

## **MRI Newsletter 10: The Western Mountain Initiative (WMI)**

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# MRI Newsletter 10: The Western Mountain Initiative (WMI)



*The Western Mountain Initiative (WMI) of the US Geological Survey (USGS) studies global change in the mountains of the American West. This MRI Newsletter describes the functioning and the specialties of this Initiative, which we advance as an excellent example of scientific collaboration. MRI talked with two of WMI's principal investigators: Jill Baron, a USGS scientist and Senior Research Ecologist with the Natural Resource Ecology Laboratory at Colorado State University, and Dave Peterson, Senior Scientist with the USDA Forest Service at the Pacific Northwest Research Station in Seattle. For the second part of the article they joined us in a discussion about the key leverage points in developing adaptation strategies to deal with global change in mountains.*

## Background and objectives of WMI

Founded in 1993, WMI integrated existing USGS research programs studying global change in the ecosystems of protected mountain areas of the Western USA. It arose out of a long tradition of collaborative and interdisciplinary research, and has received national funding for the last 5 years. The 5 core principal investigators form the WMI coordination team, with 50 to 60 cooperating scientists. WMI's principal partners on the ground are the US Forest Service and the National Park Service, which together manage the vast majority of Western mountain lands.

WMI aims to produce a West-wide understanding of and a comprehensive scientific foundation for global change research, through such instruments as a WMI meta-database, a central data portal, and monitoring guidelines. It seeks to understand the responses of protected areas to climate change and climate variability, to determine which ecosystems are especially vulnerable, to communicate this understanding to the managers of

the protected areas, and to support the development of adaptation strategies.

## Characteristics of WMI

WMI is characterized by:

- Personal relations between scientists: the core of WMI are scientists who want to collaborate and find it personally enriching to do so;
- Cordial and consistent relations between scientists and managers: mutual trust has developed through long cooperation;
- An ecosystem approach with a broad range of topics: from research to models to websites to stakeholder involvement; and
- Transdisciplinarity: for WMI transdisciplinarity means a constant dialogue across the disciplines, and between science and management.

See <http://www.cfr.washington.edu/research.FME/wmi/>

## Functioning

WMI operates across a broad range of scales, from field-based research conducted or sponsored by individual researchers to integration of knowledge through workshops and synthesis with models (Figure 1). The following projects exemplify the role and the achievements of WMI:

**a) Glaciers Online: Glaciers of the American West:** an example of a "Site specific study/regional synthesis;" <http://glaciers.research.pdx.edu/>

This site collects and distributes data on the glaciers of the American West.

**WMI's role:** Using "seed" money, WMI scientist Dan Fagre was able to catalyze an effort by Andrew Fountain and other researchers at

Portland State University to pull together all known data on the extent and rate of change of Western US mountain glaciers.

**b) RHESSys—The Regional Hydro-Ecologic Simulation System:** an example of "Regional interpretations;" <http://fiesta.bren.ucsb.edu/~rhessys/>

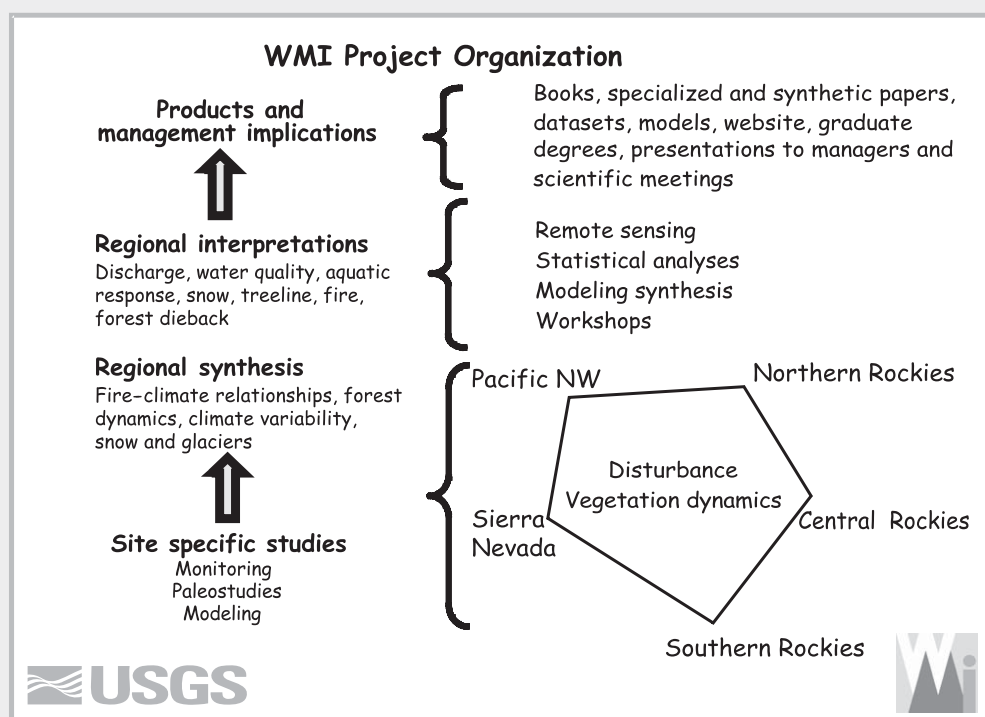
RHESSys is a GIS-based, hydro-ecological modeling framework designed to simulate carbon, water, and nutrient fluxes. It models the spatial distribution and the spatio-temporal interactions between different processes at the watershed scale.

**WMI's role:** WMI scientists Jill Baron (USGS), Lindsey Christensen (Colorado State University), and Christina Tague (UCSB) use RHESSys to compare and contrast biophysical responses of 5 national park watersheds across the West to past, current, and future scenarios of climate change. The model output is interpreted at a number of scales, from regional comparisons down to individual hillslopes and elevation bands. See [http://www.fs.fed.us/psw/mtnclim/talks/pdf/christensen\\_etal\\_poster\\_mtnclim2006.pdf](http://www.fs.fed.us/psw/mtnclim/talks/pdf/christensen_etal_poster_mtnclim2006.pdf) for an example of RHESSys use by WMI.

**c) Preliminary Review of Adaptation Options for Climate-Sensitive Ecosystems and Resources:** an example of "Products and management implications."

WMI researchers are the lead authors of the *Synthesis and Assessment Product 4.4* (SAP 4.4) for the US Climate Change Science Program, published in December 2007.

**WMI's role:** Through their long-term cooperation with the managers of protected areas, WMI's scientists Jill Baron, David Peterson, Craig Allen, Don McKenzie, Nate Stephenson, and Dan Fagre are defining adaptation approaches to reduce



**FIGURE 1** Set-up of the Western Mountain Initiative (WMI) and its activities.

the risk of negative outcomes. In preparation for writing SAP 4.4, WMI organized workshops with leaders in adaptation science and national park resource management. Upon completion of the product (see <http://www.climatescience.gov/Library/sap/sap4-4/default.php> for copies of the draft report), WMI scientists will move into a new phase of workshops, handbooks and collaboration with managers for discussing adaptation options, and skillsets with practitioners.

### Discussion with Jill Baron and Dave Peterson

*The USGS and the NPS are only one part of the social fabric of the Western Mountains. How do you integrate the other stakeholders?*

WMI does not (yet) have a strategic approach to the integration of all important stakeholders in the Western Mountains. Cooperation has a regional and ad hoc basis—for example, the seminars and information transfer with the National Cross Country Ski Areas Association in 2008.

*What are some examples of adaptation strategies or concrete actions that you propose to the managers of public lands?*

Fire is a crucial topic in the Western Mountains. We propose strategies to improve resilience by removing fuels. The managers conduct experiments, eg different forest thinnings, whose results are fed back into the process. Or we work on a reduction of the fragmentation of ecosystems and waterways, and on maintaining the ecosystems in their present form. WMI supports regional partnerships to deal with biomes, such as the Greater Yellowstone Coalition. But adaptive management is a hard-fought topic among federal administrations, resource managers, and environmental NGOs. In order to make science meaningful, and to truly implement adaptive management, we need to forge coalitions and develop common visions.

*What is the relation of these strategies to adaptation measures that other entities would have to take? Who develops these other strategies?*

In the US the best adaptation strategies have been developed by the cities in response to flooding or drought. Glacier National Park has been a pioneer in reaching out to include these other parties. Their framework includes towns and

water managers in the definition of a shared vision. At the moment there is no general linkage from the administrations of protected lands to other entities. Many agencies own and manage the land. Ideally there would be a top-down agreement to collaborate on research, management, and adaptation. But in reality, linkages and collaborations are being developed bottom-up, by people who want to work together.

*What are the key points for successful development of strategy for the whole Western Mountain region (not just the land within certain management boundaries)?*

Collaborations between landowners and institutions, and a common vision: what do we want this region to look like? The focal points should be water supply, biodiversity, fire, and recreation. WMI can provide the scientific basis for this.

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