

ABSTRACT

Visualizing Terrestrial and Aquatic Systems in 3-D

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The environmental modeling community has a long-standing need for affordable, easy-to-use tools that support 3-D visualization of complex spatial and temporal model output. The Visualization of Terrestrial and Aquatic Systems project (VISTAS) aims to help scientists produce effective environmental science visualizations for analyzing their own data and for communicating their work to other scientists, decision makers, and the public (Cushing et al. 2015). VISTAS software can be freely downloaded from <http://blogs.evergreen.edu/vistas/>. Here we present a short video that demonstrates how VISTAS can be used for 3-D visualization of large spatial and temporal datasets generated by a process-based ecohydrological model, VELMA (Abdelnour et al. 2011). For example, for a USEPA community-based modeling project in the 209 km² Mashel River Watershed in western Washington, VELMA is generating 100s of gigabytes of output describing how changes in climate and land use affect the capacity of this ecosystem to provide clean water, flood control, timber, fish and wildlife habitat and other services important to human well-being. Using 3-D images and animations of VELMA output, the video demonstrates how VISTAS can be used to better understand and communicate projected changes in snowpack and streamflow over the next century. This demonstration highlights the ability of VISTAS to simultaneously animate and integrate high-resolution 3-D maps and 2-D graphics describing spatial and temporal model output – for example, daily changes in soil moisture for 2012 vs. 2112, and how those changes influence daily streamflow. For the Mashel project, VISTAS 3-D maps, movies and graphics are being used to communicate complex model results in a visually intuitive way for local and regional stakeholders engaged in restoring stream and riparian habitats for recovery of endangered salmon populations.