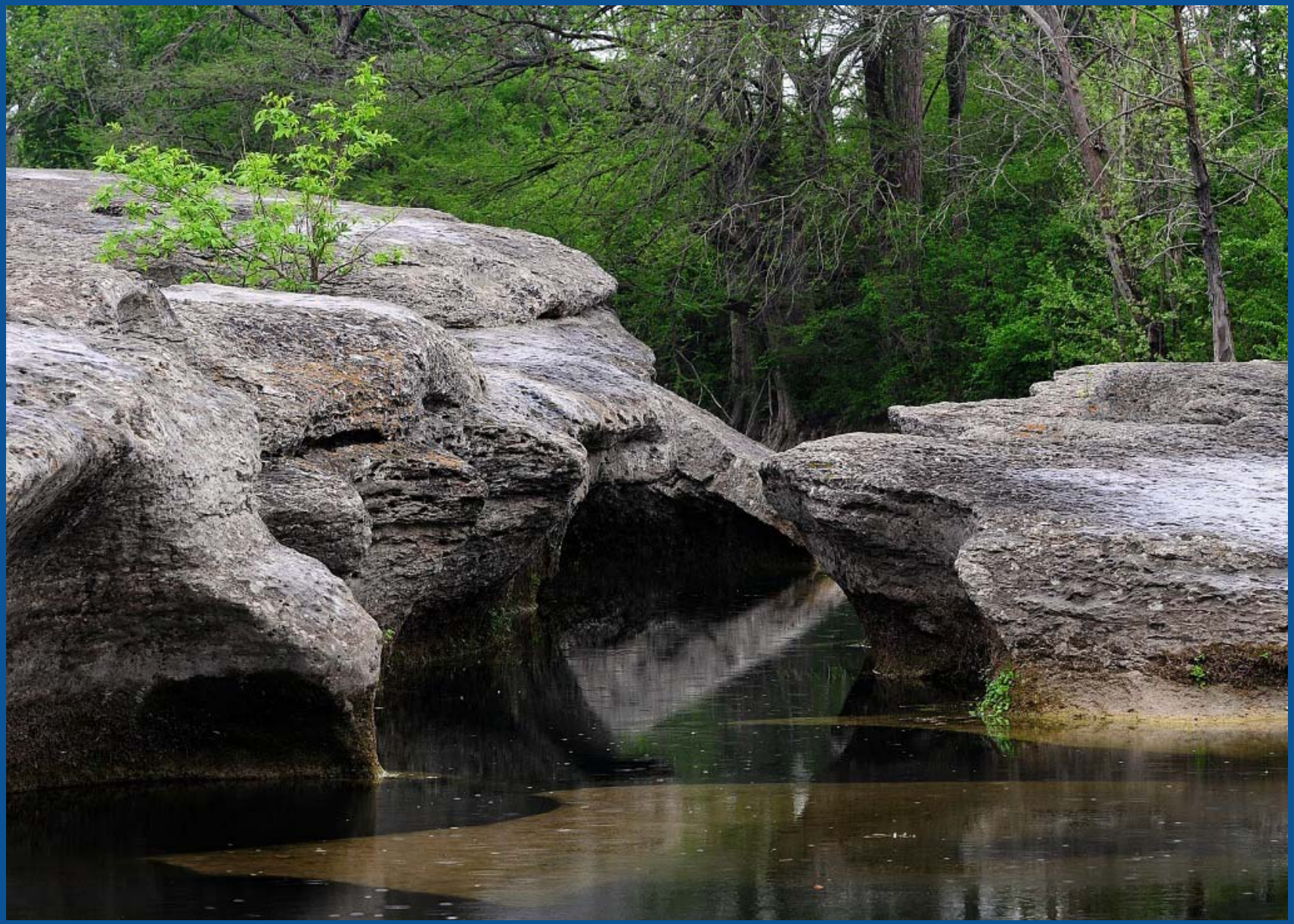
TEXAS WATER 101

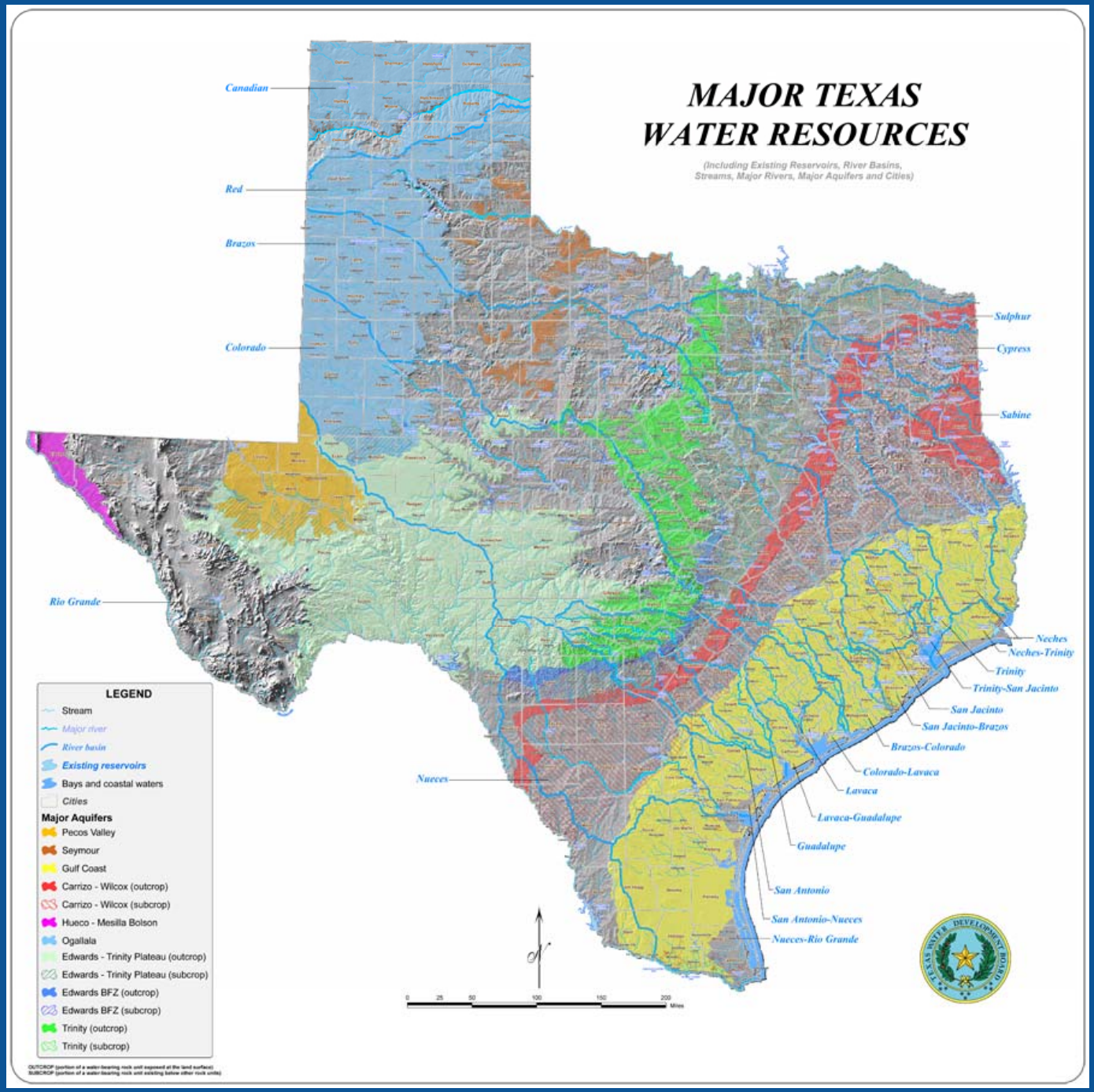
The Honorable Kathleen Hartnett White

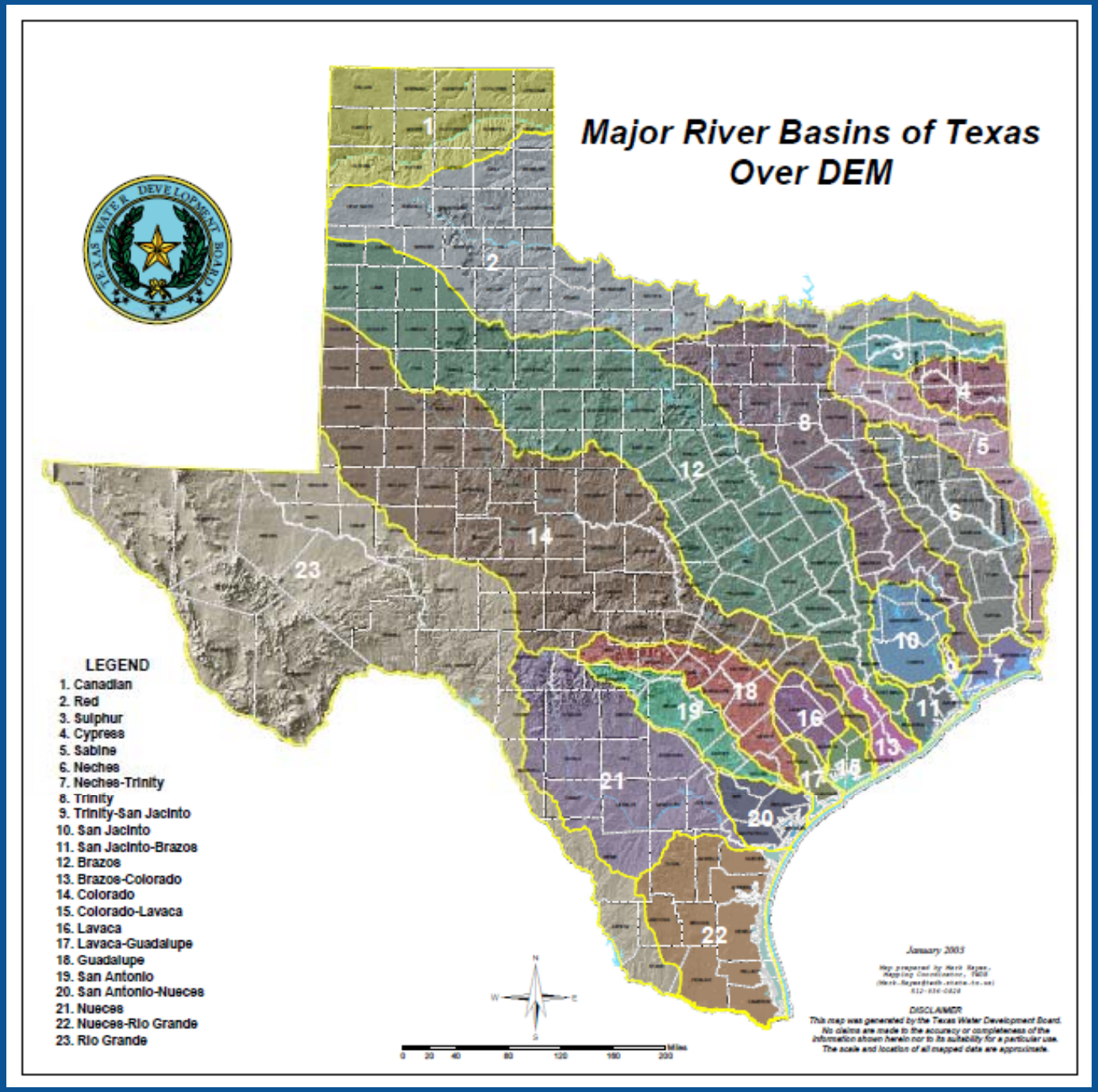
Distinguished Senior Fellow in Residence and
Director, Center for Natural Resources, T*exas Public Policy Foundation*
Former Chairman, Texas Commission on Environmental Quality



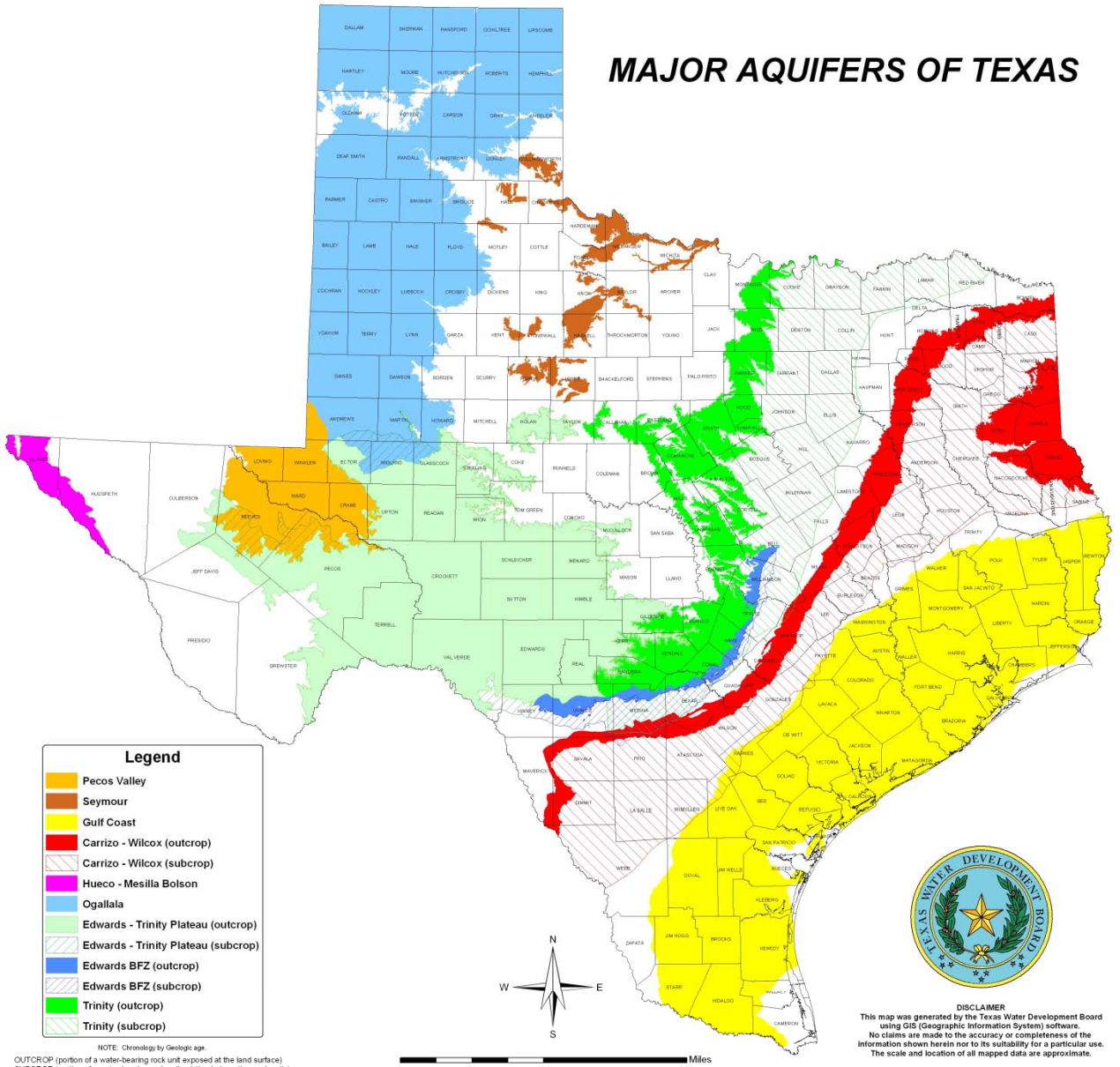
Texas Water Resources: Blessed with Bounty

- Texas has
  - 191,000 river miles
  - 23 major river basins
  - 9 major and 20 minor aquifers
  - 7 major and 4 minor bays and estuaries
  - 2,125 miles of shoreline along the Gulf of Mexico.
- No state has this volume, diversity and complexity of water resources.
- Texas also regularly has severe, prolonged droughts.
- Today Texas has 24 million people. The population will double by 2060.


MAJOR TEXAS
WATER RESOURCES
(Including Existing Reservoirs, River Basins,
Streams, Major Rivers, Major Aquifers and Cities)
Canadian
Red
Brazos
Colorado
Rio Grande
Nueces
Sulphur
Cypress
Sabine
Neches
Neches-Trinity
Trinity
Trinity-San Jacinto
San Jacinto
San Jacinto-Brazos
Brazos-Colorado
Colorado-Lavaca
Lavaca
Lavaca-Guadalupe
Guadalupe
San Antonio
San Antonio-Nueces
Nueces-Rio Grande
LEGEND
Stream
Major river
River basin
Existing reservoirs
Bays and coastal waters
Cities
Major Aquifers
Pecos Valley
Seymour
Gulf Coast
Carrizo - Wilcox (outcrop)
Carrizo - Wilcox (subcrop)
Hueco - Mesilla Bolson
Ogallala
Edwards - Trinity Plateau (outcrop)
Edwards - Trinity Plateau (subcrop)
Edwards BFZ (outcrop)
Edwards BFZ (subcrop)
Trinity (outcrop)
Trinity (subcrop)
0 25 50 100 150 200
Miles


Major River Basins of Texas
Over DEM
TEXAS WATER DEVELOPMENT BOARD
LEGEND
1. Canadian
2. Red
3. Sulphur
4. Cypress
5. Sabine
6. Neches
7. Neches-Trinity
8. Trinity
9. Trinity-San Jacinto
10. San Jacinto
11. San Jacinto-Brazos
12. Brazos
13. Brazos-Colorado
14. Colorado
15. Colorado-Lavaca
16. Lavaca
17. Lavaca-Guadalupe
18. Guadalupe
19. San Antonio
20. San Antonio-Nueces
21. Nueces
22. Nueces-Rio Grande
23. Rio Grande
January 2003
DISCLAIMER
This map was generated by the Texas Water Development Board.
No claims are made to the accuracy or completeness of the
information shown herein nor to its suitability for a particular use.
The scale and location of all mapped data are approximate.

MAJOR AQUIFERS OF TEXAS



NOTE: Chronology by Geologic age.

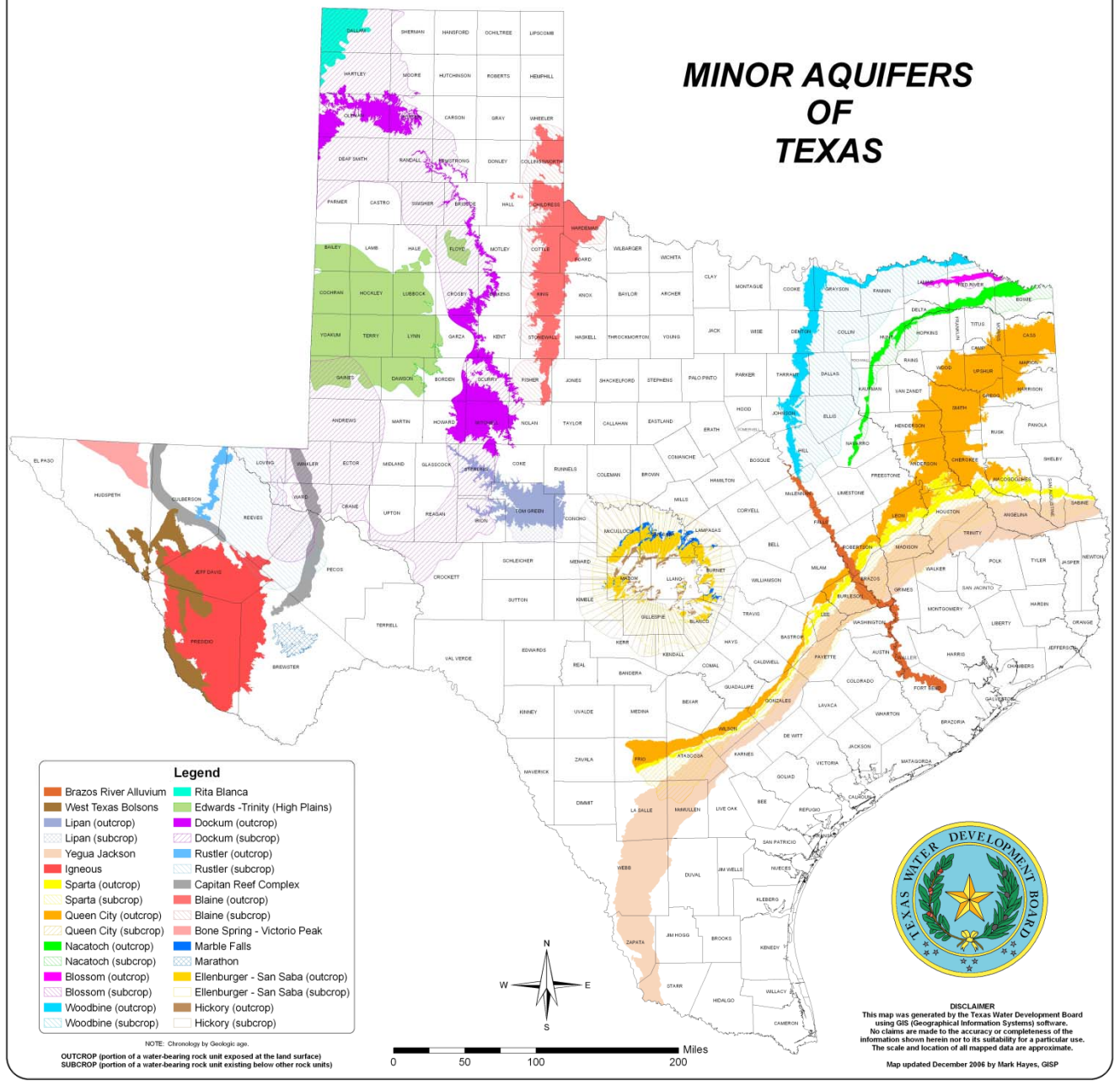
OUTCROP (portion of a water-bearing rock unit exposed at the land surface)
SUBCROP (portion of a water-bearing rock unit existing below other rock units)

TEXAS WATER DEVELOPMENT BOARD

DISCLAIMER
This map was generated by the Texas Water Development Board using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

Map updated December 2006 by Mark Hayes, GISP

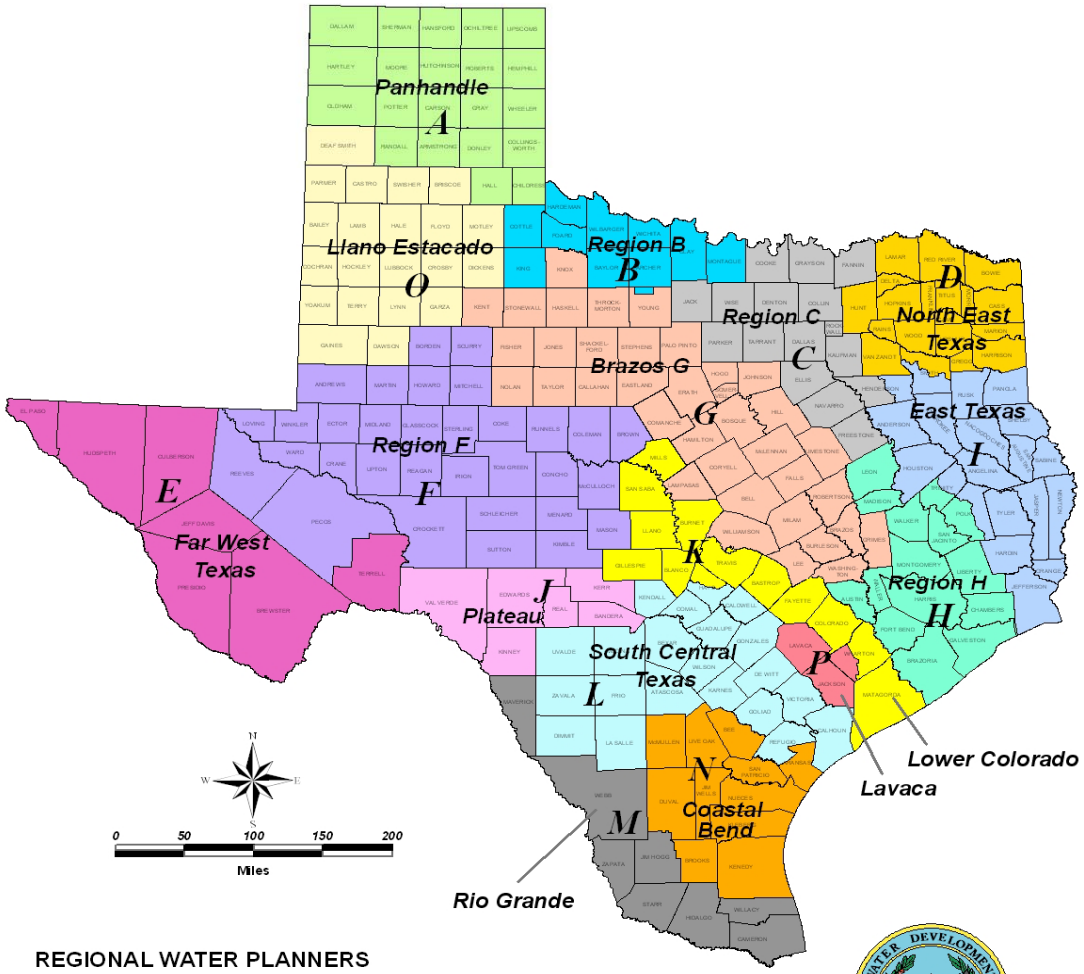
MINOR AQUIFERS OF TEXAS



Water Supply – The Value and Limits of Planning

- The Wisdom of Senate Bill 1 enacted in 1997: nationally acclaimed, locally-driven, cutting-edge science.
- Sixteen Regional Water Planning Groups.
- State Water Plan 2002 & State Water Plan 2007 prepared by TWDB.
- A bottoms-up process driven by Regional Water Planning Groups. Plans measure water currently available, usage by category, estimate future demand and available supply under drought conditions in 2060.
- The Regional Planning Groups identified 4500 water supply strategies to generate an additional nine million acre feet needed to meet demand in 2060.

Regional Water Planning Areas



REGIONAL WATER PLANNERS

Connie Townsend (512) 463 - 8290 - Regions E, J & M
Temple McKinnon (512) 475 - 2057 - Regions D, H & I
Angela Masloff (512) 936 - 0872 - Regions A, B & C
Matt Nelson (512) 936 - 3550 - Regions G, L & N
Angela Kennedy (512) 463 - 1437 - Regions F, O & P
David Meesey (512) 936 - 0852 - Region K

TEXAS WATER DEVELOPMENT BOARD

Updated by Mark Hayes
Mapping Coordinator
RIO Division/GIS Section
6/10/2008

Wake-up Call
State Water Plan 2007

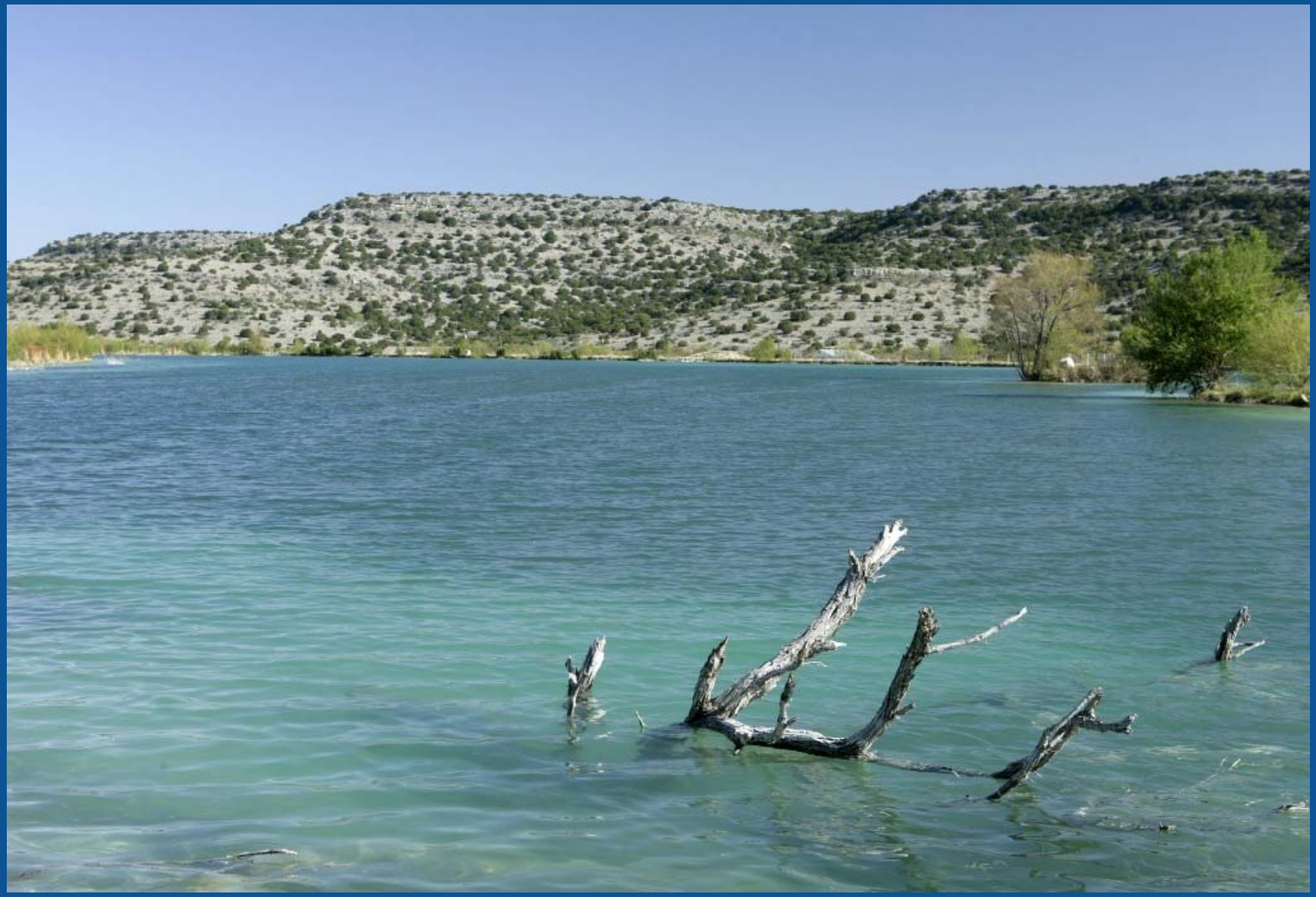
- Texas could be 85% short of demand in 2060 during a drought if existing supply is not increased by 27% or 9 million acre feet.
- Shortages of over 3 million acre feet could occur as early as 2010 in a severe, extended drought in the DFW metroplex.
- What are the key water supply strategies ? Status of Plan Implementation?
- Originally legislated priority for meeting increased demand: A "Voluntary Redistribution of Existing Supply" (e.g. irrigation rights transferred to a city, i.e. sold in a voluntary exchange)

Hope it Rains Hard and Long

- Few Water Supply Strategies Have Been Fully Implemented. Some exceptions
- Most large water supply projects can take 10 years or more to fully implement.
- Why so little progress?
  - Financing and legal uncertainty…a chicken and an egg conundrum
- Why not Haiku: The problem and the solution are the same.

Need for Legal Clarity: Water Policy and Water Transactions

- Unresolved legal questions about water rights administration and uncertain financing stymie project implementation.
- Law and rule need sufficient clarity to ground administrative and judicial decision.
- Uncertainty and indefinite delay in a state's decision making procedures complicate the ability of water authorities, local governments and the private sector to plan, finance and implement water supply projects.
- The same instability confounds and delays water conservation and protection of environmental flows.



Texas Water Rights

- Legal tradition respecting private property interests in water.
- Whatever happened to the easy way to more water: "voluntary redistribution of existing supply?"
- A voluntary redistribution assumes clearly defined, state-upheld water rights exchanged through an efficient water market.
- Long-held Texas water rights are no longer clear
  - E.G. City of Marshall water right amendment to add a beneficial use- the simplest of authorizations.
  - Still pending after 8 years including long round trip to the TX Supreme Court

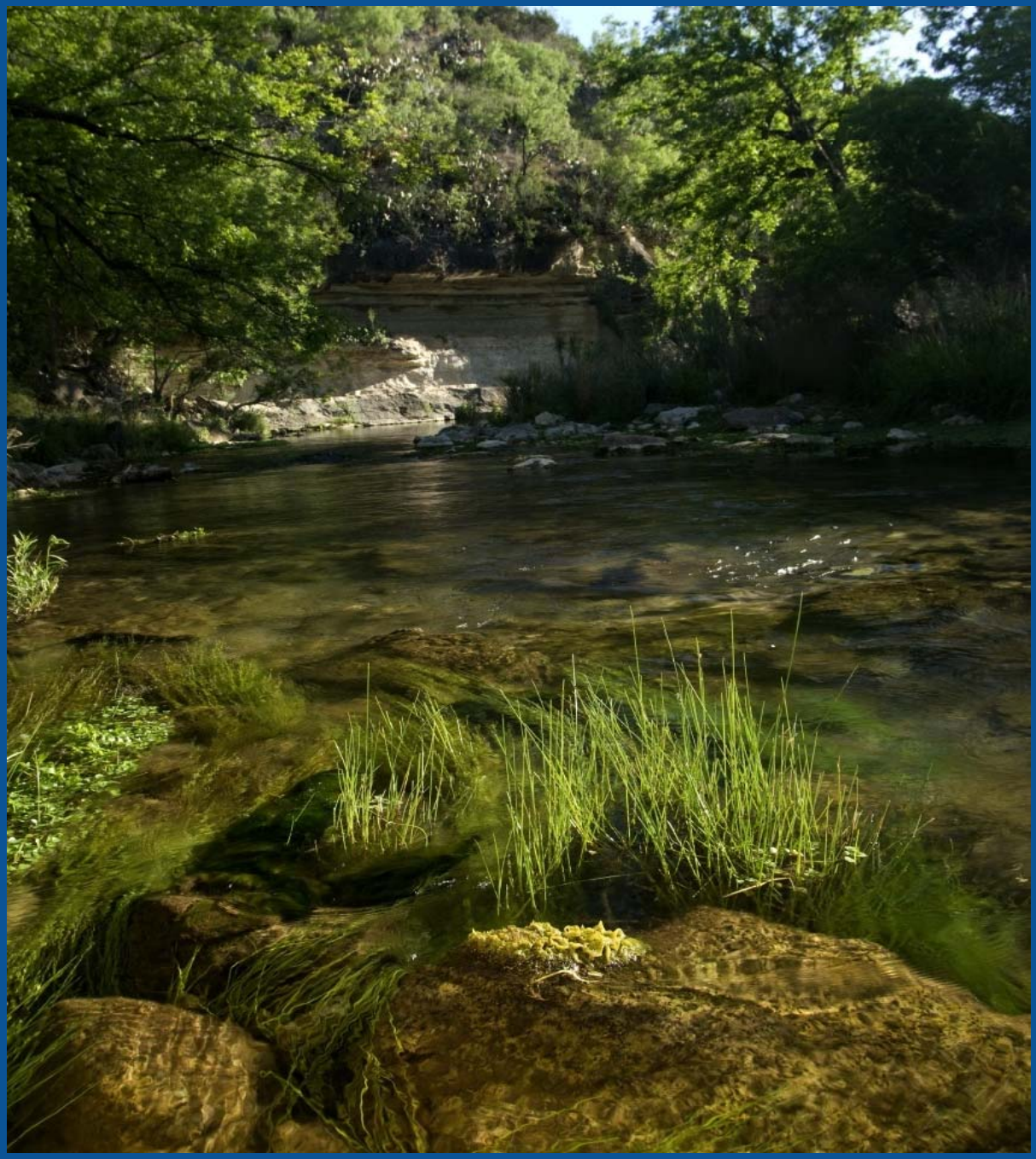
Texas Water Rights:
Two Different Legal Systems

- **Surface Water Rights** – Prior Appropriation System of Usufructory Rights & landowner riparian exception for domestic and livestock use.

- **Groundwater Rights** – Rule of Capture/Absolute Ownership

Surface Water Rights: Convey Property Interests

- For surface water, the state (through TCEQ) allocates water rights to specific volumes of water for beneficial uses stipulated by law.
- The state retains ownership of the corpus of the water but conveys a property interest in use of the water.
- Each water right carries a 'priority' date. Surface water rights are typically issued in perpetuity and clearly fungible.
- The property interest is defeasible, i.e. the state can revoke the right if wasted, not used or abandoned. Conservation is not considered non-use. (See Chapter 11 of the Texas Water Code)



Groundwater Rights
Three Separate Legal Authorities

- Common law rule of capture/ownership: a clear private property right to the water in the ground, vesting with ownership of the land. Upheld in 100 years of Texas case law.
- Local Groundwater District authority to regulate groundwater (Chapter 36 –TWC).
- Regional Groundwater Management Areas created and administered by the state(TWDB).
- Current questions about scope of the landowner's right. Does it vest only with "capture" and use or does it extend to the water in the ground as with minerals, e.g. oil & gas ?

Environmental Flows: A New Legal Kid on the Block

- Major new legislation – Senate Bill 3 from 80th Session.
- Major new science-driven, bottom-up process from Bay-Basin groups; multiple layers ending with Environmental Flow Standards adopted in rule by TCEQ.
- What is the policy goal? Maintenance, Enhancement , Restoration, Critical Flows?
- Do preservation of environmental flows and freshwater inflows confound the water supply challenge?
- Environmental Flow standard-setting should be legally integrated with regional water planning.

How Legal Uncertainty Has Delayed Water Supply Projects and Protection of Environmental Flows: Five Texas Examples

- Water Right Amendments
- Re-Use: Direct or Indirect
- Interbasin Transfers
- Groundwater 'Management'
- Environmental Flow Policy

Water Right Amendments for Change or Addition of a Beneficial Use … No Other Change.

- Previously considered the simplest of authorizations.
- Controlled by TWC 11.122b aka 'Four Corners Provision' enacted with Senate Bill 1 to facilitate 'voluntary redistribution.'
- An application to add industrial use to a municipal right has been pending in Texas for eight years. A Supreme Court ruling perhaps added to the ambiguity of state law.
- The question: does existing law require an environmental impact analysis and thus the possibility of reducing the original right?
- Core issue: what is the scope of the property interest in the existing right?

Re-use of Water: Direct and Indirect

- Indirect Re-use is an important, cost-efficient water supply strategy in most of the regional water plans.

- Re-use involves using water which otherwise would be discharged as wastewater or return flows into a stream.

- Direct use involves transporting water by pipeline or other physical conveyance to the place of re-use. Unless a water right or wastewater discharge permit requires discharge into a stream, no state authorization is required for direct re-use.

Indirect Re-Use

- Indirect re-use involves diversion of water previously discharged to a stream and requires a "bed and bank" permit to transport and divert the water from state watercourses. (TWC 11.042, 46)

- Many legal questions about bed and banks permit requirements: downstream water rights holders previous reliance on return flows, environmental impacts, groundwater versus surface water, what parties may claim right of re-use, e.g. original water right holder or wastewater treatment owner.

- Some complex indirect re-use projects have resolved legal conflicts by creative settlements among contending parties. E.G. LCRA and Austin

Inter-basin Transfer of Water

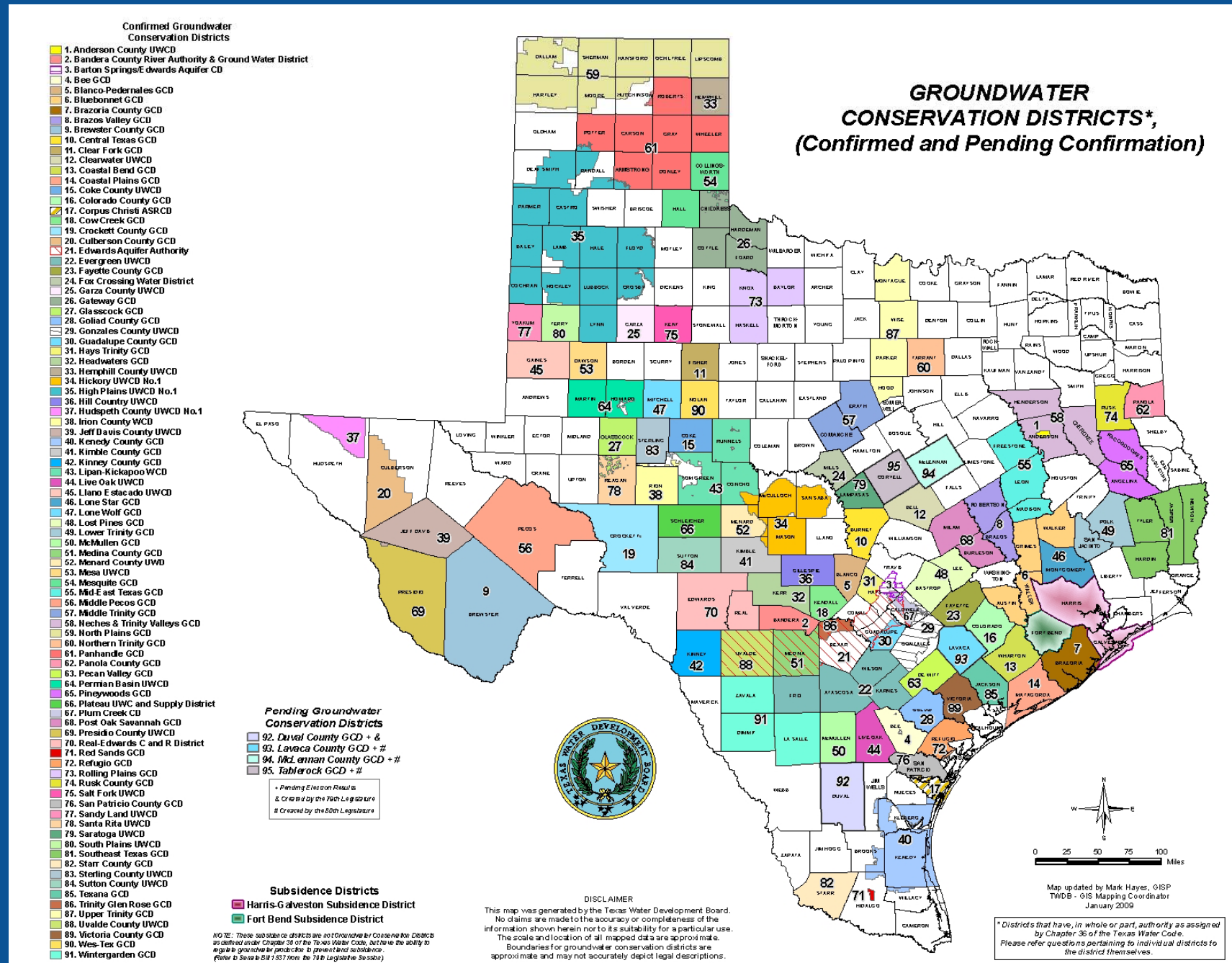
- Moving excess water from where it originates to where it is needed (TWC 11.085).
- Usually requires permit for TCEQ triggering the 'junior rights' provision.'
- When surface water is transferred from the basin or origin to another basin, the water right looses its original priority date and becomes the most junior right, i.e. lowest priority.
- The vexing question of addressing third party impacts in the basin of origin.
- The 'junior rights' provision has been debated for years and remains unresolved.

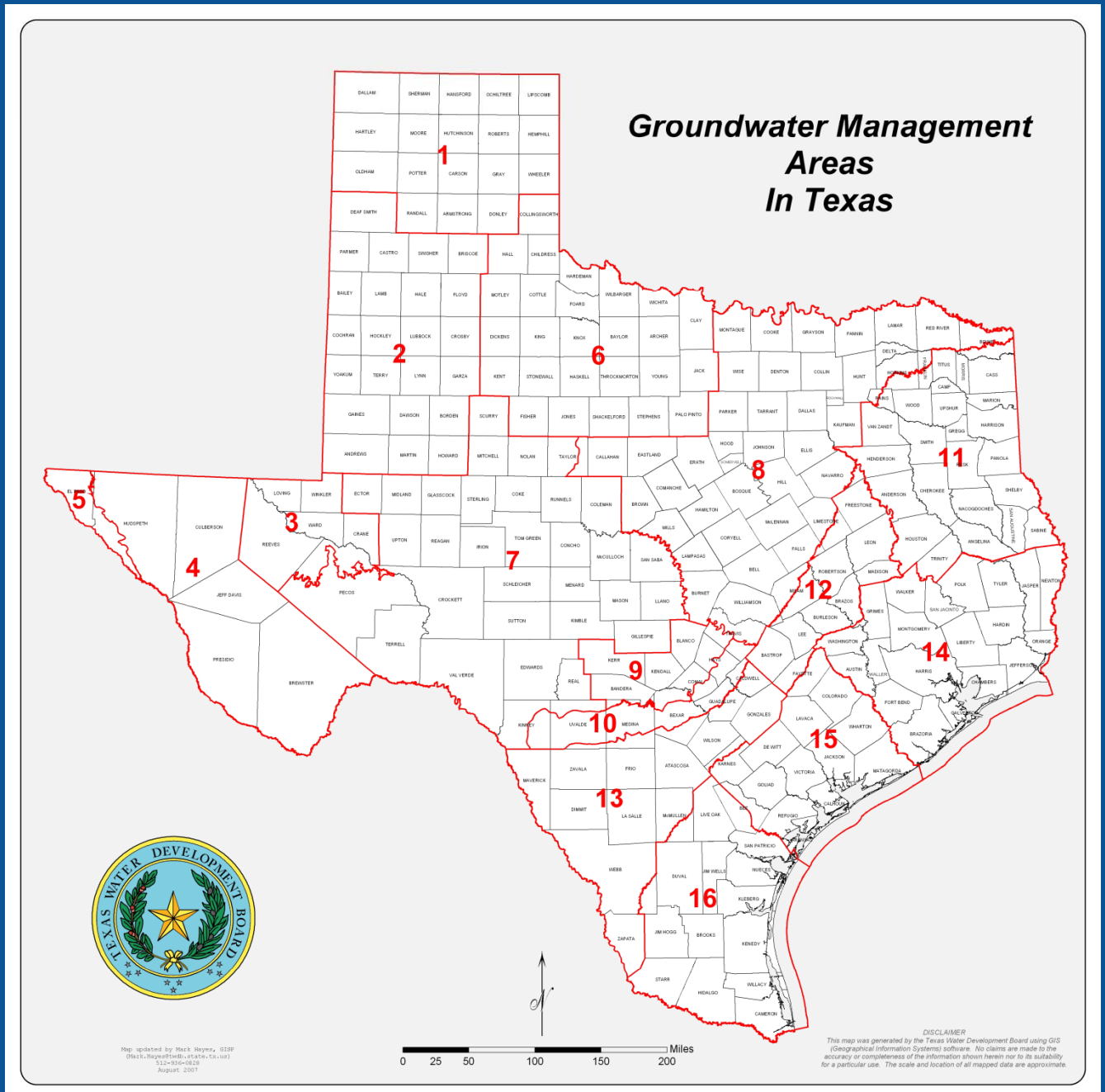
Texas Groundwater Law
A Three-Legged Stool

- 1. Common Law Landowner Rights upheld in a century of Texas case law.
- 2. Local Groundwater District authority to regulate pumping, well-spacing, and export.
- 3. Regional Groundwater Management Areas created and administered by the state.

The Courts are Busy

- In 2008, one Supreme Court ruling and three appellate court rulings upheld landowner's private rights and limits of local district authority.
- Guitar v. Hudspeth County Underground Water Conservation District, City of Del Rio v. Hamilton Trust, McDaniel Day v. Edwards Aquifer Authority.
- The risk of regulatory takings of protected property interests.
- Important distinction between E.A.A. authority and TWC Chapter 36 authority for GCDs.


GROUNDWATER
CONSERVATION DISTRICTS*,
(Confirmed and Pending Confirmation)
Confirmed Groundwater
Conservation Districts
1. Anderson County UWCD
2. Bandera County River Authority & Ground Water District
3. Barton Springs/Edwards Aquifer CD
4. Bee GCD
5. Blanco-Pedernales GCD
6. Bluebonnet GCD
7. Brazoria County GCD
8. Brazos Valley GCD
9. Brewster County GCD
10. Central Texas GCD
11. Clear Fork GCD
12. Clearwater UWCD
13. Coastal Bend GCD
14. Coastal Plains GCD
15. Coke County UWCD
16. Colorado County GCD
17. Corpus Christi ASRCD
18. Cow Creek GCD
19. Crockett County GCD
20. Culberson County GCD
21. Edwards Aquifer Authority
22. Evergreen UWCD
23. Fayette County GCD
24. Fox Crossing Water District
25. Garza UWCD
26. Gateway GCD
27. Glasscock GCD
28. Goliad County GCD
29. Gonzales County UWCD
30. Guadalupe County GCD
31. Hays Trinity GCD
32. Headwaters GCD
33. Hemphill County UWCD
34. Hickory UWCD No.1
35. High Plains UWCD No.1
36. Hill Country UWCD
37. Hudspeth County UWCD No.1
38. Irion County WCD
39. Jeff Davis County UWCD
40. Kenedy County GCD
41. Kimble County GCD
42. Kinney County GCD
43. Lipan-Kickapoo WCD
44. Live Oak UWCD
45. Llano Estacado UWCD
46. Lone Star GCD
47. Lone Wolf GCD
48. Lost Pines GCD
49. Lower Trinity GCD
50. McMullen GCD
51. Medina County GCD
52. Menard County UWD
53. Mesa UWCD
54. Mesquite GCD
55. Mid-East Texas GCD
56. Middle Pecos GCD
57. Middle Trinity GCD
58. Neches & Trinity Valleys GCD
59. North Plains GCD
60. Northern Trinity GCD
61. Panhandle GCD
62. Panola County GCD
63. Pecan Valley GCD
64. Permian Basin UWCD
65. Pineywoods GCD
66. Plateau UWC and Supply District
67. Plum Creek CD
68. Post Oak Savannah GCD
69. Presidio County UWCD
70. Real-Edwards C and R District
71. Red Sands GCD
72. Refugio GCD
73. Rolling Plains GCD
74. Rusk County GCD
75. Salt Fork UWCD
76. San Patricio County GCD
77. Sandy Land UWCD
78. Santa Rita UWCD
79. Saratoga UWCD
80. South Plains UWCD
81. Southeast Texas GCD
82. Starr County GCD
83. Sterling County UWCD
84. Sutton County UWCD
85. Texana GCD
86. Trinity Glen Rose GCD
87. Upper Trinity GCD
88. Uvalde County UWCD
89. Victoria County GCD
90. Wes-Tex GCD
91. Wintergarden GCD
Pending Groundwater
Conservation Districts
92. Duval County GCD + &
93. Lavaca County GCD + #
94. McLennan County GCD + #
95. Tablerock GCD + #
+ Pending Election Results
& Created by the 79th Legislature
# Created by the 80th Legislature
Subsidence Districts
Harris-Galveston Subsidence District
Fort Bend Subsidence District
NOTE: These subsidence districts are not Groundwater Conservation Districts as defined under Chapter 36 of the Texas Water Code, but have the ability to regulate groundwater production to prevent land subsidence.
(Refer to Senate Bill 1937 from the 70th Legislative Session)
DISCLAIMER
This map was generated by the Texas Water Development Board.
No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use.
The scale and location of all mapped data are approximate.
Boundaries for groundwater conservation districts are approximate and may not accurately depict legal descriptions.
TEXAS WATER DEVELOPMENT BOARD
N
W
E
S
0 25 50 75 100
Miles
Map updated by Mark Hayes, GISP
TWDB - GIS Mapping Coordinator
January 2009
* Districts that have, in whole or part, authority as assigned by Chapter 36 of the Texas Water Code.
Please refer questions pertaining to individual districts to the district themselves.


Groundwater Management Areas In Texas
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
TEXAS WATER DEVELOPMENT BOARD
Miles
0 25 50 100 150 200
DISCLAIMER
This map was generated by the Texas Water Development Board using GIS (Geographical Information Systems) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.
Map updated by Mark Hayes, GISP
(Mark.Hayes@twdb.state.tx.us)
512-936-0828
August 2007

Environmental Flows

- In 2001 with the State Water Plan detailing major water supply needs, environmental flows emerged as a major issue.
- Longstanding inter-agency disputes over freshwater inflow needs for bay and estuaries.
- Boom! New water right applications for pure instream use targeting 12 million acre feet of unappropriated water.
- Agency denial of these permits. Legislature upheld agency decisions. To date, courts upheld.
- After three attempts, the Legislature passed major environmental flow law.

Water Markets – Promise but not much Progress in Texas

- Water marketing, i.e. voluntary redistribution, functions only with well-defined property interests in water, legal clarity, and predictable administrative decision.
- Ad hoc revisions to long-established water right administration by courts and agencies preclude rational economic activity upon which effective water supply systems have heretofore relied.
- Active water marketing, anticipated and supported by the Texas legislature, has not emerged in Texas—with two notable exceptions.
- Within the Edwards Aquifer Authority for groundwater and within the Rio Grande Watermaster program for surface water. Both jurisdictions clearly define the property interests in the water rights; rules for transfers are temporary/seasonal transactions. (Both systems were mandated by court rulings later codified with specificity.)

Water Conservation Is Powerful

- In 2007 State Water Plan, conservation strategies proposed to meet or reduce 23% of future demand.
- Active conservation— active measures to reduce consumption.
- Passive conservation—water savings from water-efficient plumbing fixtures and appliances.
- Dramatic conservation achievement in some cities (El Paso and San Antonio) through a mix of local initiatives.
- Legislatively created Water Conservation Implementation Task Force.
- Growing public awareness of value of water, e.g. success of Water I.Q. program as state-wide public awareness campaign.

The Importance of Clear Law

- Statutory and regulatory construction aimed at clarity is critical.
- An art and a test of will.
- Language intended primarily to garner consensus can eventually defeat the purpose of the law or rule making.
- Administrative process is also critical and often benefits from legislative review and amendment.
- Wise water policy decisions need the long view …. decades in the future.