



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002NV9B

Title: Long-Range Water Supply Forecasting for Nevada and the Colorado River Basin

Project Type: Research

Focus Categories: Climatological Processes, Water Supply, Surface Water

Keywords: hydroclimatology, forecasting, streamflow, water supply, El Nino-Southern Oscillation

Start Date: 03/01/2002

End Date: 02/28/2004

Federal Funds: \$19,027

Non-Federal Matching Funds: \$38,992

Congressional District: Nevada 01

Principal Investigator:

Thomas C. Piechota

University of Nevada at Las Vegas

Abstract

Proposed herein is a two-year research study that develops improved long-range water supply forecasts for rivers that are important for the management of water resources in Nevada. This includes tributaries of the Colorado River which is the main source of water supply for Southern Nevada, and the Truckee, Walker, and Carson rivers in Northern Nevada. At the beginning of a water year (October 1, 2001), water managers do not have information on the upcoming spring-summer runoff. Currently, water supply forecasts are issued in January of the water year. The spring-summer runoff is important for meeting the demands of competing water uses (e.g., municipal, industrial, agriculture, recreation, environmental, hydropower). The proposed research establishes links between streamflow variability and large-scale atmospheric and oceanic circulation patterns. These "teleconnections" are then used in developing long-range streamflow forecasts that can be issued at the beginning of the water year. The long-range water supply forecasts are based on linear discriminant analysis (LDA) and combine the skill associated with several predictor variable such as persistence, El Niño - Southern Oscillation (ENSO) indicators, the Pacific Decadal Oscillation (PDO), and Pacific sea surface temperatures (SSTs). An exceedance probability forecast is developed and presents water managers with information that can be used with their assumed level of risk. The final task is to incorporate the forecasts into reservoir operation models for select systems. The uncertainty associated with the forecasts is included using the set control approach (SCA) which presents decision making authorities with a feasible set of alternatives that meet certain operational constraints. The final product will be an improved water supply forecast that can be used at the beginning of a water year.