

2008-09 TWRI Mills Scholarship Application

Student Name : Chihun Lee

Name and Contact Information for Faculty Advisor or Committee Chair

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Description of the student's proposed research

The purpose of my research proposed is to *investigate the impacts of natural salt pollution on water supply capabilities of river/reservoir systems in Texas.*

Statement of the problem

Salinity is a major determinant of where and how the water resources are used and also natural salt pollution is severely constraining the beneficial use of large amounts of water. The U.S. Environmental Protection Agency secondary drinking water standards suggest a maximum TDS limit of 500 mg/l set on the basis of health effects and taste preferences and because conventional treatment processes do not remove salinity. Salts also damage pipelines, equipment, household appliances, and industrial facilities. Salinity is also a major consideration in irrigated agriculture. Acceptable salt concentrations for irrigation vary greatly depending on the type of crop, soil conditions, climate, and the relative amounts and timing of rainfall versus supplemental irrigation. TDS concentrations of less than 1,000 mg/l are usually preferred for irrigation

In Texas, natural salt pollution severely constrains the water supply capabilities of the Brazos River and other neighboring rivers. Geologic formations in the Permian Basin geologic region are the primary source of the salinity. Salt springs and seeps and salt flats in the upper watersheds of the Brazos, Colorado, Pecos, Red, Canadian, and Arkansas Rivers contribute large salt loads to these rivers. The salinity drastically limits the municipal, industrial, and agricultural use of water that could otherwise be supplied by a number of existing large reservoirs located on these rivers.

The objectives of the study

1. Develop an improved understanding of the occurrence and transport of salinity in river/reservoir systems to support improvements to the salinity simulation features of the WRAP (Water Rights Analysis Package) modeling system.
2. Improve, expand, test, and evaluate the capabilities of the salinity components of WRAP for assessing impacts of natural salt pollution on water availability and supply reliability.
3. Develop and implement strategies for incorporating salinity considerations into the Texas Water Availability Modeling (WAM) System.
4. Apply the modeling capabilities developed by the research to assess the impacts of natural salt pollution on water supply capabilities of river/reservoir systems in Texas and the effectiveness of alternative strategies for dealing with the salinity.

Proposed use of funds resulting from this Scholarship

The resulting funds from this scholarship will be used primarily to pay for tuition, university fees, and textbook materials. Also, these funds could be helpful to pay for travel expense for academic

conference.

Intended career path the student anticipates pursuing

After finishing my Ph.D., I will plan to take a post-doctoral position at US or Korea. This experience of post-doctoral position could be helpful to gain broad knowledge in water resources study area. Finally, I will plan to apply research professor jobs in University at US or Korea.