



# Mountain Studies Institute

SAN JUAN MOUNTAINS, COLORADO



**BUILDING BRIDGES BETWEEN SCIENCE & SOCIETY  
IN THE SAN JUAN MOUNTAIN REGION**

**MARCIE DEMMY BIDWELL | MOUNTAIN STUDIES INSTITUTE**

# MOUNTAIN STUDIES INSTITUTE



**Science:** It's studying environmental issues like airborne mercury & climate change. It's supporting researchers who come to the San Juans from across North America.



**Outreach & Education:** It's sharing information and skills in conferences and training workshops. It's seminars and field trips for locals, visitors & students.



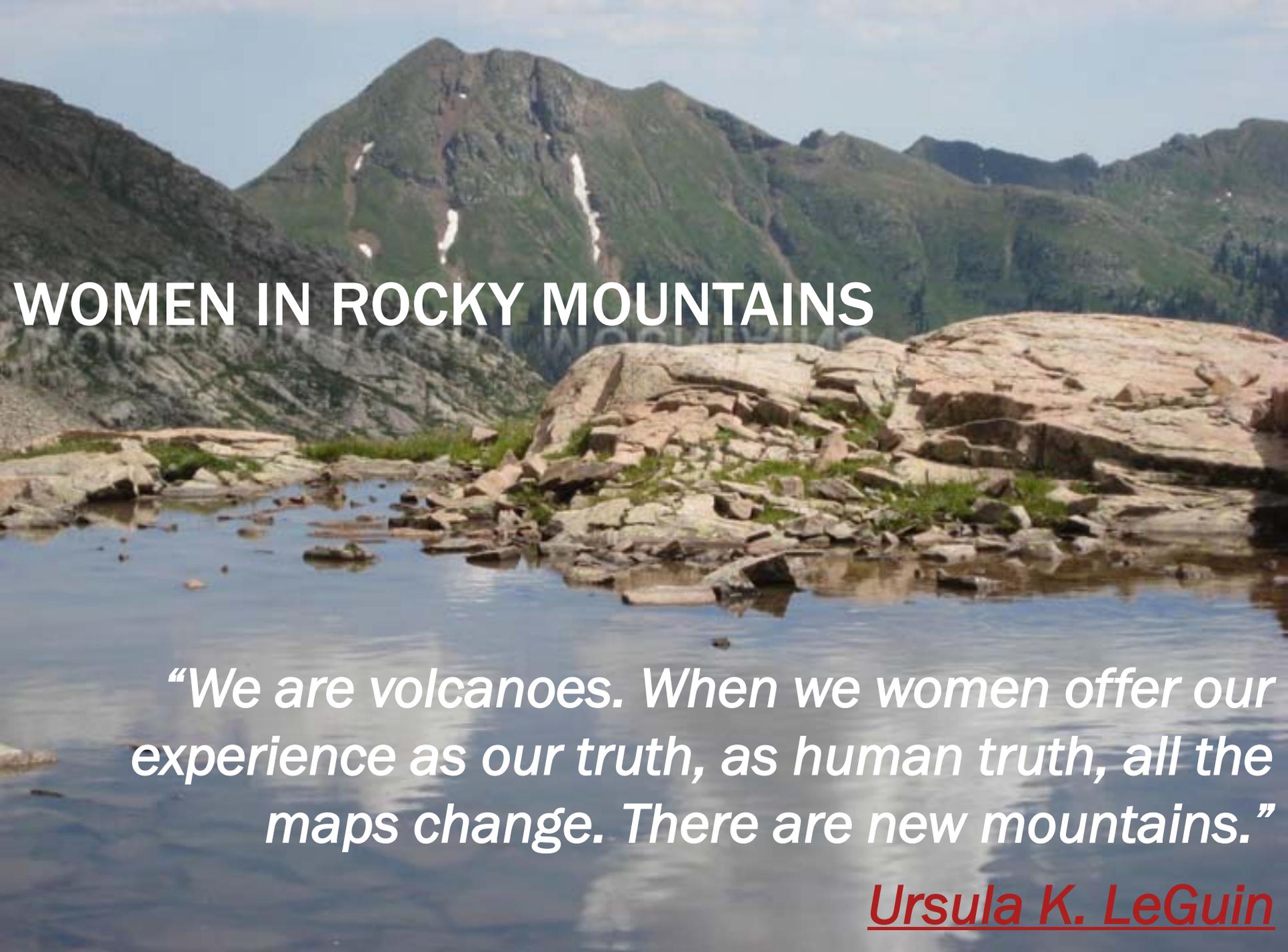
**On-the Ground Projects:** It's community projects like trails & revitalization. It's restoration of damaged fen wetlands.



**Collaboration:** It's innovative partnerships and stakeholder involvement.

[www.mountainstudies.org](http://www.mountainstudies.org)



A scenic landscape photograph of a mountain range. In the foreground, a stream flows through a rocky, light-colored terrain. The middle ground shows large, rounded boulders and patches of green grass. In the background, a prominent mountain peak with some snow patches rises against a clear blue sky. The overall scene is bright and natural.

# WOMEN IN ROCKY MOUNTAINS

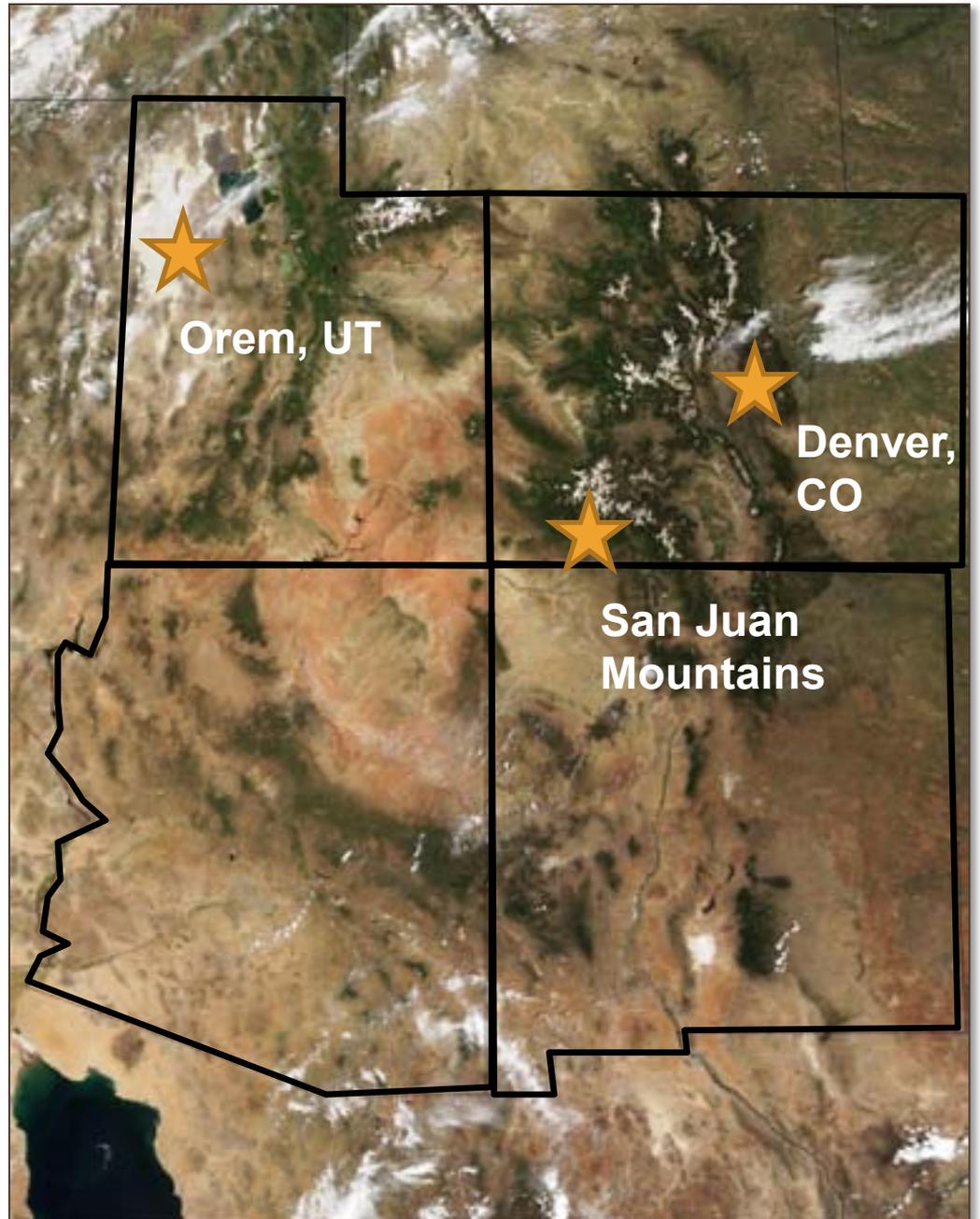
*“We are volcanoes. When we women offer our experience as our truth, as human truth, all the maps change. There are new mountains.”*

*Ursula K. LeGuin*

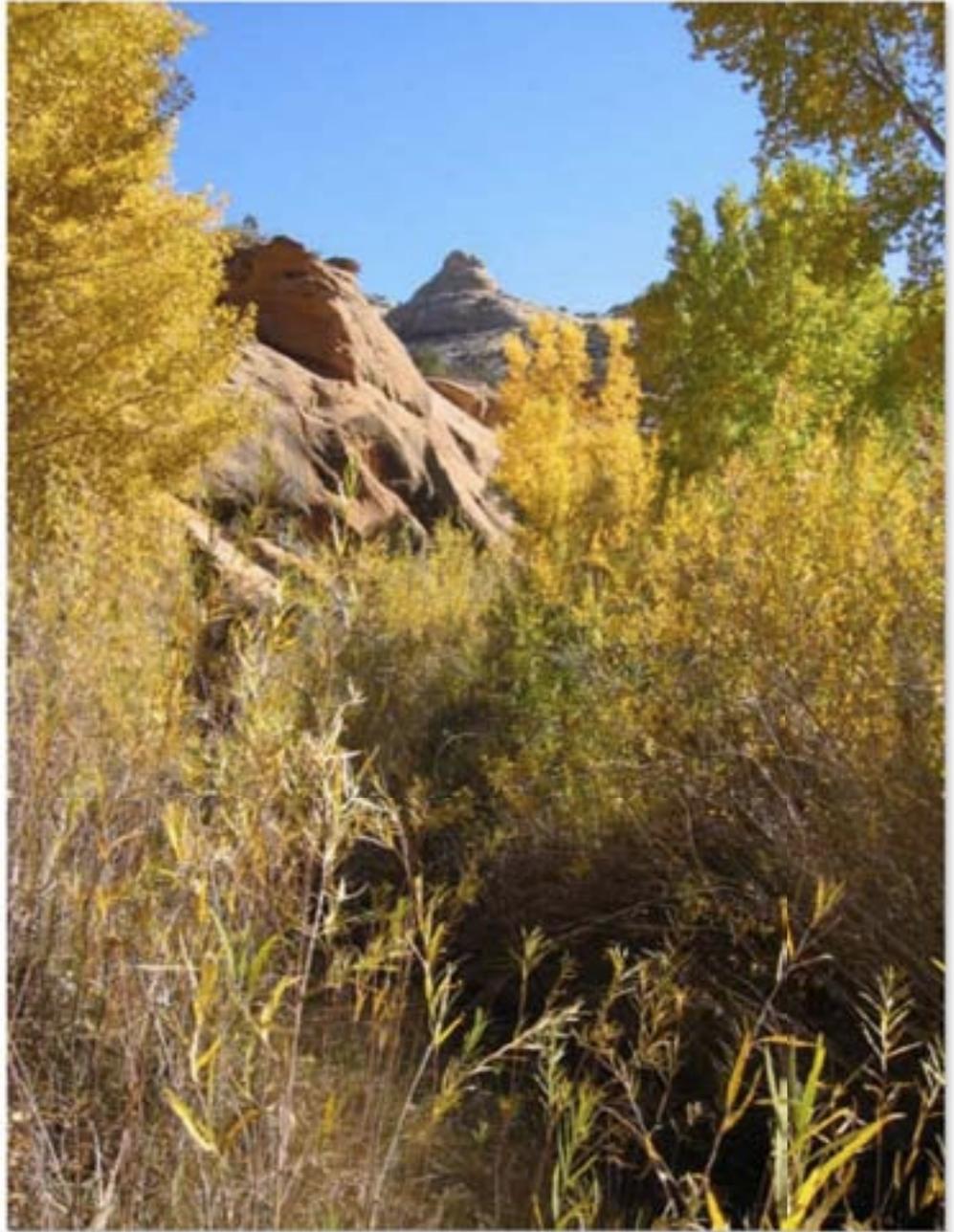


**SILVERTON & DURANGO,  
SOUTHWEST COLORADO**

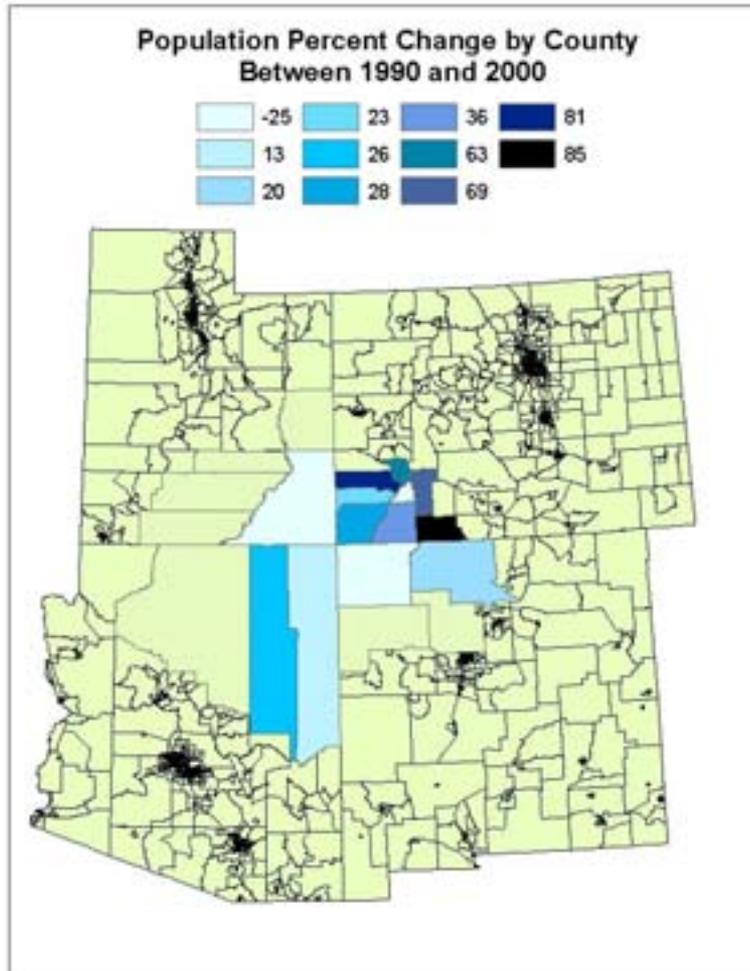
*where the Rocky Mountains dive  
into the Southwestern desert*







# WHY THE SAN JUAN MOUNTAIN REGION?



- Broad diversity of ecosystems
- Unique ecological systems
- Rapid demographic change
- Rapid economic change
- Conflicting economic trends

*Really* interesting science

# MINING LEGACY- 1500 ABANDONED MINES

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# NEW WEST: CHALLENGES & OPPORTUNITIES



# RESEARCH TO INFORM MANAGEMENT



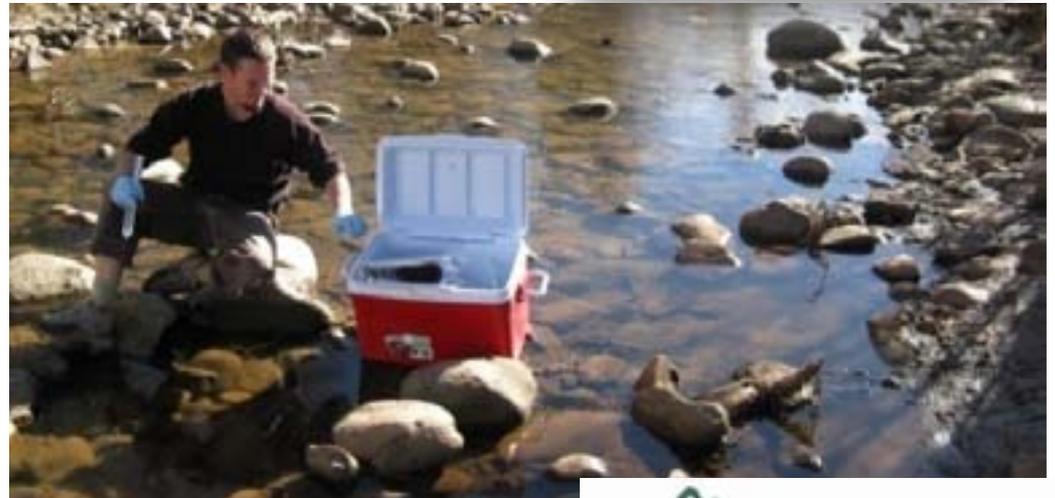
# TRACING WATER QUALITY

## Hydrology of the Fruitland Outcrop Area

MSI, CU Boulder,  
San Juan Public  
Lands (USFS/BLM),  
and Fort Lewis  
College



**Preliminary Result:** Prevalence of young water and strong hydrologic connections across the Northern San Juan Basin system, reinforced by geochemical indicators, suggest risk of hydrologic disturbance by CBM development where the Fruitland Outcrop nears the surface.



# DOCUMENTING AIR QUALITY

## Mercury in Precipitation and Environment

MSI, San Juan Public Lands (USFS/BLM), and various partners



- Mercury in precipitation, lake sediment cores, lake biota, and wetland songbirds
- MSI's results motivated the SJPLC to install a long-term Mercury Deposition Network sampler
- Back-trajectory analysis of storm tracks that bring mercury to SW Colorado (ongoing)



# RESTORING RARE & UNIQUE ECOSYSTEMS

## Fen Wetland Assessment, Restoration & Education

**MSI, San Juan Public Lands, Colorado State, MI Tech, San Juan Fens Partnership, and others**

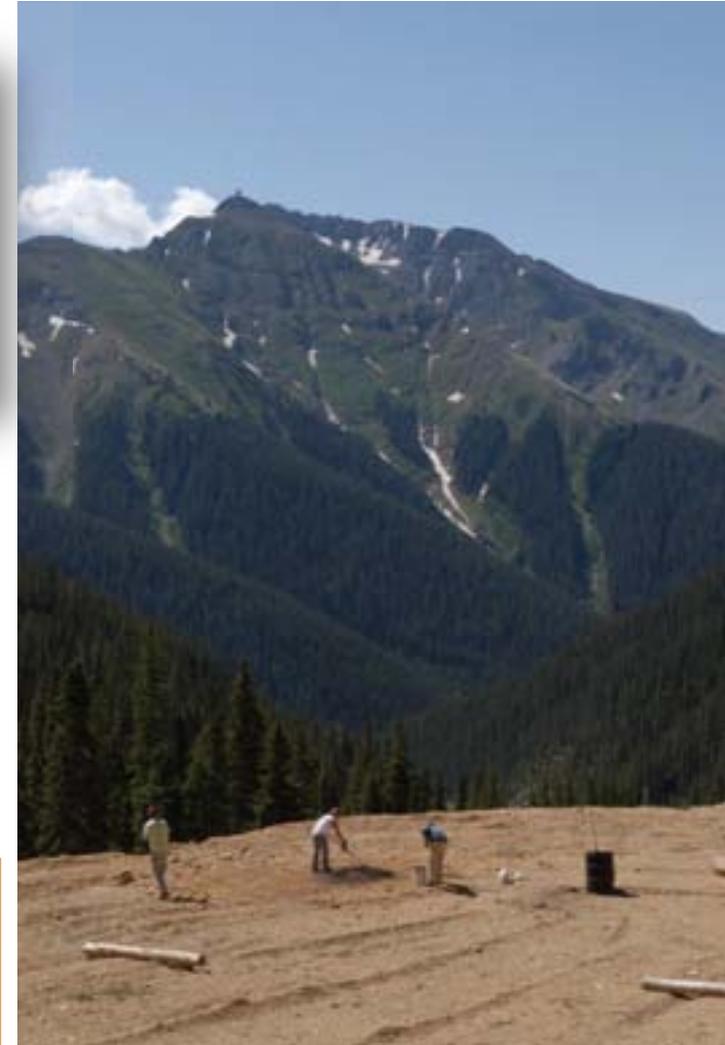


- Fen Assessment completed
- Restoration of several fens, including Chattanooga begun
- Fen Conservation Manual in preparation
- Wetland outreach booklet & 5 workshops

# SOLVING LEGACY PROBLEMS

## Mineland Re-Vegetation & Carbon Storage Project

MSI, San Juan Public Lands  
(USFS/BLM), and U. Colorado  
& Fort Lewis College



- Experimental study to test the success of using biochar for re-vegetation of damaged soils (abandoned mine lands, gas well pads, recreation misuse)
- MSI & SJPLC is working on making biochar from local fuels project thinnings

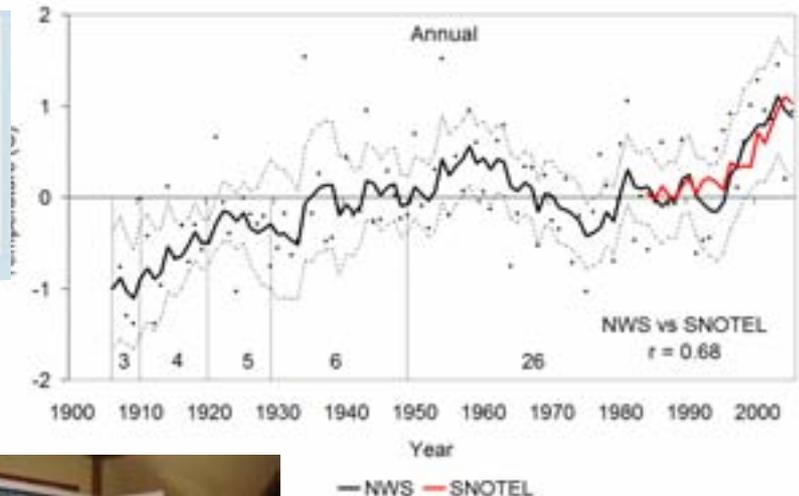
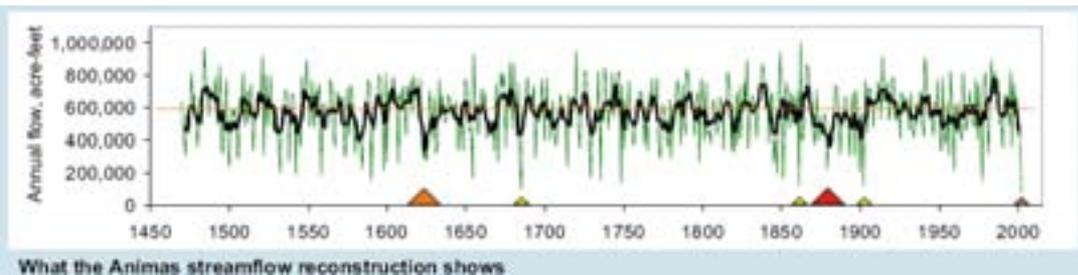
# EXPLORING CLIMATE VARIABILITY & CHANGE

## Climate Change Science & Adaptation Planning

MSI, U. Colorado-Boulder, and San Juan Public Lands (USFS/BLM),

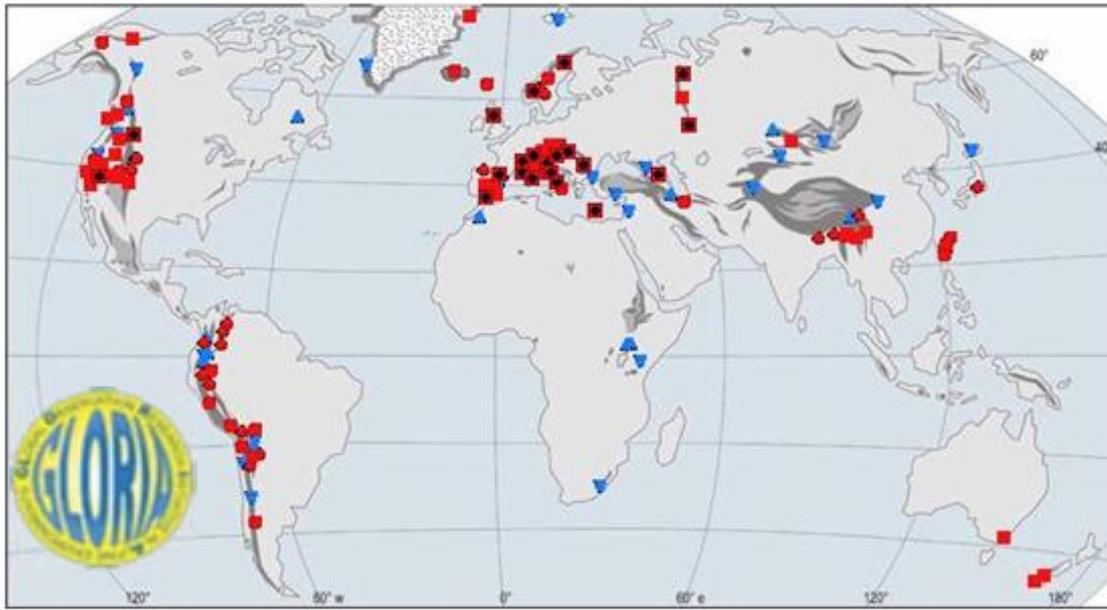


MTNCLIM Climate Conference & Managers Workshop



- Conferences and workshops bringing together scientists and managers,
- Downscaled climate projections and climate change assessments underway
- Carbon storage inventory & policy analysis





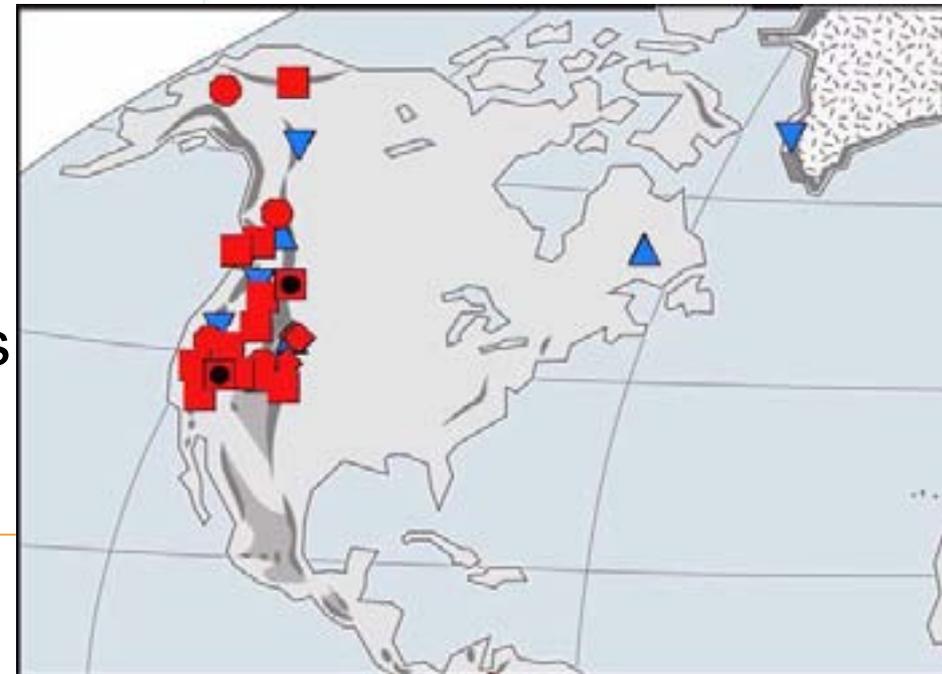
GLORIA target regions:

- Active - Resurveyed
- ▲ Planned
- Active - Baseline data included
- ▼ Interest expressed

Global Observation Research  
Initiative in Alpine Environments

# GLORIA NETWORK

[www.gloria.ac.at](http://www.gloria.ac.at)



# MONITORING CHANGE IN THE MOUNTAINS





CENTER FOR  
SNOW & AVALANCHE  
STUDIES



Steltzer et al. (2009)

*Proceedings of the National Academy of Sciences*

# NATURAL RESOURCE MANAGEMENT INTERNSHIPS



# STUDENT-LED RESEARCH: RESPONSES TO CLIMATE CHANGE

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# INVOLVING COMMUNITIES



# Climate Change Assessment for the San Juan Mountain Regions, Southwestern Colorado, USA: A Review of Scientific Research

Koren Nydick, PhD  
Executive Director  
Mountain Studies Institute

Julie Crawford, PhD  
Adjunct Scientist  
Mountain Studies Institute

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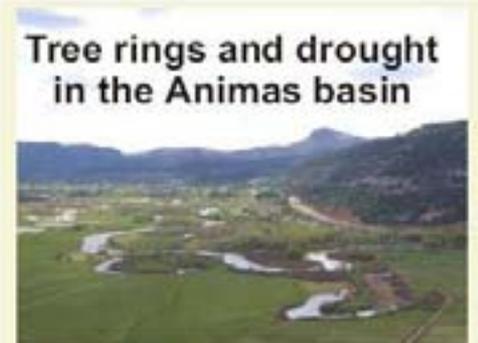
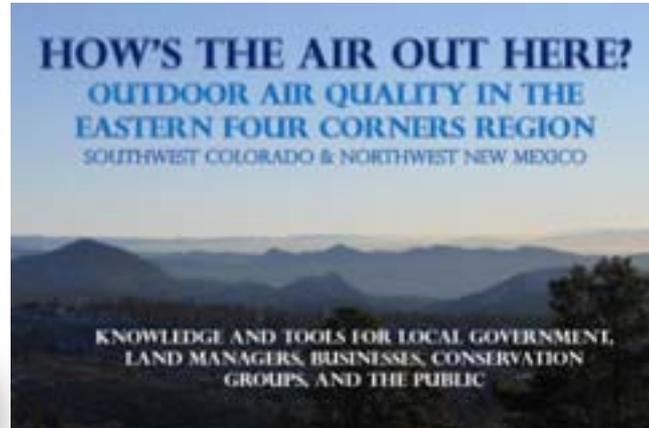
*Prepared in Cooperation with  
The San Juan Public Lands Center: USDA Forest Service – San  
Juan National Forest and USDOJ Bureau of Land Management*



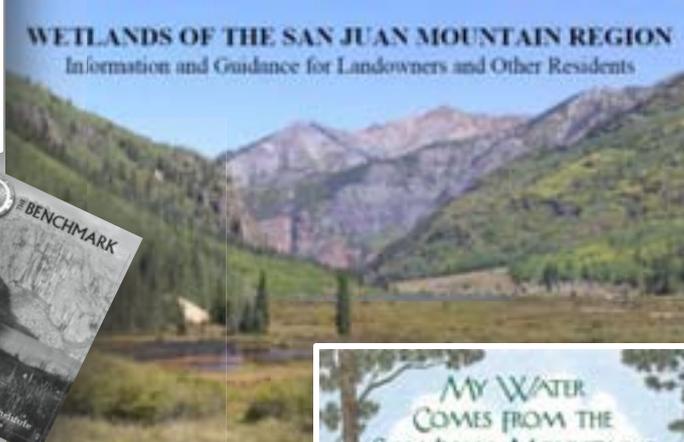
Mountain Studies  
Institute for the San  
Juan Public Lands  
Center

Research Review for  
Resource Planning

# STAKEHOLDER OUTREACH & INVOLVEMENT



The 2000-04 drought in the Animas River basin was, by most measures, the worst since records began around 1900. But have droughts this severe occurred before then? If so, how often? Have there been even worse droughts?

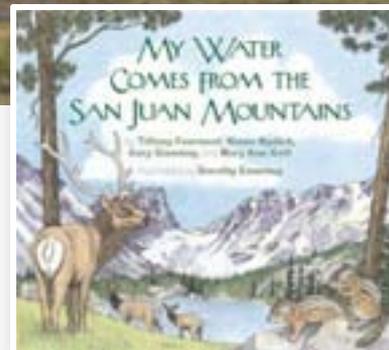


## What can tree-rings tell us about drought?

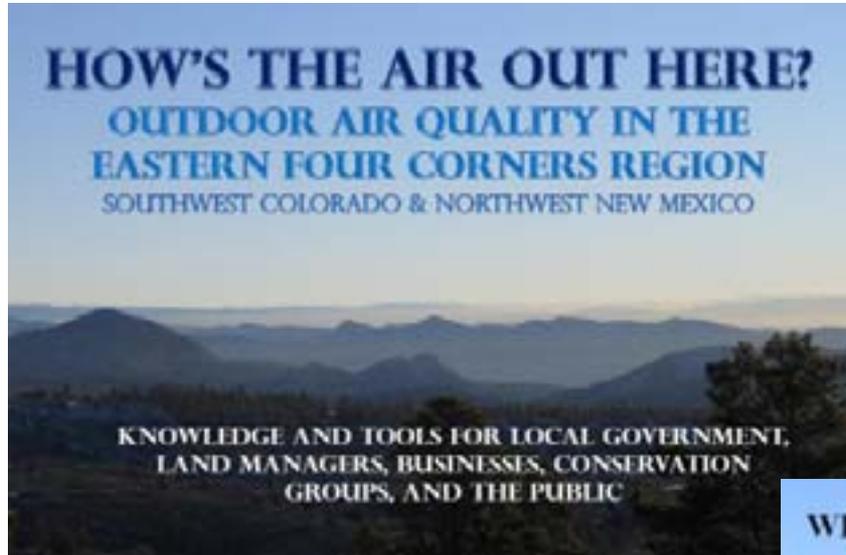
Tree growth in dry climates is limited by water availability. So trees growing at lower elevations in Colorado (pinyon pine, ponderosa pine, and Douglas-fir) faithfully record the changes in precipitation from year to year (image below).



Annual growth rings from a Douglas-fir in the South San Juan Mts. include a drought year (1977) and a very wet year (1983).

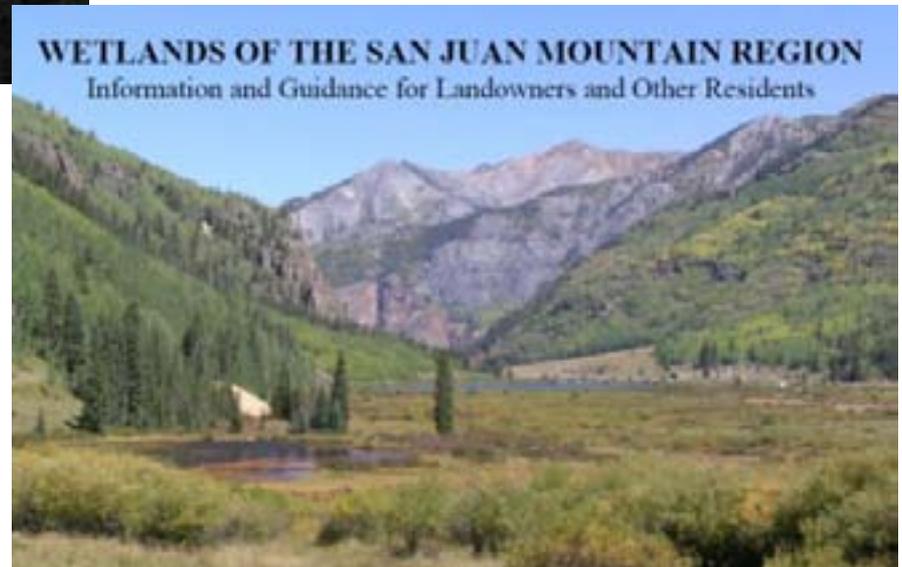


# STAKEHOLDER OUTREACH & INVOLVEMENT



- Translated to Spanish
- Developing AQ Website

- Developing land owners manuals for conservation and protection of wetlands



# CITIZEN SCIENCE MONITORING PROGRAMS

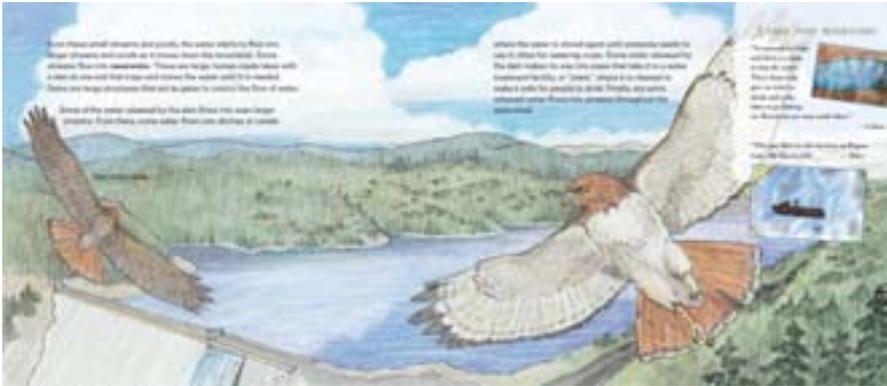
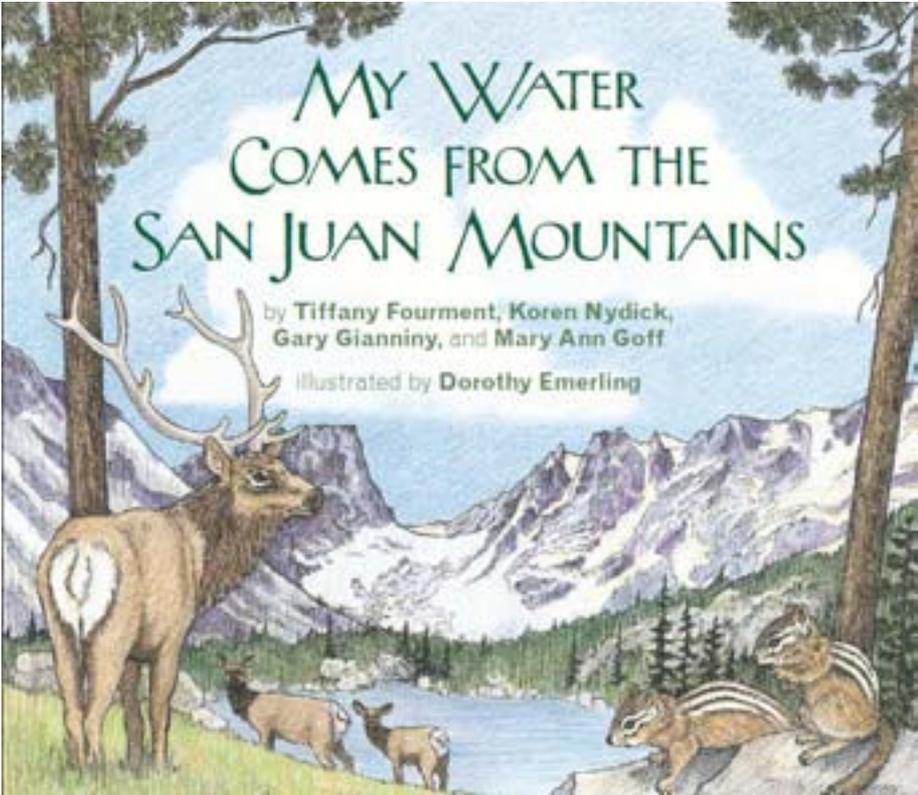
## PikaNET: Volunteer Monitoring Network for the American Pika

MSI, CU Boulder, San Juan Public Lands, CSU and other partners



- MSI helped fund CU pika research
- Collaborative program born to recruit volunteers to fill data gaps
- Combines research and education
- Workshops started this summer!

# MY WATER COMES FROM THE MOUNTAINS



# THANK YOU & ACKNOWLEDGEMENTS

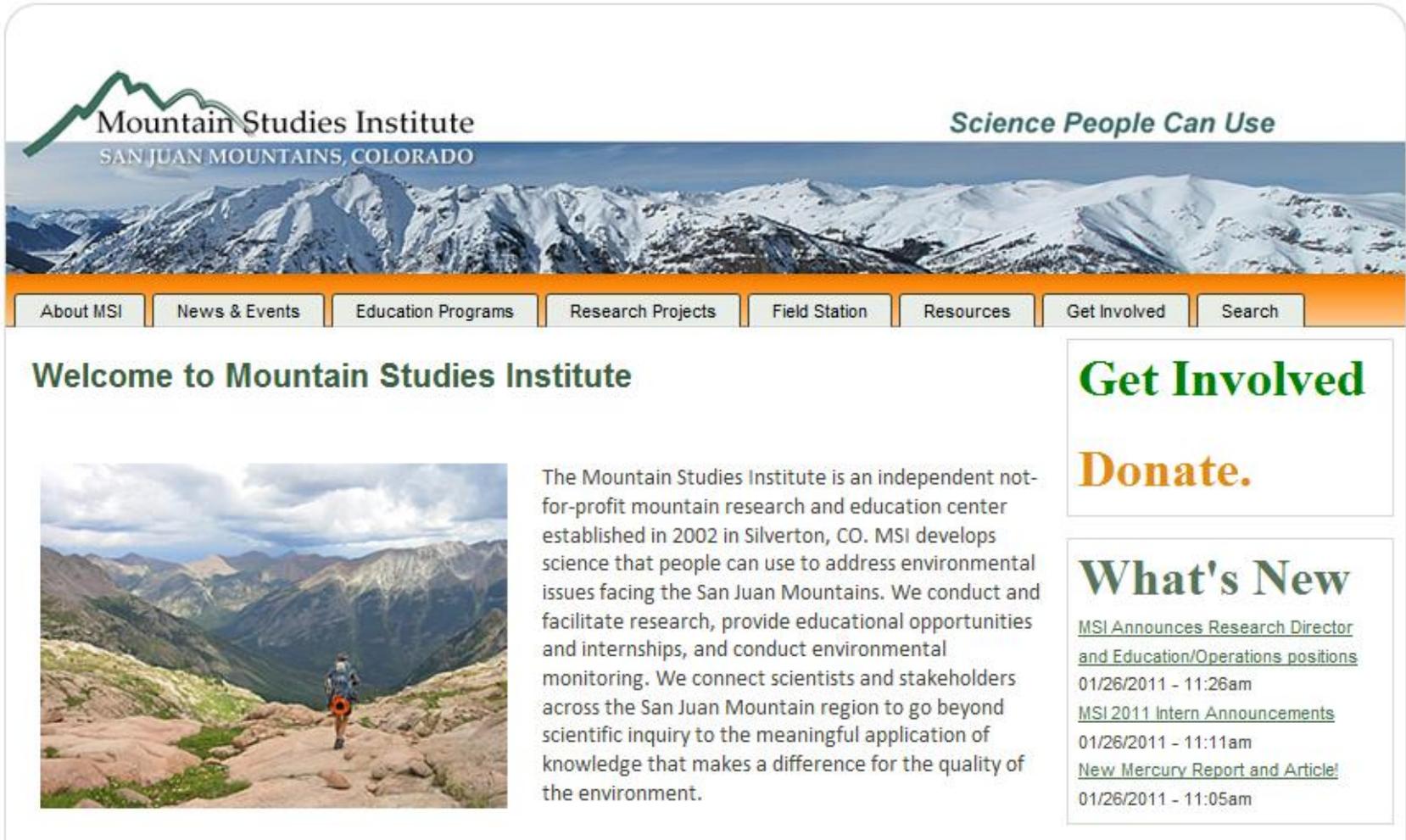
- San Juan Public Lands/National Forest
- Mountain Studies Institute  
[www.mountainstudies.org](http://www.mountainstudies.org)
- Fort Lewis College [www.fortlewis.edu](http://www.fortlewis.edu)
- University of Colorado Boulder  
[www.sjc.colorado.edu](http://www.sjc.colorado.edu)



San Juan Public  
Lands Center



# WWW.MOUNTAINSTUDIES.ORG



The screenshot shows the homepage of the Mountain Studies Institute. At the top, there is a logo with a green mountain range and the text "Mountain Studies Institute" and "SAN JUAN MOUNTAINS, COLORADO". To the right of the logo is the tagline "Science People Can Use". Below the logo is a large photograph of a snow-capped mountain range. Underneath the photograph is a navigation bar with orange buttons for "About MSI", "News & Events", "Education Programs", "Research Projects", "Field Station", "Resources", "Get Involved", and "Search". The main content area features a "Welcome to Mountain Studies Institute" heading, a photograph of a hiker on a rocky trail, and a paragraph of text describing the institute. To the right of the main content are two sidebars: "Get Involved" with a "Donate." link, and "What's New" with a list of recent news items and dates.

**Mountain Studies Institute**  
SAN JUAN MOUNTAINS, COLORADO

*Science People Can Use*

About MSI | News & Events | Education Programs | Research Projects | Field Station | Resources | Get Involved | Search

## Welcome to Mountain Studies Institute



The Mountain Studies Institute is an independent not-for-profit mountain research and education center established in 2002 in Silverton, CO. MSI develops science that people can use to address environmental issues facing the San Juan Mountains. We conduct and facilitate research, provide educational opportunities and internships, and conduct environmental monitoring. We connect scientists and stakeholders across the San Juan Mountain region to go beyond scientific inquiry to the meaningful application of knowledge that makes a difference for the quality of the environment.

## Get Involved

**Donate.**

## What's New

- [MSI Announces Research Director and Education/Operations positions](#)  
01/26/2011 - 11:26am
- [MSI 2011 Intern Announcements](#)  
01/26/2011 - 11:11am
- [New Mercury Report and Article!](#)  
01/26/2011 - 11:05am

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