

# Visualizing Terrestrial and Aquatic Systems in 3D

## Learning about Climate Change on Tribal Trust Lands?

### The VISTAS Core Team

Mike Bailey, Denise Lach, Kirsten Winters, Chad Zanocco  
Oregon State University, Corvallis OR

Jenny Orr, Willamette University

Nik Stevenson-Molnar, Taylor Mutch  
Conservation Biology Institute, Corvallis OR

Susan Stafford, Univ, Minnesota, St. Paul MN

Judith B. Cushing

judyc@evergreen.edu

The Evergreen State College, Olympia WA

Dominique Bachelet

dominique@consbio.org

Conservation Biology Institute, Corvallis OR

<http://blogs.evergreen.edu/vistas>

### VISTAS Science Collaborators

John Bolte, Jonathan Halama  
Oregon State University, Corvallis OR.

Robert McKane, Allen Brookes  
EPA Western Ecology Division, Corvallis OR

Christoph Thomas, University of Bayreuth, Germany

## About VISTAS

Grand challenge environmental science problems involve large data sets spanning multiple spatial and temporal scales, with complex, highly distributed, heterogeneous data. Visualizing natural phenomena helps scientists formulate new insights, tune models, and communicate results, but ecologists rarely use sophisticated visualization tools. We ask why not.

The **VisualizatiON of Terrestrial and Aquatic Systems** (VISTAS) project, an NSF-funded collaboration among ecologists, computer scientists, and social scientists has created software to help scientists better understand and communicate environmental science through 3D interactive topographic images. VISTAS overlays 2D maps onto 3D digital elevation maps, emphasizing the topography of the landscape, and helping people recognize familiar landmarks and better understand the role complex topography plays in the ecology of the land.

## Current Status

VISTAS focuses on 3D topographical visualizations over time and perspective. To date, we superimpose measured or modeled variables on digital elevation models and allow scientists to view and interact with single frames, animations, or multiple images. This poster presents visualizations of scientific teams whose data (at different scales) is often presented to decision makers. Each image elucidates one or more concepts that might be better conveyed using VISTAS than with prior tools. 3D terrain, enhanced topography, interactive perspective browsing and manipulation, animation over time, side-by-side viewing of data at different points in time or different attributes.

VISTAS software is freely available in the public domain and any images created with VISTAS remain the property of the person(s) or institutions that created the images. Please visit <http://blogs.evergreen.edu/vistas>.

## Tribal Use of VISTAS?

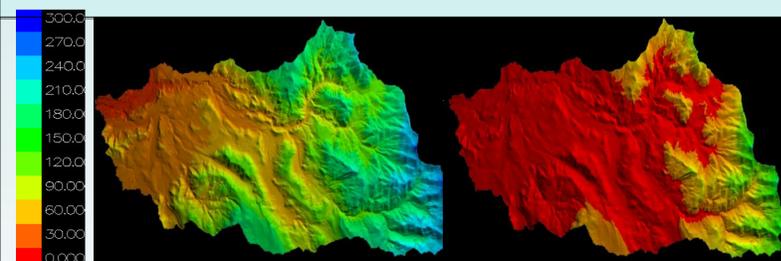
VISTAS collaborators report that *some* data are more effective when superimposed on 3D topography than when seen as 2D maps, and leads to new ways of thinking about how ecosystems respond to stress.

We just received new NSF funding to explore using visualizations to bring communities together with scientists to co-develop climate change adaptation strategies. We believe tribes might be interested in using VISTAS to explore climate change impacts on Native Lands, or to help teach about environmental issues that affect Native life and culture.

We thus seek tribal engagement to create opportunities to share new visualizations that might be useful when exploring the ecology of tribal trust lands.

**ASK TO SEE ANIMATIONS!**

## Hydro-Biogeochemical Processes VELMA



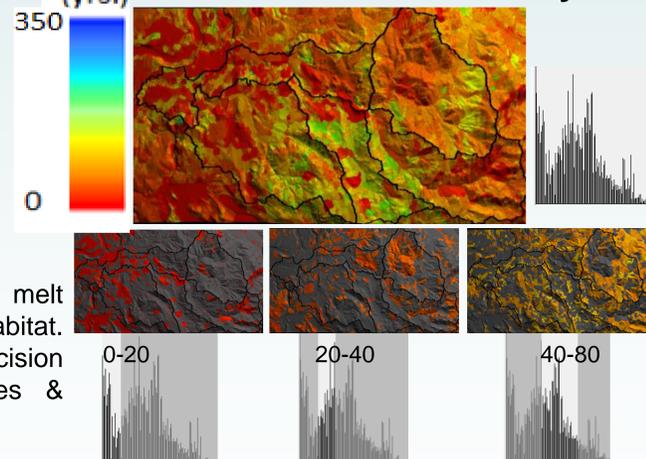
Mashel Watershed Snow Depth (SWE)

Feb 4 & 9, 1996

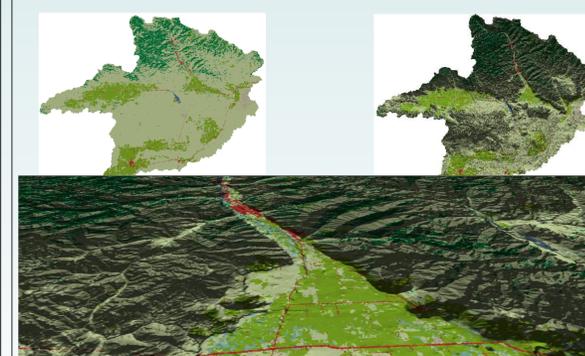
### Begin & After Rain-on-Snow Event

VISTAS 3D stills help Bob McKane (EPA Corvallis) illustrate snow melt (above) and Forest Age consequent effects on stream hydrology & habitat. These and other visualizations are facilitating science-based decision support for Salmon Recovery Planning by Puget Sound tribes & communities. LandTrendr (data at right), R. Kennedy et al.

### Mashel Forest Age Map Distribution 0 to ~150 yrs.



## Alternative Land Use ENVISION



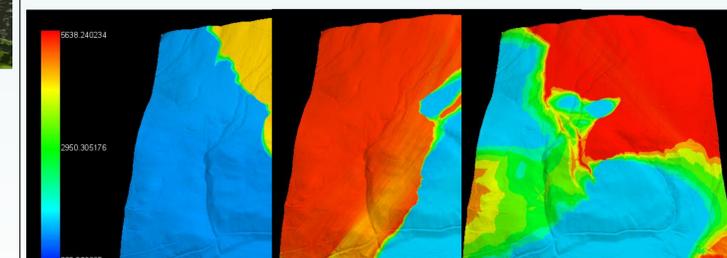
### Vegetative Cover & Land Use Big Wood Basin, Idaho

Ecologist Allison Inouye used VISTAS to show land use futures near Sun Valley. Above (left) 2D image vs. (right) 3D image. Below: Still from VISTAS fly-through.

## Modeling Irradiance Penumbra

### Following the Sun at Mt. Gardner, WA July 6, 2013

3D VISTAS animation helps Jonathan Halama (OSU Ph.D. Candidate) fine-tune & validate his Irradiance model & then create images to illustrate changes in light at ground level as shaded by vegetation at this Snotel Site. Other applications will help visualize effects on snow melt, stream temperature and plant growth.



VISTAS' focus is data from HJ Andrews Long Term Ecological Research (LTER) Site in the Cascade Mountains, Oregon, USA.



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For more information visit <http://blogs.evergreen.edu/vistas> or contact: [judyc@evergreen.edu](mailto:judyc@evergreen.edu)



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