

MSI staff Anthony Culpepper, Katie Holgate, & Hunter Gleason work with AJ Construction to install ditch dams at Chattanooga Fen as part of Chattanooga Fen Restoration Project Phase II, funded by Durango Mountain Resort & National Forest Foundation.



# Summer in the San Juans

## Highlights of Mountain Studies Institute's Programs

If the San Juan Mountains call to your heart to get out, to explore, to ask questions, and to seek a new understanding of what it means to be a part of the San Juan landscape, then you understand what drives

Mountain Studies Institute's (MSI) staff to research mountain systems, innovate techniques for restoring our valuable ecosystems, monitor vital resources of water and air, and test new practices for putting science into action. It's because the mountains have called. The projects listed on the following pages highlight several examples of MSI's pursuits to enhance the understanding and sustainable use of the mountains that surround us. *Please read on to learn more about what we do and how you can get involved.*

## 2013 update

**Chattanooga Fen Restoration completes another 265 feet in Phase II.** MSI partnered with San Juan National Forest (SJNF), Durango Mountain Resort (DMR), and Michigan Technological University (MTU) to restore part of Chattanooga Fen, a rare 10,000-year old wetland that is known as an iron fen. Fens have been thought to be rare in the continental Western U.S. because of the hot and dry climate. However, it has recently become apparent that fens are numerous in the higher elevations of the Rocky Mountains and they support endemic and unique communities. Fens require perennially saturated soils produced by nearly constant ground water inflow to accumulate peat. Even small water diversions or depletions can reverse the process of peat accumulation that has been ongoing in many fens for more than 10,000 years and lead to fen destruction. However, there are some very rare and unique "iron fens" in the Southern Rocky Mountains that are very acidic (pH = 3.0 - 4.5) from the weathering of iron pyrite, which naturally creates acidic groundwater—Chattanooga Fen is one of these special iron fens. Iron fens have very unique plant communities that are usually dominated by Sphagnum mosses, relics of ecosystems following the last ice age. The overall goal of the whole project is address 1378 feet of ditches that intercept and reroute essential groundwater flow. The project ultimately will reconnect the hydrologic regime to ~5 acres of wetland, and saturate peat resources sufficient to support Sphagnum mosses and unique plant life adapted to iron fen environments. Volunteers, college students, youth from three school districts, and many community organizations, have contributed approximately 600 volunteer hours to the project. Funding for this project includes Durango Mountain Resort, National Forest Foundation, San Juan National Forest, MSI, and Tres Rios BLM.



**2013 Summer Natural Resources Internship Program.** Four college interns participated in a ten-week program from June to August. Interns worked on a range of science, land management, and community projects around southwest Colorado, and included positions with the Tres Rios Field Office of the BLM, San Juan National Forest, and MSI. Highlights from 2013 summer projects include investigating changes in wetland function following restoration, monitoring water quality, characterizing riparian areas, water quality and biometric sampling of rivers and alpine lakes in the San Juans, and developing outreach tools about mountain research projects. All together, the four interns completed over 1600 service hours for mountain research. Funding was provided by Fort Lewis College Foundation, Colorado BLM Youth Program, Warner College Mini-grant Program of Colorado State University, and MSI projects.



*MSI 2013 field crew install berms in a wetland: Hunter Gleason of Colo. State University, Adrienne Antonsen as MSI's VISTA volunteer, Rachel O'Conner of New York, Katie Clark of Fort Lewis College, and Tom Grant, MSI's Research Director (left to right).*



**Forests—to—Faucets teacher training explores the San Juan River basin near Pagosa Springs.**

In June, MSI, Water Information Program, and San Juan Mountain Association (volunteer organization of San Juan Public Lands Center) hosted 10 teachers from SW Colorado and New Mexico for a 2-day workshop for teachers and informal educators demonstrating how to use the My Water resources in the San Juan watershed. As part of the workshop, participants met with land managers and visited important sites along the San Juan watershed from the headwaters to the city municipal water system. Annual Forests-to-Faucets teacher training workshops engage educators in place-based hands-on education about our local watersheds, based around the book *My Water Comes from the San Juan Mountains*. It aims to increase the amount of watershed science taught in our local schools and to raise educator and student awareness of the issues facing our watersheds. This workshop provides participants with teaching kits and guides, and takes them to sites throughout our watersheds to show them how to conduct educational activities in the field. ***In 2014, we will bring the series to the Dolores and Mancos watersheds. It is our goal that this workshop will be an annual tradition rotating to new watersheds.***

**Testing a new USFS protocol for measuring riparian characteristics.**

MSI has partnered with the USFS Streams Systems Technology Center to evaluate the draft riparian monitoring protocol: *U.S.D.A. Forest Service National Riparian Vegetation Monitoring Core Protocol for western streams*. The purpose of the new protocol is to develop a rapid assessment tool that managers can use to understand the condition of riparian vegetation and channel morphology at the reach scale. MSI staff are field testing and applying the protocol to stream reaches on the Animas, Piedra, San Juan, Rio Grande, Mancos, and San Miguel rivers on the San Juan, Rio Grande and Gunnison National Forests. In addition to collecting riparian vegetation and geomorphic data, MSI is evaluating the effectiveness of the protocol for management of riparian resources. Evaluation of a sampling protocol can be accomplished by comparing samples between years (inter-annual), resampling within a year (replicability), and quantifying the time and staffing necessary for specific tasks.



*Tom Grant and Rica Fulton, FLC intern, record plants along a Florida River valley transect.*



**San Juan Headwaters Forest Health Partnership hosts Little Sand Wildfire Tour and Workshop.**

MSI is helping the community of Pagosa Springs to understand their forest resources, the needs for restoration, and potential public and private actions that may help. This June, the group hosted the Little Sand Wildfire Tour that visited sites that were burned during the 2012 wildfire that burned ~25,000 acres in the Piedra River drainage. Citizens learned about forest health, impacts to businesses, and techniques for forest monitoring. This summer and fall, San Juan Headwaters is launching its citizen monitoring initiative and a series of restoration projects. *Volunteer cores a tree.*



## Snap Shots of Additional 2013 Programs



**San Miguel Radionuclide Baseline Study.** MSI is partnering with the local governments of Ophir, Telluride, and San Miguel County, U.S. EPA, and University of Colorado (CU), to conduct a baseline radionuclide study in eastern San Miguel County to evaluate any potential changes over time. Rory Cowie (MSI/CU PhD candidate) and Anthony Culpepper have collected snow, surface water and groundwater samples in source areas. This study will provide data to determine what current levels of radioactive material before a new uranium mill starts operations downwind of these communities that rely on surface water for their drinking water. *Blue Lake sample.*



**Silverton Ecology Camp, August 5-8, Silverton Colorado.** Silverton School partnered with San Juan National Forest, MSI, and BLM to offer Silverton Ecology Camp. For four days, 10 Silverton youth explored valleys and mountain tops to learn about ecology and their environment. Rob Blair and Adrienne Antonsen, MSI, led a repeat photography exercise. Gretchen Fitzgerald, USFS, led kids to discover tree ecology and MK Thompson of San Juan Mountain Association waded streams with the group in search of macroinvertebrates. The kids learned about big horn sheep and bats from Eric Freels (Tres Rios BLM) and Marcie Bidwell (MSI), and helped install a microphone to monitor bat activity near Eureka. *Rob Blair shows campers how to read a compass*



**PikaNet Citizens Science Monitoring Initiative.** This project seeks to connect the public with field research through teaching them how to monitor the climate-change threatened American Pika. At 6 trainings, Adrienne Antonson, MSI VISTA, taught over 40 volunteers what species and indicators they are looking for, where to find them, how to collect data, and how to submit the data to an online database. Data that participants collect is submitted to [citsci.org](http://citsci.org) to become part of a larger effort to monitor pika in Colorado and across the Southern Rockies. *Anthony Culpepper, MSI Research Assistant, inspects a hay pile near Red Mountain Pass.*



**Animas River Corridor Revitalization Project.** A few years ago, the Animas River Corridor in Silverton was a vast, underutilized space needing cleanup and restoration. The historic town dump was moved and capped to reduce impacts to the Animas River by the BLM. MSI staff are leading restoration and trail projects to improve the area through service learning projects with the Silverton School, National Civilian Conservation Corps (NCCC) crew, and community volunteers recruited by MSI. Real progress is being made to provide Silverton with a place for gathering, environmental appreciation, and recreation. This year, MSI partnered with A Theater Group to bring the art of theater and the environment together through plays that were written by the theater youth to celebrate their community. *NCCC crew members prepare 500 feet of new trail.*



**Silverton Student Scientists.** Silverton Student Scientists is a middle school program that MSI and Silverton School collaborate on to provide students' instruction and guidance in conducting scientific experiments. MSI has developed a curriculum packet, conducted in-class lessons, held after-school work sessions, and coordinated student participation in both local school fairs and the annual San Juan Basin Regional Science Fair in Durango. In 2013, the entire middle school participated, and performed very well at the fairs, winning 7 ribbons and a 1st place award at Regional, advancing one project on to win 3<sup>rd</sup> place at the state level. *Raylene Bar and Hanna DeKay show off their awards.*



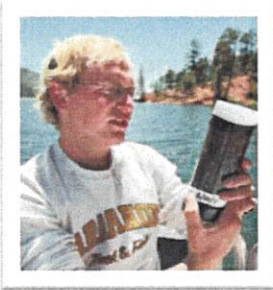
**Science in Action- new partnerships for engaging people in science.** MSI teamed up with many incredible partners this summer to widen our net of collaborators and volunteers. We worked with the Telluride Academy and Green River Preserve Western Expedition to monitor pika and restore fens. We taught PikaNet to Durango Discovery Museum's Girls Geek Boutique in Durango and offered custom workshops for Fort Lewis College classes. We worked with the Silverton School students to complete service learning projects that benefitted their community. *Green River Preserve camp youth from Western Expedition assist with Ophir Pass Fen restoration.*



**San Juan Mining & Water Quality Conference Series.** In 2013, the 3rd annual San Juan Mining Conference was held in Lake City, Colorado. These conferences are free and open to the public, and engage the public with mining industry professionals, land managers, scientists, and conservation groups. This year the conference highlighted mines that are currently operating in Lake City, Creede, and Ouray, and participants visited the Ute Ulay revitalization project. The conference was sponsored by over 12 different local and regional groups, including core support by Colorado Non-point Source Program. *Marcie Bidwell serves as moderator for discussion panels.*



## Where are they now?



**Doug Winter**, University of Colorado graduate and 2011 Intern is working with CH2MHill in Boulder as an environmental technician.

**Whitney Gaskill**, MSI's 2010-2012 OSM VISTA Volunteer received her Master of Education degree and is teaching 4<sup>th</sup> grade science and math in Colorado Springs.



## Upcoming Events in Fall 2013:

**San Juan Headwaters Forest Health Monitoring Training**, Pagosa Springs, CO—September 21<sup>st</sup>

**Ophir Fen Restoration Workday**, Ophir Pass, CO—October 4<sup>th</sup> (date subject to change due to weather)

**Connecting for Conservation**, Workshop on Collaboration, Fort Lewis College, CO—November 4<sup>th</sup> -5<sup>th</sup>

**Celebration of Mountains and Mountain Studies Institute**, Durango, CO— November 12<sup>th</sup> (11/12/13 Party)

MSI staff Anthony Culpepper and Tom Grant traveled to six high elevation lakes in the Weminuche Wilderness to sample water quality for the USGS's water monitoring program. The results of the first 25 years of this program were published in Mast and Ingersol (2011) which documented that many significant trends were evident in lake-water concentrations in the lakes. Many lakes showed upward trends in sulfate concentrations as well as acid neutralizing capacity and calcium concentrations. Upward trends in dissolved constituents appeared to be partly explained by a decline in precipitation between 1995 and 2002, which may have increased base-flow contributions to some lakes. Air temperatures, which increased throughout the region, also may have been a factor in lake-water chemical trends. Warming in alpine areas might increase rates of mineral weathering or cause enhanced melting of ice features such as permafrost, rock glaciers, and glaciers. The effect of melting ice on the chemistry of the study lakes is difficult to assess due to the unknown extent of permafrost as well as a lack of detailed hydrologic data.

