

# Water Management Information System in Mexico – United States of America Border Region

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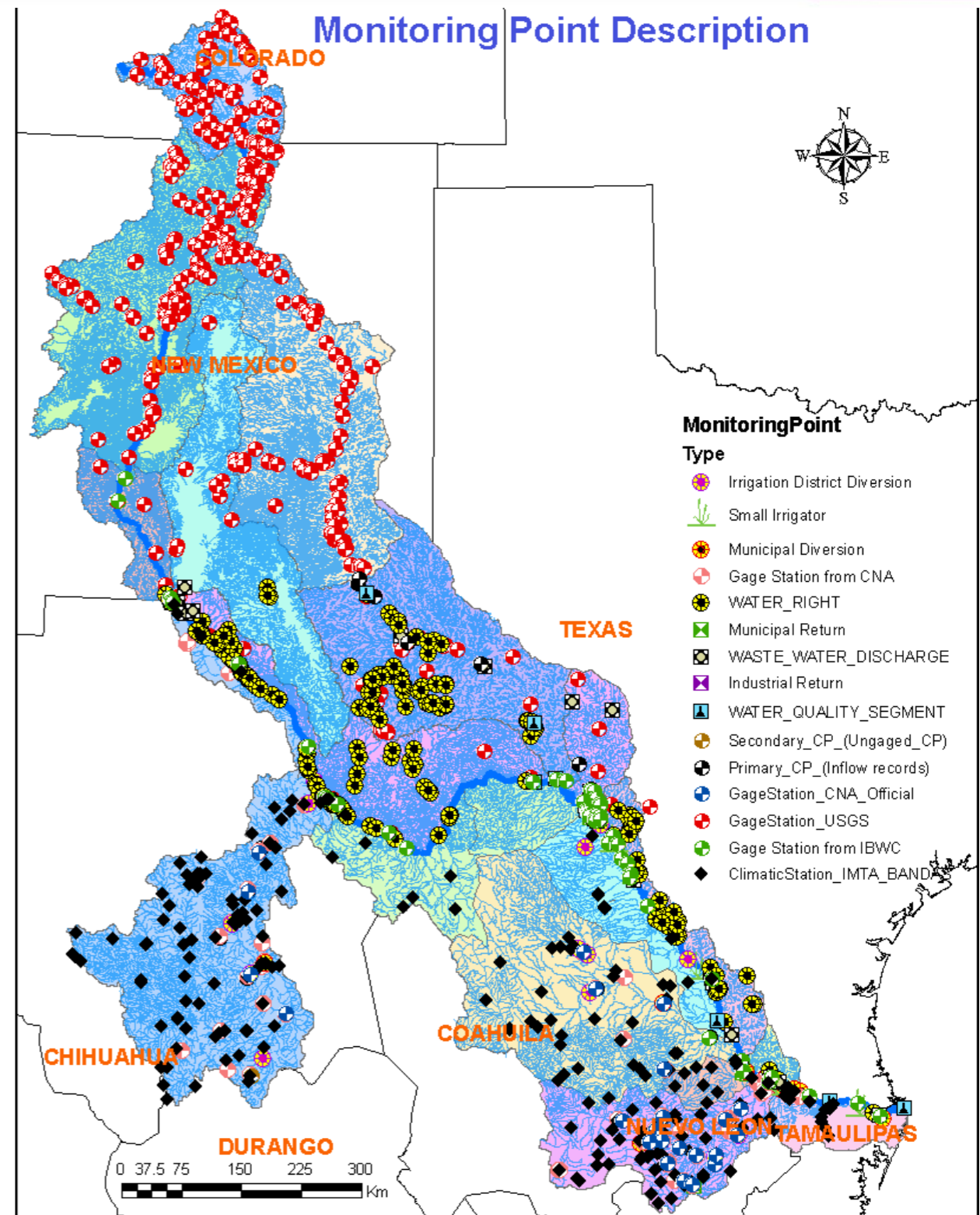
# Objective

The main objective of this study is to accomplish three tasks: develop a relational database (Geodatabase) for basins along the border Mexico-USA including both water quantity and quality data; and using data from the Geodatabase, create water quality models for selected basins of critical interest for Mexico & USA. Also, a Geodatabase of groundwater information for aquifers along the Mexico-USA border is being created.



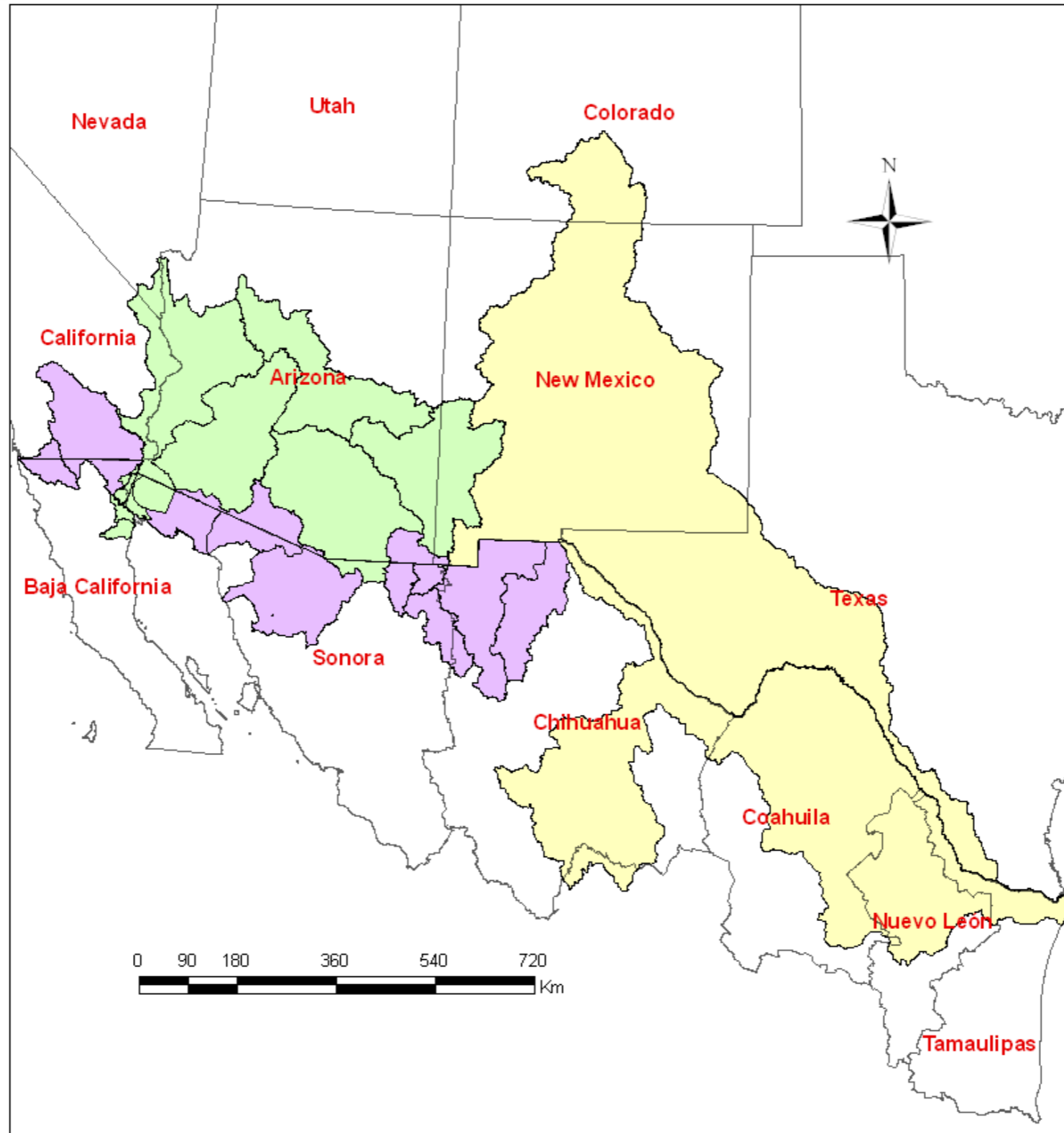
# Previous research

In previous research, the Center for Research in Water Resources (CRWR) of The University of Texas at Austin, and the National Water Commission (CONAGUA) of Mexico cooperated to develop the Rio Grande/Bravo Water Management Information System in which most of the water quantity and quality data for the binational Rio Grande/Bravo basin are included in a geographically referenced relational database





# Case study area

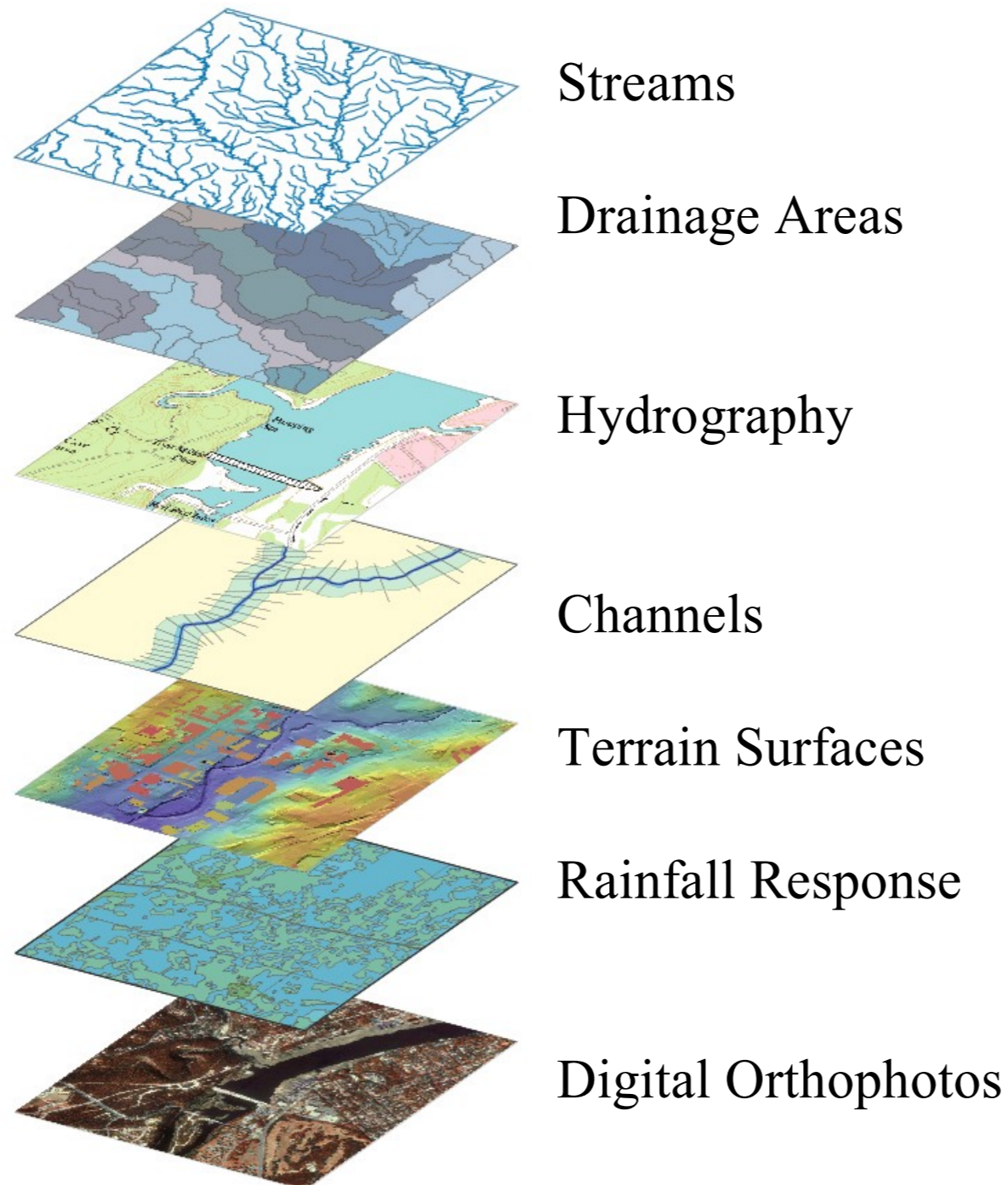




# Geodatabase Conceptual Model

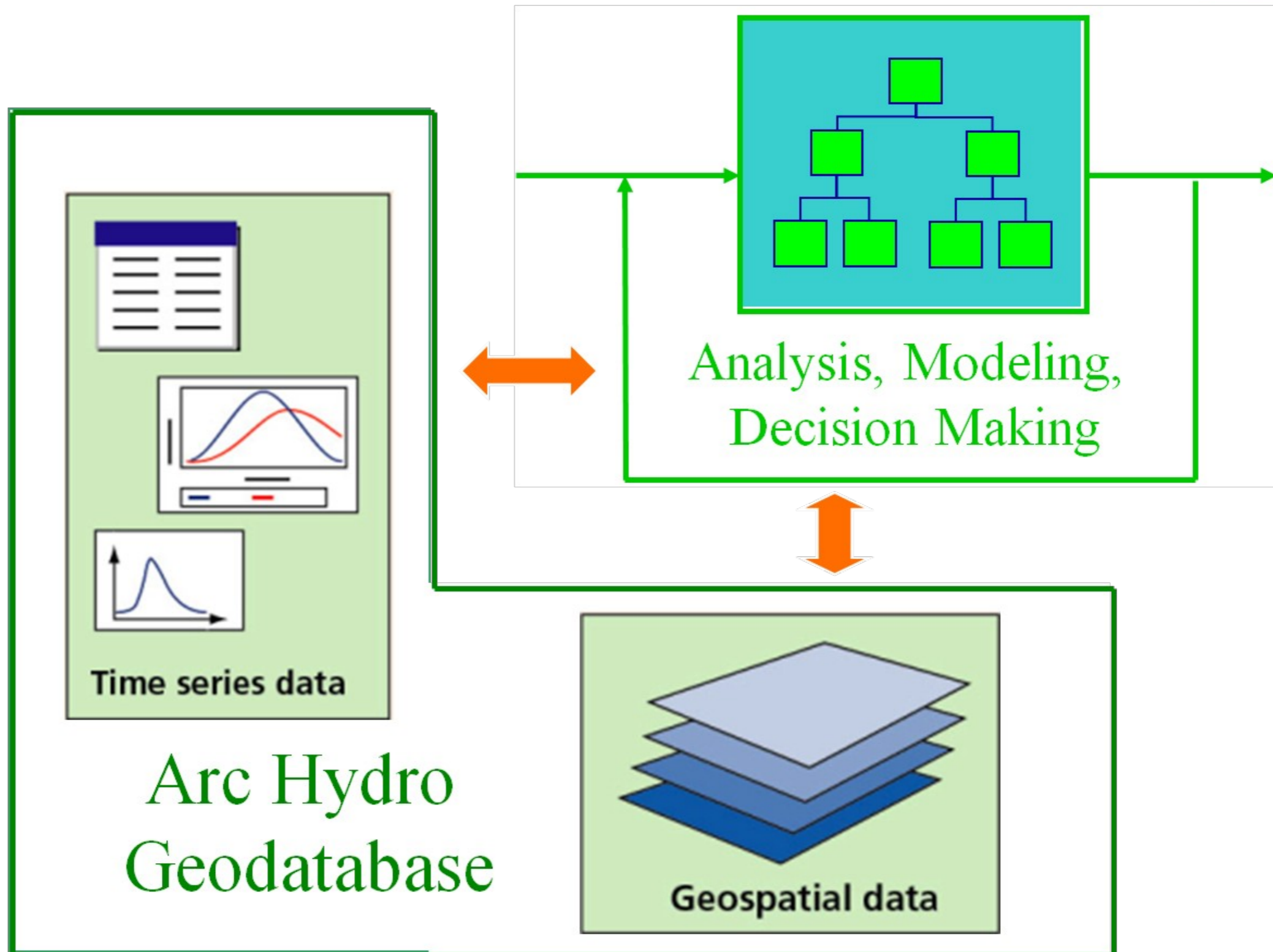


# GIS Database Design



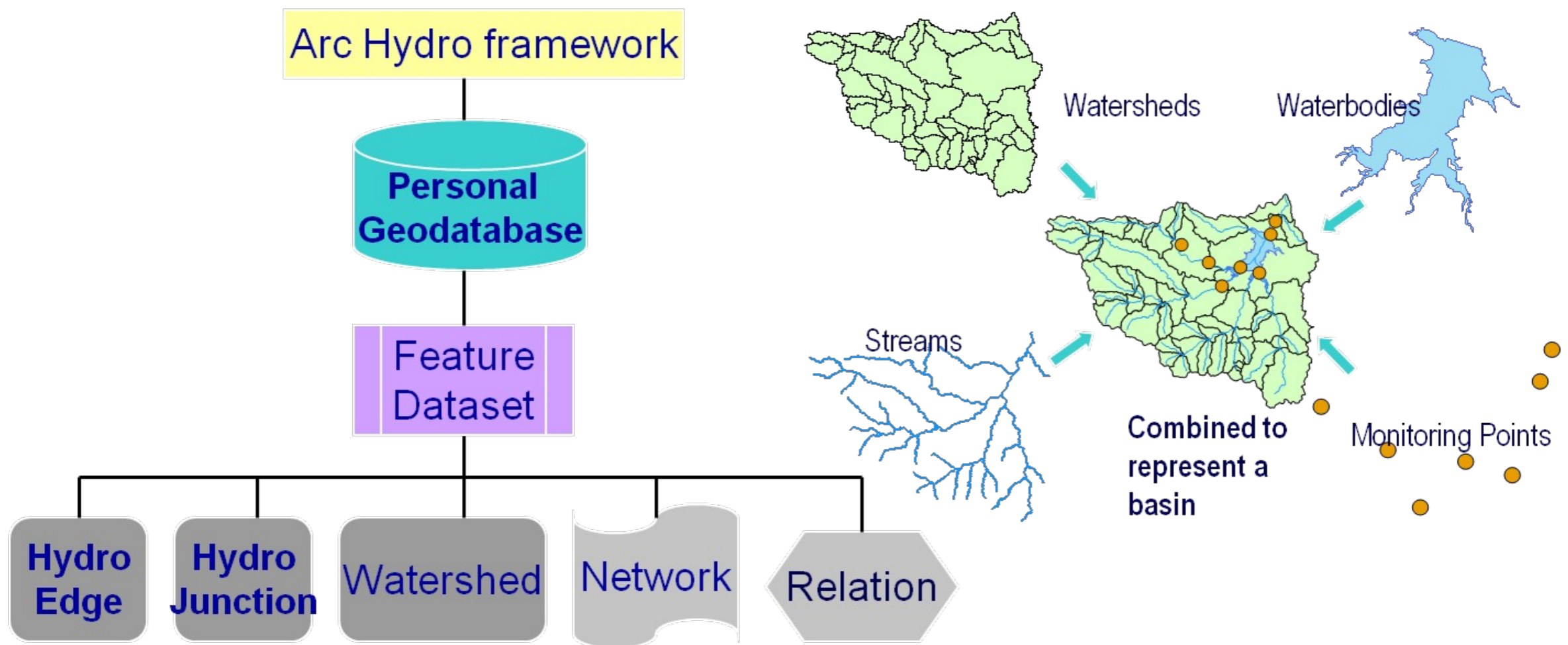
Data Model  
Based on  
Inventory

# Hydrologic Information System



# Arc Hydro Framework

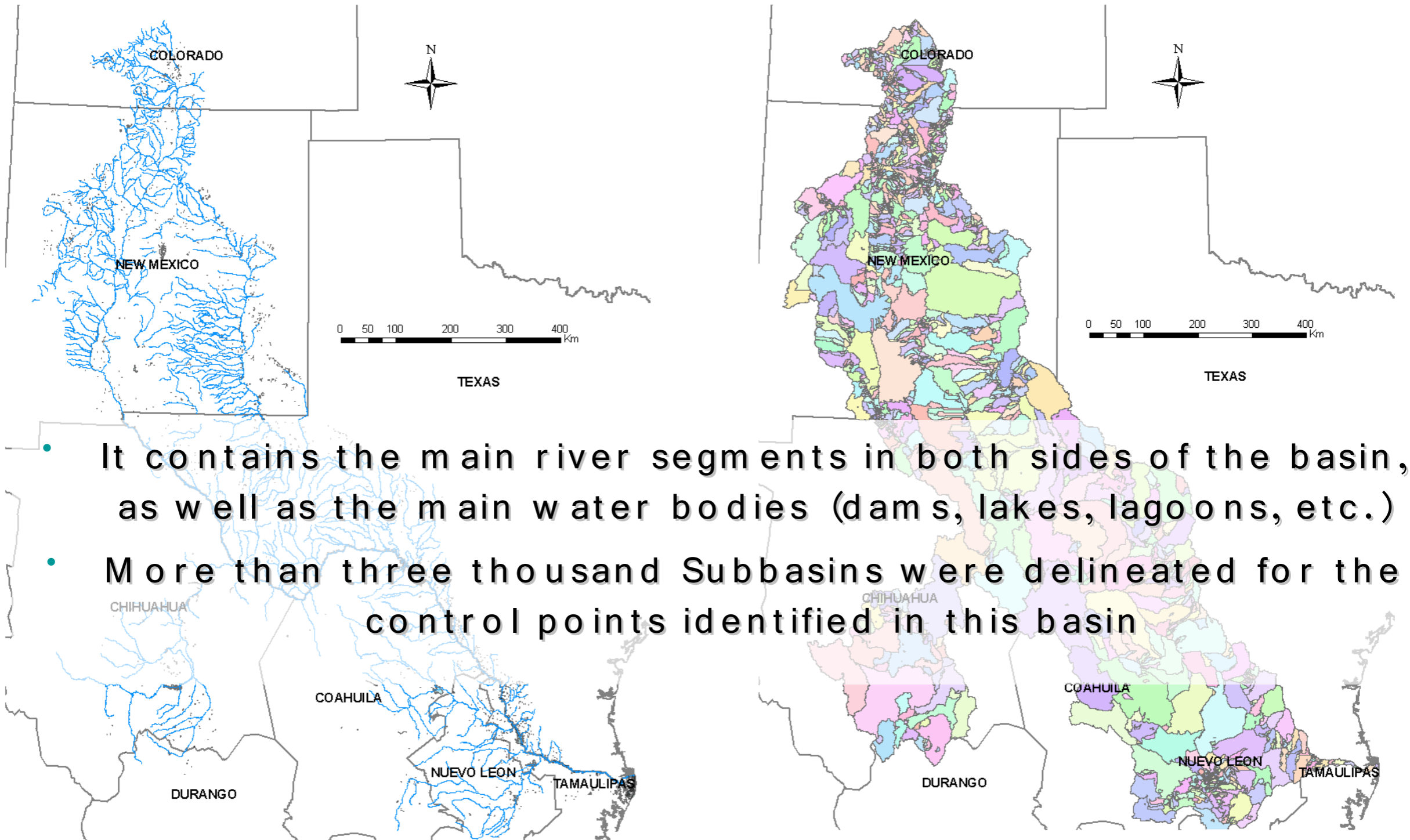
**Arc Hydro Data Model:** A Geodatabase containing a GIS representation of a Hydrological information System under a case-specific database design







# Water Bodies and basin delineation





# Conclusions

- Binational relational databases (Geodatabase) including water quantity and water quality information were created for the Rio Grande/Bravo basin using the ArchHydro framework
- Hydrological Geodatabase includes more than 5 million time series records
  - Available to Mexican and U. S. federal, state, and local organizations
  - Assisting in developing U S-Mexican bi-national cooperation concerning water in the Rio Grande basin
- Water quality Geodatabase stores around 370,000 water quality parameters associated with control points identified in this basin. This historical information is being reviewed and corrected by the CNA on the Mexican side.
- The same procedure is being reproduced for the west binational basins along the border Mexico - U SA



# Conclusions (Continued)

- Bi-national Geodatabase are being used in simulation models for the basin to
  - Explore new approaches to improve water management planning in these binational basins
    - Comprehensive, outcome-neutral, model-based planning
    - System-wide analytical capability (database, planning models, and stakeholder-driven scenarios)
    - Water quality modeling in W E A P
    - Hydrologic modeling of rainfall – runoff in the basin using climate change driven precipitation
- This project will assist Mexico to develop advanced capability to manage critical water resources in the border region shared with the USA and in developing bi-national cooperation between Mexico and the United States, providing accurate and reliable data necessary for analysis and resolution of water resources issues.



# ArchHydro Training Courses & Technology Transfer

- **U.S.**
  - Training Courses – TCEQ, IBWC, USGS, UTEP
  - Consultation – USGS, USEPA, IBWC, TCEQ
  - Installation – IBWC and UTEP
- **Mexico**
  - Training Courses – CNA, Tecnológico de Monterrey, UACJ, University of Nuevo Leon, IMTA, and CILA (in Spanish)
  - Consultation CNA, CILA, IMTA, Tecnológico de Monterrey
  - Installation – CNA, IMTA, Tecnológico de Monterrey
- **Spain**
  - Training Course – Valencia, Spain (in Spanish)
- **Panama**
  - Training Courses – Ciudad del Saber, Panama (in Spanish)
- **El Salvador**
  - Training Courses – Ciudad San Salvador (in Spanish)
- **Distribution**
  - Mexican and U.S. federal, state, and local agencies
  - IBWC and CILA
  - Mexican and U.S. NGOs and universities



# Collaboration

## Participants

- University of Texas at Austin
- Instituto Mexicano de Tecnología del Agua



## Support

- IBW C / C ILA
- Comisión Nacional del Agua
- Instituto Nacional de Estadística, Geografía e Informática
- North American Development bank
- Texas Commission on Environmental Quality
- Universidad Autónoma de Ciudad Juárez





## Geodatabase Distribution and Course Materials

<http://www.crr.utexas.edu/riogrande.shtml>

[ftp://ftp.crr.utexas.edu/pub/outgoing/patinoc/ArchHydro\\_Monterrey/](ftp://ftp.crr.utexas.edu/pub/outgoing/patinoc/ArchHydro_Monterrey/)

