

## SIENNA A. WESSEL

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### EDUCATION

**M.S.** University of Wyoming, Botany, expected 2021

Thesis: *Trajectories and drivers of compositional and functional change in restored sagebrush steppe communities of Grand Teton National Park*. Advisor: Dr. Daniel Laughlin

**B.S.** Northern State University, Biology and Environmental Science, *summa cum laude*, 2018

Certificates: Geographic Information Systems and Organismal Biology

Advisors: Dr. Jon Mitchell and Dr. Jodie Ramsey

### APPOINTMENTS

#### i. Research Appointments

8/2019-curr. **Graduate Research Assistant, University of Wyoming**

*Applied Plant Trait Ecology*

Led research focused on the trajectories and drivers of biodiversity in restored sagebrush steppe communities of Grand Teton National Park. Work involves the analysis of long-term datasets, identification of 100+ plants to species, quadrat and transect vegetation surveys, functional trait measurements, and ecological modeling using the R statistical language. Supervised and trained 9 rotating field assistants on plant survey methods, soil sampling, plant trait measurements, and seed cleaning.

6/2019-8/2019 **Field Assistant, University of Wyoming**

*Laughlin Lab; Restoration Experiments and Rare Plant Demography*

Assisted with two PhD projects by propagating plants from seed, developing a plant ID guide, setting up experimental infrastructure, conducting quadrat surveys for a restoration experiment, and collecting demographic data on rare plants.

1/2018-5/2018 **Lead Research Assistant, Northern State University**

*Pollinators and Floral Traits*

Designed and implemented behavioral studies of painted lady butterflies which compared the impacts of UV and visible spectrum floral traits on the frequency of floral visits, orientation to the nectar center, foraging rates, and associative learning.

8/2015-3/2016 **Lead Research Assistant, Northern State University**

*Fungicidal Activity of Plant Metabolites*

Characterized secondary plant metabolites for native plant species using gas chromatography-mass spectrometry and designed an experimental framework to test fungicidal activity of native plant metabolites against three fungal plant pathogens.

## *CURRICULUM VITAE*

*Updated Sept 2021*

### *ii. Teaching Appointments*

- 2021, Fall     **Teaching Assistant and Curriculum Developer (Plant Survey Methods)**  
*Field Ecology* LIFE 3410, Dr. North
- 2020, Spring   **Lab Instructor and Guest Lecturer (Plant Adaptations)**  
*Plant Form and Function* BOT 3000, Dr. Ewers and Dr. Guadagno
- 2019, Fall     **Lab Instructor and Guest Lecturer (Plant Adaptations)**  
*Biology of Plants and Fungi* LIFE 2023, Dr. Miller
- 2017, Fall     **Supplementary Instructor**  
*General Biology* BIOL 151, Drs. Mitchell and Ramsay

### *iii. Professional Appointments*

5/2021-8/2021   **Scientists in Parks Fellow, Ecological Society of America, Moose, WY**

Collected and analyzed plant community data in the software program R and developed a research brief/white paper to inform restoration and monitoring practices. Conducted outreach and created a social media campaign and ArcGIS Story Map to engage the public with restoration work in the park.

2/2021-5/2021   **Herbarium Volunteer, Rocky Mountain Herbarium, Laramie, WY**

Returned loose plant specimens to cabinets, rearranged and sorted specimens, re-labeled cabinets, studied curation techniques including database management, georeferencing, accessioning, and annotation.

5/2020-9/2020, 8/2021-curr.   **Volunteer Botanist, Curt Gowdy State Park, Cheyenne, WY**

Collected, identified, and vouchered plant specimens with geographic coordinates and relevant associated data. Conducted in-field identifications and photographic documentation of additional species. Using these data with extant herbarium records, I am currently compiling a checklist of the park flora (250+ species) and an educational brochure for visitors.

8/2018-6/2019   **Biology Lab Manager, Northern State University, Aberdeen, SD**

Managed 10 educational/research labs serving 10-15 courses which spanned multiple biological disciplines. Work involved preparation of educational and laboratory materials, ordering supplies, supervision of 5 work-study students, and the planning of a building move.

7/2018-10/2018   **Herbarium Digitization Lead, Northern State University, Aberdeen, SD**

Designed a digitization station and workflow to preserve a small herbarium collection and make specimens more publicly available. This led to a work-study position for botany-focused undergraduates.

5/2018-8/2018   **Range Technician, U.S. Fish and Wildlife, Sand Lake Refuge, Columbia, SD**

Identified 50+ plant species using keys, recorded data, and reported results in a technical report for four different projects which summarized plant community structure and floristic composition to guide future restoration and management actions. Survey work included belt transects, quadrats, timed-meandering walks, and Robel pole measurements. I also led refuge tours and outreach events for youth.

## CURRICULUM VITAE

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### 5/2017-1/2018 **Seasonal Habitat Technician, Game, Fish and Parks, Aberdeen, SD**

Assisted with restoration seeding, invasive species control, seed collection, documentation of rare plant populations, and supervision of outreach activities for elementary students. I designed a self-watering system for restoration plugs and experimented with techniques for propagation of rare plant species.

### 7/2017-8/2017 **Vegetation Monitoring Assistant, The Nature Conservancy, Leola, SD**

Collected plant community data using line transect surveys, G-transect surveys, and biomass measurements with the purpose of documenting composition, structure, and functional groups to inform future management actions such as prescribed fire.

### 2/2017-6/2017 **Earth Team Volunteer, National Resources Conservation Service, Aberdeen, SD**

Conservation work included program planning which facilitated the funding, design, and implementation of projects that restored agricultural land to grasses and forbs, ArcGIS wetland surveys and map creation, and soil surveys.

## PUBLICATIONS

### *i. Peer Reviewed*

**Wessel, S.A.**, Jones, L., Kramer, E., Stratton, C., Bloom, T.D., Shoemaker, L., Riginos, C., Laughlin, D.C. In Prep for Journal of Applied Ecology. When, Where, and How: Contingency effects alter the compositional and functional diversity of restored sagebrush steppe communities in Grand Teton National Park

### *ii. Popular Articles/Blog Posts*

2021. [From a head in the weeds to an eye on the conservation horizon](#). Scientists in Parks Blog

2021. [Life Cycle of a Plant \(Ecologist\)](#). Scientists in Parks Blog

2021. [Secrets of the Sage](#): Communicating the unseen value of the sagebrush steppe and uncovering clues to an ecological puzzle. Scientists in Parks Blog

2021. Conservation Corner: Through the Loupe to the Landscape: Biodiversity from an Ecological Perspective. Aquilegia #45.1, magazine of the Colorado Native Plant Society

2021. [Dead plants breathe new life into botanical research](#). Envirobites.org

2020. [When Fire and Water Collide: Looking to Lakes to Understand Fire's Deep Past](#). Envirobites.org

2020. [Leaving a Legacy: Plants leave "memories" in the soil that can affect future generations](#). Envirobites.org

2020. [Could We "Dilute" Disease by Protecting Biodiversity?](#) Envirobites.org

2020. [Where have all the flowers gone?](#) Envirobites.org

### *iii. Other Publications*

Fleri, J.R., **S.A. Wessel**, D.H. Atkins, N. Case, S Albeke, D.C. Laughlin. 2021. Global Vegetation Project: An Interactive Online Map of Open-Access Vegetation Photos. Vegetation Classification and Survey. 2: 41-45

## PRESENTATIONS & POSTERS

## CURRICULUM VITAE

Updated Sept 2021

**Wessel, S.,** L. Jones, E. Kramer, C. Stratton, L.G. Shoemaker., and D.C. Laughlin. Trajectories and drivers of compositional and functional change in restored sagebrush steppe communities of Grand Teton National Park (#884). 2021, July. Botanical Society of America, Virtual Meeting. *Virtual Oral Presentation*

**Wessel, S.** and G. Wessel. A preliminary checklist of the flowering plants of Curt Gowdy State Park in Laramie County, Wyoming (#1066). 2021, July. Botanical Society of America, Virtual Meeting. *Poster Presentation*

Jones, L. and **Wessel, S.** Outcomes of 14 years of sagebrush steppe habitat restoration. 2021, June. National Park Service At-Risk Species Project Spotlights. *Virtual Oral Presentation*

Jones, L., Kramer, E., and **Wessel, S.** A Salute to Sagebrush: Restoring native plant communities in the heart of the Greater Yellowstone Ecosystem. 2021, Mar. Wyoming Native Plant Society. *Virtual Oral Presentation*

**Wessel, S.,** D.C. Laughlin, L. Shoemaker, L. Jones, E. Kramer, and C. Stratton. Trajectories and drivers of floristic change in restored sagebrush steppe communities of Grand Teton National Park. 2021, Feb. Program in Ecology Symposium. *Three Minute Thesis*

**Wessel, S.,** D.C. Laughlin, L. Shoemaker, L. Jones, E. Kramer, and C. Stratton. Age of restoration and initial conditions affect sagebrush steppe community composition (#86645). 2020, Aug. Ecological Society of America, Virtual Meeting. *Poster Presentation*

**Wessel, S.** Predictability and stability of sagebrush-steppe restoration in a changing climate. 2020, Feb. Program in Ecology Symposium, Laramie, WY. *First Place Poster Presentation*

**Wessel, S.** Applying trait-based models to restore resilient plant communities and ecosystem services. 2019, Sept. Guild of Rocky Mountain Ecologists and Evolutionary Biologists, Gothic, CO and 2019, Oct. University of Wyoming Botany Seminar Series Lighting Talks, Laramie, WY. *Oral Presentation*

**Wessel, S.** Natural history collections in a modern academic world. 2018, May. NSU, Aberdeen, SD. *Oral Presentation*

**Wessel, S & J. DuCheny.** The comparative effects of visible and ultraviolet floral traits on *Vanessa cardui* attraction and associative learning. 2018, Apr. Undergraduate Creativity, Scholarship, and Research Forum. NSU, Aberdeen, SD. *First Place Poster Presentation*

**Wessel, S.** Fungicidal properties of essential oils and secondary metabolites against fungal strains common to damping-off disease. 2016, Apr. Legislative Poster Session. SD Capitol Rotunda, Pierre, SD and 2016, Apr. Undergraduate Scholarship and Activity Forum. NSU, Aberdeen, SD. *Poster Presentation*

### GRANTS (\$73,272)

2020, June	University of Wyoming Biodiversity Institute Enhancement Grant \$18,350
2020, April	University of Wyoming National Park Service Research Station Small Grant \$5,000
2020, Feb	National Park Service Focused Condition Assessment Federal Grant (co-author with Laura Jones) \$45,002
2018, March	Cornell University Travel Grant, \$600
2017, July	Botanical Society of America PLANTS Travel Grant, \$1,500

## *CURRICULUM VITAE*

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2015, Aug Northern State University Undergraduate Competitive Research Grant, \$2,820

### **AWARDS & SCHOLARSHIPS (\$44,194)**

2020, May Botany Department Service Award \$400  
2020, May Botany Department Outstanding Teaching Assistant Award \$1,000  
2020, May William A Reiners Graduate Student Fellowship \$1,000  
2020, April Arts and Science Board of Visitors Endowment \$300  
2020, March Wyoming Native Plant Society Markow Scholarship \$480  
2019, July Department of Energy Graduate Assistantship, \$28,014  
2016, Aug Zonta Club International Non-Traditional Student Scholarship, \$2,000  
2014, Aug WolfPACT Scholarship \$11,000

### **SYNERGISTIC ACTIVITIES**

#### *i. Mentoring*

2020-Present Sagebrush steppe restoration in Wyoming- Earth Optimism project, high school student group  
2019-Present Accessioning and digitizing a small university herbarium collection-honors project, sophomore student  
2017-2018 Examining adaptive behavioral responses of a pollinator to floral cues-first research experience, sophomore student

#### *ii. Science Communication*

2020-curr. Contributing Writer and Peer Reviewer, Envirobites.org  
2020-curr. Communications Manager (Social Media, Curriculum Development, Marketing), UW Global Vegetation Project  
2020-2021 Plantae Science Communication Fellow, American Society of Plant Biologists  
2020 Contributing Writer, Aquilegia Newsletter, Colorado Native Plant Society

#### *iii. Outreach*

2021, June Plant Walk Leader, Sagebrush Steppe Plant ID Field Day, WY Native Plant Society-Teton Chapter  
2020, Aug. Guest Speaker, Earth Optimism Teen Conversation, Cody WY (shifted to a small group virtual presentation due to COVID-19)  
2020, Feb. Laramie Science on Tap Guest Speaker, "Plant Restoration and Conservation in a Changing Climate"  
2019, Nov. K-12 Outreach Volunteer, NASA Consortium Science Kitchen Program

#### *iv. Service*

2021 Moderator, Ecology Session: Community Assemblages, Succession, Marcescence, Botanical Society of America Virtual Conference  
2019 Botany/Ecology Division Judge, Volunteer Organizer, Conference Chaperone,

## *CURRICULUM VITAE*

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2018-2019 Northern South Dakota Science and Math Fair  
2018-2019 South Dakota Women in Science Conference Organizer  
2018-2019 Materials Coordinator and Curriculum Developer, NSU STEM Outreach  
2016-2018 Treasurer and Community Engagement Leader, NSU Environmental Club

### *iv. Membership*

2020-curr. Wyoming Native Plant Society  
2020-curr. Colorado Native Plant Society  
2020-curr. American Society of Plant Biologists  
2019-curr. Ecological Society of America  
2017-curr. Botanical Society of America

## **OTHER TRAINING & CERTIFICATIONS**

First Aid/CPR/AED Certification, June 2018  
ATV Operator's Certification, May 2017  
South Dakota Commercial Herbicide Applicator License, June 2017  
Wildland Firefighter Courses S-190 and S-130, October 2017

## **SKILLS**

- Fluent in the R programming language and advanced at data cleaning and analysis
- Proficient with data collection, map-making, layer creation, and spatial analysis in ArcGIS
- Advanced at vascular plant identification using dichotomous keys (Flora of the Pacific Northwest, Vascular Plants of Wyoming, Vascular Plants of South Dakota), specimen collection, and curation
- Adept at project management including leadership and training of seasonal staff in the field and lab settings, grant writing, accounting, and administrative tasks
- Practiced with multimedia and design software programs including Audacity, ArcGIS StoryMaps, Canva, Illustrator, Photoshop, Lightroom, and Wondershare
- Backcountry/multi-day backpacking experience at high elevation (9,000+ ft)
- Intermediate Spanish speaking, writing, and reading