



# WILD WOMEN OF RECLAMATION NEWSLETTER

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ASMR American Society of Mining and Reclamation

*Greetings to all of our fellow Wild Women of Reclamation,*

Welcome to our second Wild Women of Reclamation Newsletter. I am calling this the Winter edition, as it is technically still winter, as evidenced by the photo I took from my office this afternoon. This is the third nor'easter in the past ten days. The lovely daffodils in the header were sent by Dr. Jennifer Franklin from the University of Tennessee, Knoxville. These photos are the difference between living at latitude 36 °N and 46°N. Please continue to send us flower photos for inclusion in future letterheads.



Our first newsletter had an incredible response and we received several requests to be added to the newsletter email list. Good old fashioned email might still have a lease on keeping people connected.

This newsletter format is meant to be a quick read and easy to put together every few months, but it will only be successful if we get stories from you. The submissions could be something factual about your research or your reclamation project or it could just be commentary on a relevant topic. Submissions should be one to two pages in length and include a few photos, if possible. A brief biography (max. ½ page) about who you are and a photo will also make you more recognizable at the next conference. Including contact information may result in a request for additional information, collaboration potential or just a comment on your article.

Please remember to register for the 35<sup>th</sup> Annual Meeting of the American Society of Mining & Reclamation. "The Gateway to Land Reclamation" will be hosted in St. Louis, Missouri, June 3-7, 2018. Conference registration is open at [www.asmr.us/](http://www.asmr.us/), with Early Bird pricing until April 1. The Wild Women of Reclamation will be hosting the annual get-together breakfast on Monday, June 4, at 7am at the conference hotel. The routine will be the same. Grab your breakfast and come to the appointed meeting room for a group photo, two presentations and some networking. Now is also a great time to contact your connections from last year to say "Hello, what are you up to, and are you coming to St .Louis?". If you are new to the field, this is a great way to make contacts. If you are a student, this is a good way to meet industry contacts. Please don't be shy. And if you are, bring a female friend. Special speakers this year will be Dr. Jennifer Franklin, an Associate Professor in Forestry from the University of Tennessee, Knoxville, and Ms. Summer King, the Environmental Scientist for the Quapaw Tribe of Oklahoma. They both have very interesting stories to tell.

We hope you enjoy reading this edition and hope to see many of you in St. Louis!

Michele Coleman ([mcoleman@nbpower.com](mailto:mcoleman@nbpower.com))

Cindy Adams ([cindya@sgm-inc.com](mailto:cindya@sgm-inc.com))

In this edition of the newsletter, we have two very different articles.

The first article is an introspective article about fungi by Hannah Angel. Hannah talks about the interesting mushrooms that we see while out in the woods but then ties their existence as evidence of ecological restoration and health of recovering soils. She also has some fun with foraging, but cautions that she learned the skill from an expert.



Hannah Angel



Cindy Adams

The second article by Cindy Adams describes a habitat mitigation project in western Colorado which relates the interconnectedness between regulatory agencies, watershed and other not-for-profit groups and consultants. Cindy also gives a quick description of the methodology employed during the project assessment and presents early monitoring results.

**Hannah Angel** recently moved to Blacksburg, Virginia to pursue a doctoral degree in Soil Science at Virginia Tech (VT). Her work will focus on soil processes involved in mine soil genesis on mineral sands mined land in eastern VA and coal mined land in southwestern VA. Hannah is a graduate teaching assistant for the basic soils lab at VT and has become active in the Soil Judging Club.

Hannah received her Bachelor's and Master's degrees in Forestry from the University of Kentucky and Stephen F. Austin State University, with an emphasis in mine land reclamation during the latter.

Hannah enjoys baking, yoga, hiking, and spending time with her cat Oliver. Email: [angelhz@vt.edu](mailto:angelhz@vt.edu)

**Cindy Adams** is a Senior Consultant at SGM in Glenwood Springs, Colorado. SGM is a full service civil engineering and consulting firm. Cindy focuses on environmental consulting, specifically aquatic resource delineations and permitting, vegetation surveys, Phase 1 Environmental Site Assessments, and weed management plans. Cindy also has written many federal and state grants for clients. Prior to Colorado she lived in both Utah and Wyoming working for BKS Environmental, a small environmental consulting firm started by ASMR Past President Brenda Schladweiler.

Cindy graduated from the University of Denver with a bachelor of science in Environmental Science and a Masters of Business Administration. They had a cool program where you could do your bachelors and masters in five years so she was able to combine both areas of interest. She has been fortunate to be able to use both skill sets throughout her more than 10 year career.

Cindy moved back to Colorado two years ago to be closer to family. In 2016 she and her husband helped build their dream home on the family ranch. She is also a Girl Scout co-leader for a multi age level troop with Daisies, Brownies, and Juniors. It's cookie time here, so things have been hectic. In her free time, she enjoys feeding her five chickens, hiking, snow shoeing, gardening, and cooking.

Cindy can be reached at [cindya@sgm-inc.com](mailto:cindya@sgm-inc.com)

# Fungi for Thought

Hannah Angel

When I lived in Nacogdoches, deep in the heart of the piney forests of east Texas, I fell in love with a mushroom forager. Combining my passion for trees with his mushroom hunting skills, we formed a mycorrhizal alliance based on a deep appreciation for the natural world. Over three years of wading through Texas' thickets and trudging up and down Appalachian slopes, a new chapter of curiosity emerged. Aside from their beautiful, diverse, and delicious fruiting bodies (of the edible kind), fungi have a lot to offer our world. In school I was taught the importance of fungi from a forestry perspective (e.g. forest health, diseases, role of mycorrhizae), but within that academic construct, I failed to fully appreciate the complexity, interconnectedness, and beauty of this often-overlooked world. Fungi (both microscopic and their reproductive structures which we call 'mushrooms') are a world within themselves. The Kingdom Fungi creates integral networks between systems of sustainability that links nearly every part of our natural world. Mushrooms play a significant role in our everyday life, providing everything from food and medicine to artistic inspiration.

Perhaps the most important roles of fungi are their nutrient cycling powers and ability to repair damaged or contaminated environments. Regarding the latter, fungi are capable of effectively degrading petroleum hydrocarbons, bioaccumulating heavy metals, and filtering pollutants such as *E. coli*<sup>1</sup>. Another fascinating subject is the way in which fungi help trees share information. Suzanne Simard, a forest ecologist and professor at the University of British Columbia, discovered that forest ecosystems are healthy and strong because they participate in a collaborative support system, linked together through a vast underground network of fungal mycelia<sup>2</sup>.

While fungi receive special attention here, the importance of other organisms cannot go unnoticed. The trees we plant, in mined land reforestation for example, sets the trajectory for future forests and are dependent upon insect, fungal, and bacterial communities (just to name a few) to facilitate the recovery and development of an ecosystem. Many reclamation practitioners make it a practice to inoculate the bare roots of the tree seedlings they plant as part of the reforestation process. It is this holistic or "systems" approach to restoring disturbed land that sparks my interest and I am excited to see where this growing interest takes me in my professional career.

In my personal life, wild mushroom hunting will surely be a lifelong hobby.

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<sup>1</sup> Taylor, A. and P. Stamets. 2014. Implementing Fungal Cultivation in Biofiltration Systems – The Past, Present, and Future of Mycofiltration. USDA Forest Service Proceedings, RMRS-P-72. 23-28 p.

<sup>2</sup> Simard, Suzanne. 2009. The Foundational Role of Mycorrhizal Networks in Self-Organization of Interior Douglas-fir Forests. *Forest Ecology and Management* 258: S95-S107.



Figure 1 Fungal mycelia<sup>3</sup>

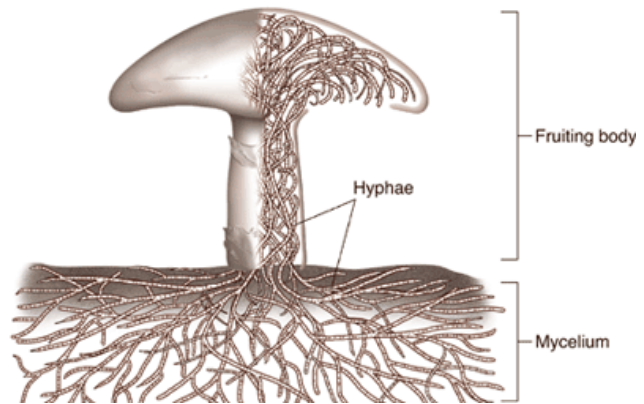


Figure 2 Structure of multicellular fungus<sup>4</sup>



Figure 3 Comb Tooth (*Herceium coralloides*)  
An edible choice.



Figure 4 Amanita (*Amanita flavorubescens*)  
Photo: Shawn Fischer



Figure 5 Chanterelles (*Cantherellus texensis*)  
A choice edible



Figure 6 Wild Enokitake (*Flammulina velutipes*)  
The "wild" version of the cultivated Enokitake

<sup>3</sup> [http://ketenewplymouth.peoplesnetworknz.info/image\\_files/0000/0001/9929/Fungal\\_mycelia\\_-3.JPG](http://ketenewplymouth.peoplesnetworknz.info/image_files/0000/0001/9929/Fungal_mycelia_-3.JPG)

<sup>4</sup> [https://moodle.clsd.k12.pa.us/district\\_videos/Biology/iText/products/0-13-115540-7/ch21/ch21\\_s1\\_2.html](https://moodle.clsd.k12.pa.us/district_videos/Biology/iText/products/0-13-115540-7/ch21/ch21_s1_2.html)



## Habitat Mitigation at Orchard Mesa Wildlife Area

Cindy Adams

Grand Valley Water Users Association (GVWUA), in cooperation with the US Bureau of Reclamation (USB Reclamation), has implemented a habitat mitigation project at the Orchard Mesa Wildlife Area (OMWA) located near Grand Junction, Colorado. GVWUA, a client of SGMs, was awarded funding under the Basinwide Salinity Control Program to support the lining of 5,125 feet of the Government Highline Canal in compliance with the Colorado River Basin Salinity Control Act (43 U.S.C. 1571-1599). The Act requires that this project will need to replace incidental fish and wildlife values foregone in association with the implementation of salinity control projects. The successful implementation of this Habitat Mitigation Plan will offset wildlife habitat loss from GVWUA's projects by creating a total of 5.908 habitat units of mitigation as a result of this project.

The overall objective of this project is the long-term eradication of noxious weeds in the mitigation area. The noxious weeds include: *Tamarix parviflora* (Tamarisk), *Elaeagnus angustifolia* (Russian olive), *Cardaria draba* (whitetop), *Lepidium latifolium* (perennial pepperweed), *Acroptilon repens* (Russian knapweed), and *Cirsium arvense* (Canada thistle). Based on the Habitat Mitigation Replacement Unit Calculation, the goal is that noxious weeds will cover no more than 5% of the project area. A secondary objective is the native to non-native ratio of 80% native to 20% non-native cover throughout the project area.

Also included in this project was the development of a longer term 50-year Habitat Mitigation Plan that will support this and other mitigation needs for future projects.

The habitat inventory and evaluation methods followed the guidelines developed and included in USB Reclamation's March 2013 "Basinwide Salinity Control Program: Procedures for Habitat Replacement" (procedures). USB Reclamation calculated the habitat mitigation unit loss for the project. Only riparian or wetland habitat was eligible for habitat replacement. The determination of habitat type was made by ocular observation and delineated using a Terrain Navigator Pro. The Habitat Quality Score incorporated eleven criteria to examine aspects of habitat that were essential for wildlife including: acreage, vegetation diversity, stratification, native species vs. nonnative species, noxious weeds, overall vegetation condition, interspersed open water, connectivity, uniqueness or abundance, water supply, and alteration. An estimated total of 4.77 units of habitat value would be lost as a result of the Government Highline Canal Lining Project.

The baseline vegetation inventory used both qualitative and quantitative methods. Three random 50-meter transects were established in the project area. Each transect had 100 point-intercepts at 0.5-meter intervals along each 50 meter transect. Aerial vegetation cover was measured. Overall noxious weeds composed about 5% to 32% of the absolute vegetation cover, and averaged to 23% of the relative vegetative cover.

Twenty-two permanent photo points were established in the project area. At least one permanent photo point was established in each noxious weed concentration area to document the dominant vegetative cover. Five photos were taken at each photo point, one in each cardinal direction and ground surface. Dominant vegetation was noted at each photo point.

Noxious weeds were to be treated both mechanically and chemically, with treatment occurring both in

the Spring and Fall. There are some restrictions of timing due to the project being in a wildlife area. Russian olive and tamarisk were treated using the cut-stump treatment in both the Fall and Spring. Russian knapweed received chemical treatment in the Fall. Whitetop and Perennial pepperweed received chemical treatment in the Spring.

Results after the first year of treatment illustrate early success. Many of the Russian olive and tamarisk trees/shrubs did not have re-occurring shoots in the second year and the large trees have been cut, chipped, and removed from the site. Below is an example of the success removal of noxious weeds, from one photo point.

Overall, the project has many more years to be studied but the initial results are positive.



*Figure 7 Habitat Mitigation Orchard Mesa Wildlife Area  
Pre-treatment*



*Figure 8 Habitat Mitigation at OMWA  
post-treatment*