Upper Columbia Basin Network
Inventory and Monitoring

National Park Service
U.S. Department of Interior
Pacific West Region

Basin Bulletin

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"John Day Fossil Beds" by Miguel Vieira from Walnut Creek, CA, USA

Cover story: Studying the sagebrush-fungi community

Matthew Hovland, UCBN biotechnician, shares details of his upcoming graduate research to be conducted at JODA.

What's new for the Pikas in Peril (PIP) project?

Emily Rankin, a Doris Duke Conservation Scholars intern from UIdaho, provides the latest update on the PIP project.

Searching for amphibians at Big Hole National Battlefield

Eric Starkey, UCBN Aquatic Biologist, joined USGS and Greater Yellowstone Network staff to survey for amphibians

UPPER COLUMBIA BASIN NETWORK
UCBN

Plus:

- Check out our field schedule for this summer, pg. 4
- Meet the new vegetation ecologist at Craters of the Moon National Monument and Preserve, pg. 8
- Learn more about the Columbia spotted frog, pg. 8

National Park Service
U.S. Department of Interior

The National Park Service has implemented natural resource inventory and monitoring on a servicewide basis to ensure all park units possess the resource information needed for effective, science-based managerial decision-making, and resource protection.

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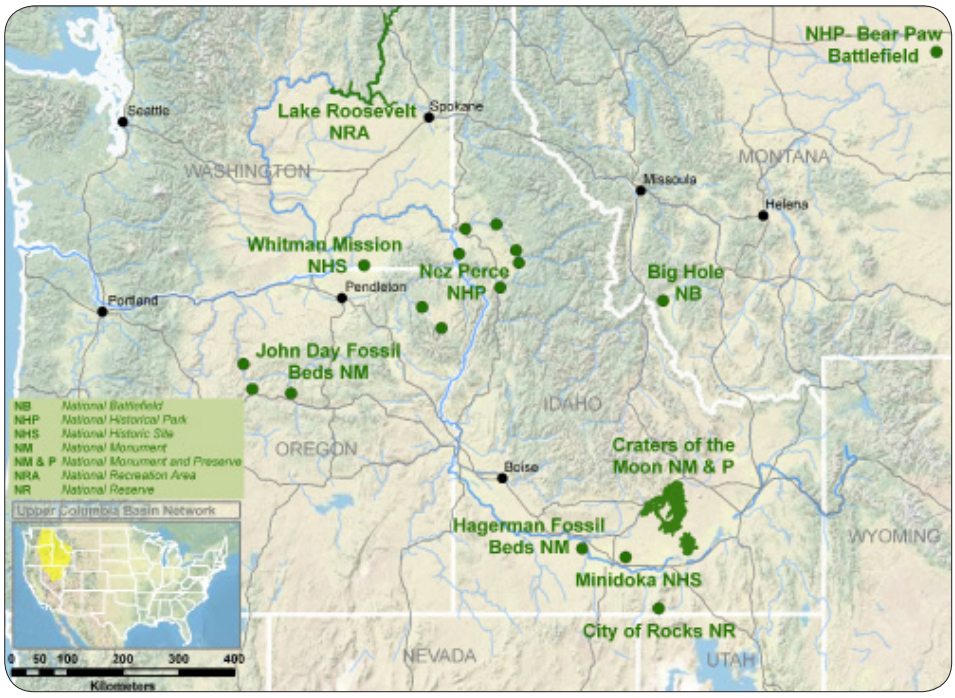


PARKS IN THE NETWORK

Big Hole National Battlefield (BIHO)

City of Rocks National Reserve (CIRO)

Craters of the Moon National Monument and Preserve (CRMO)

Hagerman Fossil Beds National Monument (HAFO)

Minidoka National Historic Site (MIIN)

John Day Fossil Beds National Monument (JODA)

Lake Roosevelt National Recreation Area (LARO)

Nez Perce National Historical Park (NEPE)

Whitman Mission National Historic Site (WHMI)

http://science.nature.nps.gov/im/units/ucbn/
Taking the pulse of the National Parks

The Program's Manager Corner
Gordon Dicus

Happy Summer to everyone! One theme this year is change. Change in the typical annual weather patterns as we've seen a warm, low-snow winter transition into a hot, dry summer of extreme fire hazard. And change in staff faces at the Upper Columbia Basin Network (UCBN) parks as several folks who had been around for many years departed for other positions or retirement. We wish them all well in their new pursuits, and we look forward to collaborating with new staff, such as Jim Bromberg who is featured on page 8 of this newsletter. The UCBN Inventory and Monitoring (I&M) Network recently filled a new position, as well – a second NPS Biological Technician position. Dan Esposito will officially join the UCBN I&M team later this month. He's not really a new face, though, having previously worked for UCBN I&M both in the student employee program and through a cooperative agreement while pursuing his Master's degree from Oregon State University. Dan will continue to work alongside Devin Stucki and Matt Hovland as our intrepid traveling field crew. Matt is preparing to enter a Master's degree program himself, as you'll learn from the article on page 5. Another new but familiar face is Lisa Garrett, who has returned to the Pacific West Region as our Regional I&M Program Manager. And lastly, a totally new face – Emily Rankin came to the UCBN I&M Network through the Doris Duke Conservation Scholars Program as a summer intern from the University of Idaho. Emily is assisting us with science communication, focusing on the results of the Pikas in Peril project (see page 6).

One thing that hasn't changed is our busy summer work schedule. The UCBN I&M team has completed camas lily monitoring at NEPE and BIHO, sagebrush steppe monitoring at JODA and CIRO, and lemhi penstemon monitoring at BIHO. Limber pine monitoring at CRMO will occur next month. Eric Starkey completed water quality monitoring at CIRO, and will continue that work at BIHO through summer and fall. Our invaluable park partners completed bat and sage-grouse monitoring at CRMO, assisted with camas and lemhi penstemon monitoring at NEPE/BIHO, are supporting aspen monitoring at CRMO this month, and continue to enable all of our I&M projects. And our US Forest Service partners are conducting stream channel and riparian vegetation monitoring at BIHO and CIRO. We are grateful for the capable assistance from all our partners.

We are planning a UCBN Science Meeting at City of Rocks National Reserve in early October, and are very excited by the prospect of getting as many of the park staff together as possible to discuss our latest monitoring results, future plans, and integration of I&M data with park management.

Have a wonderful summer, including an occasional rain dance.

Join us at our Science Meeting in October at CIRO

UCBN inventory and Monitoring Program Schedule

2015

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
MONITORING									
Aspen						CRMO			
Bats	CRMO	CRMO							
Camas lily				NEPE	BIHO				
Lemhi penstemon and invasive weeds						BIHO			
Limber pine							CRMO		
Riparian Vegetation					BIHO CIRO	BIHO	BIHO		
Stream Channel Characteristics					BIHO CIRO	BIHO	BIHO		
Sagebrush-steppe vegetation					CIRO JODA				
Sage-grouse		CRMO	CRMO						
Water quality					BIHO CIRO	BIHO	BIHO	BIHO	BIHO
INVENTORIES									
Vegetation mapping	All UCBN parks. Final maps and reports completed.								

Monitoring activities for which field operations are conducted by park staff.

Monitoring activities for which field operations are conducted by UCBN staff, or by UCBN staff in cooperation with park staff.

Monitoring activities for which field operations are conducted by NPS partners.

Mycorrhizal fungi in sagebrush-steppe habitat

Matthew Hovland - Biological Technician Upper Columbia Basin Network

Last summer I was proudly involved in the Upper Columbia Basin Network's fifth year of pika monitoring at Craters of the Moon and Lava Beds National Monuments, and Crater Lake National Park, and was recently given the opportunity to co-author a paper analyzing temperature sensor data collected from crevices within potential pika habitat. If all goes as planned, it will be my first publication, and the realization of years of intentions. I have been authoring novels since 2007, though never thought writing scientific papers and technical reports for the National Park Service would be just as fulfilling.

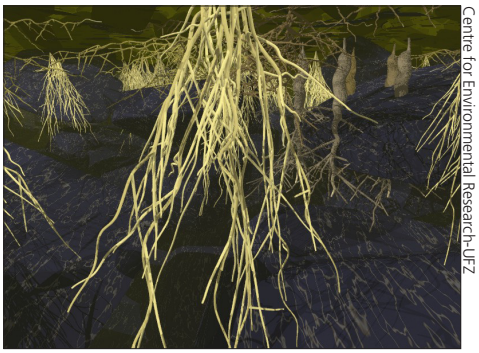
In the fall I will be leaving the pika work behind and returning to Oregon State University as a graduate student to study the effects of medusahead *(Taeniatherum medusae-caput)* invasion on the soil fungi community associated with native bunchgrasses.

Medusahead *(Taeniatherum medusae-caput)*

I will most likely focus my work within the Clarno Unit of John Day Fossil Beds National Monument (JODA); although, other similar sites have been proposed. This project has the potential to answer questions about medusahead invasability, bunchgrass resilience, and the viability of ground-up restoration techniques building off of healthy soil fungi communities.

Intact bunchgrass stands being invaded by encroaching medusahead at the Clarno Unit of JODA

When most of us think of fungi, we may conjure images of dark forests, moist areas laden with moss from which golden chanterelle mushrooms appear. The similar ecological value that fungi provides in forested ecosystems is found in sagebrush-steppe rangelands. There may not be rangeland chanterelles, but like the chanterelles in forests whose underground networks of mycelium connect the root systems of trees, rangeland soils are full of arbuscular mycorrhizal fungi, which attach themselves to the roots of sagebrush, bunchgrasses, and forbs, in essence extending the root systems and allowing for enhanced water and nutrient uptake.



Centre for Environmental Research-UFZ

Model of a below-ground habitat of arbuscular mycorrhizal fungi showing how it can spread and connect with root systems

Multiple studies have highlighted the effects of exotic plant invasion on soil microbial communities. The soil fungi community in particular is often altered (e.g., shifts in the species present, decreases in abundance or diversity) since they have evolved symbiotic relationships with the above ground plant species. Invasive plant species, which alter soil microbial communities, may leave long lasting legacies that benefit exotics and make it difficult for native plants to reestablish. A decrease in the abundance of soil fungi may also decrease soil aggregation, leading to more easily eroded soils.

Soil is a living breathing part of our ecosystems; the chemical, biotic, and physical components of which determine the potential for life to exist aboveground. With careful attention to the complex belowground interactions we may be able to better understand, and conserve the integrity of our treasured plant communities.

Update on the Pikas in Peril Project

Emily Rankin - University of Idaho Student Intern

The American pika *(Ochotona princeps)* is considered an indicator species for climate change effects on ecosystems. Pikas are native to western North America, occurring in talus slope and lava flow habitats characterized by sparse vegetation and an ample supply of deep crevices for protection from predators and excessive heat. Adapted to cold subalpine environments, pikas can suffer fatal heat stress in temperatures at or above 80 degrees Fahrenheit, making them sensitive to climate change. In consideration of this sensitivity, site-specific details on pika population trends, genetic diversity patterns, and habitat changes will inform management objectives. Collaborative efforts to monitor pika populations provide critical information, facilitating both site-specific planning and comparisons among different areas of the American pika's range.

NPS Photo/Doug Owen

Pika gathering wildflowers at CRMO

Monitoring of pika occupancy within suitable habitat at Craters of the Moon National Monument and Preserve began in 2007 by the Upper Columbia Basin Network, and was expanded in 2009 through collaboration with the Klamath Network to include Lava Beds National Monument, and Crater Lake and Lassen Volcanic National Parks. Then in 2010, the UCBN initiated the "Pikas in Peril" project, which added four parks in the Rocky Mountains.

Biological technician searching for pika at Lassen Volcanic National Park

The Pikas in Peril project was designed to correlate climate data with pika occupancy and genetic information, and to assess the vulnerability of pika populations to changes in temperature and precipitation patterns. This research has engaged several organizations and universities, citizen scientists and volunteers, and has involved collection of data on pika occupancy within suitable habitat and taking fresh pika scat samples for genetic analysis.

The results are in, and the answer to the question "Will pika be adversely affected by climate change in the Northwest and the Rocky Mountains?" is, "It depends..." The vulnerability assessments have developed several scenarios, drawing on the climatic conditions of each park. It's impossible to give one overarching statement or recommendation concerning pika in the West. Instead, site-specific climate data and landscape characteristics must be considered in conjunction with local knowledge of pika habits to predict future population patterns and create management recommendations. Results from some NPS sites show expected declines in pika populations due to increased summer temperatures. The results for other NPS sites, however, are more complex.

Pika scat collected for genetic analyses

Several manuscripts detailing different aspects of the Pikas in Peril project are in progress, and The Upper Columbia Basin Network is partnering with the researchers and park managers this summer to condense the results into park-specific resource briefs, summarizing potential threats to pika populations from climate change effects, and possible management and mitigation strategies. It has been a hugely collaborative effort, and we are very grateful to everyone involved!

Amphibian survey at Big Hole National Battlefield

Eric Starkey - UCBN Aquatic Biologist

Amphibian populations both globally and nationally have been in steep decline. Nationally, 32% of species are declining and regional assessments point to similar trends. Declining trends in occupancy are occurring on federally managed lands, with the greatest observed rate of decline on National Park Service lands. The primary causes of amphibian decline on public lands are thought to be largely related to disease (fungal pathogen) and climate change (change in precipitation) (Adams et al. 2013).

Despite these disturbing trends, the Columbia spotted frog *(Rana luteiventris)* is frequently observed along the picturesque North Fork Big Hole River. The other two species potentially encountered at Big Hole National Battlefield (BIHO) are the Western toad *(Anaxyrus boreas)* and the long-toed salamander *(Ambystoma macrodactylum)*.

Even with frequent incidental amphibian observations, the Upper Columbia Basin Network (UCBN) and BIHO would like to know if populations are experiencing declines similar to those found elsewhere. As a result, the UCBN has partnered with the Greater Yellowstone Network (GRYN) and the United States Geological Survey (USGS) to develop an amphibian monitoring approach at BIHO. The GRYN and USGS already conduct extensive amphibian and wetland monitoring in the area, and this opportunity for collaboration will potentially allow data from BIHO to be included in regional analysis.

USGS staff searching for survey sites at BIHO

A two-day visit in June focused on defining several sample sites and preliminary assessment of methods to count both adults and juveniles. Day one was filled with "bush-whacking" through willows to find relatively hydrologically isolated breeding sites teeming with tadpoles and adult frogs. In total we found 7 potential survey locations, most of which consisted of a wetland with emergent vegetation, water 0.5-1 m deep, and few if any fish present.

Columbia spotted frog tadpole

Day two consisted of checking 24 minnow traps that were set in two sites near the base of the Siege Area and deploying both temperature and water level loggers at 5 sites. Results of trapping for 24-hours yielded over 500 Columbia spotted frog tadpoles, burbot *(Lota lota)*, white suckers *(Catostomus commersoni)* and a common garter snake *(Thamnophis sirtalis)*.

Minnow trap used in the amphibian survey

Future efforts will focus on egg mass surveys, and assessment of all sites with visual surveys for adults and trapping for juveniles. Methods used should yield repeatable fine scale abundance data that will establish a baseline for future comparison and show how BIHO fits into the increasingly important realm of amphibian conservation.

The UCBN would like to thank Andrew Ray (GRYN), Blake Hossack (USGS) and Adam Sepulveda (USGS) for their assistance with this project. In addition we thank the I&M Division and PWR for RFP funding to enhance network collaboration.

Literature cited: Adams, M. J., D. A. W. Miller, E. Muths, P. S. Corn, E. H. Campbell Grant, L. L. Bailey, G. M. Fellers, R. N. Fisher, W. J. Sadinski, H. Waddle, and S. C. Walls. 2013. Trends in amphibian occupancy in the United States. PLoS ONE 8(5):e64347.

New faces in our network

Jim Bromberg

Vegetation Ecologist at Craters of the Moon National Monument and Preserve

We welcome Jim Bromberg to the Upper Columbia Basin Network! Jim is the new vegetation ecologist at Craters of the Moon National Monument and Preserve.

His career with National Parks started with volunteer work at Golden Gate National Recreation Area and a summer internship with Yellowstone National Park. He continued at Point Reyes National Seashore where he spent four years working on various coastal restoration, vegetation monitoring, and invasive plant management projects.

After receiving his master's degree in ecology from Colorado State University, he spent another 4 years at Rocky Mountain National Park managing similar types of projects in more mountainous terrain. Now, Jim is in a completely different environment and habitat type, and is thrilled to learn about the northern desert and the ecological interactions and management practices across this unusual landscape.

In his spare time, Jim likes hiking and exploring the mountains of Idaho and enjoying the displays of wildflowers. Jim is looking forward to meeting and working with several of you in the Network.

Featured Creature
Columbia Spotted Frog *(Rana luteiventris)*

Columbia spotted frogs *(Rana Luteiventris)* are found from southeast Alaska and most of British Columbia to eastern Washington, Idaho, western Montana and portions of Wyoming, Nevada, and Utah. They are light to dark brown, gray or olive with dark spots. The underside of the legs are orange or yellow. They live in areas with abundant vegetation and near permanent bodies of water, such as ponds, streams and marshes.

Spotted frogs migrate along riparian corridors for spring breeding, summer foraging and winter hibernation; the latter occurring in spring-fed ponds with willows. Eggs are laid at the water surface in masses up to 500 eggs. Larvae eat algae and organic debris, and adult frogs appear to be opportunistic and generalists, eating insects, arachnids and mollusks primarily. Columbia spotted frogs can live up to twelve years.

The main threat to spotted frogs is habitat loss, particularly the destruction, fragmentation and degradation of wetlands. Other threats include disease and the introduction of non-native predators.

Species information obtained from:
http://www.fws.gov/oregonfwo/Species/Data/ColumbiaSpottedFrog/
http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=D027
http://www.fws.gov/nevada/protected_species/amphibians/species/col_spotted_frog.html
http://amphibiaweb.org/cgi/amphib_query?where-genus=Rana&where-species=luteiventris