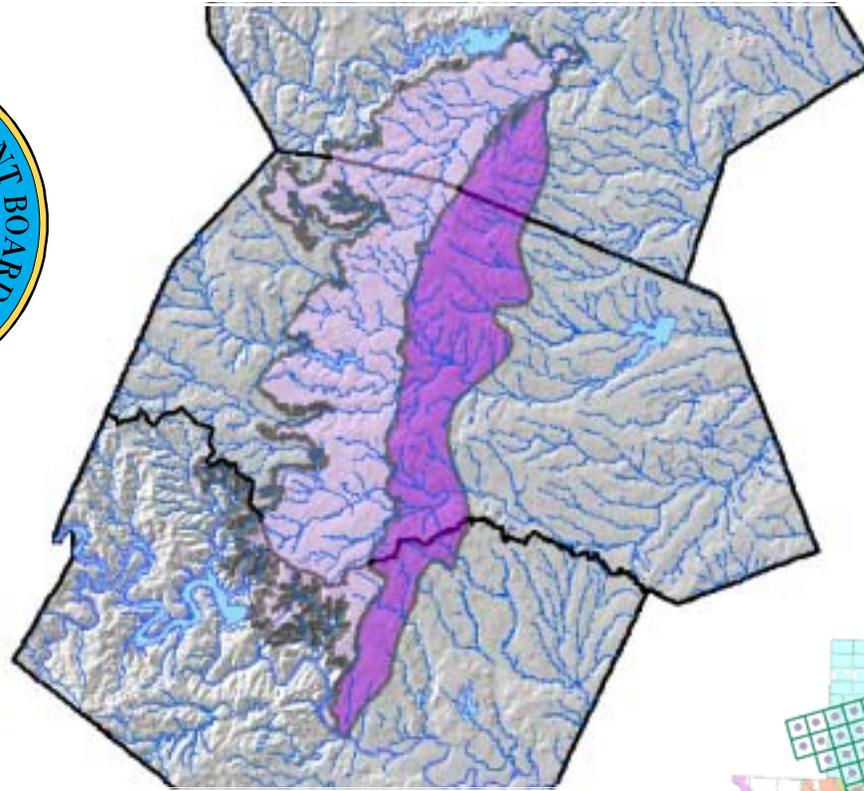


NORTHERN EDWARDS AQUIFER



**First Stakeholder Advisory Forum
March 18, 2002**



texas water development board

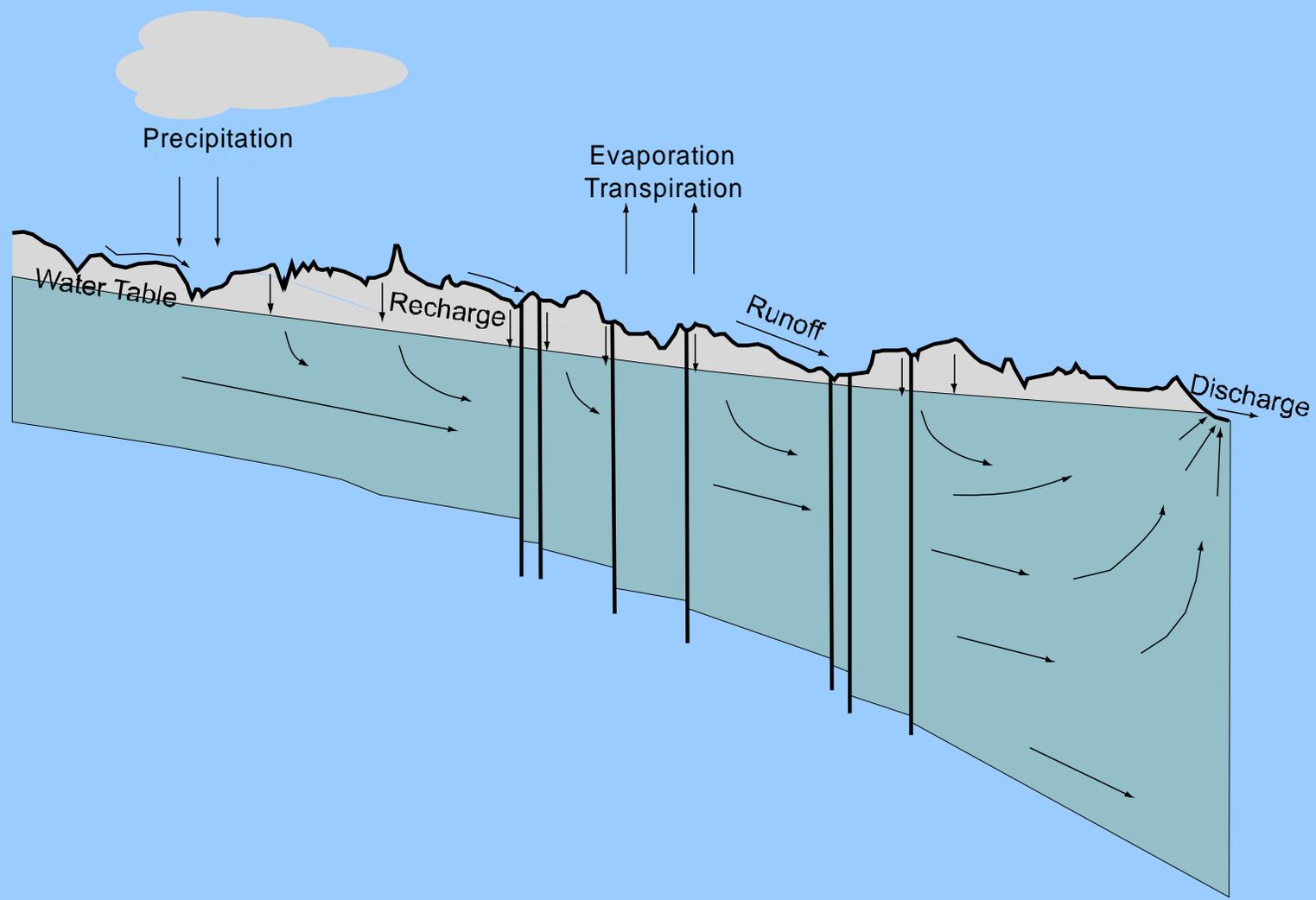
OUTLINE

- Introduction to groundwater modeling
- Overview of northern segment of Edwards Aquifer
- GAM schedule
 - SAF meetings
 - Project milestones

INTRODUCTION TO GROUNDWATER FLOW MODELING

WHAT IS AN AQUIFER?

- Rock or sediment from which usable amounts of water can be extracted



HYDROLOGIC CYCLE

WHY ARE GROUNDWATER FLOW MODELS NEEDED?

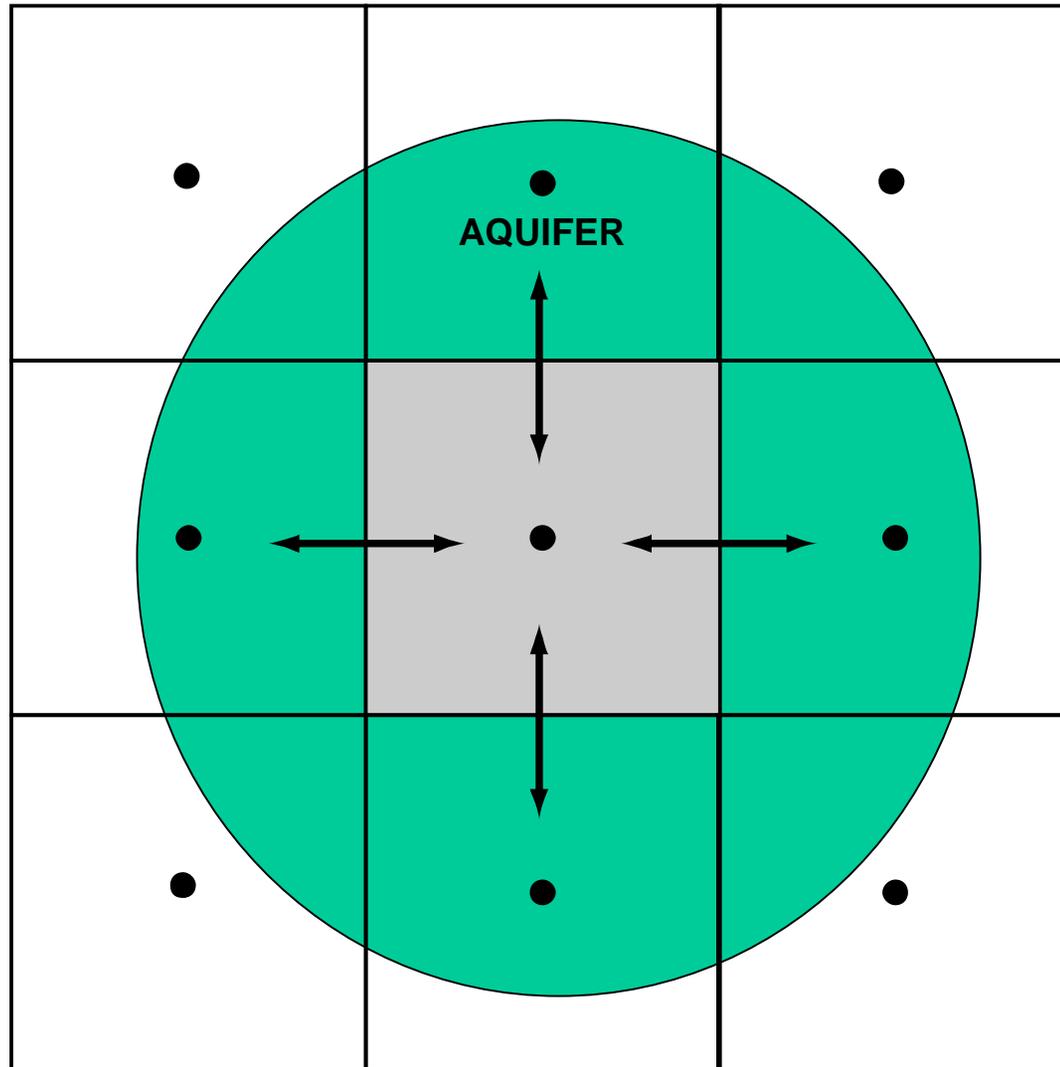
- Groundwater flow is difficult to observe
- Aquifers are typically complex in terms of spatial extent and hydrogeological characteristics
- Means of integrating available data for prediction of groundwater flow

GROUNDWATER FLOW MODELING

- Mathematical representation of an aquifer
- Uses basic laws of physics that govern groundwater flow
- Calculates the hydraulic head at discrete locations (grid)
- Calculated model heads can be compared to hydraulic heads measured in wells

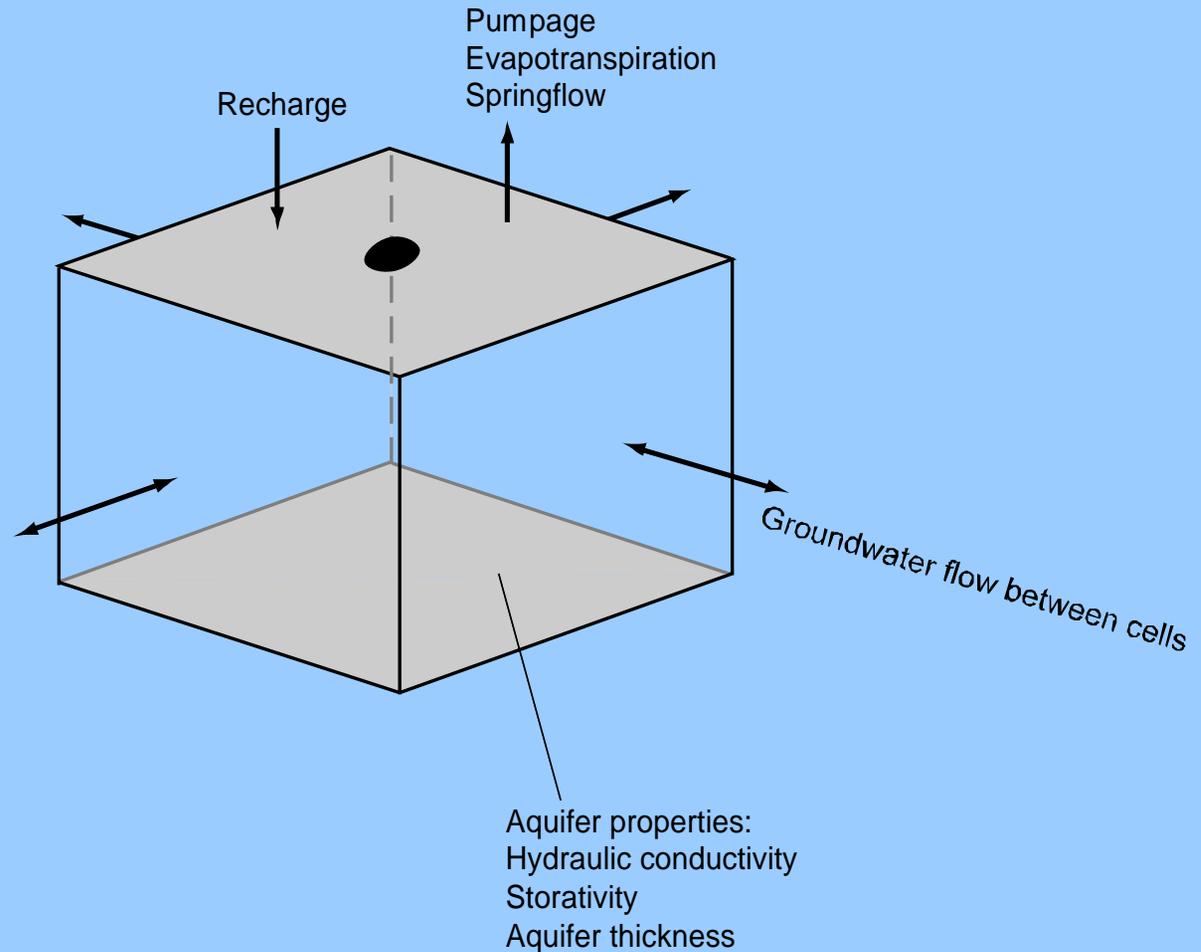
MODEL INPUT DATA

- Geology
 - Stratigraphy
 - Structure
- Water levels
- Surface water
 - Spring discharge
 - Stream discharge
- Aquifer properties
- Water use



MODEL CELL

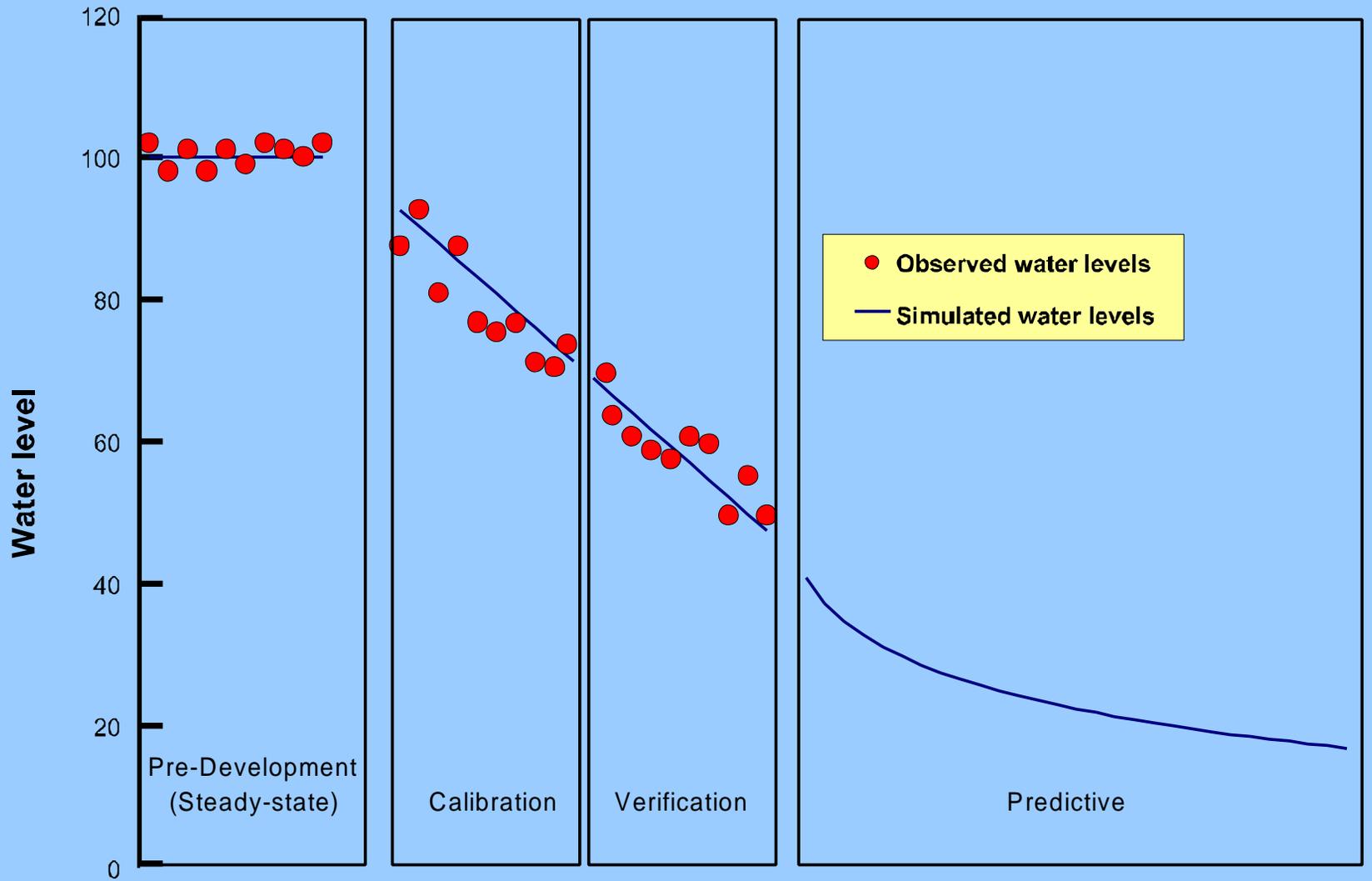
Hydraulic head calculated by balancing water inflows and outflows



MODEL CELL

MODELING PROCESS

- Define model objectives
- Develop conceptual model
- Design model
- Calibration and verification modeling
 - Comparison with observed data
- Predictive modeling
 - Predict impacts of projected growth
 - 2000 - 2050

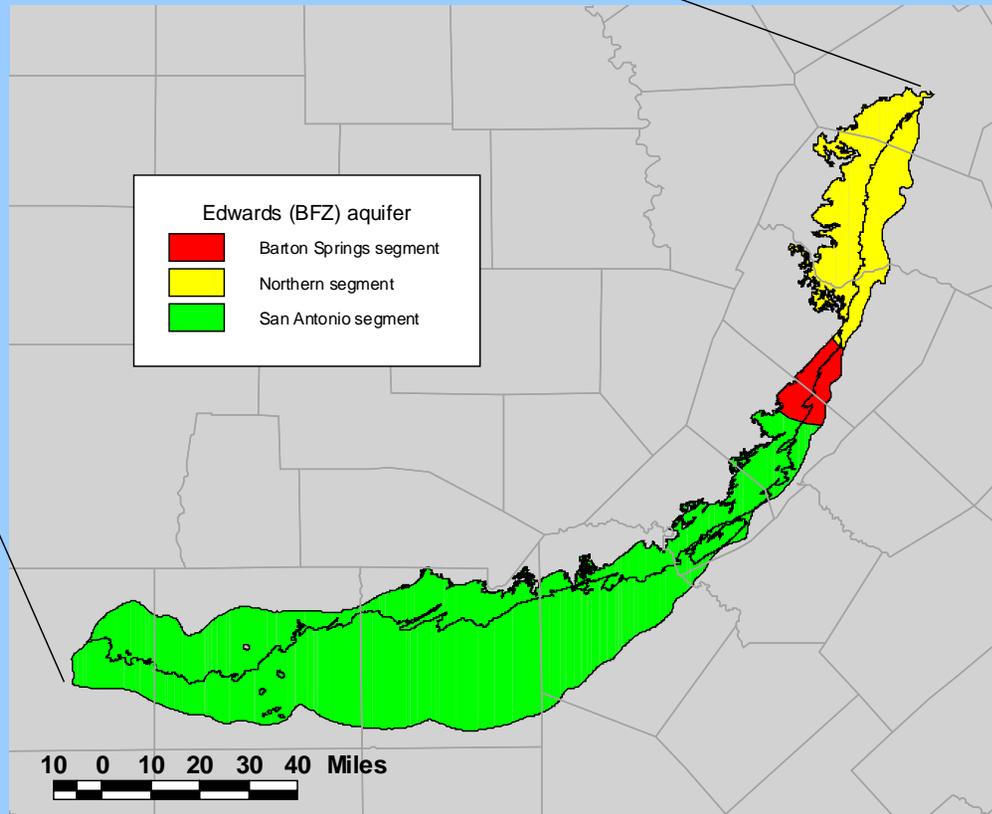
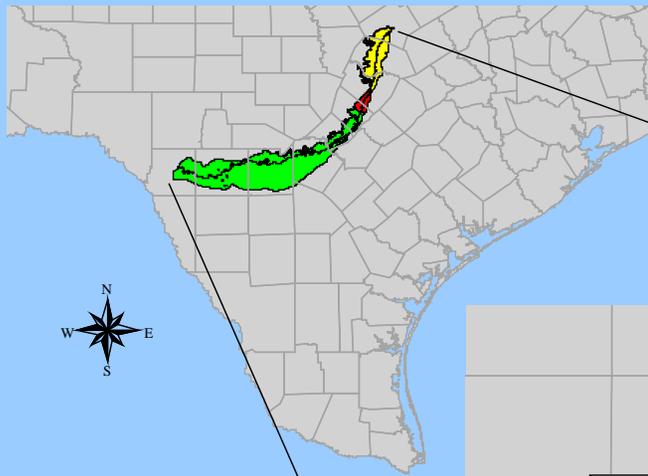


MODEL PERIODS

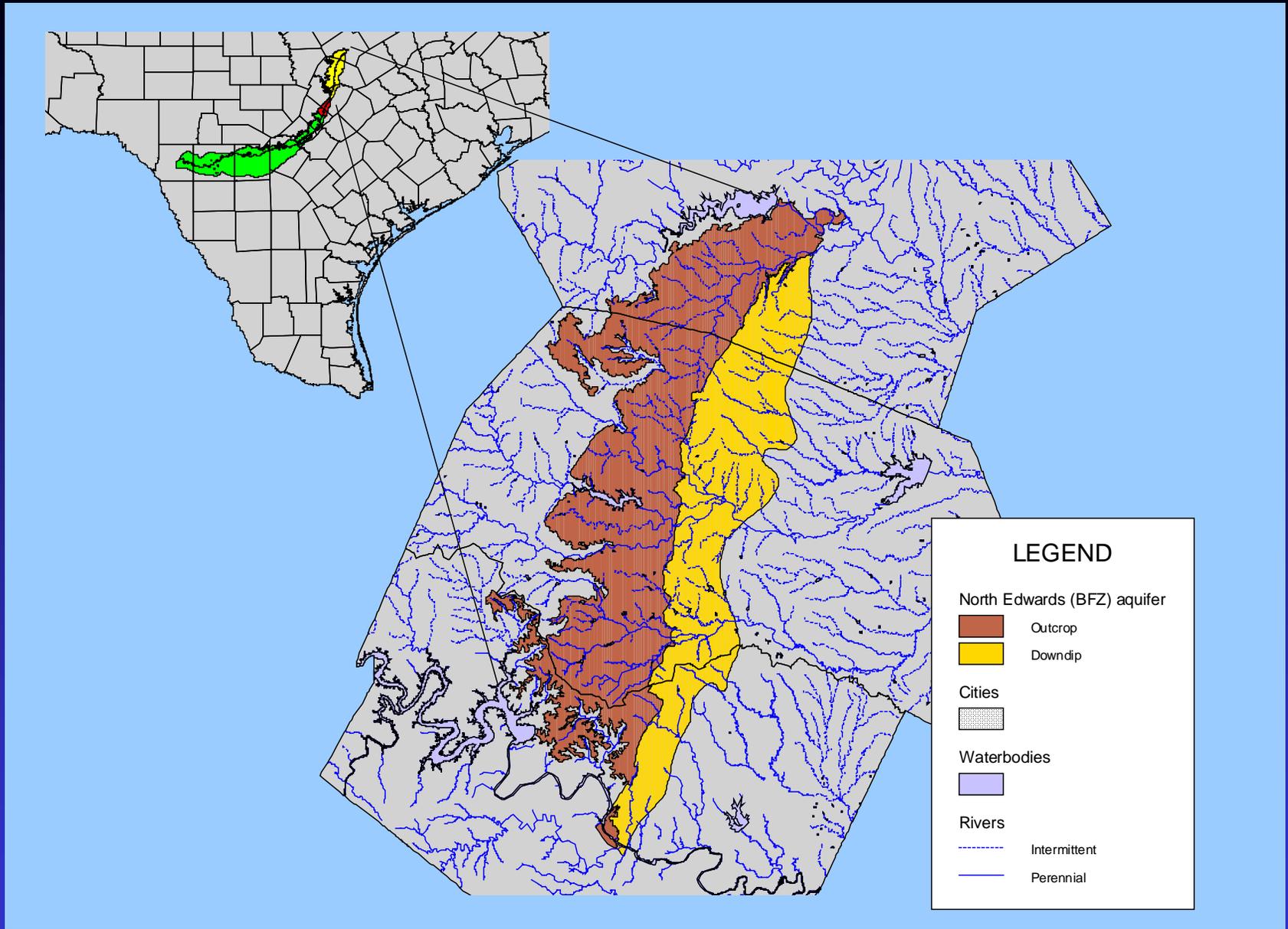
MODEL LIMITATIONS

- Approximation of the real system
 - Regional scale
- Uncertainty in the input data
 - Grid resolution
 - Incomplete data

OVERVIEW OF THE NORTHERN SEGMENT OF THE EDWARDS AQUIFER



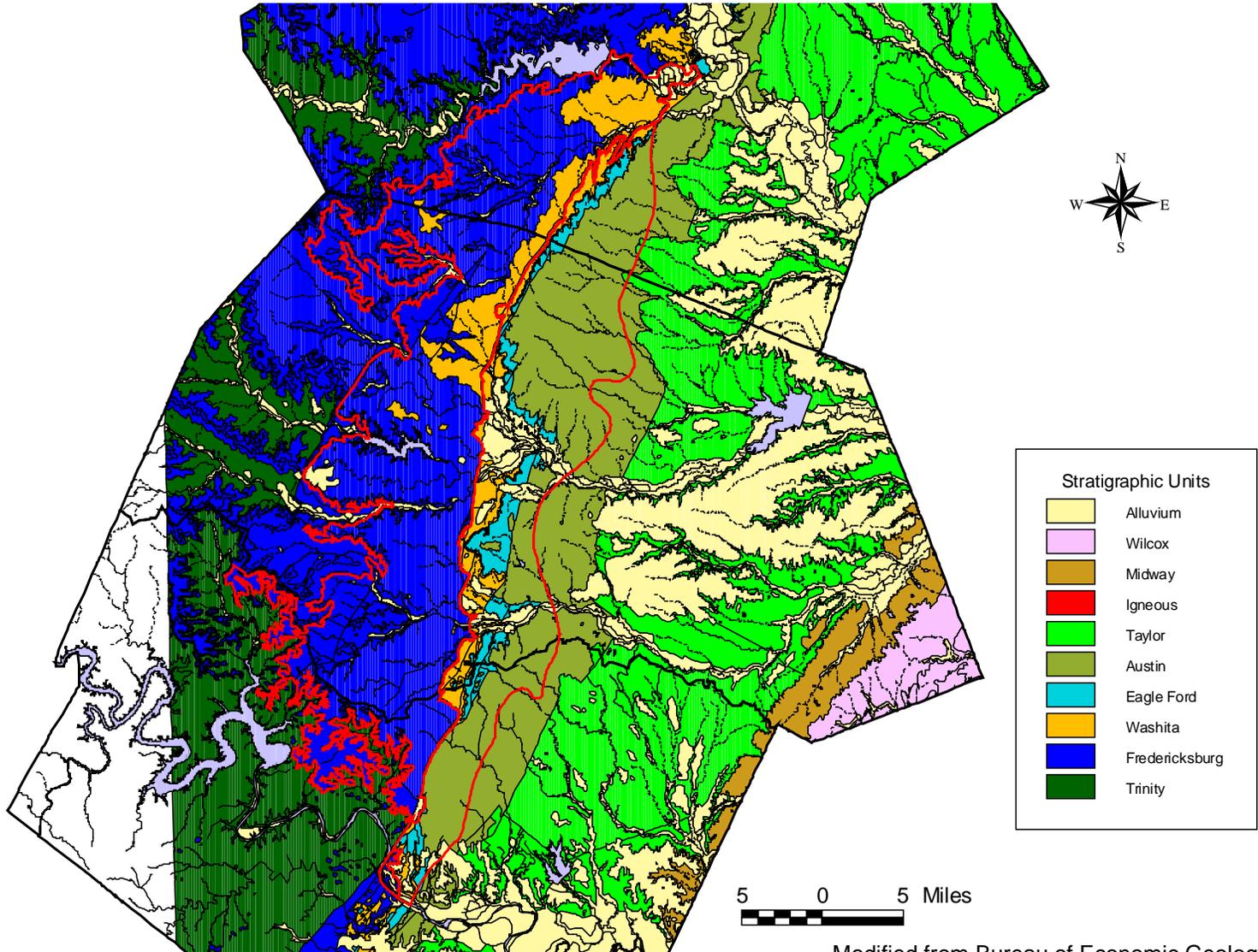
EDWARDS AQUIFER



LOCATION MAP

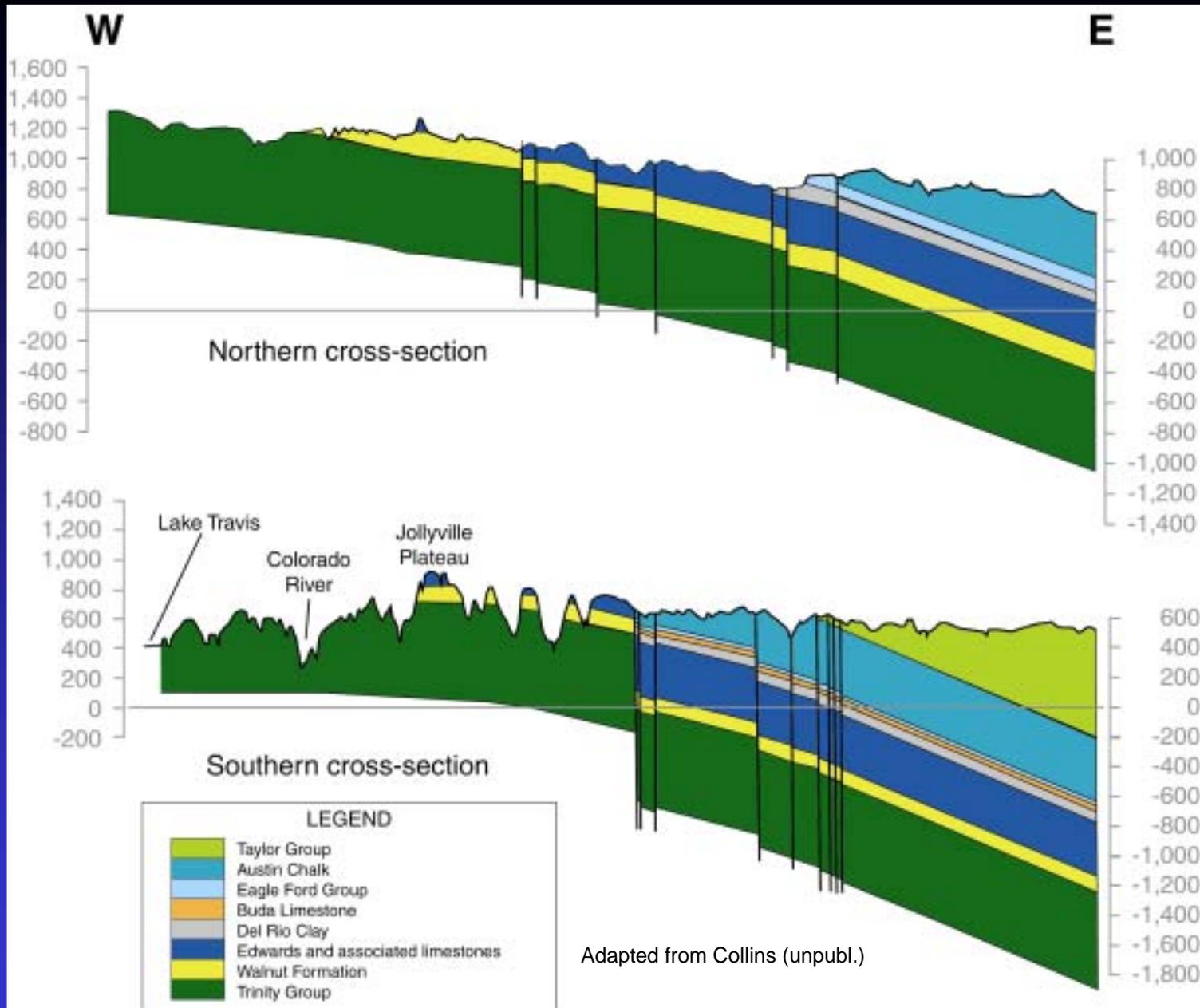
Series	Group	Stratigraphic Unit	Hydrologic Unit	Maximum Thickness (feet)	
Gulf	Navarro		Navarro and Taylor Groups	820	
	Taylor				
	Austin		Austin Chalk	425	
Comanche	Eagle Ford			30	
	Washita	Buda Limestone		50	
		Del Rio Clay		60	
		Georgetown Formation	Edwards and associated limestones	90	
	Frederickburg	Kiamichi Formation		15	
		Edwards Limestone		185	
		Comanche Peak Limestone		50	
		Walnut Formation		110	
	Trinity		Paluxy Formation	Upper Trinity	10
		Glen Rose	Upper Member		430
			Lower Member	430	
		Travis Peak	Hensell Sand Member	Middle Trinity	75
			Cow Creek Limestone Member		80
			Hammett Shale Member	30	
Sligo Member			Lower Trinity	140	
Hosston Member				815	

HYDROSTRATIGRAPHIC COLUMN

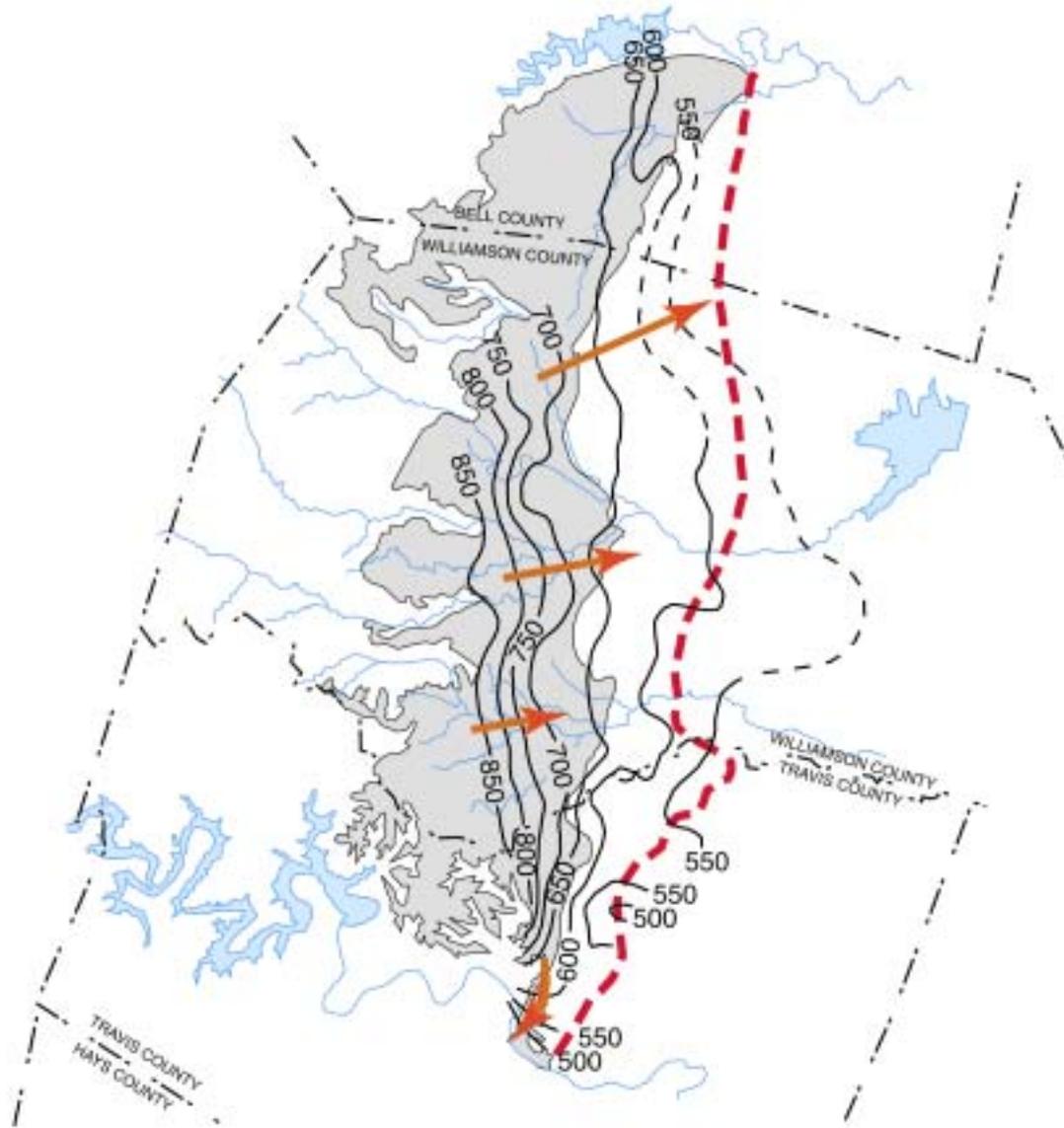


Modified from Bureau of Economic Geology
Geologic Atlas of Texas

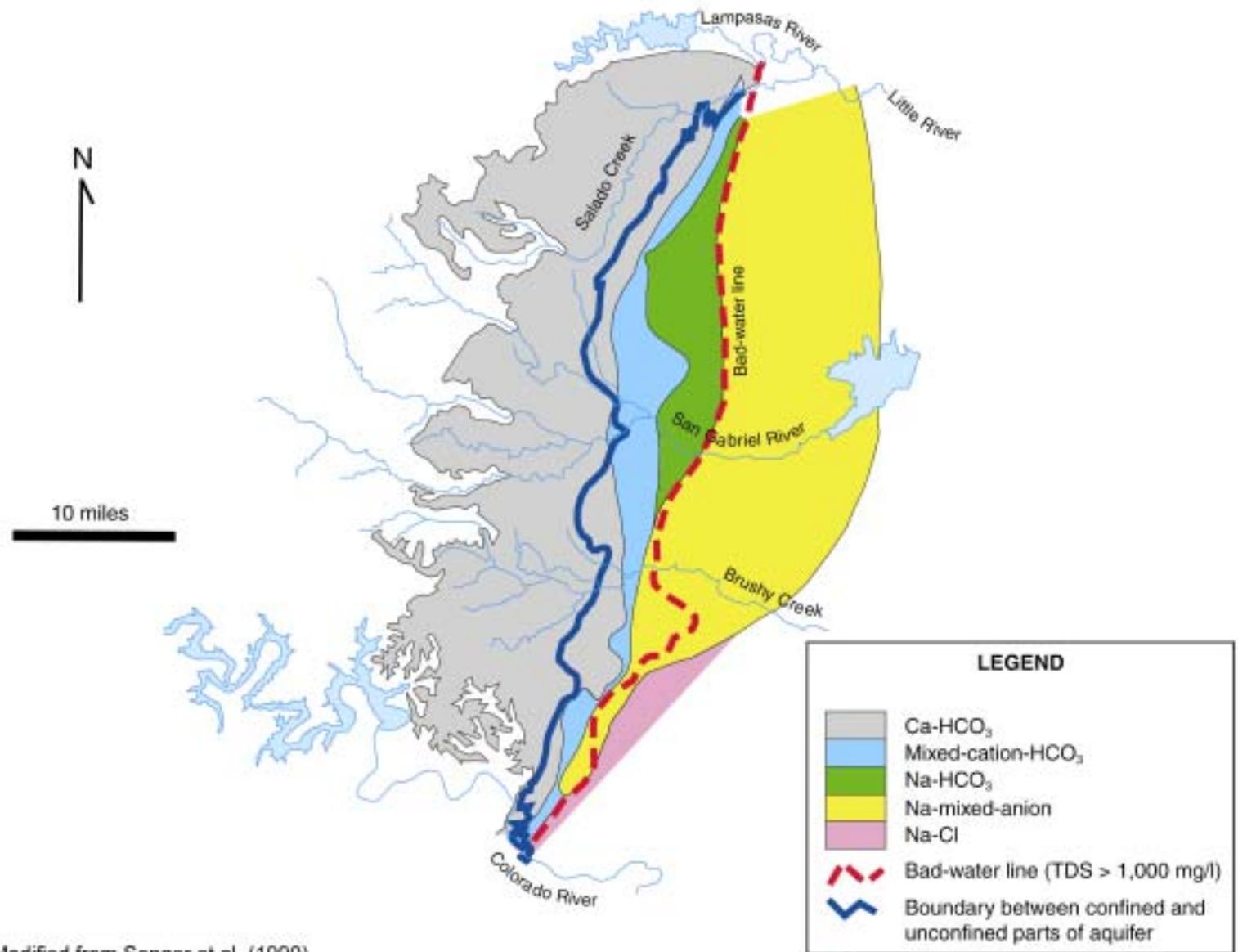
SURFACE GEOLOGY



CROSS SECTIONS



POTENTIOMETRIC SURFACE MAP



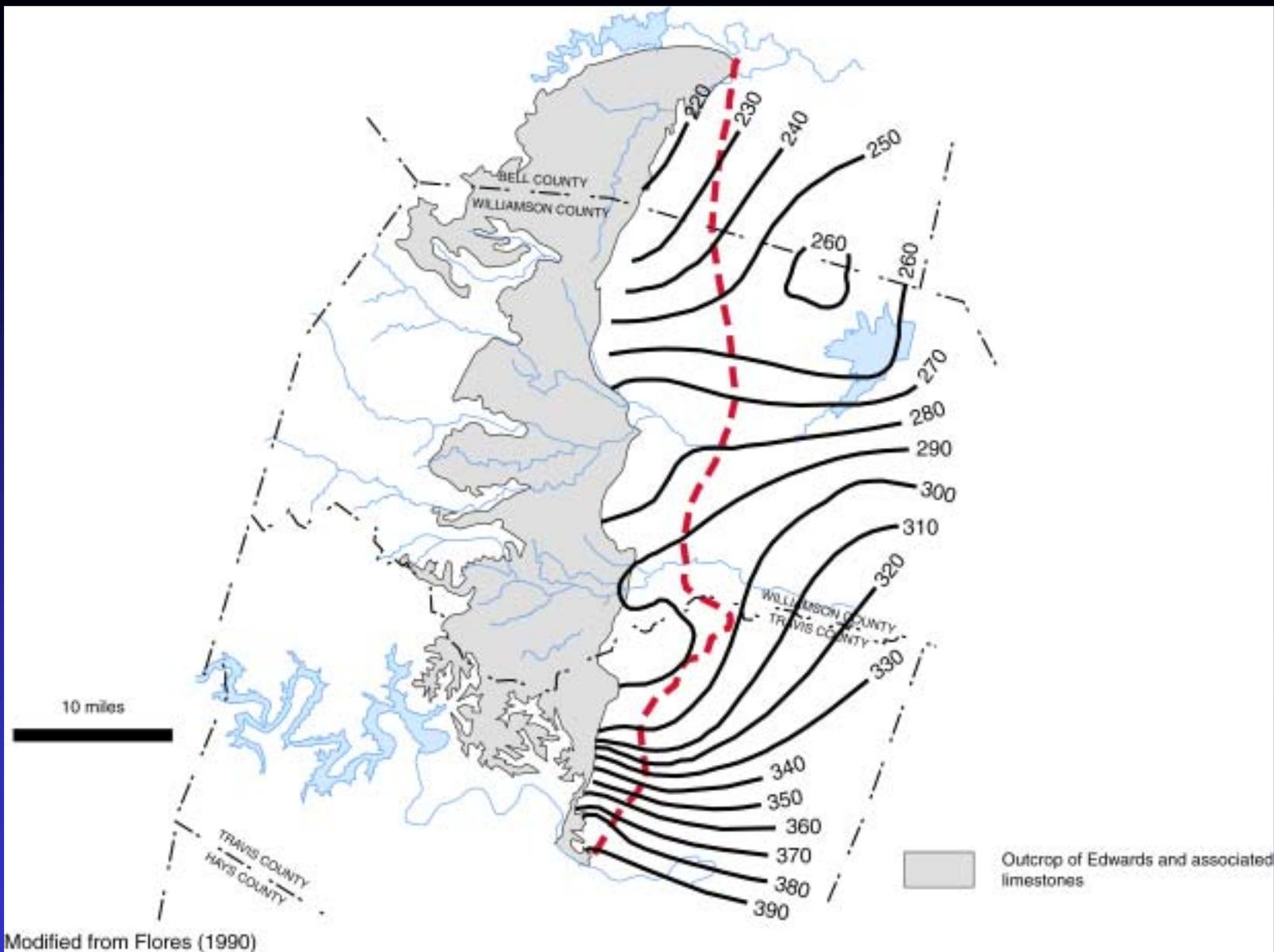
Modified from Senger et al. (1990)

GROUNDWATER QUALITY

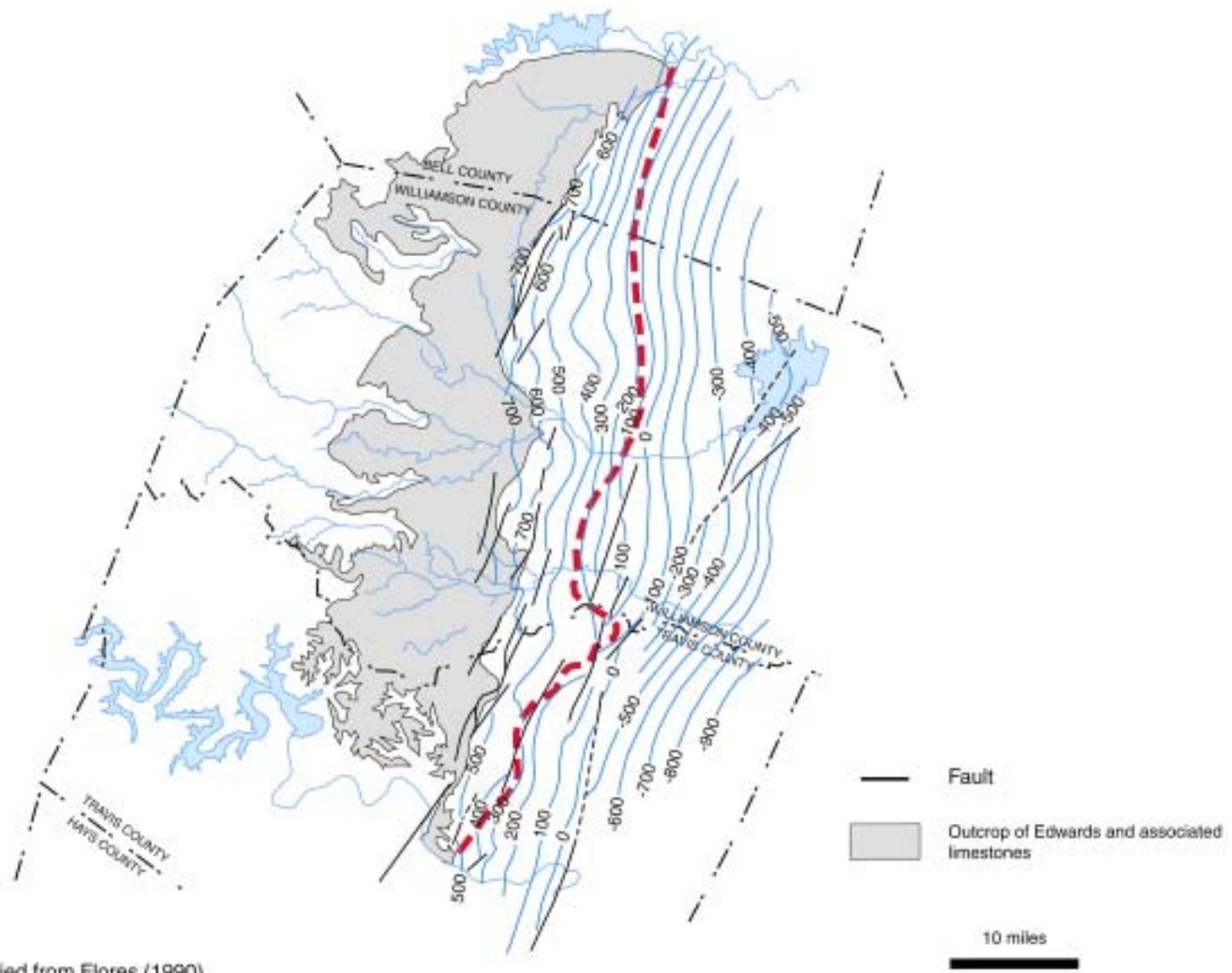
MODEL OF THE NORTHERN
SEGMENT OF THE EDWARDS
AQUIFER

MODELING APPROACH

- One-layer model
- Lateral boundaries
 - Colorado River
 - Outcrop of Edwards and associated limestones
 - Bad-water line

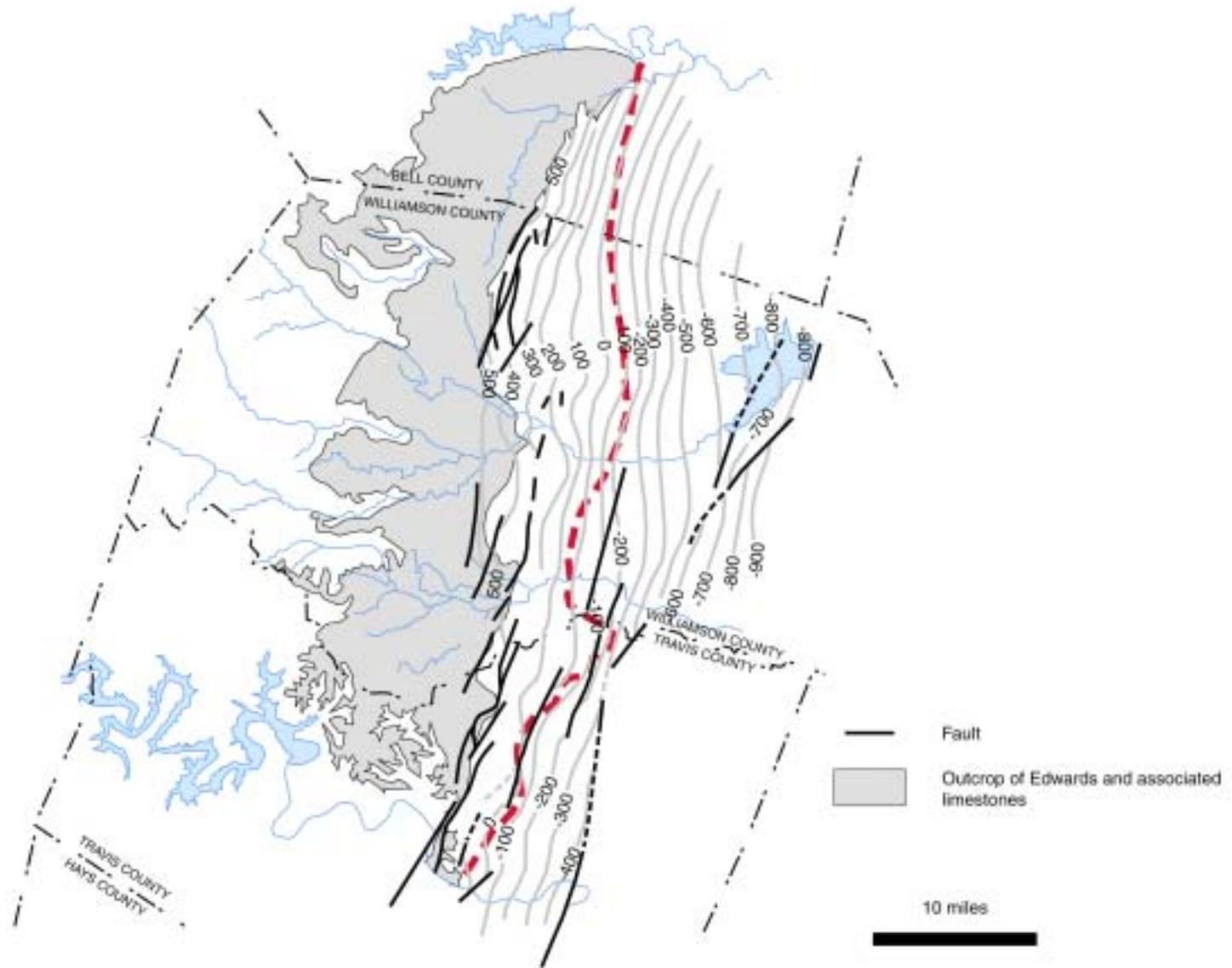


AQUIFER THICKNESS MAP



Modified from Flores (1990)

ALTITUDE OF AQUIFER TOP



ALTITUDE OF AQUIFER BASE

GAM SCHEDULE

SCHEDULE

2002

- SAF Meeting 1— Mar. 18  ● June —Draft conceptual model
 - SAF Meeting 2 — June  ● Sept. —Initial model design
 - SAF Meeting 3— Sept.  ● Dec. —Calibrate steady-state model
 - SAF Meeting 4 — Dec.  ● Feb. —Calibrate transient model
-

2003

- SAF Meeting 5 — Mar.  ● Mar. —Complete model predictions
- Apr. —Prepare draft report
- SAF Meeting 6— June  ● Aug. —Present SAF Model Seminar
- ▲ Deliver Final Product

SAF INPUT NEEDED

- Data
 - Pump test results
 - Water-level
 - Springflow
- Insights
 - How the aquifer works
 - Model assumptions



**Northern Segment of the Edwards Aquifer
Stakeholder Advisory Forum 1
March 18, 2002**

	Name	Affiliation
1	David Johns	City of Austin/WPDRD
2	Cheryl Maxwell	Clearwater UWCD
3	Kelly Mills	TNRCC
4	Abiy Berehe	TNRCC
5	James Carson Sloan	TNRCC
6	B. D. Spoons	TDA
7	Andrew Covar	City of Austin/W/WW
8	Roberto Anaya	TWDB
9	Robert Mace	TWDB
10	Ian Jones	TWDB

**NORTHERN SEGMENT OF THE EDWARDS AQUIFER GROUNDWATER
AVAILABILITY MODEL**

Stakeholder Advisory Forum #1, March 18, 2002

About 10 people attended the first Stakeholder Advisory Forum for the northern segment of the Edwards aquifer groundwater availability model. These stakeholders represent different state government agencies, the City of Austin, and the Clearwater UWCD.

At the beginning of the meeting, Robert Mace gave an introduction to GAM and the role of SAFs. Ian Jones gave the main presentation that consisted of a brief introduction to groundwater hydrology, groundwater modeling and the hydrogeology of the northern segment of the Edwards aquifer, and the schedule work to be done on the northern Edwards GAM and SAF meetings.

The discussion following the presentations mostly dealt with suggestions for potential sources of data to be used in model. These suggestions included obtaining pump test data from public supply wells, evapotranspiration data from the Blackland Research Center and TWRI, as well as data from dissertations, e.g., Barbara Mahler. Concern was expressed by David Johns (City of Austin) about the potential for successfully modeling groundwater flow along the southern edge of the model. He expressed willingness to share results of dye tracing and stream gauging along Shoal Creek, conducted by the City of Austin, that may be use to the model.