

# SUSAN M. WATERS

Center for Natural Lands Management  
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University of Washington, Bothell  
School of Interdisciplinary Arts and Sciences  
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*Global change ecology ♦ Plant community ecology ♦ Pollination ecology ♦ Citizen science*

## RESEARCH INTERESTS

- Effects of climate change and invasions on plant-pollinator interactions
- Phenological shifts in native and exotic plant species
- Management of rare species and plant communities under global change
- Citizen science in ecological research; scientific literacy in public education

## EDUCATION

### University of Washington

**Ph.D.** Ecology, 2013. Doctoral dissertation: *Plants, pollinators and global change: the effects of invasion and flowering phenology on plant-pollinator interactions*. Advisor: Dr. Janneke Hille Ris Lambers.

### University of Massachusetts

**M.Ed.** Science education, 1996.

### Hampshire College

**B.A.** Ecology, 1992. Division Three: *Effects of elevation and edge on soil nitrogen cycling in a montane forest ecosystem*. Advisor: Dr. Charlene D'Avanzo.

## POSITIONS

### Center for Natural Lands Management

2015 to present. **Rare Species Ecologist.**

- *Led conservation science research program on plant community habitat requirements of federally endangered Taylor's checkerspot butterfly*
- *Coordinated state, federal, academic, and non-profit partners in restoration and reintroduction actions in prairie habitat*

### University of Washington, Bothell campus

2015 to present. **Affiliate Faculty.**

2013-2015. **Postdoctoral Teaching Fellow.**

**Program in Interdisciplinary Pedagogy  
School of Interdisciplinary Arts and Sciences.**

- *Extensively increased and diversified statistical, experimental design, and analytical elements in two courses (Ecology and Science Methods and Practice); designed Citizen Science course*
- *Mentored undergraduate research*

## Doris Duke Conservation Scholars Program

2015. Conservation Research Mentor.

- *Faculty mentor in competitive program to increase diversity and inclusion of communities historically underrepresented in ecology and conservation*
- *Mentored undergraduates in ecological research and conservation practice*

## Urban Pollination Project Citizen Science Initiative

2011-2015. Founder and director.

- *Created, funded, directed, and implemented citizen science initiative in community gardens to assess land use effects on pollinator populations and resulting effects on urban crop production*
- *Recruited, supervised and coordinated >200 citizen participants and 15 field interns; coordinated educational outreach to >20 K-12 schools and summer programs*
- *Mentored undergraduate research*
- *Developed plant pollination ecology curriculum now used in 2<sup>nd</sup> grade classes in WA*

## University of Washington, Seattle campus

2007-13. Research Assistant.

- *Developed high school curriculum module on the effects of climate change on native tree range shifts on Mt. Rainier, Washington.*

2012. Huckabay Fellow.

- *Designed data analysis course based on citizen science data.*

2009-12. Graduate Teaching Assistant.

- *Courses: Foundations in Ecology; General Biology; Natural History*

## Pioneer Valley Performing Arts High School, Massachusetts

1997-2005. Science Department Head and Biology Teacher.

## PUBLICATIONS

**Waters, S.** and Dunwiddie, P. 2016. Habitat Enhancement of Plant Communities for Taylor's Checkerspot Butterfly. Internal publication of Department of Defense Army Compatible Use Buffer Program.

**Waters, S.**, Fisher, S., and Hille Ris Lambers, J. 2014. Neighborhood-contingent indirect interactions between native and exotic plants: multiple shared pollinators mediate plant reproductive success during invasions. *Oikos* 123: 433-440.

Price, B. and **Waters, S.** 2014. Analyzing datasets in ecology and evolution to teach the nature and process of science. CUREnet (NSF-funded Course-based Undergraduate Research Experience database, a resource for post-secondary instructors), <http://curenets.utexas.edu/projects/analyzing-datasets-ecology-and-evolution-teach-nature-and-process-science>

**Waters, S.** and Clifford, M. 2014. Pollinators, plants, and our food: an educational module in six parts for life sciences in grades 2-3. King Conservation District, Seattle, WA.

Hille Ris Lambers, J., Ettinger, A., Ford, K., Haak, D., Miner, B., Rogers, H., Sheldon, K., Tewksbury, J., **Waters, S.** and Yang, Y. 2013. Accidental experiments: Ecological and evolutionary insights and opportunities derived from global change. *Oikos* 122: 1649-1661.

**Waters, S.**, Chen, C., and Hille Ris Lambers, J. In preparation. Impacts of asymmetric phenological shifts on pollinator-mediated seed production of native plants.

**Waters, S.**, and Hille Ris Lambers, J. In preparation. Invasion by exotic plant species alters seasonal patterns of community floral resources for pollinators.

**Waters, S.** and Clifford, M. In preparation. Pollination and fruit production are reduced when urban gardens are surrounded by impervious surfaces.

## PRESENTATIONS

- 2016 **Waters, S.**, C. Chen, and J. Hille Ris Lambers. **[invited]** Climate change, invasion, and phenological shifts: anticipating changes to native plants' reproductive potential. In Symposium: Conserving rare and imperiled species in the context of climate change. *Natural Areas Conference*, Davis, CA.
- 2016 **Waters, S.** Conservation of pollinators on Department of Transportation lands: a brief introduction to pollination. **[invited]** Washington Department of Transportation, Tumwater, WA.
- 2016 **Waters, S.** and M. Clifford. Plant pollination and fruit production are reduced when urban gardens are surrounded by impervious surfaces. *Ecological Society of America annual meeting*, Fort Lauderdale, FL.
- 2015 **Waters, S.** and J. Hille Ris Lambers. **[invited]** Invasion alters seasonal patterns of floral resources for pollinators. *Cascadia Prairie-Oak Partnership Conference*, Tacoma, WA.
- 2014 **Waters, S.** and J. Hille Ris Lambers. Global change synergies: Climate change, phenology, and interactions between native and invasive plants. *Meeting the Challenge: Invasive Plants Conference*, Seattle, WA.
- 2013 **Waters, S.** and M. Clifford. **[invited]** Native plants, insects, and our food: the Urban Pollination Project. *Washington Native Plant Society*, Seattle, WA.
- 2013 **Waters, S.** and M. Clifford. **[invited]** Local, experimental citizen science: Seattle's Urban Pollination Project. *Program on the Environment*, University of Washington, Seattle, WA.
- 2012 **Waters, S.** and J. Hille Ris Lambers. Timing is everything: indirect interactions between native and exotic plants through shared pollinators depends on flowering phenology. *Ecological Society of America annual meeting*, Portland, OR.
- 2012 **Waters, S.**, J. Hille Ris Lambers, S. Fisher. There goes the neighborhood: invaded floral neighborhoods affect foraging by multiple pollinators to influence reproductive success in native plants. *Conserving Plant Biodiversity in a Changing World Conference*, Seattle, WA.
- 2011 **Waters, S.**, J. Hille Ris Lambers, S. Fisher. Neighborhood-conscious pollinators affect native plant success during invasion. *Ecological Society of America annual meeting*, Austin, TX. (Poster)
- 2010 **Waters, S.**, J. Hille Ris Lambers. Historical flowering phenology, invasion by exotic grasses, and seasonal pollinator resources. *Ecological Society of America annual meeting*, Pittsburgh, PA. (Poster)

## GRANTS AND AWARDS

2016	US Fish and Wildlife Recovery Program <i>Taylor's checkerspot plant and insect interactions: documenting host/nectar plant pollination and predation</i>	\$135,000
2016	Department of Defense Army Compatible Use Buffer Program <i>Taylor's checkerspot habitat enhancement</i>	\$259,000
2014	US Fish and Wildlife Connecting People With Nature <i>Pollination outreach</i>	\$1,000
2014	King Conservation District Seattle Community Partnership <i>Pollination ecology curriculum for K-12</i>	\$13,000
2013	Fellowship, Program in Interdisciplinary Pedagogy, UW Bothell School of Interdisciplinary Arts and Sciences	\$30,000
2012	Kathryn C. Hahn Writing Fellowship, UW Dept. of Biology	\$4,000
2012	Huckabay Teaching Fellowship, UW Graduate School	\$4,000
2011	Experimental and Field Ecology Award, UW Dept. of Biology	\$1,800
2009	Experimental and Field Ecology Award, UW Dept. of Biology	\$1,800
2008	National Science Foundation Graduate Research Fellowship <i>The ecological and evolutionary role of novel weapons (allelopathy) in ecological invasions.</i>	\$90,000

## SERVICE ACTIVITIES

*[In-department]*

2009–16 **Mentor to Undergraduate Researchers.** *Provided intellectual, analytical, and technical support from experimental design to completion. Examples:*

- 1) *herbarium-based research: rapid evolution in response to climate change;*
- 2) *field research: effects of an invasive plant on pollination of nearby native plants*
- 3) *greenhouse research: pollinator foraging behavior in enclosures*

2014-5 **E-Course designer.** *Redesigned existing required science course as 50% on site, 50% online. E-learning Fellows Program, University of Washington Office of Learning Technologies.*

2014 **Collaborator with science librarians to assess and increase student access to peer-reviewed scientific literature.** *Co-designed, implemented, and assessed interactive evaluation of students' ability to use online science library resources.*

2012 **Organizer, R Seminar.** Department of Biology. *Organized weekly graduate seminar for ecologists to share knowledge of the R programming language for data analysis.*

2011 **Founder, Pollination Interest Group.** *Organized first-ever weekly seminar for pollination biologists at the University of Washington, uniting graduate and undergraduate students, professors, and post-docs from multiple disciplines and departments.*

2011 **Organizer, Ecology Seminar.** Department of Biology. *Selected theme, chose papers, and organized topics for weekly ecology journal club. Focus: phenology in ecology.*

*[Outreach]*

- 2015 **Invited expert.** Washington Department of Transportation. Training to facilitate understanding of need for pollinator habitat along transportation corridors.
- 2014 **Curriculum designer.** King Conservation District, Seattle, WA.
- 2014 **Guest Scientist, pollination biology.** Sally Ride Science Festival, Bothell, WA.
- 2014 **Naturalist and conservation educator.** Urban Pollination Project, Seattle, WA. *Designed outreach materials for both adults and children; gave >10 workshops in 2014.*
- 2013-4 **Guest Scientist, climate change.** Seattle Public Schools, Seattle, WA. *Provided materials and curriculum support to teachers for original 2-week educational module on biological impacts of climate change (4 classrooms, 120 5<sup>th</sup> graders).*
- 2011 **Guest Ecologist.** Seattle Public Schools, Seattle, WA. *Created and presented daylong curriculum on plant/pollinator ecology to two elementary school classrooms.*

*Reviewer: Northwest Science*

## SELECTED PRESS

- “Citizen scientists gather data on urban bees,” Sarah Sanborn, PBS QUEST Science. 17 Sept. 2013. <http://science.kqed.org/quest/2013/09/13/citizen-scientists-gather-data-on-urban-bees/>
- “Seattle project highlights role of declining bumble bees,” Jennifer Wing, KPLU (local NPR affiliate). 18 July 2013. <http://knkx.org/post/seattle-project-highlights-role-declining-bumblebees>
- “Stingers don’t get in the way of Puget Sound classrooms, backyards helping bees,” Kim Shepard, MyNorthwest.Com. 5/16/13. <http://mynorthwest.com/11/2275513/Buzzworthy>