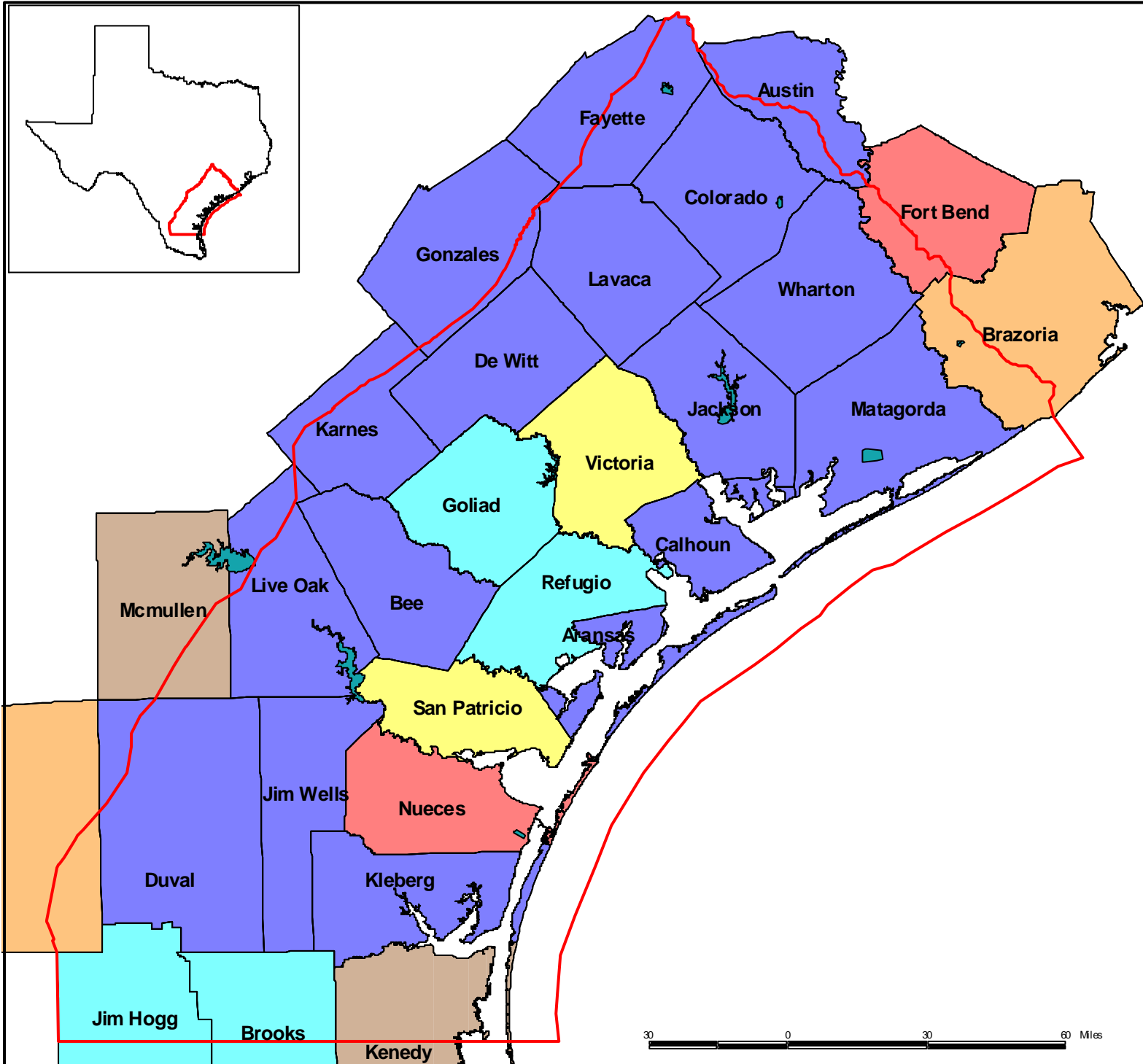
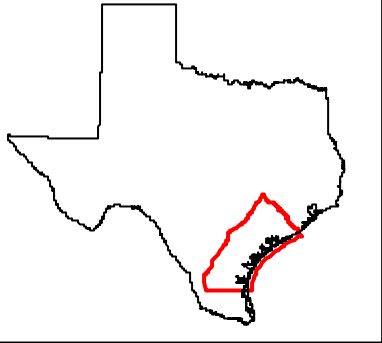
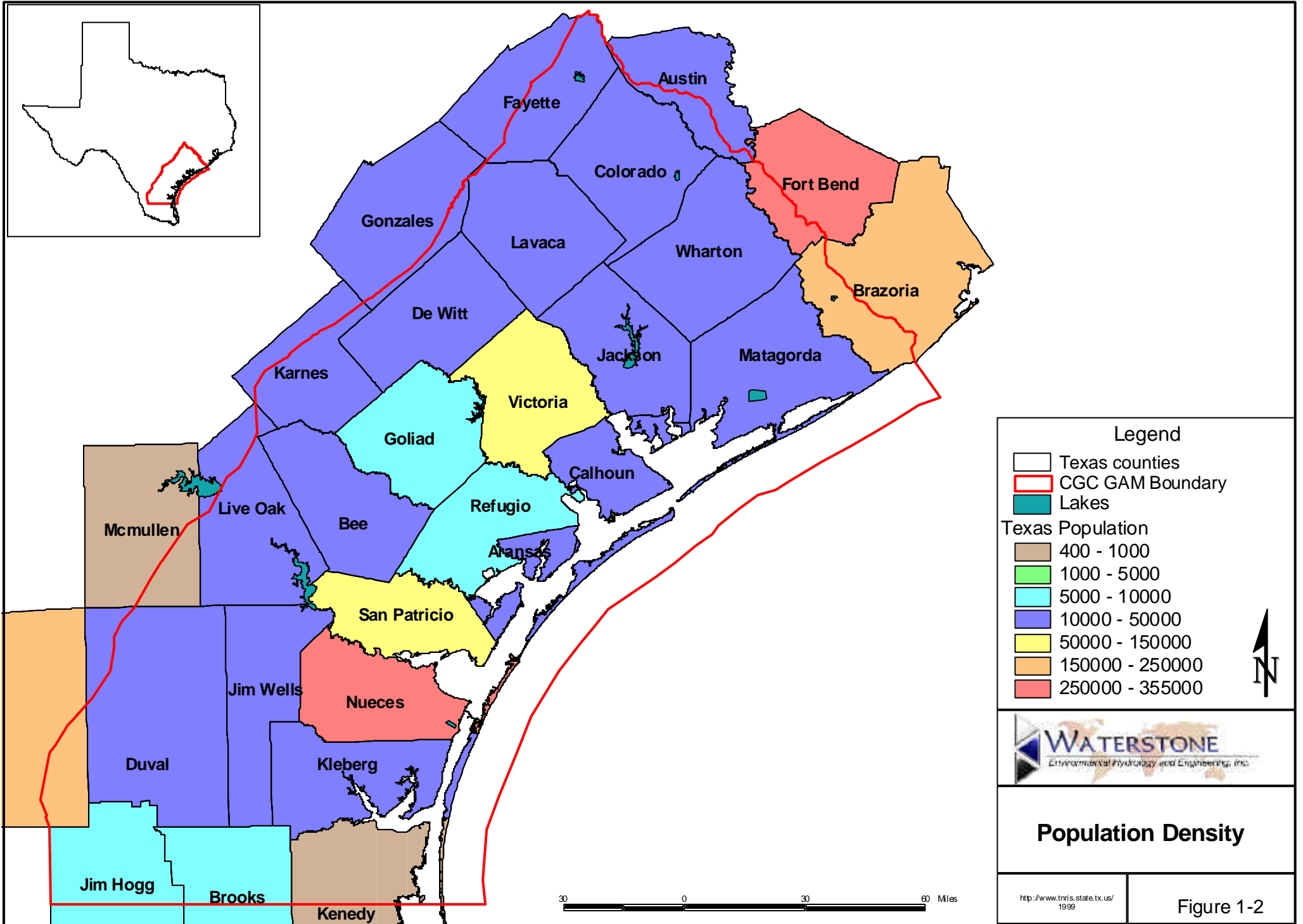


Legend

- Texas counties
- CGC GAM Boundary
- Lakes
- # Cities
- ~ Rivers
- ~ Roads



**CGC GAM
Study Area Location**



Legend

- Texas counties
- ▭ CGC GAM Boundary
- ▭ Lakes

Texas Population

- 400 - 1000
- 1000 - 5000
- 5000 - 10000
- 10000 - 50000
- 50000 - 150000
- 150000 - 250000
- 250000 - 355000

Population Density

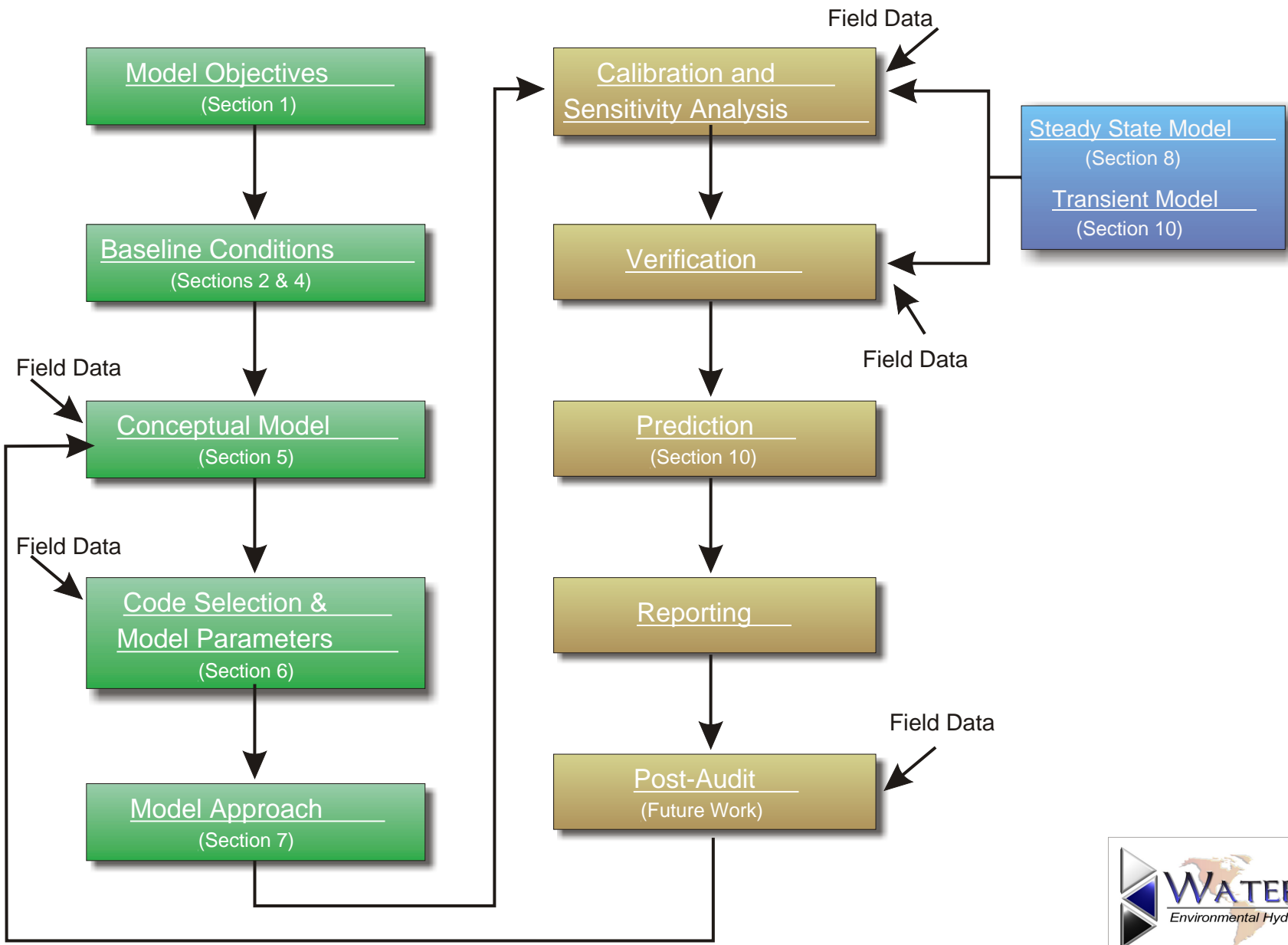


Population Density

<http://www.tnris.state.tx.us/>
1999

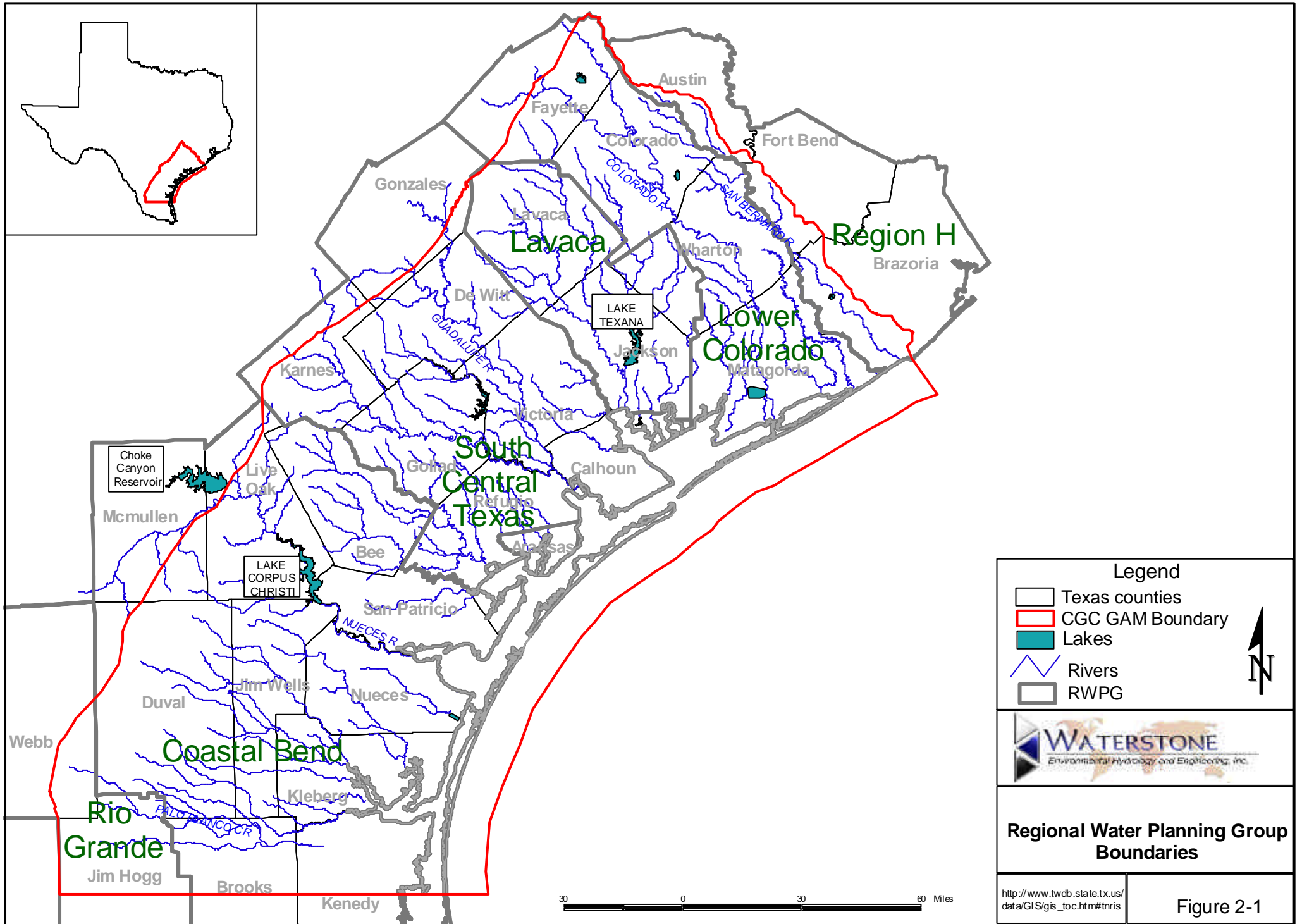
Figure 1-2





Groundwater Modeling Steps

Figure 1-3



Legend

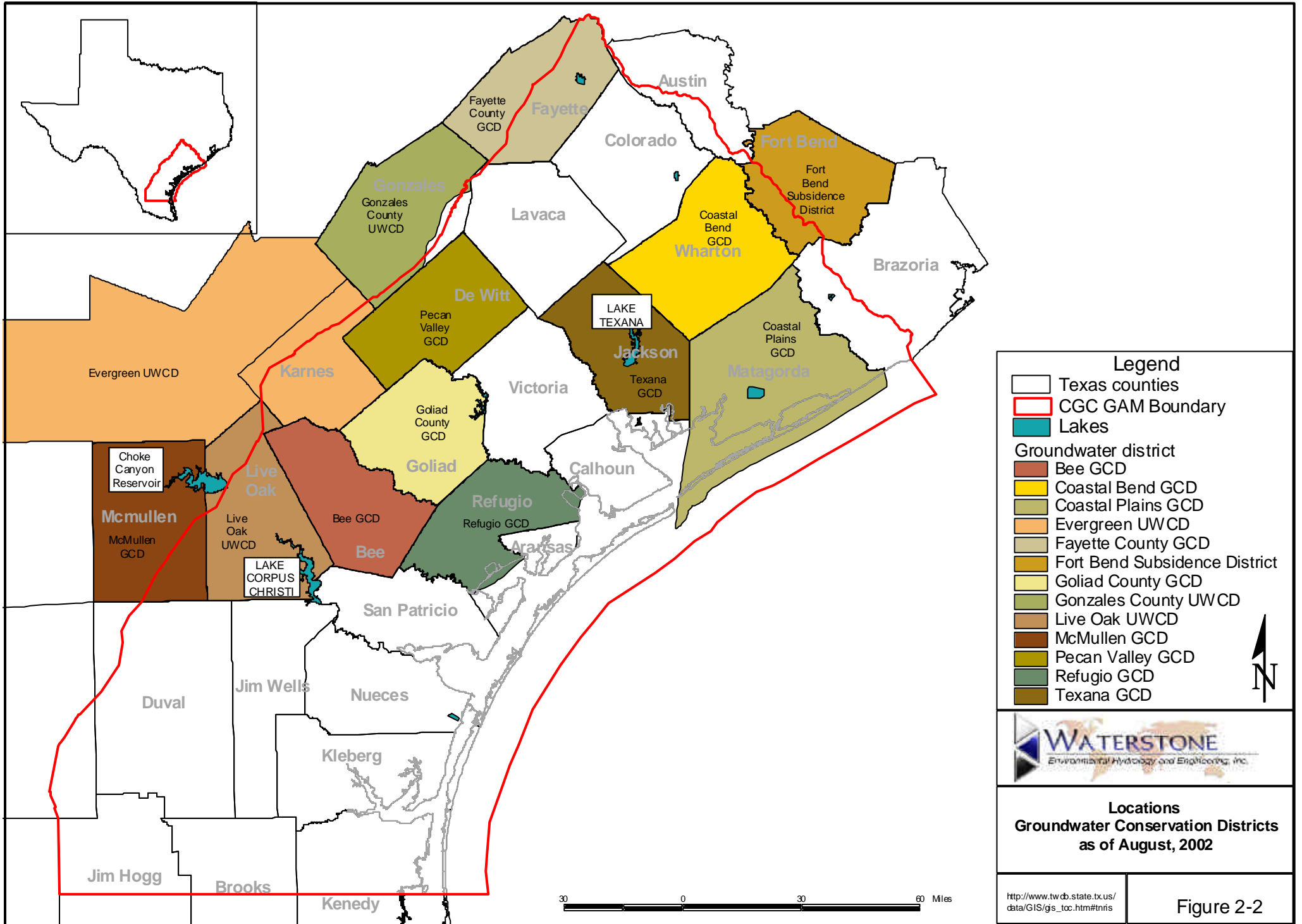
- Texas counties
- CGC GAM Boundary
- Lakes
- Rivers
- RWPG

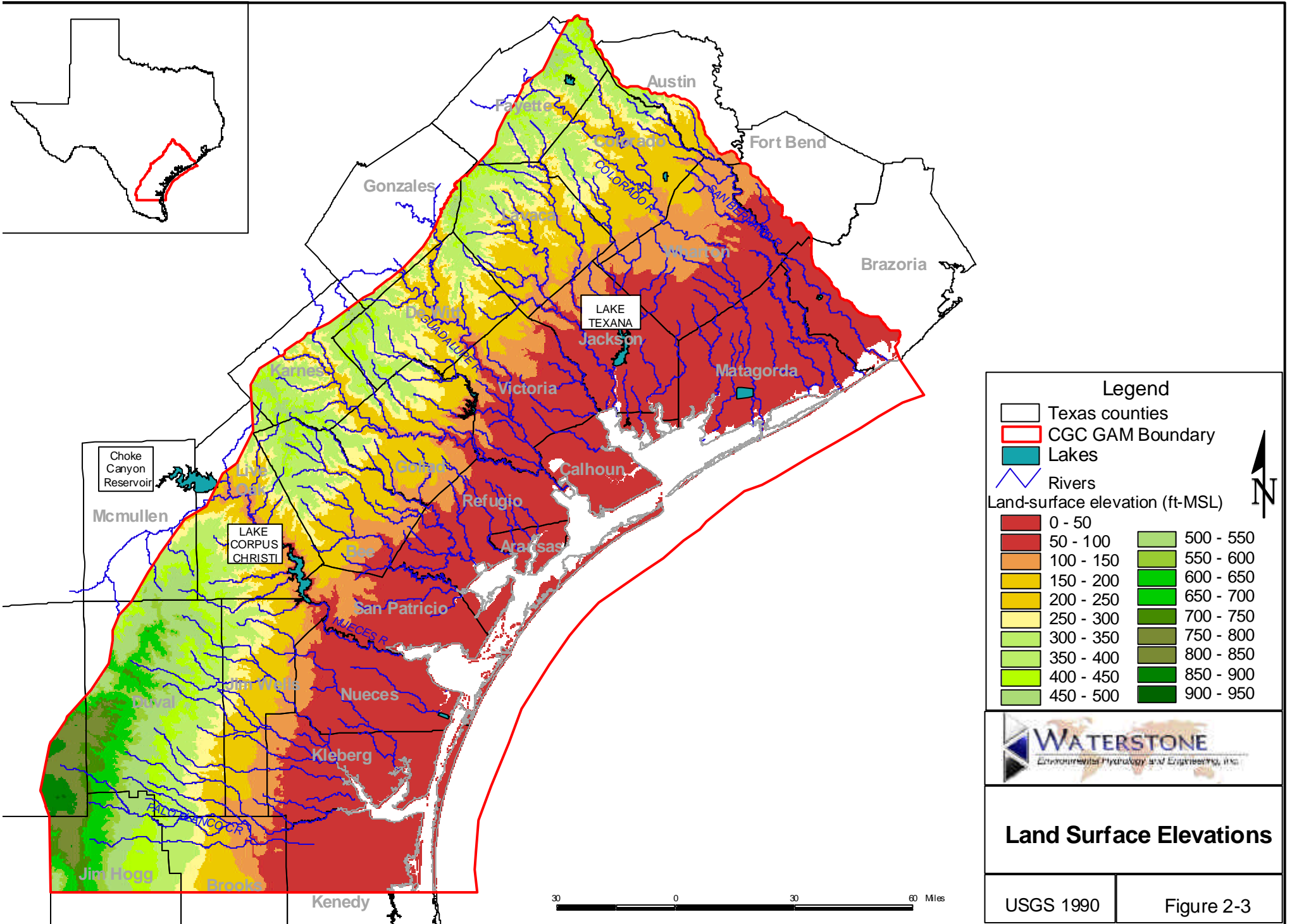
WATERSTONE
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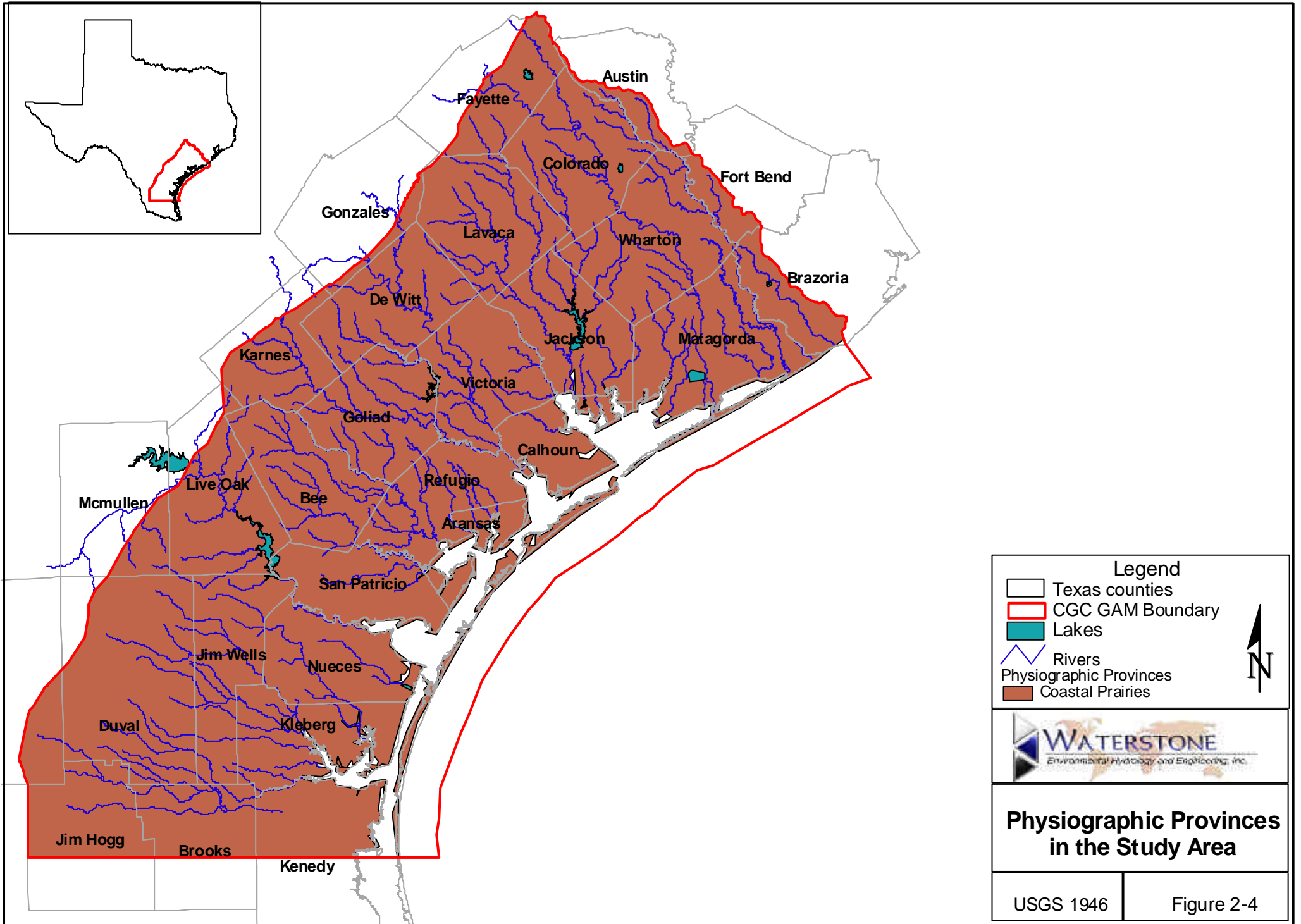
Regional Water Planning Group Boundaries

http://www.twdb.state.tx.us/data/GIS/gis_toc.htm#nr1s

Figure 2-1





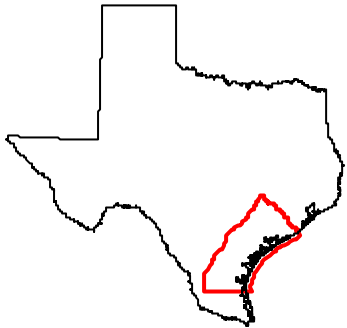
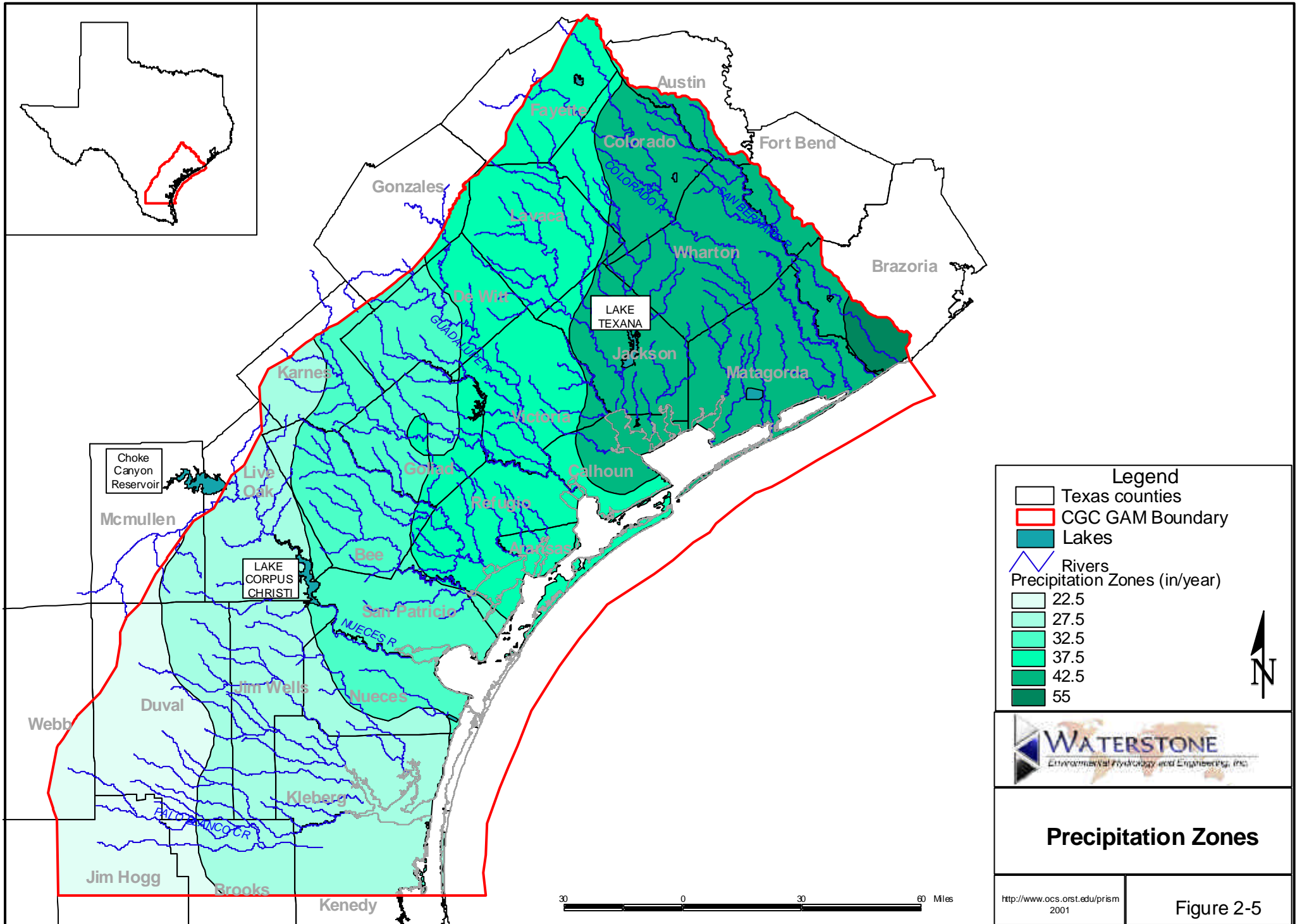


Legend

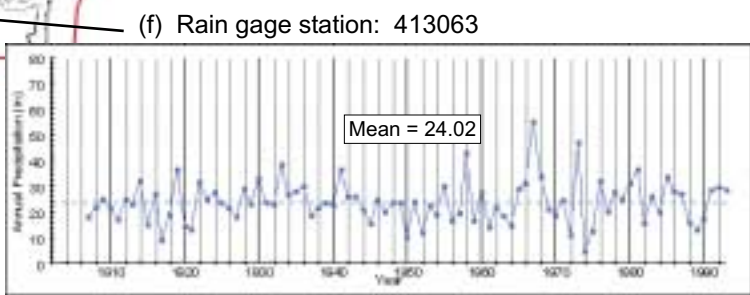
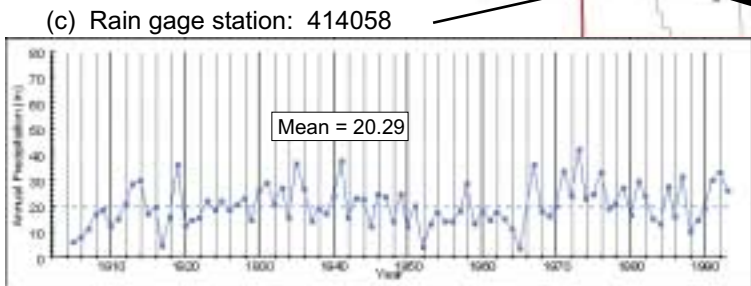
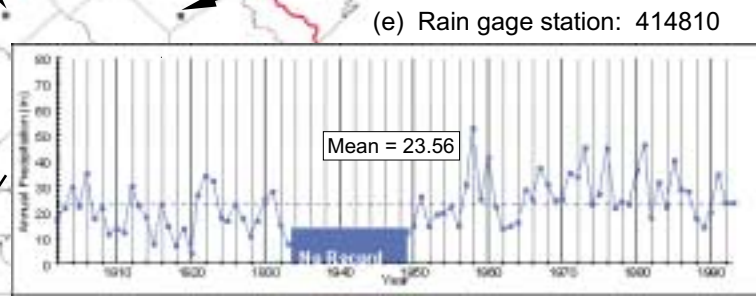
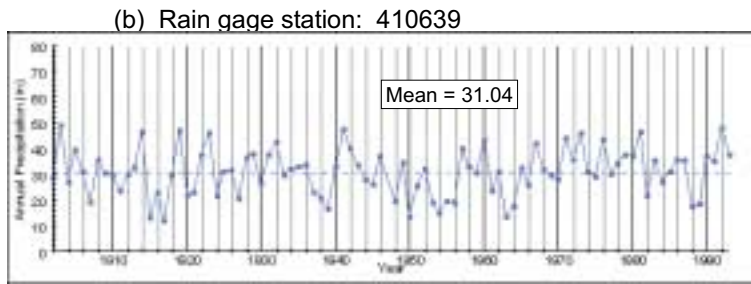
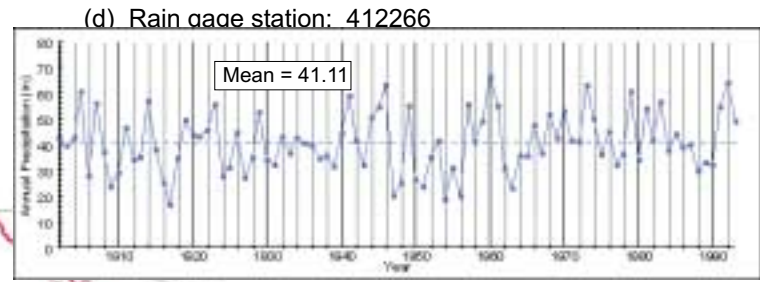
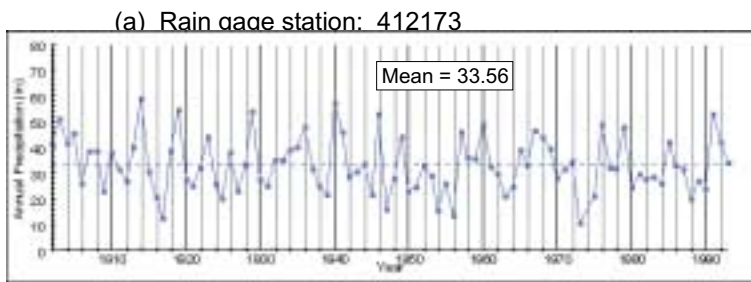
- Texas counties
- CGC GAM Boundary
- Lakes
- Rivers
- Physiographic Provinces
- Coastal Prairies



**Physiographic Provinces
in the Study Area**



30 0 30 60 Miles



Rain gages: (a)412173, (b)410639, (c)414058,
(d)412266, (e)414810, and (f)413063.

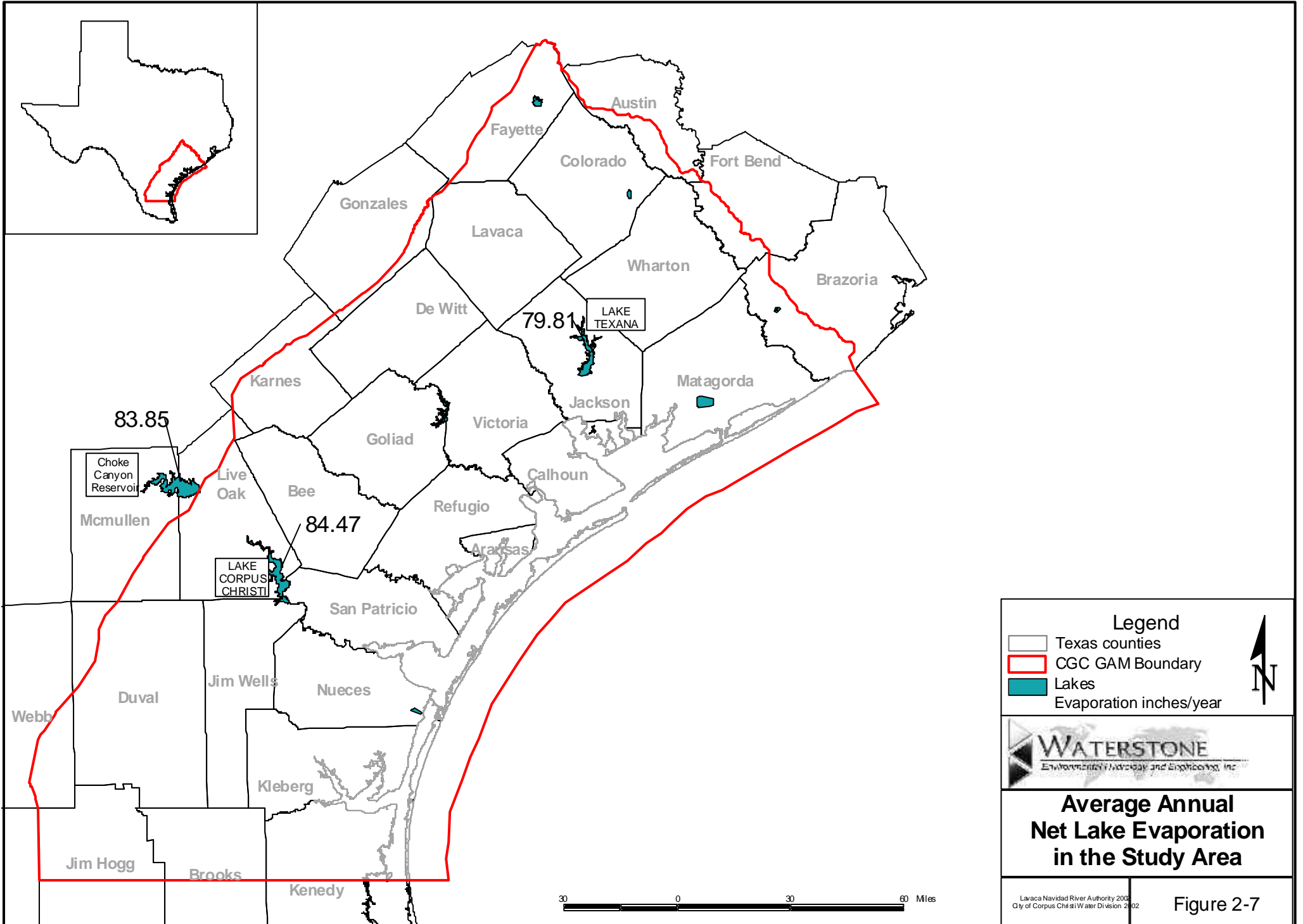
30 0 30 60 Miles



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**Historical Annual Precipitation
 for the Central Gulf Coast
 1900 - 1999**

Rain Gage Data	Figure 2-6
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Legend

- Texas counties
- CGC GAM Boundary
- Lakes
- Evaporation inches/year

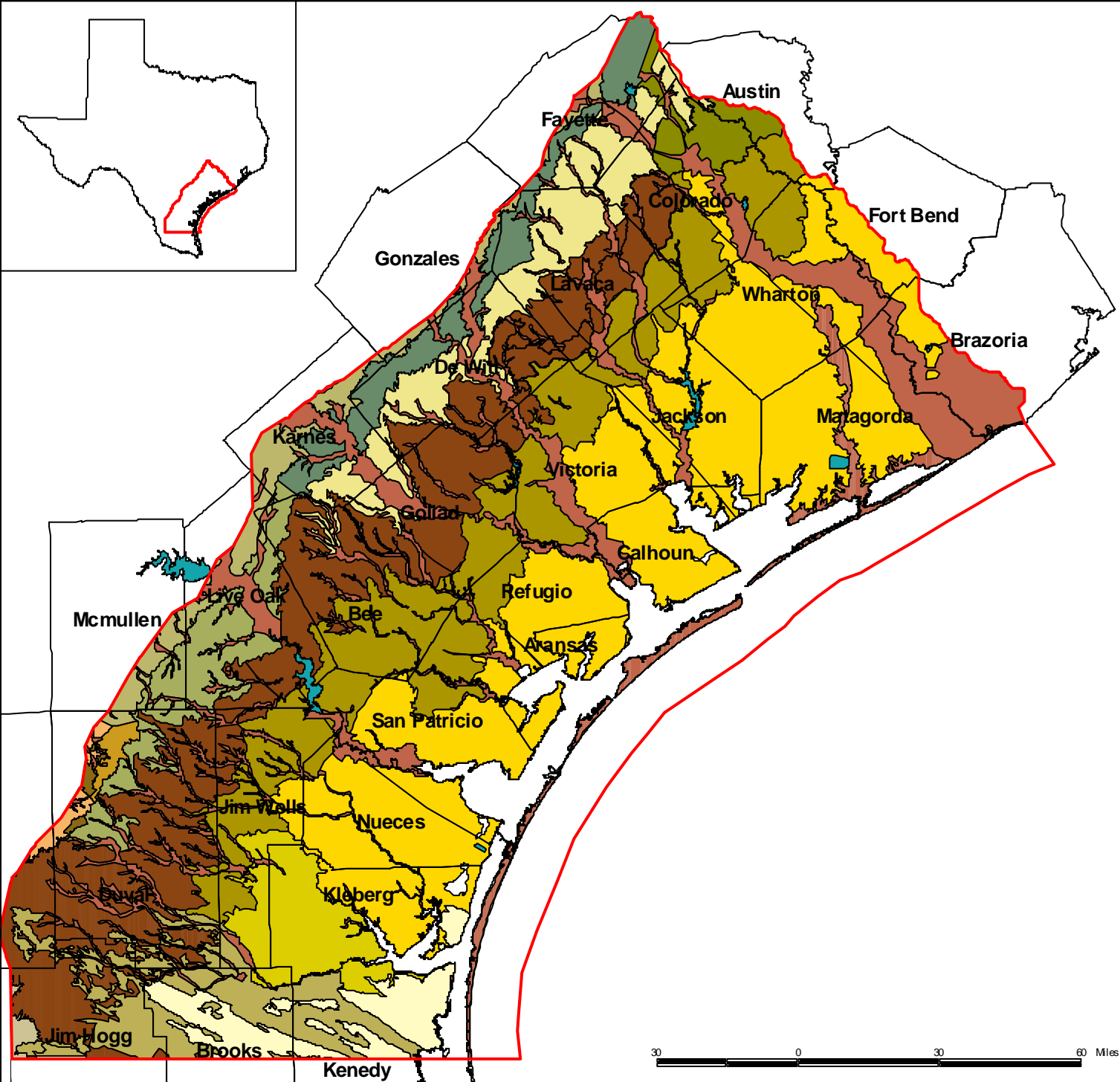
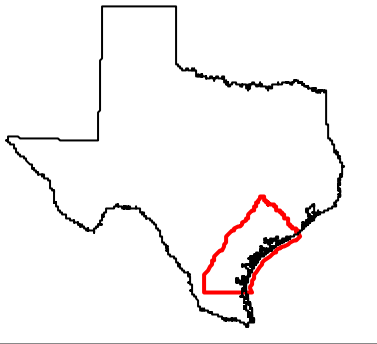
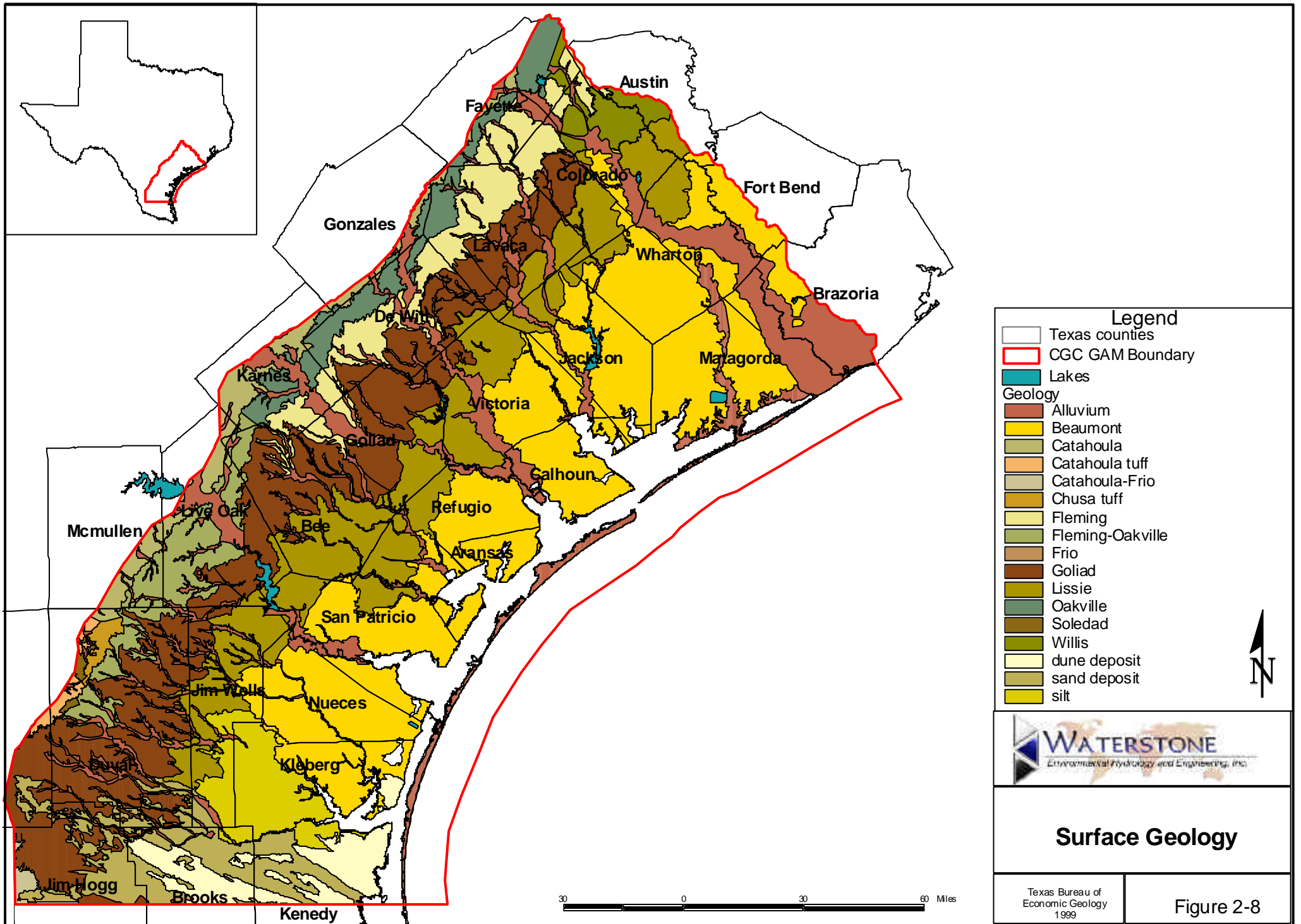
WATERSTONE
 Environmental, Water and Engineering, Inc.

Average Annual Net Lake Evaporation in the Study Area

30 0 30 60 Miles

LaVaca Navidad River Authority 2002
 City of Corpus Christi Water Division 2002

Figure 2-7



Surface Geology

Texas Bureau of Economic Geology 1999

Figure 2-8

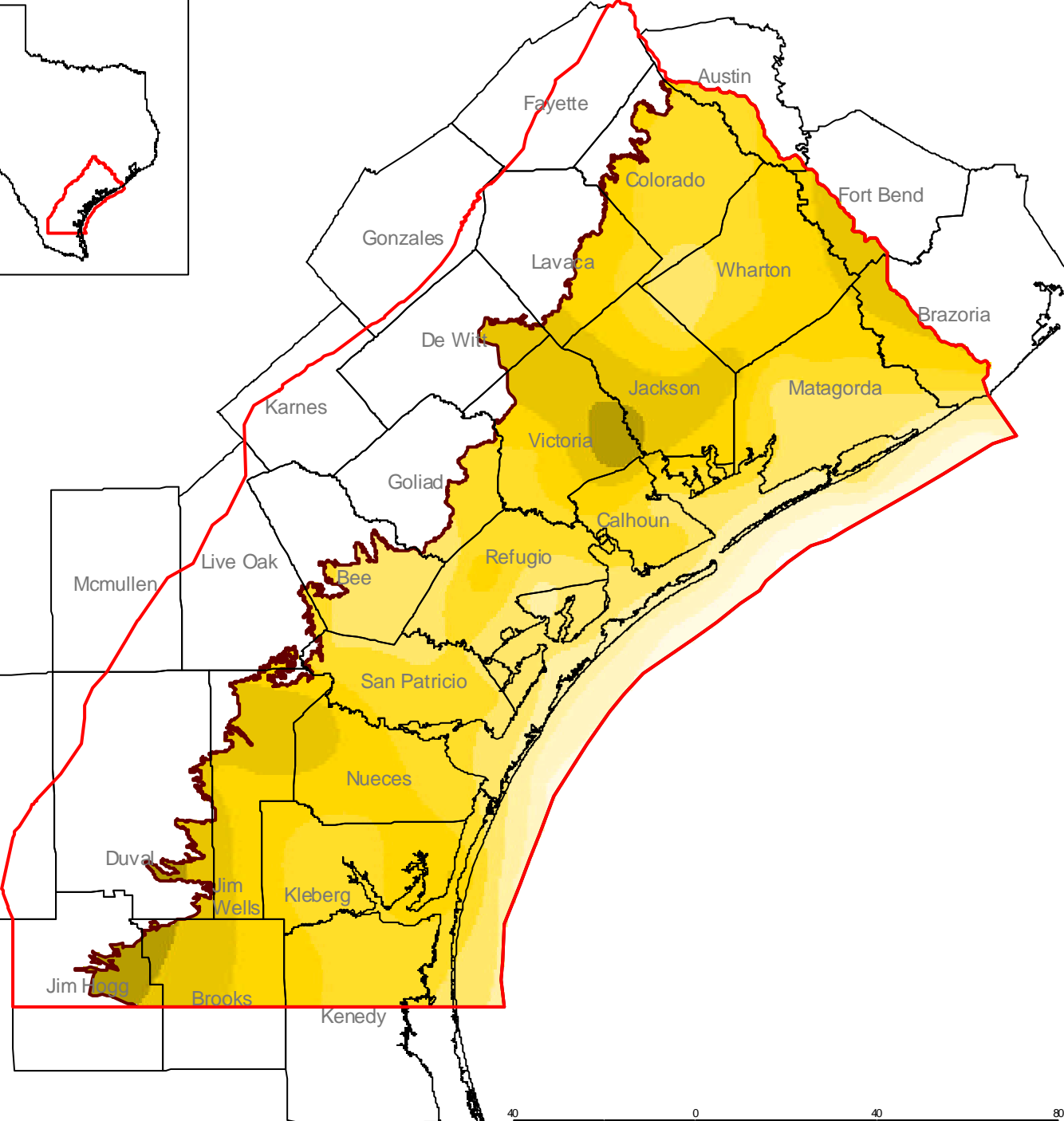
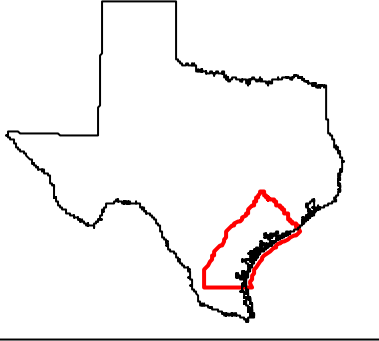
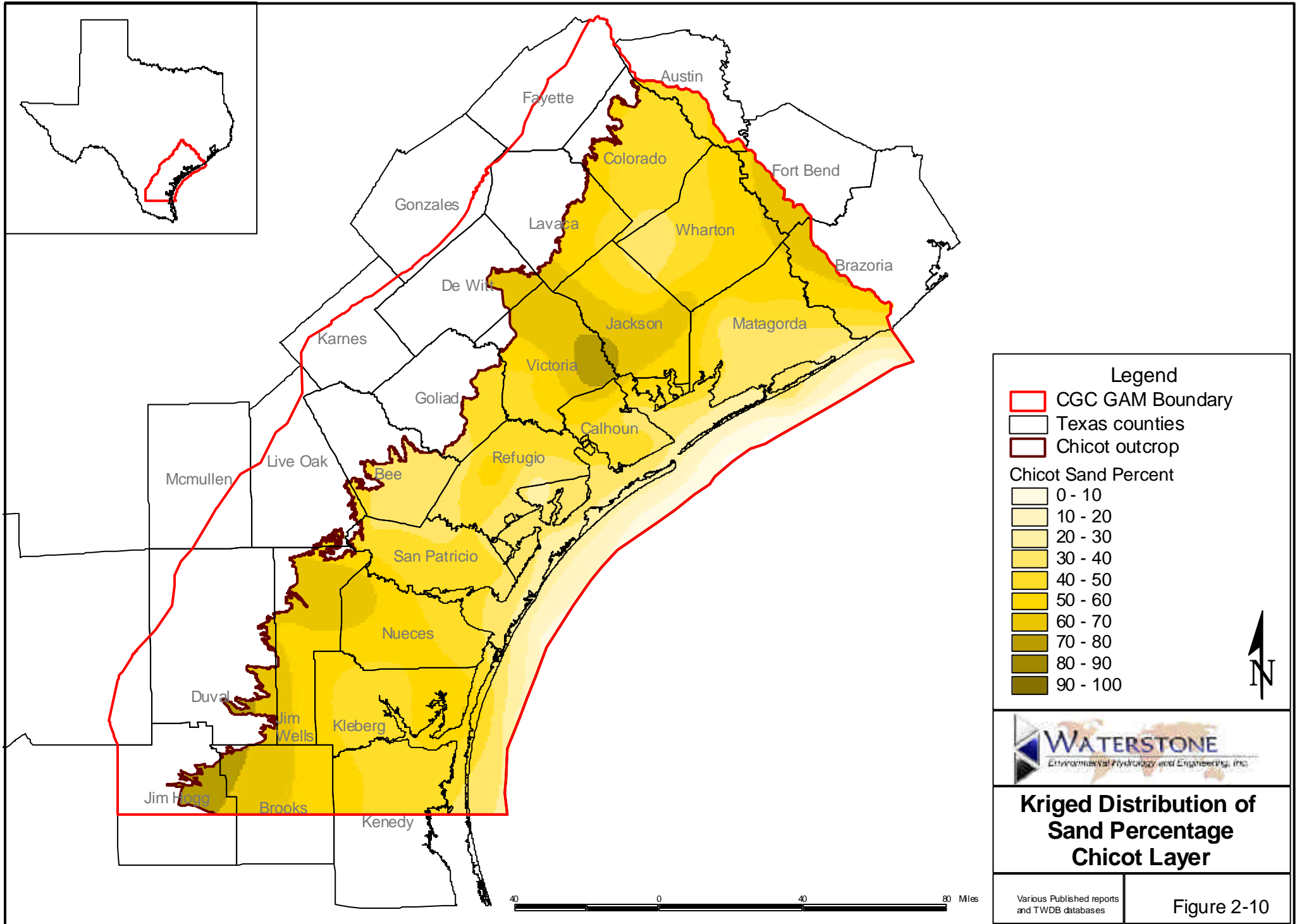
System		Texas Coastal Lowlands	
System	Series	Stratigraphic Units	Hydrogeologic Units
QUATERNARY	HOLOCENE	Alluvium	Chicot Aquifer
	PLEISTOCENE	Beaumont Clay Montgomery Formation Bentley Formation Willis Sand	
TERTIARY	PLIOCENE	Goliad Sand	Evangeline Aquifer
	MIOCENE	Fleming Formation	Burkeville Confining System
		Oakville Sandstone	Catahoula Confining System (Restricted)
		Catahoula Sandstone or Tuff ²	
OLIGOCENE	Anahuac Formation ¹	Jasper Aquifer	
	"Frio" Formation ¹		

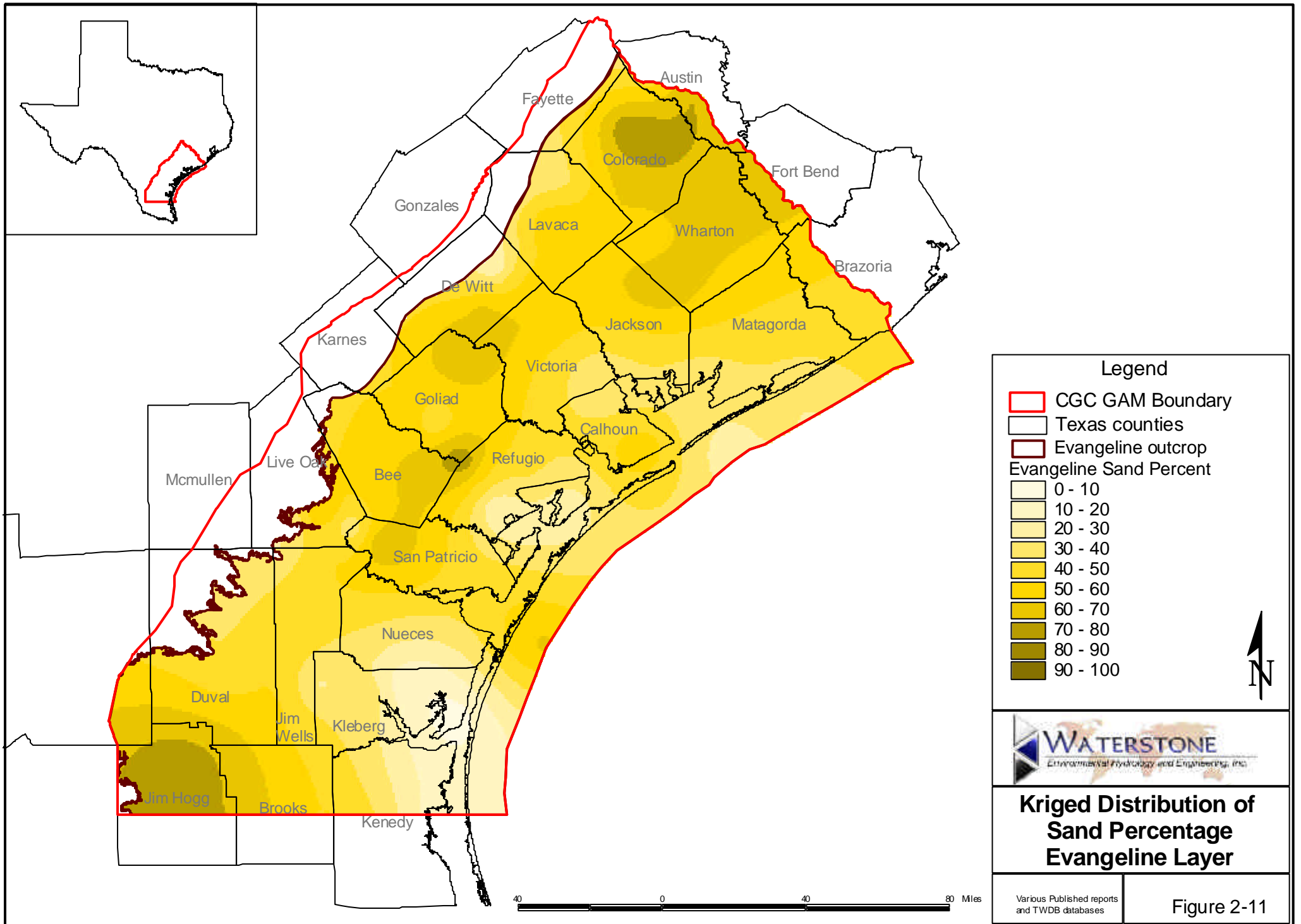
1 Present only in the subsurface

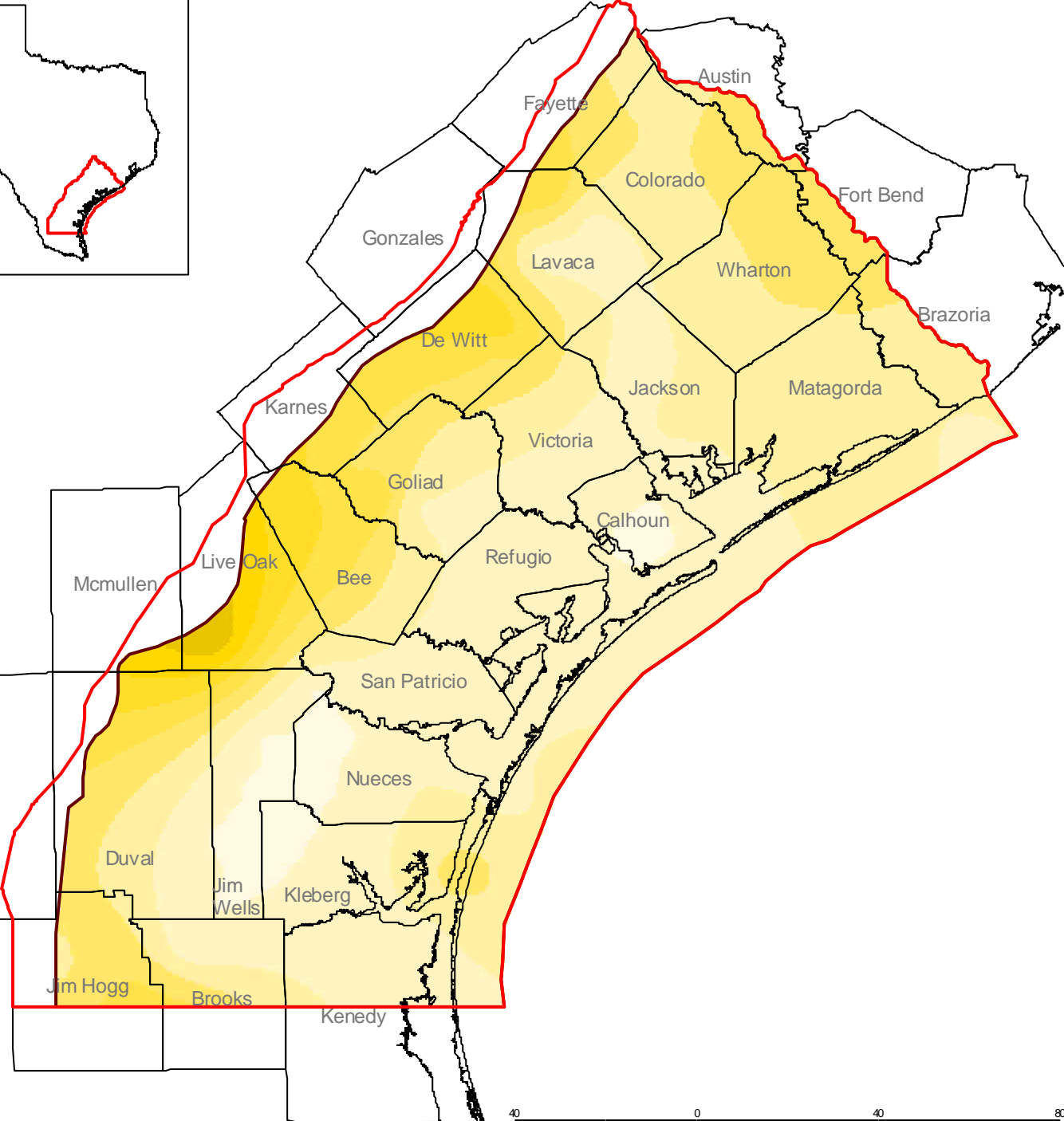
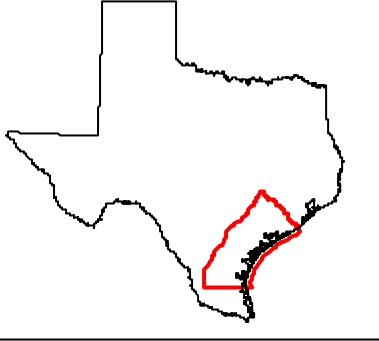
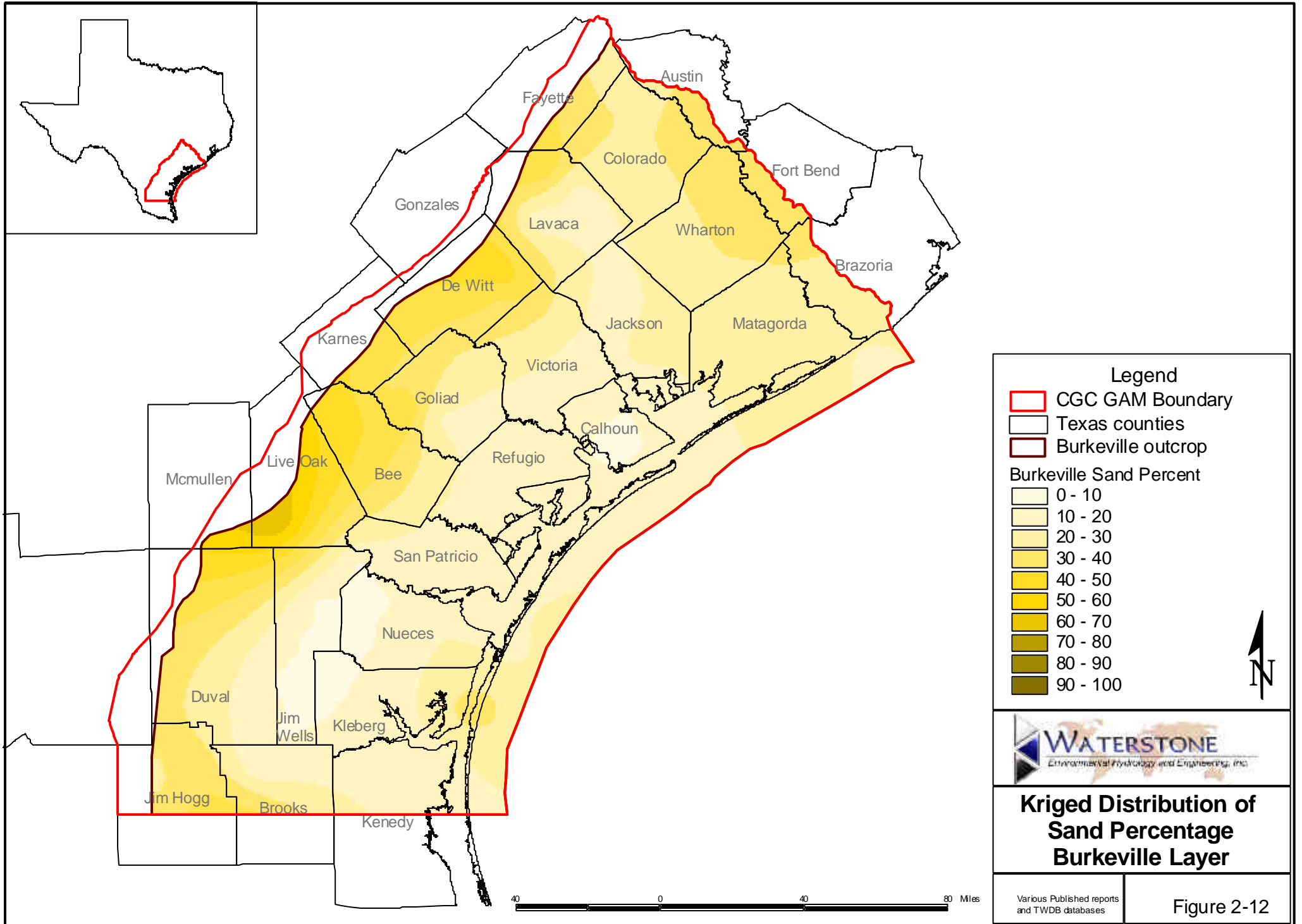
2 Catahoula Tuff west of Lavaca County

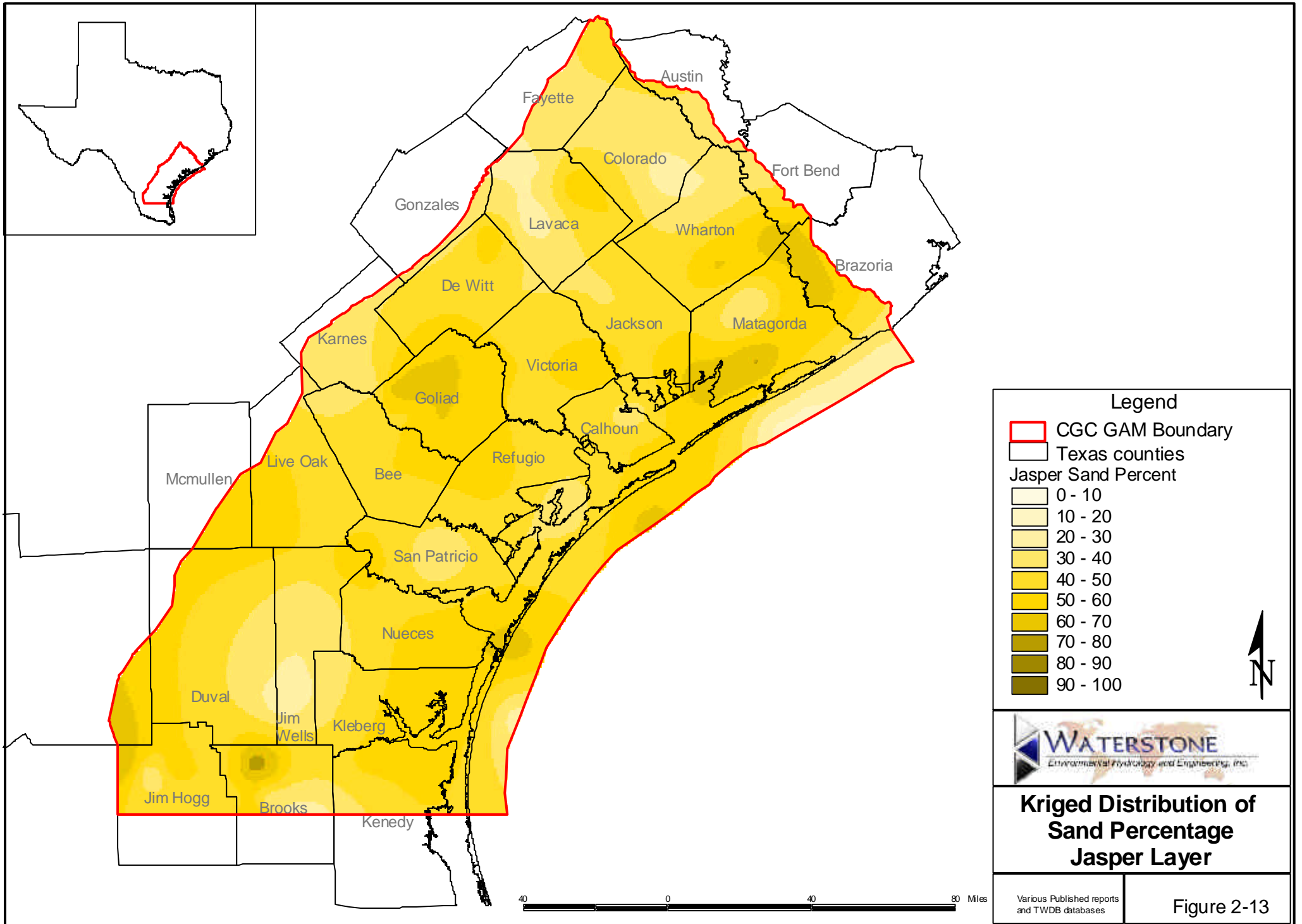


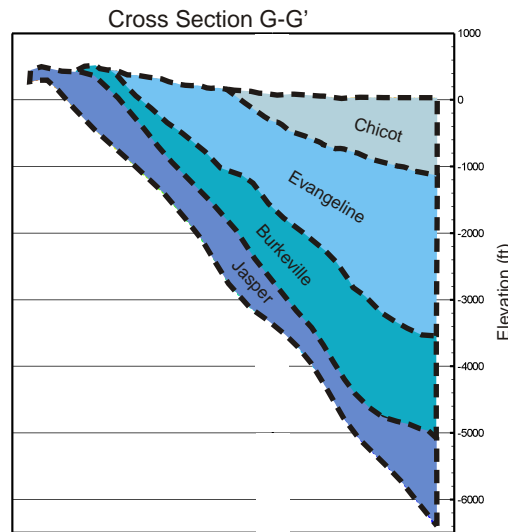
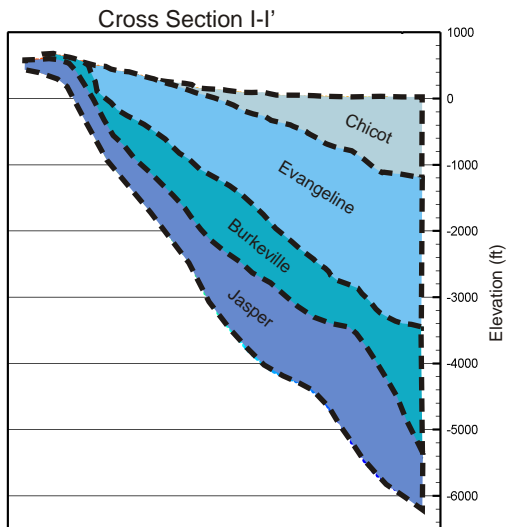
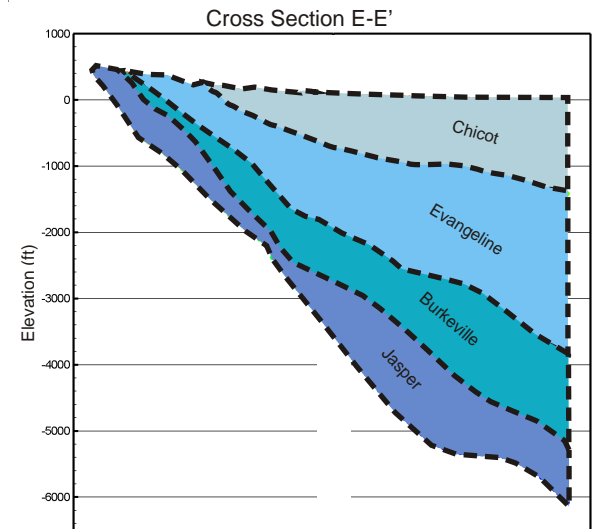
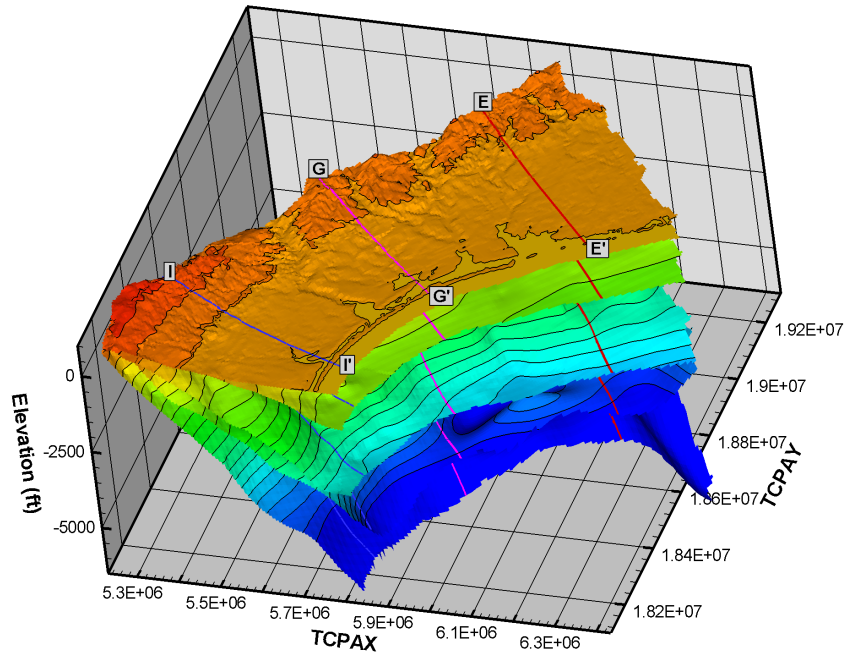
Stratigraphic and Hydrogeologic Units of the Central Gulf Coast











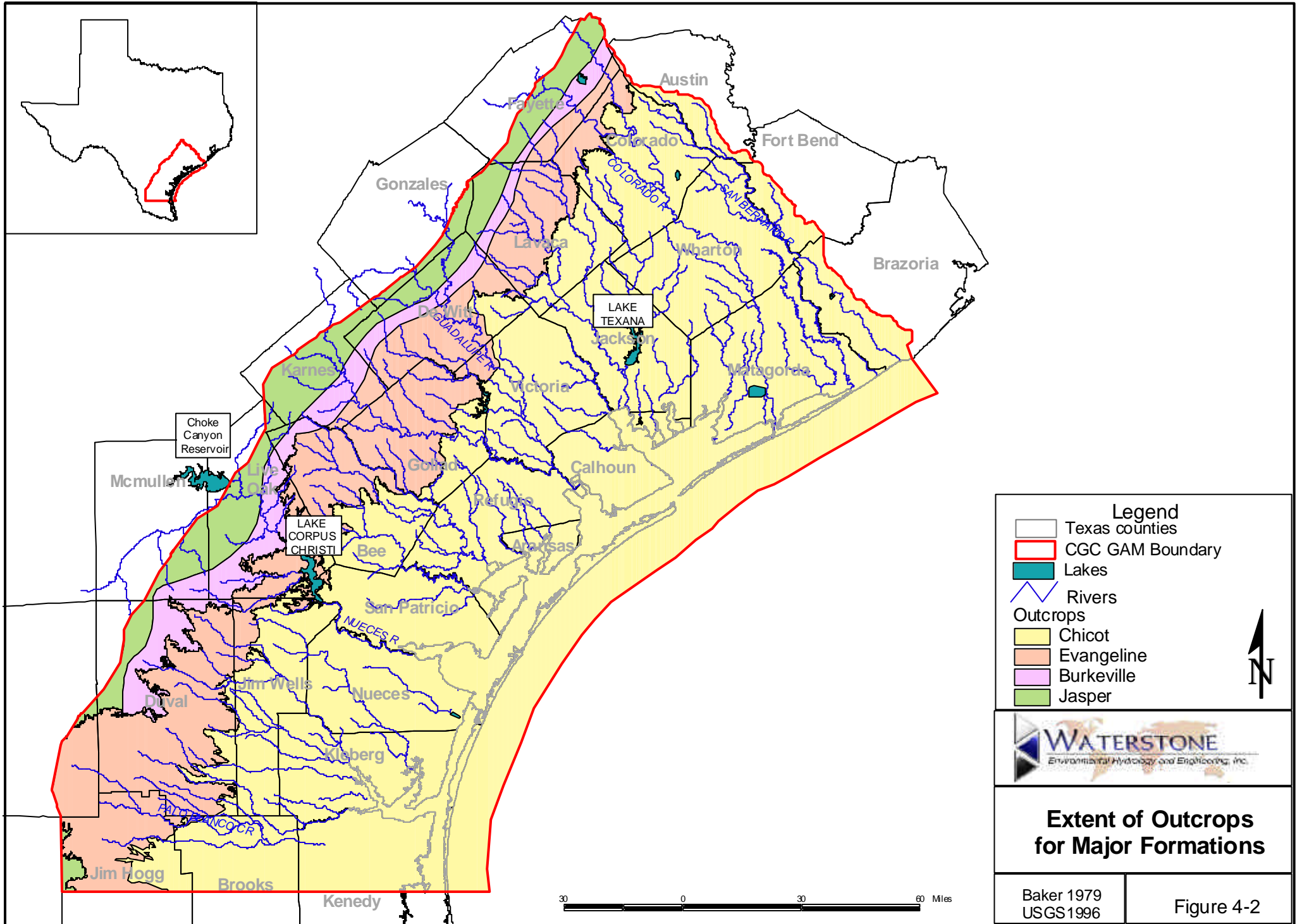
Vertical exaggeration ~ 80x



3-D Aquifer Model and
Cross Sections

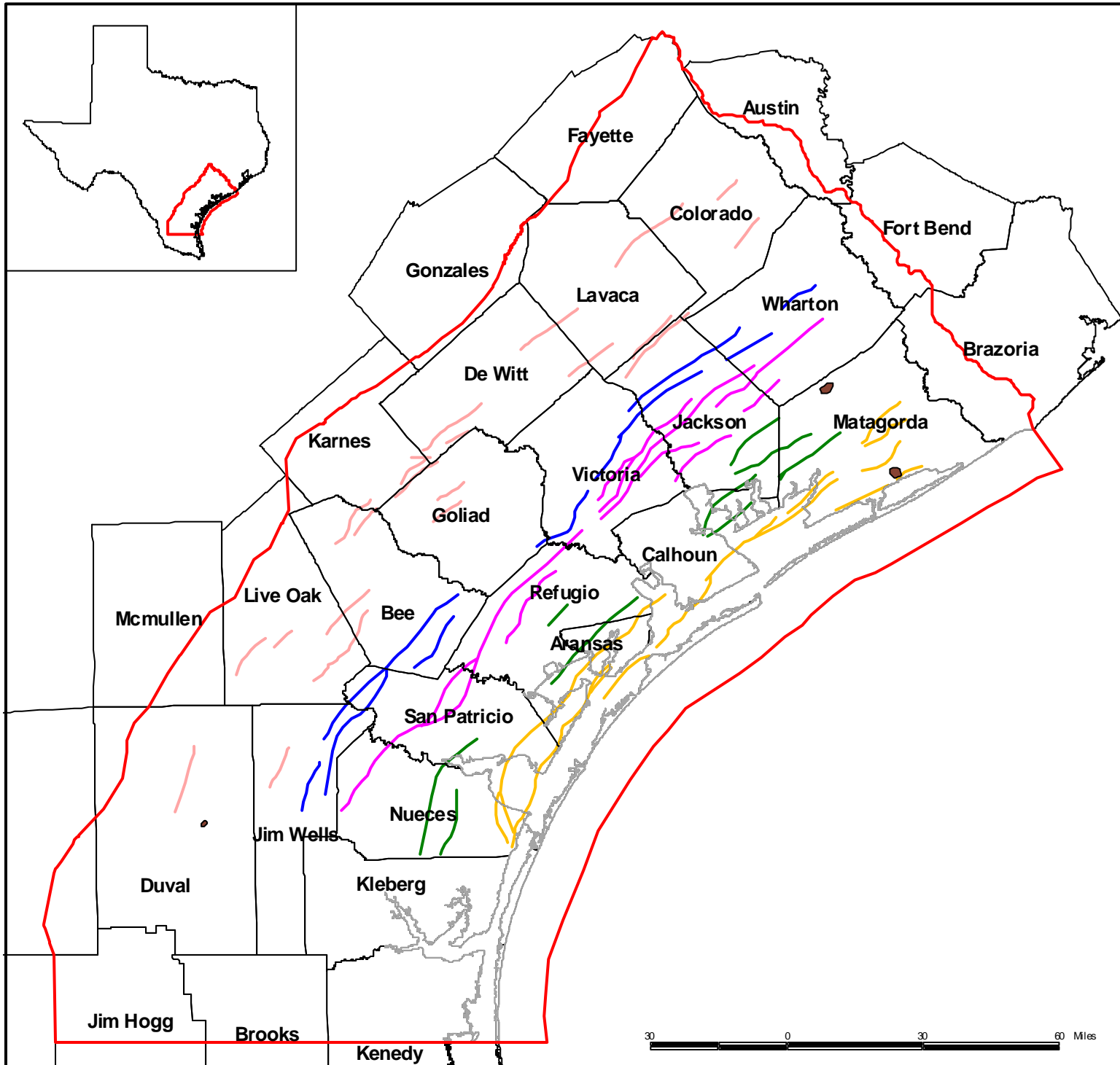
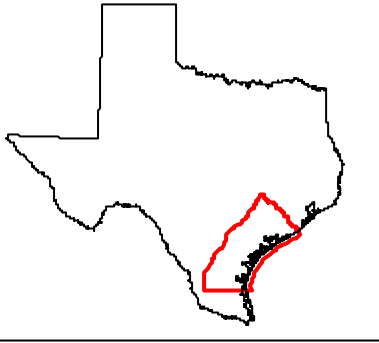
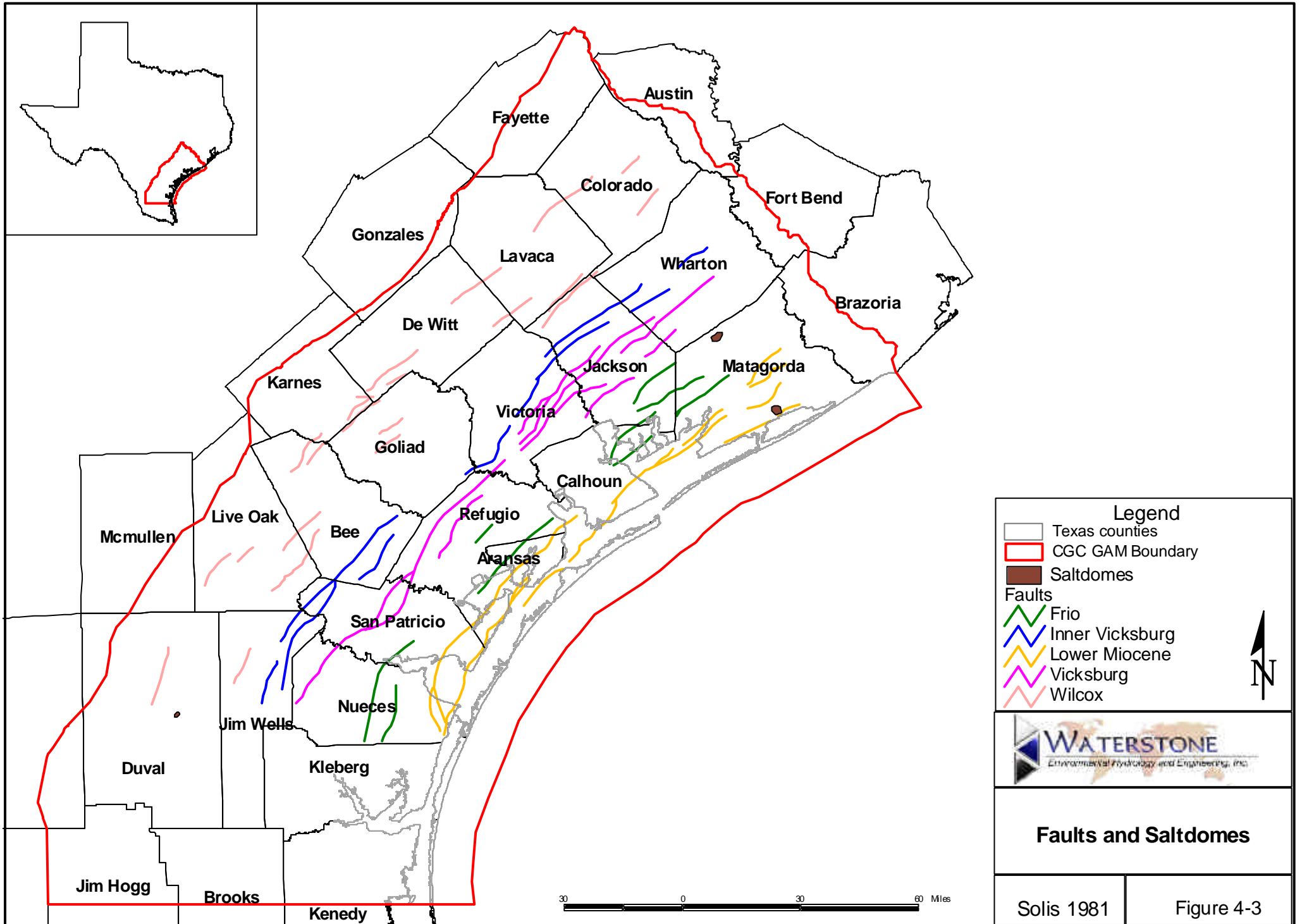
Baker 1979

Figure 4-1



Legend	
	Texas counties
	CGC GAM Boundary
	Lakes
	Rivers
Outcrops	
	Chicot
	Evangeline
	Burkeville
	Jasper
Extent of Outcrops for Major Formations	
Baker 1979 USGS1996	Figure 4-2

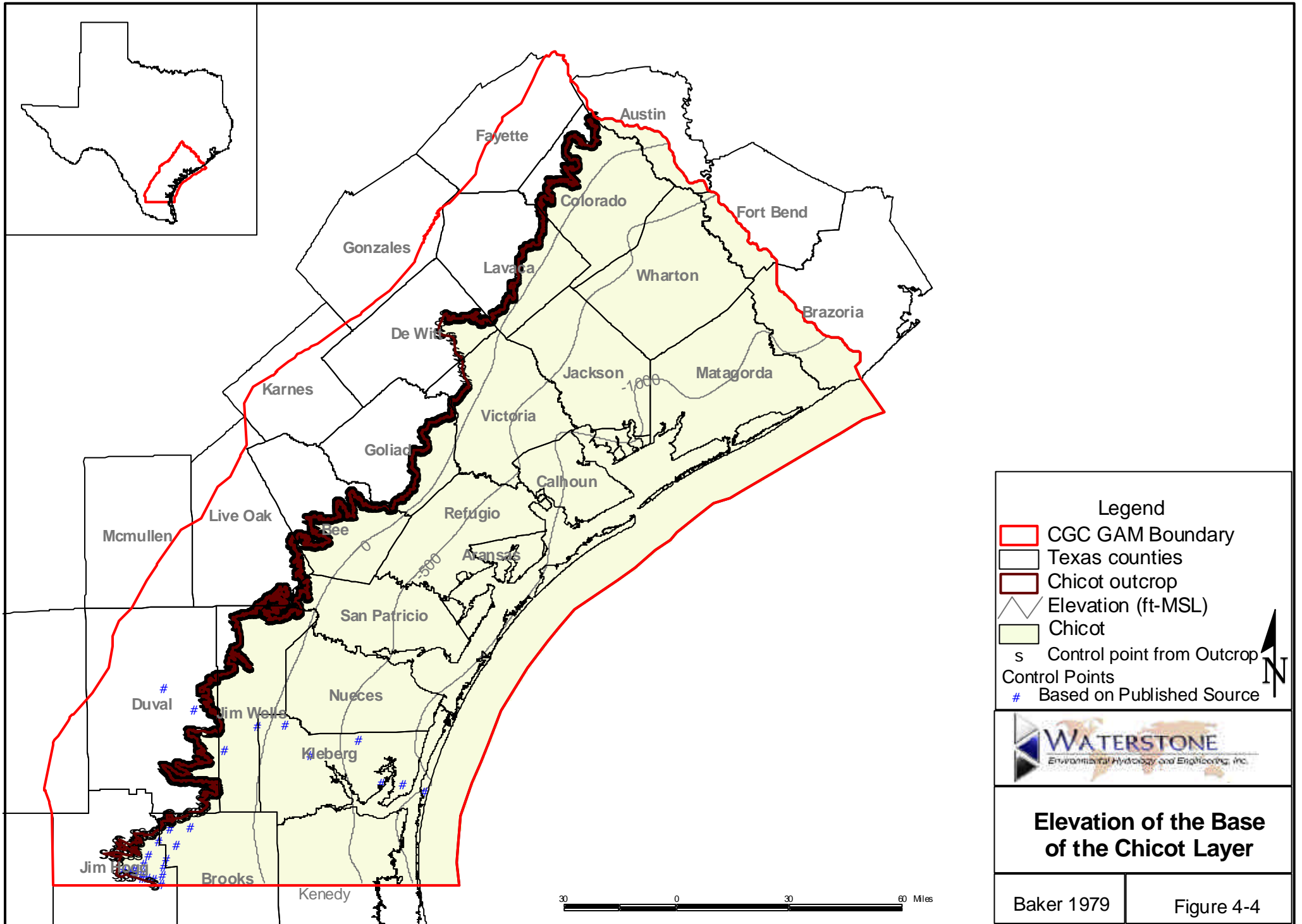
30 0 30 60 Miles

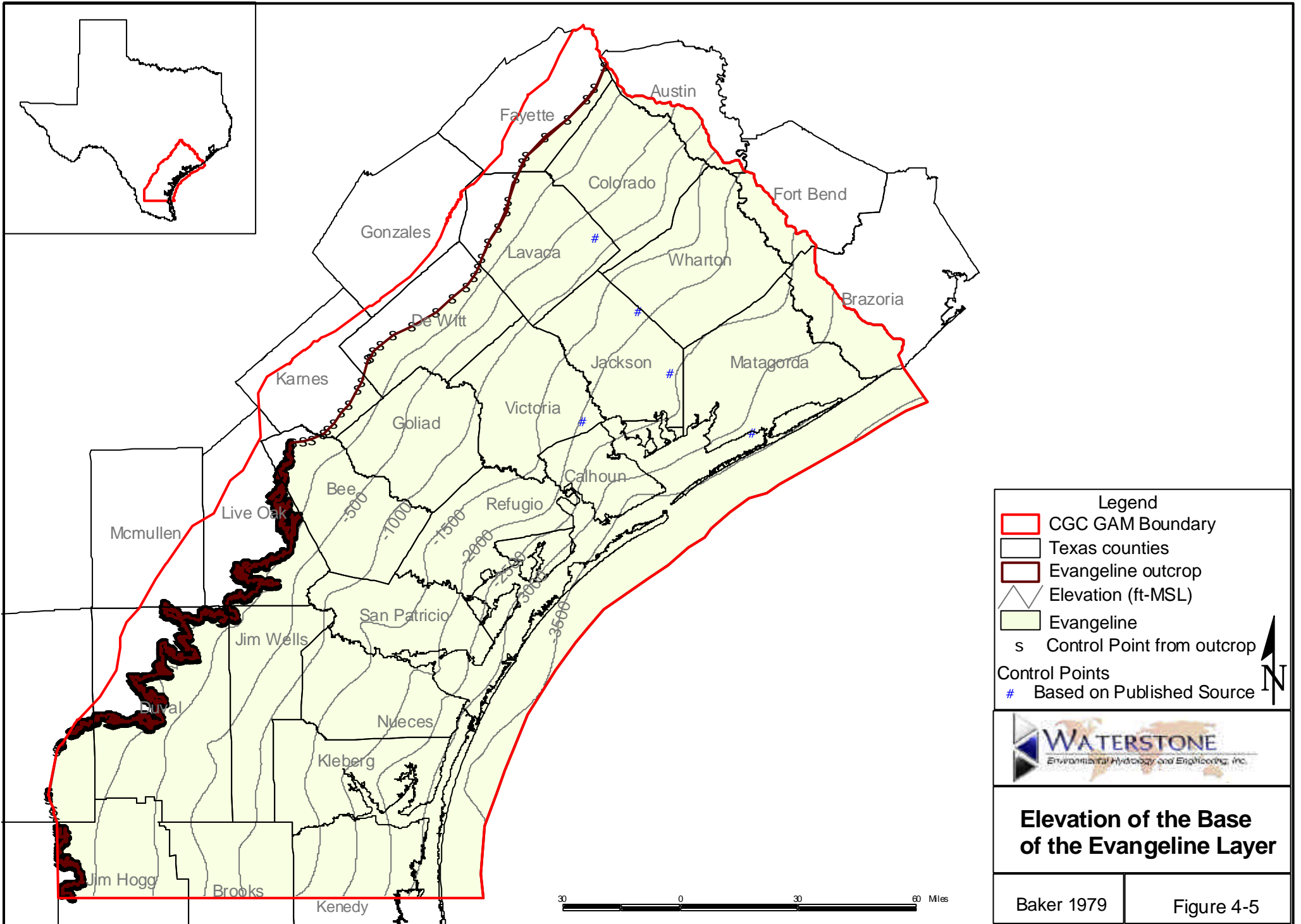


Faults and Salt domes

Solis 1981

Figure 4-3





Legend

- CGC GAM Boundary
- Texas counties
- Evangeline outcrop
- Elevation (ft-MSL)
- Evangeline
- s Control Point from outcrop
- # Control Points Based on Published Source

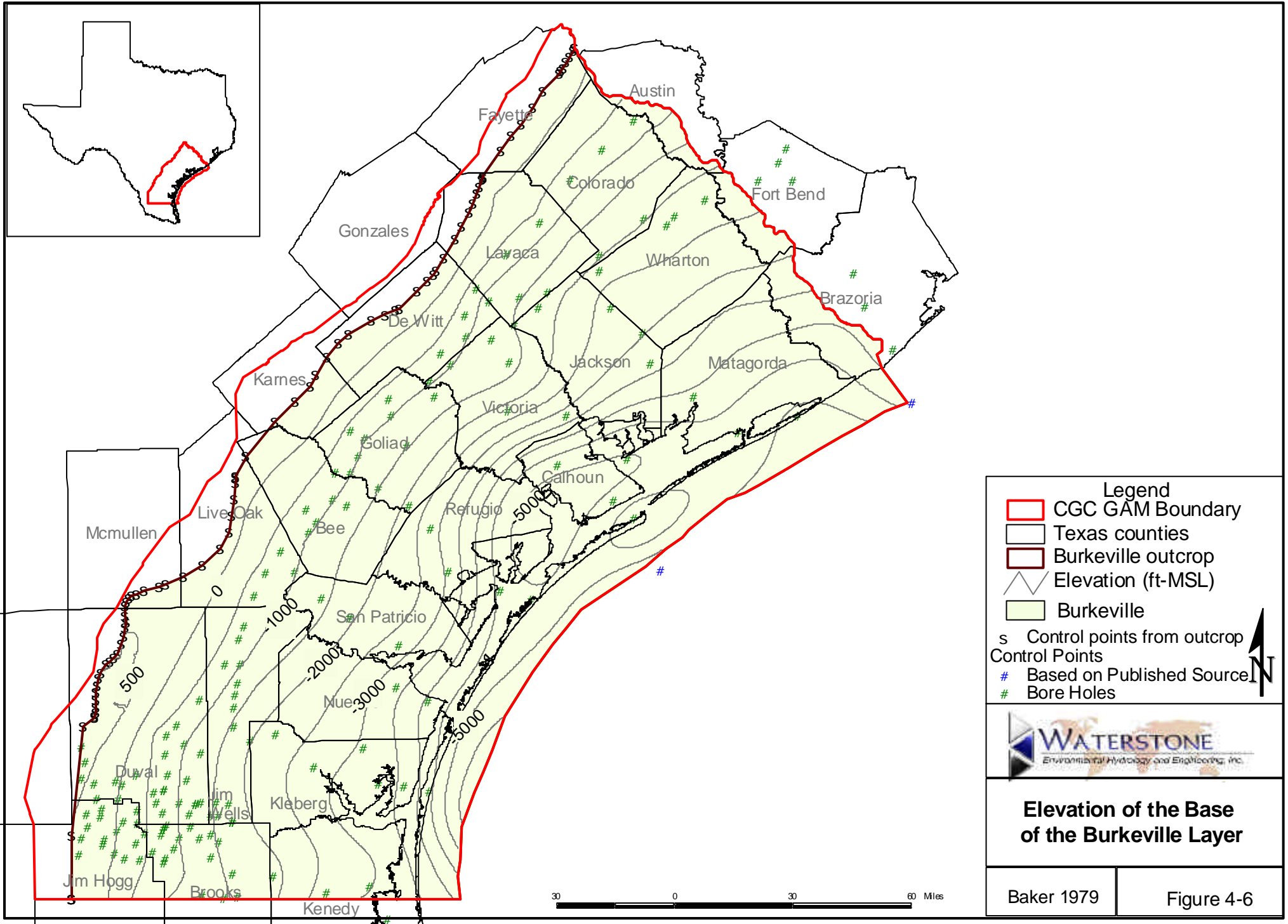


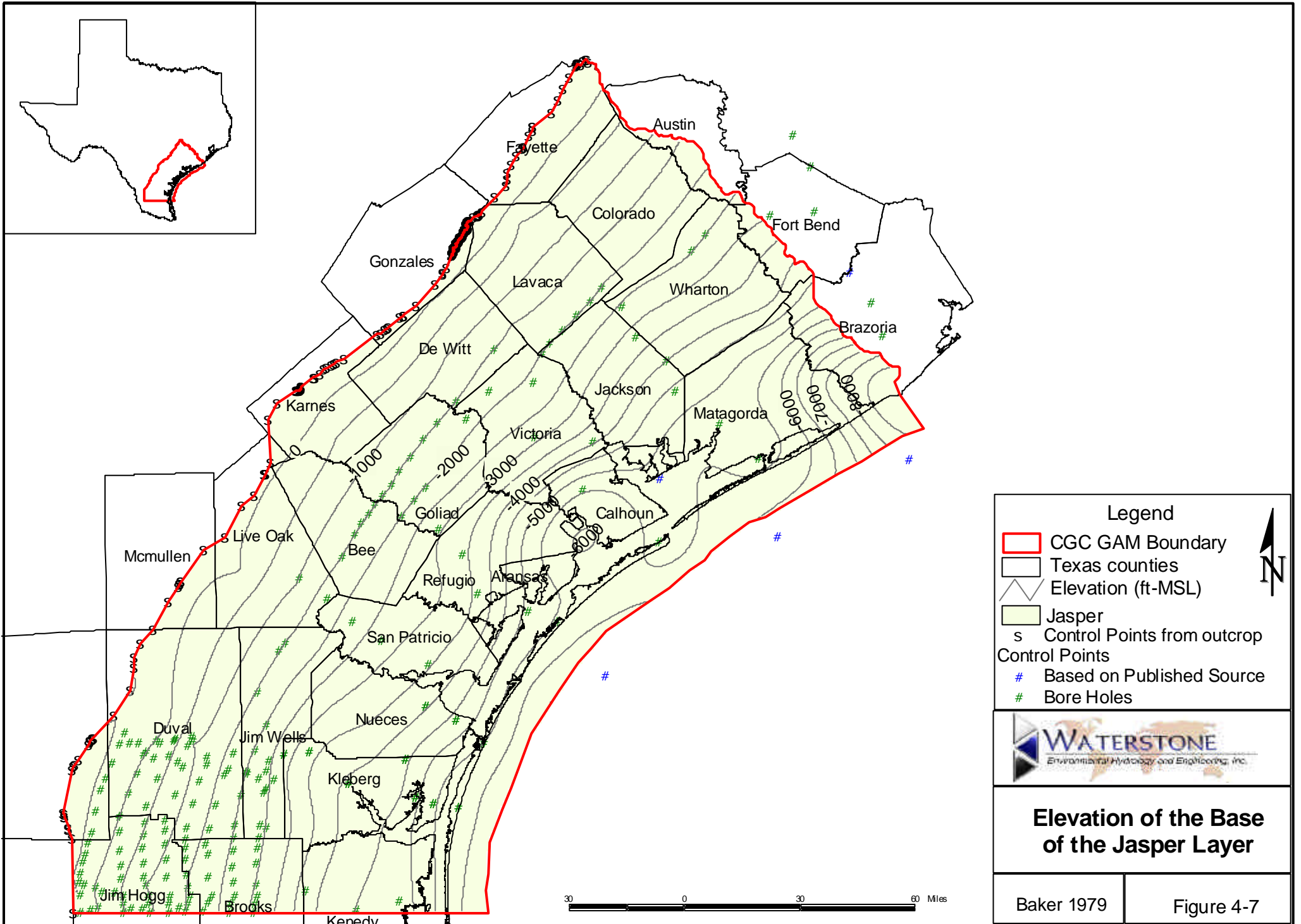
Elevation of the Base of the Evangeline Layer

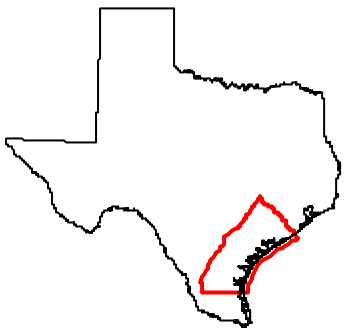
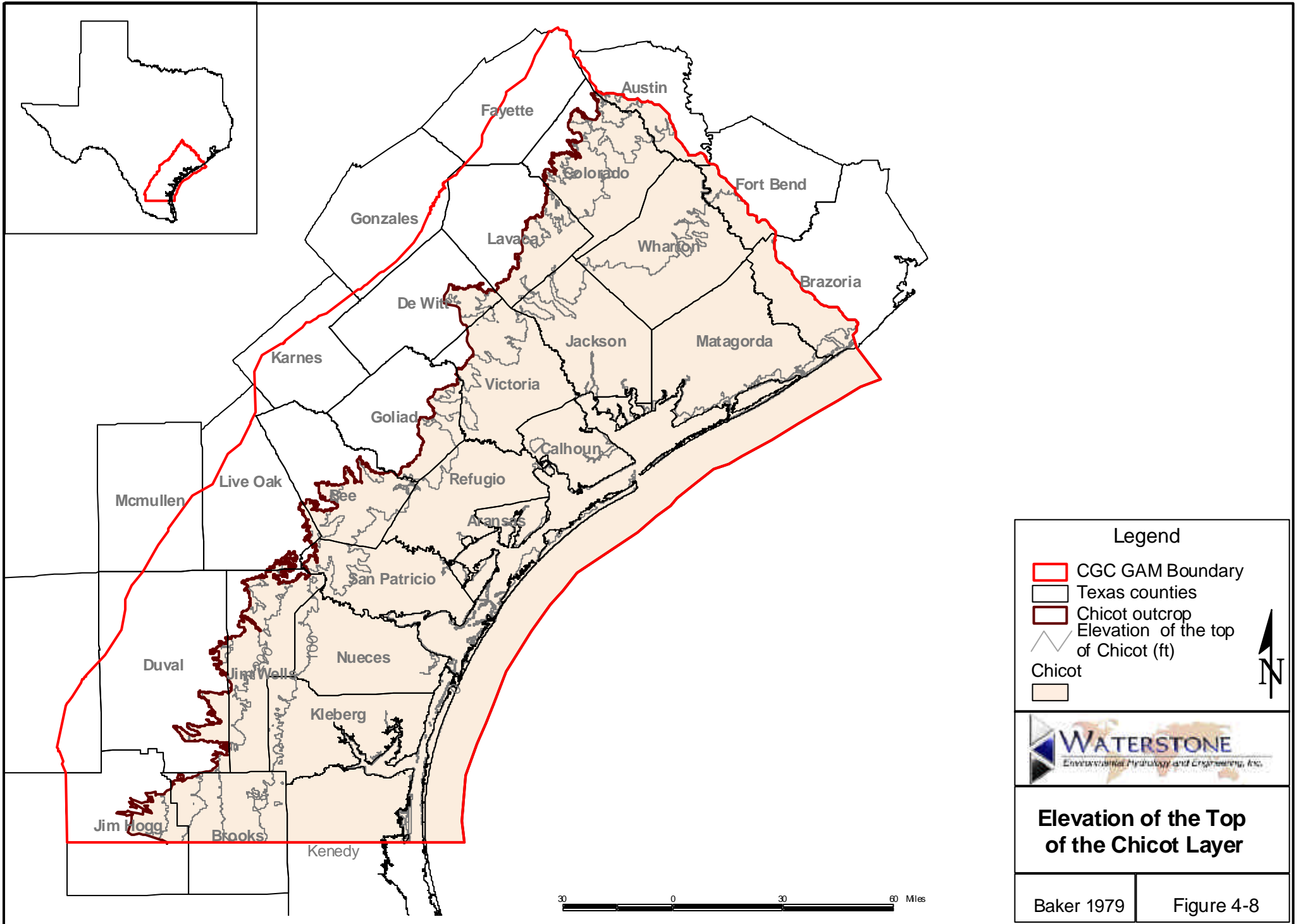
Baker 1979

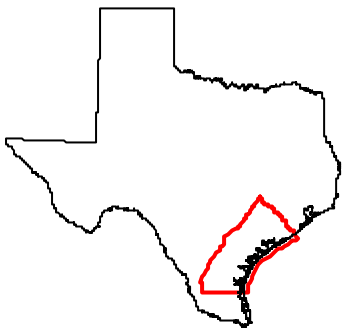
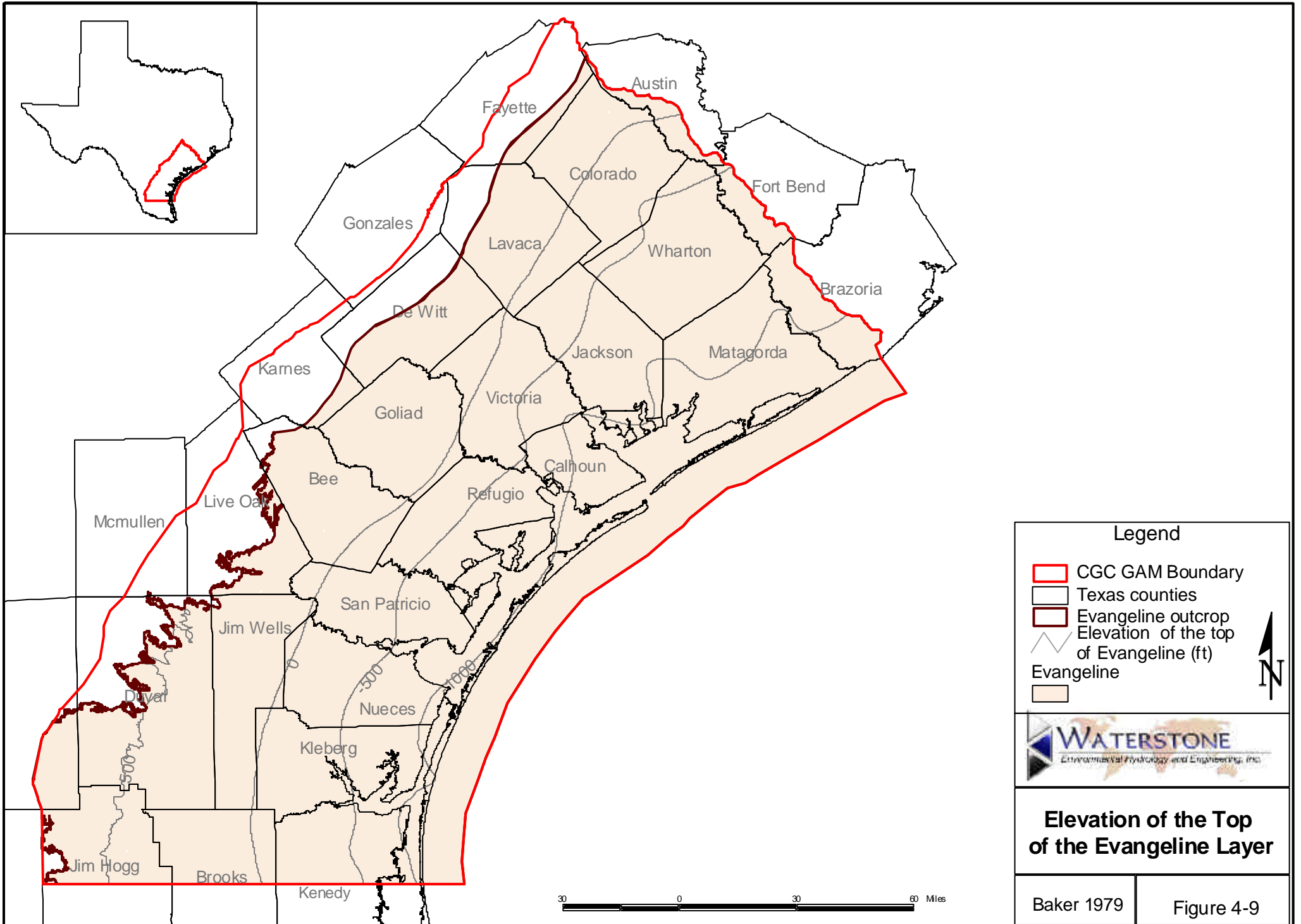
Figure 4-5

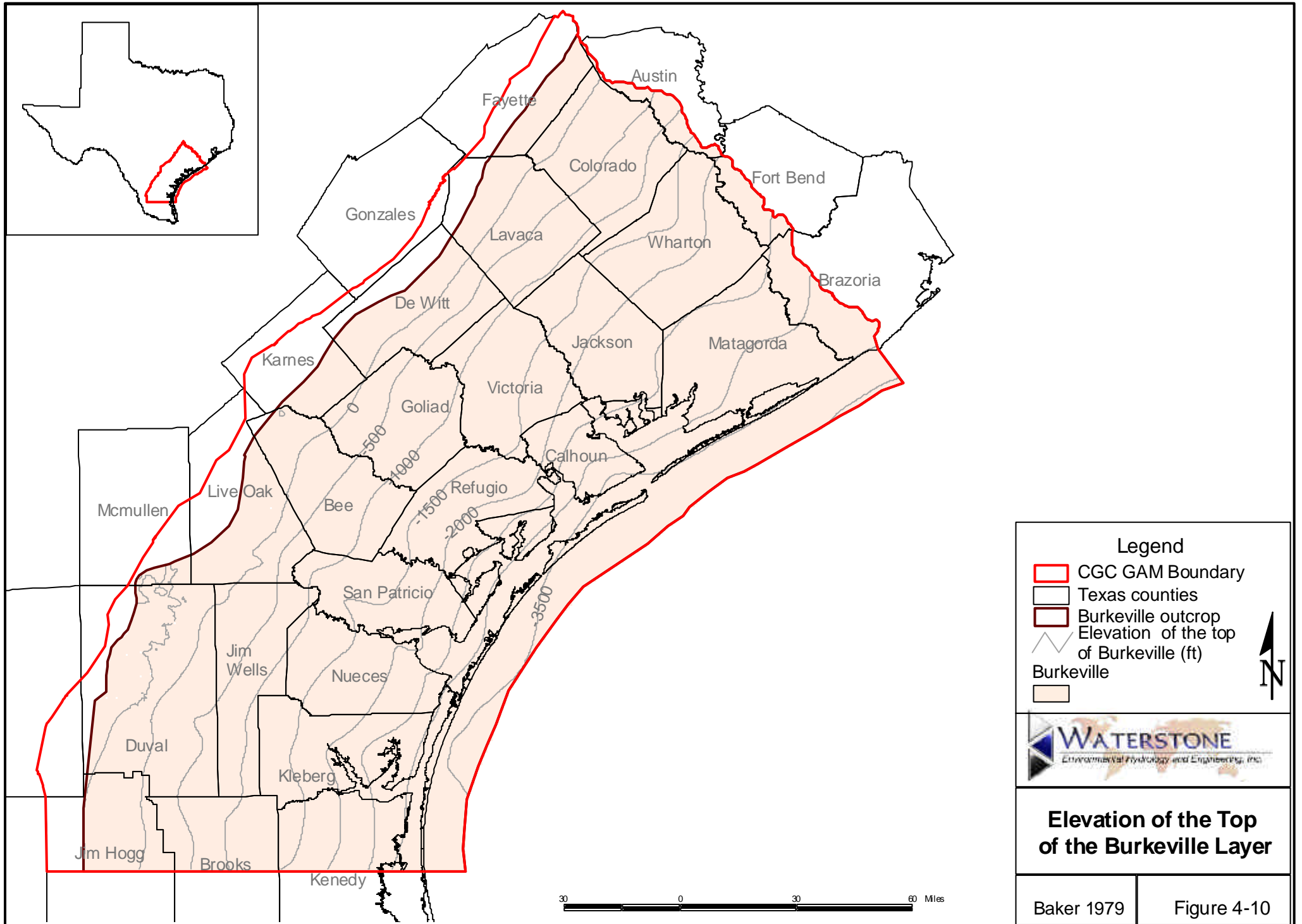


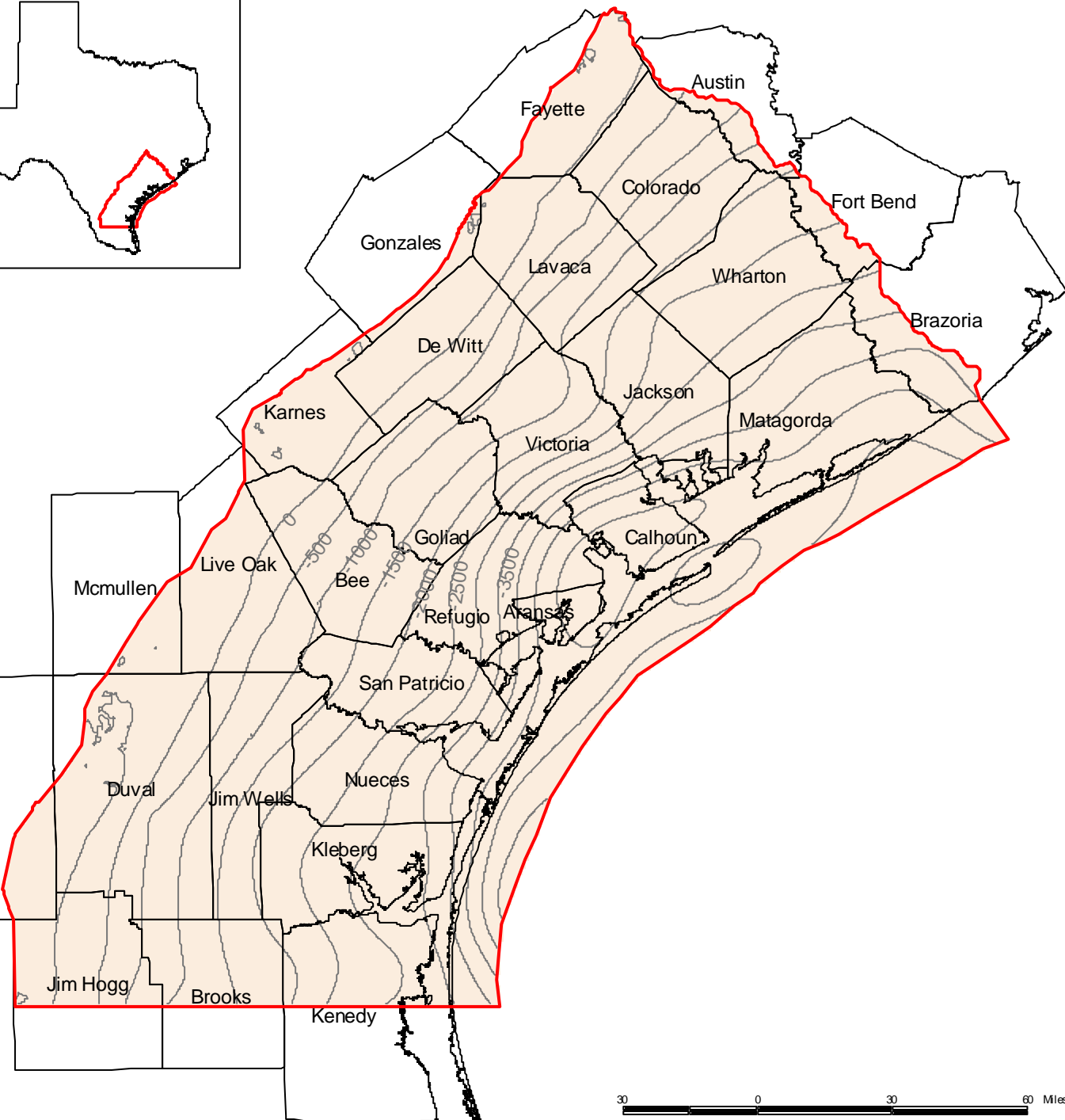
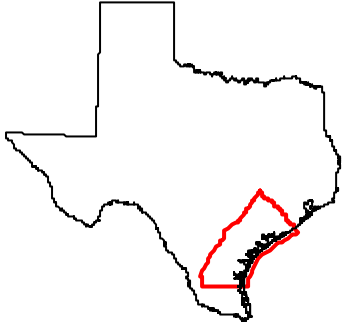
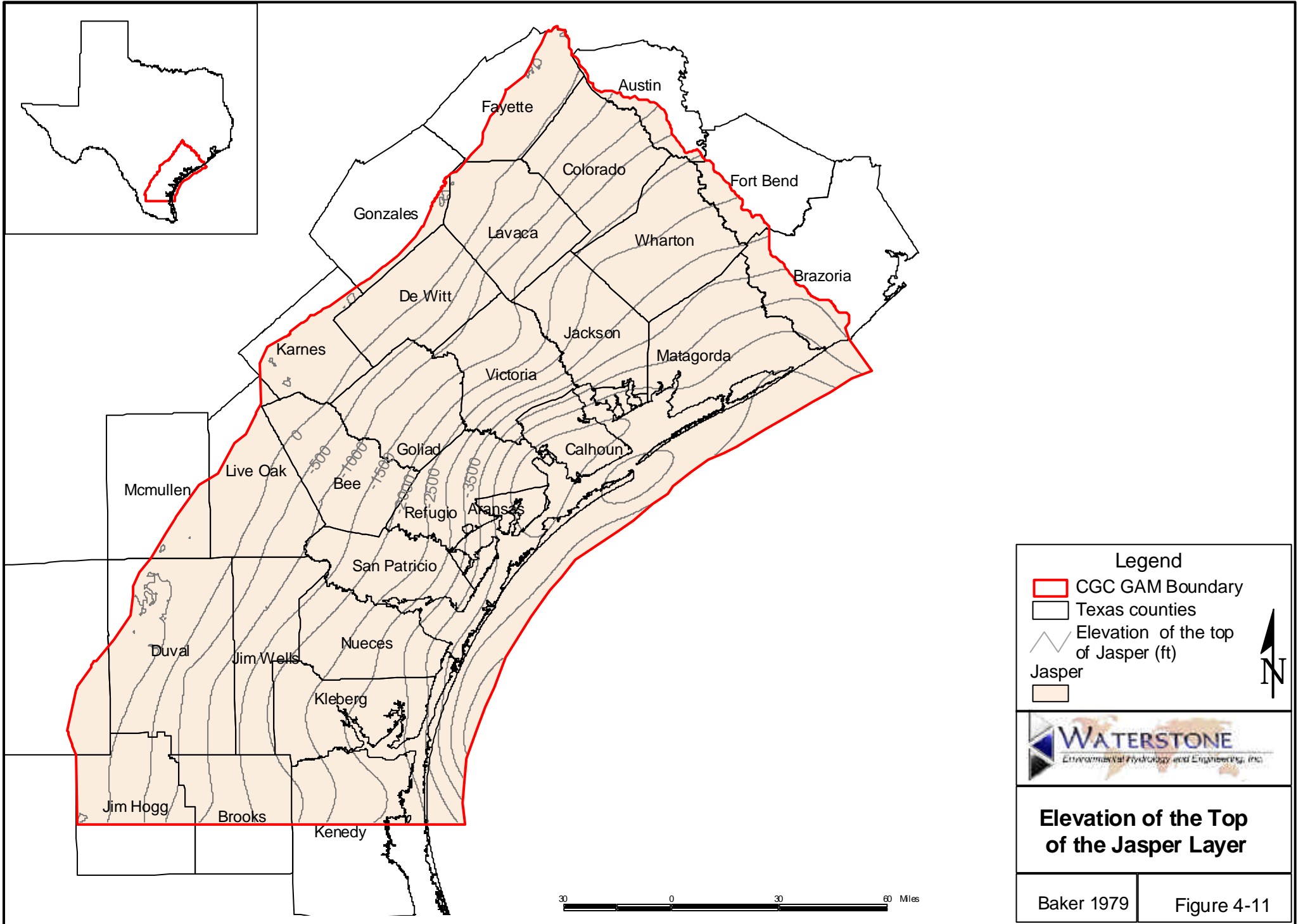












Legend

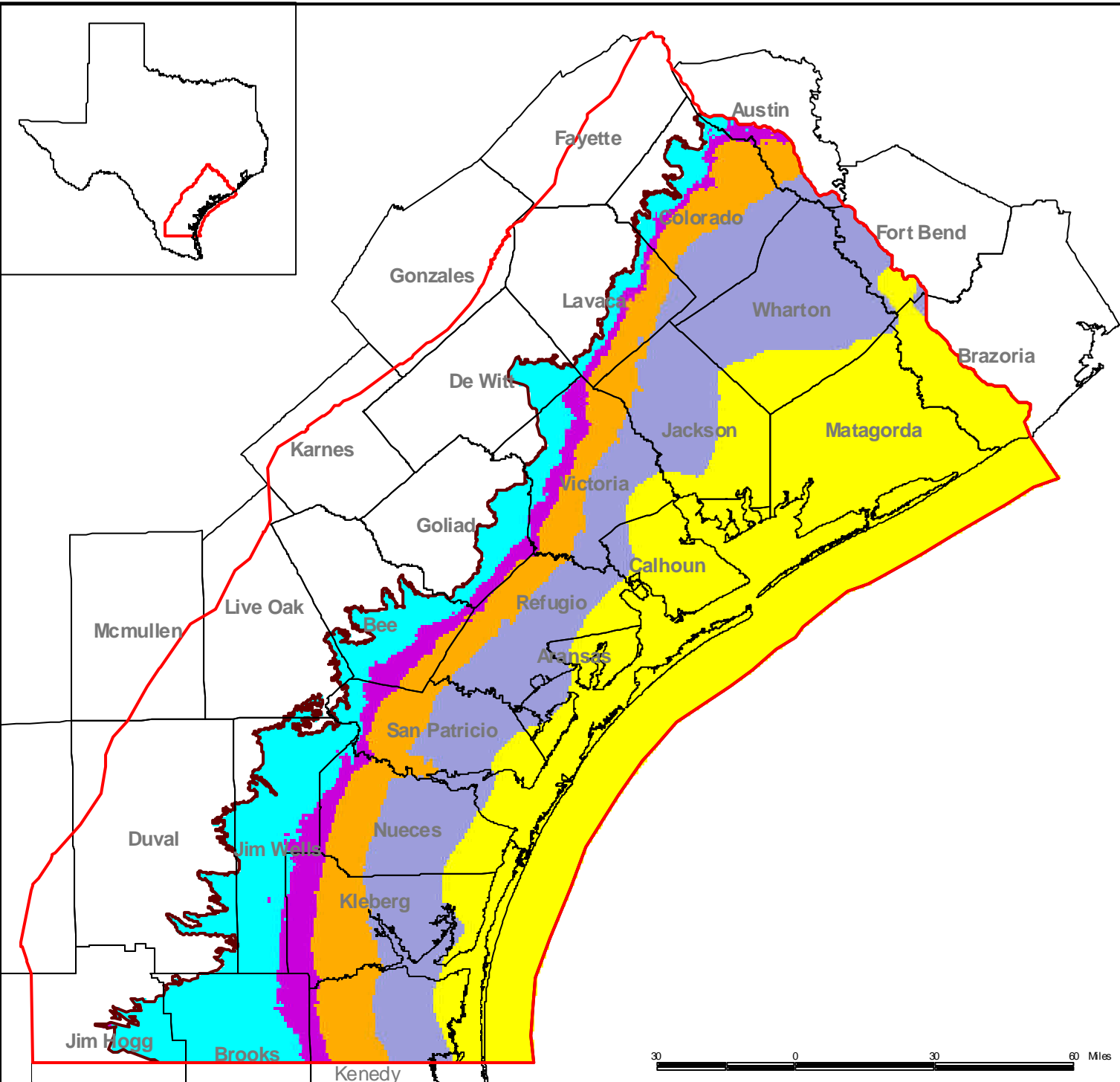
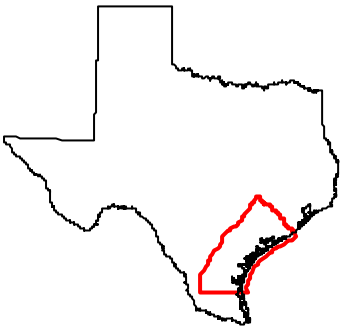
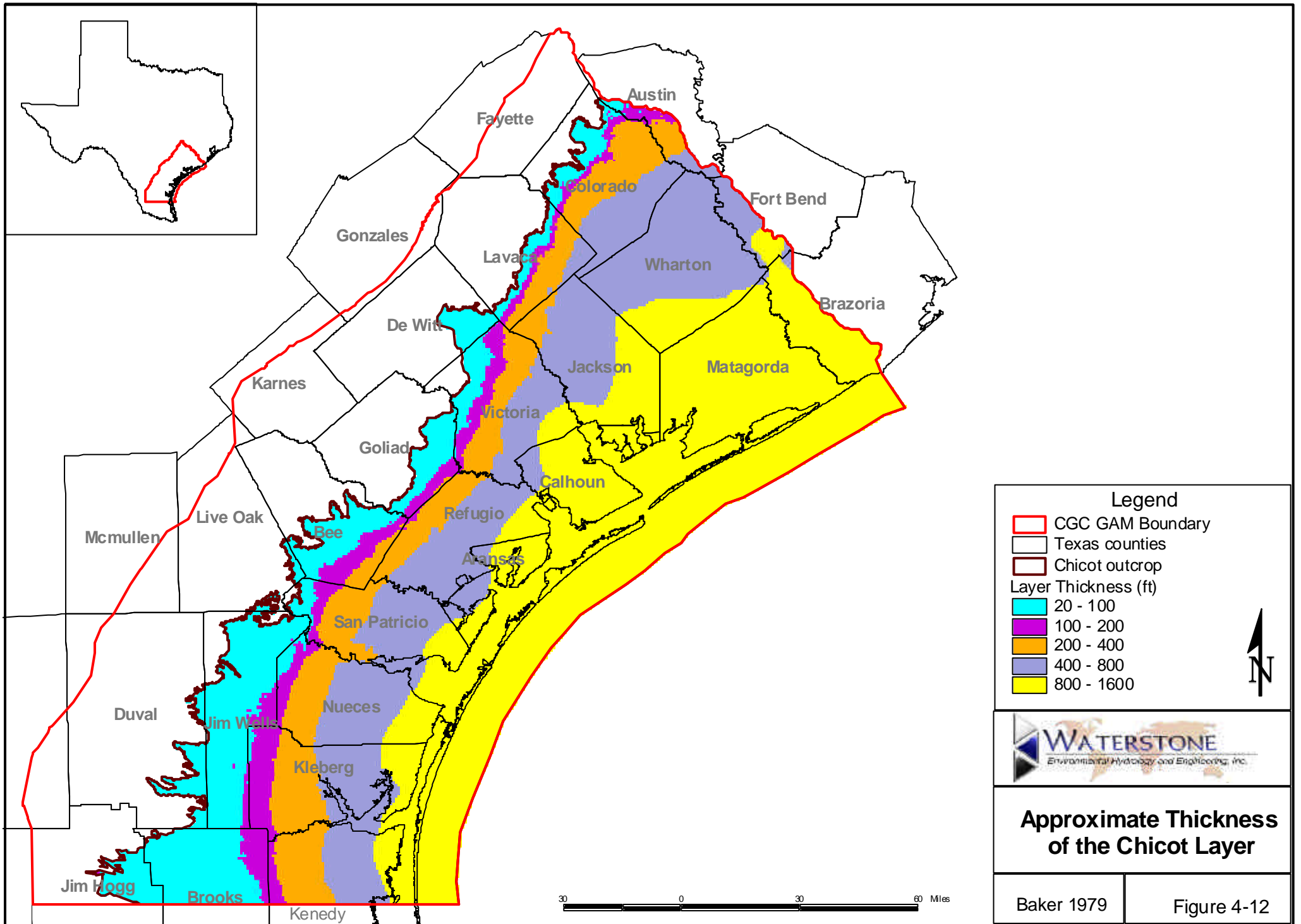
- CGC GAM Boundary
- Texas counties
- Elevation of the top of Jasper (ft)

Elevation of the Top of the Jasper Layer

Baker 1979

Figure 4-11





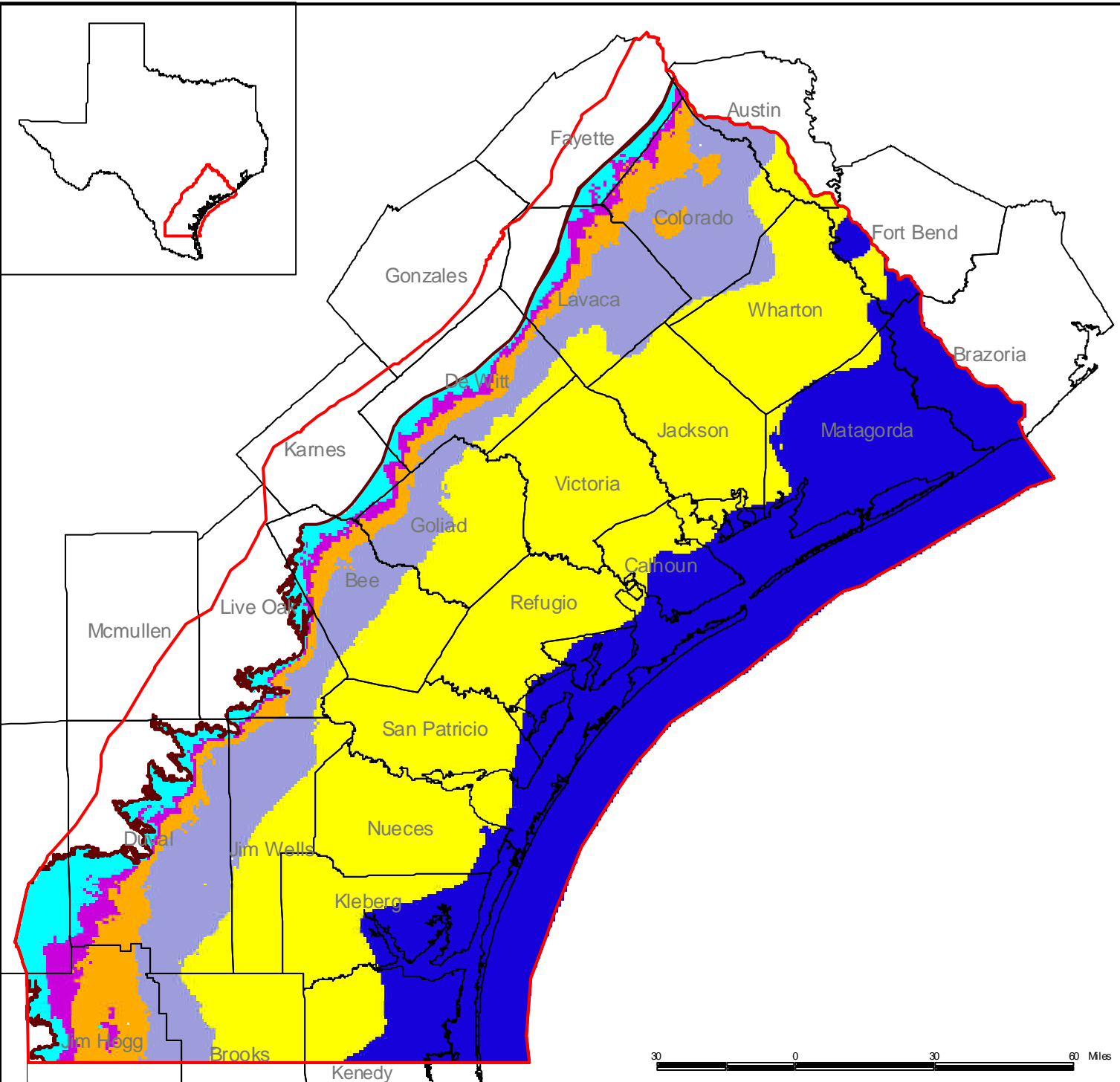
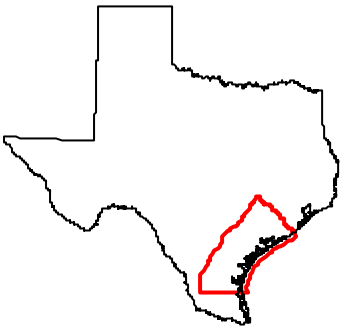
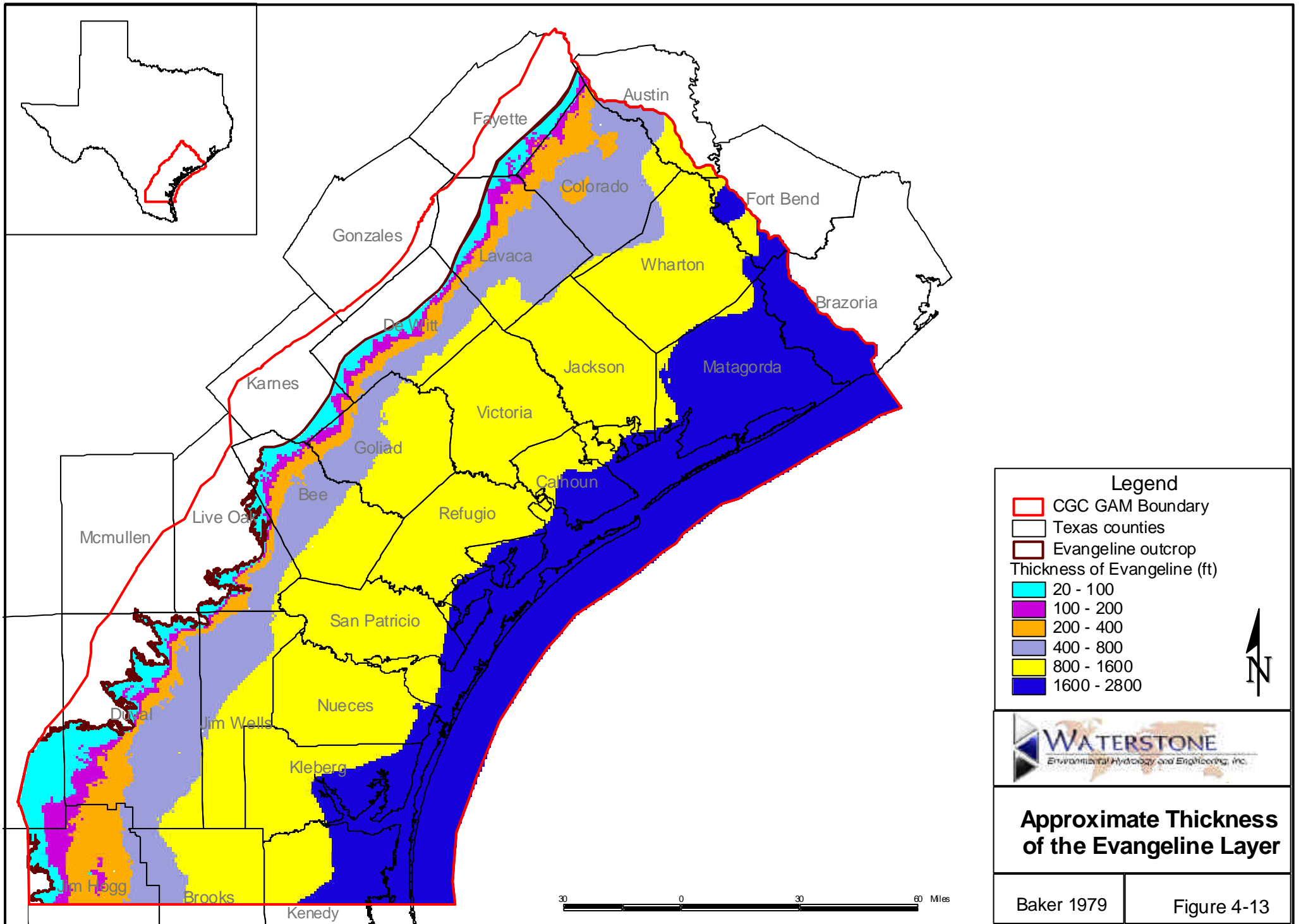
Legend

- CGC GAM Boundary
- Texas counties
- Chicot outcrop
- Layer Thickness (ft)
 - 20 - 100
 - 100 - 200
 - 200 - 400
 - 400 - 800
 - 800 - 1600

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Approximate Thickness of the Chicot Layer

Baker 1979 Figure 4-12



Legend

- CGC GAM Boundary
- Texas counties
- Evangeline outcrop

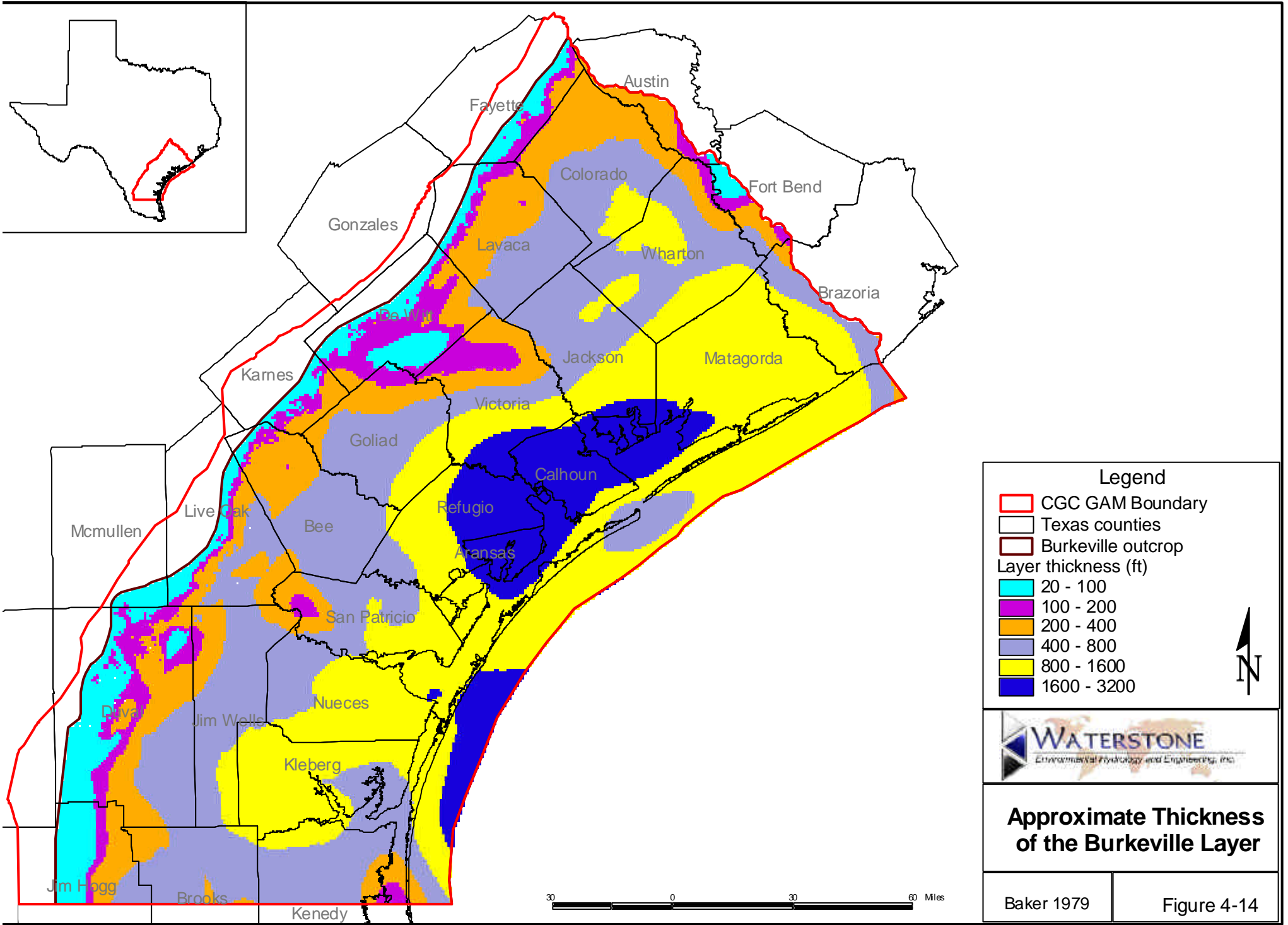
Thickness of Evangeline (ft)

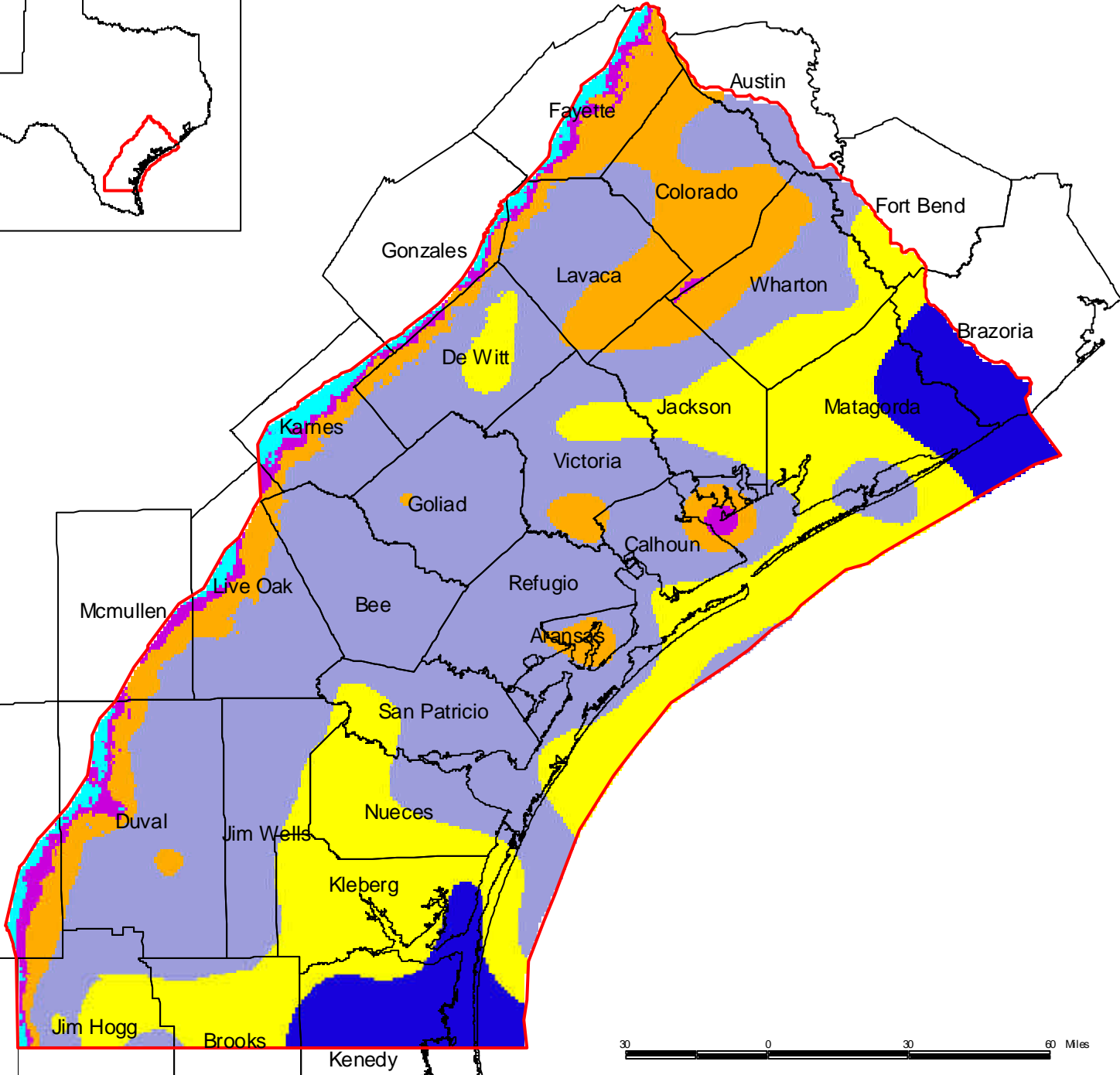
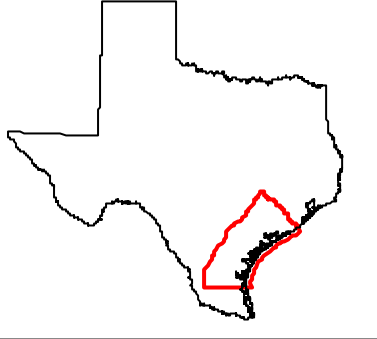
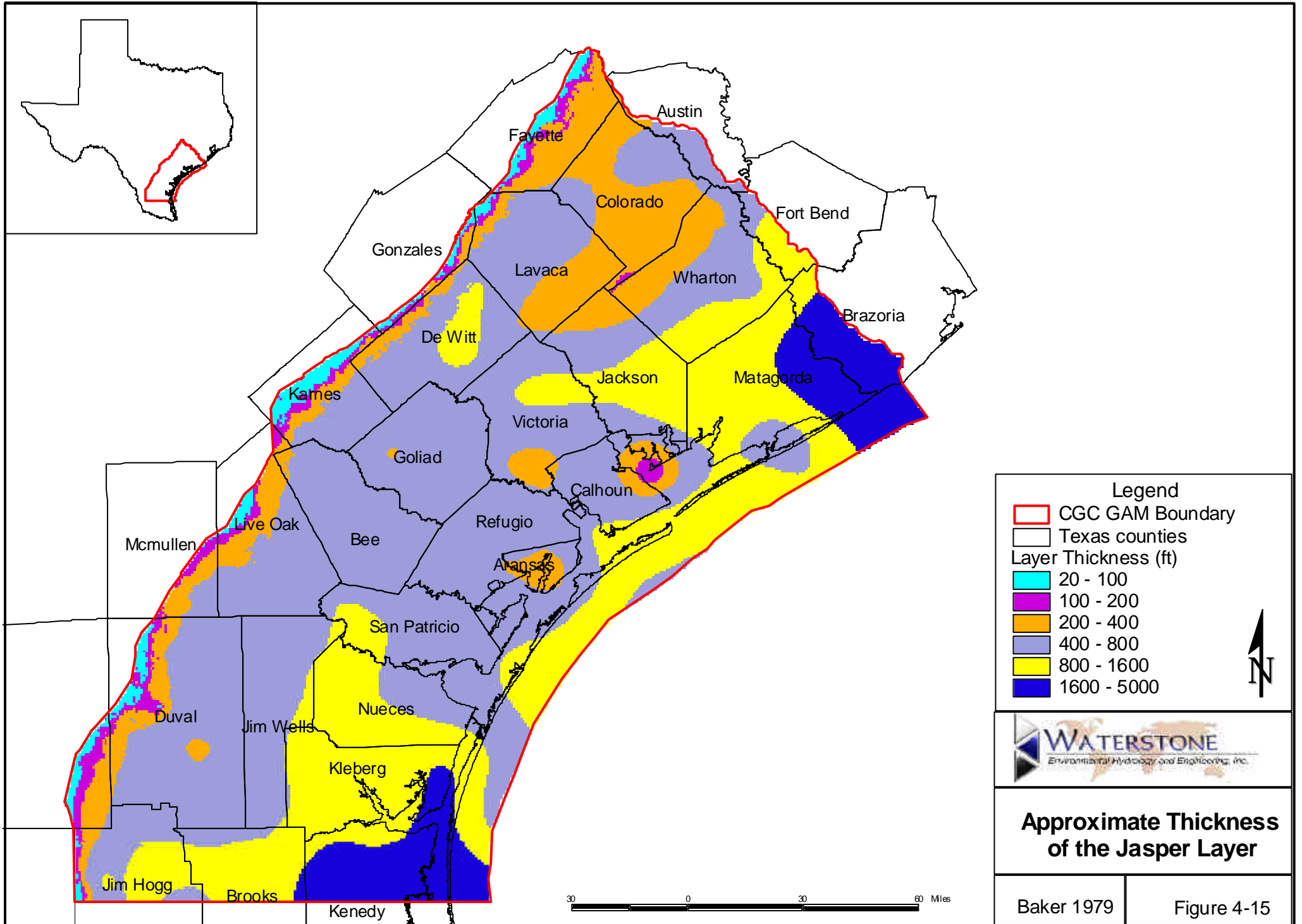
- 20 - 100
- 100 - 200
- 200 - 400
- 400 - 800
- 800 - 1600
- 1600 - 2800



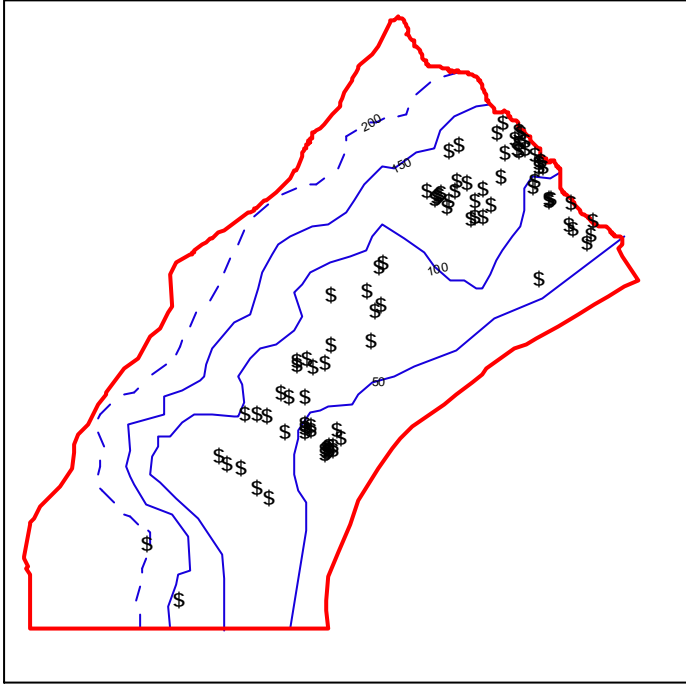
Approximate Thickness of the Evangeline Layer







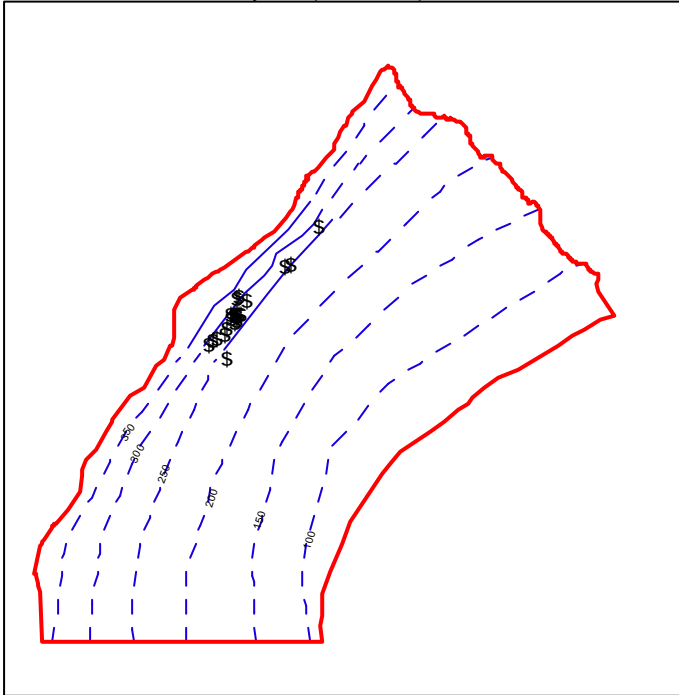
Observed Predevelopment Water Level Elevation (ft)
Layer 1 (Chicot)



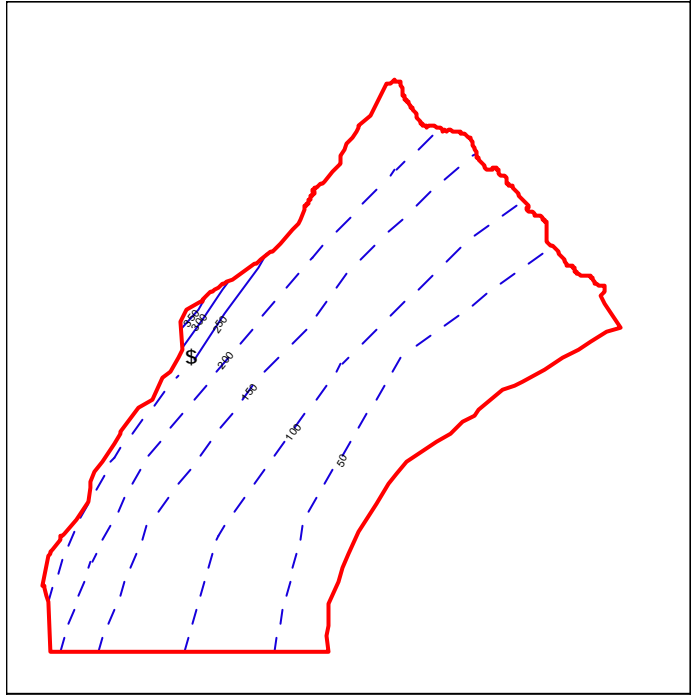
Observed Predevelopment Water Level Elevation (ft)
Layer 2 (Evangeline)



Observed Predevelopment Water Level Elevation (ft)
Layer 3 (Burkeville)



Observed Predevelopment Water Level Elevation (ft)
Layer 4 (Jasper)



Notes: Dased lines represent
hypothetical contours.
Contours are only valid in proximity
to data points.

50 0 50 100 150 Miles

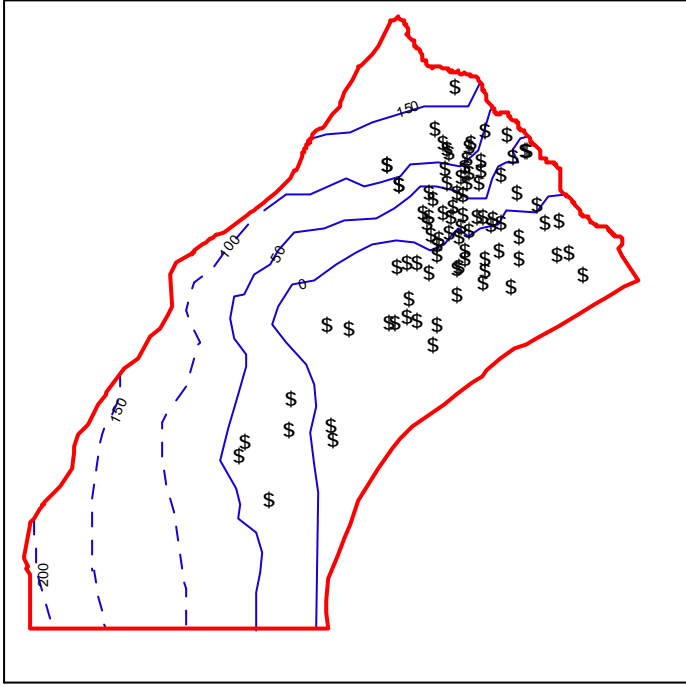


**Observed Predevelopment
Water Level Elevations (ft)
1901-1940**

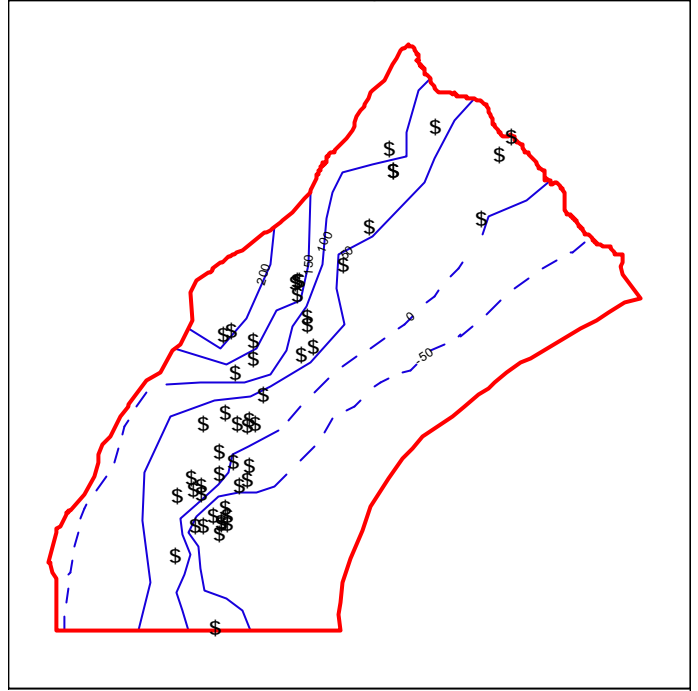


Figure 4-16

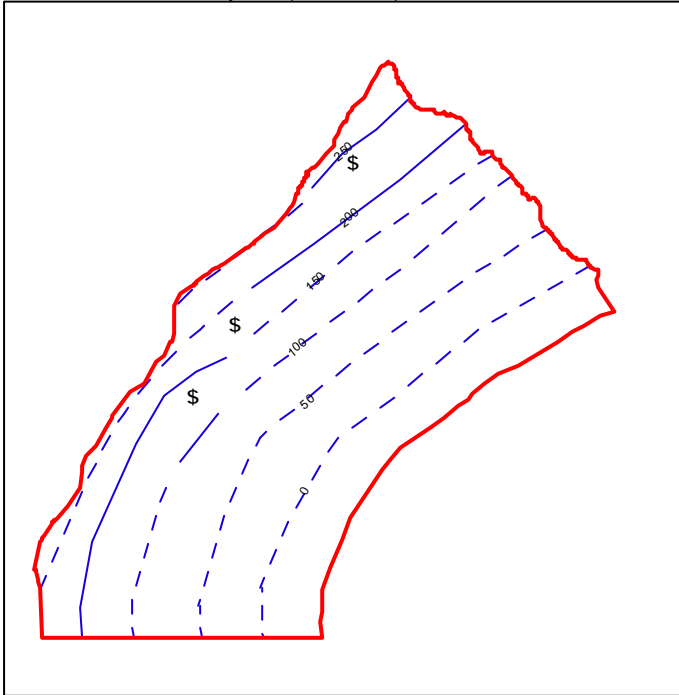
1988 Observed Water Level Elevation (ft)
Layer 1 (Chicot)



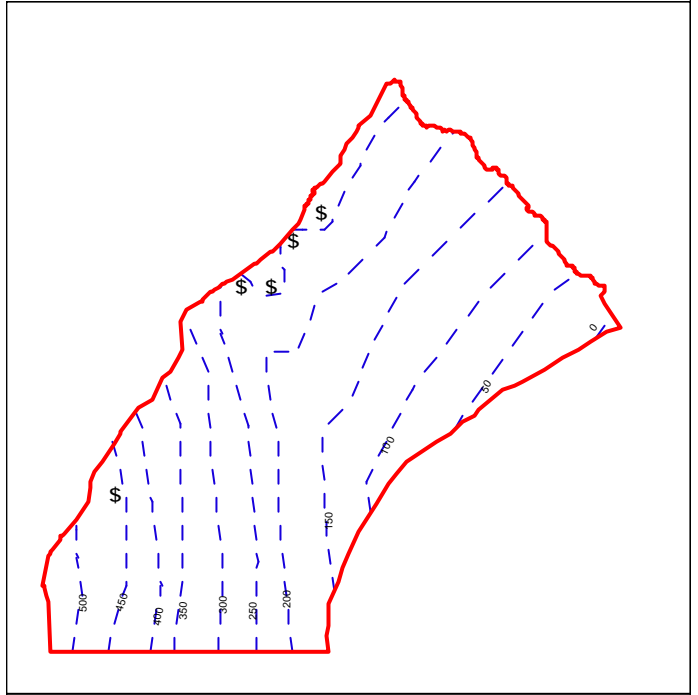
1988 Observed Water Level Elevation (ft)
Layer 2 (Evangeline)



1988 Observed Water Level Elevation (ft)
Layer 3 (Burkeville)



1988 Observed Water Level Elevation (ft)
Layer 4 (Jasper)



Notes: Dased lines represent
hypothetical contours.
Contours are only valid in proximity
to data points.

50 0 50 100 150 Miles

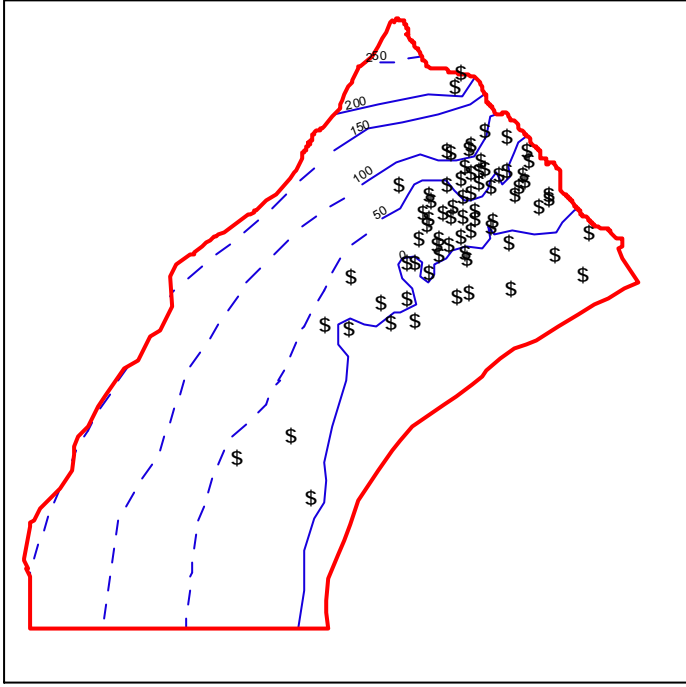


**Observed 1988
Water Level Elevations (ft)**

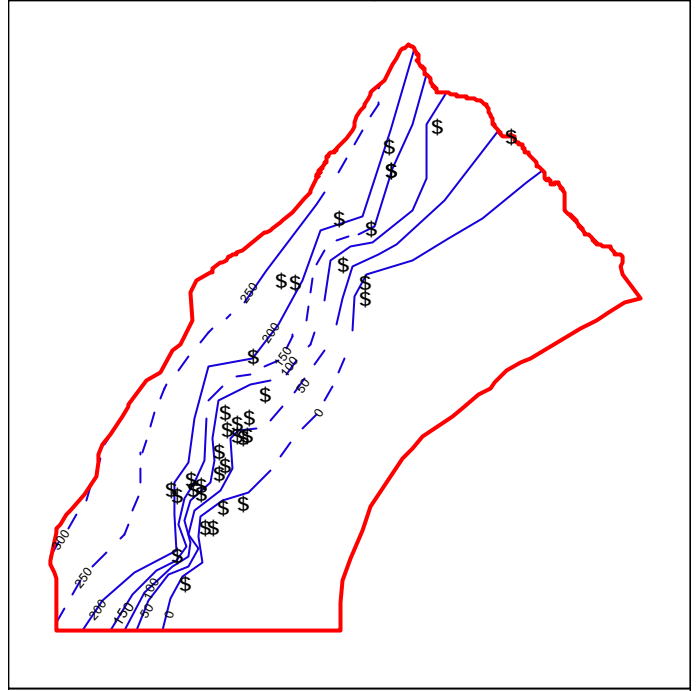


Figure 4-17

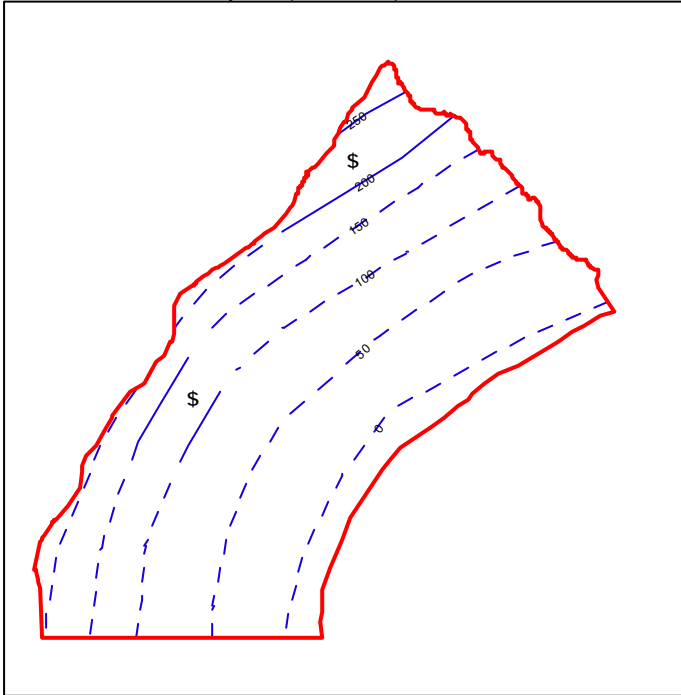
1998 Observed Water Level Elevation (ft)
Layer 1 (Chicot)



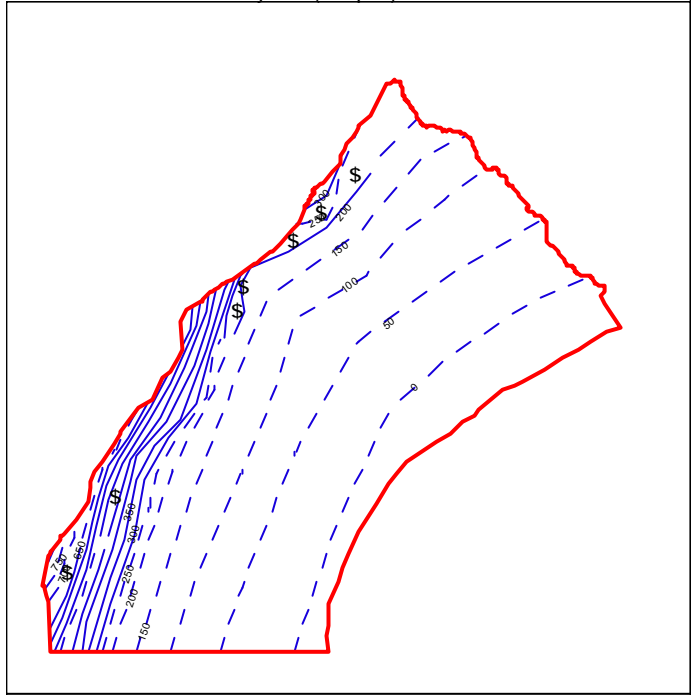
1998 Observed Water Level Elevation (ft)
Layer 2 (Evangeline)



1998 Observed Water Level Elevation (ft)
Layer 3 (Burkeville)



1998 Observed Water Level Elevation (ft)
Layer 4 (Jasper)



Notes: Dased lines represent
hypothetical contours.
Contours are only valid in proximity
to data points.

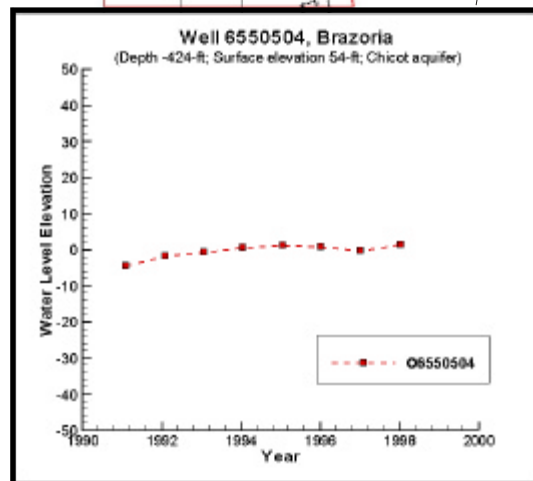
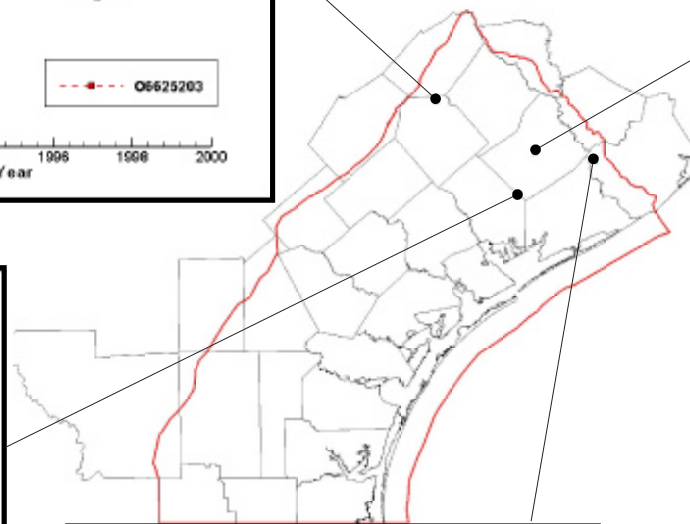
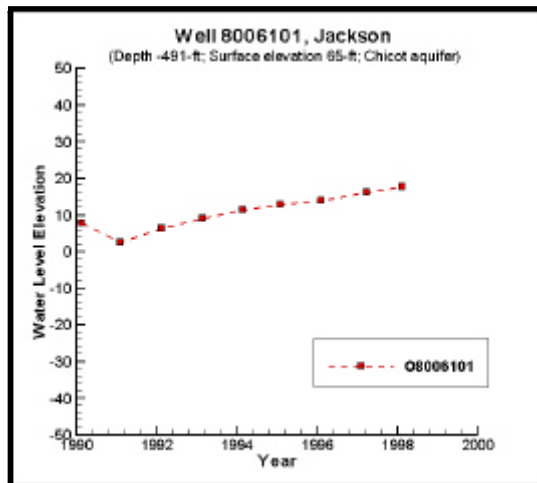
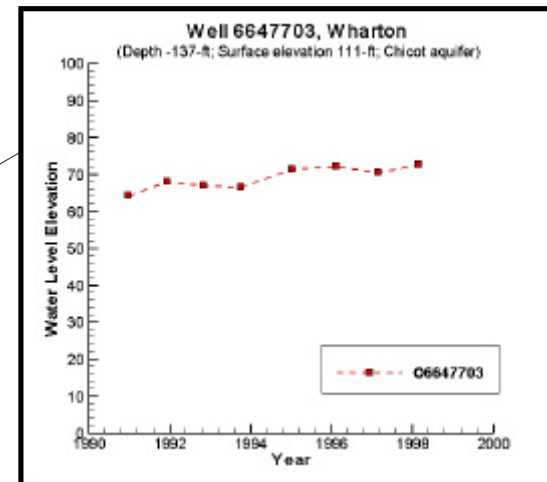
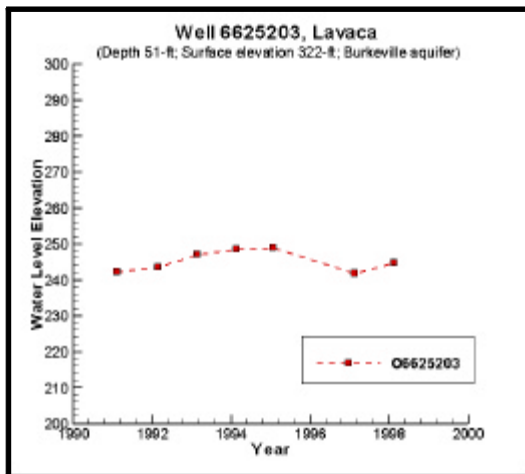
50 0 50 100 150 Miles



**Observed 1998
Water Level Elevations (ft)**



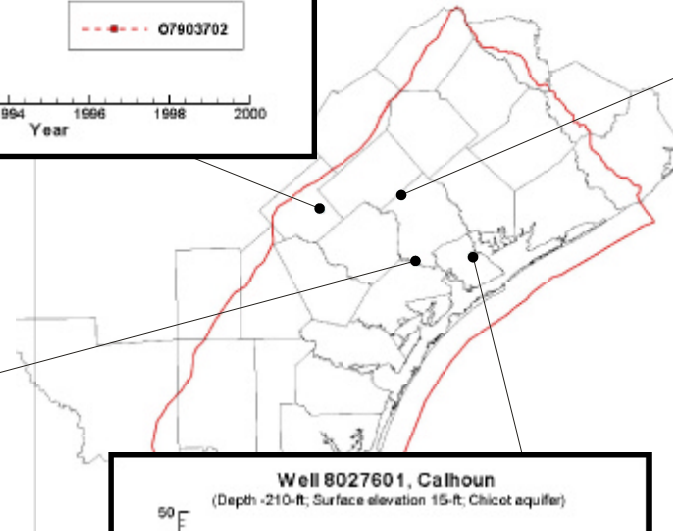
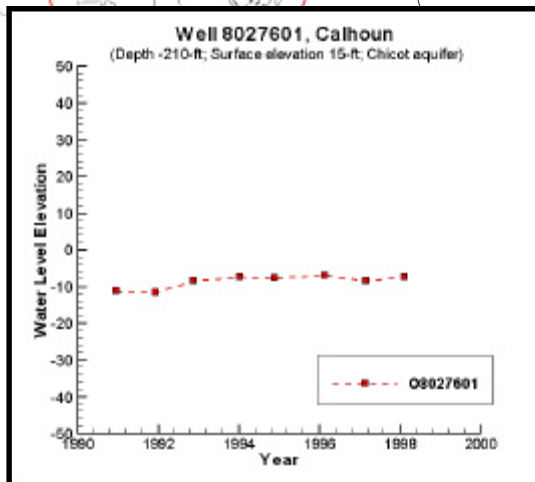
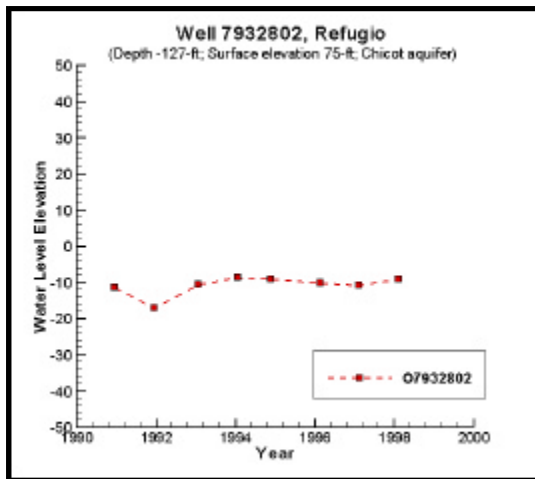
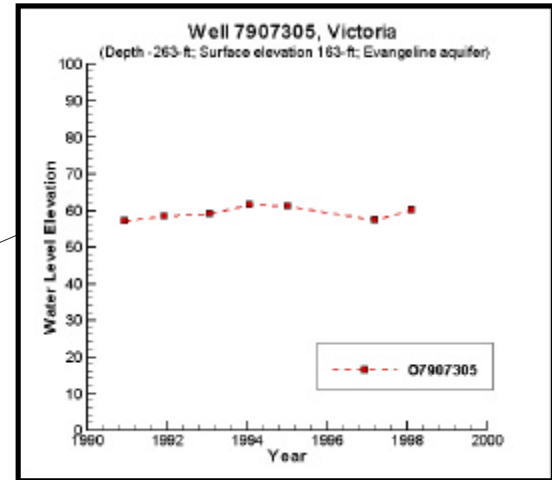
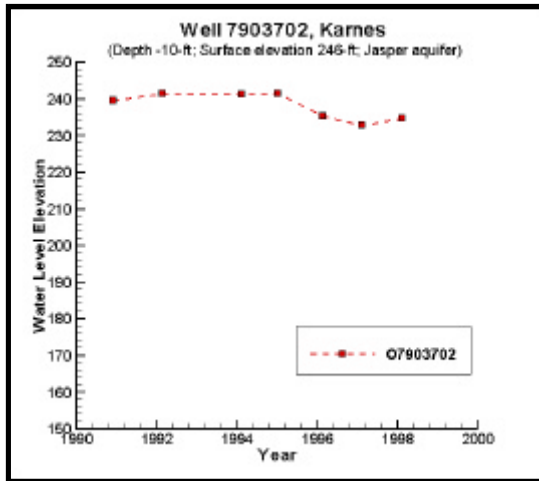
Figure 4-18



**Observed Water Levels
Northern CGC
1990 - 1998**

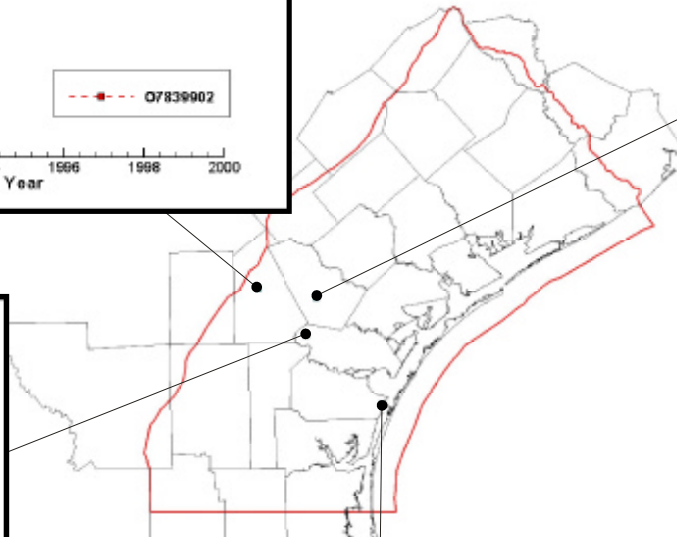
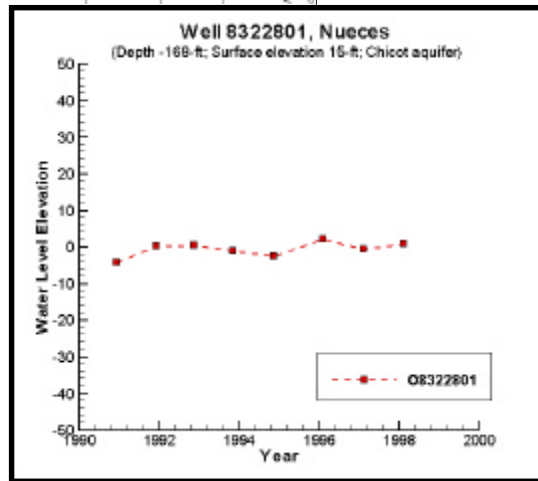
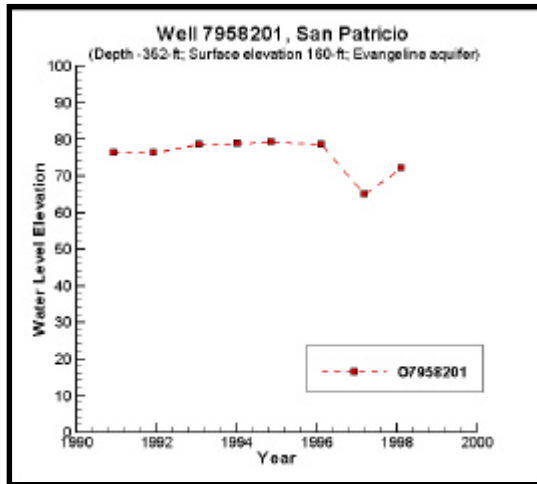
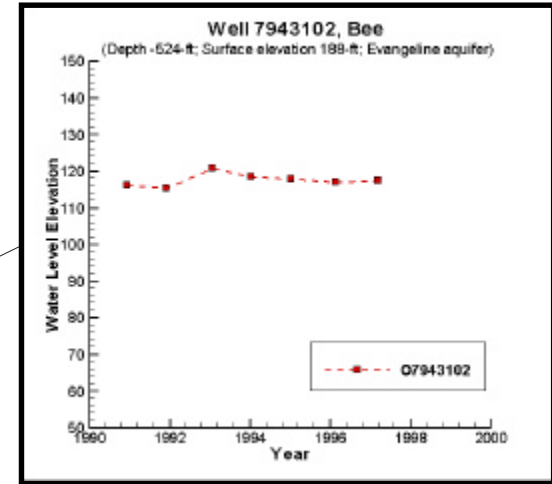
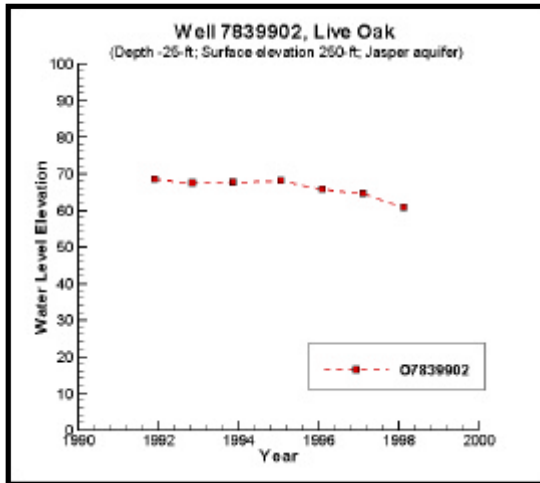
30 0 30 60 Miles





**Observed Water Levels
North Central CGC
1990 - 1998**





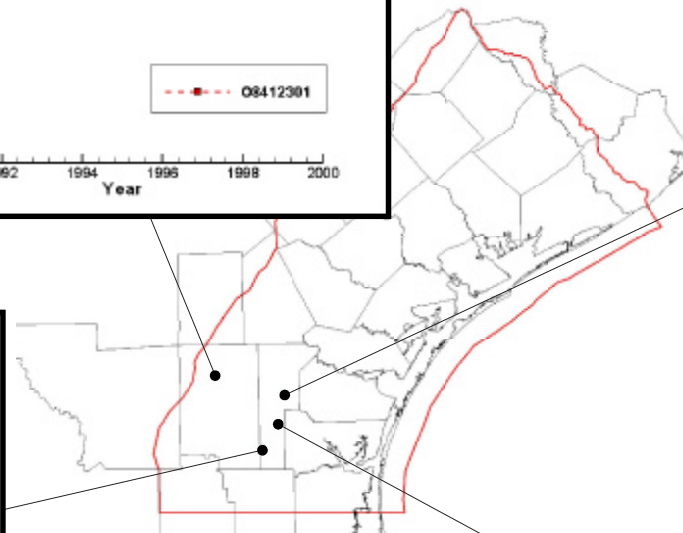
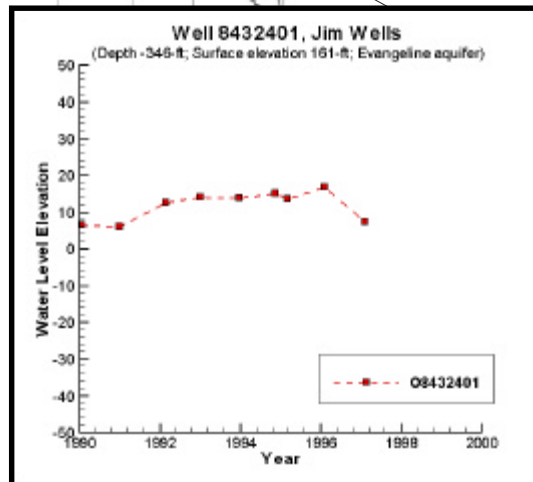
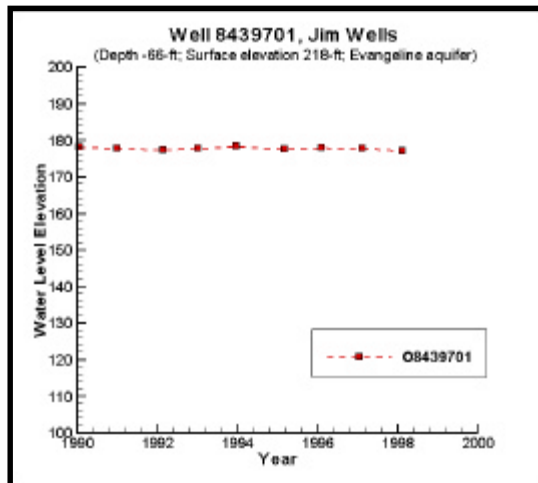
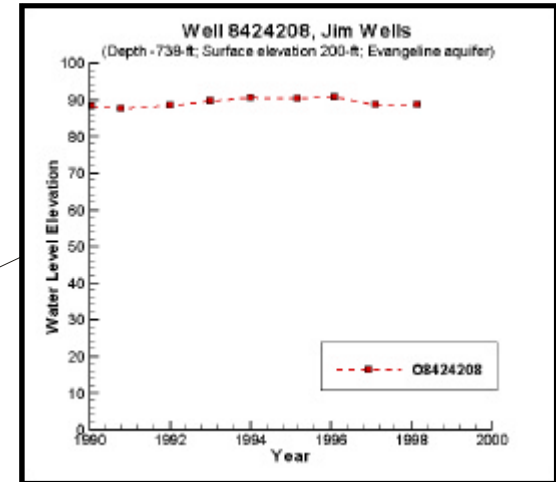
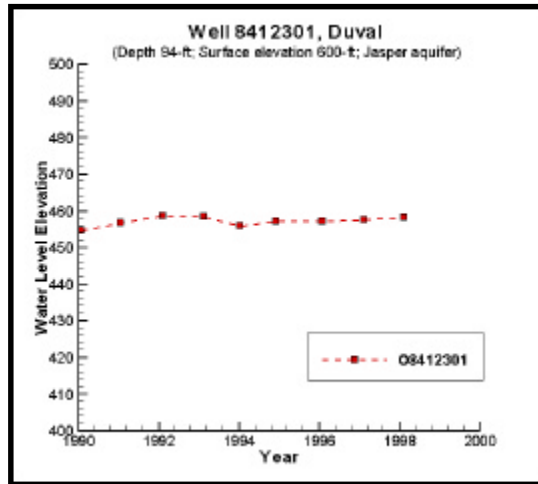
30 0 30 60 Miles



**Observed Water Levels
South Central CGC
1990 - 1998**

TWDB Database

Figure 4-21



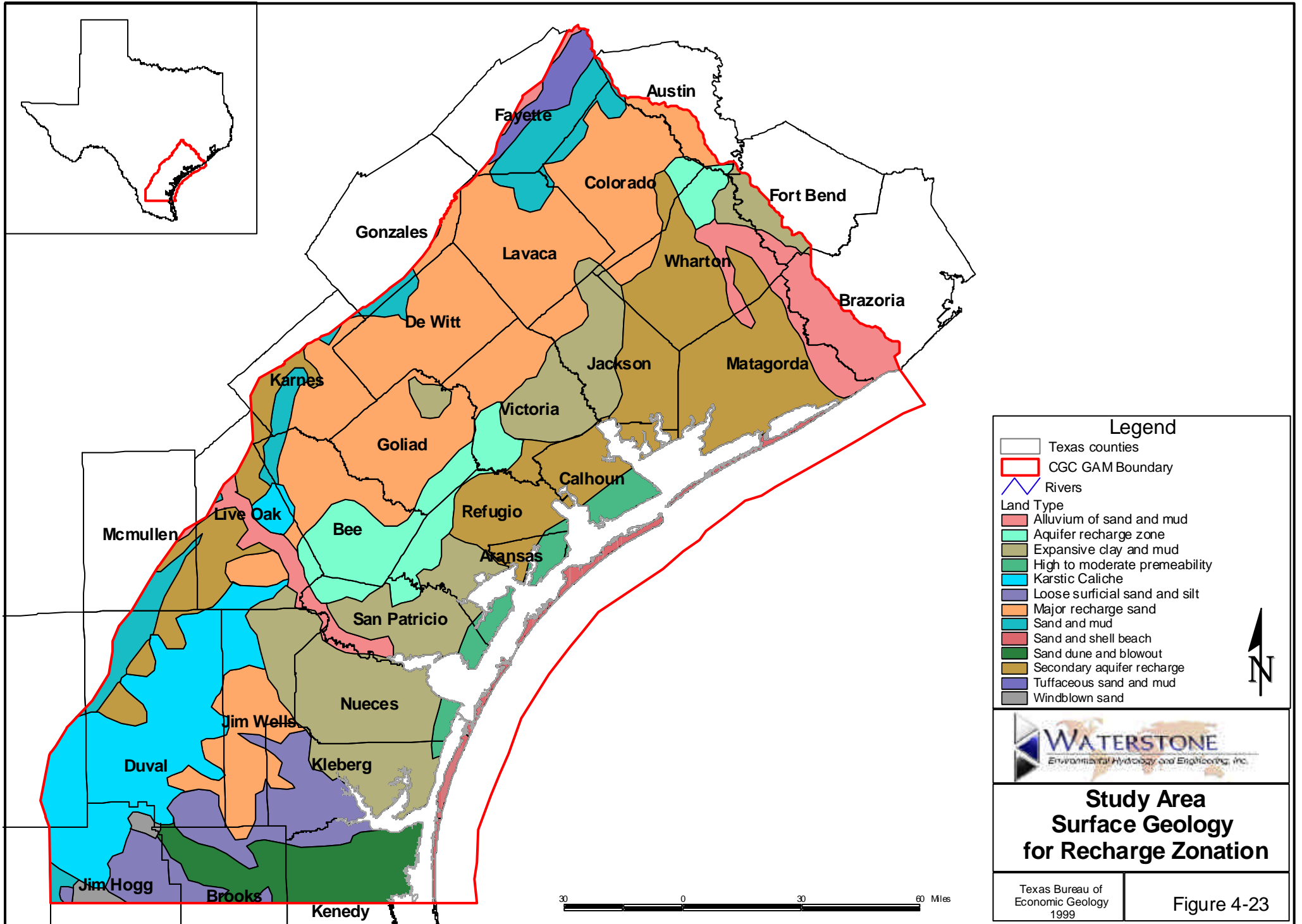
30 0 30 60 Miles



**Observed Water Levels
Southern CGC
1990 - 1998**

TWDB Database

Figure 4-22



Legend

- Texas counties
- CGC GAM Boundary
- Rivers

Land Type

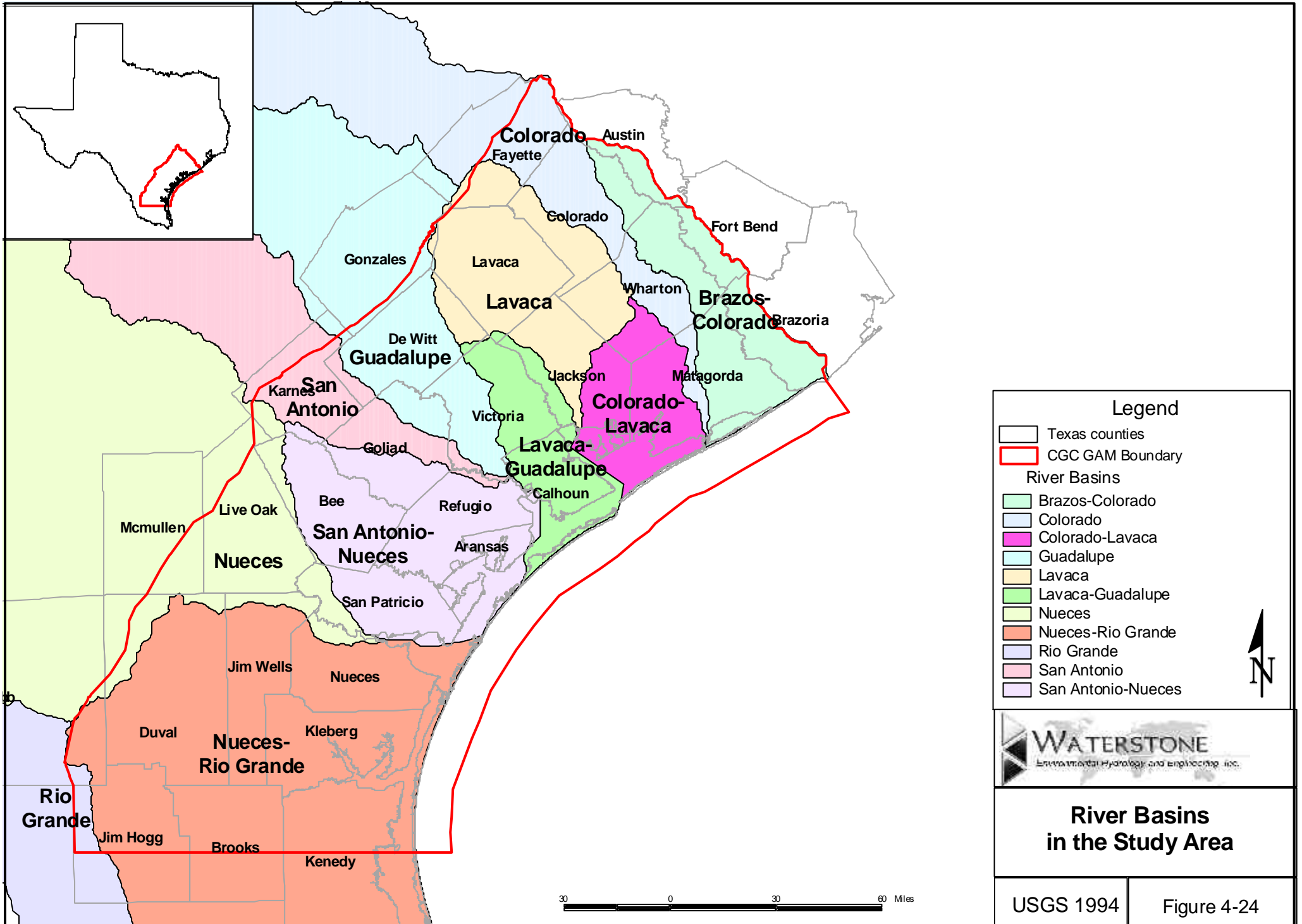
- Alluvium of sand and mud
- Aquifer recharge zone
- Expansive clay and mud
- High to moderate permeability
- Karstic Caliche
- Loose surficial sand and silt
- Major recharge sand
- Sand and mud
- Sand and shell beach
- Sand dune and blowout
- Secondary aquifer recharge
- Tuffaceous sand and mud
- Windblown sand

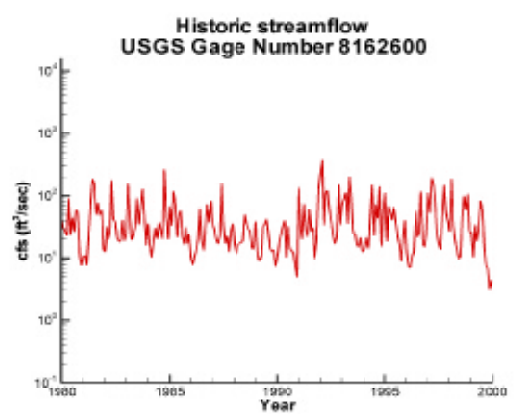
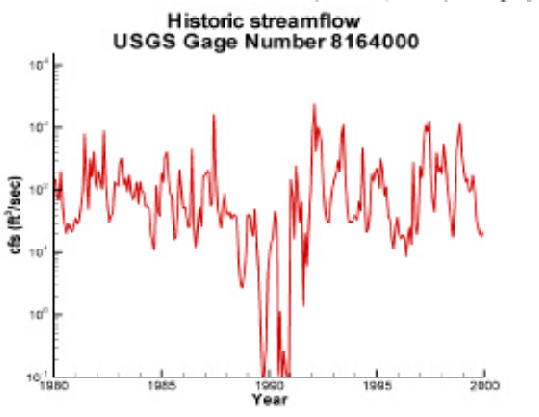
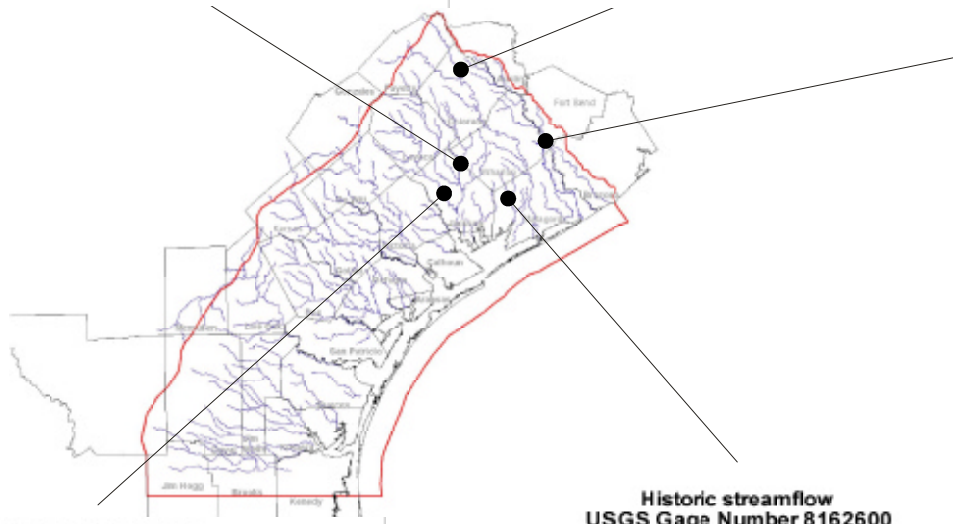
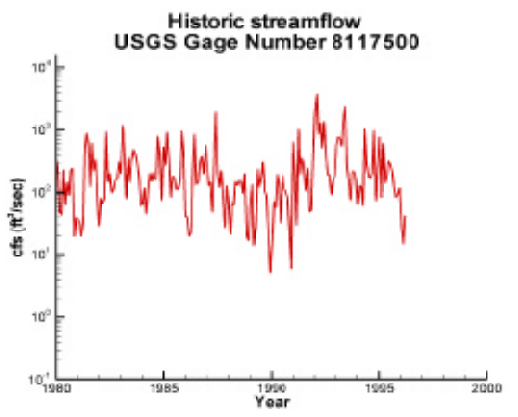
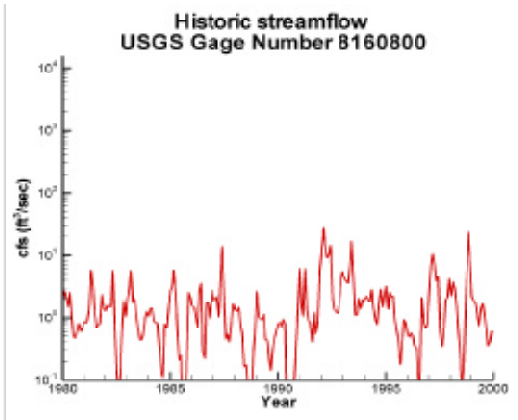
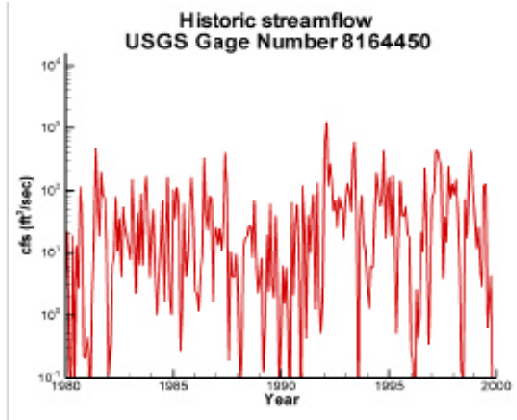


**Study Area
Surface Geology
for Recharge Zonation**

Texas Bureau of
Economic Geology
1999

Figure 4-23



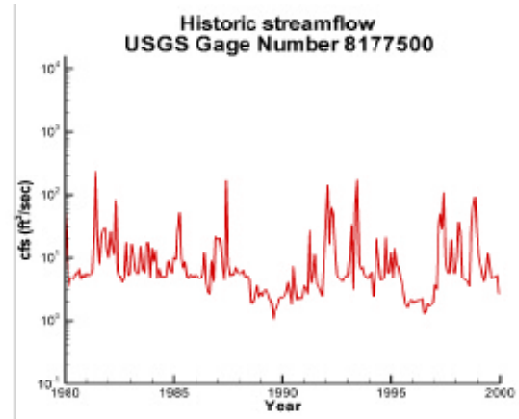
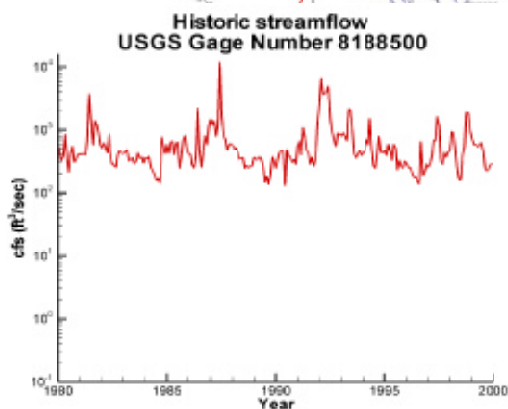
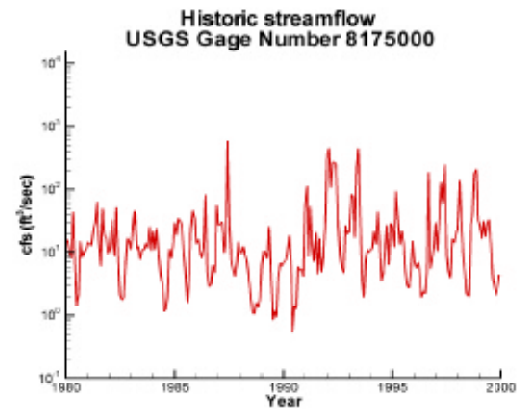
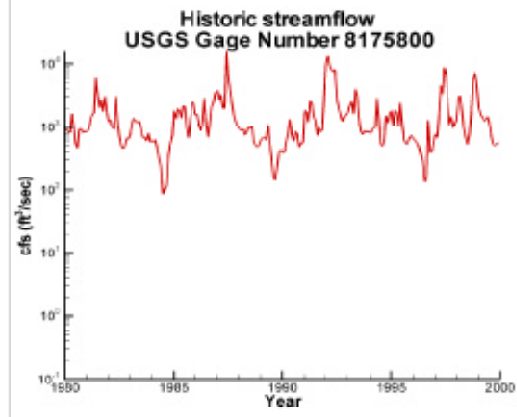
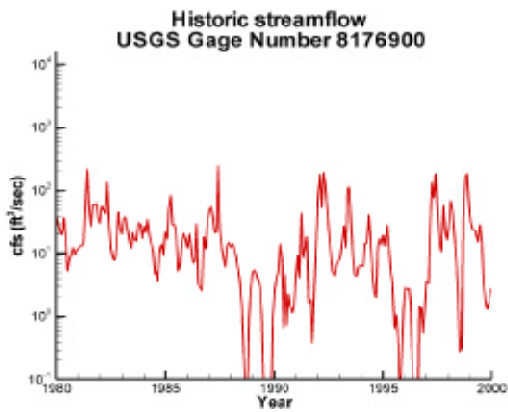


30 0 30 60 Miles



**Historic Streamflow
Northern CGC
1980-1999**

Figure 4-25

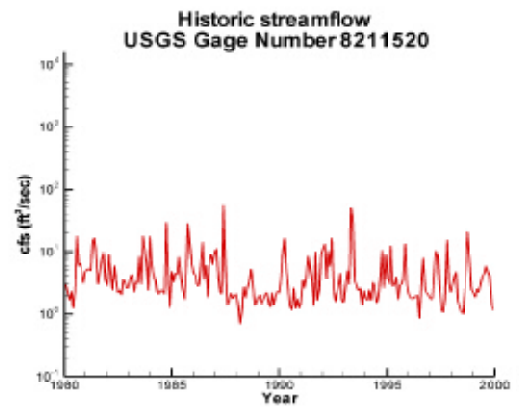
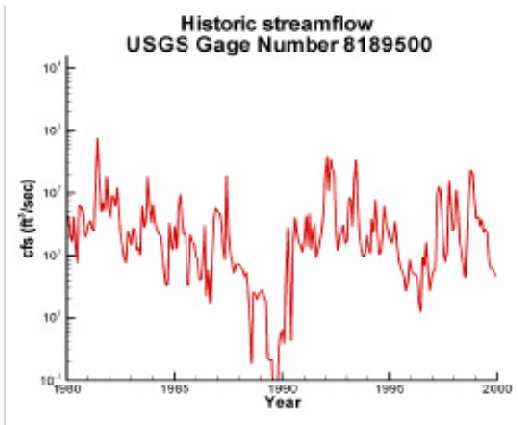


30 0 30 60 Miles



**Historic Streamflow
Central CGC
1980-1999**

Figure 4-26

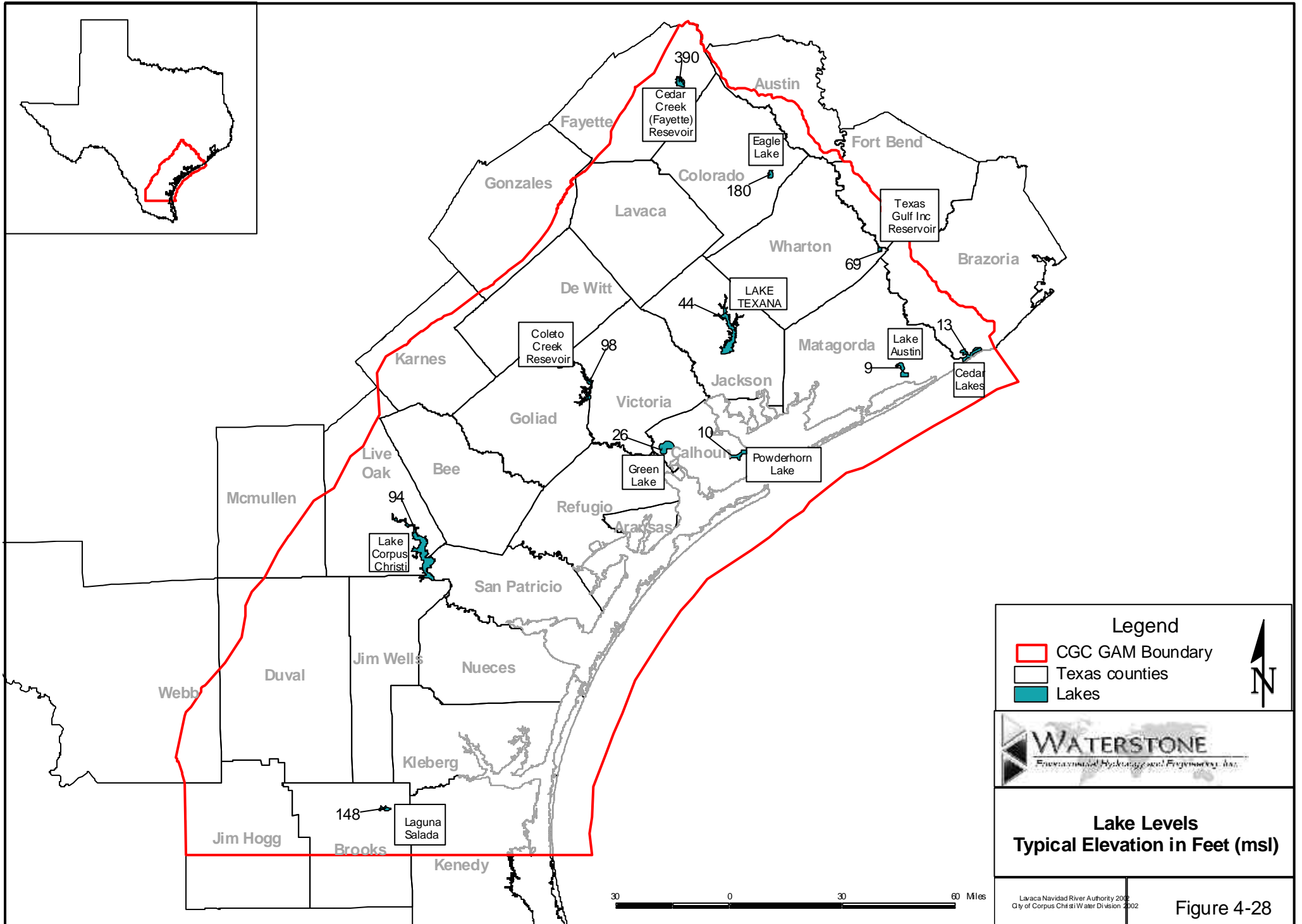


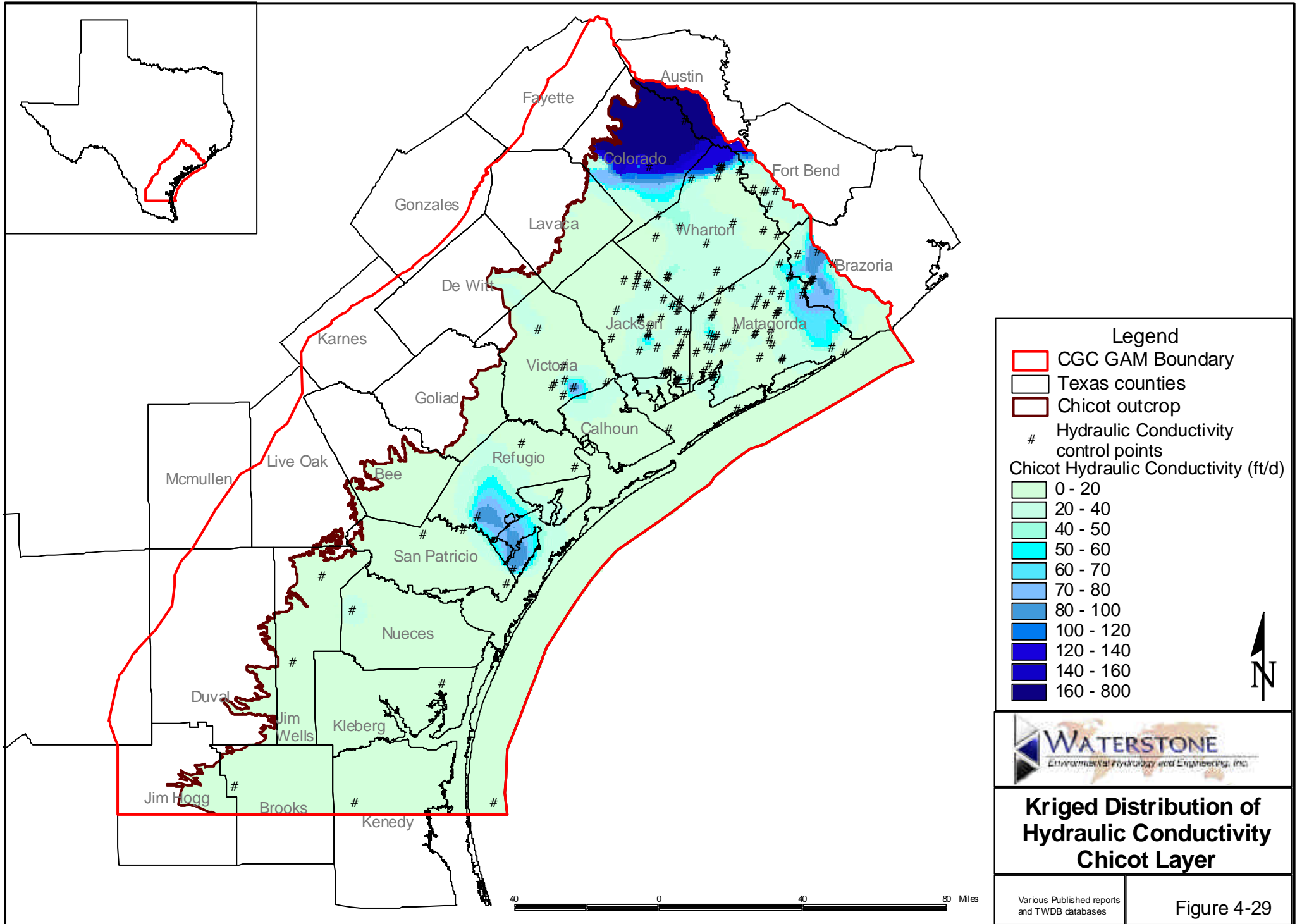
30 0 30 60 Miles

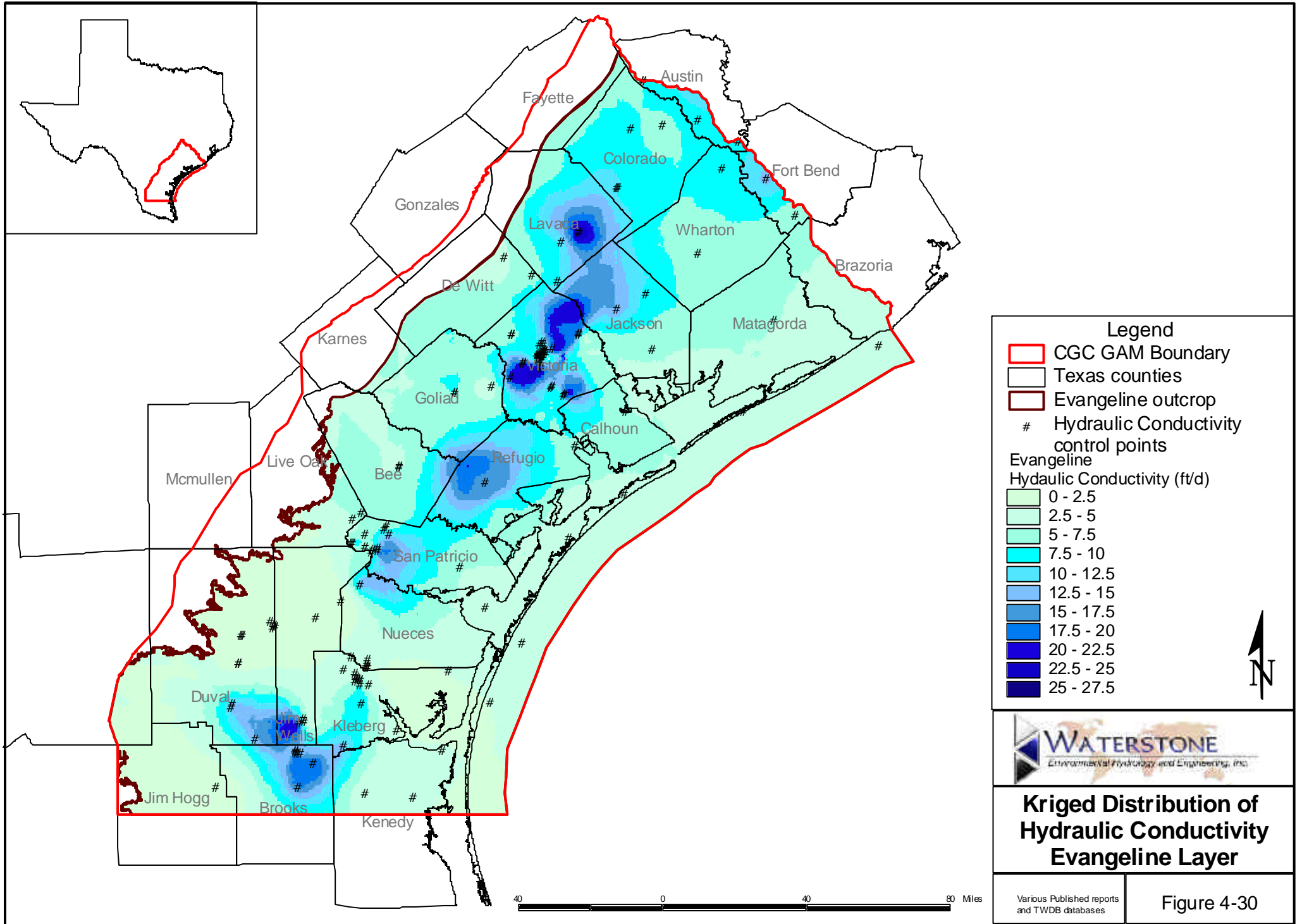


**Historic Streamflow
Southern CGC
1980-1999**

Figure 4-27







Legend

- CGC GAM Boundary
- Texas counties
- Evangeline outcrop
- # Hydraulic Conductivity control points

Evangeline Hydraulic Conductivity (ft/d)

- 0 - 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 - 10
- 10 - 12.5
- 12.5 - 15
- 15 - 17.5
- 17.5 - 20
- 20 - 22.5
- 22.5 - 25
- 25 - 27.5

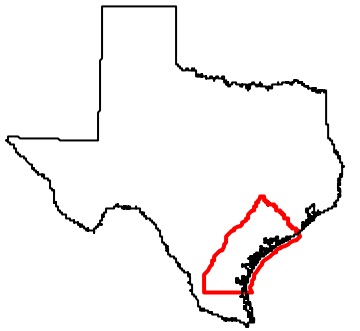
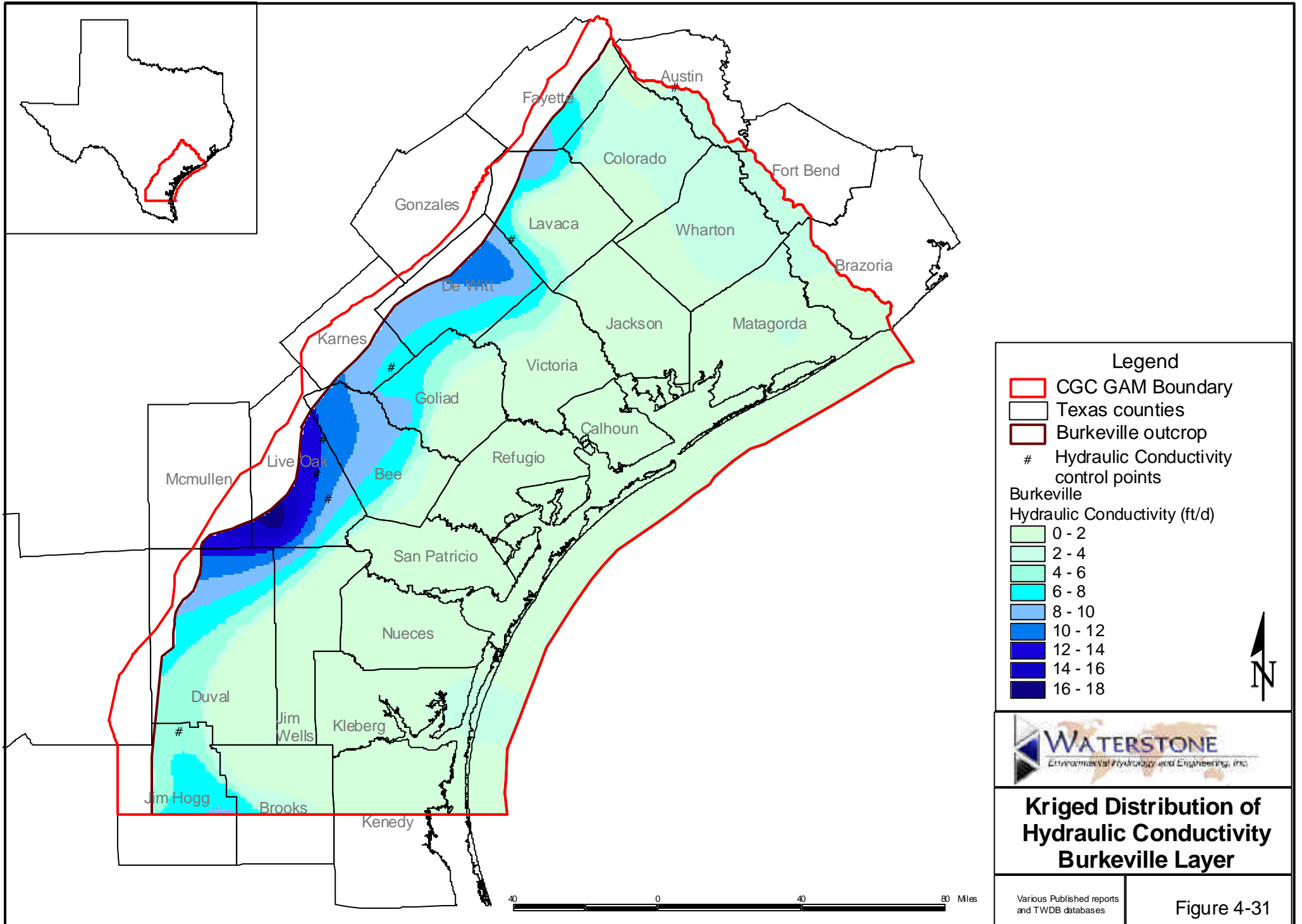


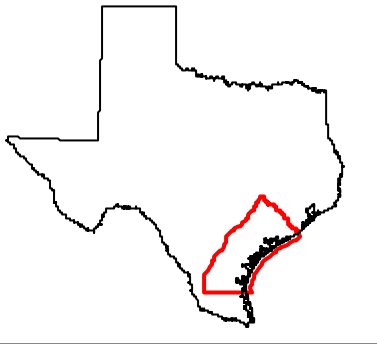
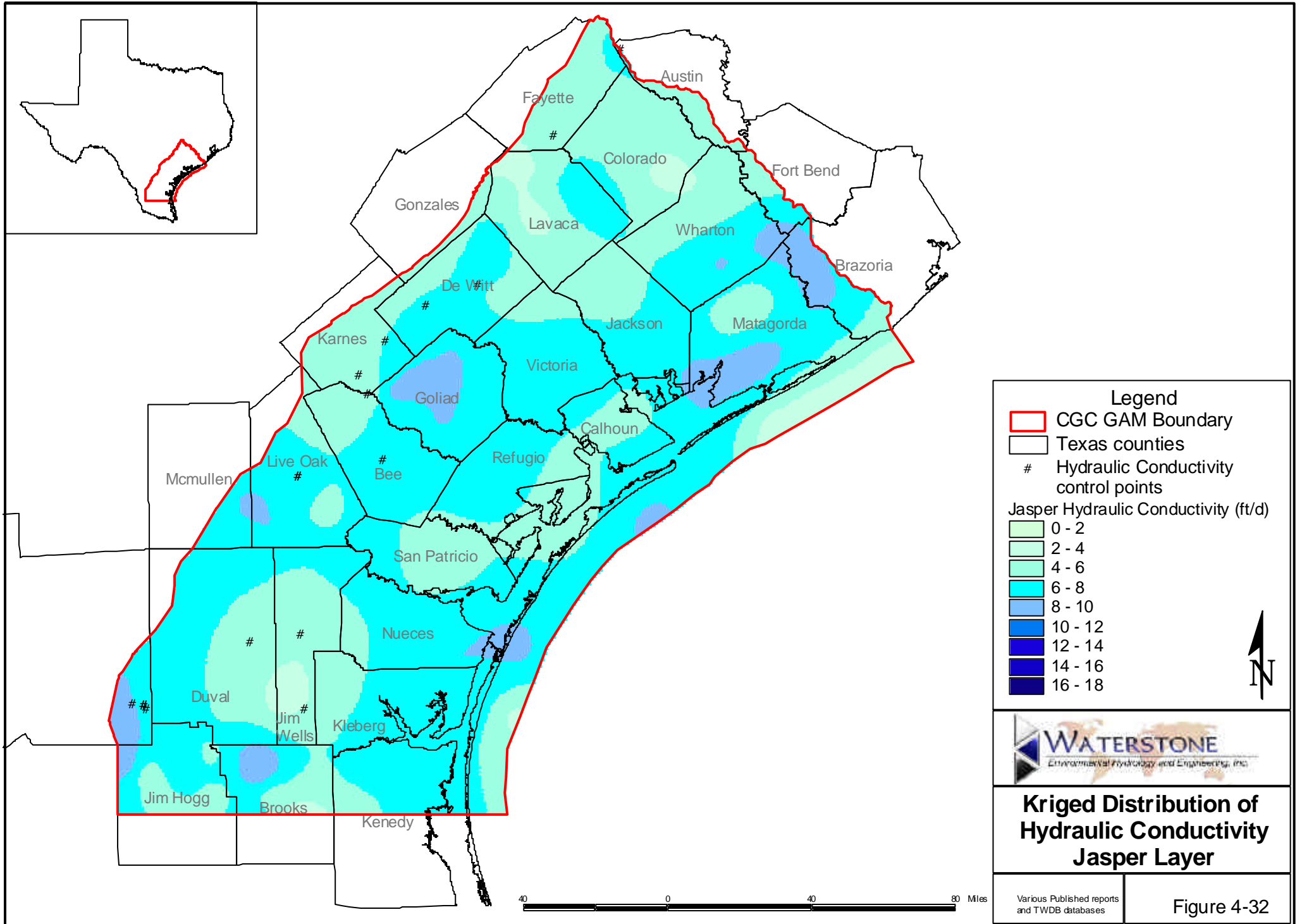
Kriged Distribution of Hydraulic Conductivity Evangeline Layer

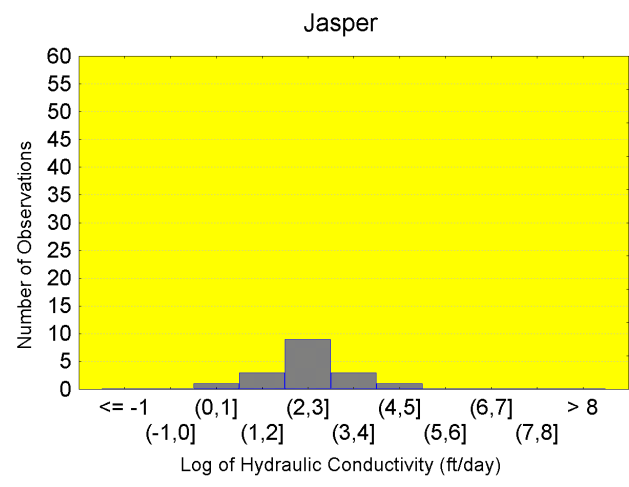
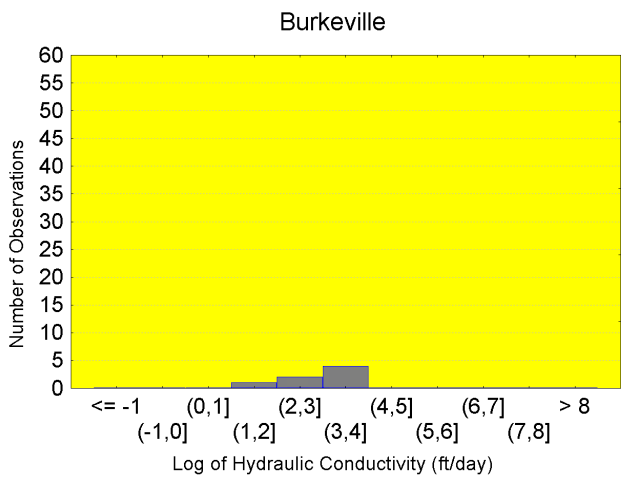
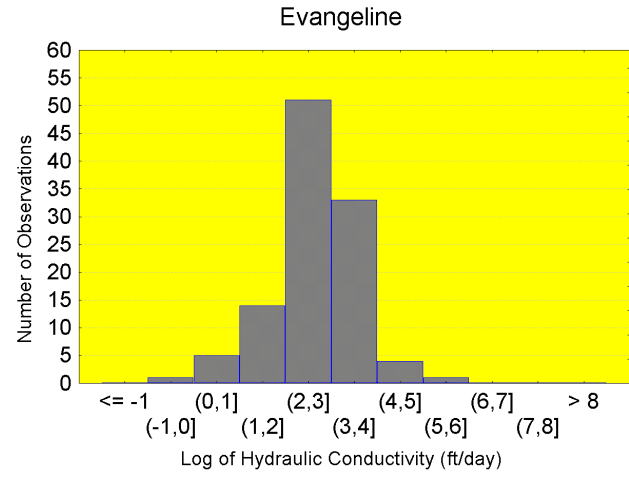
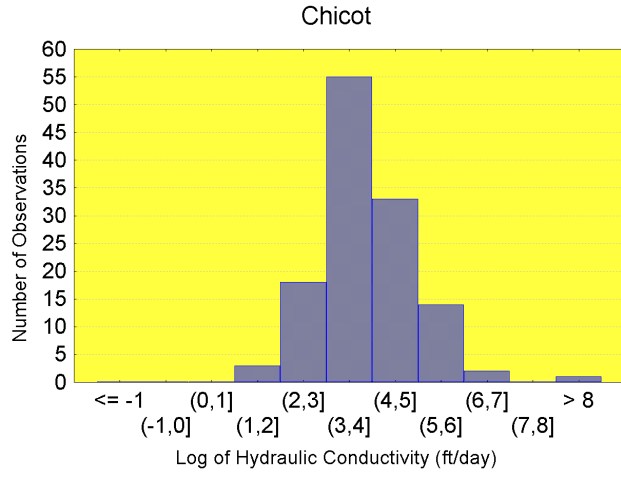
Various Published reports and TWDB databases

Figure 4-30

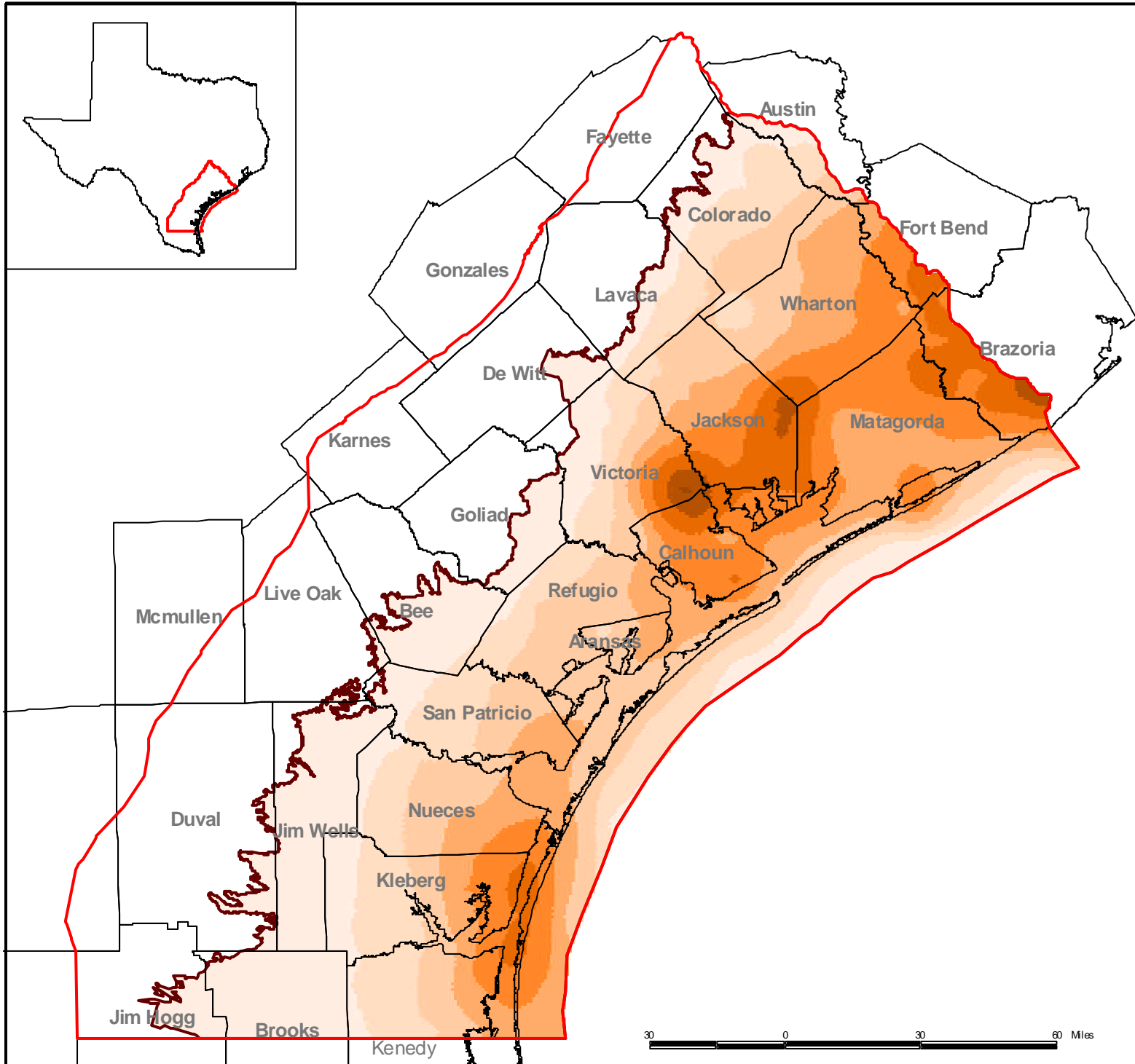
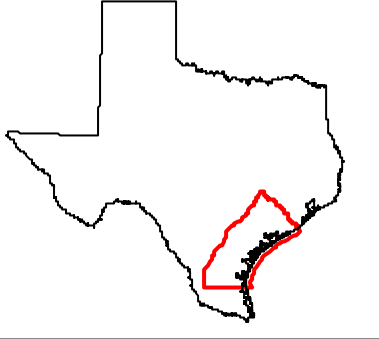
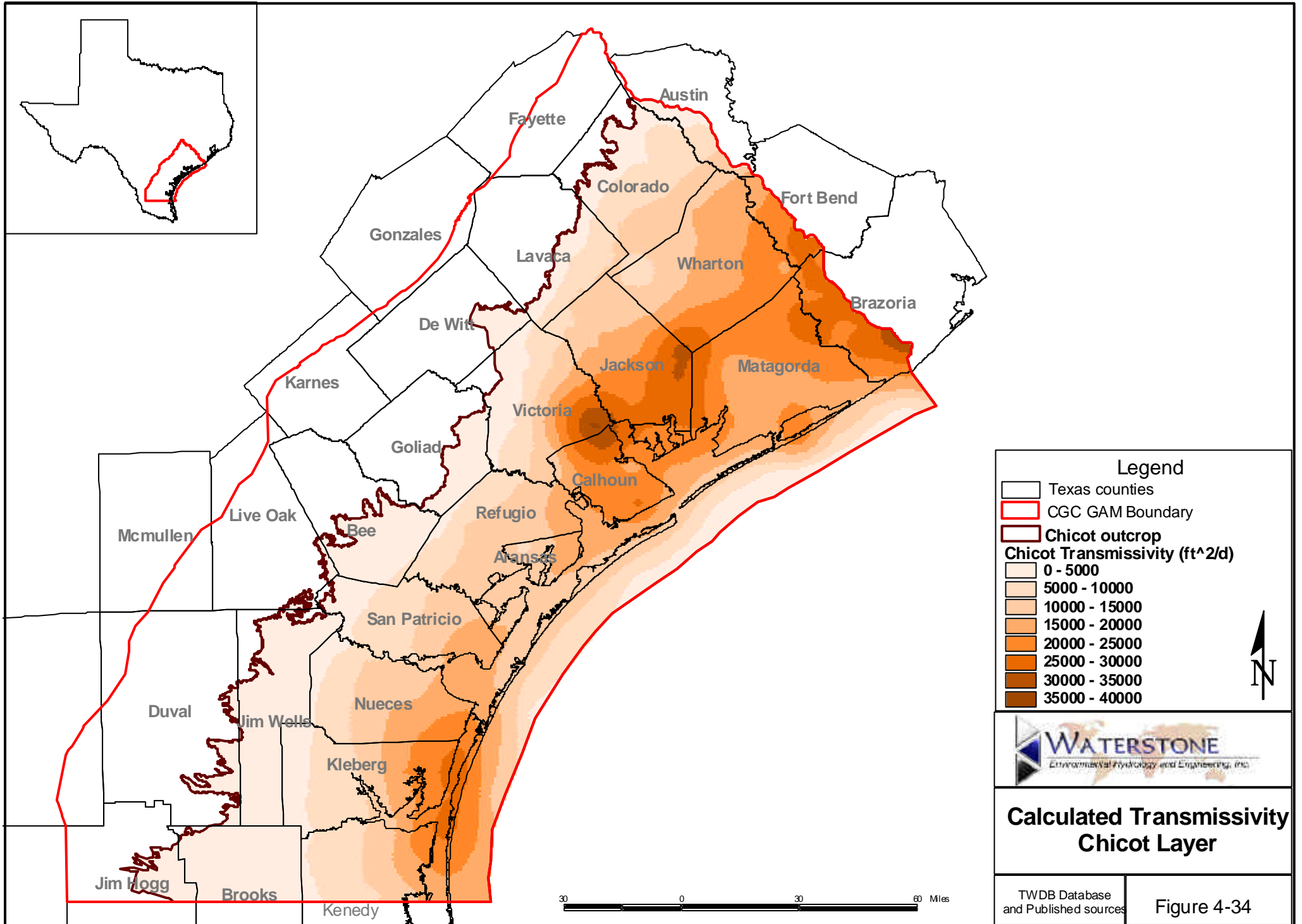
40 0 40 80 Miles

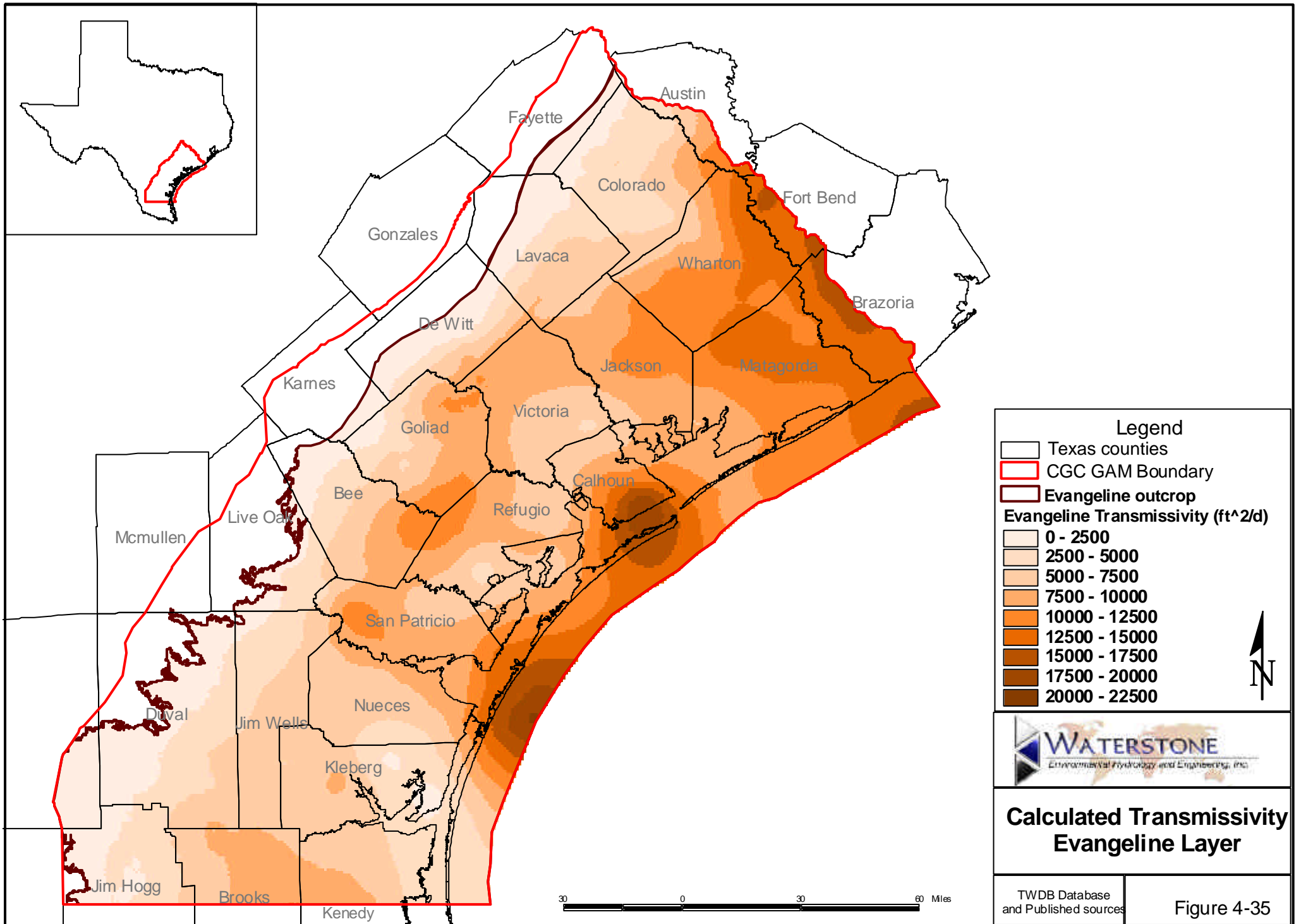


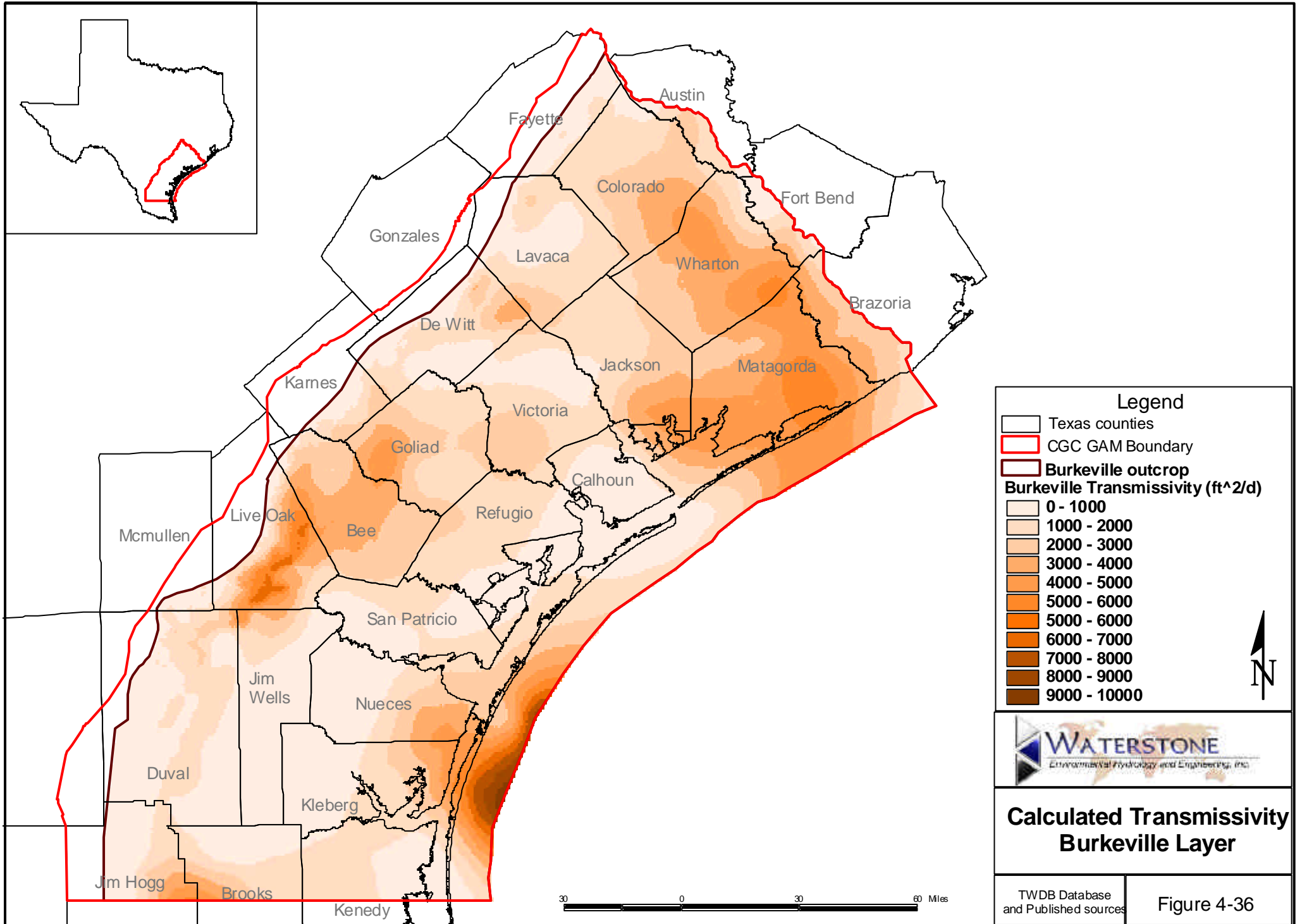




Histograms of Hydraulic Conductivity







Legend

- Texas counties
- CGC GAM Boundary
- Burkeville outcrop

Burkeville Transmissivity (ft²/d)

- 0 - 1000
- 1000 - 2000
- 2000 - 3000
- 3000 - 4000
- 4000 - 5000
- 5000 - 6000
- 5000 - 6000
- 6000 - 7000
- 7000 - 8000
- 8000 - 9000
- 9000 - 10000

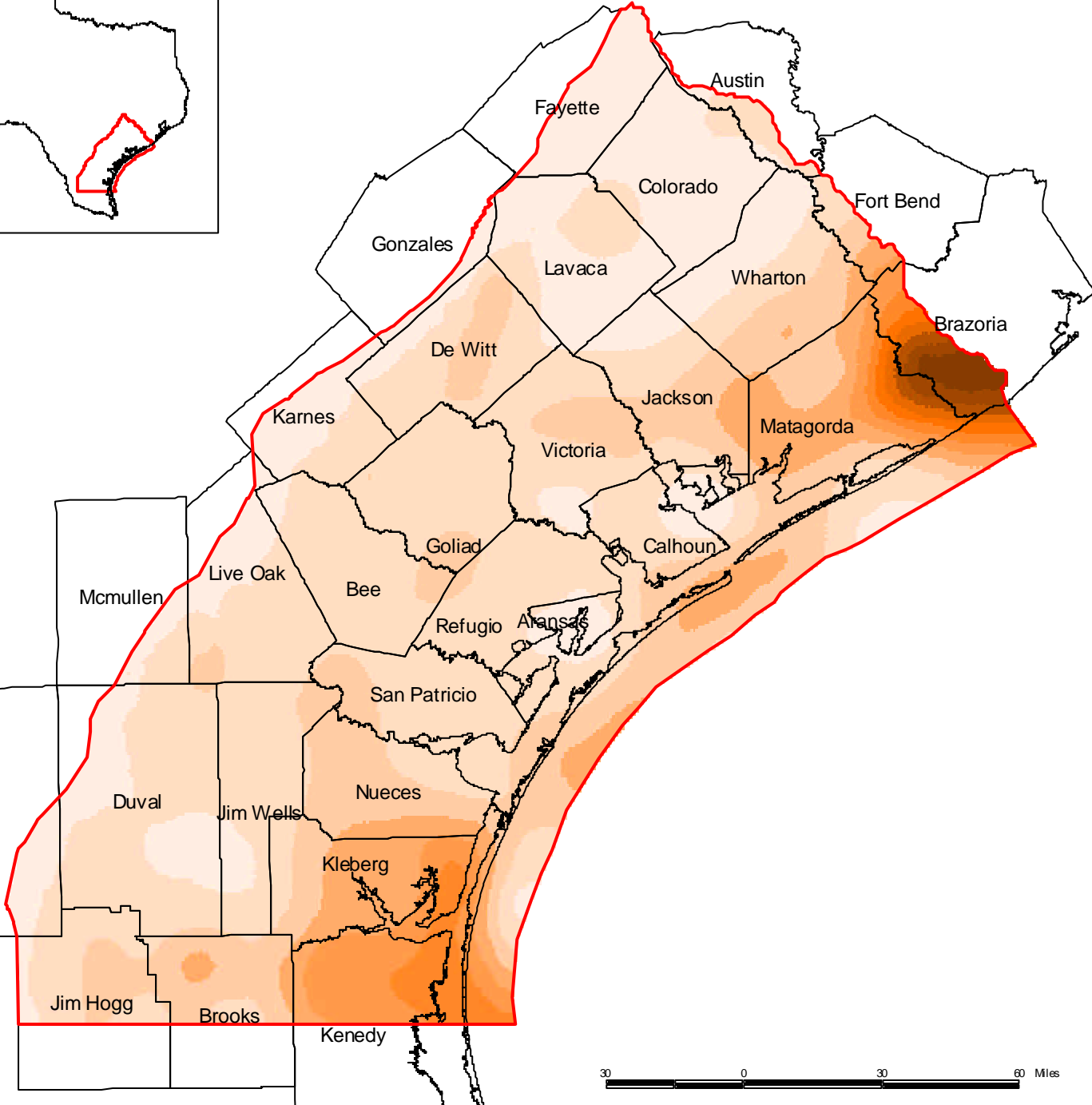
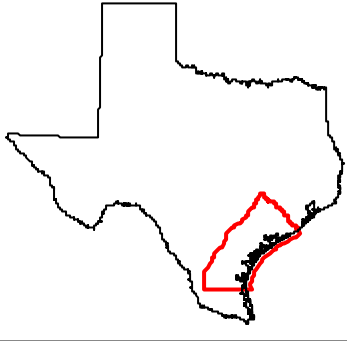
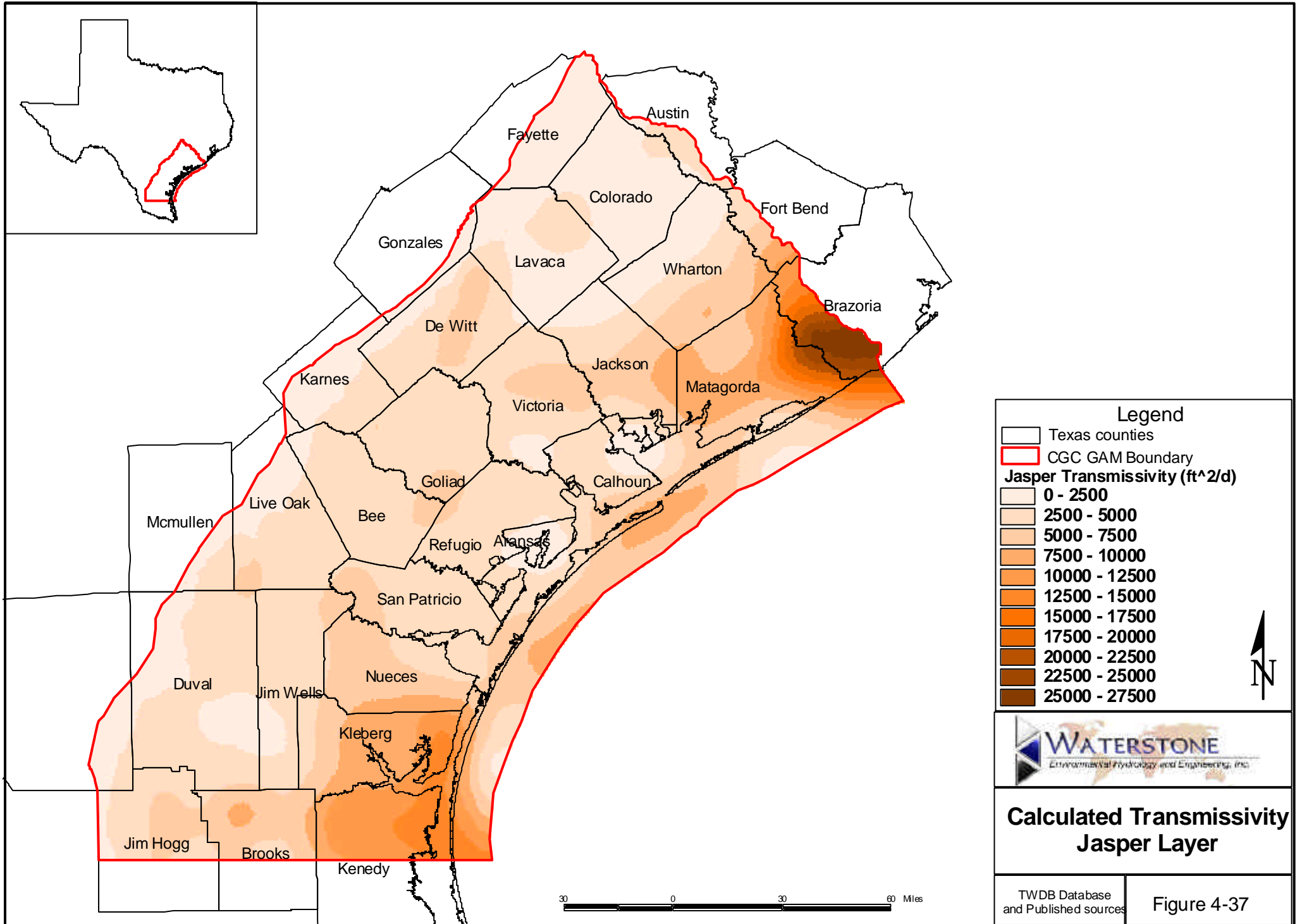


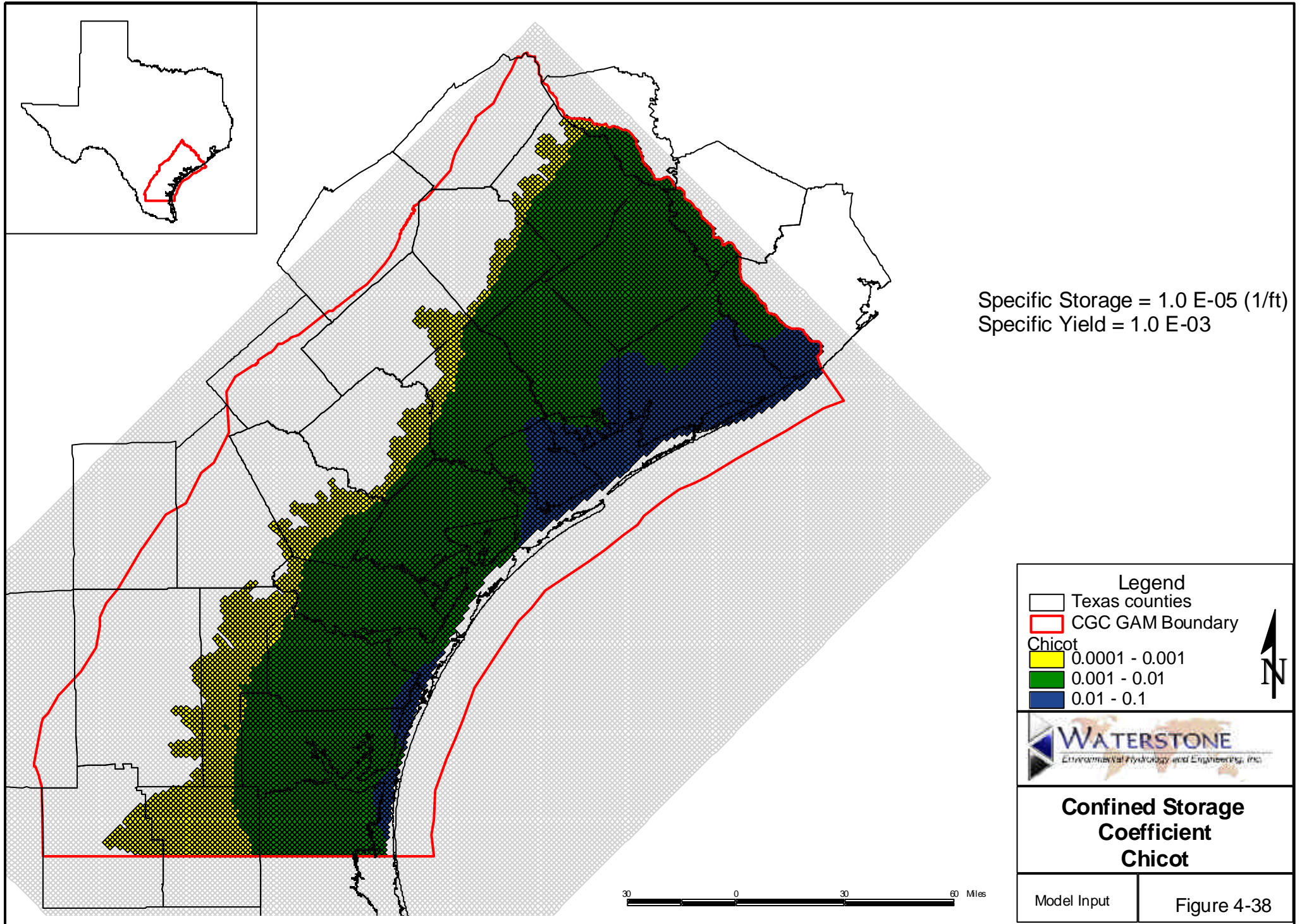
**Calculated Transmissivity
Burkeville Layer**

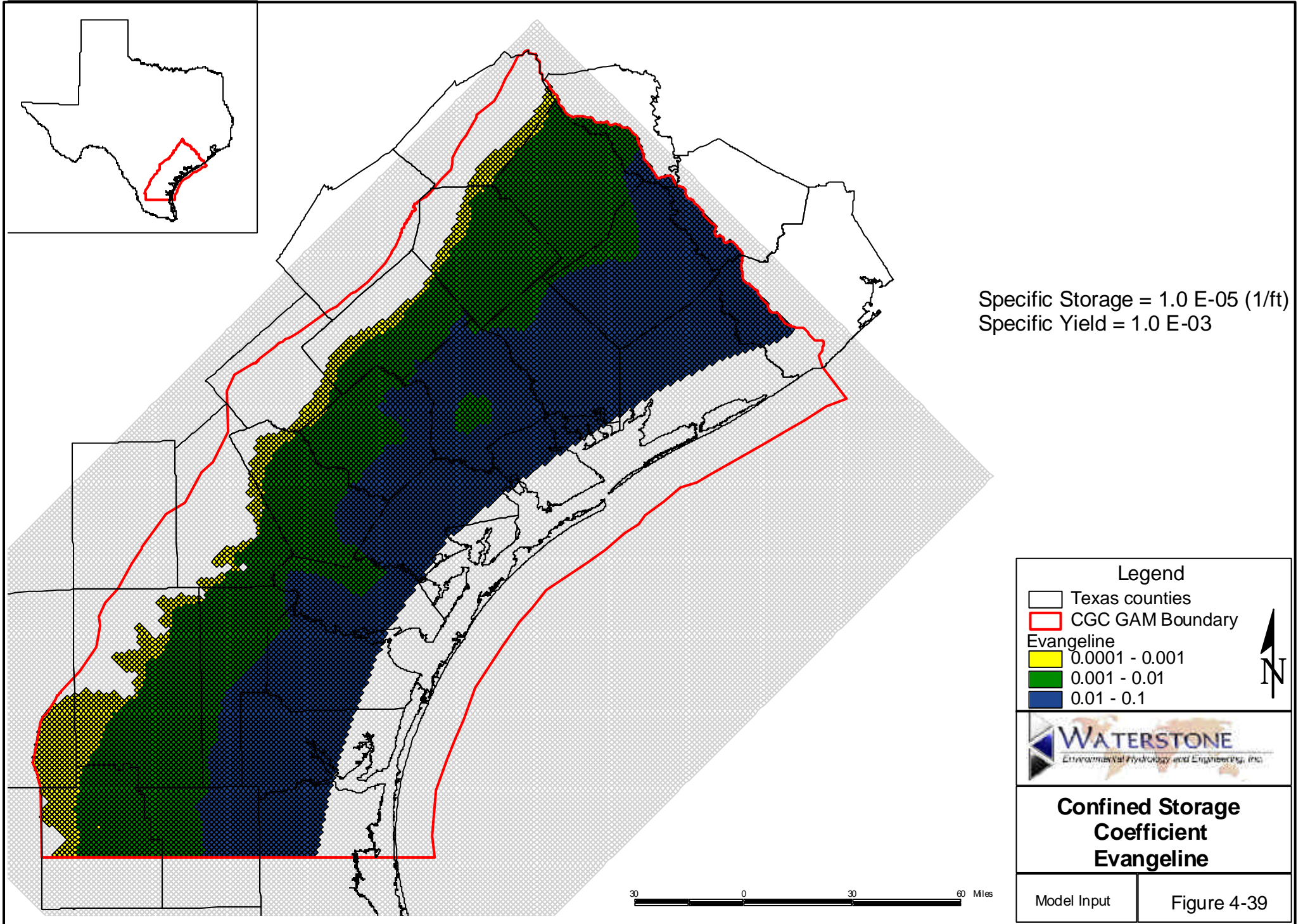
TWDB Database
and Published sources

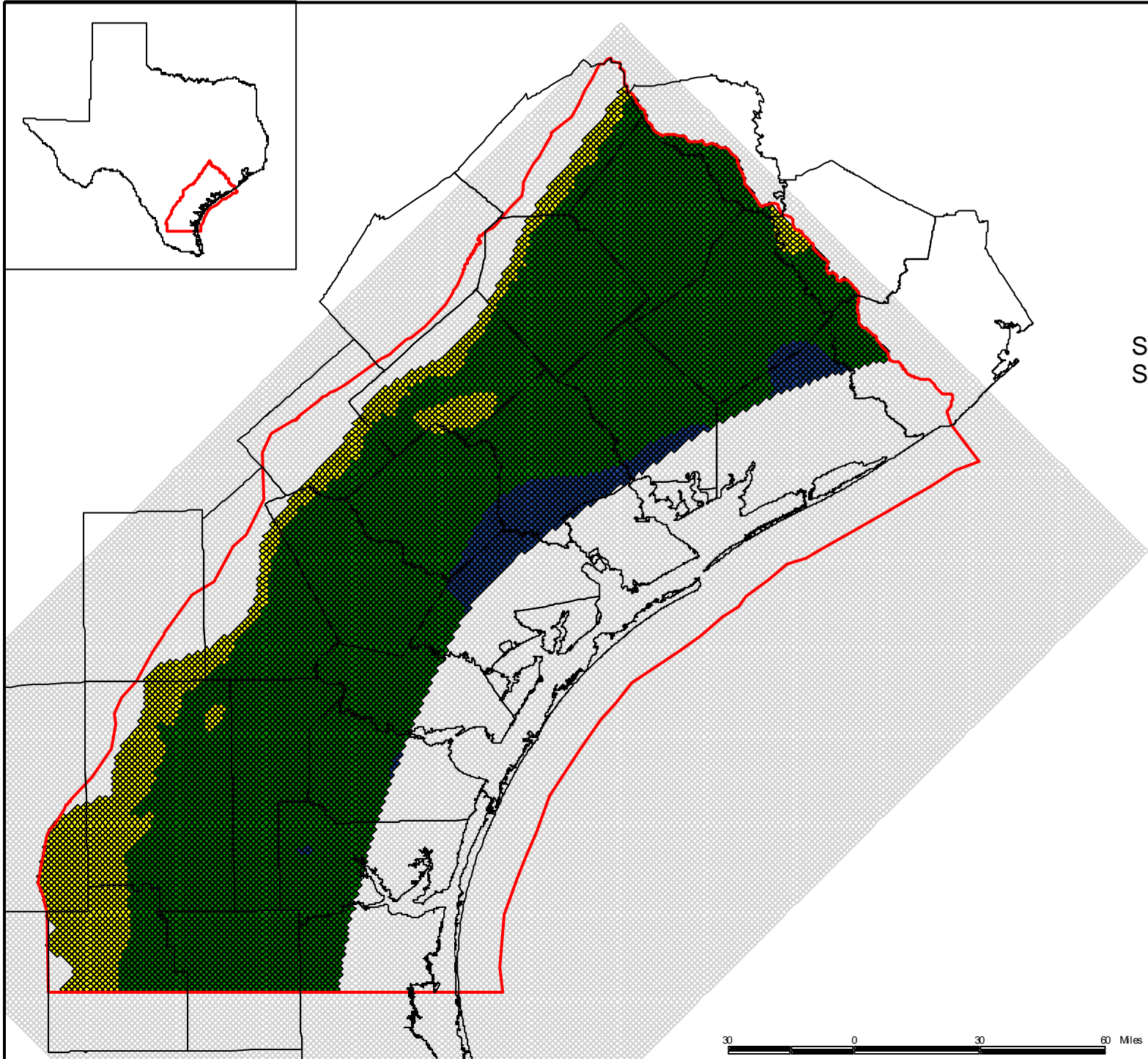
Figure 4-36

30 0 30 60 Miles





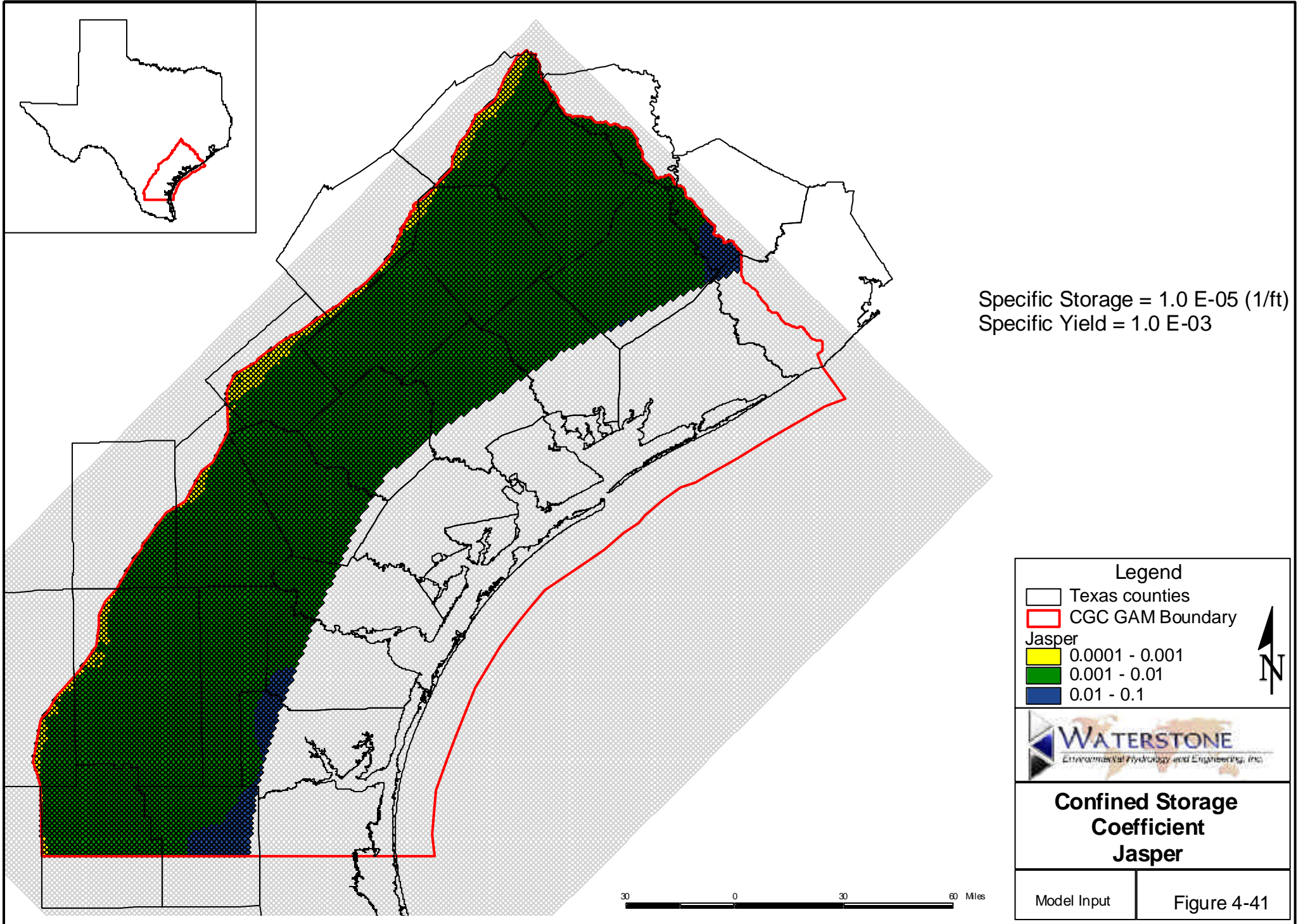


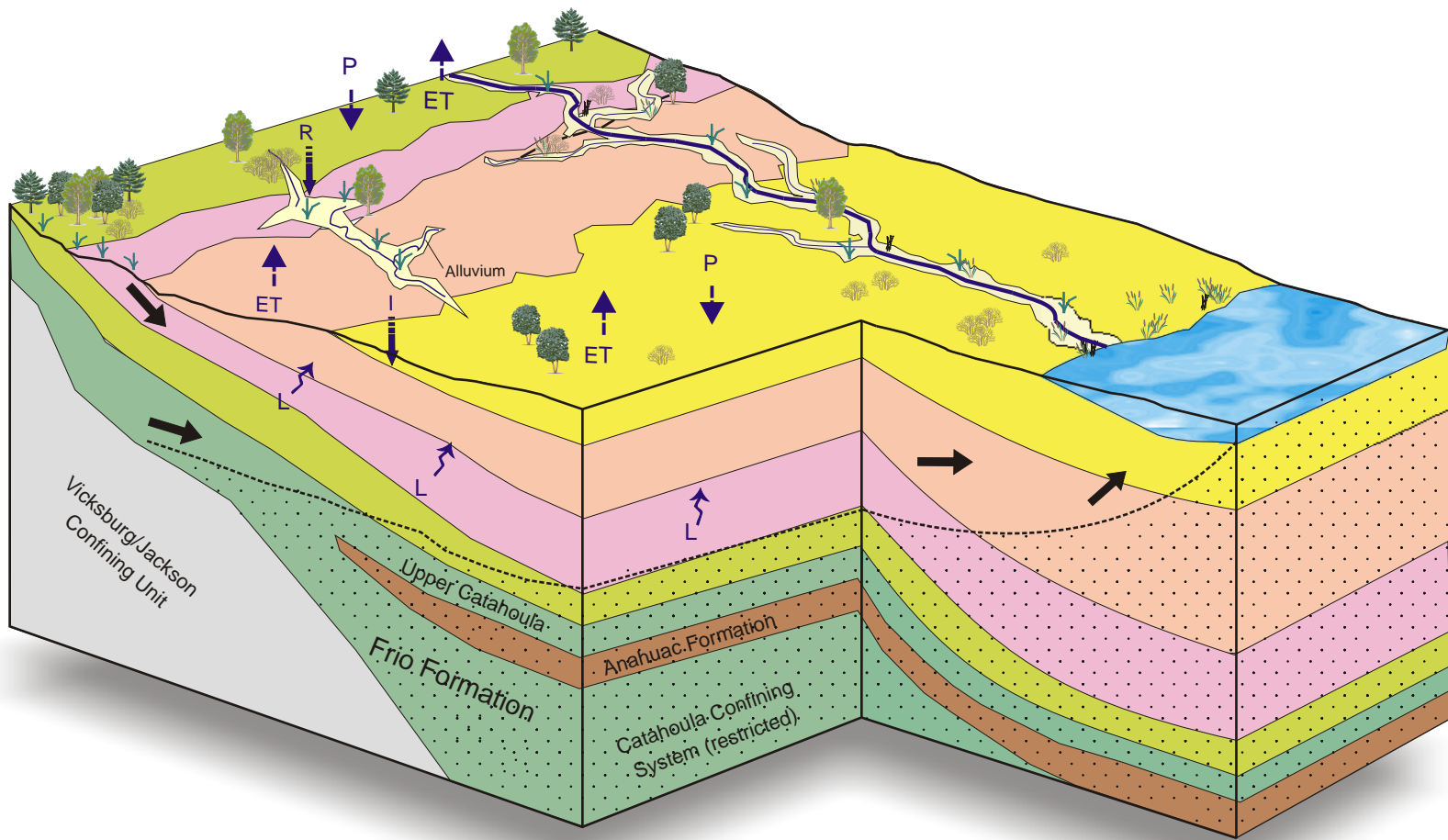


Specific Storage = 1.0 E-05 (1/ft)
 Specific Yield = 1.0 E-03

Legend	
	Texas counties
	CGC GAM Boundary
Burkeville	
	0.0001 - 0.001
	0.001 - 0.01
	0.01 - 0.1
Confined Storage Coefficient Burkeville	
Model Input	Figure 4-40







Legend

- Stream
- Salt Water
- Infiltration
- Evapotranspiration
- Precipitation
- Runoff
- Leakance
- Groundwater Flow Direction

Chicot
Aquifer

Evangeline
Aquifer

Burkeville
Confining
Unit

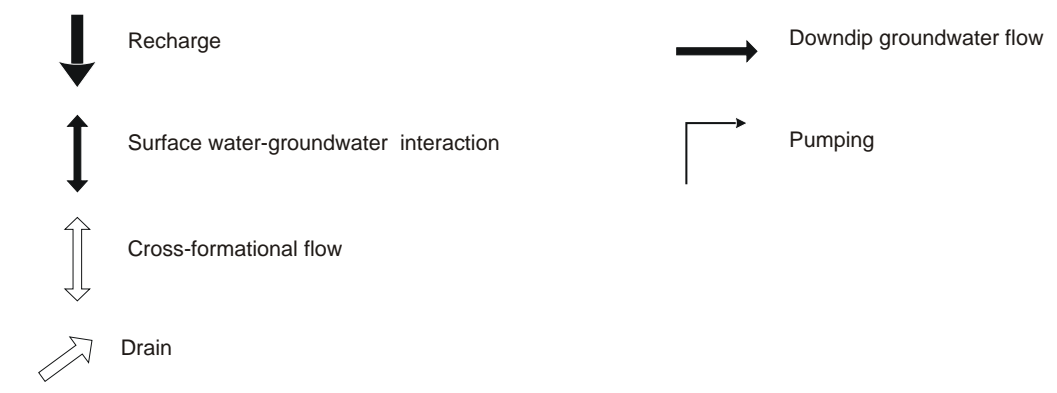
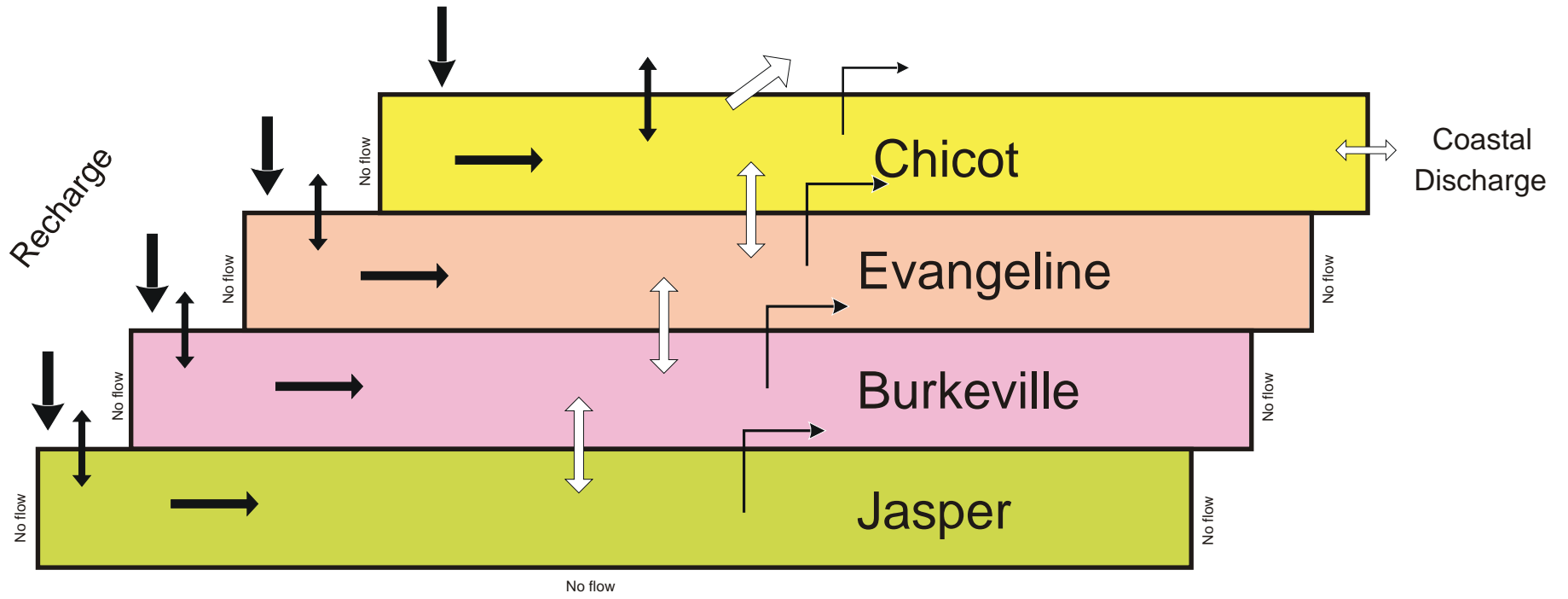
Jasper Aquifer



3-D Conceptual Model

Baker 1979 Figure 5-1

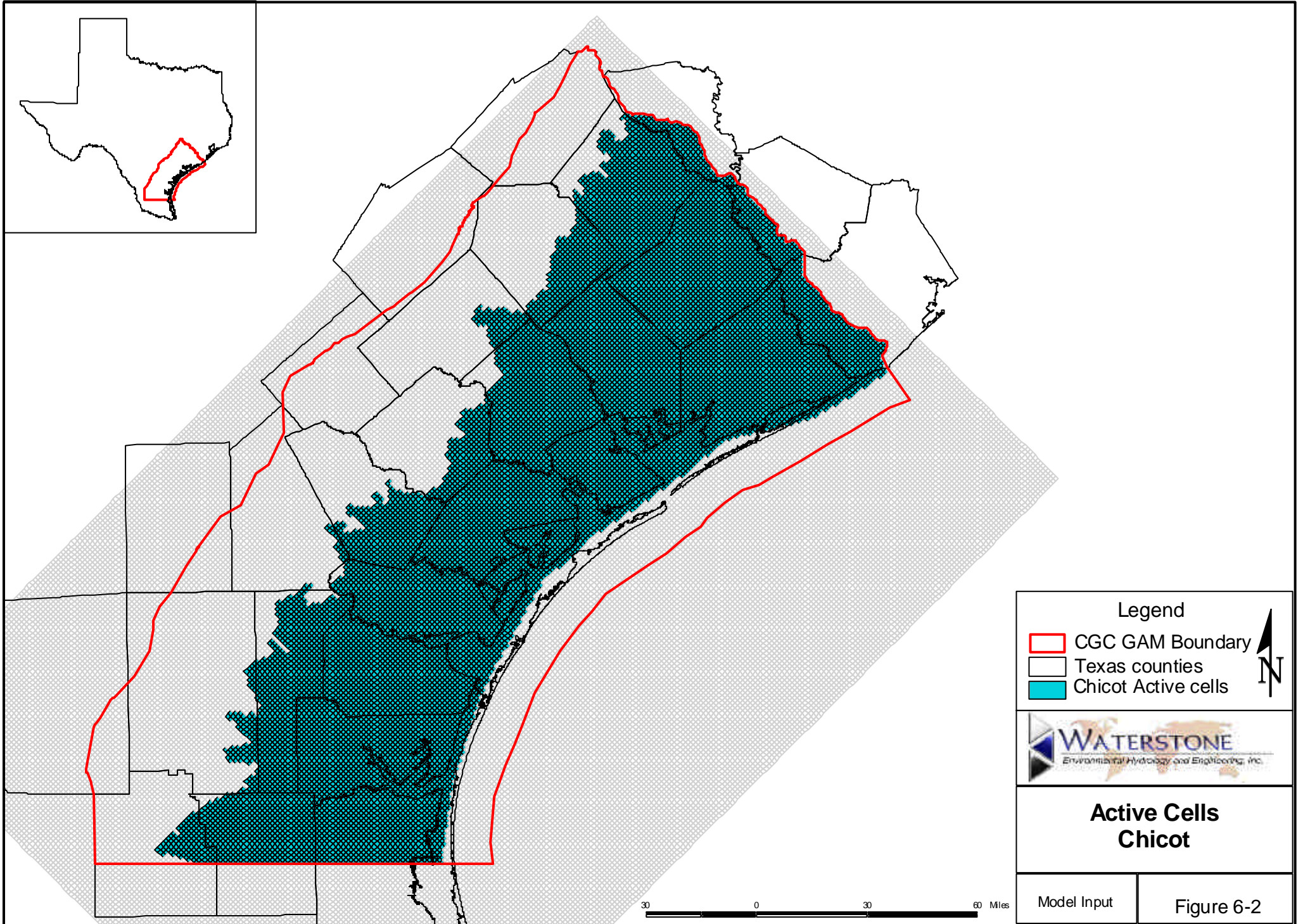
Figure Not to Scale



WATERSTONE
Environmental Hydrology and Engineering, Inc.

Conceptual Groundwater Flow
in the CGC Aquifer

Figure 6-1



Legend

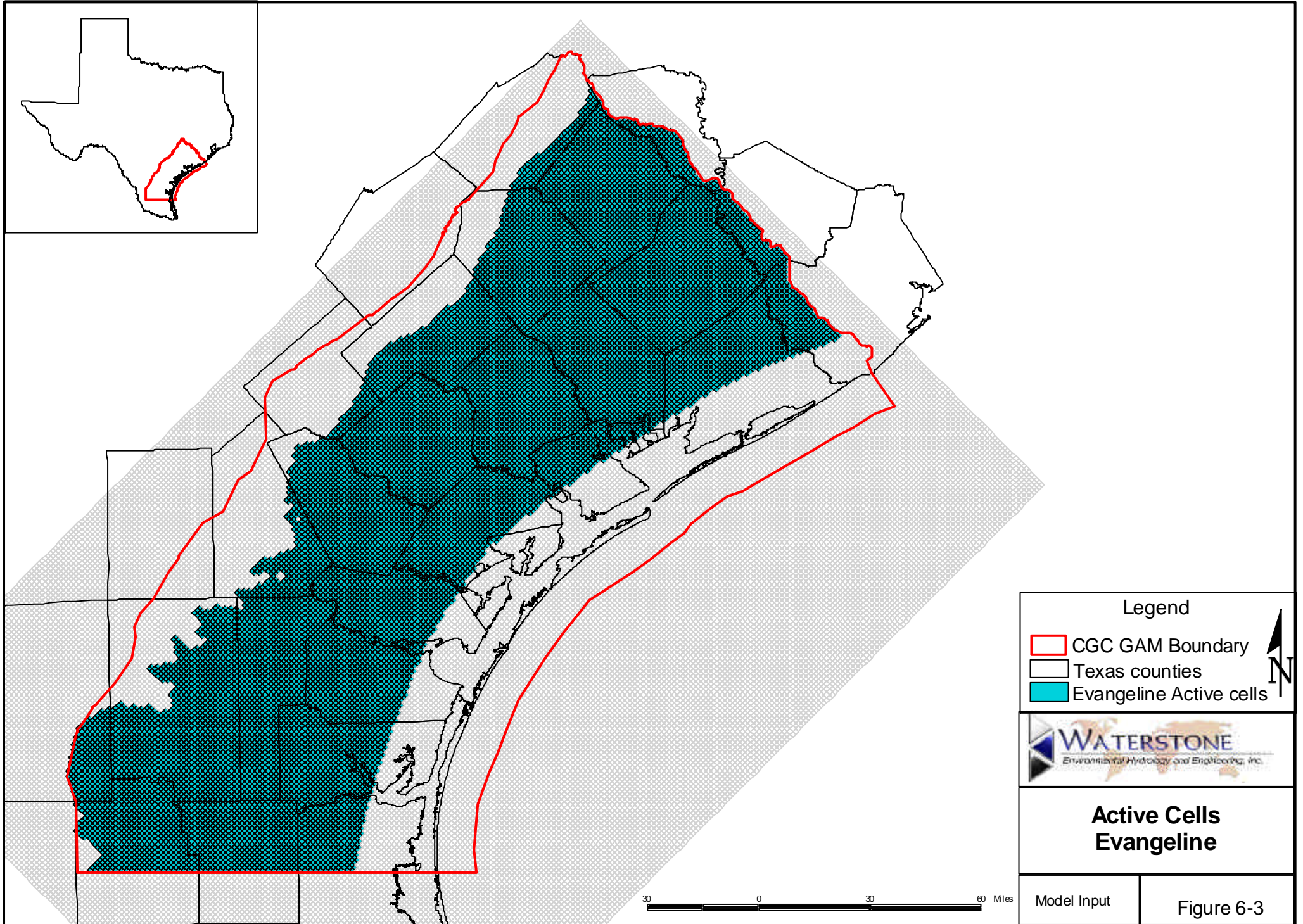
- CGC GAM Boundary
- Texas counties
- Chicot Active cells

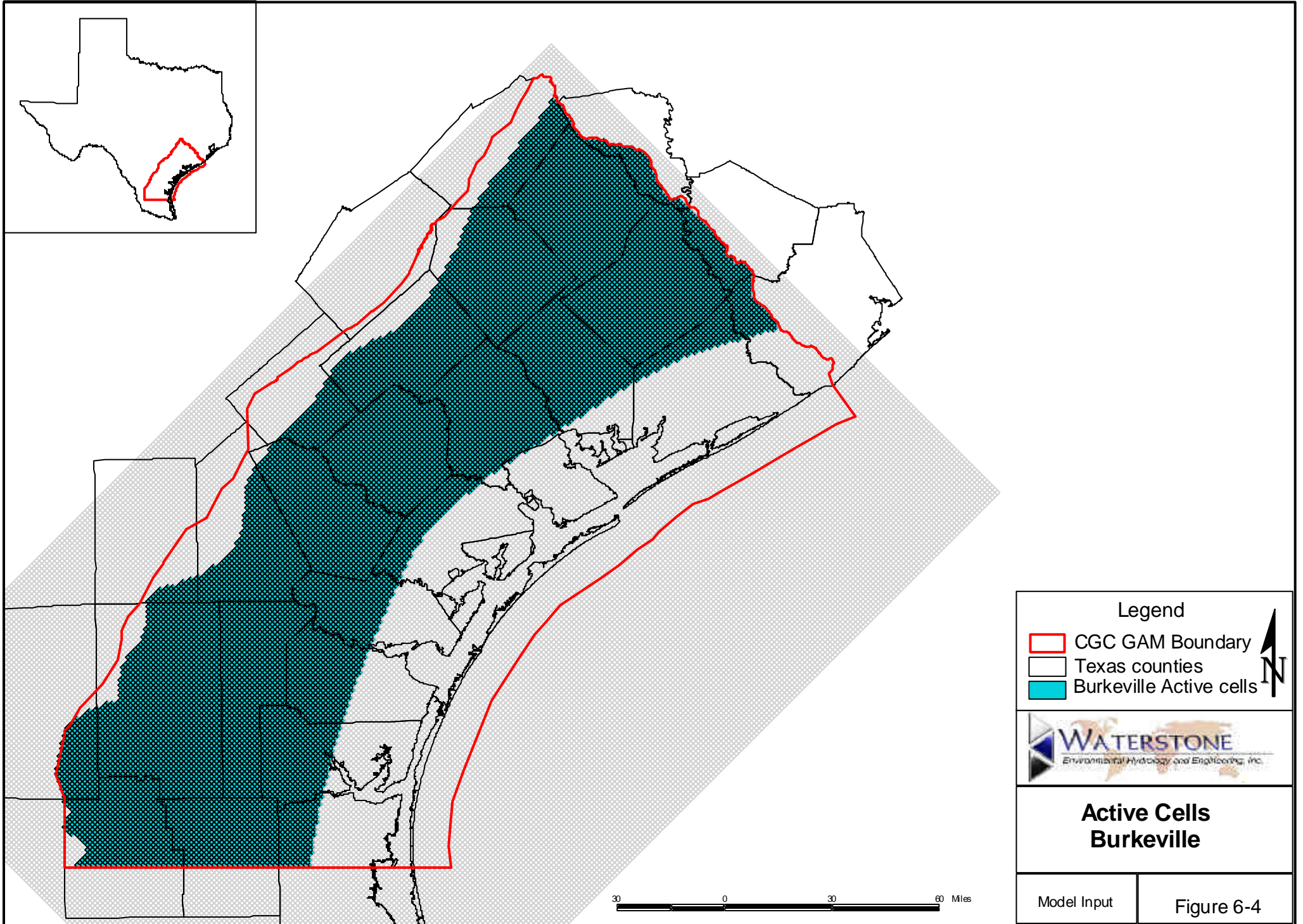


Active Cells
Chicot




Model Input

Figure 6-2





Legend

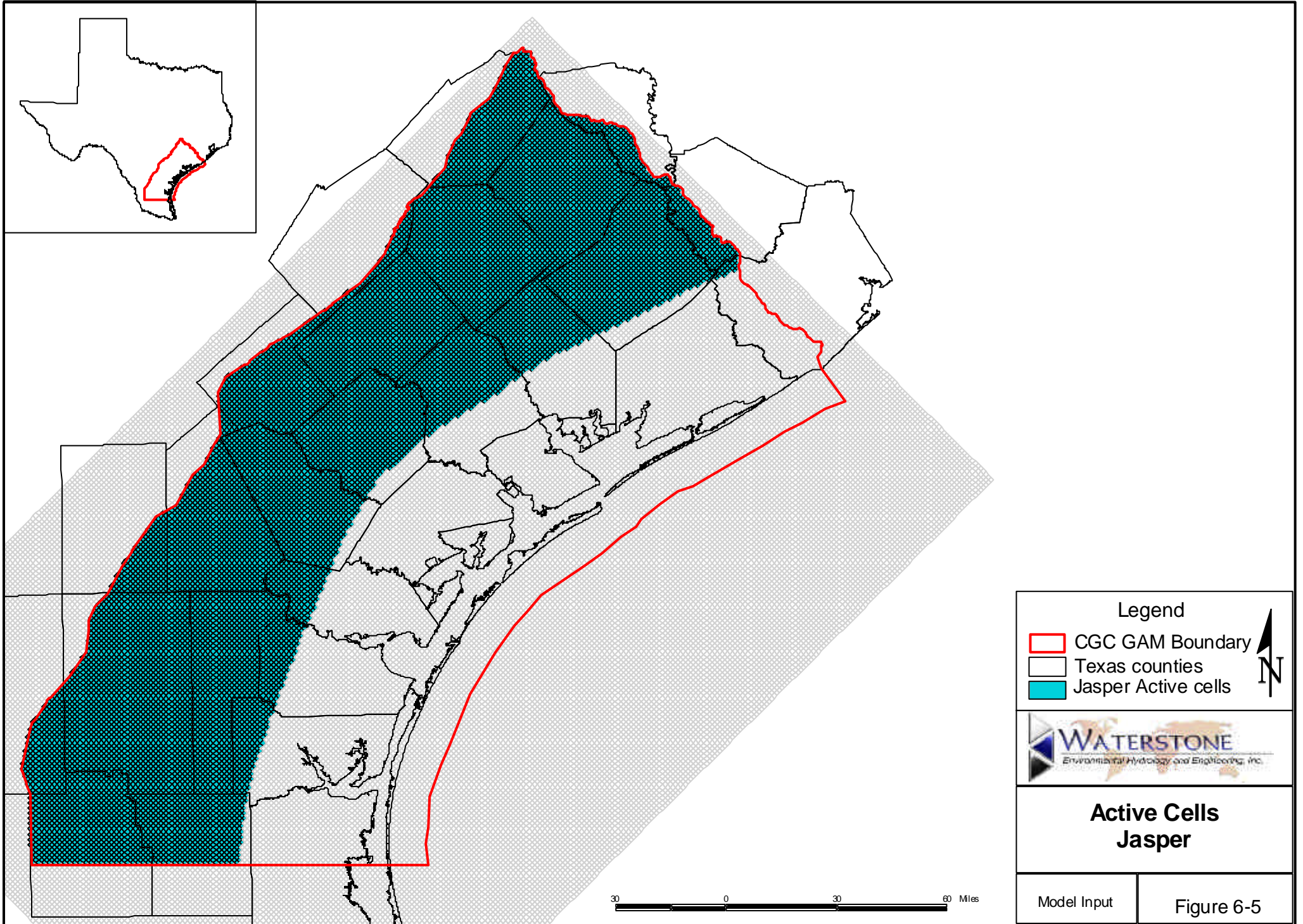
-  CGC GAM Boundary
-  Texas counties
-  Burkeville Active cells



**Active Cells
Burkeville**

Model Input

Figure 6-4



Legend

- CGC GAM Boundary
- Texas counties
- Jasper Active cells

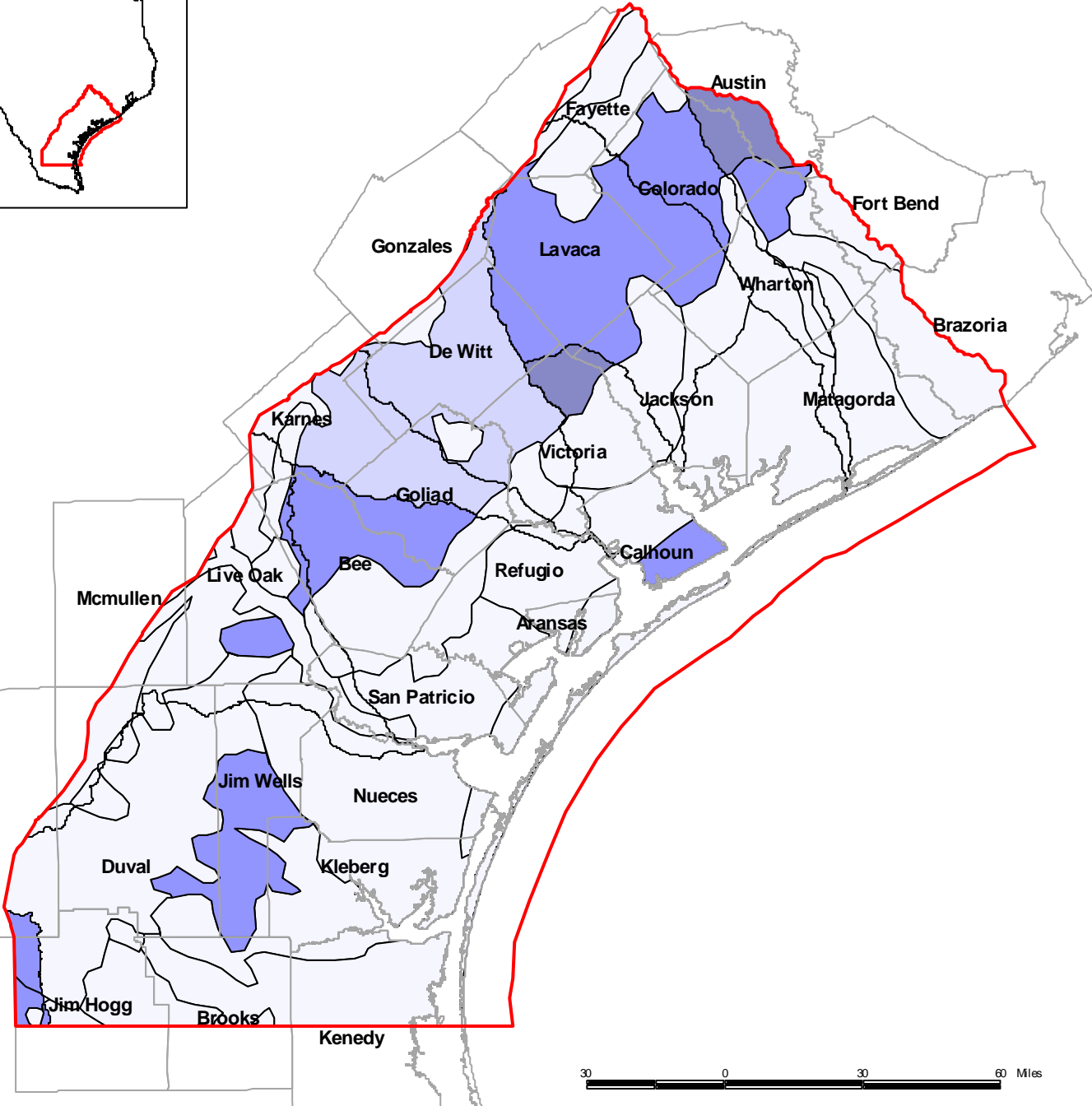
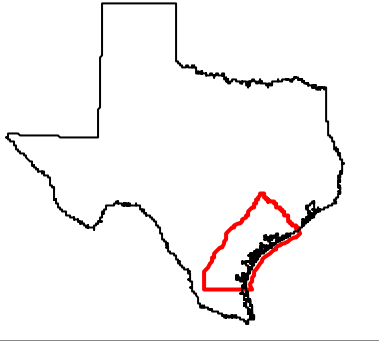
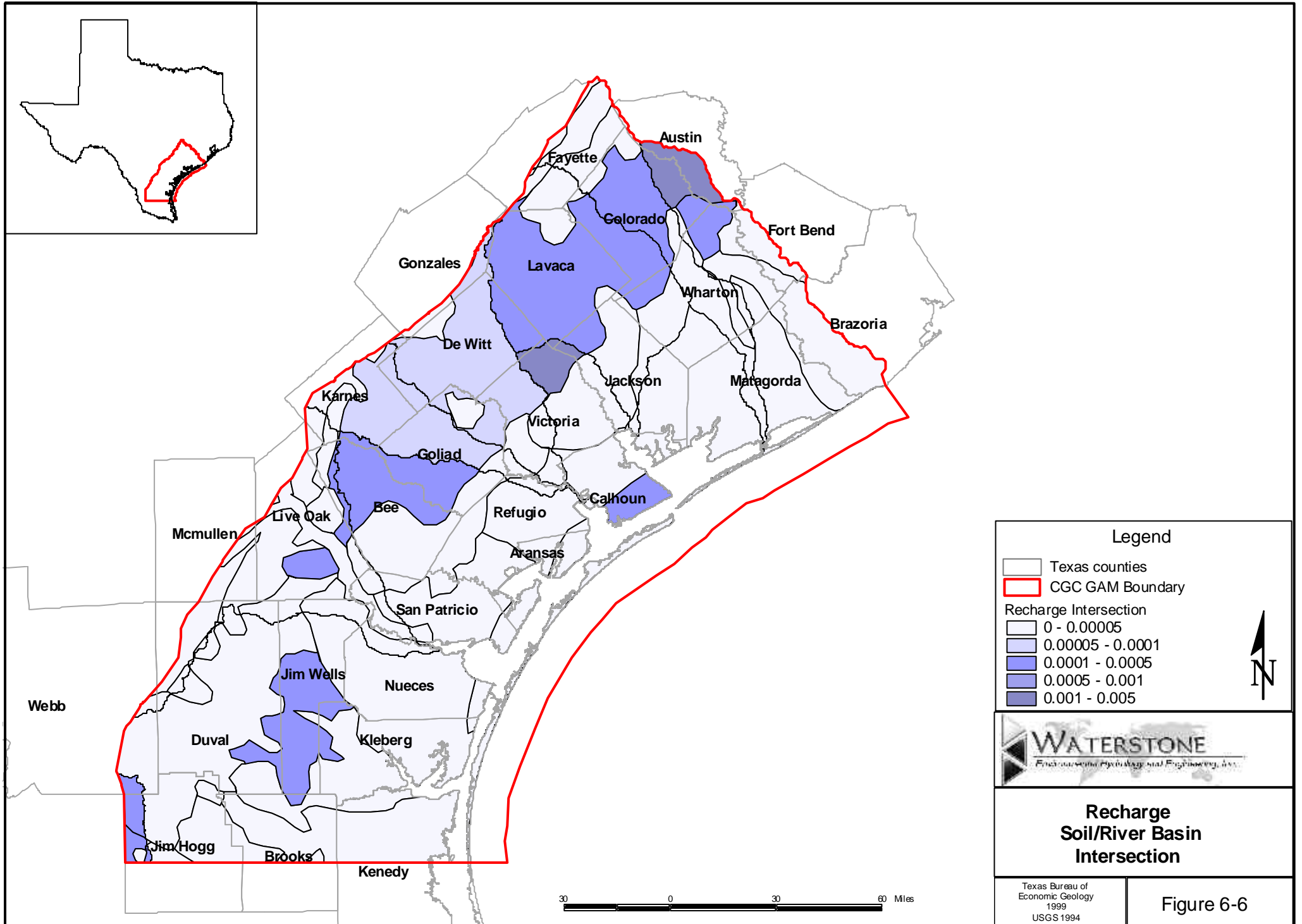


Active Cells
Jasper

Model Input

Figure 6-5

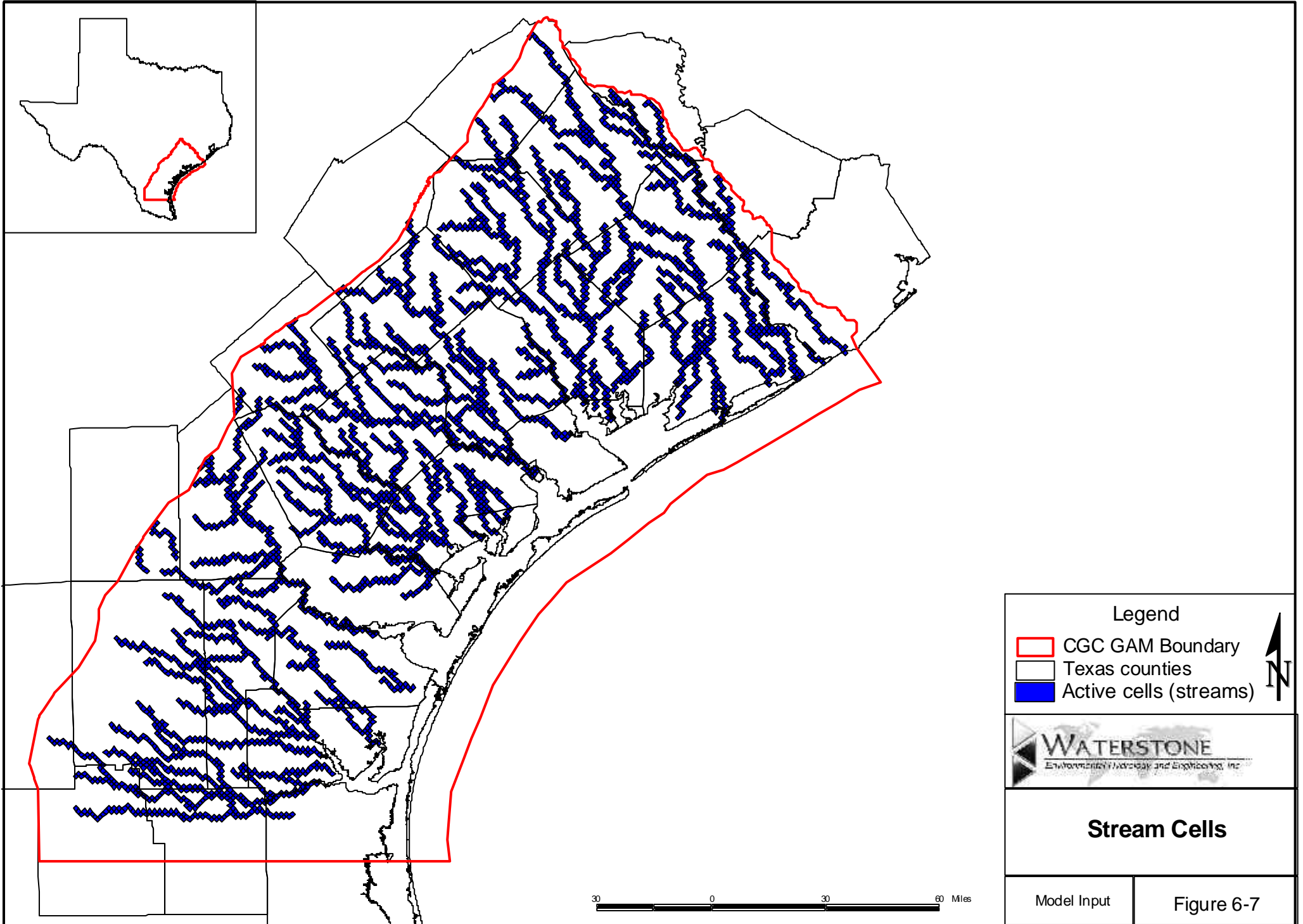
30 0 30 60 Miles

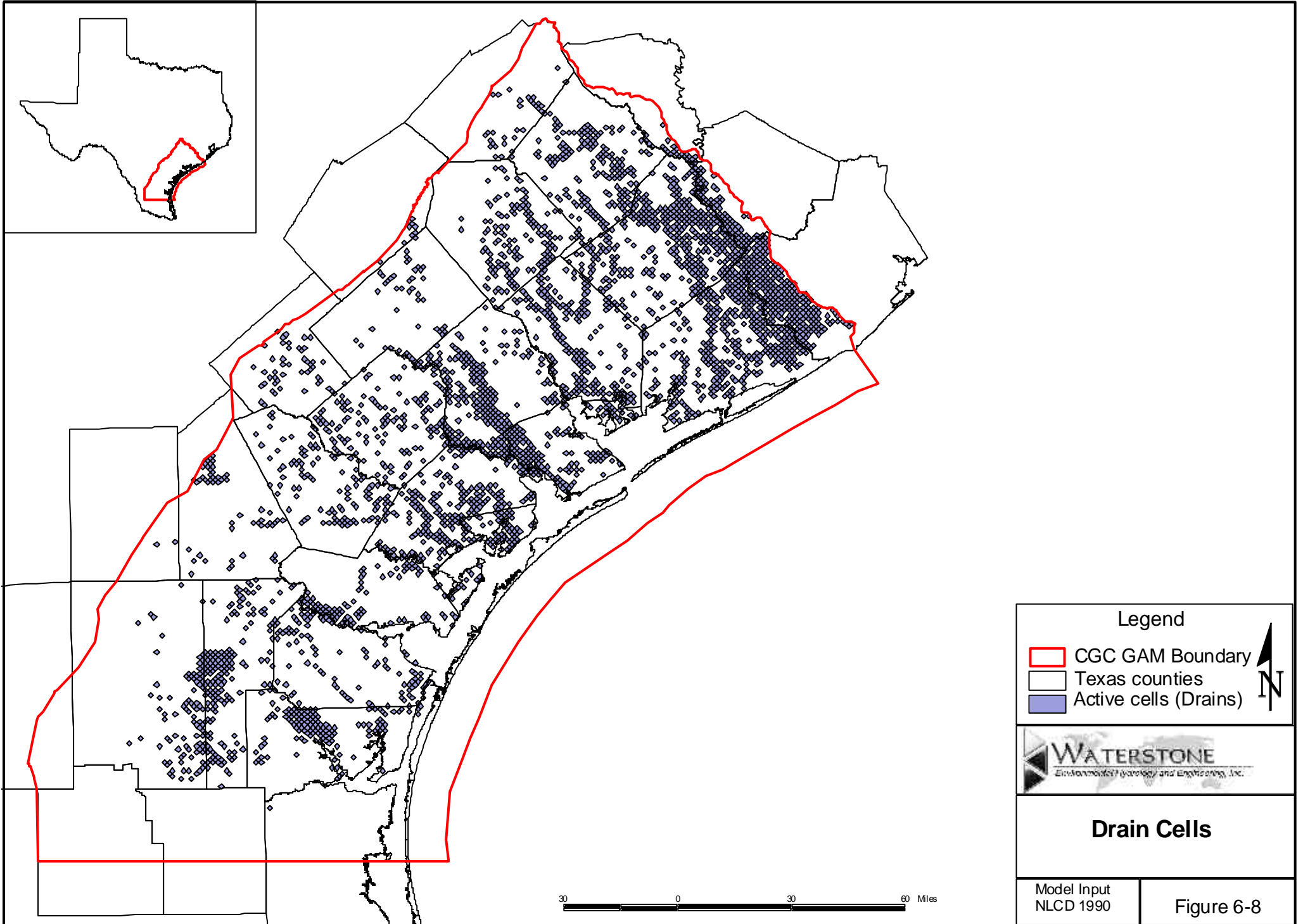


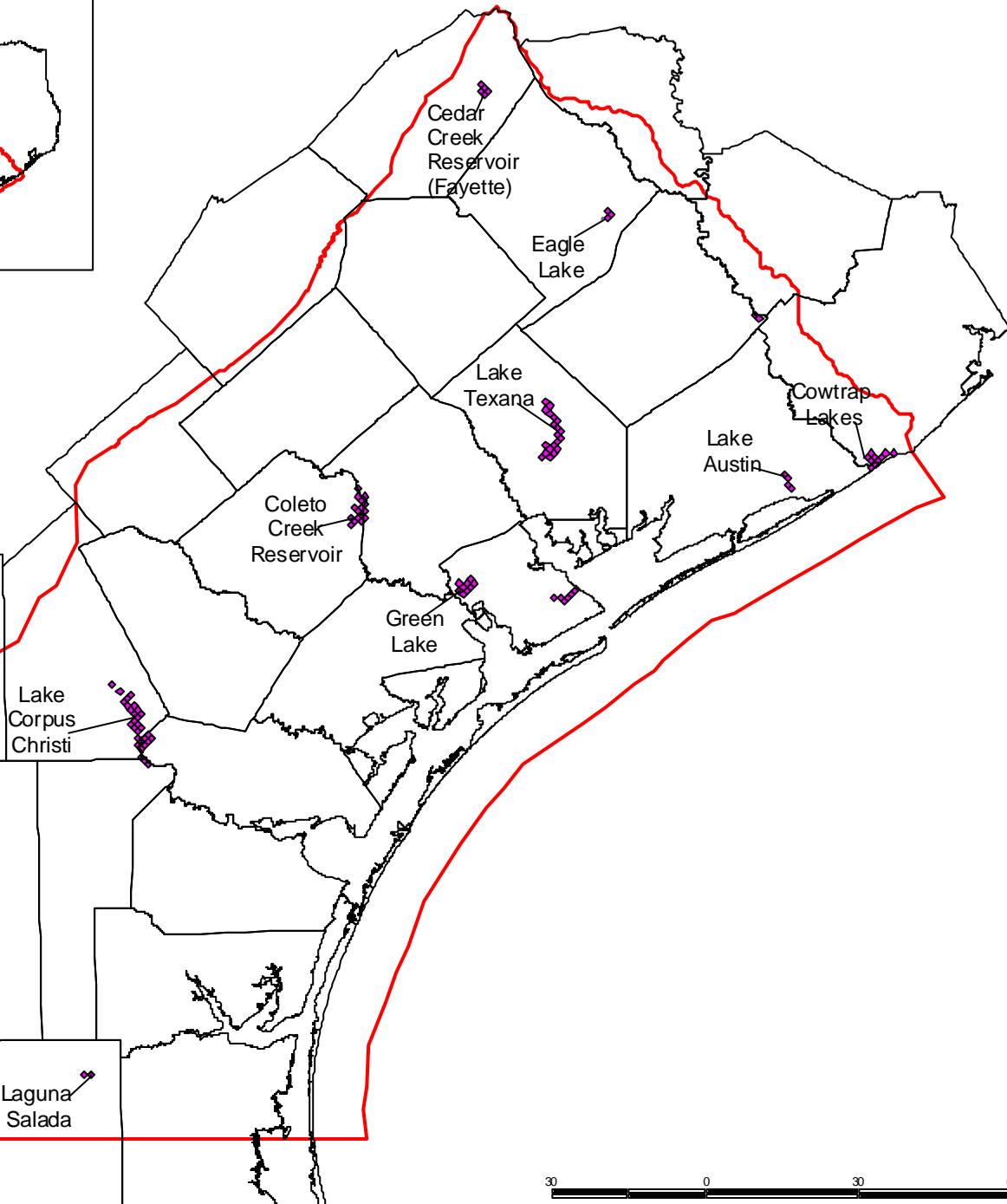
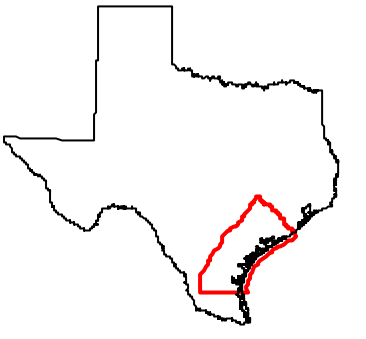
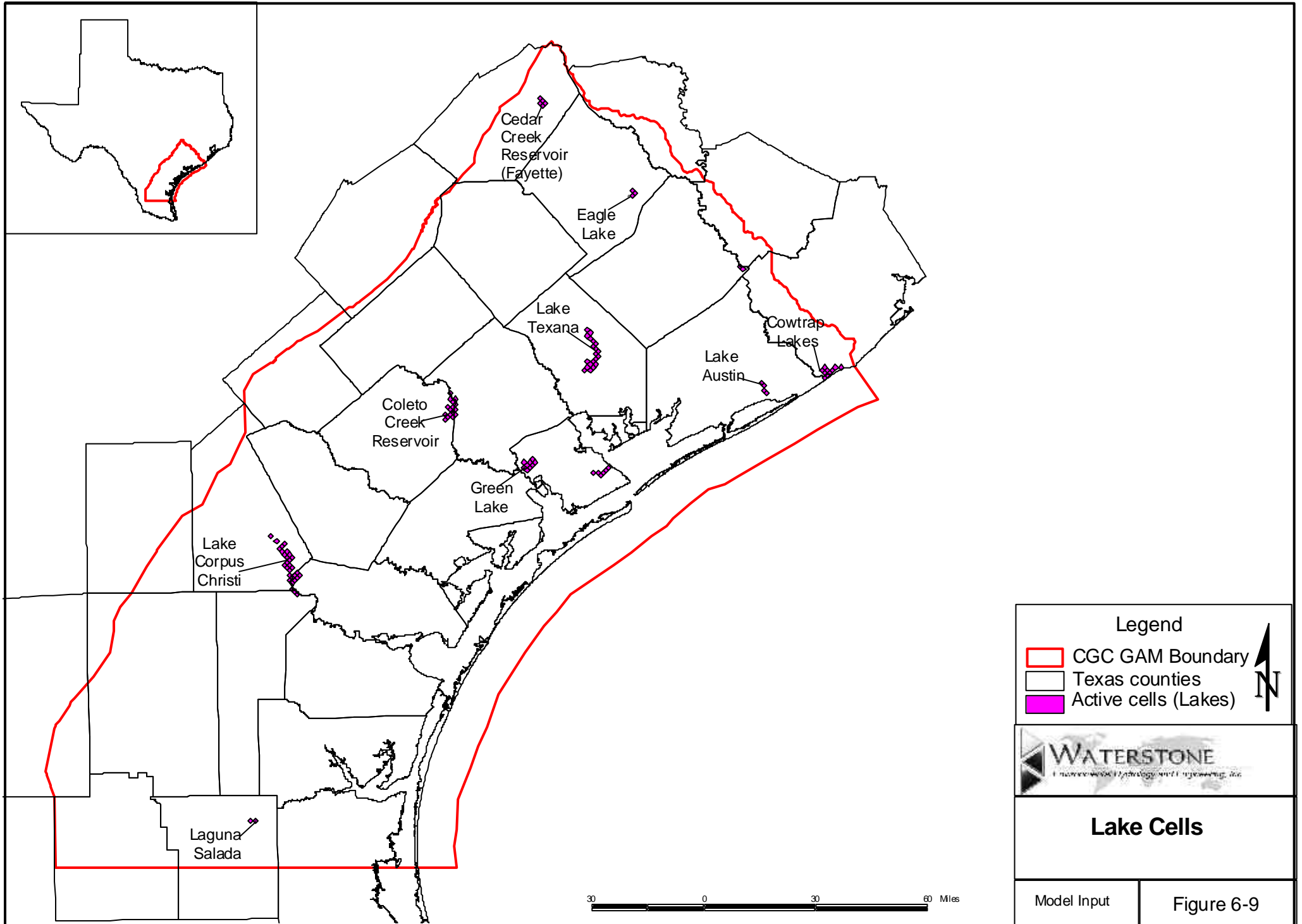
Recharge Soil/River Basin Intersection

Texas Bureau of Economic Geology
1999
USGS 1994

Figure 6-6







Legend

- CGC GAM Boundary
- Texas counties
- Active cells (Lakes)



Lake Cells

Model Input

Figure 6-9



