

# FY 2009 RESEARCH PROBLEM STATEMENT

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## TITLE

**Prediction of future flow regimes based on climate change**

## PROBLEM (Description of need)

Elevated levels of carbon dioxide, methane and other heat-trapping gasses are theorized to have significant impact on future climate patterns. This is expected to result in a myriad of changes to regional flow regimes. Regional warming may produce earlier snowmelt peaks at high altitudes. Decreasing levels of snowpack may result in more frequent and pronounced droughts in some areas. Increases in short-term rainfall intensity may produce larger floods in small watersheds. Without adequate insight into probable future flow regime changes, flow structures such as bridges and culverts will be designed based on historical flow data that may not prove accurate for future flow regimes.

## PROPOSED RESEARCH, DEVELOPMENT OR TECHNOLOGY TRANSFER ACTIVITY

Predictors of future climate patterns such as General Circulation Models (GCM's), Regional Circulation Models (RCM's) and Transient Climate Simulations are becoming more consistent as computing power approaches needed levels for the complexity of these models. Existing streamflow models are capable of predicting various streamflow statistics with adequate precision in homogeneous regions. Coupling rainfall and temperature outputs from GCM's and RCM's with proven streamflow models will provide needed insight into which regions within the state are most susceptible to flow regime change, and in what form that change is likely to take. Potential cooperative research links with PSU and OTREC will be considered.

## BENEFITS

Determining where flood levels are likely to increase will aid in the design of new, upgraded or retrofitted flow structures such as bridges and culverts, thus minimizing the occurrences of failures or over-designs. Future changes to the lower end of the flow regime could have significant impacts on fish passage and water-use permit decisions.

## CONTACT PERSON:

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