
- Howeth JG, CA Gantz, PL Angermeier, EA Frimpong, MH Hoff, **RP Keller**, NE Mandrak, MP Marchetti, JD Olden, CM Romagosa & DM Lodge. 2016. Predicting invasiveness of species in trade: climate match, trophic guild, and fecundity influence invasive success of nonnative freshwater fish. *Diversity and Distributions* 22:148-160.
- Springborn MR, **RP Keller**, S Elwood, CR Romagosa, C Zambrana-Torrel, & P Daszak. 2015. Integrating risk assessment for invasion and disease risk in live animal trade. *Diversity and Distributions* 21: 101-110.
- Gantz CA, DR Gordon, CL Jerde, **RP Keller**, WL Chadderton, PD Champion, & DM Lodge. 2015. Managing the introduction and spread of non-native aquatic plants in the Great Lakes: a regional risk assessment approach. *Management of Biological Invasions* 6:45-55.
- Keller RP**, MW Cadotte, & G Sandiford. 2015. Working across disciplines to understand and manage invasive species. Pages 1-20 in: **Keller RP**, M Cadotte & G Sandiford (eds). *Invasive Species in a Globalized World: Ecological, Social, and Legal Perspectives on Policy*. University of Chicago Press.
- Sandiford G, **RP Keller**, & MW Cadotte. 2015. Final Thoughts: Nature and Human Nature. Pages 381-394 in: **Keller RP**, M Cadotte & G Sandiford (eds). 2015. *Invasive Species in a Globalized World: Ecological, Social, and Legal Perspectives on Policy*. University of Chicago Press.
- Wittman ME, CL Jerde, JG Howeth, SP Maher, AM Deines, JA Jenkins, GW Whitley, SR Burbank, WL Chadderton, AR Mahon, JT Tyson, CA Gantz, **RP Keller**, JM Drake, & DM Lodge. 2014. Grass carp in the Great Lakes region: Expert perception of ecological risk, potential for establishment, and re-evaluation of experimental evidence on ecological impact. *Canadian Journal of Fisheries and Aquatic Sciences* 71:992-999.

- Xu J, TL Wickramaratne, NV Chawla, EK Grey, K Steinhäuser, **RP Keller**, JM Drake & DM Lodge. 2014. Improving management of aquatic invasions by integrating shipping network, ecological, and environmental data: data mining for social good. *KDD Data Mining Proceedings*. DOI: 10.1145/2623330.2623364.
- Keller RP** & M Springborn. 2014. Closing the screen door to new invasions. *Conservation Letters* 7:285-292. DOI: 10.1111/conl.12071
- Xu J, T Wickramaratne, E Grey, K Steinhäuser, **RP Keller**, J Drake, N Chawla & D Lodge. 2014. Patterns of ship-borne species spread: A clustering approach for risk assessment and management of non-indigenous species spread. ArXiv: 1401.5407v1, 21 Jan 2014.
- Nghiem, LTP, T Soliman, DCJ Yeo, HTW Tan, TA Evans, JD Mumford, **RP Keller**, RHA Baker, RT Corlett & LR Carrasco. 2013. Economic and environmental impacts of harmful non-indigenous species in Southeast Asia. *Public Library of Science ONE* 8(8):e71255. doi:10.1371/journal.pone.0071255
- Gordon GR, CA Gantz, CL Jerde, WL Chadderton, **RP Keller** & PD Champion. 2012. Weed risk assessment for aquatic plants: modification of a New Zealand system for the United States. *Public Library of Science ONE* 7(7): e40031. doi:10.1371/journal.pone.0040031
- Keller RP**. 2011. Freshwater invasive species in Great Britain: ecological and economic causes and consequences. Pages 92-97 in: Gang J (ed.) *Reverse Effect: Renewing Chicago's Waterways*. Studio Gang Architects, Chicago.
- Keller RP** & C Perrings. 2011. International policy options for reducing the environmental impacts of invasive species. *BioScience* 61:1005-1012.
- Springborn M, CM Romagosa & **RP Keller**. 2011. The value of nonindigenous species risk assessment in international trade. *Ecological Economics*. 70:2145-2153.
- Keller RP**, J Geist, JM Jeschke & I Kühn. 2011. Invasive species in Europe: ecology, status and policy. *Environmental Sciences Europe* 23:23.
- Keller RP**, D Kocev & S Džeroski. 2011. Trait-based risk assessment for invasive species: high performance across diverse taxonomic groups, geographic ranges and machine learning/statistical tools. *Diversity and Distributions*. 17:451-461.
- Keller RP**, JM Drake, M Drew & DM Lodge. 2011. Linking Environmental Conditions and Ship Movements to Estimate Invasive Species Transport Across the Global Shipping Network. *Diversity and Distributions* 17:93-102.
- Keller RP** & DM Lodge. 2010. Prevention: designing and implementing national policy and management programs to reduce the risks from invasive species. Pages 220-234 in: Perrings C, M Williamson & M Lonsdale (editors). *Bioinvasions and Globalization*. Oxford University Press.
- Keller RP**, PSE zu Ermgassen & D Aldridge. 2009. Vectors and timing of nonindigenous freshwater species establishment in Great Britain. *Conservation Biology* 23:1526-1534.
- Keller RP** & JM Drake. 2009. Trait based risk assessment for invasive species. Pages 44-62 in: **Keller RP**, DM Lodge, MA Lewis & JF Shogren (editors). *Bioeconomics of Invasive Species: Integrating Ecology, Economics, Policy and Management*. Oxford University Press.
- Keller RP**, DM Lodge, M Lewis, J Shogren & M Krkosek. 2009. Putting bioeconomic research into practice. Pages 266-284 in: **Keller RP**, DM Lodge, MA Lewis & JF Shogren (editors) *Bioeconomics of Invasive Species: Integrating Ecology, Economics, Policy and Management*. Oxford University Press.

- Lodge DM, M Lewis, J Shogren & **RP Keller**. 2009. Introduction to biological invasions: biological, economic and social perspectives. Pages 1-24 *in*: **Keller RP**, DM Lodge, MA Lewis & JF Shogren (editors) *Bioeconomics of Invasive Species: Integrating Ecology, Economics, Policy and Management*. Oxford University Press.
- Bampfylde C, A Bobeldyk, JA Murray, K Drury, **RP Keller**, C McIntosh. 2009. Interactions between theoreticians and empiricists: rusty crayfish as a case-study. Pages 226-243 *in*: **Keller RP**, DM Lodge, MA Lewis & JF Shogren (editors). *Bioeconomics of Invasive Species: Integrating Ecology, Economics, Policy and Management*. Oxford University Press.
- Keller RP** & DM Lodge. 2009. Invasive Species. *In* GE Likens (editor). *Encyclopedia of Freshwaters*. Elsevier, Oxford, UK.
- Keller RP**, K Frang* & DM Lodge. 2008. Preventing the spread of invasive species: intervention guided by ecological predictions leads to economic benefits. *Conservation Biology* 22:80-88.
- Keller RP**, DM Lodge & DC Finnoff. 2007. Risk assessment for invasive species produces net bioeconomic benefits. *Proceedings of the National Academy of Sciences USA* 104:203-207.
- Keller RP** & DM Lodge. 2007. Species invasions from commerce in live aquatic organisms – problems and possible solutions. *BioScience* 57:428-436.
- Keller RP**, JM Drake & DM Lodge. 2007. Fecundity as a basis for risk assessment of nonindigenous molluscs. *Conservation Biology* 21:191-200.
- Keller RP** & PS Lake. 2007. Potential impacts of a recent and rapidly spreading colonizer of Australian freshwaters: Oriental weatherloach (*Misgurnus anguillicaudatus*). *Ecology of Freshwater Fish* 16:124-132.
- Keller RP**, C VanLoon[^], AN Cox[^], DM Lodge, L-M Herborg & J Rothlisberger. 2007. From bait shops to the forest floor: earthworm use, transport and disposal by anglers. *American Midland Naturalist* 158:321-328.
- Loo SE, **RP Keller** & B Leung. 2007. Freshwater invasions: using historical data to analyze spread. *Diversity and Distributions* 13:23-32.
- Bossenbroek JM, J McNulty & **RP Keller**. 2005. Can ecologists heat up the discussion on invasive species risk? *Risk Analysis* 25:1595-1597.

MANUSCRIPTS IN REVIEW (* = graduate / [^] = undergraduate student advisee of Keller):

- Cranberg C*, J Milanovich & **RP Keller**. Potential North American ranges of the invasive crayfishes *Faxonius rusticus* (rusty crayfish) and *Procambarus clarkii* (red swamp crayfish) under current and future climate projections. *In Review at Ecography*.
- Prescott V & **RP Keller**. Quantitative tests of three species distribution models for aquatic invasive species. *In Review at Fisheries*.

MANUSCRIPTS IN PREPARATION:

- Copic C*, J Bieber, R Egly & **RP Keller**. Barriers to the spread of *Apocorophium lacustre*, a high-risk invasive amphipod threatening the Laurentian Great Lakes. For submission to *Biological Invasions*.
- Copic C*, J Bieber & **RP Keller**. Trials of carbon dioxide as a barrier to prevent the spread of invasive aquatic invertebrates.
- Egly R, C Copic*, L Hammett[^], EM O'Shaughnessey* & **RP Keller**. Best practices for control of non-native red swamp crayfish *Procambarus clarkii* in an open study system.

Egly R & **RP Keller**. Intensive trapping of red swamp crayfish (*Procambarus clarkii*) in a flowing system has reduced population and allowed native species to recover. For submission to *Aquatic Invasions*.

Keller RP, J Deines, J Marte[^], RM Egly & DM Lodge. High accuracy of rapid risk assessment for fish introductions to the United States. For submission to *Biological Invasions*.

OTHER ACADEMIC PUBLICATIONS:

Keller RP. 2017. Ecology for All. *BioScience* 67:769-770. [Invited book review of CJ Krebs. 2016. Why Ecology Matters. University of Chicago Press] doi:10.1093/biosci/bix061

Keller RP & S Kumschick. 2017. Invasive species have massive impacts, but wise policy can keep them out. *The Conversation* [online academic op-ed site]. <https://theconversation.com/invasive-species-have-a-massive-impact-but-wise-policy-can-keep-them-out-79444>

Gordon DR, SL Flory, D Lieurance, PE Hulme, C Buddenhagen, B Caton, PD Champion, TM Culley, C Daehler, F Essl, JE Hill, **RP Keller**, L Kohl, AL Koop, S Kumschick, DM Lodge, RN Mack, LA Meyerson, GR Pallippambil, FD Panetta, R Porter, P Pysěk, LD Quinn, DM Richardson, D Simberloff & M Vilá. 2016. Weed risk assessments are an effective component of invasion risk management. *Invasive Plant Science and Management* 9:81-83 (rebuttal of Smith et al. 2015 article).

Keller RP & M Springborn. 2011. Long-term correlations in European socioeconomic conditions create a bias to conclusion that an invasion debt occurs. *Proceedings of the National Academy of Sciences* 108:E220 (letter to editor).

Simberloff D and 140 co-signatories, including **RP Keller**. Non-natives: 141 scientists object. *Nature* 475: 36 (letter to editor).

Keller RP & C Perrings. 2010. International policy options to reduce the harmful impacts of invasive alien species. *Commissioned report for United Nations Environment Program*.

Harris J, L Bowling, **RP Keller**, RJ Keller, J Kress, PS Lake & DC McPhail. 2006. The Tooma River project – interdisciplinary probes into ill-defined and unpredictable contamination. Technical Report. CRC for Freshwater Ecology, Canberra (Australia).

Keller RP & DM Lodge. 2005. Probability of nonindigenous seafood species becoming established. *Conservation Biology* 19:287-288 (letter to editor).

Drake JM & **RP Keller**. 2004. Environmental justice alert: do developing nations bear the burden of risk for invasive species? *BioScience* 54:718-719 (op-ed).

PUBLICATIONS IN NON-ACADEMIC OUTLETS:

Keller RP. Chicago River is due for a change. 2010. *Commentary* op-ed article in Chicago Tribune, 1 September 2010, p. 40.

Keller RP. 2007. Trade in live aquatic organisms. *Lakeline Fall* 2007:30-31 (review article in lake management publication).

INVITED SEMINARS/PRESENTATIONS:

(* = graduate / ^ = undergraduate student advisee of Keller):

Keller RP. November 11, 2023. Preventing the Spread of Invasive Aquatic Invertebrates in the Chicago River System. Invited seminar to *Department of Biological Sciences, University of Illinois Chicago*.

Keller RP & G Dlesk*. October 12, 2023. Food web impacts of invasive red swamp (*Procambarus clarkia*) and rusty (*Faxonius rusticus*) crayfishes in the Chicago River and Lake Michigan. Invited presentation to the *Invasive Crayfish Collaborative* (remote).

- Keller RP, R Egly & N Szklaruk***. September 19, 2023. Non-physical barriers for preventing spread of invasive invertebrates. Invited presentation to *Sea Grant Great Lakes Network Meeting* (Evanston, Illinois).
- Keller RP**. June 21, 2023. Scud (*Apocorophium lacustre*) in Illinois. Invited presentation to United States Army Corps of Engineers, *Brandon Road Interbasin Project Non-structural Committee* (remote).
- Keller RP**. February 22, 2023. Red swamp and rusty crayfish in Illinois waterways. Invited presentation to Great Lakes Commission *Great Lakes Interstate Prevention, Early Detection and Rapid Response Core Team and Surveillance Planning Meeting* (remote).
- Keller RP**. August 25, 2022. Spread and Control of Invasive Crayfishes in the Chicago Region. Invited presentation in the session *Detection, Control and Eradication of Invasive Crayfishes* at the annual meeting of the *American Fisheries Society* (Spokane, Washington).
- Keller RP**. June 1, 2022. Red swamp and rusty crayfish in Illinois waterways. Invited presentation to *Great Lakes Panel on Aquatic Nuisance Species* (meeting held remotely due to Covid).
- Keller RP**. October 27, 2021. Economics of Aquatic Invasive Species and Effectiveness of Outreach Campaigns in Illinois. Invited presentation to *Great Lakes Panel on Aquatic Nuisance Species* (meeting held remotely due to Covid).
- Keller RP, C Copic^ & R Egly**. January 27, 2021. The effect of electric and carbon dioxide barriers on invasive invertebrates. Invited presentation to the *Asian Carp Regional Coordinating Committee*.
- Keller RP**. July 8, 2020. Detection and Control of Invasive Crayfishes in the Chicago Region. Presentation in Webinar titled Current status of invasive crayfish prevention, early detection, and control activities funded by the Great Lakes Restoration Initiative, organized by the U.S. Fish and Wildlife Service.
- Keller, RP**. January 26, 2020. Invasive Crayfishes in the Midwest and Great Lakes Region: Current Status and Management Options. Invited presentation at *Aquatic Invasive Species Workshop, Midwest Fish and Wildlife Conference* (Springfield, Illinois).
- Keller RP**. October 2, 2019. Potential for New Invaders to Enter the Great Lakes Via the St. Lawrence and Chicago Rivers. Invited presentation at *Ballast Water Best Management Practices For Great Lakes Vessels: Project Stakeholder Roundtable Discussion* (Cleveland, Ohio).
- Keller RP**. September 16, 2019. *Risk of Aquatic Species Invasions in the Great Lakes*. Invited presentation and discussant at *Symposium on the IPBES Global Assessment on Biodiversity and Ecosystem Services and its Implications for the Great Lakes Region*. Hosted by the Lieutenant Governor of Ontario and the Environmental Law and Policy Center (Toronto, Canada).
- Keller RP**. September 12, 2019. Invasive Aquatic Species in Illinois: Arrival, Spread, and What the Future Holds. Invited one-hour seminar to STEM group at Joliet Junior College (Joliet, Illinois).
- Keller RP**. September 7, 2018. Keeping Out the Next Invasive Species: Ecological and Economic models to support policy. Invited one-hour seminar at *Department of Natural Resources and Environment, University of Illinois Urbana-Champaign* (Urbana-Champaign, Illinois).
- Keller RP**. January 30, 2017. Preventing the arrival of invasive species: ecological and economic models to support policy. Invited one-hour seminar at *Bren School of Environmental Science and Management, University of California Santa Barbara* (Santa Barbara, California).
- Keller RP**. May 20, 2016. Promise and Challenges of Risk Assessment as an Approach for Preventing the Arrival of Invasive Species. Invited Keynote presentation at *43rd Annual Research Symposium on the Management of Biological Invasions in South Africa* (Worcester, South Africa)

- Keller RP.** February 3, 2016. Chicago Area Waterway System as an Invasion Pathway for Crustaceans. Invited presentation to *Chicago Mayor's Nature and Wildlife Committee* (Chicago, USA).
- Keller RP.** January 30, 2015. Preventing the Arrival of Invasive Species: From Models to Policy. Invited department seminar at the *University of Adelaide's Environment Institute* (Adelaide, Australia).
- Keller RP.** October 3, 2014. Risk Assessment for Invasive Species in the Great Lakes. 20 minute presentation via Webinar as part of a session co-organized by the Environmental Law Institute and the National Invasive Species Council. 235 people from across the US and Canada registered for the Webinar.
- Keller RP.** September 24, 2014. Differential Impacts of Invasive Species in Developing and Developed Countries, and Economic Outcomes From Applying Risk Assessment for Invasive Species. One hour presentation via Skype to the EU funded COST Workshop on the Socio-Economic Impacts of Invasive Species, held in Cyprus. I was invited as an international participant but was not able to attend. As an alternative I presented via Skype.
- Keller RP.** September 19, 2014. Preventing Invasions from Trade in Live Aquatic Organisms. One hour presentation to invasive species managers and policy makers from across the Great Lakes Basin. *Shedd Aquarium*, Chicago.
- Keller RP.** June 3, 2014. Preventing invasions from trade in live aquatic organisms. Invited presentation at *BIOTIC Conference on Trade and Invasive Species in the Great Lakes*. University of Wisconsin, Milwaukee.
- Keller RP.** May 21, 2014. Increasing Safety of Migratory Birds at Loyola University Chicago. Oral presentation at *GreenTown Chicago*, University of Illinois at Chicago.
- Keller RP.** October 25, 2013. Developing Regional Risk Assessment Tools to Predict and Prevent Invasive Species. *International Congress on Biological Invasions*. Qingdao, China.
- Keller RP.** October 15, 2013. Invasive species in the Great Lakes, and what we can do to prevent them. Invited Keynote presentation at the *Second Annual Sheinbuks Lecture and Scholars Awards*. Chicago State University.
- Keller RP.** July 18, 2012. Reducing the economic and ecological risks from invasive species. Invited Keynote presentation to the *Invasive Species Working Group of the Pacific Northwest Economic Region Annual Meeting*. Saskatoon, Canada.
- Keller RP, D Kocev & S Džeroski.** August 11, 2011. Trait-based risk assessment for invasive species: high performance across diverse taxonomic groups, geographic ranges and machine learning/statistical tools. *Ecological Society of America*. Austin, Texas, USA.
- Keller RP.** April 7, 2011. Predicting and preventing the spread of aquatic invasive species through the Chicago Area Waterway System. Presentation as part of expert panel at University of Illinois, Urbana-Champaign.
- Keller RP.** October 6, 2010. Community Ecology in a Globalized World: Invasive Species, Economics and the Future of the Great Lakes. Departmental Seminar, Department of Biology, Loyola University.
- Keller RP.** June 2, 2010. Bioeconomics of Invasive Species. *16th Annual German-American Frontiers of Science Symposium* (organized and funded by the National Academies of Science). Pottsdam, Germany.
- Keller RP.** May 27, 2010. Disconnecting Places: Asian Carp and Other Aquatic Invasive Species of Concern for the Calumet Region. Invited Presentation at Calumet Summit, 2010. Purdue University Calumet.

- Keller RP.** April 2009. Global shipping networks drive changing risks of invasion. *Odum Conference, Understanding and Managing Biological Invasions as Dynamic Processes*. Rensselaerville Institute, New York, USA.
- Keller RP, JM Drake, M Drew & D Lodge.** April 2009. Predicting future Great Lakes invaders: global datasets of shipping traffic and environmental conditions identify high-risk shipping routes. *International Conference on Aquatic Invasive Species*. Montreal, Canada.
- Keller RP, K Frang & DM Lodge.** December 2008. Risks and bio-economic impacts associated with movement of live bait. *Midwest Fish and Wildlife Conference*. Columbus, Ohio, USA.
- Keller RP, J Rothlisberger, WL Chadderton & DM Lodge.** October 2008. Prevention strategies for limiting the spread of aquatic invasive species by recreational boaters. *Natural Areas Association annual meeting*. Nashville, Tennessee, USA.
- Keller RP, PSE zu Ermgassen & D Aldridge.** 2007. The history and future of freshwater invasions in Great Britain. *London Freshwater Group Spring 2007 Meeting*. Linnean Society, London, UK.
- Keller RP, DM Lodge, K Frang & DC Finnoff.** 2007. Ecological and economic theory in analyzing risk in biological invasions. Symposium presentation at *Ecological Society of America annual meeting*, San Jose, CA, USA.

OTHER PRESENTATIONS TO ACADEMIC AUDIENCES:

Presenter listed first; oral unless specified, (= graduate / ^ = undergraduate student advisee of Keller)*

- Keller RP, G Dlesk* & C Cranberg*.** June 5, 2024. Coexistence of invasive rusty (*Faxonius rusticus*) and red swamp (*Procambarus clarkii*) crayfish in an urban waterway. Contributed oral presentation at the annual meeting of the *Association for the Sciences of Limnology and Oceanography* (Madison, WI).
- Oosterbaan T* & **RP Keller.** June 5, 2024. Microplastic accumulation in invasive red swamp crayfish (*Procambarus clarkii*) in a highly urbanized river. Contributed oral presentation at the annual meeting of the *Association for the Sciences of Limnology and Oceanography* (Madison, WI).
- Bieber J, C Copic, R Egly & **RP Keller.** June 5, 2024. Barriers to the spread of an invasive scud (*Apocorophium lacustre*) in the Chicago Area Waterway System. Contributed oral presentation at the annual meeting of the *Association for the Sciences of Limnology and Oceanography* (Madison, WI).
- Quebbeman A* & **RP Keller.** June 5, 2024. Determining the presence of non-native aquatic species in recreational boat harbors in Chicago, Illinois. Contributed oral presentation at the annual meeting of the *Association for the Sciences of Limnology and Oceanography* (Madison, WI).
- Egly R & **RP Keller.** June 5, 2024. Impacts of removal of invasive crayfish *Procambarus clarkii* on macrophytes and macroinvertebrates in an urban river. Contributed oral presentation at the annual meeting of the *Association for the Sciences of Limnology and Oceanography* (Madison, WI).
- Dlesk G* & **RP Keller.** June 4, 2024. Impact of wastewater effluent on the carapace microbiome of an invasive crayfish in an urban river. Contributed oral presentation at the annual meeting of the *Association for the Sciences of Limnology and Oceanography* (Madison, WI).
- Keller RP.** May 13, 2024. Interactions between the invasive red swamp (*Procambarus clarkii*) and rusty (*Faxonius rusticus*) in the Chicago Region. Contributed oral presentation at the *International Conference on Aquatic Invasive Species* (Halifax, Canada).
- Dlesk G* & **RP Keller.** August 22, 2023. Food-web interactions of overlapping populations of invasive

rusty (*Faxonius rusticus*) and red swamp (*Procambarus clarkii*) crayfish in an urban waterway. Contributed oral presentation at the Annual Meeting of the *American Fisheries Society* (Grand Rapids, Michigan).

- Keller RP.** August 22, 2023. Spread and ecological impacts of rusty crayfish (*Faxonius rusticus*) in Lake Michigan. Contributed oral presentation at the Annual Meeting of the *American Fisheries Society* (Grand Rapids, Michigan).
- Ballard M[^], G Dlesk* & **RP Keller.** August 21, 2023. Invasive red swamp crayfish may increase transfer of harmful bacteria to fishes. Contributed poster presentation at the Annual Meeting of the *American Fisheries Society* (Grand Rapids, Michigan).
- Szklaruk N*, T Oosterbaan[^], S Ware[^] & **RP Keller.** August 21, 2023. Chicago Region water quality increases stress and may deter invasive invertebrates. Contributed oral presentation at the Annual Meeting of the *American Fisheries Society* (Grand Rapids, Michigan).
- Egly R, **RP Keller** & R Polak. August 21, 2023. Effectiveness of electric barriers for preventing the spread of invasive invertebrates. Contributed oral presentation at the Annual Meeting of the *American Fisheries Society* (Grand Rapids, Michigan).
- Egly R & **RP Keller.** August 9, 2023. Removal of invasive crayfish *Procambarus clarkii* in an urban river system. Contributed oral presentation at the Annual Meeting of the *Ecological Society of America* (Portland, Oregon).
- Cranberg C* & **RP Keller.** August 25, 2022. Historical Trends of Aquatic Invasive Species in Illinois, a Key Gateway Between Basins. Contributed oral presentation at the Annual Meeting of the *American Fisheries Society* (Spokane, Washington).
- Egly R & **RP Keller.** August 25, 2022. Removal of invasive crayfish *Procambarus clarkii* in an open, flowing, urban system. Presentation in the session *Detection, Control and Eradication of Invasive Crayfishes* at the Annual Meeting of the *American Fisheries Society* (Spokane, Washington).
- Szklaruk N*, R Egly, **RP Keller.** August 25, 2022. Effects of Electric, Carbon Dioxide, and Water Quality Barriers on Invasive Invertebrates. Presentation in the session *Detection, Control and Eradication of Invasive Crayfishes* at the Annual Meeting of the *American Fisheries Society* (Spokane, Washington).
- Henry T, B Harris, J Lamer, **RP Keller** & B Smith. November 7, 2021. Do water quality and habitat influence the distribution of the invasive amphipod *Apocorophium lacustre* in the Illinois River? Poster presentation at Annual meeting of *American Fisheries Society* (Baltimore, Maryland).
- Cook Z[^], R Egly, J Staunton[^], H Moy[^], R Polak and **RP Keller.** January 2021. Effectiveness of Electric Barriers in Preventing Spread of the Invasive Invertebrates *Apocorophium lacustre* and *Procambarus clarkii*. Oral presentation at annual Midwest Fish and Wildlife Conference.
- Copic C*, N Szklaruk* and **RP Keller.** May 2021. The efficacy of dissolved carbon dioxide for preventing spread of aquatic invasive invertebrates. Oral presentation at annual meeting of the Society for Freshwater Science.
- Cranberg C* & **RP Keller.** August 2021. Modeling the potential North American ranges of the invasive crayfishes *Faxonius rusticus* (rusty crayfish) and *Procambarus clarkii* (red swamp crayfish) under current and future climate projections. Oral presentation at annual meeting of the Ecological Society of America.

- RP Keller**, E. O'Shaughnessey* & R Egly. August 13, 2019. Red Swamp Crayfish in the Chicago Region: Interactions with Rusty Crayfish and Experimental Control. *Ecological Society of America Annual Meeting* (Louisville, Kentucky).
- R Egly, C Copic* & **RP Keller**. August 13, 2019. Effectiveness of Electric and Carbon Dioxide Barriers for Preventing Spread of the Invasive Amphipod *Apocorophium lacustre* into the Laurentian Great Lakes. *Ecological Society of America Annual Meeting* (Louisville, Kentucky).
- Copic C*, R Egly, E O'Shaughnessey* & **RP Keller**. May 20, 2019. Optimizing invasive crayfish trapping methods, case study of *Procambarus clarkii*. Oral presentation at Annual meeting of the *Society for Freshwater Science* (Salt Lake City, Utah).
- O'Shaughnessey*, R Egly & **RP Keller**. January 30, 2019. Control of Red Swamp Crayfish (*Procambarus clarkii*) in Chicago Region to Reduce Risk of Spread Across Great Lakes Basin. *Midwest Fish and Wildlife Conference* (Cleveland, Ohio).
- RP Keller**. June 20, 2018. Invasive crayfishes in the Great Lakes: current status and management options. *International Association of Great Lakes Research Annual Meeting* (Toronto, Canada). Presentation in session I co-organized.
- RP Keller** & V Prescott*. June 20, 2018. Climate change and ecological risk assessment for predicting future Great Lakes crayfish invasions. *International Association of Great Lakes Research Annual Meeting* (Toronto, Canada). Presentation in session I co-organized.
- Par J^, E O'Shaughnessey* & **RP Keller**. January 30, 2018. Diversity, distribution, and habitat associations of non-native mollusks in the Chicago region (poster). *Midwest Fish and Wildlife Conference* (Milwaukee, Wisconsin).
- Prescott V* & **RP Keller**. January 30, 2018. Combining invasive species risk assessments with climate change to predict future invaders in the Great Lakes. *Midwest Fish and Wildlife Conference* (Milwaukee, Wisconsin).
- O'Shaughnessey E* & **RP Keller**. January 30, 2018. Battle of the claws: interactions between two non-native crayfish species in the Chicago region. *Midwest Fish and Wildlife Conference* (Milwaukee, Wisconsin).
- Charlebois P & **RP Keller**. January 30, 2018. Addressing the threat of organisms in trade in the Great Lakes region: science-based risk assessment and outreach. *Midwest Fish and Wildlife Conference* (Milwaukee, Wisconsin).
- Prescott V* & **RP Keller**. November 8, 2017. Combining invasive species risk assessments with climate change to predict future invaders in the Great Lakes. *International Association of Great Lakes Research's State of Lake Michigan Meeting* (Green Bay, Wisconsin).
- O'Shaughnessey E* & **RP Keller**. November 8, 2017. Battle of the claws: interactions between two non-native crayfish species in the Chicago region. *International Association of Great Lakes Research's State of Lake Michigan Meeting* (Green Bay, Wisconsin).
- Keller RP**, E Cole* & K Garbach. November 8, 2017. Assessing the success of outreach at reducing invasion risks from movement of recreational boats. *International Association of Great Lakes Research's State of Lake Michigan Meeting* (Green Bay, Wisconsin).
- O'Shaughnessey E* & **RP Keller**. August 10, 2017. Battle of the claws: Competition between two non-native crayfish species in the Chicago region. *Ecological Society of America annual meeting*, Portland, OR.

- Keller RP**, E Cole* & K Garbach. October 26, 2016. Outreach to prevent spread of invasive species: tracing messages to action. *Illinois Water Conference* (Champaign, Illinois).
- Keller RP**, G Habeeb^, J Brenner* & T Henry^. April 11, 2016. Chicago Area Waterway System as an Invasion Pathway for Crustaceans. *International Conference on Aquatic Invasive Species*, Winnipeg, Canada.
- Henry T^, G Habeeb^, J Brenner* & **RP Keller**. May 24, 2016. Distribution and spread of non-native crustaceans in the Chicago Area Waterway System: implications for invasions in the Great Lakes and Mississippi. *Society for Freshwater Science* annual meeting. Sacramento, California. (Poster).
- Cole E*, K Garbach & **RP Keller**. August 11, 2015. Assessing outreach efforts to recreational boaters as a means to reduce spread of aquatic invasive species. *Ecological Society of America* annual meeting. Baltimore, USA.
- Keller RP**, E Cole* and K Garbach. May 18, 2015. Outreach to Prevent Spread of Invasive Species: Tracing Messages to Action. *Society of Freshwater Science* annual meeting, Milwaukee, WI.
- Keller RP** & C Gantz. August 15, 2014. Cost and Consistency of Different Approaches to Risk Assessment for Invasive Species. *Ecological Society of America* Annual Meeting, Sacramento, California.
- Jacobs A* & **RP Keller**. May 21, 2014. Straddling the Divide: Invasive Aquatic Species in Illinois and Movement Between the Great Lakes and Mississippi Drainages. *Joint Aquatic Sciences* meeting, Portland, OR.
- Scheiwiller K^, A Jacobs* & **RP Keller**. May 20, 2014. Long-term zebra mussel invasion rates throughout the Great Lakes Region. *Joint Aquatic Sciences* meeting, Portland, OR. (Poster).
- Cole E*, K Garbach & **RP Keller**. April 11, 2014. Modeling Adoption of Prevention Practices for Aquatic Invasive Species. *Illinois Lakes Management Association* Annual Meeting, Sandwich, IL.
- Scheiwiller K^, A Jacobs* & **RP Keller**. April 10, 2014. Long-term Invasion Rates of Zebra Mussels Across the Great Lakes Region. *Illinois Lakes Management Association* Annual Meeting, Sandwich, IL. (Poster).
- Jacobs A* & **RP Keller**. April 10, 2014. Straddling the Divide: Invasive Aquatic Species in Illinois and Movement between the Great Lakes and Mississippi Drainages. *Illinois Lakes Management Association* Annual Meeting, Sandwich, IL.
- Keller RP**. March 26, 2014. Preventing the Arrival of Invasive Species: From Models to Policy. Undergraduate Colloquium in the Mathematical Sciences. Loyola University Chicago.
- Keller RP**. March 11, 2014. Keeping Out the Next Invasive Species: Addressing Challenges in Prediction and Prevention. Institute of Environmental Sustainability Seminar, Loyola University Chicago.
- Keller RP** & A Jacobs*. October 3, 2013. Looking Forward: Risk Assessment Tools to Identify Future Invaders Before They Arrive. *14th Biennial Governor's Conference on the Management of the Illinois River*. Peoria, IL.
- Grey E, F Kraus, A Baldrige, **RP Keller** & C Gantz. June 5, 2013. Herpetofauna Risk Assessment For The Great Lakes. *International Association of Great Lakes Research* annual meeting. Purdue University, IN.
- Gantz C, **RP Keller**, D Lodge, D Gordon, C Jerde & W Chadderton. June 5, 2013. Predicting Invasive Aquatic Plant Species in the Laurentian Great Lakes Basin Using a Questionnaire-Style Risk

Assessment. *International Association of Great Lakes Research* annual meeting. Purdue University, IN.

Keller RP, J Howeth, C Gantz, D Lodge & N Mandrak. June 5, 2013. Risk Assessment for Fishes in the Laurentian Great Lakes. *International Association of Great Lakes Research* annual meeting. Purdue University, IN.

Jacobs A* & **RP Keller**. June 3, 2013. Aquatic Invasive Species in Illinois: Inventory, Analysis of Spread and Relation to Great Lakes Aquatic Invasive Species Management. *International Association of Great Lakes Research* annual meeting. Purdue University, IN. (poster).

Jacobs A* & **RP Keller**. May 22, 2013. Aquatic Invasive Species in Illinois: Inventory, Analysis of Spread and Relation to Great Lakes Aquatic Invasive Species Management. *Society for Freshwater Science* annual meeting. Jacksonville, FL. (poster).

Hitzroth G, D Hillbrich, P Charlebois, M Farley, B Kirschner & **RP Keller**. April 23, 2013. Outreach on Great Lakes OIT Risk Assessments. *International Conference on Aquatic Invasive Species*. Niagara Falls, Canada.

Jacobs A* & **RP Keller**. March 6, 2013. Aquatic Invasive Species in Illinois: Inventory, Analysis of Spread and Relation to Great Lakes Aquatic Invasive Species Management. *American Fisheries Society, Illinois Chapter* annual meeting. Rend Lake Resort, IL. (Poster).

Mandrak NE & **RP Keller**. February 21, 2013. Identifying Climate Match Hot Spots to Facilitate Risk Screening of Freshwater Fishes in Trade. *American Society for Limnology and Oceanography Annual Meeting*. New Orleans, LA.

Howeth JG, CA Gantz, EA Frimpong, M Hoff, **RP Keller**, DM Lodge, N Mandrak, MP Marchetti, JD Olden & CM Romagosa. February 21, 2013. Trait-Based Risk Assessment of Non-Native Fishes in Trade. *American Society for Limnology and Oceanography Annual Meeting*. New Orleans, LA.

Keller RP. November 15, 2012. Changing attitudes towards the Chicago River. Presentation as part of a session I proposed and organized at the *Biennial Chicago Wilderness Congress*. Chicago, IL.

Wittmann ME, CJ Jerde, JG Howeth, SP Maher, JM Drake, WL Chadderton, AM Mahon, CA Gantz, **RP Keller**, J Deines & DM Lodge. August 8, 2012. Reducing uncertainty in the perceived risk of grass carp (*Ctenopharyngodon idella*) invasion in the Great Lakes: Ploidy, distribution, and ecosystem impact). *Ecological Society of America Annual Meeting*, Portland, OR.

RP Keller & J Deines. August 7, 2012. Rapid risk assessment for invasive species: testing a screening approach for fish introductions. Presentation at the *Ecological Society of America Annual Meeting*, Portland, OR.

Howeth, JG, CA Gantz, PL Angermeier, EA Frimpong, M Hoff, **RP Keller**, DM Lodge, NE Mandrak, MP Marchetti, JD Olden, & CM Romagosa. August 6, 2012. A trait-centered approach to risk assessment of non-native fishes in trade. Presentation at the *Ecological Society of America Annual Meeting*, Portland, OR.

Lodge DM, **RP Keller**, JM Drake, MB Drew, WL Chadderton. May 17, 2012. Linking Environmental Conditions and Shipping to Estimate Invasive Species Transport. Presentation at the annual meeting of the *International Association for Great Lakes Research*. Cornwall, ON, Canada.

Tarpey L^ & **RP Keller**. August 12, 2011. Keeping out invasive plants: history of the U.S. Federal Noxious Weeds List. *Ecological Society of America* annual meeting. Austin, TX. (Poster).

Keller RP. May 2011. Predicting the vectors and identity of future invaders. University of Chicago conference on *Invasive Species and Globalization*.

- Keller RP.** 13 January, 2010. From Sea Lamprey to Asian Carp: History, Ecology and Economics of Invasive Species in the Great Lakes. Presentation to University of Chicago Triple Helix Student Society.
- Keller RP.** 19 November, 2009. Combining Ecology and Economics to Address Invasive Species. Presentation for University of Chicago Program on the Global Environment Workshop series.
- Keller RP, JM Drake, M Drew & DM Lodge.** August 2008. Who will invade next? Predicting Great Lakes invasions based on shipping traffic and environmental similarity of origin ports. *Ecological Society of America* Annual Meeting, Milwaukee, Wisconsin, USA.
- Keller RP & DM Lodge.** October 2007. National policy for invasive species. *BESTNet/ DIVERSITAS ecoSERVICES Workshop on Economic and Ecological Science and Management of Invasive Species.* Tempe, Arizona, USA.
- Keller RP.** March 2007. Risk assessment for invasive aquatic animals. *Control of Invasive Aquatic Animals* meeting, organized by The Nature Conservancy. Las Vegas, Nevada, USA.
- Keller RP, K Frang* and DM Lodge.** August 2006. Back to the future: using historical data to test whether ecological predictions make economic sense. *Ecological Society of America* annual meeting, Memphis, Tennessee, USA.
- Keller RP, DM Lodge & DC Finnoff.** August 2005. Accuracy of ecological risk assessment determines net economic and social benefits from risk management of invasive species. *Ecological Society of America* annual meeting. Montreal, Canada.
- Keller RP & DM Lodge.** October 2004. Is risk assessment for invasive species economically and socially beneficial? Environmental risk and nonindigenous species invasions in the Great Lakes region: risk analysis, management and communication. *Risk Analysis for Invasive Species* meeting, Cleveland State University, Ohio, USA.
- Keller RP, JM Drake and DM Lodge.** March 2004. Predicting freshwater mollusc invaders in the Great Lakes. *Midwest Ecology and Evolution Conference*, University of Notre Dame, Indiana, USA.
- Keller RP & DM Lodge.** November 2003. Risk analyses of aquatic plants: comparing existing and new methods. *Victorian Department of Sustainability and Environment* symposium, Melbourne, Australia.
- Keller RP, JM Drake & DM Lodge.** June 2003. Keeping out the next invasive mollusc: a modeling approach to predicting the impact of future freshwater mollusc introductions. *Society for Conservation Biology* annual meeting, Duluth, Minnesota, USA.
- Keller RP, CM VanLoon* & DM Lodge.** October 2002. Coming to a pond near you: live aquatic plant trade as an invasion pathway. *Invasive Plants: Global Issues, Local Challenges* conference, hosted by the Chicago Botanic Gardens, Chicago, Illinois, USA (poster).

PRESENTATIONS AT FEDERAL CONGRESSIONAL BRIEFINGS:

- Keller RP.** June 20, 2012. Economic and environmental benefits from risk assessment for invasive species. Presentation at congressional briefing sponsored by National Environmental Coalition on Invasive Species. House Building (Capitol), Washington DC.
- Keller RP.** November 11, 2011. Ecological and economic benefits of risk assessment for invasive species. Presentation at congressional briefing sponsored by Great Lakes United and the Northeast Midwest Institute. Senate Building (Capitol), Washington DC.

PRESENTATIONS TO PROFESSIONAL, MANAGER, & POLICY-MAKER AUDIENCES:

- Keller RP.** October 2, 2019. Potential for New Invaders to Enter the Great Lakes Via the St. Lawrence and Chicago Rivers. Invited presentation at *Ballast Water Best Management Practices For Great Lakes Vessels: Project Stakeholder Roundtable Discussion* (Cleveland, Ohio).
- Keller RP.** September 16, 2019. *Risk of Aquatic Species Invasions in the Great Lakes*. Invited presentation and discussant at *Symposium on the IPBES Global Assessment on Biodiversity and Ecosystem Services and its Implications for the Great Lakes Region*. Hosted by the Lieutenant Governor of Ontario and the Environmental Law and Policy Center (Toronto, Canada).
- Keller RP.** June 27, 2018. Invasive crayfishes in the Great Lakes: background for the Invasive Crayfish Collaborative. *25 minute Presentation to academics, managers, and policy-makers, at the kick-off meeting of the Invasive Crayfish Collaborative*. Chicago (Illinois).
- Keller RP.** October 3, 2014. Risk Assessment for Invasive Species in the Great Lakes. 20 minute presentation via Webinar as part of a session co-organized by the Environmental Law Institute and the National Invasive Species Council. 235 people from across the US and Canada registered for the Webinar.
- Keller RP.** June 18, 2013. Assessing the ecological risks of aquatic exotic plants. Invited presentation at a Webinar organized by the Great Lakes SeaGrant programs. >200 plant trade and conservation professionals from around the Great Lakes Basin registered for the event.
- Keller RP.** April 30, 2013. Assessing the ecological risk of aquatic exotic plants. Presentation to Chicago Master Gardeners Workshop, Chicago Botanic Gardens.
- Keller RP.** December 5, 2012. Invasive species risk assessment for mollusks in the Great Lakes. Presentation as part of a training workshop for aquatic resource managers at the Aquatic Nuisance Species Meeting, Ann Arbor, MI.
- Keller RP.** May 23, 2012. Risk assessment for invasive species. Presentation as part of *Risk Assessment Expert Panel* at the joint meeting of the Great Lakes and North East Aquatic Nuisance Species Panels.
- Keller RP & C Gantz.** May 22, 2012. Preventing invasions from trade in live aquatic organisms. Two hour evening presentation and training given at the joint meeting of the Great Lakes and North East Aquatic Nuisance Species Panels.
- Keller RP & C Gantz.** October 18, 2011. Risk assessment for aquatic plant species. Presentation to the Ohio Invasive Plant Council, Columbus, Ohio. I was invited to give this presentation about risk assessment to help the OIPC as they develop their own risk assessment tools.
- Keller RP.** 3 May, 2010. *Risk Assessment for Invasive Species*. Presentation to Natural Resources Defense Council. NRDC offices, Chicago, IL.
- Keller RP.** 18 November, 2009. Risk Assessment for Aquatic Invasive Species. Presentation to *Risk Assessment Working Group of the US National Invasive Species Council*. NISC offices, Washington DC.

PRESENTATIONS TO EDUCATORS:

- Keller RP.** September 19, 2019. Sampling and Identification of Crayfish in the Chicago Region. Presentation as part of *Friends of the Chicago River Schools Network 2019 Kickoff* event. I hosted this event at Loyola University Chicago.
- Keller RP.** August 5, 2016. The Ecology and Impacts of Invasive Species. One hour Presentation at Loyola University Chicago Center for Science and Math Education workshop for Chicago Public School Teachers.

- Keller RP.** October 17, 2015. The Ecology and Impacts of Invasive Species. One hour Presentation at Loyola University Chicago Center for Science and Math Education workshop for Chicago Public School Teachers.
- Keller RP.** May 28, 2015. Understanding and Managing Invasive Species: From Models to Policy. One hour Presentation at Loyola University Chicago Center for Science and Math Education workshop for Chicago Public School Teachers.
- Keller RP.** October 10, 2014. Ecology and Invasive Species: Understanding Processes and Controlling Great Lakes Invaders. One hour Presentation at Loyola University Chicago Center for Science and Math Education workshop for Chicago Public School Teachers.
- Keller RP.** July 31, 2014. The Ecology and Impacts of Invasive Species. One hour Presentation at Loyola University Chicago Center for Science and Math Education workshop for Chicago Public School Teachers.
- Keller RP.** April 21, 2011. I gave two presentations (*The changing aquatic landscape of the Great Lakes* and *Asian carp: the final straw*) as part of the full day University of Chicago Graham School event 'Great Lakes, Great Threats, Great Opportunities'. Chicago, IL.
- Keller RP.** July 30, 2010. Human, Ecological and Economic Impacts of Invasive Freshwater Species. Invited Presentation at University of Chicago Center for International Studies Summer Teacher Institute.
- Keller RP.** February 22, 2011. Global Freshwater and Invasive Species, Teacher Workshop for Center for International Studies at the University of Chicago. This full day workshop consisted of two presentations, both given by me, and a session for class development, which I advised.
- Keller RP.** July 30, 2010. Human, Ecological and Economic Impacts of Invasive Freshwater Species. Invited Presentation at University of Chicago Center for International Studies Summer Teacher Institute.

PRESENTATIONS AS PART OF UNIVERSITY OR COMMUNITY SERVICE:

- Keller RP.** April 11, 2019. Invasive Species In The Great Lakes. One-hour Presentation, co-sponsored by *Loyola University Chicago Libraries* and *Edgewater Village Chicago* for National Library Week. Information Commons, Loyola University Chicago (Chicago, Illinois).
- Keller RP.** April 16, 2018. I was a discussant at an event in LUC's History Department to celebrate the release of Benjamin Johnson's book *Escaping the Dark Gray City: Fear and Hope in Progressive Era Conservation*.
- Keller RP.** October 1, 2012. Invasive species: Ecological and economic impacts in freshwater ecosystems. FW Parker School, Lincoln Park, Chicago. This presentation was the culmination of a ~3 month project during which I assisted FW Parker School in Chicago with a project they were conducting to look at invasive species in the Chicago River. I participated in multiple phone calls with teachers to help them establish the project, and I gave this presentation to help students develop their projects.
- Keller RP.** April 18, 2012. Living on the roof of the world: Relationships between humans and the environment in Tibet. I developed and presented this one hour evening seminar about human/environment relationships in Tibet. This was part of the lead up to the Dalai Lama's visit, and took 2-3 full days to prepare. Attendees included students, faculty, and members of the local community.

Keller RP. November 17, 2010. Global Freshwater: An Endangered Resource? Presentation to two 5th grade classes at Ogden International School, Chicago.

GRANT WRITING AND FUNDING:

- **Keller RP.** Invasive species management in Northeast Illinois. Proposal submitted March 2024 to Illinois Department of Natural Resources and US Fish and Wildlife Service for \$399,991. Will. Be fully funded, project begins January 1, 2025.
- **Keller RP.** Effects of water quality and trapping on spread and population control of invasive aquatic species in Illinois. Proposal submitted March 2023 to Illinois Department of Natural Resources and US Fish and Wildlife Service for \$408,698. Funded for \$268,561. Money on the way to Loyola.
- **Keller RP.** Distribution, impacts, and risk assessment for invasive aquatic species in Illinois. Proposal submitted March 2022 to Illinois Department of Natural Resources and US Fish and Wildlife Service for \$408,698. Fully funded. October 2023 – December 2025.
- **Keller RP.** Invasive Aquatic Species in Northeast Illinois. Proposal submitted March 2021 to Illinois Department of Natural Resources and US Fish and Wildlife Service for \$455,937. Fully funded. July 2022 – December 2024.
- **Keller RP.** Foodweb impacts of red swamp crayfish (*Procambarus clarkii*) invasions in Illinois and Michigan. Proposal submitted March 2020 to Illinois Department of Natural Resources and US Fish and Wildlife Service for \$390,325. Fully funded. August 2021 – October 2023.
- Phelps N (University of Minnesota), **Keller RP**, Kinsey A, Brady V, Campbell T, Dumke J, and four federal partner scientists. Local and Landscape-Level Effectiveness of Aquatic Invasive Species Prevention. Proposal submitted June 2020 to USGS Water Resources Research Aquatic Invasive Species Competitive Grants Program. Total budget \$243k with \$33.4k coming to Loyola. Fully funded. September 2021 – April 2024.
- **Keller RP.** Monitoring and Control of Invasive Crayfish and Macrophytes in the Illinois Portion of the Great Lakes Basin. Proposal submitted March 2018 to Illinois Department of Natural Resources and US Fish and Wildlife Service Great Lakes Restoration Initiative competition. \$318,737. Fully funded. November 2019 – July 2021.
- **Keller RP.** Illinois State Comprehensive Management Plan for Aquatic Nuisance Species Update. Proposal submitted September 2019 to Illinois Department of Natural Resources. \$15,307. Fully funded. January – June, 2020.
- **Keller RP.** The effect of electric, carbon dioxide and water quality barriers on the risk of aquatic invasive species passage through the Chicago Area Waterway System. Proposal submitted May 2019 to Illinois-Indiana Sea Grant. \$91,571. Fully funded. March 2020 – November 2022.
- Davis MA, ER Larson, ML Niemiller & **RP Keller.** Using environmental DNA to detect the leading edge of an invasive amphipod (*Apocorophium lacustre*) near Lake Michigan. Preproposal submitted January 2019 to US Fish and Wildlife Service's Great Lakes Fish and Wildlife Restoration Act funding competition. Total request \$184,687 with ~\$44,000 coming to Loyola. Not funded.
- Boyer TA (lead-PI), **RP Keller**, RT Melstrom & R Newton (co-PIs). Valuing environmental restoration with a coupled ecological-economic model. Submitted June 2018 to Michigan Department of Environmental Quality. Request of \$299,370 with \$100,000 coming to Loyola. Not funded.
- Vredenburg V, **RP Keller**, KR Lips, E Pienaar, MR Springborn. CNH-L: RUI: AMPHIBIAN: Amplifying preventable human and animal infectious disease by coupling international trade and

nature. Submitted November 2017 to National Science Foundation Coupled Human and Natural Resources Panel. Total budget request \$1,599,214 with \$113,565 coming to Loyola. Not funded.

- **Keller RP.** Field and laboratory risk assessment for the threat of *Apocorophium lacustre* establishment in the Great Lakes. Proposal submitted March 2017 to US-EPA/USFWS Great Lakes Restoration Initiative RFP in conjunction with IL DNR. Total request of \$117,002. Fully funded. November 2017 – October 2019.
- **Keller RP.** Risk assessment for emerging invasive species threats to the Great Lakes. Submitted March 2017 to combined US-EPA/USFWS Great Lakes Restoration Initiative RFP in conjunction with IL DNR. Total request of \$110,210. Not funded.
- **Keller RP.** Control of red swamp crayfish (*Procambarus clarkii*) in Chicago Region to reduce risk of spread across Great Lakes Basin. Proposal submitted March 2018 to US-EPA/USFWS Great Lakes Restoration Initiative RFP in conjunction with IL DNR. Total request of \$175,932. Fully funded. March 2018 – October 2019.
- Kopf RK, **RP Keller**, NN Mazur, L Baumgartner, P Humphries, N Bond & J Brooks. Conducting social, economic, and ecological risk assessment for use of Cyprinid herpesvirus 3 (CyHV-3) for carp biocontrol in Australia. Submitted April 2017 to Australian Fisheries Research and Development Council. Total request of \$(AUD) 1,353,533, with \$24,300 to support Reuben Keller's involvement. Not funded.
- Charlebois P & **RP Keller.** An invasive crayfish collaborative – expanding capacity of the Great Lakes region to manage AIS. Proposal submitted January 2017 to US EPA Great Lakes Restoration Initiative. Total budget \$299,000, with \$40,000 coming to Loyola University Chicago. Fully funded. June 2017 – May 2019.
- Vredenburg V, **RP Keller**, KR Lips, E Pienaar, MR Springborn. CNH-L: RUI: AMPHIBIAN: Amplifying preventable human and animal infectious disease by coupling international trade and nature. Proposal submitted November 2016 to National Science Foundation Coupled Human and Natural Resources Panel. Total budget request \$1,799,714 with \$173,304 coming to Loyola. Not funded.
- Vredenburg V, KR Lips, E Pienaar, CM Romagosa, MR Springborn & **RP Keller.** Coupling legal and socioeconomic impacts of the live animal trade with the loss of amphibian biodiversity and the spread of infectious diseases. Proposal submitted November 2015 to National Science Foundation Coupled Human and Natural Resources Panel. Total budget request \$1,785,252, with \$177,017 for LUC. Not funded.
- **Keller RP.** Assessing Current Invasion Risks to the Southern Basin of Lake Michigan and Developing Early Detection and Rapid Response Guidelines to Address Future Risks. Submitted May 2015 to combined US-EPA/USFWS Great Lakes Restoration Initiative RFP in conjunction with IL DNR. Total request of \$111,925. Fully funded. May 2016 – March 2018.
- **Keller RP.** Integrating Climate Change Predictions and Aquatic Invasive Species Risk Assessment for the Great Lakes. Submitted May 2015 to combined US-EPA/USFWS Great Lakes Restoration Initiative RFP in conjunction with IL DNR. Total request of \$98,843. Fully funded. May 2016 – March 2018.
- **Keller RP** (lead PI) & J Bossenbroek (Co PI, University of Toledo). Determining the Potential of Recreational Boats to Vector Invasive Species Throughout the Great Lakes. Submitted May 2015 to combined US-EPA/USFWS Great Lakes Restoration Initiative RFP in conjunction with IL DNR. Total request of \$215,143 (\$96,235 of this to U Toledo as a sub-contract). Not funded.

- **Keller RP.** Assessing the Distribution of *Apocorophium lacustre* in the Chicago Area Waterway System. Submitted April 2015 to IL Department of Natural Resources. Total request of \$23,532. Fully funded. June 2015 – September 2016.
- **Keller RP.** Distribution of Native and Invasive Crayfish in the Chicago Area Waterways System and Near Shore Lake Michigan. Submitted April 2014 to IL Department of Natural Resources. Total request of \$15,689.97. Fully funded. June 2015 – September 2016.
- **Keller RP.** Monitoring And Control Strategies To Respond To Growing Threats From Invasive Species In The Southern Basin Of Lake Michigan. Submitted January 2015 to IL-IN SeaGrant with a total budget of \$121,781. Not funded.
- **Keller RP.** Mapping location, spread, and impacts of invasive species in the Chicago Region. Submitted October 2014 to Illinois Department of Natural Resources 2014 State Wildlife Grant Pre-Proposal. Total budget request \$91,376. Not funded.
- Sabo, A & **RP Keller.** Assisted tree migration risks, feasibility and implementation guidance: an evaluation of species ecology, landscape structure, and partners. Proposal submitted November 2014 to SESYNC for Autumn Sabo to be a resident post-doc at SESYNC, with RP Keller acting as mentor. Total budget to Loyola, if funded, would have been two months of summer salary for Keller, and travel funds. Not funded.
- **Keller RP & K Garbach (co-PIs)** *Outreach to Address AIS in Illinois: Tracing Outreach Messages.* Submitted July 2013 to Illinois Department of Natural Resources, as a sub-contract through Illinois Natural History Survey. Total budget request: \$101,789. Fully funded. August 2013 – December 2015.
- **Keller RP (sole PI).** Invasive Aquatic Species in Illinois: Inventory Species and Update State Management Plan. Proposal submitted February 2012 to Illinois Department of Natural Resources. Fully funded for \$82,000. March 2012 – August 2014.
- **Keller RP (PI), T Hoellein, J Kelly, C Peterson, T Hoang, C Putonti, D Treering (co-PIs)** (March 2012). The Effects of Spatial and Temporal Variation of Measured Abiotic and Biotic Attributes on Ecosystem Health in the Chicago Area Waterways System: Building the Foundation for Scientific Inquiry. Submission to Loyola University Chicago internal grant program “Stimulating Multidisciplinary Research at Loyola’s Lakeside Campuses”. Funded at \$20,000.
- CL Jerde (lead PI), **RP Keller**, DM Lodge, A Mahon, C Knapp (co-PIs). Invasive Species Surveillance of the Bait Trade. Proposal to US EPA. Status: Fully funded for \$273,309 with no money coming to Loyola. I helped to conceive and write the proposal and traveled to project meetings with all my travel costs paid by the grant which was housed at another institution.
- K Bertrand (lead PI), **RP Keller** and 13 others (co-PIs). Cross-cultural analysis of the biological and social consequences of hybridization: lessons from Asian carp. Pre-proposal submitted October 2014 to NSF with a total estimated budget of \$4.4million. Not funded.
- **Keller RP.** Preventing Invasions from Trade in Live Aquatic Organisms. Initial proposal was written by Keller and Lodge and submitted to EPA in January 2010 with lead PI DM Lodge. Proposal successful and fully funded at \$997,364. When I began at LUC a sub-contract for \$76,399 was made to fund my continuing involvement in this project. September 2011 – August 2014.
- Lead author of *Risk Assessment Framework for Invasive Freshwater Animals*, submitted to USGS in August 2009 with PI DM Lodge. Proposal successful and fully funded at \$50,000.
- Successful application to Program on the Global Environment (University of Chicago) competition

for funds to support undergraduate research. \$2,500 for academic year 2010-11.

- During my PhD and first Post Doc (Notre Dame) I was co-author of funding proposals to National Science Foundation (n=3), US Environmental Protection Agency, National Oceanic and Atmospheric Administration (3), National Center for Ecological Analysis and Synthesis (2), and the Great Lakes Commission. Several of these were funded and supported aspects of my dissertation and post-doc.

AWARDS:

- Awarded *Faculty Member of the Year* at Loyola University Chicago in 2024. This award is given by Faculty Council for excellence in teaching, research, and service.
- Awarded inaugural (2015) *Kolvenbach Award for Engaged Teaching* by Loyola University Chicago's Center for Ignatian Pedagogy. One LUC faculty member is selected for this award annually.
- Awarded the *Protector of the Environment* award by Chicago Audubon Society, 2015. This award is in recognition of the work I've done with students to reduce bird deaths at Loyola's campus.
- Designated a *Master Researcher* by the Sujack Awards Committee, Loyola University Chicago, 2013. Three faculty from across Loyola received this award in 2013.
- *Outstanding teaching in the Biological Sciences*. University of Notre Dame. 2006.
- *Outstanding Graduate Student Teacher Award for Excellence in Teaching*. Kaneb Center for Teaching and Learning, University of Notre Dame. 2006.
- *Striving for Excellence in Teaching certificate*. Kaneb Center for Teaching and Learning, University of Notre Dame. 2006.
- *Fisher Fellowship* (one semester of stipend) awarded by Department of Biological Sciences in Fall, 2003, in recognition of contributions made to non-academic department life (in particular, establishing and serving as founding president of the Biology Graduate Student Organization).

TEACHING

Professor, Loyola University Chicago Fall 2011-present

- Developed and taught: *Environmental Sustainability* (Fall 2011 & Spring 2012)
- Developed and taught: *Honors, Science and Society* (Fall 2011, 2012, 2013, 2014, Spring 2012, 2013)
 - Each of these sections satisfied the LUC requirement for students to take an 'engaged learning' course. This required me to work with students to develop large projects, outside of class. A number of these are detailed in the following section (*Student Engagement*).
- Developed and taught: *The Scientific Basis of Environmental Issues* (Fall 2012 – Fall 2015).
- Developed and taught capstone class for Environmental Science majors (Fall 2015, 2019-2023, Spring 2024).
- Developed and taught *Applied Interdisciplinary Data Analysis* (Spring 2016 – Fall 2019).
- Developed and taught *Environmental Statistics* (Spring 2020, Spring 2021, Fall 2023)
- Developed and taught *Invasive Species* (Fall 2020, Fall 2021). Note: this class has been taught in combined undergraduate and graduate sections.
- Developed and taught *Sustainable Systems – Natural Science Perspectives* (Spring 2022, 2023, 2024). Note, this is a graduate level class required for all SES Masters students.
- Developed and taught *Sustainable Systems – Natural Sciences Masters level class*. (Spring 2022-2024)

Lecturer, University of Chicago Fall 2009-August 2011

- Developed and taught: *Human Impacts on the Global Environment* (Fall 2009 and 2010)
- Developed and taught: *Freshwater ecosystems of the Calumet region* (Spring 2010 & 2011)

Teaching Fellow, University of Notre Dame Fall 2007

- Taught upper level *General Ecology* with Prof. Jennifer Tank.

Laboratory course coordinator, University of Notre Dame

Spring 2006

- Wrote labs for upper level *Biostatistics* lab course and coordinated 10 teaching assistants.

Teaching Assistant, University of Notre Dame

Spring 2003 & 2004

- Taught upper level *Biostatistics* lab course section

STUDENT ENGAGED LEARNING CLASS PROJECTS:

Many of the courses I have taught at Loyola University Chicago have satisfied the *Engaged Learning* requirement for student graduation. In these courses I have mentored large student projects out of class. Four representative projects are described below.

- Spring 2012 – present. Student Operation for Avian Relief (SOAR). My students and I decided to begin investigating the issue of migratory bird collisions with campus buildings. Since then I have organized students to be out every morning during the two annual migrations to collect and catalog dead birds. We have worked closely with other units on campus, especially Facilities, to modify building operations (e.g., blinds, lighting) and have successfully reduced bird deaths at several buildings. More than 200 students have now worked on this project. Students involved in this project received the inaugural *Service-Learning Innovation in Sustainability Award* in 2014, and I was awarded the Chicago Audubon *Protector of the Environment* award in 2015. A major result of this work was the LUC Facilities Department spending ~\$250k during summer 2021 to add bird-safe film to the buildings that SOAR had identified as being most dangerous for birds. This has reduced bird deaths at those buildings by ~99%. Note that in recent years I have worked closely with Fr. Stephen Mitten to run the SOAR program.
- Fall 2013. Students accessed Loyola's photographic archives to develop a timeline of landscaping changes. From this they were able to estimate tree diversity and density on campus over time, and carbon sequestration. Next, students put 'price tags' on specific trees detailing their ecosystem and economic value. Finally, students worked with Facilities to organize a tree planting on Arbor Day.
- Spring 2012. Several student groups worked with the Institute of Cultural Affairs (ICA) on a project to map environmental initiatives in the City of Chicago. Groups each chose one of Chicago's 77 neighborhoods and then contacted environmental groups in the neighborhood, and visited each neighborhood, to put together lists of projects. This contributed to ICA's continuing efforts to bring those working on environmental issues together.
- My students worked with Gale Elementary School afterschool program to develop curriculum for growing vegetables in the school's greenhouse. The greenhouse was otherwise underused, and the new curriculum has enabled the program to leverage available resources. The class lessons were transmitted in hard copy and in videos created by the students, and included a visit to Loyola's urban gardens by Gale Elementary students.

STUDENT RESEARCH MENTORING:

Graduate Students:

Alex Quebbemann. August 2023 – present. Quebbemann is working on the distribution of aquatic invasive species in Chicago harbors.

Tava Oosterbaan. August 2023 – present. Oosterbaan is working on microplastic concentrations in crayfishes and mussels in the Chicago River.

Grant Dlesk. August 2022 – present. Dlesk is working on the food-web effects of invasive crayfishes in the Chicago River, and on the diversity and distribution of different bacterial communities in the River.

Natalia Szklaruk. August 2021 – August 2023. Szklaruk was fully funded by my grants and working on projects to look at best practices for invasive species detection, and the effects of poor water quality on invasive species spread in the Chicago Area Waterway System.

Nichole Angell. August 2021 – July 2023. I was a member of Angell’s committee. Angell was a Masters student at the University of Minnesota working on the economic outcomes from invasive species control.

Trent Henry. August 2020 – June 2022. Masters Thesis Title: Distribution and ongoing threat of invasive scud (*Apocorophium lacustre*) to the Illinois River and Laurentian Great Lakes. I was a member of Henry’s committee (not lead advisor). Henry completed his Masters degree at University of Illinois Urbana-Champaign. Note that Henry was previously a research undergraduate student in my lab at Loyola.

Carter Cranberg. August 2019 – May 2021. Masters Thesis Title: Distributions of nonindigenous aquatic species across space and time in the Chicago Region, Illinois, and North America. School of Environmental Sustainability, Loyola University Chicago. Currently working at the U.S. EPA.

Colette Copic. August 2019 – August 2021. Masters Thesis Title: The efficacy of abiotic barriers at preventing spread of invasive invertebrates in the Chicago Area Waterway System. School of Environmental Sustainability, Loyola University Chicago. Currently working as a restoration biologist for Audubon Chicago.

Erin O’Shaughnessey. June 2016 – June 2019. Masters Thesis Title: Habitat associations and community interactions of non-native species in the southern basin of lake Michigan. School of Environmental Sustainability, Loyola University Chicago. Papers from her work published in *Biological Invasions* and *Journal of Great Lakes Research*. Currently a high school science teacher in Chicago Public School system.

Ellen Cole. Masters Thesis Title: Assessing the Success of Outreach at Preventing the Movement of Aquatic Invasive Species in Illinois. Degree conferred by Loyola University Chicago in August 2016. Co-advised by Prof. Kelly Garbach. Cole presented her work at two conferences. Two papers published in *Journal of Environmental Management*. Currently a lab manager at Michigan State University.

Abigail Jacobs. August 2012 – October 2014. Masters thesis title: History of Freshwater Invasions in Illinois: Learning From the Past to Inform the Future. Degree conferred by Loyola University Chicago in December 2014. One paper published in journal *Biological Invasions*. Currently a Lab manager at Boston area water utility.

Undergraduate Research Students at Loyola University Chicago:

I have mentored a total of 41 undergraduate students with an average of over three working with me each semester during my time at Loyola University Chicago. Student projects have been related to my ongoing research and have included fieldwork in the Chicago Region, lab work, computer modeling, and data collection and analysis. Undergraduate students working with me have received a total of 19 fellowships to financially support their work.

Undergraduates who have worked in my lab at Loyola University Chicago:

Name	Semesters*	Highlights^; Project
Liam Mitchell	Sp24	Effects of wastewater on microplastic pollution in the Chicago River
Martina Gomez de la Torre	Sp24	Role of Chicago harbors in the introduction and spread of invasive aquatic species
McKenna Curley	Sp24	Effects of invasive crayfish on Chicago River foodwebs
Kennedy McDonald	Fa23 - present	Cura Scholars student working on invasive species in harbors.
Mikayla Ballard	Fa21- present	Cura Scholars student who will work in my lab until she graduates in Spring 2024. Microplastic pollution and Chicago River foodwebs, and bacterial effects of sewage outflows.

Amelia Schneider	Sp23-present	Effects of wastewater treatment plants on water temperature in the Chicago River, crayfish trapping. Botts Fellow.
Alyssa Cerpa	Fa23 - present	Invertebrates and macrophytes in Chicago harbors. Botts Fellow.
Shane Franzen	Sp22-Fa23	Aquatic invasive species outreach and SCUBA diving.
Sarah Sukanen (Physics major)	Fa22-Sp23	Mulcahy Fellow co-advised by Bo Polak (Physics). Effects of barges on electric fields in rivers and implications for invasive species spread.
Tava Oosterbaan	Fa22-Sp23	Botts Fellow, crayfish trapping techniques.
Alex Quebbeman	Fa22-Sp23	Botts Fellow, CO2 barriers for invasive species
Dylan Herald	Fa21-Sp22	Botts Fellow, crayfish invasions in Lake Michigan
Maddy Misicka	Fa21-Sp22	Botts Fellow, sampling design for invasive species monitoring
Natalia Szklaruk	Fa20-Sp21	Mulcahy Fellow; CO2 invasive species barriers
Kannon Larison	Fa20-Sp21	Mulcahy Fellow; Electric invasive species barriers
Jack Marte	Fa20-Sp21	Mulcahy Fellow; Modeling distribution of invasive species
Lauren Hammett	Su20-Sp21	Provost Fellow; Crayfish trap design
Eve Hemingway	Fa19-Su20	Mulcahy Fellow; Lab and field work on crayfish distribution; Accepted presentation at annual <i>Society for Freshwater Science</i> meeting, but canceled due to Covid.
Julianna Scivinsky	Fa19-Su20	Mulcahy Fellow; Organism husbandry; Accepted presentation at annual <i>Society for Freshwater Science</i> meeting, but canceled due to Covid.
Rose Mohammadi	Fa19-Sp20	Sorting and identifying invertebrate samples
Megan Barrera	Fa18-Sp20	Mulcahy Fellow; Invasive species distributions in Illinois River. Accepted presentation at annual <i>Society for Freshwater Science</i> meeting, but canceled due to Covid.
Colette Copic	Fa18-Sp19	Crayfish distributions; Presented undergraduate research at annual <i>Society for Freshwater Science</i> meeting. Now Masters student in my lab.
Carter Dell	Fa18	Lab analysis of crayfish samples and data
Samuel Urben	Su18	Field research on invasive crayfish
Amelia Howerton	Su18	Field research on invasive crayfish
Deirdre Turner	Fa17-Su18	Helped to revise Illinois Aquatic Invasive Species Management Plan, now employed at federal EPA
Bridget Hulsebosch	Fa17	Crayfish data entry and analysis
John Zink	Sp17-Su17	Provost Fellow; Data analysis for <i>Student Operation for Avian Relief</i>
Jenny Par	Fa16-Sp18	Identification of aquatic invasive species
Jonathon Brenner	Su15, Su16	Field sampling; Co-author on one presentation and one publication
Gabrielle Habeeb	Su15-Sp16	Field sampling; Co-author on one presentation and one publication
Abby Jahn	Fa15-Sp16	Mulcahy Fellow; Toxicity of Chicago River sediments
Trent Henry	Su15-Su16	Provost Fellow; Mulcahy Fellow; Co-author on one presentation and one publication
Kema Malki	Fa14-Sp15	Worked to establish and expand <i>Student Operation for Avian Relief</i> project at Loyola which has drastically reduced deaths of migratory birds on campus
Nikhil Malekal	Fa14-Sp15	
Addison Jacobs	Fa14-Sp15	
Kevin Scheiwiller	Sp13-Sp14	Mulcahy Fellow; Presented work at annual <i>Society for Freshwater Science</i> meeting and at <i>Illinois Lakes Management Association</i> meeting
Reana Thomas	Sp12-Su14	Funded by Pulitzer Center on Crisis Reporting to travel to Kashmir (India) and report on invasive species and environmental justice issues.
Andrew Shin	Sp12-Sp13	International environmental justice implications of invasive species
Victor Reyes	Sp12-Fa12	
Bianca Grove	Sp11-Sp13	

*Fa=Fall, Sp=Spring, Su=Summer

^Mulcahy, Provost, and Botts Fellowships are internal Loyola University Chicago scholarships to fund undergraduate research.

Four of these projects are described in more detail below.

- Fall 2021 – present. Mikayla Ballard joined my lab in Fall 2021 through the *Cura Fellows* program. This program matches students from backgrounds that have been under-represented in research to mentors. Mikayla has worked on several projects in my lab, including field and bench research. During Spring 2022 I worked with her on an application for an NSF *Research Experiences for Undergraduates* program in Panama. She was successful and spent summer 2022 conducting field research on Barro Colorado Island, Panama. We also developed a research plan for Fall 2022 – Spring 2024 for which Mikayla lead research on the effects of bacterial and microplastic pollution from the North Shore Sewage Treatment Plant on downstream foodwebs. Mikayla received the 2024 E.O. Wilson Award for Outstanding Performance in Undergraduate Research from the School of Environmental Sustainability.
- Summer 2015 – present. Many students have been engaged in my field research sampling for invasive aquatic organisms in the Chicago region. These students have gotten experience in field and lab methods, SCUBA diving, using and servicing equipment, data collection and analysis, conference presentations and publication.
- Fall 2012 – Spring 2014. Kevin Scheiwiller worked to assemble a time-series of zebra mussel invasions across the Midwest. He was funded by an internal Mulcahy Fellowship and presented his results at the international *Society for Freshwater Science* annual meeting and at the *Illinois Lakes Management Association* meeting.
- Spring 2012 – Summer 2014. A total of five students worked on a project investigating the impacts of invasive species globally and the potential environmental justice implications raised by the trades that transport them. This work culminated in Reana Thomas travelling to Kashmir, India, during Summer 2014. She was funded by the *Pulitzer Center on Crisis Reporting* to spend time there interviewing locals affected by recent species invasions. Her work is available at: <https://pulitzercenter.org/people/reana-thomas>

Undergraduate Students at University of Chicago and University of Notre Dame:

- Aug 2010 – Aug. 2011. Mentored undergraduate Lauren Tarpey on a project titled *Impacts of Invasive Plants in the United States, and Adequacy of the Federal Response*, University of Chicago. I secured funds for Tarpey to present her research at the 2011 Ecological Society of America annual meeting
- Summer 2005. Mentored NSF Research Experience for Teachers fellow Kristin Frang at University of Notre Dame. Frang is a co-author on the paper that came from her work with me.
- Summer 2004. Mentored NSF Research Experience for Undergraduates student Annie Cox. Cox is a co-author on the paper that came from her work with me.
- 2001-2009. I consistently mentored undergraduate research students (>5) during graduate and post-doc career at University of Notre Dame.

SERVICE:

University Service at Loyola University Chicago (highlights)

- | | |
|-----------|--|
| AY2023-24 | <ul style="list-style-type: none"> • Member of <i>Magis Faculty Leadership Program</i> • SES delegate serving on the <i>LUC Faculty Development Review Committee</i> • Mentor for two students in the <i>Cura Scholars</i> program for under-represented minorities in STEM research • Member of <i>Campus Landscape Committee</i> |
| AY2022-23 | <ul style="list-style-type: none"> • SES delegate serving on the <i>LUC Faculty Development Review Committee</i> |

- Mentor in *Cura Scholars* program for under-represented minorities in STEM research
- AY2021-22
- SES delegate serving on the LUC *Faculty Development Review Committee*
 - Mentor in *Cura Scholars* program for under-represented minorities in STEM research
 - Executive Committee member of Loyola University Chicago American Association of University Professors Chapter
- AY2020-21
- Executive Committee member of Loyola University Chicago American Association of University Professors Chapter
 - Served on St Ignatius Award Committee
 - Mentor in *Cura Scholars* program for under-represented minorities in STEM research
- AY2019-20
- Served on St Ignatius Award Committee
 - Recruitment outreach during visit to Joliet Junior College where I gave a seminar
 - Executive Committee member of Loyola University Chicago American Association of University Professors Chapter
- AY2018-19
- Served on St Ignatius Award Committee
 - Executive Committee member of Loyola University Chicago American Association of University Professors Chapter
- AY2017-18
- Member of STEM committee to recommend interdisciplinary offerings in STEM that would enhance LUC's offerings
- AY2016-17
- LUREC Land Management Committee
 - Campus Landscape Committee
- AY2015-16
- Member of Loyola University Chicago Faculty Council
 - LUREC Land Management Committee
 - Campus Landscape Committee
- AY2014-15
- Member of Loyola University Chicago Faculty Council
 - LUREC Land Management Committee
 - Campus Landscape Committee
- AY2013-14
- LUREC Land Management Committee
 - I worked with the Biology Department to select a speaker for the 2014 *Frontiers in Science Symposium*. We selected Daniel Simberloff and I was asked to make the invitation. Simberloff accepted, presented in April 2014.
- AY2012-13
- LUREC Land Management Committee
 - UCSF137 Science Tier 1 Course Development Committee
 - Campus Landscape Committee
- AY2011-12
- LUREC Land Management Committee
 - UCSF137 Science Tier 1 Course Development Committee
 - Researched and presented evening seminar to coincide with visit by Dalai Lama

Service to School of Environmental Sustainability (highlights)

- AY2023-24

 - Chair of Mid-Tenure Review committee for candidate with joint appointment in SES Quinlan School of Business
 - Chair of promotion review committee for NTT faculty member in SES
 - Graduate Program Director for Research Track of SES Masters Program
- AY2022-23

 - Chair of Tenure Track search committee. This committee ended up leading to hires of two TT faculty members.
 - Graduate Program Director for Research Track of SES Masters Program
- AY2021-22

 - Chair of committee developing by-laws for SES. This involved meeting with small groups of SES employees and integrating their suggestions. By-laws were ratified by the full faculty in December 2021 and now govern SES operations.
 - Chair of Tenure review committee for SES faculty member.
 - Chair of SES Tenure Track search committee for Ecology
- AY2020-21

 - Chair of committee developing SES by-laws
 - Chair of Tenure review committee for SES faculty member
 - Organized lab access schedules during Covid. This involved coordinating schedules with ~40 faculty and students and ensuring that all LUC regulations were adhered to. I developed schedules for Summer 2020, Fall 2020, Spring 2021 and Summer 2021.
- AY2019-20

 - Chair of Non-Tenure Track Search Committee for Conservation Biology
 - Reviewer for SES LUROP Fellowships
 - Organized lab access schedules during Covid. This involved coordinating schedules with ~40 faculty and students and ensuring that all LUC regulations were adhered to
- AY2018-19

 - Member of one tenure review and one third year review committees
 - Member IES Masters Program Development Committee
 - Member of Committee to develop SES awards program
 - Member of SES Diversity, Equity and Inclusion Committee
- AY2017-18

 - Chair of NTT Plant Ecologist search committee
 - Member of Masters Program Director search committee
 - Member of two tenure and promotion committees
 - Member of Masters and Awards committees
- AY2016-17

 - Spent afternoons of August 3 & 4 at *Teen Conservation Leadership Conference*, organized by Brookfield Zoo. I spoke to roughly 150 students about Loyola and the IES
- AY2015-16

 - Member of IES Capstone Committee
 - Member of Applied Interdisciplinary Data Analysis course development committee
 - Met and had lunch with all campus interviewees for two single year positions
 - Member of IES Academic Council
 - Organizer (with Prof. Jing) of IES seminar series. We brought in eight speakers to present different perspectives on social-ecological resilience in the Chicago Region
- AY2014-15

 - Member of IES Masters Program Development Committee

- Member of Applied Interdisciplinary Data Analysis course development committee
 - Member of IES Academic Council
- AY2013-14
- Member of Search Committee (TT in Sustainable Business, shared hire and search committee with Quinlan School of Business)
 - Met with all campus interviewees for NTT search for Conservation and Restoration
 - Member of IES Masters Program Development Committee
 - I lead development of the ENV5 Major in Conservation and Restoration (this included developing several new courses and working with many others to coordinate the curriculum with other degree offerings).
 - Member of IES Academic Council
- AY2012-13
- Member of Search Committee (TT in Environmental Policy)
 - Department Representative to College of Arts and Sciences Academic Council
 - I lead development of the ENV5 Major in Conservation and Restoration (this included developing several new courses and working with many others to coordinate the curriculum with other degree offerings).
 - Worked on Faculty Strengths Committee to develop new curriculum and potential course offerings
 - Leader of Departmental Curriculum Review Committee. Specifically, we went through all syllabi and looked for redundancies among our course offerings.
- AY2011-12
- Member of Search Committee (TT in Sustainable Agriculture)
 - Member of Search Committee (NTT in Citizen Engagement)
 - Met with all campus interviewees for NTT search for Ecosystem Services
 - Department Representative to College of Arts and Sciences Academic Council

Professional Service

- **Co-Chair of Aquatic Life Committee** of the Illinois Invasive Species Council. August 2021 – present. This Committee includes experts from across the state and makes recommendations to the Illinois Department of Natural Resources about how their programs can best reduce the risks and harm from invasive species.
- **Member of *Hydrilla Hunt!*** working group in Illinois. This group meets regularly to plan management of invasions of Hydrilla in Illinois, and to develop strategies to reduce the chance of invasions. 2014-present.
- **Associate Editor** for journal *Biological Invasions*. September 2016 – present.
- **Member of Shedd Aquarium Research Committee**. I work with Shedd researchers and two other external academics to review research proposals written by Shedd employees and/or that would use Shedd facilities. February 2013 – present.
- **Associate editor** for journal *Diversity and Distributions*. July 2010 – December 2015.
- **City of Chicago, Department of Environment**. I was an advisor to the City on their Invasive Species Program. In particular, I advised which species should be banned from sale, and presented testimony at a City Alderman’s Meeting. Many of the species subsequently banned were identified through research in Keller & Lodge 2007, *BioScience* journal. 2006 – 2013.
- **Member of Indiana Department of Natural Resources working group on risk assessment for aquatic invasive plants**. Developed risk assessment tool for predicting which aquatic plant species proposed for trade are likely to cause harm. Tool is now being used for state policy. 2007-2013

- **Proposed and organized** session at the biennial *Chicago Wilderness Congress* (organized by Chicago Wilderness, November 15th, 2012) titled “Reimagining the Chicago and Calumet Rivers for the 21st Century and Beyond”. The session included four presentations; myself, Debra Shore (elected Commissioner for the Metropolitan Water Reclamation District of Greater Chicago), David St. Pierre (Executive Director of the MWRD), and Josh Ellis (Program Director at the Metropolitan Planning Council). The session was a great success with >200 attendees.
- **Proposed and organized** session at the June 2013 *International Association of Great Lakes Research* conference, held at Purdue University.
- **US National Invasive Species Council.** Working with Risk Assessment Working Group to update national tools. September 2009 – October 2011
- **Organized** *Invasive Species in a Globalized World* Conference, May 2011. This brought researchers together from a range of disciplines, and from across the globe.
- **Lessons from the Gulf Oil Spill.** Organized public event at Shedd Aquarium, Chicago, with three expert speakers. November 3, 2010.
- **Asian carp invasion: potential economic and ecological impacts in the Great Lakes.** Organized public event at Shedd Aquarium, Chicago, with five expert speakers. April 6, 2010.
- **Reviewer** for *Nature*, *PNAS*, *Conservation Biology*, *Frontiers in Ecology and the Environment*, *BioScience*, *Diversity and Distributions*, *Ecological Applications*, *Methods in Ecology and Evolution*, *Oikos*, *Limnology and Oceanography*, *Journal of Environmental Management*, *Ecological Economics*, *Biological Invasions*, *American Malacological Bulletin*, *International Journal of Biodiversity Science and Management*, *Limnologica*, and many other journals. Reviewer of book proposals to Oxford University, University of Chicago, Taylor and Francis, and Springer Presses.
- **Co-organizer** of Midwest Ecology and Evolution Conference, 2004.

Research Proposal Reviewing (all are full research proposals of >10 pages)

- 2022 – Reviewed research proposal for Austrian Academy of Sciences program in *Resilience of Mountain Regions: interdisciplinary and transdisciplinary approaches*.
- 2022 – Reviewed research proposal for University of Wisconsin, Milwaukee.
- 2021 – Reviewed four (4) research proposals for California Sea Grant.
- 2021 – Reviewed research proposal for New York Sea Grant.
- 2021 – Reviewed research proposal for Wisconsin Sea Grant.
- 2018 – Reviewed research proposal for European Research Council.
- 2015 – Reviewed research proposal for Minnesota Sea Grant.
- 2014 – Reviewed research proposal for UK National Environment Research Council.

WORKING GROUP AND POLICY REVIEW GROUP MEMBERSHIP:

Invited External Expert for Canadian Science Advisory Secretariat (CSAS) peer review of National *Aquatic Invasive Species Screening-level Risk Assessment Tool for Watch Lists*. I participated in six full days of meetings. August-November, 2024.

Member of the *QZAP (Quagga and Zebra Action Plan)* expert advisory group. This group develops scenarios and recommends management and research to prevent invasion of *Dreissenid* mussels into the Pacific Northwest (2020 – 2022).

Member of the *Social-Ecological Synthesis Center's* working group titled **Linking Trade, Biology, and Pet Owner Decisions to the Risk of Vertebrate Invasions in the US**. This has involved one three-day meeting in Annapolis, MD, several conference calls, and contributions to forthcoming manuscripts. Project ended in 2019. See: <https://www.sesync.org/project/propose-a-pursuit/linking-trade-biology-and-pet-owner-decisions-to-the-risk-of-vertebrate>

- Invited participant in **U.S. Army Corps of Engineers Great Lakes and Mississippi River Interbasin Study** – Brandon Road Lock and Dam *Apocorophium lacustre* Expert Elicitation. This involved two full days of meetings followed by review of the reports produced. December 14-15, 2015.
- Invited participant in **Commonwealth Scientific and Industrial Research Organization (CSIRO, Australia) expert elicitation** on Invasion Risk from Global Shipping and biofouling. Consisted of me working through and ranking risk for different shipping scenarios, and two hours of followup phone calls with the full expert group. Five experts were chosen from North America. March – May, 2015.
- Member expert peer review panel for **Canada’s proposed National Biological Risk Assessment Guidelines**, June 2008. This involved reviewing documents and attending a three-day workshop in Burlington, Canada, to finalize the Guidelines.
- Invited participant at **Ecological and Economic Science and Management of Invasive Species**. Workshop to develop recommendations for COP9 of Convention on Biological Diversity, October 2007.
- Member **Machine Learning Tools for Ecology** working group. Funded by National Center for Ecological Analysis and Synthesis, 2006-2008.

PRESS COVERAGE (SELECTED):

Interviewed for:

- [2023](#): Scripps News Network. Invasive crayfish crisis: Scientists’ quest to protect native habitats. TV piece about work my lab is doing in the Chicago River. October 2023.
- [2023](#): Chicago Sun-Times. Red swamp crayfish found in the Chicago River could wreak havoc on local ecosystems. August 11, 2023.
- [2023](#): WBEZ (Chicago NPR station) Curious City. Meet the lobster-like crustaceans invading the Chicago River. Interviewed by Laura Pavin on multiple occasions, including when she came and observed my lab doing fieldwork in the Chicago River. This became a long-form radio piece (16 minutes) and a shorter (5 minutes) contribution to the Curious City series. The shorter version ran several times on WBEZ during August, 2023.
- 2022: Interviewed by Juanpablo Ramirez from WNIJ (Northern Illinois Public Radio). Ramirez interviewed me over the phone and then visited the lab for a formal interview. Story ran in August, 2022.
- 2022: Interviewed by Patty Wetli for article about invasive crayfish. Article is posted on WTTW’s website: <https://news.wttw.com/2022/05/16/crayfish-was-rescued-during-chicago-river-day-cleanup-major-plot-twist-it-s-invasive>
- 2020: Interviewed by Dale Bowman for article about my lab’s research in the Chicago Sun-Times. <https://chicago.suntimes.com/2020/8/7/21358376/red-swamp-crayfish-studying-trapping-invasive-crayfish-chicago-river-system>
- 2020: Interviewed by Conor Johnson for article in The Toledo Blade about grass carp invasion. <https://www.toledoblade.com/local/environment/2020/08/16/great-lakes-grass-carp-invasive-species/stories/20200809133>
- 2016: Bill Rapai’s book *Lake Invaders* (2016, Wayne State University Press). I am quoted in several passages.
- 2015: Online Magazine Hakai by Geogg Giller, for an article about potential marine invasions of the Arctic region. 11/24/15. <https://hakaimagazine.com/news/arctic-invasion/>
- 2015: U.S. Catholic Magazine, for a profile of me in the December 2015 issue. <https://uscatholic.org/articles/201601/piranhas-in-the-chicago-river/>
- 2015: Anna Gaynor for profile on the Loyola University Chicago website.
- Baikal TV. Interviewed by this Siberian broadcaster for a series about environmental issues. Video is available at: <https://www.youtube.com/watch?v=RYuanImbRGg&feature=youtu.be>

- 2015: Nature Magazine article, interviewed by Boer Deng, and quoted by her, for article about artificial intelligence applications to modeling the spread of diseases. <http://www.nature.com/news/artificial-intelligence-joins-hunt-for-human-animal-diseases-1.17568>
- 2014: Article about SOAR bird program for article in DNAinfo. <http://www.dnainfo.com/chicago/20141119/rogers-park/loyolas-buildings-are-beautiful-but-deadly-for-migrating-birds-researchers>
- 2011: Radio WILL (NPR station in Champaign, IL) *Focus* program, May 25, 2011. Audio online at <http://will.illinois.edu/focus/interview/focus110525b/>
- 2010: WBEZ's (Chicago Public Radio) *Worldview*, June 1st, 2010. Audio online at http://www.chicagopublicradio.org/Program_wv.aspx?episode=42333.
- 2010: Public Radio International's *The World*, May 5th, 2010. Audio online at <http://www.worldscience.org/podcast/elephant-bees-oil-spill-gulf-coast-climate-asian-carp-bald-eagle/>

Research cited by articles in: New York Times, Nature Conservancy Magazine, Environmental Science & Technology, newswise.com, suburbanchicagonews.com, Wyoming Public Radio, South Bend Tribune.

Research described in press releases from: Union of Concerned Scientists, The Nature Conservancy, Illinois-Indiana Sea Grant, University of Notre Dame, University of Wyoming, the Australian Weeds Co-operative Research Center.