

## Post-MtnClim Workshop for Resource Managers Midway, Utah; September 18, 2014

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As part of the *MtnClim 2014*, 10th Anniversary Conference, a Post-MtnClim Workshop was held for natural resource managers. The workshop was open to all interested practitioners and scientists, and was held Thursday, September 18, after the main conference had adjourned. The goals of the half-day workshop were to provide state-of-science updates on the effects of climate change, and to discuss climate-smart management. Presentations focused on:

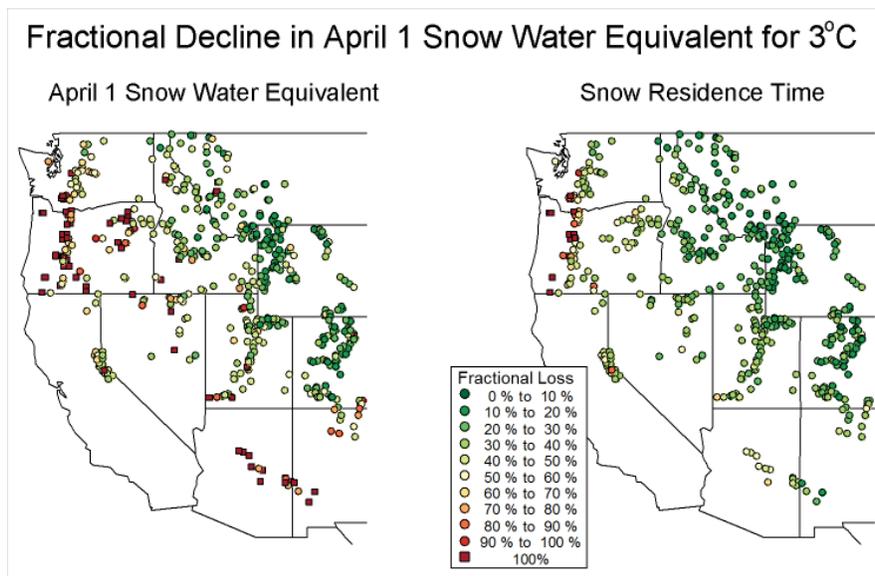
- Vegetation and water
- Identifying management concerns and priorities
- Focusing on sensitive resources and locations
- Discussing options for adapting to changing resource conditions

Organizers were Dave Peterson, USDA Forest Service, PNW Research Station, Seattle Washington; Natalie Little, USDA Forest Service, Region 4, Ogden, Utah; and Steve Jackson, DOI SW Climate Science Center, Tucson, Arizona.

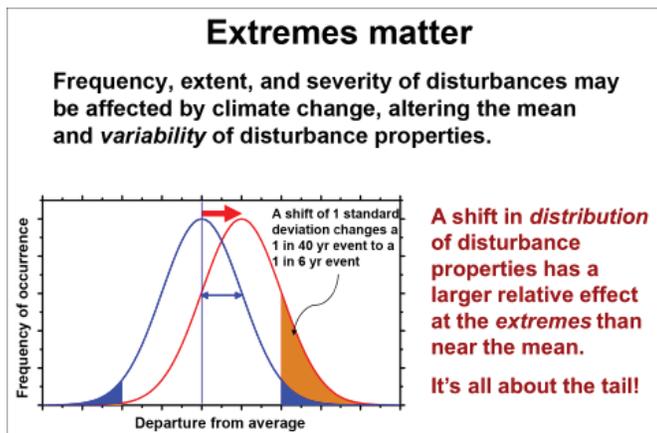
The workshop began with science presentations on Water, Vegetation, and Adaptation, including the following.

Charlie Luce, USDA Forest Service Research, Boise, Idaho, presented on “Water Resources and Climate Change: Trends and Projections”. Charlie’s presentation proposed that because of the rise in temperatures due to climate change, snow will not last as long and April snowpack will mostly decline (Fig. 1). He discussed the uncertainties associated with annual flows and flood magnitude.

Dave Peterson presented on “Climate Change Effects on Vegetation and Disturbance”. Dave showed how studies of historical and projected temperature indicate that maximum temperatures will increase at a faster rate in the future, thus affecting vegetation and disturbance. He displayed how extremes matter (Fig. 2). Dave discussed the possibility of increasing bark beetle outbreaks, as well as how climate change will affect wildfire. Other stressors such as fungal pathogens and invasive species may add to the challenges faced by mountain ecosystems in the future. Dave concluded by stating the time to take action is now!



**Figure 1.** Expected change in snow water equivalent and residence time (Luce presentation).



**Figure 2.** Importance of extremes for vegetation and disturbance (Peterson presentation).

Jill Baron of the US Geological Survey, Fort Collins, Colorado presented thoughts on adaptation. She said “there are wonderful experts who think about processes and science,” but what needs to happen is for that information to be put in simple terms so land managers can take action. “No action” in the face of climate change is a decision that may carry the greatest risk. Climate change effects will occur concurrently with contemporary resource problems. We need scenario planning, vulnerability assessments, and adaptive management in order to begin taking action. We also need to work together and build trust across political and disciplinary boundaries.

Steve Jackson addressed challenges to land managers. He said “we need to mobilize in many fronts and in as many ways as we can.” Land managers need to use the resources available to them from the universities, and everyone needs to bridge the chasm between science and management.

After the scientific presentations, the attendees participated in a talking circle and discussed challenges that land managers are facing in regards to climate change science. Some of the main concerns voiced were:

- Language barriers between scientists and land managers.
- Ease of access to scientific information.
- Communication between land managers who value climate change science and their superiors who don't.
- Superiors make decisions based on politics.
- Education for line officers and superiors is needed.
- Time and budget constrain capacity.
- Science needs to be incorporated in agency planning documents.

The participants then broke into four groups to discuss a number of concerns further, including:

1. From a research point of view, what are the most relevant topics to study, and who do scientists talk to at the agencies?
2. Feedback on vulnerability, adaptation, and monitoring assessments.
3. Embedding climate specialists in agencies.
4. Climate change refugia

Dave Peterson closed with additional thoughts on climate change and implementation. He said the complexities are growing. We are pioneers in making ecosystems more resilient. "Don't let your kids say that your generation let everything decline – take action so you can say you did your part in reducing climate change impacts."