



## WATER RESOURCES RESEARCH GRANT PROPOSAL

1. **Title:** Evaluating Water Policy Affecting Fish Habitat, Hydrology, and Irrigated Agriculture in the Snake River Basin.
2. **Focus Categories:** HYDROL, IG, ECON
3. **Keywords:** Ground and Surface Water Hydrology, Irrigation, Economics, Fish Habitat
4. **Duration:** September 1, 1998 through August 31, 2000
5. **Federal Funds Requested:** \$128,159
6. **Non Federal Funds Pledged:** \$264,959
7. **Principal Investigators:**

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8. **Congressional District:** The Fifth of Washington State
9. **Statement of Critical Problem:**

Changes in water management policies for the Snake River are required as a consequence of the 1991 classification of Salmon River Sockeye as endangered and the 1992 classification of Spring and Summer Chinook Salmon stocks as threatened under the Endangered Species Act. As in many basins in the western United States, the Snake River is heavily appropriated for irrigation and hydroelectric power production, resulting in problems relating to water quantity and quality in Idaho, Oregon and Washington. Further, surface water and groundwater are highly interdependent in the region. Deep percolation of irrigation water in the upper Snake River basin recharge the Snake Plain aquifer, and outflows from the aquifer augment river flows in the lower basin. Given that nearly 4 million acres are irrigated with water diversions from storage reservoirs, streams, and aquifers in the upper basin, actions taken to increase instream flows, in the lower river will have direct impacts on water supply quantity and quality in the upper Snake River and the Snake Plain aquifer. Consequently, changes in water policy to assist salmon recovery may dramatically affect the hydrology and the agricultural economy of the region.

Research is needed to seek out the most desirable policy alternatives to restore salmon habitat and minimize the undesirable impacts on other portions of the basin's ecosystem and economy. Specific water policies, including minimum flow regulations, agricultural water conservation and institutional changes, are currently being considered by the National marine Fisheries Service, the Northwest Power Planning Council, the Bureau of Reclamation, the Army Corps of Engineers and the Idaho Department of Water Resources. The changes in water policy being considered are sizable. For example, the Army Corps of Engineers is currently undertaking a study to assess a range of alternatives, including increasing instream flows by as much as 1 million acre-feet. Such a large change in water allocation will have a significant impact on irrigated agriculture, hydroelectric power production and the hydrologic components of the region. Because the changes being considered are central to the operation of the Snake River system, it is necessary to examine all dimensions of policy effects from a multi-disciplinary perspective with an integrated modeling approach. The objective of this research is to evaluate alternative water policy choices for salmon recovery in the Snake River basin for effects on quantity and quality of streamflow, groundwater recharge and discharge, irrigated agricultural production, hydroelectric production, and the region's economy.

## **10. Benefits of Proposed Research**

The proposed research will benefit regulatory agencies, policy makers, water resource users and the general public by developing and providing knowledge and analytical methods that will result in better management and use of limited water resources. The primary goal will be to quantify the trade-offs and impacts of acquiring water from the upper Snake River basin to enhance instream flows for salmon recovery in the lower basin. More specifically, the type of information the proposed research will produce are quantitative changes in river flow, reservoir storage, aquifer recharge and discharge, cropping patterns in irrigated agriculture, irrigation management practices and technologies, the quality of excess applied water, hydroelectric power production and the impacts of these changes on the region's economy. This will allow policy makers to assess the trade-offs between acquiring instream flows and the impacts to the region's hydrology and the regional economy.

Information developed in this project will be used by federal regulatory and policy-making agencies as they consider the efficacy of alternative measures for salmon recovery, and the consequences of such measures on the myriad of stakeholders. The set of models developed during this research will enable agencies to assess a variety of policy options. More specifically, the set of models will be able to examine changes in physical management policies, such as

minimum flow requirements and storage water releases, and economic policies, such as water marketing and long-term water right purchases.