

Dr. Karen Oberhauser

Biography

Karen Oberhauser is the Director of the UW-Madison Arboretum. She and her students have conducted research on several aspects of monarch butterfly ecology. Her research depends on traditional lab and field techniques, as well as the contributions of a variety of audiences through citizen science. Her strong interest in promoting a citizenry with a high degree of scientific and environmental literacy led to the development of a science education program that involves courses for teachers, and opportunities for youth to engage in research and share their findings with broad audiences. In 1996, she and graduate student Michelle Prysby started a nationwide Citizen Science project called the Monarch Larva Monitoring Project, which continues to engage hundreds of volunteers throughout North America. Karen has authored over 90 papers on her research on monarchs, insect conservation, and citizen science.

Karen is passionate about the conservation of the world's biodiversity, and believes that the connections her projects promote between monarchs, humans, and the natural world promote meaningful conservation action. Her current work, and that of her colleagues at the UW Arboretum, continues to promote these connections between humans and our natural environment. She is the chair of the Monarch Joint Venture, and a founding officer of the Monarch Butterfly Fund. In 2013, Karen received a White House Champion of Change award for her work with Citizen Science.

Readings and Resources

Selected news articles:

- [New Arboretum director continues legacy of restoration, teaching](#)

Hamilon, E. (November 4, 2017). New Arboretum director continues legacy of restoration, teaching. University of Wisconsin Madison News.

"Oberhauser began her tenure as the eighth director of the Arboretum on Oct. 1. She came from the University of Minnesota, where she was a recognized expert on monarch butterflies. She was drawn by, as she says, "the people and the land" of the Arboretum. Oberhauser is set on furthering the Arboretum's dual missions of education and ecological restoration, while looking for ways to have these overlapping, if sometimes competing, missions complement one another."

- [New director says UW-Madison Arboretum offers good blend of science and respite](#)

Treleven, E. (December 26, 2017). New director says UW-Madison Arboretum offers good blend of science and respite. Wisconsin State Journal.

Selected articles:

- [Science Professional Development with Teachers: Nurturing the Scientist Within](#)

Koomen MH, Blair R, Young-Isebrand E, Oberhauser K. 2014. Science professional development with teachers: nurturing the scientist within. Electronic Journal of Science Education. 18(6). <http://ejse.southwestern.edu/issue/view/1140>

We used a mixed-methods study to understand the nature of classroom instruction and the

enactments of inquiry with nine teachers after an extensive professional development (PD). The Summer Ecology Institute for Teachers focused on science as a process and included mentoring by scientists and science educators. We validated our findings using a triangulation approach with multiple data sources: pre-post attitude surveys, classroom observations using the CETP-COP protocol with observation notes at 5 minute intervals, semi-structured interviews, and review of student science notebooks. Our first three findings address the nature of classroom instruction: 1) in their classroom practice the nature of the instruction was as mentors for K-12 students as they engaged in scientific inquiry, 2) the teachers' instructional practices were drawn from their own emerging identities as scientists who practice scientific inquiry in their interactions with their K-12 students (TIS) and 3) the classroom practice of the teachers promoted high levels of cognition and student engagement. A fourth finding addresses the enactment of inquiry in teachers' classrooms: Finding 4) while teachers integrated inquiry into many aspects of their classroom instructional practices, there was an unevenness in the components of the inquiry enactments. Implications for PD are included.

- [Local and cross-seasonal associations of climate and land use with abundance of monarch butterflies *Danaus plexippus*](#)

Saunders, S. P., Ries, L., Oberhauser, K. S., Thogmartin, W. E., & Zipkin, E. F. (2018). Local and cross-seasonal associations of climate and land use with abundance of monarch butterflies *Danaus plexippus*. *Ecography*, 41(2), 278-290.

Quantifying how climate and land use factors drive population dynamics at regional scales is complex because it depends on the extent of spatial and temporal synchrony among local populations, and the integration of population processes throughout a species' annual cycle. We modeled weekly, site-specific summer abundance (1994-2013) of monarch butterflies *Danaus plexippus* at sites across Illinois, USA to assess relative associations of monarch abundance with climate and land use variables during the winter, spring, and summer stages of their annual cycle. We developed negative binomial regression models to estimate monarch abundance during recruitment in Illinois as a function of local climate, site-specific crop cover, and county-level herbicide (glyphosate) application. We also incorporated cross-seasonal covariates, including annual abundance of wintering monarchs in Mexico and climate conditions during spring migration and breeding in Texas, USA. We provide the first empirical evidence of a negative association between county-level glyphosate application and local abundance of adult monarchs, particularly in areas of concentrated agriculture. However, this association was only evident during the initial years of the adoption of herbicide-resistant crops (1994-2003). We also found that wetter and, to a lesser degree, cooler springs in Texas were associated with higher summer abundances in Illinois, as were relatively cool local summer temperatures in Illinois. Site-specific abundance of monarchs averaged approximately one fewer per site from 2004-2013 than during the previous decade, suggesting a recent decline in local abundance of monarch butterflies on their summer breeding grounds in Illinois. Our results demonstrate that seasonal climate and land use are associated with trends in adult monarch abundance, and our approach highlights the value of considering fine-resolution temporal fluctuations in population-level responses to environmental conditions when inferring the dynamics of migratory species.

- [Invertebrate Natural Enemies and Stage-Specific Mortality Rates of Monarch Eggs and Larvae.](#)

Anda, A., Oberhauser, K.S. (2015) Invertebrate Natural Enemies and Stage-Specific Mortality Rates of Monarch Eggs and Larvae. *Monarchs in a Changing World: Biology and Conservation of an Iconic Insect*. 5: 60-70.

We measured stage-specific immature monarch mortality rates over 24-hour intervals in the wild. We documented similar mortality rates during two summer breeding seasons, and 24-hour survival rates were slightly but significantly lower for both first-and second-instar larvae (~60%)

than eggs (~63%). Monarchs had lower survival on plants with spiders or higher numbers of aphids present and on plants with more evidence of herbivory, and survival decreased over the course of the summer. Additionally, monarchs found on the bottom and apex of milkweed leaves were more likely to survive. Position on plants varied across monarch ages, with eggs more likely to be found on the bottoms of leaves, first and second instars more likely to be hidden in the leaves at the apex of the plants, and older larvae more likely to be on the tops of leaves. We argue that position on the plant may affect the likelihood of predation differently at different monarch ages. Potential predators were very common on milkweed plants, and several lines of evidence suggest that predation was responsible for most of the mortality we observed.