



WATER RESOURCES RESEARCH GRANT PROPOSAL

Title: Analysis of Water Use Trends in the United States: 1950-1995

Focus Categories: WU, COV, MOD

Keywords: Weather Demand, Water Use Data, Statistical Models, Data Sources

Duration: 9/99 - 8/01

Federal Funds Request: \$150,000

Non-Federal Matching Funds Pledged: \$204,034

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Abstract

Improved information about water withdrawals and uses in specific geographical regions, and a basic understanding of the factors that influence water use, are a necessary requirement for sound water resources management. The U.S.G.S. National Water-Use Information Program (NWUIP) has collected and published an extensive inventory of water use information since 1950. This information has provided a basis for the development and evaluation of national water policies as well as regional and local plans for the development and use of water resources. It also offers an excellent opportunity for examining and explaining historical trends in water use, and to improve our understanding of the factors that influence water use. The proposed study will make two significant contributions to the science of water demand analysis:

- 1) it will provide important insights into the effects of individual factors that have influenced historical water withdrawals, and uses by various sectors, and
- 2) it will estimate the quantitative impact of various efforts aimed at improving the efficiency of water use.

Both total off-stream water use, and withdrawals by water-use and selected subcategories, will be analyzed as dependent variables.

These withdrawals will be correlated with demographic, economic and other determinants that are likely to explain water use such as: changes in the availability of water, the price of water, market saturation of technological water saving innovations, changes in national and state regulations, water and wastewater treatment costs, adoption

of best management water conservation practices, changes in industrial production and productivity, and other factors.

The major task of the proposed study is to assemble two databases from which the relationships between water use and the likely explanatory variables can be estimated. These two databases will include:

State-Level Database, which will combine the 480 observations in each category (and sub-category) of water use (10 benchmark years in each of the 48 States) with state-level observations of the values of potential explanatory variables for the same period.

County-Level Database, which will combine more than 30,000 observations in each category (and sub-category) of water use (10 benchmark years in the 3,143 counties), with county-level observations of potential explanatory variables

Many different data sources will be explored in the search for appropriate explanatory variables. Demographic and economic data will be obtained from official governmental sources, such as Bureau of the Census and Bureau of Economic Analysis. Other sources will include information collected by state and nongovernmental organizations, such as retail water price data that are available from periodic surveys conducted by the American Water Works Association. The availability of data through the Internet also offers an opportunity to obtain and organize the necessary data at a reasonable cost by using the existing and emerging Internet technologies. The study team will make maximum use of these electronic sources of data and data-retrieval technologies

Specific outcomes of this study will include a series of multivariate econometric models, which will relate the historical water use by each category to a number of explanatory variables. These models will be evaluated for their ability to estimate state-level water withdrawals using variables obtained from easily available data sources. The estimated relationships will be used to prepare estimates of water withdrawals for the year 2000, which can be checked for accuracy once the actual measures become available.