Salinity Simulation of the Rio Grande Above Amistad

Dr. S. Miyamoto, H. Manwar, Dr. F. Yung, Texas A&M AgriLife Research
Dr. R. Muttiah, Texas A&M AgriLife Research and Extension Center at Temple
Dr. K. Inosako, Department of Agricultural Engineering, Tottori University, Japan

BACKGROUND

Salts are the most frequent contaminant which limits full utilization of water resources in Texas. The Rio Grande is not an exception. Salinity at Amistad International Reservoir has risen close to the federal drinking water standard of 1000 ppm in 1986/87 and again in 1994. The reason for these increases is unknown. The goal of this project is to understand the cause(s), and to develop a simulation model useful for evaluating various salinity control options.

APPROACH

- Determine the extent of salt storage in river banks and floodways.

- Analyze the historical salt balance in various reaches of the Rio Grande above Amistad.

- Analyze flow and salinity relationships at major tributaries and reservoirs.

- Develop a realistic salt and water transport model considering streamflow-river bank interaction
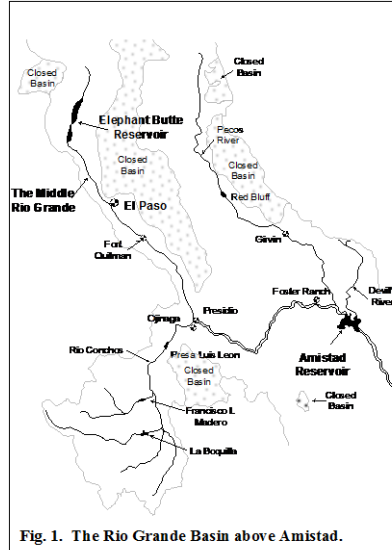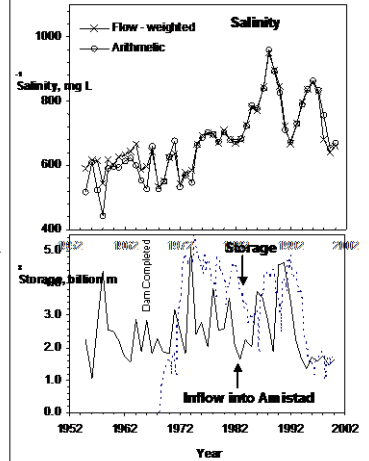

Fig. 1. The Rio Grande Basin above Amistad.

STREAM FLOW

- Flow – Salinity Relation
- Reservoir Impact on salinity
- Two dimensional flow process
- Routing Programs

Flow and Salinity Simulation Model

Model Verification

RIVER BANK

- Salinity of the river bank
- Salt Effects on Infiltration and salt leaching
- Estimate of Evapotransp.
- Salt Transport in the bank and floodplains

▨ Completed

CURRENT FINDINGS

- Salts stored in river banks and floodways vary with location, but amount to as much as 150 tons/ha in the root zone depth of 1.2 m in the reach below El Paso. For the floodway area between El Paso and Presidio, the storage is estimated at 1.2 million tons.

- The quantity of salts which were flushed during 1986 flood was estimated at 1.1 million tons based on IBWC flow and salinity data. This quantity was sufficient to raise salinity of the reservoir to 960 ppm.

- The salt and water transport model currently being developed will include both instream processes and inbank processes.

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