The GRYNdow

Winter 2018 Newsletter

National Park Service
U.S. Department of the Interior

Greater Yellowstone Network
Inventory & Monitoring Program

Soda Butte Creek/NPS

The GRYNdow is a window into GRYN science in Greater Yellowstone Ecosystem parks.

Inside this Issue

Montana State Says Delist Soda Butte Creek!

Soda Butte Creek becomes the **FIRST** Montana water body recommended for delisting from the 303(d) Impaired Waters List. Following the Montana Department of Environmental Quality (MT DEQ) cleanup of the McLaren mill and tailings site, we worked collaboratively with MT DEQ and Yellowstone NP to monitor water quality in Soda Butte Creek. In November 2017, MT DEQ determined that metal levels in Soda Butte Creek support all designated beneficial uses and the creek should be delisted.

What does this mean?

Soda Butte Creek has reached clean levels.

What happens now?

The proposed delisting of the creek will go out for public comment. If all goes as planned, the decision to delist will be published in the updated MT DEQ 2018 Integrated Report and 303(d) list.

We will continue to collaborate with MT DEQ to quarterly assess water quality conditions at Yellowstone's northeast boundary and to carry out follow-up studies related to the successful McLaren Tailings Reclamation Project.

Comparison of Soda Butte Creek downstream of the McLaren tailings impoundment in 2009 (left) and 2013 (right). Photo courtesy of Tom Henderson (MT DEQ).

NPS

Western toad tadpoles discovered during monitoring at Tern Lake at Yellowstone NP.

NPS

Cayley Faurot-Daniels is monitoring whitebark pine in Tom Miner Basin.

NPS

Uplands monitoring crew at Bighorn Canyon NRA.

NPS

Water resource monitoring using a bridge board sampler on the Snake River in Grand Teton NP.

Monitoring Updates

Wetlands and Amphibians: In 2017, we visited 335 individual wetland sites across 31 permanent catchments in Yellowstone and Grand Teton national parks and John D. Rockefeller, Jr. Memorial Parkway. Only 36 sites were dry or too shallow to survey.

At least one species of amphibian was present on 59% of surveyed sites. Boreal chorus frogs were the most commonly detected species (in 47% of surveyed sites). Two of the 31 catchments contained breeding evidence by all four monitored species (boreal chorus frog, Columbia spotted frog, western tiger salamander, and western toad). Compared to zero catchments in 2016, two in 2015, and four in 2014, this reflects the year-to-year breeding variability even in protected areas like parks.

Climate: Weather in 2017 was wetter and warmer than most years since 1987. Record annual precipitation was recorded at Mammoth, Old Faithful, and Moose, while Lovell was in the 77th percentile for this time period. Mean annual temperatures for these stations were well above average too (66th to 90th percentiles).

The wet and warm conditions resulted in above average soil moisture with Lovell recording its highest average annual soil moisture since 1987. Consequently, water deficits, or drought stress, were near average at these stations except Lovell which recorded its second lowest water deficit since 1987. Currently (as of 2/12/18) snow water equivalent in the snowpack is well above average in and near Yellowstone NP (106-195%), but diminishes south into the Tetons and Wind River Range (69-120%).

Whitebark Pine: In 2017, we visited 47 transects in Panel 2 stands and one Bureau of Land Management (BLM) transect from Panel 1 that was not surveyed in 2016 due to a fire closure. We also initiated a pilot study investigating the effects of climatic and other variables, such as aspect and slope, on growth patterns in whitebark pine near established monitoring plots. As part of this study, an intern collected, processed, and assisted with aging and cross dating tree cores from select whitebark pines.

In our 15th year (2018), we will survey 46 transects in Panel 3 stands between June and September, including two BLM transects. Our collabortions with resource managers in the NPS and multiple agencies continues to flourish. This cohesive team effort builds a strong foundation for science-informed management of whitebark pine into the future.

Upland Vegetation: In 2018, we will continue upland vegetation monitoring in juniper woodland, juniper-mountain mahogany, and sagebrush-steppe and grassland communities. A focus on mountain mahogany will be included to evaluate its apparent decrease. This monitoring will provide management-relevant information for a species that is an important food for bighorn sheep. In collaboration with the park and a university researcher, we will investigate the feasibility of tracking mountain mahogany change in conjunction with annual upland vegetation monitoring. We will continue to support sage-steppe vegetation monitoring in Grand Teton and Yellowstone national parks.

Water Resources: The 2018 water resources monitoring season will begin in March at Bighorn Canyon NRA. We will visit the park quarterly to collect data at Bighorn and Shoshone rivers and park springs. The discharge protocol approved in 2017 will be incorporated into our sampling efforts. In April, monthly water quality monitoring at Yellowstone and Grand Teton national parks will resume. Lab and field monitoring data have been entered for 2017 and analysis and reporting are underway.

Mentoring Emerging Scientists: We continue to have great success with interns who assist with all of our monitoring efforts. The Mosaics interns presented the study results that integrated whitebark pine and amphibian data with climatic and other variables to understand potential change at the Mosaics in Science conference in Denver, Colorado. In 2018, we will again host Montana State University student interns and co-host a Mosaics in Science intern.

Rocky Mountain Snowpack Monitoring

Warmer temperatures and precipitation shifts over the last several decades have already altered the size and dynamics of mountain snowpacks, which in turn alter river flows and wetland and lake levels. Our network along with other parks, networks, and agencies are working collaboratively with the U.S. Geological Survey (USGS) to document long-term changes in snowpack chemistry. USGS began this effort across multiple national parks and forests in 1993. Fourteen sites are within the Greater Yellowstone Ecosystem, including two sites in Grand Teton NP and three sites in Yellowstone NP.

What Can Snowpacks Tell Us?

In a process called atmospheric deposition (transfer of gases and particulates from the atmosphere to earth's surface), snowpacks collect pollutants throughout the snowfall season. As a result, samples of the snowpack collected around peak snow accumulation reflect the chemistry of most of the annual precipitation and dry deposition that occurs in mountainous areas. Results help support investigations into the effects of deposited pollutants on local and regional ecological systems.

Want to Learn More?

Go to https://co.water.usgs.gov/projects/RM_snowpack to find an interactive map of the study, resulting snowpack chemistry publications, and photos and data from this project.

A field worker skis into Garnet Canyon site in Grand Teton National Park to collect snow samples. Photo courtesy of USGS/Graham Sexstone.

The Survey123 Solution

In a data management breakthrough, we tested the data collection app Survey123 for ArcGIS in June 2017 and it instantly became the exclusive data entry solution for all upland vegetation monitoring surveys in Bighorn Canyon NRA.

Survey123 allows us to rapidly develop, test, and adjust data forms and is easy to use in the field. It has data entry quality controls, time-of-survey data reviews, and automatic data assembly, as well as the ability to use online tools for immediate review of submitted data. As if all of that were not enough, it also runs on Windows, iOS, and Android devices!

NPS

With this instant success, we helped develop a Survey123 solution for use in the 2017 sage steppe vegetation monitoring at Grand Teton NP and we will be using Survey123 in our upcoming 2018 amphibian monitoring.

Mosaics interns using Survey123 at Bighorn Canyon NRA.

Climate-Smart Training

GRYN staff, with managers from Yellowstone National Park, received funding from the Greater Yellowstone Coordinating Committee to host **"Climate-Smart Conservation: Putting Adaptation Principles into Practice."** This National Conservation Training Center course will be held in June 2018 to help demystify climate adaptation for application to on-the-ground conservation.

The course will provide guidance on carrying out adaptation with intentionality, how to manage for change and not just persistence, how to craft climate-informed conservation goals, and how to integrate adaptation into on-going work. Conservation practitioners and natural resource managers will learn to become savvy consumers of climate information, tools, and models.

The target audience for this training includes conservation practitioners and natural resource managers working at multiple scales to ensure the ongoing effectiveness of their work in an era of climate change. Click below to find more information.

Toolkit at climate.gov with links to the course:

https://toolkit.climate.gov/tool/climate-smart-conservation-putting-adaptation-principles-practice

Climate-Smart Guide:

https://www.nwf.org/climatesmartguide

NPS

Whitebark Pine Collaborations

We provided our Greater Yellowstone Network 2004 to 2016 whitebark pine monitoring data and associated publications to the U.S. Fish & Wildlife Service (USFWS) in response to their request for information to assist with the review of whitebark pine as a candidate species under the Endangered Species Act. USFWS is scheduled to complete a Species Status Assessment by spring of 2019. We will keep you posted as we learn more.

In November, we participated in the National Whitebark Pine Restoration Summit, a collaborative effort among multiple federal agencies, tribes, and other interest groups to develop a landscape approach to whitebark pine restoration. With whitebark pine health deteriorating across its range, this collaborative approach will help focus resources by identifying priority areas for whitebark pine restoration.

Andy Ray points out the three cones on this small whitebark pine at Terrace Point in Yellowstone NP.

Fall 2018 Issue of *Yellowstone Science*

Vital signs monitoring is a critical part of managing the intact ecosystems of national parks. Just as it is important for people to have their vital signs monitored by a doctor regularly, we monitor vital signs in parks to track ecosystem health.

The Greater Yellowstone Network partnered with park staff, the USGS, university scientists, and others to discuss how vital signs are being used to understand and assess park health in an upcoming *Yellowstone Science* issue. They also explore how vital signs trends are likely to shape the future of Yellowstone NP.

Watch for this special issue of Yellowstone Science in the fall of 2018 (https://www.nps.gov/yell/learn/yellowstone-science.htm).

Recent Publications

Girdner, S. F., A. M. Ray, M. W. Buktenica, D. K. Hering, J. A. Mack, and J. W. Umek. 2017. Replacement of a unique population of newts (*Taricha granulosa mazamae*) by introduced signal crayfish (*Pacifastacus leniusculus*) in Crater Lake, Oregon. Biological Invasions. DOI: 10.1007/s10530-017-1570-6.

Greater Yellowstone Whitebark Pine Monitoring Working Group. 2017. Monitoring whitebark pine in the Greater Yellowstone Ecosystem: 2016 annual report. Natural Resource Report. NPS/GRYN/NRR—2017/1453. National Park Service. Fort Collins, Colorado.

Sepulveda, A. J., and A. M. Ray. 2017. Guest editorial: Aquatic science in the Northwest. Northwest Science 91:230-233.

Shanahan, E., K. Legg, and R. Daley. 2017. Status of whitebark pine in the Greater Yellowstone Ecosystem: A step-trend analysis with comparisons from 2004 to 2015. Natural Resource Report. NPS/GRYN/NRR—2017/1445. National Park Service, Fort Collins, Colorado.

Wright, W. J., and K. M. Irvine. 2017. Assessment of imperfect detection of blister rust in whitebark pine within the Greater Yellowstone Ecosystem. Natural Resource Report. NPS/GRYN/NRR—2017/1457. National Park Service. Fort Collins, Colorado.

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