

#### WILD WOMEN OF RECLAMATION NEWSLETTER

WWR Spring 2018 vol. 3 ASMR American Society of Mining and Reclamation

Greetings to all of our fellow Wild Women of Reclamation,

Welcome to our third Wild Women of Reclamation Newsletter. Again, this has proven to be a great way to reach out to women and share our professional experiences and knowledge. The delicate *Chaetopappa ericoides (sand aster or rose health)* in the header was taken in NE Utah by Dr. Brenda Schladweiler of BKS Environmental Associates, Inc. For a summer project, please remember to take a few shots of lovely flowers on your reclamation sites and send them to us. The next edition of the newsletter can then feature a few pages of beauty. We can have some fun and vote on our favorite picture!

We continue to get a good response from the newsletters and are still receiving 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. This is a free networking bonus! 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 <u>www.asmr.us/</u>. 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 so that you can make arrangements to meet in 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.

Also, if you are a runner or a walker, please bring your sneakers and join the Haulin' ASMR group at 6:30 am in the hotel lobby Sunday- Thursday to get some early morning fresh air and meet some new friends.

We hope you enjoy reading this edition and we look forward to seeing many of you in St. Louis and take lots of flower photos this summer!

Michele Coleman (<u>mcoleman@nbpower.com</u>) pin cherry blossom (May, New Brunswick, Canada) Cindy Adams (<u>cindya@sgm-inc.com</u>)



In this edition of the newsletter, we have two very different articles. The first is from a PhD candidate and WWR member and the second is a web link to an interesting US Fish and Wildlife Service newsletter.

The first article is from PhD candidate Michelle Valkanas. While juggling a young family, Michelle is doing research in a topic that has been in the forefront of mine reclamation. Acid mine drainage has impacted thousands of stream miles but acid mitigation efforts in the past four decades has resulted in decreasing the impact of many watersheds. Passive treatment systems have been major contributors to these improvements. Michelle's research deals with a maintenance item in passive treatment operations that could assist in monitoring system function to predict a decline in metal removal efficiency before it occurs.



Michelle Valkanas

**Michelle Valkanas** is currently attending Duquesne University in Pittsburgh, Pennsylvania pursuing her doctoral degree in biological sciences. She attended Duquesne University as an undergraduate, as well, where she earned a B.S. in Biology. Her work focuses on the microbial communities found in passive remediation systems and how they impact system efficiency.

Michelle is actively involved in her Women in Science chapter where she helps to organize and host guest speakers that talk about unconscious bias and professional challenges women face and how to overcome them. She also participates in community outreach through school programs, teaching middle schoolers about biology; and Meet a Scientist events at Phipps Conservatory, where she educates the public about her research and the devastation caused by abandoned mine drainage.

Michelle enjoys baking, jumping on the trampoline with her two kids, and trips to Lake Erie.

Michelle can be reached at <u>bollingerm@duq.edu</u> and for more information on her research visit her website <u>www.michellevalkanas.com</u>

The second article is a web link to an interesting US Department of Fish and Wildlife newsletter that Brenda Schladweiler sent us. Although this is based on the Mountain and Prairie Region, there may be additional publications for other sections of the US. This issue talked about National Wildflower Week (May 11), nesting birds and baby bisons. You can sign up for the newsletter on-line and read about the grizzly bear recover plan and antelope shedding in the most recent newsletter! The photos are inspiring.

#### The Study of Microbial Communities in Passive Remediation Systems

#### Michelle Valkanas

Abandoned Mine Drainage is devastating our nation's watersheds. With no way to eradicate the process once it starts, remediation systems are being built to treat abandoned mine drainage. Active systems require the addition of chemicals to neutralize and precipitate contamination, while passive systems rely on aeration and retention time in settling ponds to precipitate the contamination. Passive remediation systems are becoming the preferred method of treatment for abandoned mine drainage because of their ability to efficiently remove contaminants with reduced cost (~ 20x less per system to build) and upkeep compared to their active counterpart.

Geochemically, passive systems are well understood. Through increasing the pH (when needed) and aeration, metal contamination, mainly in the form of iron, quickly precipitates. Bacteria-aided bioremediation for sulfur and manganese have also been proven successful and are well defined. With the reduction of sulfate to sulfide, heavy metals are removed through the formation of metal sulfides.

What roles are played by the microbial communities within passive systems that naturally develop? Despite high level of contamination, a select community of bacteria flourishes in these environments. Are they merely just surviving in this environment, or are they impacting the system's long-term efficiency? Can we study these bacterial communities in a bottom-up approach in order to better understand the systems function? Furthermore, can we identify specific genera of bacteria or metabolic genes that can be used as indicators of system function?

Passive systems often need dredged to remove the contaminants and restore system efficiency. This typically does not occur until the systems have already declined. My research seeks to use bacterial genera and metabolic genes to predict these declines in efficiency before they occur. Through the characterization of microbial populations across a diverse collection of passive systems (2 with acidic mine drainage and 2 with circum-neutral pH), I aim to identify specific bacterial communities that correlate with changes in contaminant levels. Bacteria quickly adapt to changes in the environment, and thus, gene expression levels change (e.g. stress genes and contaminant metabolism genes)<sup>1,2</sup>. Through the analysis of bacterial composition in diverse environmental conditions, both in situ and in the lab, I aim to identify potential bio-indicators. These bio-indicators will not only aid in system design and efficiency, but will provide insight into the biotic influences in passive systems.

<sup>&</sup>lt;sup>1</sup>Xie J, He Z, Liu X, Liu X, Van Nostrand JD, Deng Y, Wu L, Zhou J, Qiu G. 2011. GeoChip-Based Analysis of the Functional Gene Diversity and Metabolic Potential of Microbial Communities in Acid Mine Drainage. Applied and Environmental Microbiology 77:991-999.

<sup>&</sup>lt;sup>2</sup> Prabhakaran P, Ashraf MA, Aqma WS. 2016. Microbial stress response to heavy metals in the environment. Rsc Advances 6:109862-109877.



Reclaimed Iron Hydroxide at Lowber



Sampling at Lowber



Even the dead of winter can't stop the yellow boy



Biofilm at Lowber with a manganese sheen

The second item is from the US Fish and Wildlife Service Mountain and Prairie Region. It is a wonderful newsletter that brings to our attention updates and fun facts about the flora and fauna that some of us are using to restore habitat. The photographs are spectacular. We all don't have bison's, but most of us can encourage milkweed and other butterfly friendly species in our meadow habitat. The May 11, 2018 newsletter is inserted in this newsletter so you can have a quick look but the direct link (below) will enable signing up for the newsletter directly. Enjoy the photos!

# Here is the web link *https://content.govdelivery.com/accounts/USDOIFWS6/bulletins/1ef80c2?reqfrom=share*



## U.S. Fish & Wildlife Service Mountain-Prairie Region

# National Wildflower Week; Nesting Birds; Baby Bison and Wild Moms

USFWS Mountain-Prairie Region sent this bulletin at 05/11/2018 11:55 AM MDT



May 11, 2018

What's Wild



Monarch butterfly and bumblebee on swamp milkweed by Jim Hudgins/USFWS

### Help Native Plants and Wildlife by Celebrating National Wildflower Week

<u>National Wildflower Week</u> is celebrated each year during early May. Native plants, including wildflowers, are vital to maintaining healthy habitats. Their natural beauty is matched by their

important role stabilizing soil (and preventing erosion), cycling water and nutrients throughout the environment, and providing food for wildlife.

Wildflowers wash across the American landscape each spring, splashing their <u>brilliant colors and</u> <u>sublime spendor</u> at national wildlife refuges across the United States. Pinks, purples, reds, yellows, oranges, and whites are just a few of the vibrant hues you can see.

Meanwhile, hummingbirds, bats, bees, butterflies, moths, and an astonishing diversity of other wildlife actively <u>pollinate</u> North American wildflowers as they blossom and bloom. The United States has <u>4,000 native bee species</u> alone!

<u>Milkweed</u> (not a weed at all!) is one native plant particularly important for <u>monarch butterflies</u>. It's the only plant where these iconic orange-and-black insects will lay their eggs. Discover how you can create a <u>native plant garden</u> in seven easy steps and explore additional <u>tips for attracting</u> <u>monarchs</u> to your local community.

#### **Look Out for Nesting Birds**



Piping plover by Steven Tucker/USFWS

#### Many Different Types of Bird Nests Pop Up Each Spring Across the United States

Spring is nesting season, but not all nests are the same. Bird nests can be as diverse as the different birds that create them, varying in shape, size, color, building materials, and location. <u>Bald eagles</u> have some of the largest nests of all, weighing up to half a ton. Bald eagle nests can reach over four feet wide and three feet deep. Eagles adding to their nest each year may eventually create one 10 feet across! They like nesting in tall trees near coastlines, estuaries, large lakes, rivers, or reservoirs with an ample supply of fish and other prey to feed their eaglets. <u>Golden eagles</u> prefer nesting on cliffs or tall trees with unobscured views of their surroundings. They can be seen soaring over <u>sagebrush habitat</u> scouring for mammals or other birds to feast on.

Hummingbirds are the tiniest of all nesting birds. Their eggs can be as small as jelly beans. Hummingbirds build their nests using lichens and spiderwebs.

While many birds nest in trees, some nest on the ground - in grasslands, wetlands, or along <u>shorelines</u>. <u>Piping plovers</u> and killdeer are two examples. These small, skittish birds create an inconspicuous nest called a "scrape" by literally scraping a depression in the ground and laying their eggs there. Adults of both species will feign a broken wing to lure predators away from their nests, only to fly away to safety at the last minute.

<u>Learn more</u> about nesting birds across the United States and how to spot them. Explore <u>birding</u> <u>tips</u> for your next visit on public lands (or right outside your home). Discover how birding and wildlife-viewing generates <u>nearly \$80 billion</u> in the U.S. economy.

### Did You Know? Baby Bison and

## Magnificent Moms

March through May is peak calving season for bison. Calves are born sporting an unmistakable red-orange fur coat, earning them the nickname "red dogs." It takes several months before young bison begin brandishing their characteristic dark brown coloration, horns, and shoulder hump. In the meanwhile, calves remain under the close protection of their watchful mothers. This Mother's Day, learn about other <u>hard-working wildlife moms</u> across the United States and discover <u>14 more</u> <u>fascinating facts</u> about America's National Mammal.



Photo: A bison and calf at Rocky Mountain Arsenal National Wildlife Refuge near Denver, Colorado by Rich Keen/DPRA



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