

**NRCS, NPS, BLM, Colorado State University and University of Wyoming Team Up to offer a Soil Survey Field Practicum in Dinosaur National Monument**

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Dinosaur National Monument (DNM), located in the rugged NW corner of Colorado, recently attracted a diverse group of Colorado State University (CSU) and University of Wyoming (UWYO) faculty, undergraduate and graduate students, and professional scientists from the Natural Resource Conservation Services (NRCS), Bureau of Land Management (BLM) and the National Park Service (NPS). The five-day field experience, held September 6-10, 2018, was part of a Soil Survey Field Practicum course with the objective of providing students with on-the-ground training from field experts in the areas of pedology, range ecology, and archaeology. This diverse and collaborative working group provided a unique experiential learning opportunity, encouraging students to engage in soil science from the holistic lens required to make effective land management decisions.

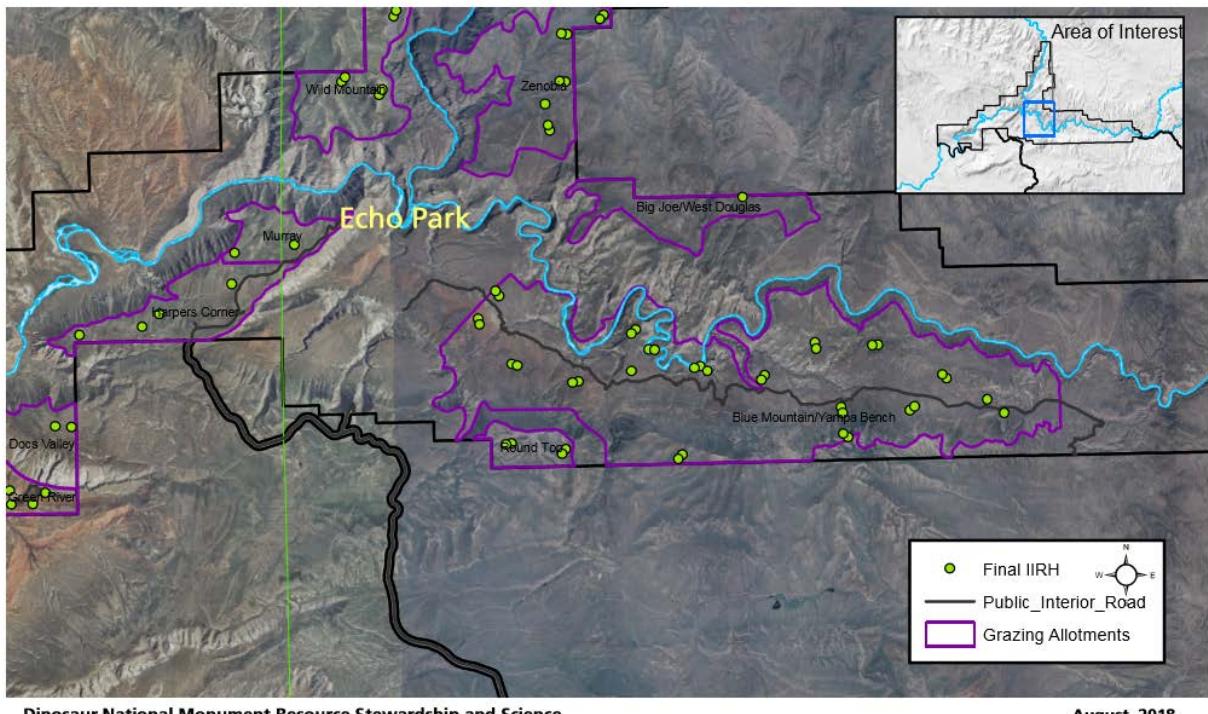
The goal of the conducted soil survey work is to assist the NPS in the development of Ecological Site Descriptions (ESDs) and ultimately a grazing monitoring program for three allotments within DNM. The allotment in focus of this trip was on the Yampa Bench. To this end, students learned what criteria are necessary to determine field sites and how to navigate to pre-selected sites using Geographic Positioning Systems (GPS). Sites were located off Yampa Bench Road, requiring a 30 to 60 minute vehicle commute and furthermore, a 30 to 60 minute cross-country hike. Access to two sites required multiple crossings of the Yampa River over shallow rock bars. Additionally, student groups were escorted by an archaeologist to ensure selected sites did not coincide with those of archaeological interest, thus students learned how to recognize cultural resources prevalent in DNM. Finally, small groups of three students practiced their craft and received technical guidance and training from Pedologists/Soil Scientists to excavate soil pits, accurately characterize and document soil properties, classify the soils, and collect samples for laboratory analyses.

The NPS hosted the Field Practicum at the primitive base camp in Echo Park Campground, which lies at the confluence of the Green and Yampa Rivers in the heart of DNM. Here, all faculty, students, and scientists rejoined each day to review highlights of each of the five groups and subsequently submit completed pedon descriptions and collected samples. All participants experienced camp etiquette and the additional enrichments provided by the NPS staff including an interpretive geology lecture, a petroglyph walk, and a flintknapping workshop.

Objectives by all parties and participants were reached within the 5-day Soil Survey Field Practicum. CSU and UWYO faculty provided students the opportunity to gain the technical experience to work in interdisciplinary teams to address relevant and current land management decisions using systems thinking. The NPS and BLM have 27 new sites with completed soil pedon descriptions and archaeological clearances for inclusion into their ESDs, and the NRCS accomplished its mission to provide technical assistance to farmers, ranchers, and landowners to aid them in conservation of resources. In addition, by providing hands-on soil survey field guidance in this diverse group setting, NRCS was able to extend outreach, raise awareness, and educate others about soils, soil survey and NRCS and the programs and services it offers. And as a bonus, NRCS has a new pool of potential recruits.



## 2018 Soil Course Characterization Points



Dinosaur National Monument Resource Stewardship and Science

August 2018

The 2018 Soil Survey Field Practicum focused on collecting data for the grazing allotment located on the Yampa Bench to develop Ecological Site Descriptions for the installation of a grazing monitoring plan.  
Image courtesy of NPS.



A group photo of CSU and UWYO students and faculty, and scientists from the NPS, BLM and NRCS participated in the 2018 Soil Survey Field Practicum in Dinosaur National Monument. Photo by Suellen Melzer.



Looking east, this is a photo of the Yampa Bench (at left) intersecting with the faulted Blue Mountain Plateau (ridge to the right). The Yampa river is just to the left of the Yampa Bench and out of the photo. Blue Mountain Plateau is a half-faulted anticline that ends up horizontal at the surface and is a remnant of the floor of the flat valley that existed before the Colorado River changed its course. Photo by Kari Sever.



UWYO and CSU students work together to sieve and estimate coarse fragments while another student records data on a pedon description sheet. Photo by Kari Sever.



Photo – left: Will Bowers, Ph.D. student in hydrology at UWYO, uses a hand lens to view a soil ped.  
Photo – right: Than Damn, Ph.D. student in soil chemistry at UWYO, prepares to work up a texture sample. Photos by Kari Sever.



Students from two groups work together to complete a soil pit description, while NPS Archaeologist, Tanacy Bruhns, observes. Photo by Kari Sever.



NRCS soil scientist, Kari Sever, scribes and prepares a soil texture sample, while Than Dam and Will Bowers focus on other data collection activities at a soil pit. Photo by CSU student, Bo Collins.



Photo of a Fine-loamy, mixed, superactive, mesic Aridic Haplustepts. Students were challenged with classifying soils using Keys to Soil Taxonomy and using an MLRA LRU key to identify the correct ecological site. This exercise emphasized the value of recording pertinent detailed information while at the excavation site. NRCS Ecological Site Specialist, Dean Stacy in Price, UT, assisted in pin-pointing the correct LRU within MLRA 47 and the need for establishing LRU 47E, called "Dinosaur Highlands". Photo by Suellen Melzer.



A sampling team fording the Yampa River on a shallow gravel bar to access remote areas of a grazing allotment in DNM. Photo L-R: Bo Collins from CSU, (left) looks down river and Anna Robinson from UWYO, (right) looks up at the views of amazing geological history recorded in the Weber Sandstone (~300 million years old), while CSU Pedology Professor, Dr. Suellen Melzer and CSU student, Haiylee Meiners, pose for a photo. Photo by Suellen Melzer.



Many artifacts were observed during the site screening prior to site excavation. If artifacts were encountered, the sites were recorded and the soil pits were relocated by the archaeologist to avoid any disturbance. Everyone enjoyed the search for artifacts while en route to or prior to excavating the sites. Photo – left: NRCS MLRA Soil Survey Leader, Andy Steinert (R-5, Fort Morgan), proudly displays the first artifact hand tool he found on the first day of the Field Practicum. Photo by Karen Vaughan.

Photo – right: NRCS Soil Scientist, Kari Sever (R-4, Fort Collins) holds a quartzite flake and a tiger chert projectile point found near a proposed excavation pit. Photo by Kari Sever.



NPS Ecologist, Emily Spencer, works as scribe for this team of new soil scientists, Paul Gadecki from CSU, Ryan Schroeder from CSU and Anna Robinson from UWYO. Photo by Karen Vaughan.



Bouzeriba Alsunuse from UWYO, determines soil color of a sample collected along the Yampa Bench.  
Photo by Karen Vaughan.



A stop at the Harding Hole Overlook afforded breathtaking views of the Yampa River and the geological beauty held within DNM. The thick golden tan layers are the Weber Sandstone formation which is made of solidified dunes from a sahara-style sand desert that blanketed the area about 300 million years ago. Crossbedding in the ancient dunes can be seen at almost any location near the bluffs of the Yampa Bench. The Yampa River below reflects historically low water levels, affecting water use permits throughout the region for the remainder of 2018. Photo by Andy Steinert.

A few comments from students who attended the Field Practicum:

"The trip to Dinosaur National Monument is definitely one of the most memorable and formative experiences I have had as a CSU student. I learned a ton about field methods for describing soil and I also became much more familiar with how to use the Keys to Soil Taxonomy to classify soils based on their morphology. It was so nice to be able to work through the whole pedon description sheet with experienced NRCS soil scientists and get a sense of their workflow and thought processes."

*Dylan C. - Senior, Colorado State University*

"This field experience with the NRCS gave me an invaluable opportunity to gain knowledge and insight from experts in the field."

*Travis B. – Masters Degree Candidate, Colorado State University*

"I really enjoyed my time in Dinosaur National Monument during this field soils course - I made new friends, professional connections, and a desire to return to the Monument to recreate on my own time, in addition to honing my soil description skills. This course was an amazing opportunity to work with a lot of people with a range of different backgrounds for a common purpose: to fill data gaps to ensure our public lands are being managed with sound scientific knowledge. It's not often that you can get a bunch of college folks, NRCS, BLM, and NPS folks working together and sharing experiences in one place. This adventure allowed a great sharing of knowledge and experience and is something that I would do again in a heartbeat!"

*Ryan S. – Masters Degree Candidate, Colorado State University*