

MEET A GRASSLAND RESEARCHER **Maddie Nolan** madeline.nolan@ucsb.edu

Ph.D. Candidate, Ecology, Evolution, and Marine Biology, University of California, Santa Barbara

What is your study system? What are your primary research goals?

My research and dissertation are focused on grasslands in Southern California with an emphasis on those occurring in the coast range mountains. My primary research goal is to understand how climate change will impact the establishment and resilience of native grassland species and to explore how current grassland restoration techniques can be modified to improve grassland restoration in the future. I am particularly interested in asking applied questions with the hope that my research can be directly used by practitioners to help improve the success of restoration efforts. For this reason, my research is heavily focused on the native perennial bunchgrass, purple needlegrass (*Stipa pulchra*). This species is widely used throughout California in grassland restoration efforts and is often the dominant species that is planted. Therefore, it is imperative that we understand not only how climate change will impact the establishment of this specific species but also what practical steps practitioners can take to improve the likelihood that restored populations of this species will persist into the future. While I am focused on perennial bunchgrass, I am also interested in understanding how climate change will impact the establishment of a diverse array of native grassland forbs such as *Dichelostemma capitatum*, *Bloomeria crocea*, *Plantago erecta*, and *Eschscholzia californica*. Because while restoration efforts are often focused on establishing native perennial grasses, such as purple needlegrass (*S. pulchra*), these grasses are only one species within an incredibly diverse and speciose ecosystem. Therefore, to truly restore native grasslands, we need to not only establish native grasses but also the native forbs that coexist with them in natural ecosystems. It is my hope that my research will help practitioners understand what impacts the establishment of common native forbs and suggest ways in which to increase the presence of these species in restoration projects.

Who is your audience?

My research is geared both towards ecologists, particularly those who are also doing applied restoration ecology, as well as restoration practitioners who are restoring native grasslands in California. While I am primarily interested in applied questions and doing research that can be directly used by practitioners, I am



also interested in using restoration as a way to test basic ecological theory which can further the ecological science that is at the heart of restoration ecology.

Who has inspired you, including your mentors?

My first exposure to the world of land management and restoration was in my hometown of Columbus, Ohio. Immediately after I graduated from Ohio State University, I was at a loss at what to do with my life. On a whim, I decided to volunteer for the natural resource division of the local Metro Parks. It was here that Carrie Morrow, who was the assistant director of natural resource management, introduced me to the world of science-based land management. Carrie introduced me to habitat restoration and really motivated me to pursue a career in

land management. I decided to go to graduate school in ecology and environment science because of her. I would also not be where I was without the mentorship of Drs. Bradley Cardinale and Carla D'Antonio. Brad was my advisor for my master's degree at the University of Michigan, and he was instrumental in teaching me how to actually do science professionally. He took a chance by agreeing to work with me, despite my limited experience in ecology and for that I am grateful. Carla is my current advisor for my Doctoral degree at UC Santa Barbara and introduced me to grassland restoration. She is an amazing role model and teacher and I cannot thank her enough for how much she has taught me about restoration ecology.

How has or will your research align with the mission of CNGA "to promote, preserve, and restore the diversity of California's native grasses and grassland ecosystems through education, advocacy, research, and stewardship"?

The chief purpose of my research is to improve conservation, restoration, and management of native vernal pool plant species. Specifically, I aim to develop and improve protocols for rare plant species surveys and enhanced community diversity estimates that can be used to prioritize vernal pools for management. Additionally, I hope my experimental-based investigations of adaptation will be used to guide vernal pool conservation and restoration decisions that are backed by experimental evidence. Lastly, not only do I

continued next page

MEET A GRASSLAND RESEARCHER *continued*

advocate for vernal pool grasslands through professional and academic meetings, but also through outreach and education at public events, and K-12 and community field trips to the UC Reserve. One of the greatest privileges I've been given is the opportunity to work with local educators to develop the Next Generation Science curriculum based on vernal pool phenomena for public schools in the Central Valley.

Why do you love grasslands?

I originally was attracted to grasslands because they are such a diverse ecosystem and I have always been interested in

understanding why species coexist with one another. Grasslands in California are particularly diverse, and I am fascinated with how so many different species can coexist together. I am also equally interested in understanding invasion dynamics, and, unfortunately, California grasslands are notorious for being heavily invaded by exotic annual grasses. For me, it is a perfect ecosystem to study because I can explore my interests in biodiversity and community assembly as well as understand how some species are able to fundamentally alter a community.



California Native Grasslands Association

JOIN US in our mission to promote, preserve, and restore the diversity of California's native grassland ecosystems through education, advocacy, research, and stewardship.

P.O. Box 485, Davis, CA 95617 • (530) 902-6009

cnga.org

The image is a promotional graphic for the California Native Grasslands Association. It features a background of a field with yellow, white, and purple flowers. A dark green rectangular box is overlaid on the top left, containing the organization's name in white serif font. To the right of this box, the mission statement is written in white sans-serif font. At the bottom of the graphic, the contact information and website are displayed in white sans-serif font.