

# FY 2009 RESEARCH PROBLEM STATEMENT

Use this form to submit a problem statement

Submittal via E-mail is preferred: Save the form and give it a new, descriptive name, then send to:  
barnie.p.jones@odot.state.or.us

ODOT Research Unit  
200 Hawthorne Ave. SE, Suite B-240  
Salem, OR 97301-5192

Office Phone: (503) 986-2700  
FAX Phone: (503) 986-2844

## TITLE

**Streamflow peak flows in small, mountainous streams**

## PROBLEM (Description of need)

Small, mountainous streams are some of the most difficult places for estimating peak flows. Large variability in soil and vegetation conditions, differences in elevation and a scarcity of long-term/ small drainage area stream gaging stations results in poor flood estimates for watersheds with drainage areas of less than 5 square miles. Predictions are worse still for watersheds with drainage areas of less than a square mile.

## PROPOSED RESEARCH, DEVELOPMENT OR TECHNOLOGY TRANSFER ACTIVITY

Research is a two-step process. Step one involves collecting five years worth of low-cost peak streamflow estimates across a variety of watershed conditions in the Coast and Cascade mountain ranges. Peaks will be estimated using crest stage gages, a simplistic non-electronic device that measures peak stage with cork. These peak stages are translated into peak flows by surveying in the crest stage gage readings and other high water marks, and inputting the elevations into a peak flow model. This procedure, called "Indirect Flow Modeling," has been utilized by the USGS for decades in determining peak flows for stations without stage/discharge relations. Crest stage gages will also be set up at preexisting streamflow stations with small drainage areas, including USGS sites funded by the Bureau of Land Management and Oregon State University sites in HJ Andrews experimental forest. Accuracy of the indirect flow measurements can be verified by comparing flow estimates made using the indirect model with those estimated using the stage/discharge relationship.

Step two involves creating equations for predicting peak streamflows statistics throughout the Coast and Cascade mountain ranges. The peak discharges at the crest stage gage sites will be combined with the long-term records of the BLM and HJ Andrews sites to create regional equations for estimating flood levels of various return intervals.

## BENEFITS

Having more precise estimates of small watershed peak flows will provide fiduciary benefits in the design and upkeep of flow structures, including bridges and culverts. All new equations will be entered into USGS StreamStats. Personnel from BLM and USFS will assist with data collection analysis.

## CONTACT PERSON:

Name, address phone number and e-mail

**Adam Stonewall, USGS**  
**2130 SW 5<sup>th</sup> Ave**  
**Portland OR 97201**

## FOR RESEARCH UNIT USE ONLY

*NCHRP*  
*SPR*  
*POOLED FUND*  
*STATE*  
*OTHER*

**503-251-3276**

**stonewal@usgs.gov**

**PLEASE RENAME THE COMPLETED FORM WITH A SHORT NAME RELATING TO THE RESEARCH TOPIC.**

**Submittal of this form via E-mail is preferred. Send to: [barnie.p.jones@odot.state.or.us](mailto:barnie.p.jones@odot.state.or.us)**