

# High Mountain Glacial Watershed Program

Quarterly Newsletter

## Introducing the High Mountain Glacial Watershed Program

**G**reetings from the High Mountain and Glacial Watershed Partnership (HMGWP)! This Community of Practice (CoP) resulted from the September 2011 Andean-Asian Glacial Lake Expedition and Knowledge Exchange in Nepal with the goal of addressing the perceived gaps in knowledge and collaboration for both researchers and practitioners working in the high mountains. The HMGWP grew out of the Adaptation Partnership. We hope that through the Community of Practice, we can coordinate knowledge exchange and projects that will broaden our understanding of the high mountain environment while also supporting the communities who rely on the mountains and glacial watershed systems to sustain their lives.

The U.S. Agency for International Development (USAID) and the U.S. Department of State provided the initial financial support to HMGWP as part of their support for the Adaptation Partnership.

We invite all researchers and development practitioners interested in high mountain development issues to join. Our hope is that the Partnership will combine international scientific experience with local knowledge and resources to promote global awareness of the critical importance of high mountain glacial watersheds. Particular focus will be placed on the impact of climate change, interaction between highland and lowland communities, and services for protecting fragile ecosystems. The Partnership will be led by Dr. Alton Byers of The Mountain Institute and Dr. Daene McKinney of the University of Texas at Austin – whom you can read about on Page 4.

Our initiatives will focus primarily on remote, high altitude mountain ecosystems and communities with the aim of developing innovative tools and practices for facilitating adaptation to climate change. In doing so, the Partnership will contribute to the conditions necessary for all stakeholders who are dependent on glacial watersheds, including local communities, government agencies, and downstream populations, to become more resilient to the impacts of climate change. It will also advance and disseminate knowledge of high mountain systems and processes, and increase global awareness of and support for threatened glacial environments.

If you have any colleagues who may be interested in joining the High Mountain Glacial Watershed Program and its Community of Practice or if you are part of any new initiatives that match the goals and vision of the HMGWP, please contact Kate Voss at [kvoss@mountaing.org](mailto:kvoss@mountaing.org).



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## The Climber-Scientist Small Grants Program: An Overview

Additional activities of HMGWP included the creation of a "Climber-Scientist Small Grants Program" to provide field-based, hands-on research opportunities for scientists and practitioners in many of the world's most poorly studied mountain regions. The grants program will also encourage systematic use of field work to support and augment remote sensing technologies such as satellite imaging, further assist mountain communities in adapting to climate change, and enhance development of the next generation of high mountain physical and social scientists, including those with little climbing experience.

Our first application deadline was June 22nd, 2012, and the grants will be awarded in July 2012. We had a fantastic response to the grant solicitation, and look forward to supporting the new, innovative research that will emerge from the Climber-Scientist Small Grants program.

For More Information,  
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## Launching the HMGWP Community of Practice Web Platform

As part of the HMGWP, a new web platform is in development to provide resources, highlight fieldwork and case studies, and encourage collaboration between CoP members to spark dialogue and develop new research and field priorities.

CoP membership is open to researchers, universities, practitioners, policy makers, and all others interested in promoting the sustainable use of the world's highest mountain regions. The CoP will be both an in-person and online network, which will support workshops and meetings for the membership as well as publicizing and participating in events that are of interest to members. Members will be connected through an email listserv and an online space for community interaction. Visit the HMGWP Community of Practice website at:

<http://www.adaptationpartnership.org/communitiesofpractice/highmountainglacial>

Submit Content for the  
Community of Practice Website:

**Do you have stories from the field? An interesting research project? Any recent publications? Know of current funding opportunities?**

If so, email any stories, publications, updates to Kate Voss at: [kvoss@mountain.org](mailto:kvoss@mountain.org)

## Spring 2012 Nepal Fieldwork Summary

During April/May 2012 fieldwork, rapid reconnaissance of four potentially dangerous glacial lakes was completed. Repeat photography and analysis of Thulagi Lake in the Annapurna Region revealed stable conditions of the lake. The first ever ground-penetrating radar survey was conducted at Dudh Pokhari and Tam Pokhari glacial lakes in the Hinku Valley. The data are currently being processed, and initial results are expected to be published the end of July 2012.

Initial community consultations took place throughout the Hinku valley. The Mera Alpine Conservation Group was particularly interested in forging a relationship with the HMGWP to further develop conservation efforts in the region and to begin community vulnerability and adaptation consultations in the valley.

In addition to the HMGWP activities, the expedition team was joined by a National Geographic Society project to assess opportunities to connect remote mountain communities in the Hinku with the global community through the Last Mile Technology Program. The program provided social media training to The Mountain Institute employees during a one-day workshop in Kathmandu, and provided new media equipment to the trainees.

Following the work in the Hinku, the expedition team headed to the Khumbu Valley to conduct a GPR survey of Imja Lake and to begin forming a framework for the community vulnerability and adaptation trainings that will take place in September 2012.

Furthermore, the HMGWP is collaborating with the UNDP on a new Imja Lake GLOF Risk Reduction Project, which will be a three-year effort to develop both technical engineering and social adaptation solutions to the threat of an Imja Lake GLOF.

May 2012 Expedition team members include: Dr. Alton Byers, Dr. Daene McKinney, Ang Rita Sherpa, Chris Rainier, David Grober, T.H. Cullhane, Marcelo Somos, Meghan Hartman, Stephanie Spray, Bheem Rai, Jefferson Moss IV, James McKinney, and Kate Voss.

# Notes from the Field: Ground-penetrating radar at altitude

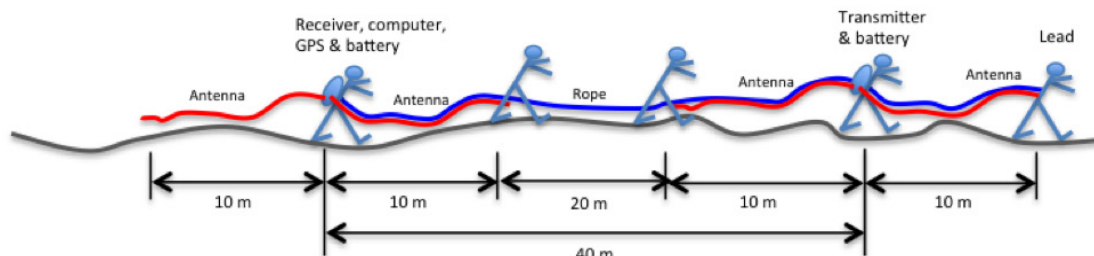


During the Spring 2012 fieldwork in Nepal, the HMGWP continued both technical and community adaptation work in the Himalayas. On the technical side, ground-penetrating radar (GPR) surveys were carried out in the Hinku and Khumbu Valleys at Dudh Pokhari, Tam Pokhari, and Imja Lakes. The goal of the GPR surveys was to obtain new data that will provide insight to the structure of the terminal and lateral moraines of these lakes. This information is incredibly valuable to understand the stability of the lakes and to inform future engineering work in the region. It was exciting to conduct the GPR research as our survey at Dudh Pokhari was the first scientific study conducted at the lake, and the study at Tam Pokhari provided unique insight to the structure of a terminal moraine after a glacial lake outburst flood (GLOF) event occurred in 1998. Furthermore, our work at Imja Lake will inform a new UNDP-funded project that seeks to develop an engineering solution to decrease the threat of a GLOF event.

In order to use the equipment, Dr. Daene McKinney and Ph.D candidate Marcelo Somos from the University of Texas at Austin constructed a backpack-mounted GPR system (see diagram below). The backpack system was the best strategy for trudging over and down the loose scree moraines with the receiver, transmitter, and antennae (see photos above). GPR is a fantastic tool to analyze the composition of the surveyed area. When we apply it to a glacial lake moraine, we are able to “see” the location and thickness of debris, ice, groundwater, bedrock, and other sedimentary layers that exist in the study area. Ultimately, this information should allow us to predict the stability of the moraine and any changes that might occur. For example, if a moraine has a significant ice core, it can be predicted that the ice will continue to melt in the upcoming decades, leading to instability in that moraine.

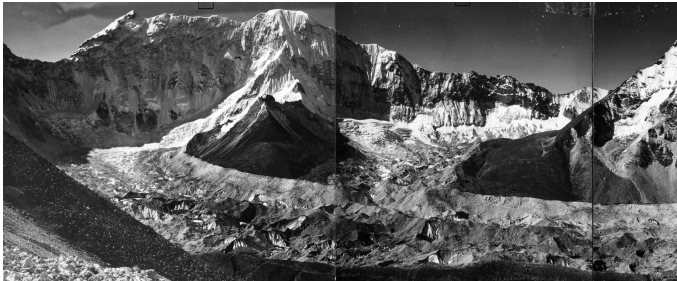
Researchers at the University of Texas at Austin are currently processing the data, and a first draft paper summarizing the results will be released by Fall 2012 and posted on the HMGWP website.

Above – Top Left and Right: Panorama of Dudh Pokhari campsite (Photo credit: Kate Voss); Top Center: GPR Transmitter (Photo credit: James McKinney); Bottom Left: GPR team testing equipment in Khote (Photo credit: James McKinney); Bottom Center: GPR receiver (Photo credit: Kate Voss); Bottom Right: GPR team at Tam Pokhari (Photo credit: Chris Rainier). Below – Diagram of backpack mounted GPR system deployment. Diagram by: Dr. Daene McKinney



## Repeat Photography: A valuable tool to evaluate climate change

Dr. Alton Byers has spent years in the Mt. Everest region recreating the prized 1950s-era photographs of Swiss glaciologist Fritz Müller and Austrian alpinist and mapmaker Erwin Schneider. By comparing the images, Byers can evaluate the changes seen in the high mountains and glacial watersheds. Some glaciers are shrinking, while others are growing, and the changes are occurring at different rates based on the size, location, and type of the glacier. By reproducing the images, Byers has created a powerful portfolio to visualize climate and environmental change in the Himalayan alpine. Photographic documentation is not only gripping, but the information to be gathered through the image comparisons is invaluable to scientific analysis and understanding of the impacts of climate change. In particular, Byers' work has highlighted the formation of new glacial lakes that are emerging as glaciers begin to retreat (see image below of Imja Lake, 2012).



Alton Byers' updated 2012 panorama of Imja Lake, taken from a photo point above the Island Peak High Camp (top right), can be compared to the 1956 panorama of Imja Glacier by Erwin Schneider (top left) to observe changes in the high mountain glaciers due to climate change and the emergence of Imja Lake.



Bottom: Dr. Alton Byers at a photo point above Island Peak High Camp during fieldwork in May 2012.

Photo credits:  
Top Right: Alton Byers;  
Top Left: Erwin Schneider, courtesy of The Association for Comparative Alpine Research, Munich, property of Alton Byers;  
Bottom: Padam Rai

## Consulting with Communities: Assessing vulnerability and adaptation

During the Spring 2012 fieldwork in Nepal, the HMGWP began to formulate a strategy to assess community vulnerability and potential adaptation solutions to the increasing threat of a glacial lake outburst flood from Imja Lake in the Khumbu region. The effort is being spearheaded by Engility's Meghan Hartman, who is developing an implementation plan to analyze vulnerability and adaptation options in the valley. Throughout her fieldwork in Nepal, Hartman met with local community members along the entire valley, from Monju to Dingboche.



Engility's Meghan Hartman discussing perceptions about the threat of Imja Lake with a local community member from the Khumbu Alpine Conservation Council in Dingboche, Nepal.  
Photo credit: Bheem Raj Rai

Hartman worked closely with The Mountain Institute's Ang Rita Sherpa and Alton Byers to create a framework for future adaptation training in the Khumbu. The team has trained local Nepalis in the adaptation curriculum, which they will then use in consultations with communities throughout the Imja Valley to assess the specific threats of climate change. By using this information, the Nepali trainers will engage community members to develop adaptation strategies to manage the risks of climate change. The trainings began in July 2012, and the first community consultations will take place in Fall 2012.

## Upcoming Events

### Singapore International Water Week

HMGWP CoP members will present a poster on "Mainstreaming Climate Concerns into IWRM: A Nepal Case Study" during Singapore International Water Week from July 1-5, 2012. You can find more information at: <http://www.siww.com.sg/>

### IUCN World Conservation Congress

The High Mountain Glacial Watershed Program will be featured in the Protected Planet Pavilion at the International Union for the Conservation of Nature's (IUCN) World Conservation Congress, which will be held in Jeju, Korea from September 6-15, 2012. The HMGWP will be featured in the forum session 1124: "Mountains and Connectivity – Community based management options in mountain protected areas and launching the International Connectivity Conservation Network." Additional information is available at: <http://www.iucnworldconservationcongress.org/>

### Annual Fall American Geophysical Union Meeting (AGU)

Members of the HMGWP Community of Practice organized a special session (GC059) on "Water Supply in Glacierized Mountain Watersheds – Monitoring Hydrological Transitions and Assessing Vulnerability in a Changing Climate" for the Fall 2012 AGU meeting. The meeting will take place from December 3-7, 2012 in San Francisco, CA. It would be fantastic to have a strong HMGWP presence at AGU, so please submit your poster abstracts by August 8, 2012! Go to the AGU website to submit and learn more: <http://fallmeeting.agu.org/2012/>

## HMGWP Emerges as a Strong Presence

### National Geographic Society's Explorers Symposium

During the National Geographic Society's Explorers Symposium from 11-15 June 2012, Dr. Alton Byers, Co-Director of the HMGWP, presented an overview of the High Mountain Glacial Watershed Program to fellow NGS Explorers which garnered phenomenal support from the NGS. Dr. Byers met with NGS's Energy Initiative to discuss mini-hydro development in Nepal, joined photographer Chris Rainier for a TV interview, and met with key NGS departments to discuss further media and outreach opportunities to link the HMGWP with the National Geographic Society.

### Meeting on Water Reduction by High Mountain Glaciers

Dr. Daene McKinney, Co-Director of the HMGWP, presented an overview of the High Mountain Glacial Watershed Program during a conference titled "Effects on Water Reduction by High Mountain Glaciers" on 2 July 2012 in Lima, Peru. The conference was convened by the National Water Authority of Peru, CARE, the University of Zurich, and the Swiss Agency for Development and Cooperation.

### Workshop on Risk Management in the Hindu-Kush-Himalayan Region

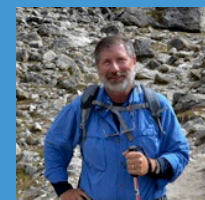
HMGWP CoP members were a strong presence during the UNDP's regional workshop on "Knowledge Sharing for Effective Risk Management of Hydro-Meteorological Hazards in the Hindu-Kush-Himalayan Region", which took place in Kathmandu, Nepal from 21-23 March 2012. As a key output of the conference, the HMGWP will be assisting UNDP with its upcoming Imja Lake Risk Reduction Project.

## Meet the HMGWP Co-Managers



**Dr. Alton Byers**

Dr. Alton Byers is The Mountain Institute's Director of Science and Exploration. He is a mountain geographer and climber who specializes in applied research, high altitude conservation and restoration programs, climate change impacts in the mountains, highland-lowland interactive system approaches to conservation, and mountain photography.



**Dr. Daene McKinney**

Dr. Daene McKinney is a professor in the Environmental and Water Resources Engineering program of the Department of Civil, Architectural, and Environmental Engineering at The University of Texas at Austin. His research interests are in sustainable management of water resources, by integrating engineering, economic, environment, and policy.