Lower Rio Grande/Rio Bravo Salinity Study (LRG/RBSS)

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TCEQ Environmental Trade Fair

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Introduction: David Eaton

- Four members of the binational team involved in the lower Rio Grande/Rio Bravo Salinity Study
- José Luis Fernández Zayas of Universidad Nacional Autónoma de México (UNAM)
- Dan Sheer, Miguel Pavon and David Eaton of The University of Texas at Austin (UT-Austin)

Sponsoring Government Agencies

- The two teams of consultants from UNAM and UT-Austin, cooperating under the guidance of three Mexican and three US government agencies:
- Comisión Internacional de Limítes y Aguas (CILA)
- International Boundary and Water Commission, U.S. Section (IBWC)
- Comisión Nacional del Agua, Mexico (CONAGUA)
- U.S. Environmental Protection Agency (USEPA)
- La Secretaría de Desarrollo Urbano y Medio Ambiente de Tamaulipas (SEDUMA)
- Texas Commission on Environmental Quality (TCEQ)

Study Objectives

- Identify location and possible causes of increasing salinity
  - Preliminary analysis by Dr. Eaton's Policy Research Project (PRP) UT Austin
- Identify causes of salinity spikes
  - Salinity sometimes spikes to undesirable levels for public consumption
  - Cause of the spikes is unclear
- Discussion of Soil Salinization Issues, Economic Impacts, Agricultural Impacts, etc.

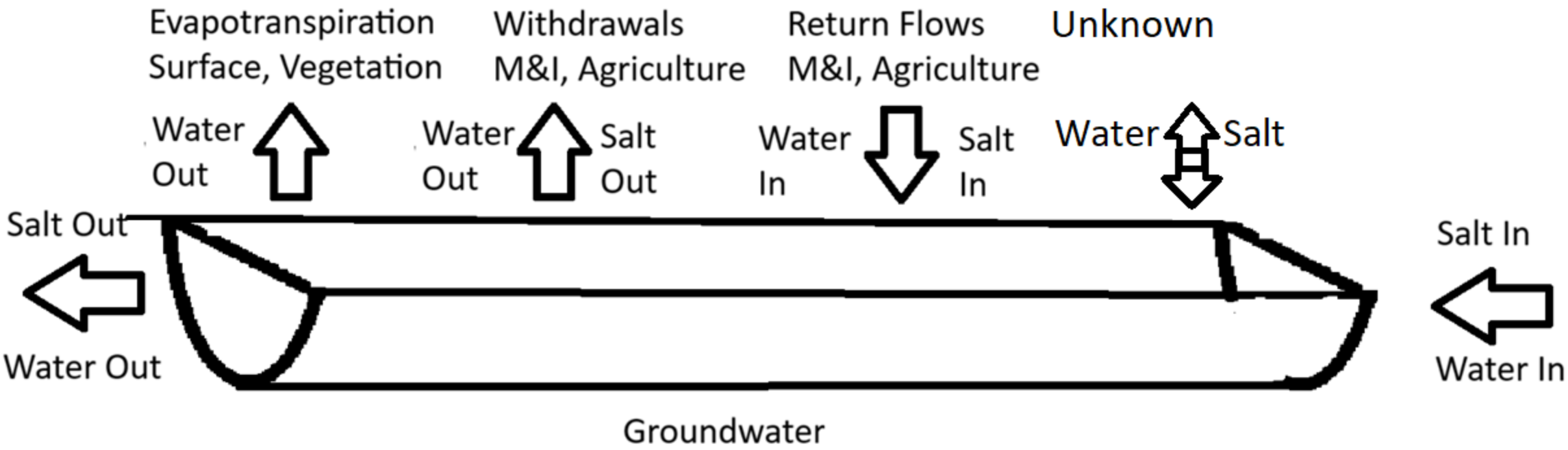
Basic Strategy: A Salinity Mass Balance

- The two consultants (UNAM and UT-Austin) collected data from Mexican and US sources on the flows and salinity within the RG/RB basin to explain changes and fluctuations in river salinity
- The approach included all sources of water/salinity that can enter the river and all withdrawals of water/salinity that can leave the river, where data was available
- Based on an understanding of the factors that affect salinity concentrations, the six sponsoring agencies can take action to prevent or control salinity
- An initial mass balance has been developed and improved upon as more data was collected and analyzed

Methods

- No new in situ data was be collected
- Mass Balance Accounting
  - Salt In = Salt Out for each reach
  - Reaches defined by monitoring stations with proximity and concurrent measurements of flow and specific conductivity (proxy for salinity) gives salt in (upstream) and salt out (downstream)
  - Additional diversion, discharge with flow and TDS, Salinity, or Specific Conductivity (Sp.C) will be used to augment the mass balance
  - Information on agricultural return flows used
  - Estimates of reach evaporation and phreatophytic water use used to augment mass balance
  - Unaccounted for loads calculated

Reach Mass Balance



Daily Analytical Time Step

- In some cases, 15 minute time-step data was available
  - Converted to daily using flow weighting as possible
- Daily time step eliminates much noise and facilitates tracking of what is going on during transient events
- Transients may be related to the timing of:
  - reservoir releases,
  - runoff peaks,
  - large diversions,
  - discharges and
  - return flows.

Categories of Data

1. Official Data (Highest Confidence)
   a. Example: Official CILA records
2. Best Available
   a. Example: IBWC Best Available
3. Artificial Data
   a. Calculated missing timesteps
   b. Anzalduas Canal
4. Unknown Data (Least Confidence)
   a. Assume “0” values

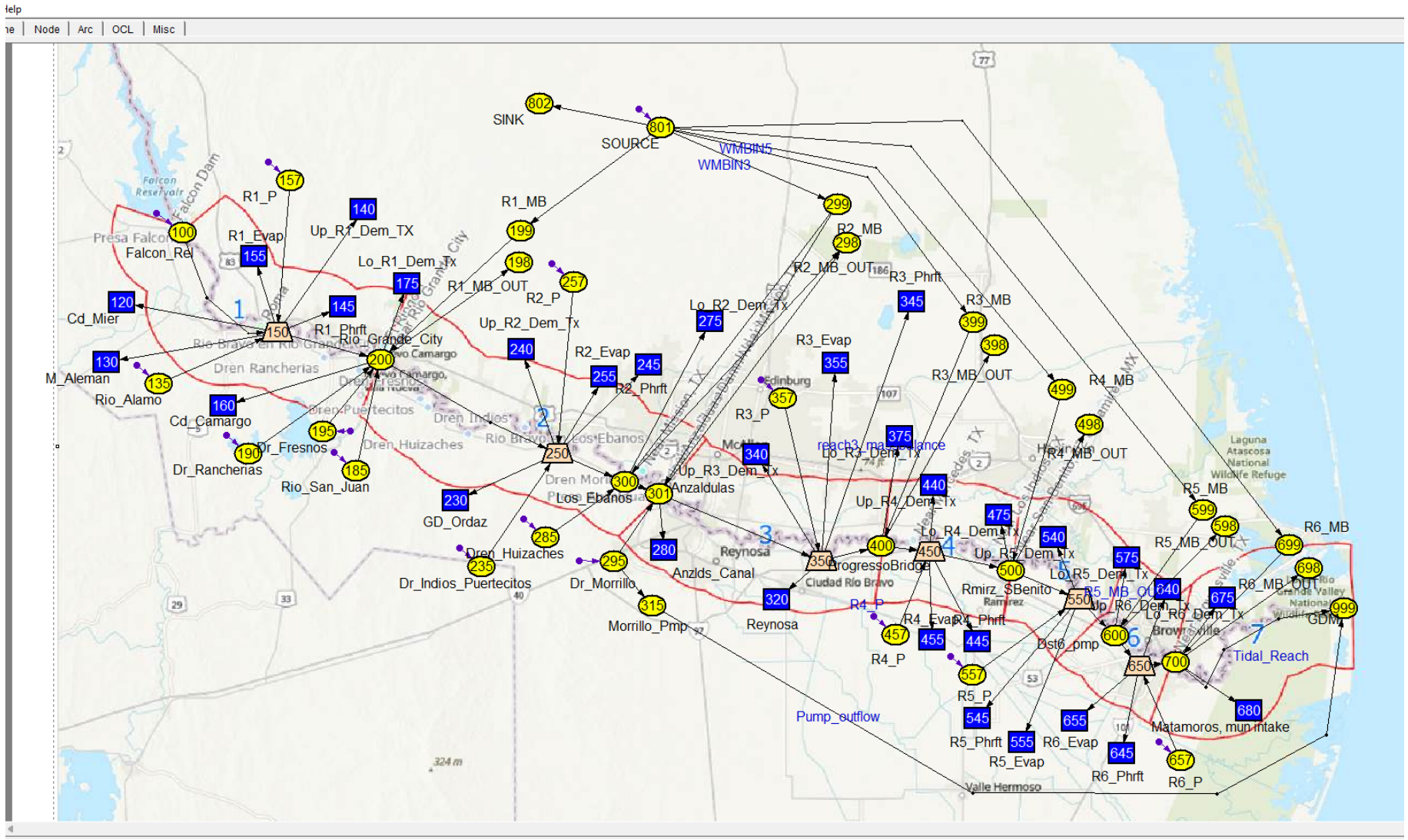
International Coordination

- The project includes consultants hired by Mexico and the US
- Wherever possible, conclusions will be reached by consensus
- Data exchange and analytical collaboration have begun
- Data Management Plan has been drafted and reviewed and confirmed in principle by consultants from both Mexico and Texas, and reviewed by Mexican and US government sponsoring agencies

Data and Analytical Sharing Principles

- All data sets utilized in evaluations on either side should be available to both sides. This could be accomplished with a shared data base.
- All data sets should be stored in a commonly accessible data base.
- Each side is free to utilize tools or analytical methods of choice
- Each side will make available any tool or analytical method to the other side

Model Schematic



Preliminary Conclusions

- Critical increase in salt load seems to be in reaches 1, 2, 2a, and 3
- Graphs identify where and when unknown salt loadings originate
- Additional dynamics at play:
  - Bank Seepage
- Data Gaps Highlight need for more robust monitoring network.

Questions?