

# Science

## BRIEFING

March 2, 2014

## WESTERN U.S. STREAM FLOW METRIC DATASET

### BACKGROUND

Flow regime is of fundamental importance in determining the physical and ecological characteristics of a river or stream, but actual flow measurements are only available for a small minority of stream segments, mostly on large rivers. Flows for all other streams must be extrapolated or modeled. Modeling is also necessary to estimate flow regimes under future climate conditions. To date there are few databases of modeled stream flows that are broad in coverage, fine in resolution, and available for both historical and future climate conditions.

### RESEARCH

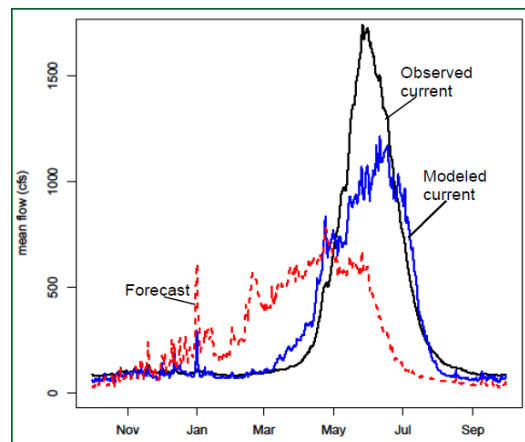
**Research Activity:** RMRS researchers developed a database of modeled flow metrics for streams in major river basins of the western US for historical conditions and under future climate change scenarios. These are based on daily simulations of the [Variable Infiltration Capacity \(VIC\)](#) macroscale hydrologic model produced by the University of Washington Climate Impacts Group. Model outputs were used to calculate a set of summary flow metrics (mean annual flow, mean timing of runoff, and winter frequency of high flows) to describe key attributes of the flow regime for all stream segments across the western U.S. (excluding large rivers) using the [NHDPlus](#) stream hydrography layer.

### Benefits to Resource Managers:

Water resource planners and land managers need tools to assess climatic effects on sensitive aquatic species so that limited resources can be directed to restoration and preservation actions in areas that have been prioritized to have the greatest potential for actual conservation benefit. Stream-flow prediction tools provide this essential information to resource managers. The VIC model is a useful for understanding the effects of hydrology in delimiting species distributions and predicting the potential effects of climate shifts on aquatic organisms.



*Flow metrics were modeled for streams in major river basins of the western US.*



*Hydrograph displaying observed historical flow (black), modeled historical conditions (blue), and forecasted climatic conditions (red) for Johnson Creek, Idaho.*

### KEY POINTS

- Climate change is projected to alter the flow regimes of streams and rivers, with consequences for physical processes and aquatic organisms.
- The stream flow metric dataset makes it possible to study the effects of droughts, changes in snowpack, water resource impacts, and other hydrologic changes for historical and future climate change scenarios.
- Datasets are available for historical conditions (1978-1997) and for future climate change scenarios associated with global climate models

### MORE INFORMATION

Flow metrics and climate scenarios are available for free download at the Stream Flow Metric Dataset website, [www.fs.fed.us/rm/boise/AWAE/projects/modelled\\_stream\\_flow\\_metrics.shtml](http://www.fs.fed.us/rm/boise/AWAE/projects/modelled_stream_flow_metrics.shtml). For additional information and important caveats on data accuracy and appropriate use, please contact **Charlie Luce**, USFS Research Hydrologist, (208)373-4382 or [cluce@fs.fed.us](mailto:cluce@fs.fed.us).