City of Fredericksburg Water Supply Update

March 2, 2015

Todays Presentation

City of Fredericksburg

1. Local Drought and Water Supply
2. Water Conservation Efforts – Measurable Results
3. Future Water Supply
4. Drought Response Stages and Watering Restrictions

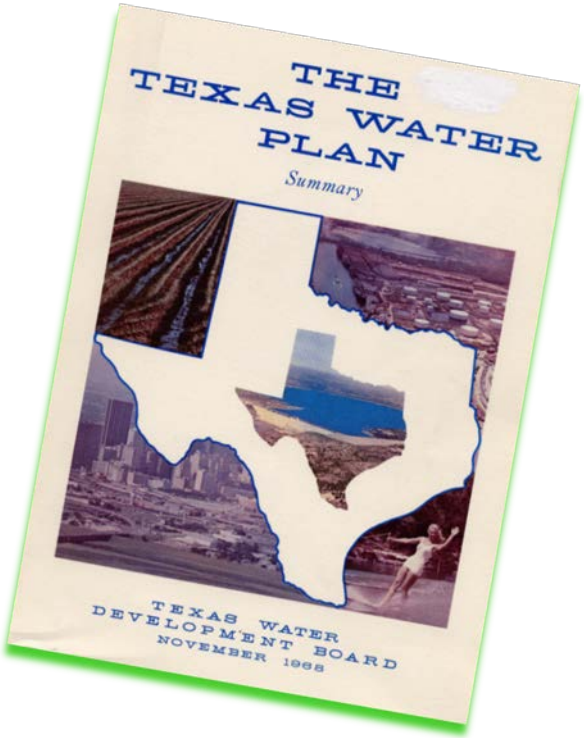
Hill Country Underground Water Conservation District

1. Fredericksburg historical rainfall and US Seasonal Outlooks for 2015
2. Texas Soil Observation Network (TxSON)
3. Recharge and drawdown dynamics of the Ellenburger Aquifer in the Fredericksburg area
4. Local drought index and HCUWCD Drought Management Plan
5. Future water demands

Water Planning: Legislative Response to Drought

Late 1950s Drought of Record

- 1957: Creation of TWDB
- 9 State Water Plans, 1961-2012
- Updated every 5 years
- Next update 2017



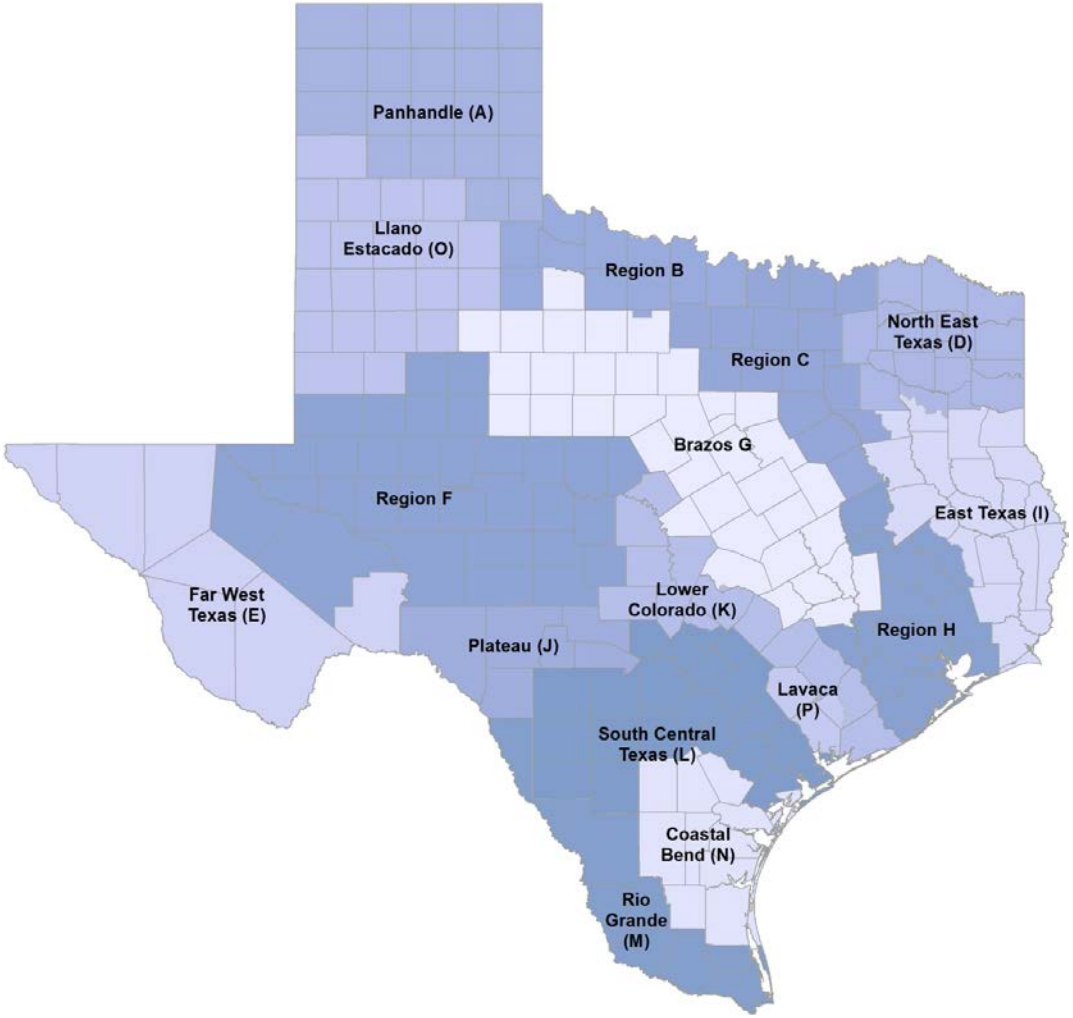
Late 1990s - New Drought of Record?

- $6 billion economic losses in 1996

2010 to present – New Drought of Record?

- $12 billion economic losses
- 115,000 jobs lost

Regional Water Planning

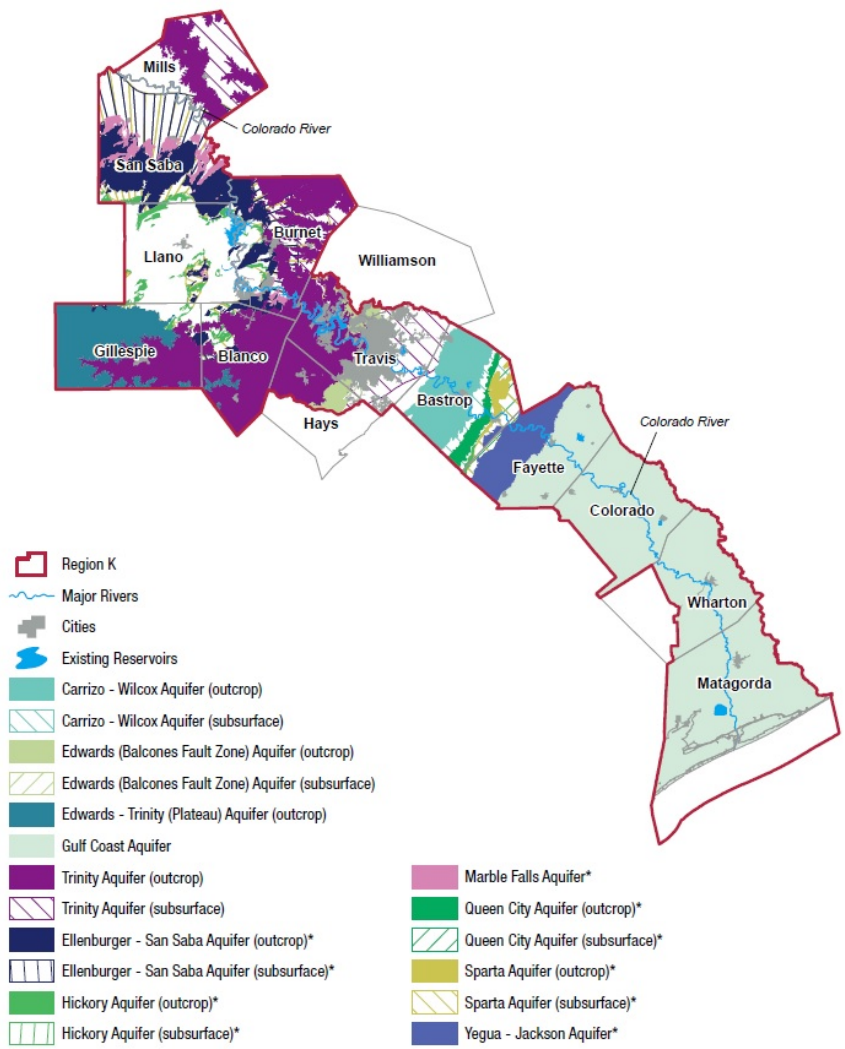


Texas Water Development Board

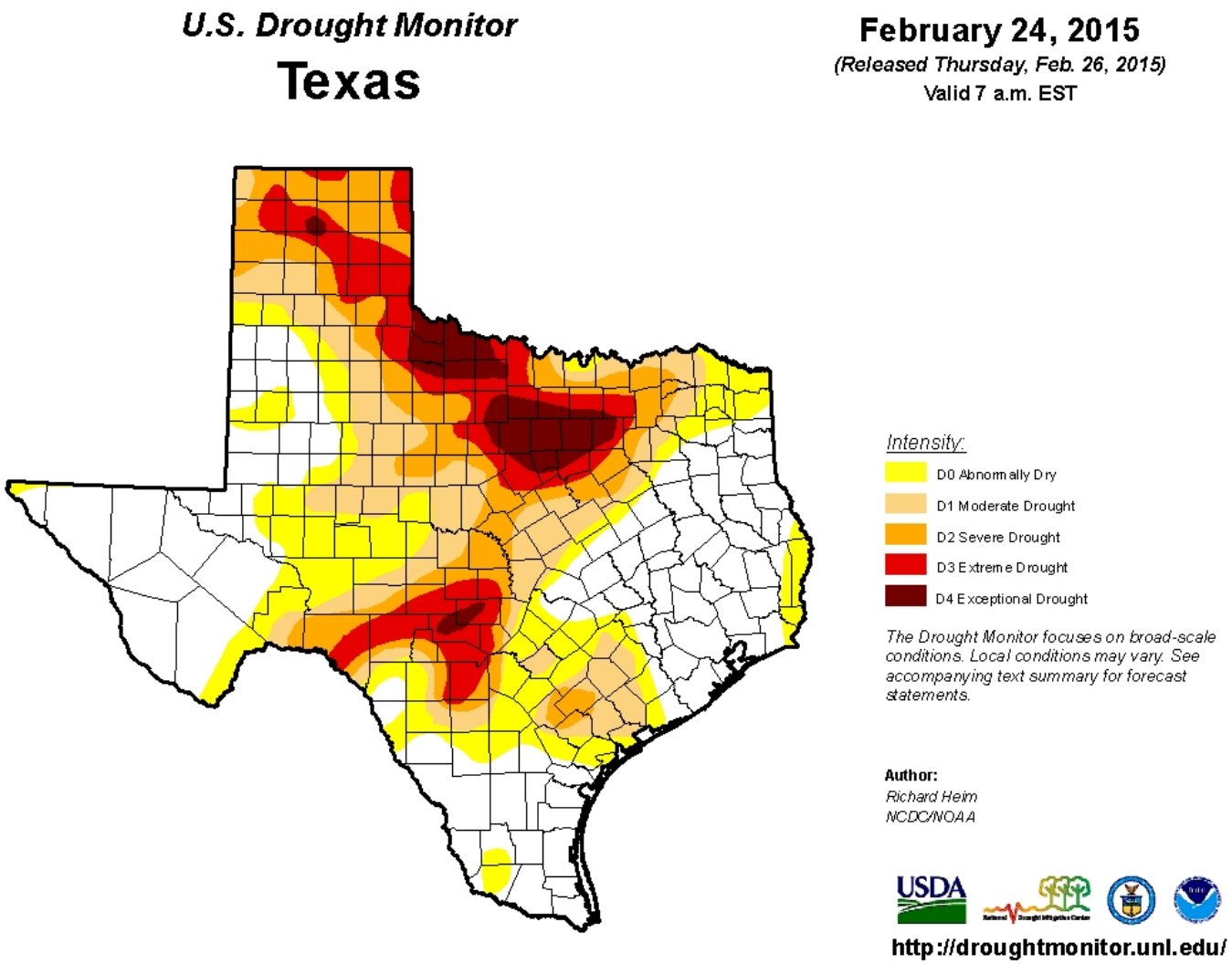
Region K

- 2010 population 1.4M
- 2060 population 2.8M
- *2060 statewide population increase = 82%*
- Water Supply
  - 77% surface water
  - 23% ground water
- 2060 water demand
  - Increase 27%
- *2060 statewide water demand increase= 22%*
  - http://www.myfoxaustin.com/clip/11152332/historic-

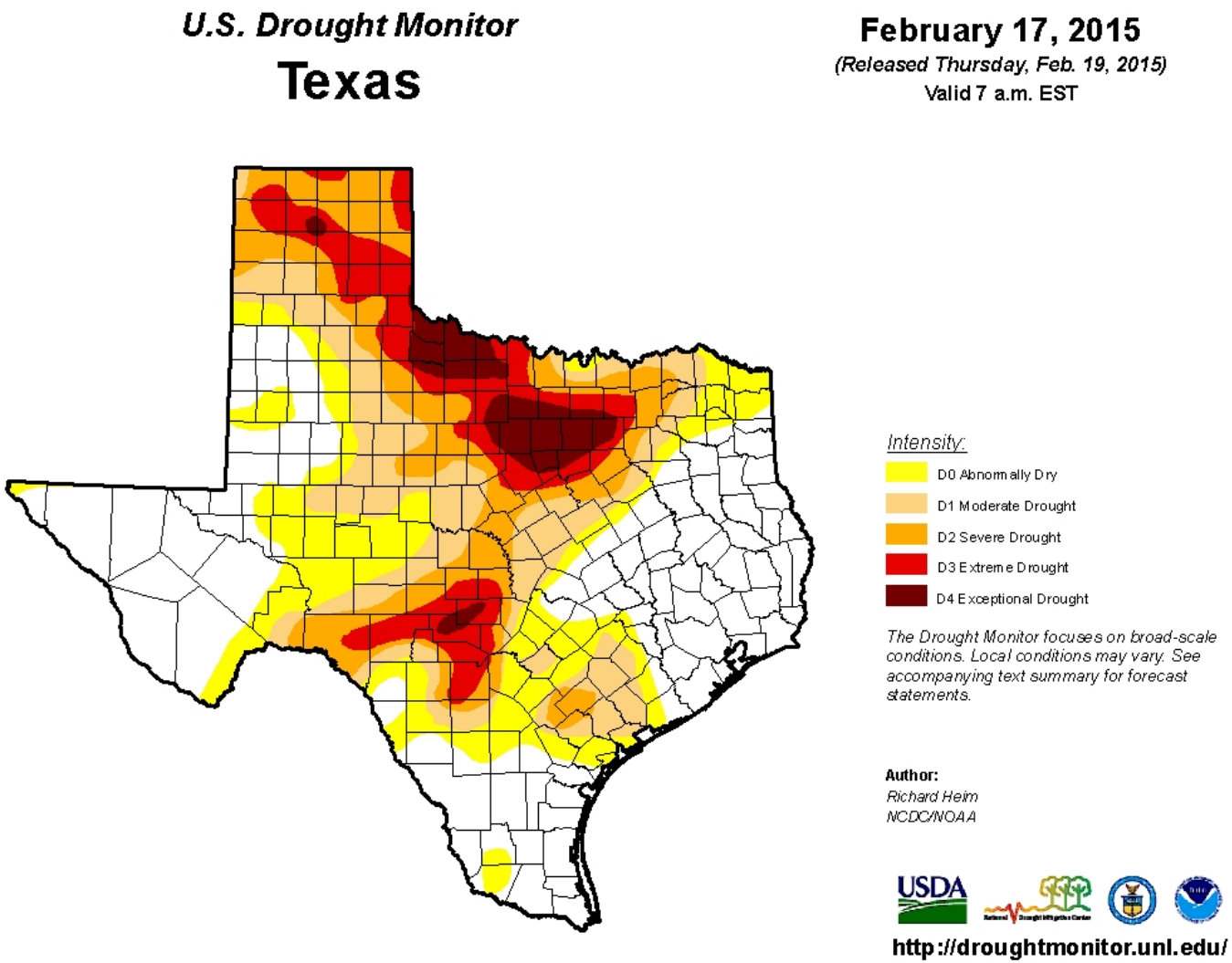
FIGURE K.1. LOWER COLORADO (K) REGIONAL WATER PLANNING AREA.



Texas Drought Report for 2.24.15



Texas Drought Report for 2.17.15



Texas Drought Report for 2.10.15

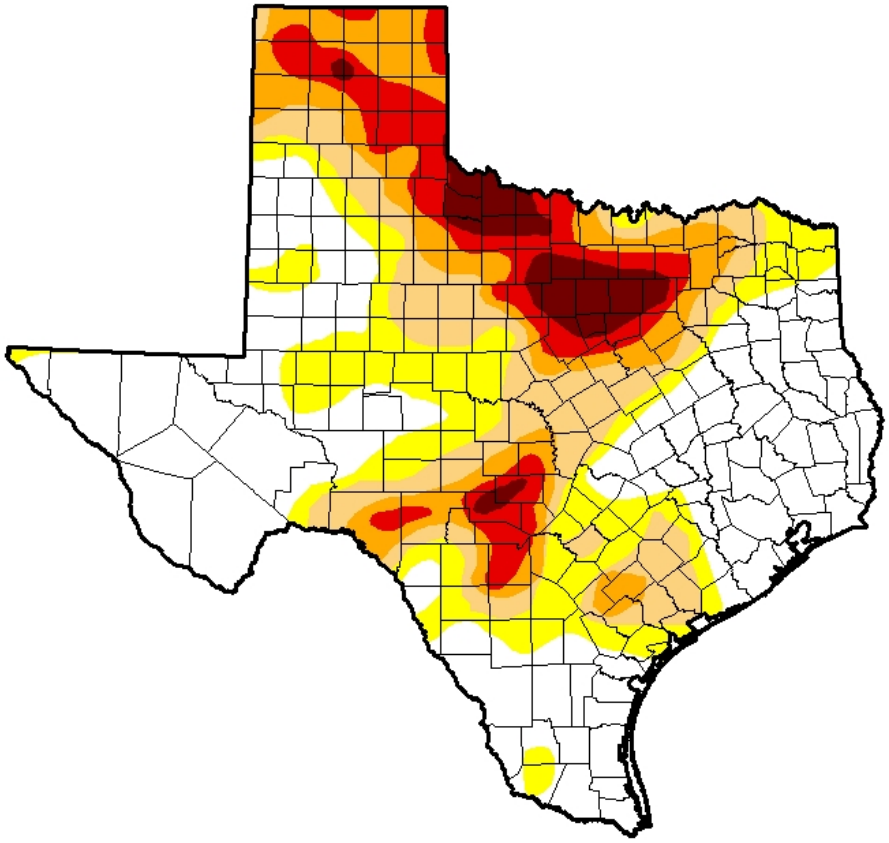
U.S. Drought Monitor

Texas

February 10, 2015

(Released Thursday, Feb. 12, 2015)

Valid 7 a.m. EST



Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
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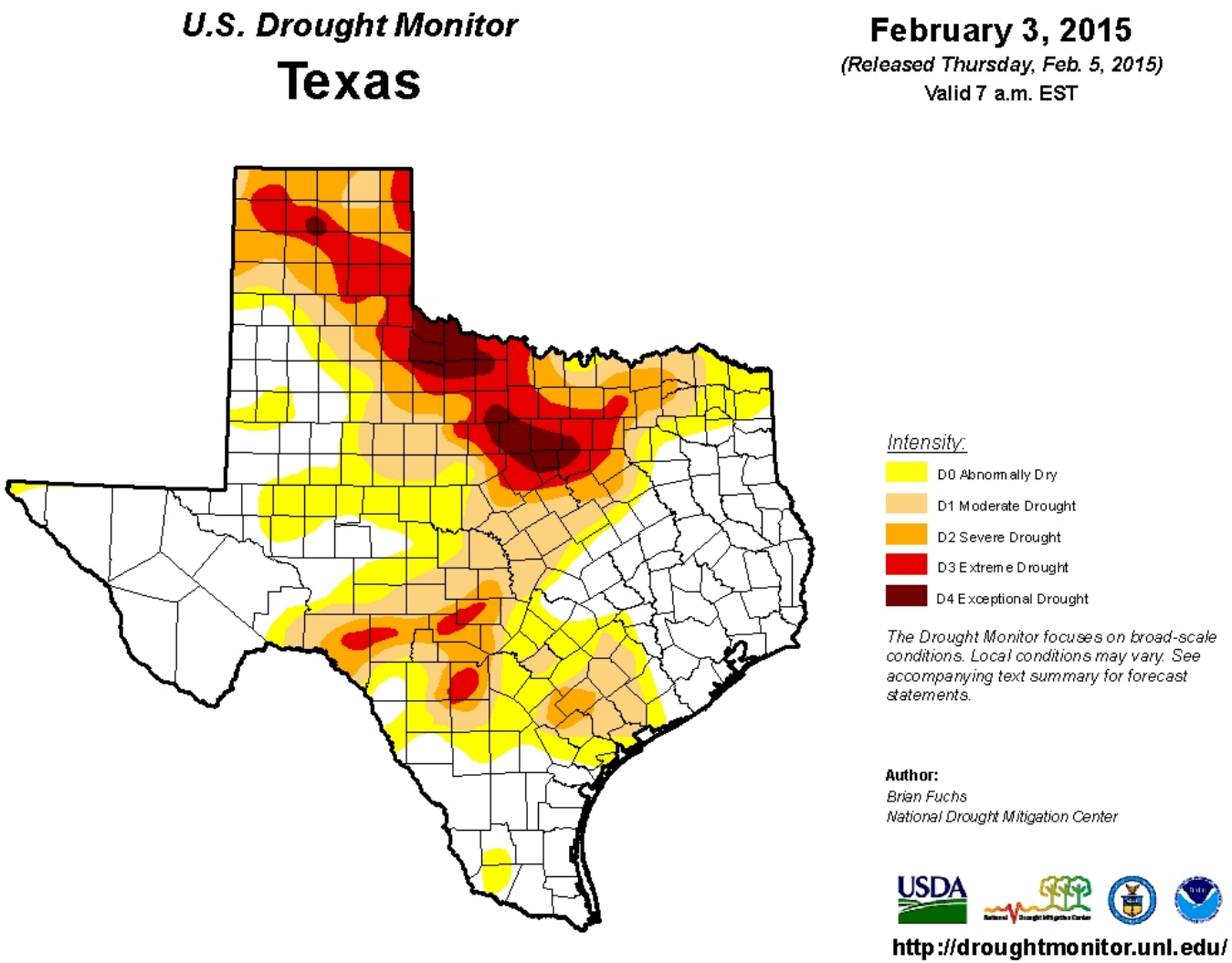
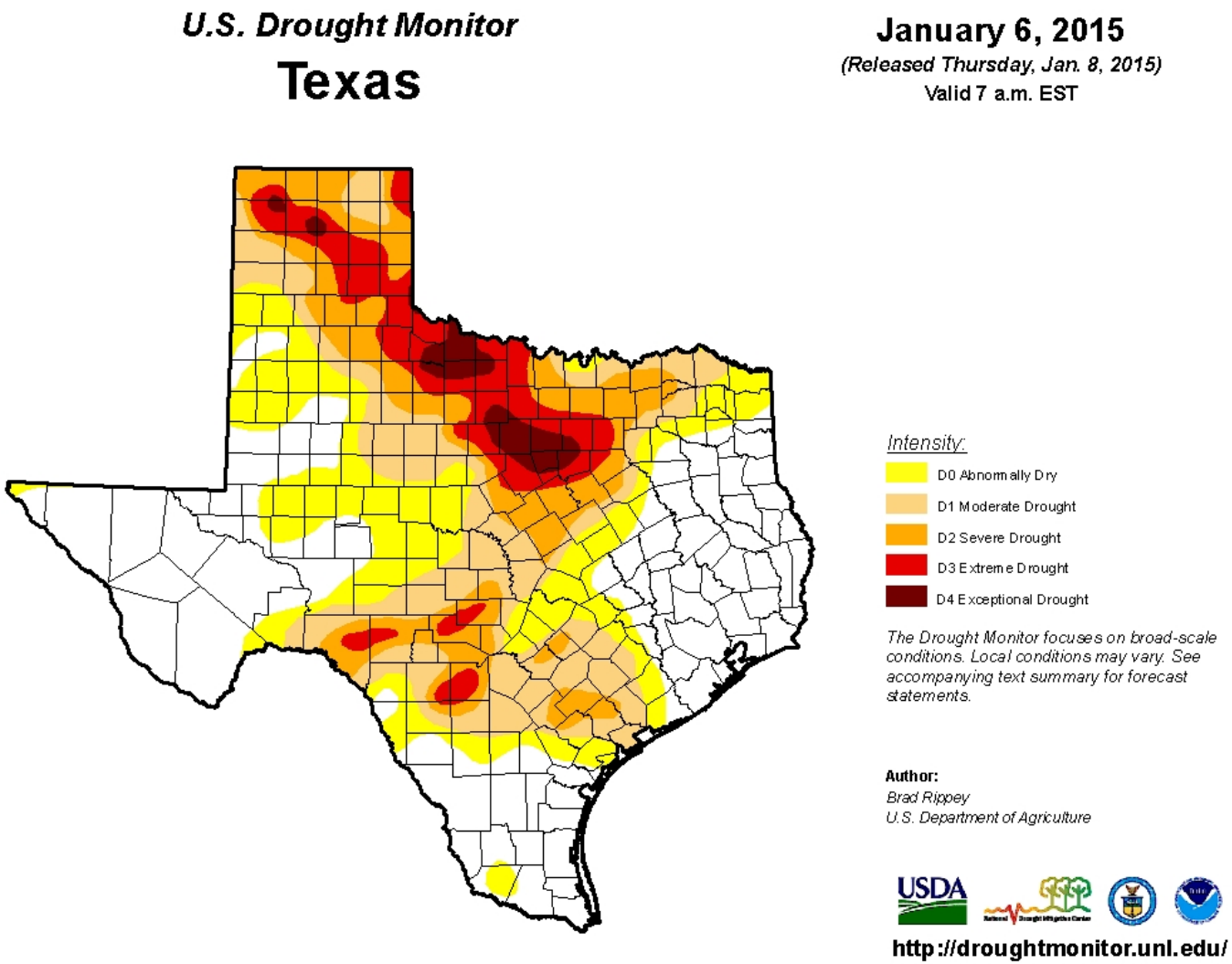
Texas Drought Report for 2.3.15



Texas Drought Report for 1.6.15



Texas Drought Report for 12.2.14

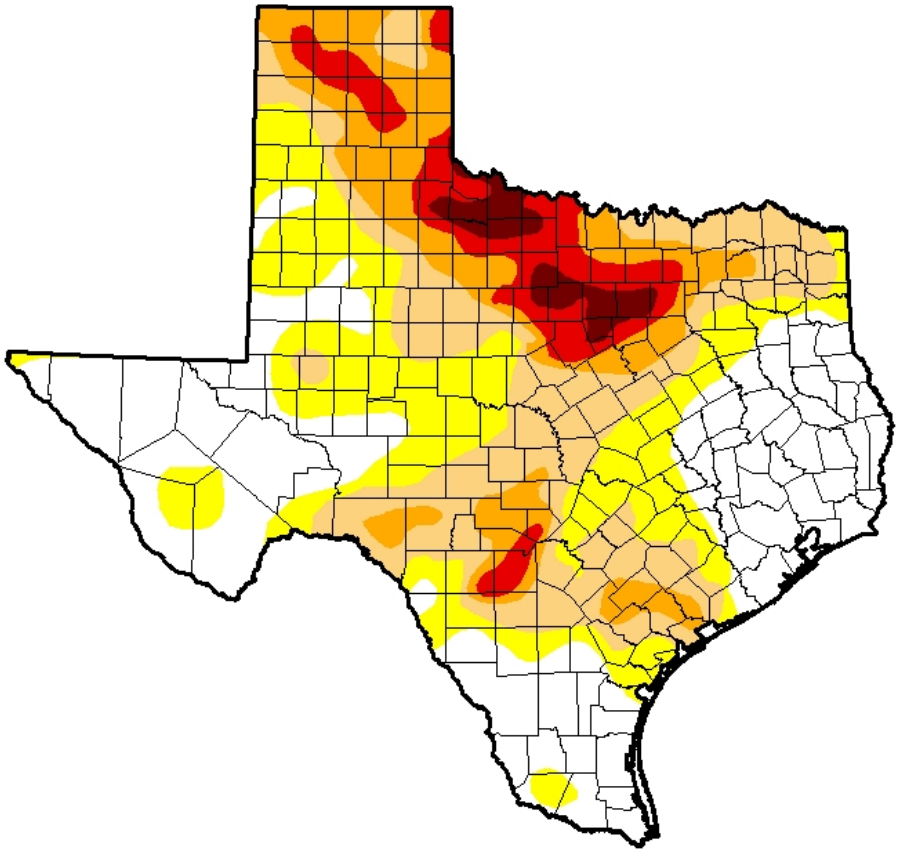
U.S. Drought Monitor

Texas

December 2, 2014

(Released Thursday, Dec. 4, 2014)

Valid 7 a.m. EST



Intensity:

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Author:
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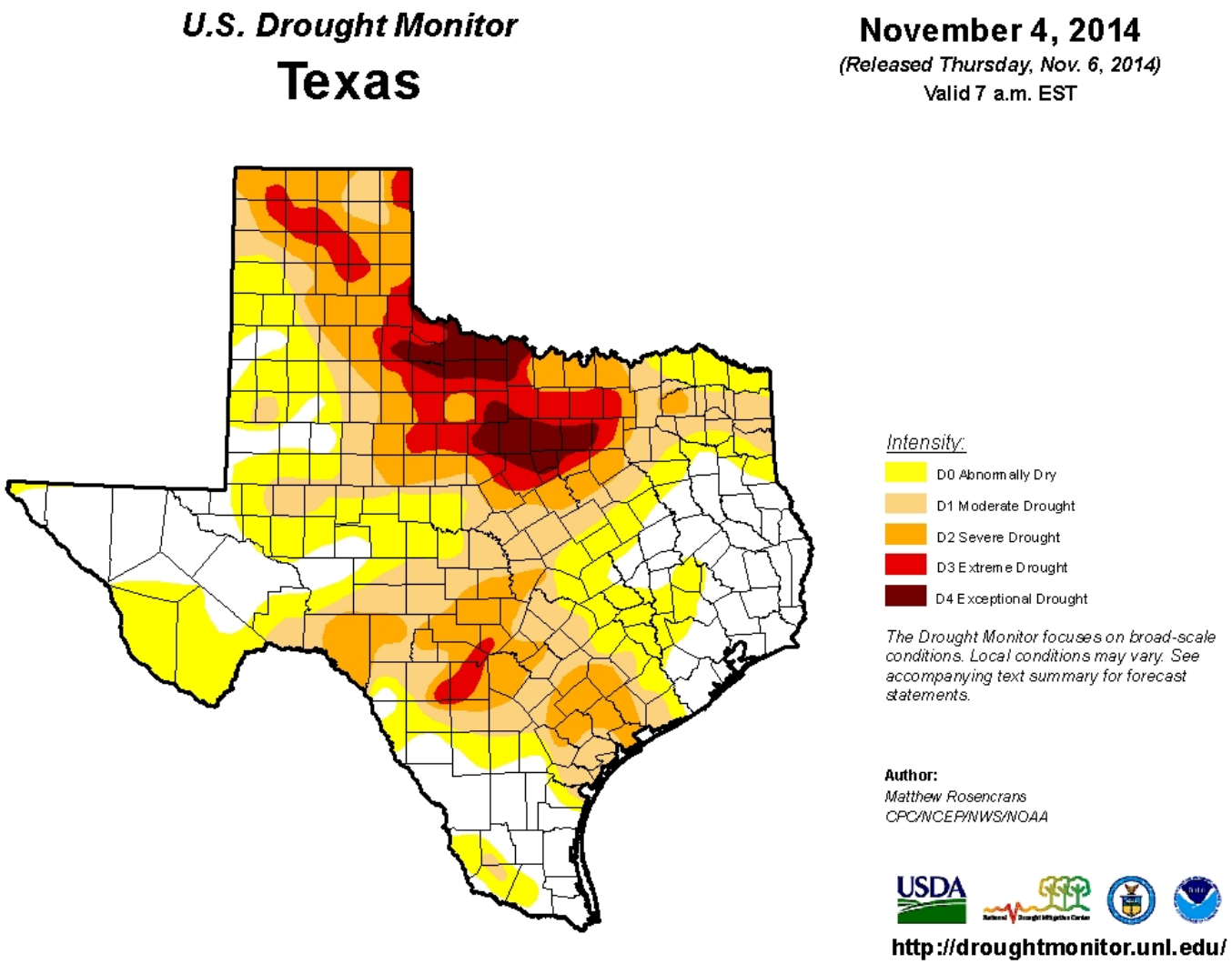
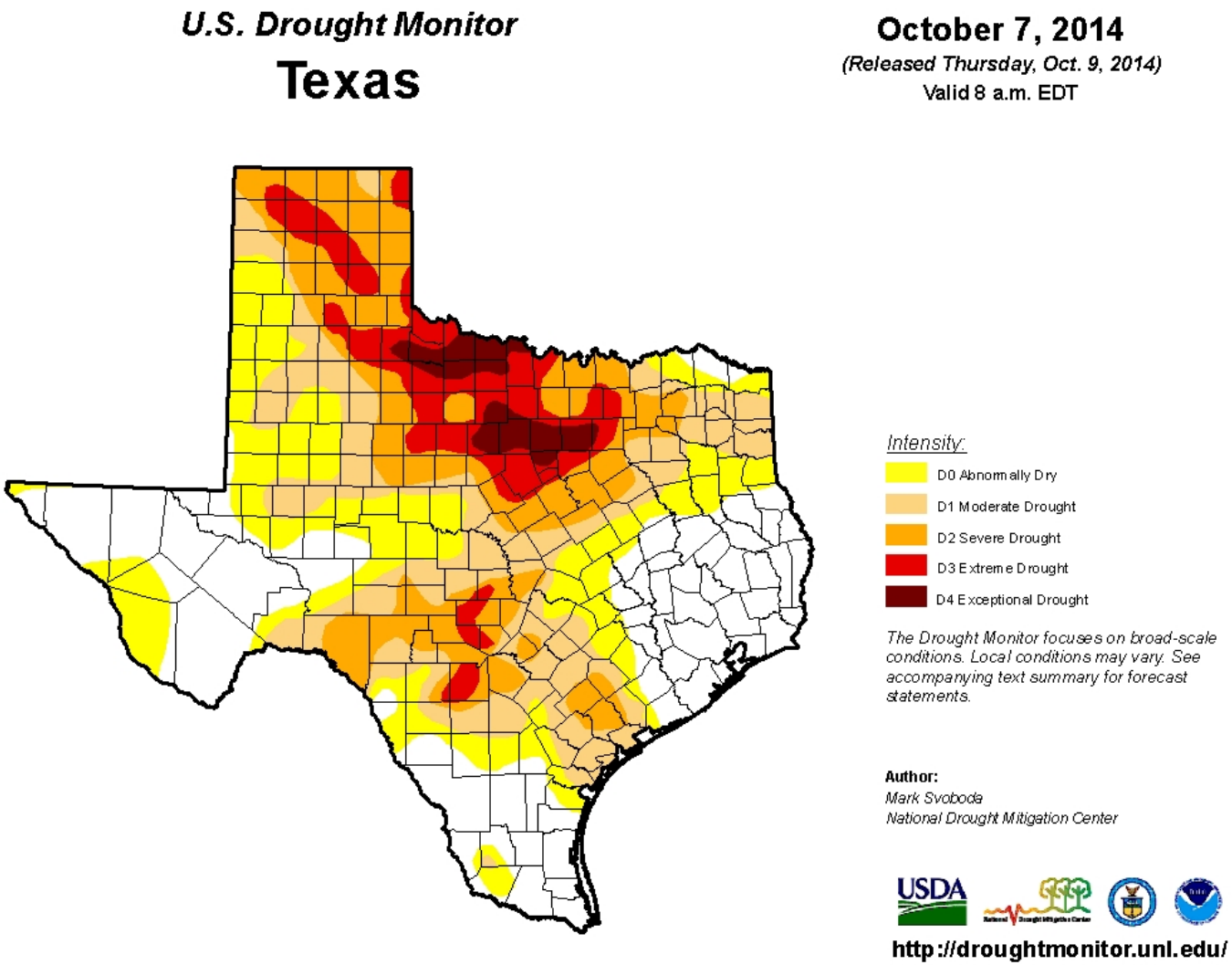
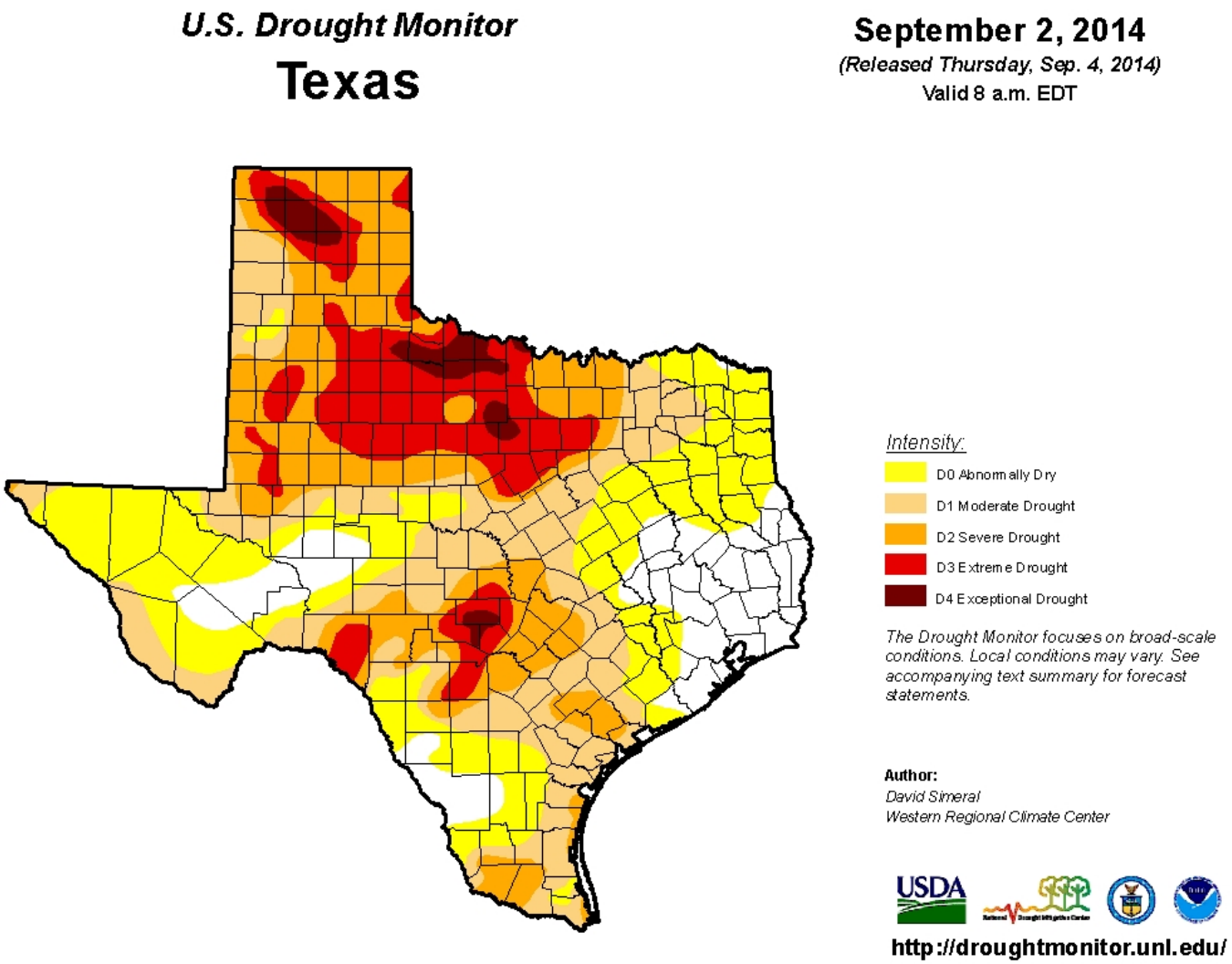
Texas Drought Report for 11.4.14



Texas Drought Report for 10.7.14



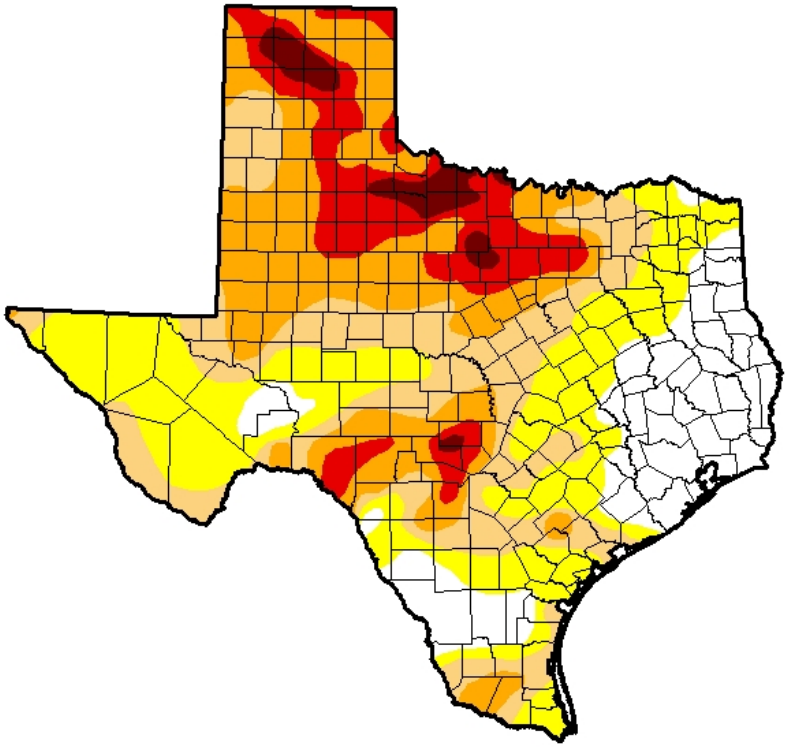
Texas Drought Report for 9.2.14



Texas Drought Report for 8.4.14

U.S. Drought Monitor

Texas



August 5, 2014

(Released Thursday, Aug. 7, 2014)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	17.20	82.80	56.88	35.52	13.67	2.85
Last Week 7/29/2014	15.95	84.05	58.10	32.96	14.29	2.94
3 Months Ago 5/6/2014	5.11	94.89	83.35	65.13	46.17	21.28
Start of Calendar Year 12/31/2013	28.48	71.52	43.84	21.15	5.82	0.79
Start of Water Year 10/1/2013	6.62	93.38	70.95	25.08	4.01	0.12
One Year Ago 8/6/2013	1.72	98.28	88.38	67.69	25.80	6.24

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

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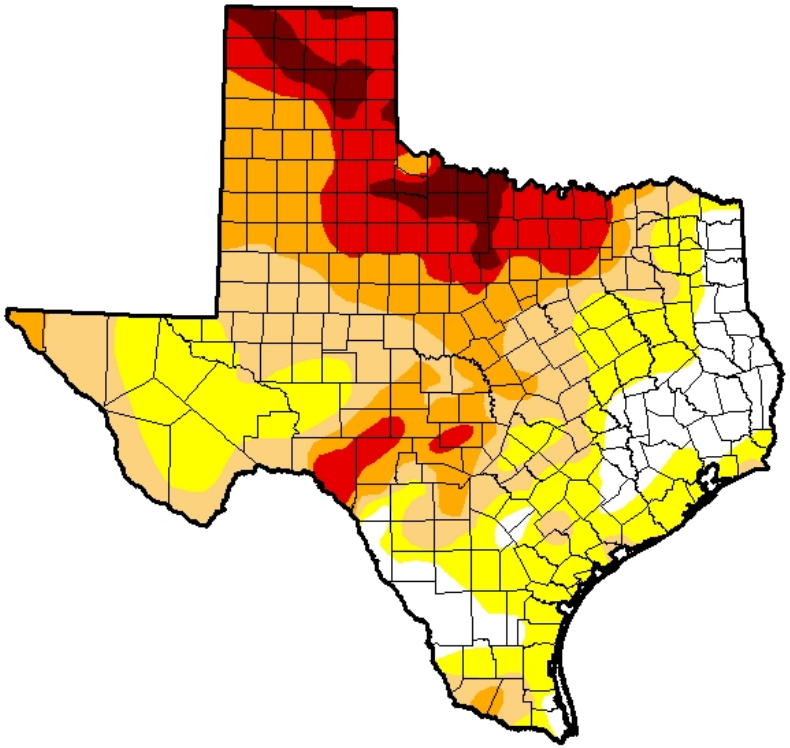
Texas Drought Report for 7.1.14

U.S. Drought Monitor

Texas



July 1, 2014

(Released Thursday, Jul. 3, 2014)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	12.86	87.14	60.44	36.99	18.51	4.76
Last Week 6/24/2014	11.41	88.59	69.00	36.86	19.27	4.95
3 Months Ago 4/1/2014	15.40	84.60	66.80	42.06	27.36	4.42
Start of Calendar Year 12/31/2013	28.48	71.52	43.84	21.15	5.82	0.79
Start of Water Year 10/1/2013	6.62	93.38	70.95	25.08	4.01	0.12
One Year Ago 7/2/2013	1.23	98.77	87.13	68.67	32.63	12.20

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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Author:
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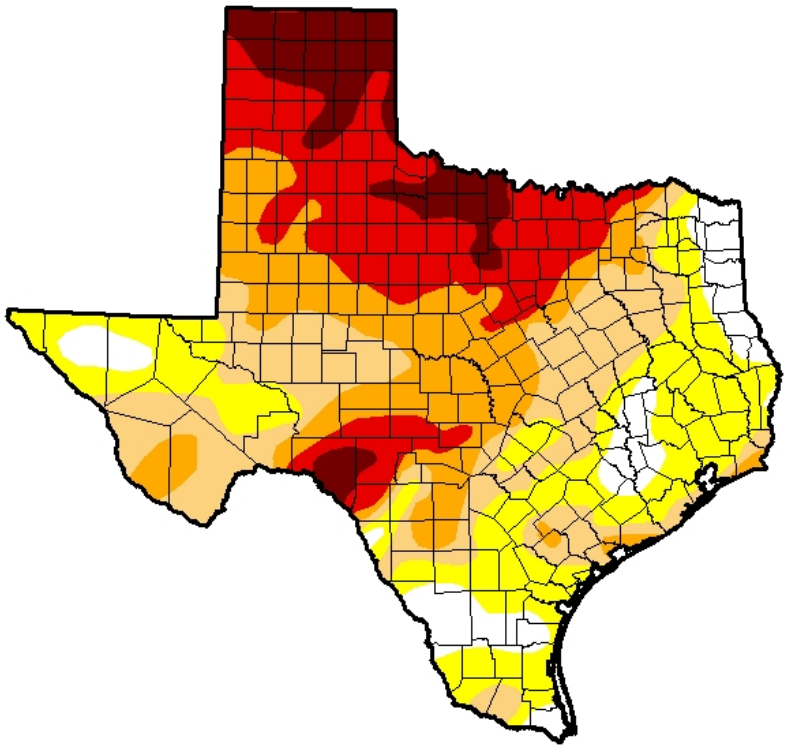
Texas Drought Report for 6.3.14

U.S. Drought Monitor

Texas



June 3, 2014

(Released Thursday, Jun. 5, 2014)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	8.65	91.35	68.20	46.31	27.01	8.66
Last Week *5/27/2014*	10.72	89.28	71.16	49.16	32.81	10.76
3 Months Ago *3/4/2014*	8.95	91.05	67.15	31.38	8.52	1.07
Start of Calendar Year *12/31/2013*	28.48	71.52	43.84	21.15	5.82	0.79
Start of Water Year *10/1/2013*	6.62	93.38	70.95	25.08	4.01	0.12
One Year Ago *6/4/2013*	4.66	95.34	87.38	59.59	33.12	16.47

Intensity:

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- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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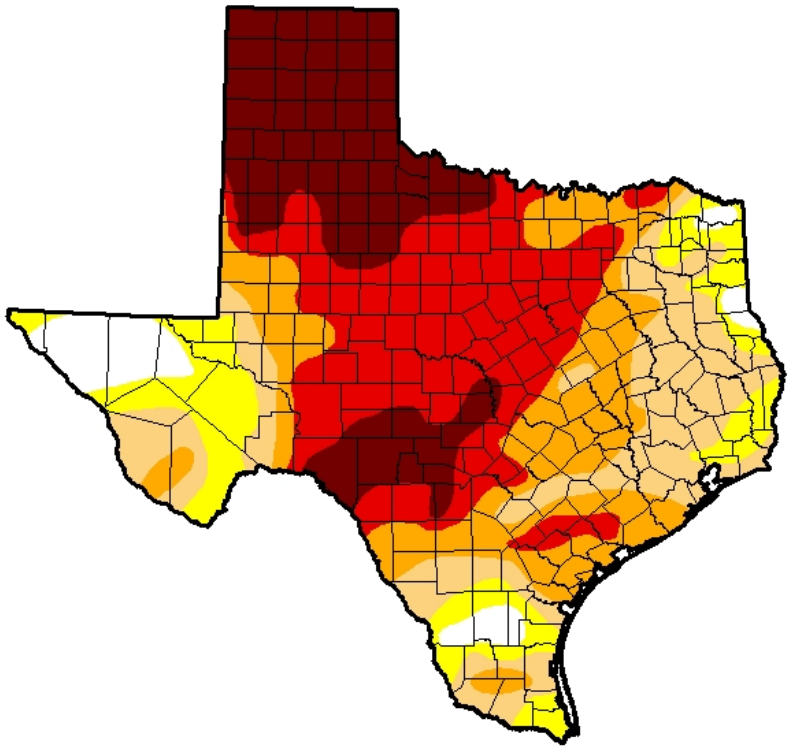
Texas Drought Report for 5.6.14

U.S. Drought Monitor

Texas



May 6, 2014

(Released Thursday, May. 8, 2014)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	5.11	94.89	83.35	65.13	46.17	21.28
Last Week *4/29/2014*	9.88	90.12	74.47	52.91	37.86	17.75
3 Months Ago *2/4/2014*	14.95	85.05	51.68	22.34	7.95	0.71
Start of Calendar Year *12/31/2013*	28.48	71.52	43.84	21.15	5.82	0.79
Start of Water Year *10/1/2013*	6.62	93.38	70.95	25.08	4.01	0.12
One Year Ago *5/7/2013*	1.45	98.55	92.13	72.82	40.58	12.88

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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Author:
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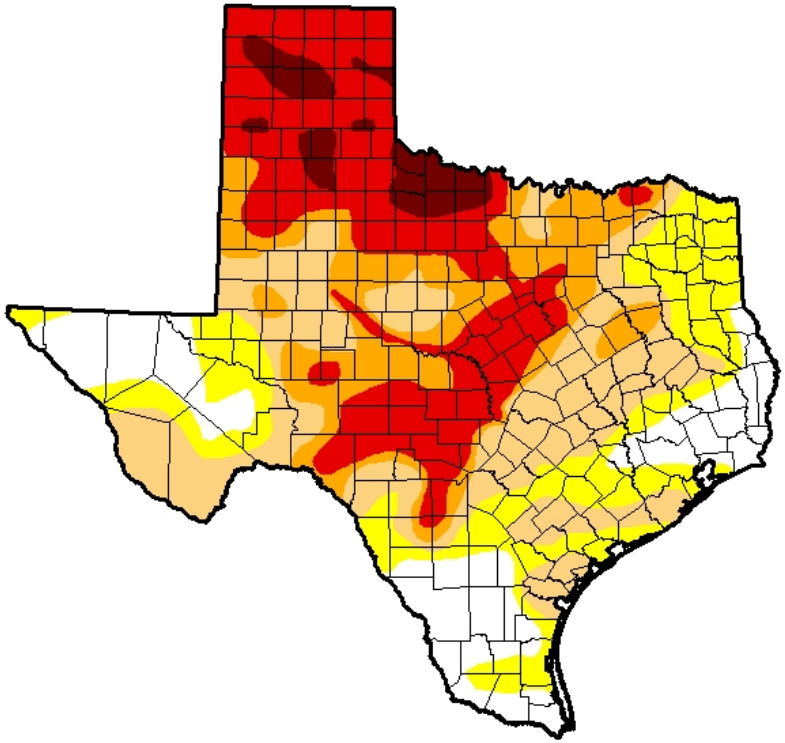
Texas Drought Report for 4.1.14

U.S. Drought Monitor

Texas



April 1, 2014

(Released Thursday, Apr. 3, 2014)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	15.40	84.60	66.80	42.06	27.36	4.42
Last Week *3/25/2014*	14.73	85.27	67.43	41.85	24.97	3.48
3 Months Ago *12/31/2013*	28.48	71.52	43.84	21.15	5.82	0.79
Start of Calendar Year *12/31/2013*	28.48	71.52	43.84	21.15	5.82	0.79
Start of Water Year *10/1/2013*	6.62	93.38	70.95	25.08	4.01	0.12
One Year Ago *4/2/2013*	1.40	98.60	88.21	65.44	32.95	11.81

Intensity:

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Author:
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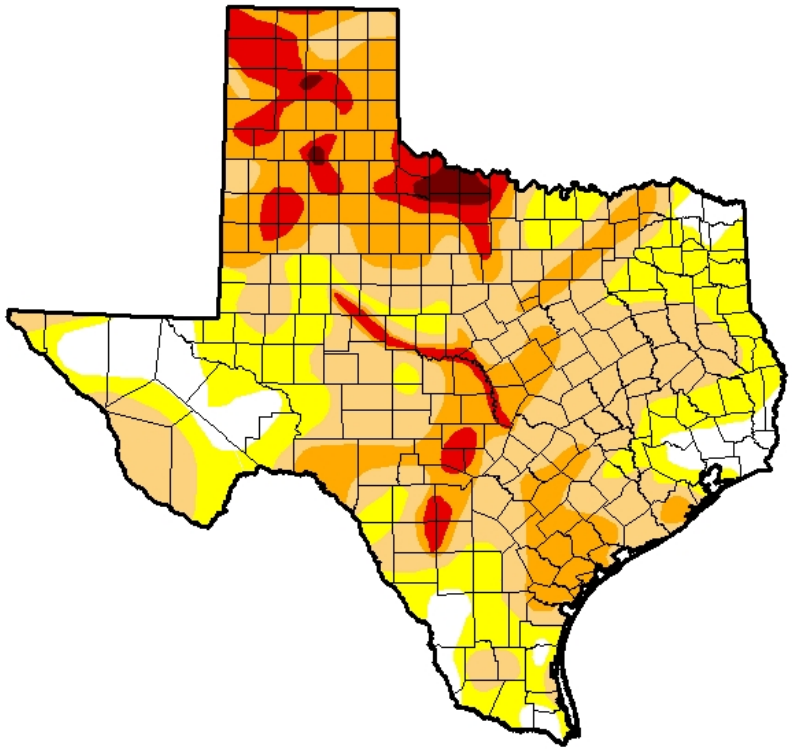
Texas Drought Report for 3.4.14

U.S. Drought Monitor

Texas



March 4, 2014

(Released Thursday, Mar. 6, 2014)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	8.95	91.05	67.15	31.38	8.52	1.07
Last Week *2/25/2014*	7.38	92.62	67.88	33.55	9.45	0.93
3 Months Ago *12/3/2013*	24.58	75.42	47.39	21.29	5.84	0.96
Start of Calendar Year *12/31/2013*	28.48	71.52	43.84	21.15	5.82	0.79
Start of Water Year *10/1/2013*	6.62	93.38	70.95	25.08	4.01	0.12
One Year Ago *3/5/2013*	11.15	88.85	76.29	55.62	23.86	7.41

Intensity:

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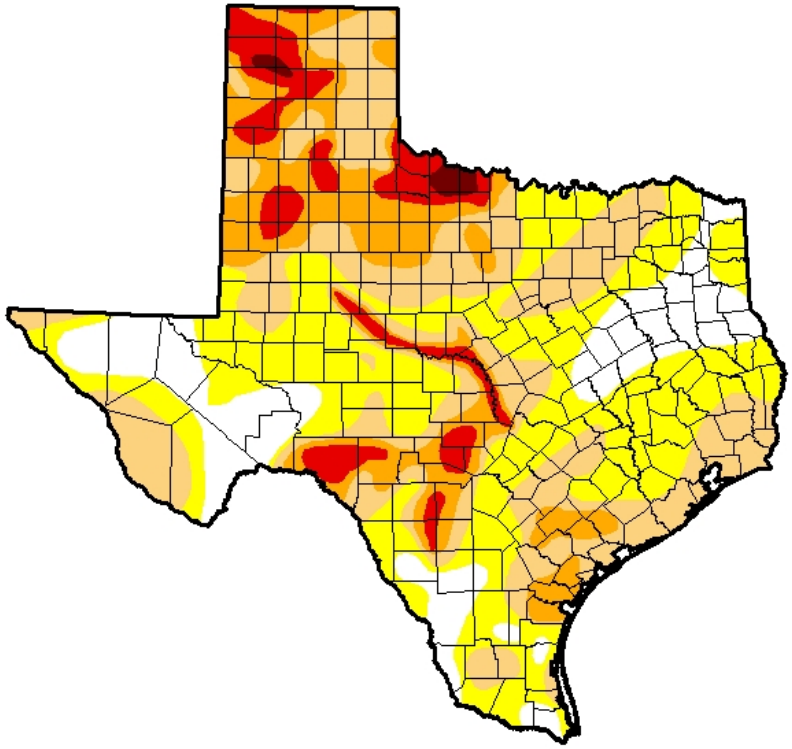
Texas Drought Report for 2.4.14

U.S. Drought Monitor

Texas



February 4, 2014

(Released Thursday, Feb. 6, 2014)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	14.95	85.05	51.68	22.34	7.95	0.71
Last Week *1/28/2014*	19.30	80.70	49.37	22.63	7.14	0.79
3 Months Ago *11/5/2013*	20.07	79.93	50.49	23.61	5.43	0.49
Start of Calendar Year *12/31/2013*	28.48	71.52	43.84	21.15	5.82	0.79
Start of Water Year *10/1/2013*	6.62	93.38	70.95	25.08	4.01	0.12
One Year Ago *2/5/2013*	9.52	90.48	77.26	52.64	23.72	7.79

Intensity:

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Author:

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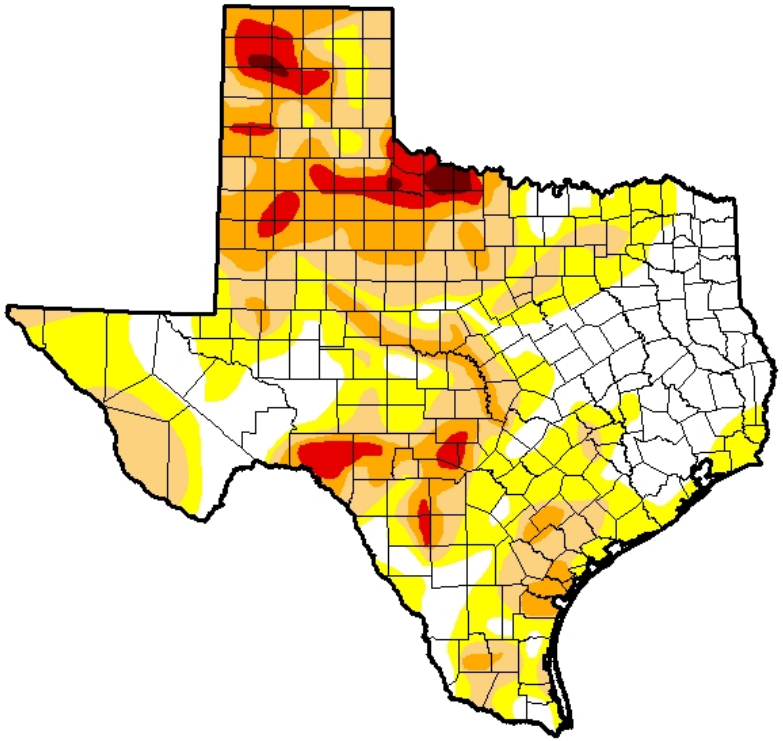
Texas Drought Report for 1.7.14

U.S. Drought Monitor

Texas



January 7, 2014

(Released Thursday, Jan. 9, 2014)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	28.13	71.87	43.89	20.84	5.82	0.79
Last Week *12/31/2013*	28.48	71.52	43.84	21.15	5.82	0.79
3 Months Ago *10/8/2013*	6.60	93.40	70.47	25.41	4.41	0.12
Start of Calendar Year *12/31/2013*	28.48	71.52	43.84	21.15	5.82	0.79
Start of Water Year *10/1/2013*	6.62	93.38	70.95	25.08	4.01	0.12
One Year Ago *1/8/2013*	4.29	95.71	83.78	65.85	34.79	11.41

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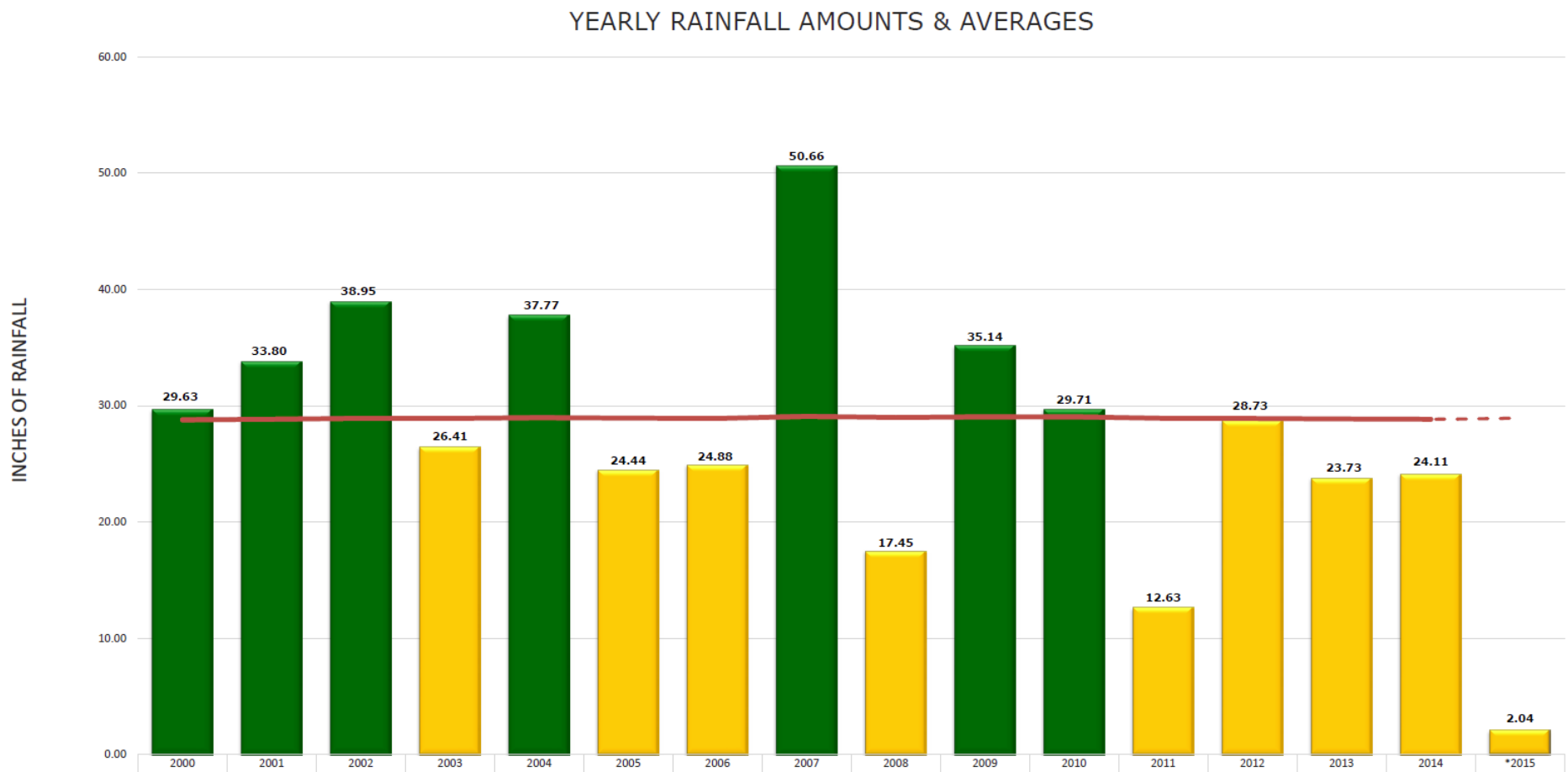
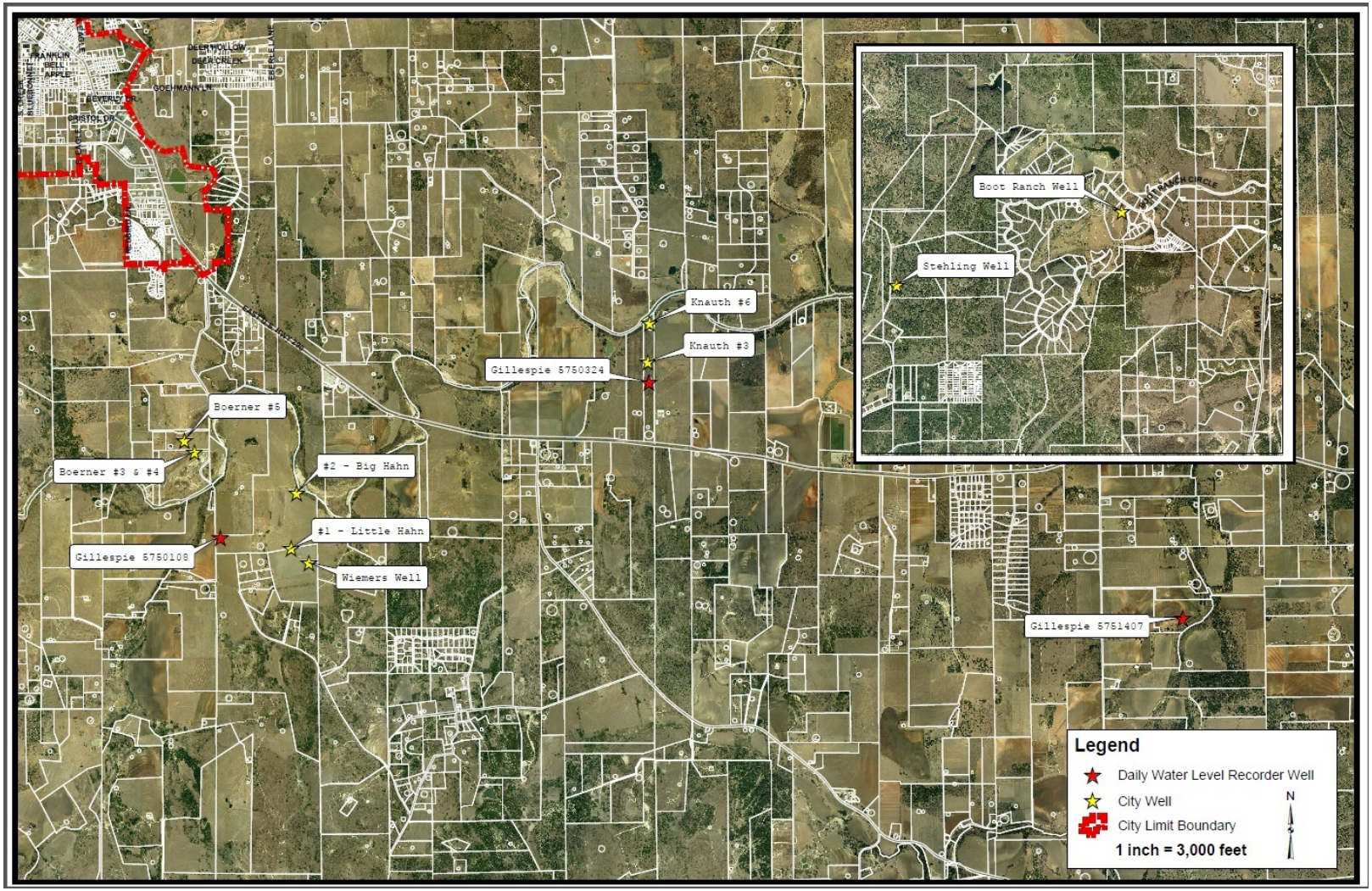
City of Fredericksburg
Historical Rainfall: 2000-2015



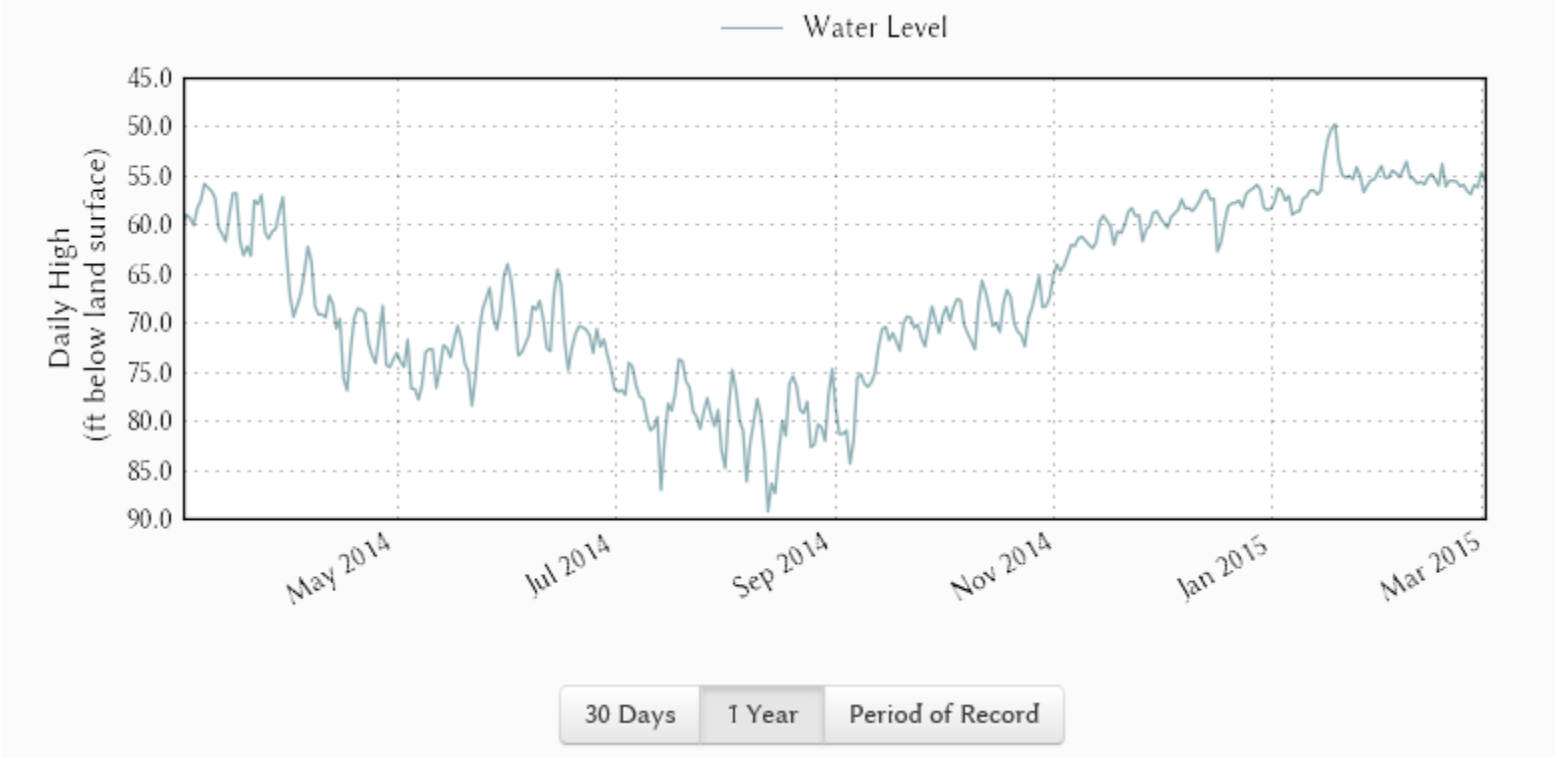
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	*2015
Rainfall Total	29.63	33.80	38.95	26.41	37.77	24.44	24.88	50.66	17.45	35.14	29.71	12.63	28.73	23.73	24.11	2.04
Rainfall Average Since 1877	28.79	28.83	28.92	28.90	28.98	28.94	28.90	29.09	28.99	29.04	29.05	28.91	28.91	28.87	28.83	

* Through January

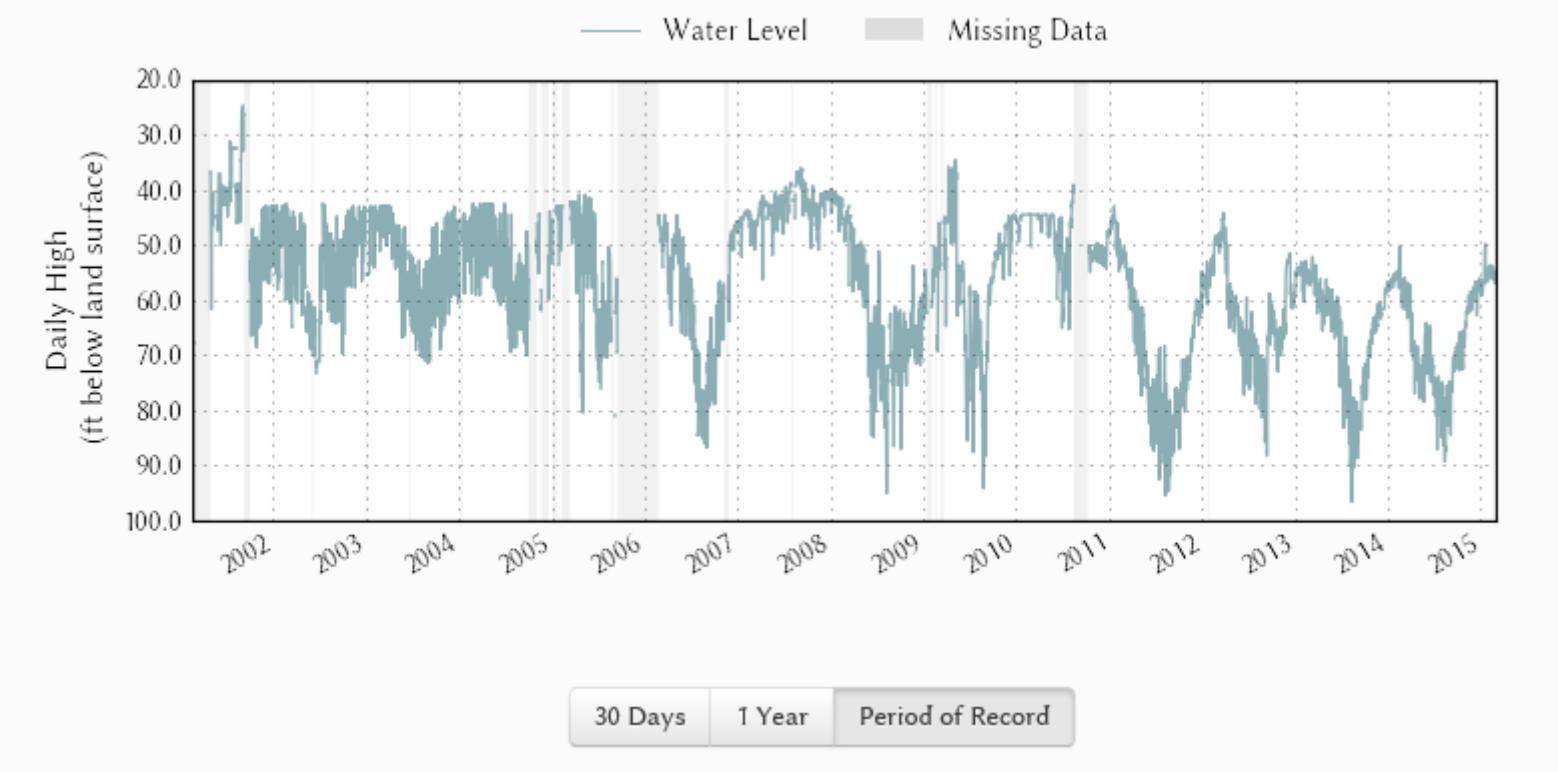
City of Fredericksburg Groundwater Wells



City of Fredericksburg
Knauth Well Field

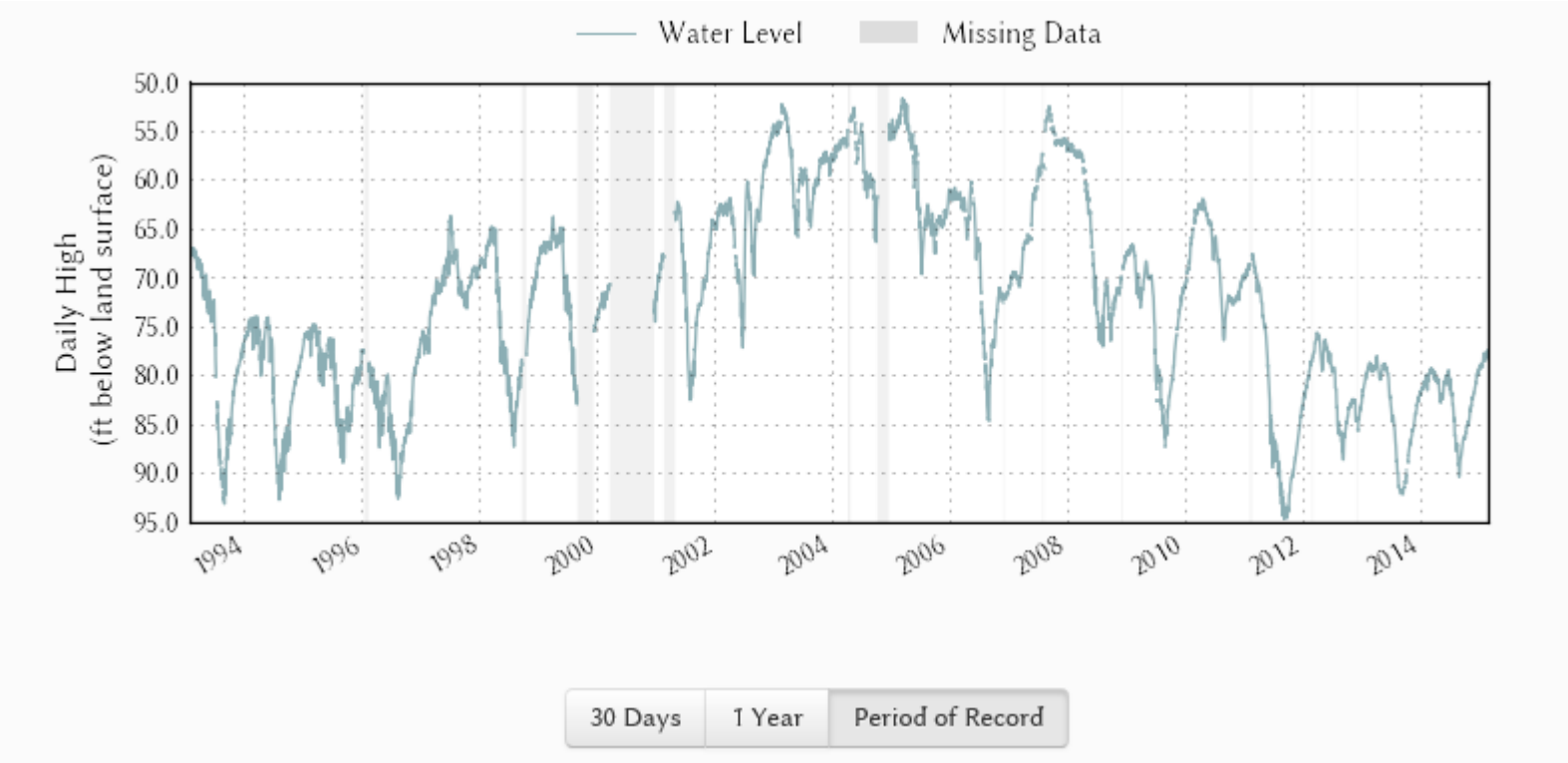


City of Fredericksburg
Knauth Well Field



City of Fredericksburg
Boerner Well Field

City of Fredericksburg
Boerner Well Field



Water Conservation Measures

What are we currently doing to conserve water?

1. Water rate adjustment/increase
2. Watering restrictions
3. AMR “smart” meters
4. Water system leak detection survey
5. Re-use of reclaimed water
6. Water conservation plan
7. Drought contingency plan
8. Public education

Current Water Conservation Measures

1. **Water Rate Adjustment/Increase**

   * New rates went into effect October 1, 2013

   <u>How do new rates encourage water conservation?</u>

   - Higher usage = higher cost/volume of water
   - Commercial sewer rates based on actual water usage

Current Water Conservation Measures

2. Watering Restrictions

- New watering restrictions went into effect May 1, 2014
- 5 stages of watering restrictions
- Goal of each stage is to reduce demand of water
  - Stage 1: 5%
  - Stage 2: 20%
  - Stage 3: 30%
  - Stage 4: 40%
  - Stage 5: 50%

Current Water Conservation Measures

3. AMR "Smart" Meters

- Water meter change-out completed July 15, 2013
- Meter data from new meters includes date/time/amount of usage

Current Water Conservation Measures

4. Water System Leak Detection Survey

- Phases 1-3 completed in February, 2015
- Surveys Included:
  - 130 miles of piping
  - 5,500 service lines
  - 520 fire hydrants
- 75 leaks were identified
- Potential annual losses
  - 50,000,000 gallons
  - 20 day water supply
  - 5% of annual water usage
  - $110,000 in revenue

Current Water Conservation Measures

Historic System Water Losses

- 2010: 12.5% or 103,900,000 gallons
- 2011: 10.4% or 103,998,000 gallons
- 2012: 9.1% or 74,885,000 gallons
- 2013: 8.5% or 66,840,000 gallons
- 2014: 7.0% or 51,953,000 gallons

Based on annual production of 900,000,000 gallons

- Eliminate 5% of losses = 52,000,000 gallons
- @ 200 GPCD = water supply for 712 additional people or 4 years of growth at 1.6% annual compounded growth rate

Current Water Conservation Measures

5. Re-Use of Reclaimed Water

- 500M gallons produced annually (50% of water supply)
- 35-40% currently re-used annually
- 100% re-use within 5 years
- Golf Courses: Boot Ranch and Lady Bird Johnson
- TCEQ 210 permit permitting sale of reclaimed water for construction use
- Fairgrounds
- FISD
- City parks

Current Water Conservation Measures

6. Water Conservation Plan

- 80th Texas Legislative Session
  - SB3, HB3 & HB4 involving state water planning and conservation passed
  - Joint TCEQ/TWDB rules adopted requiring submittal of 5 year water conservation plan for public utilities with over 3,300 connections
- 2014 City Water Conservation Plan Approved by TCEQ and TWDB

Current Water Conservation Measures

7. Drought Contingency Plan

- TCEQ requires all public utilities with over 3,300 connections to submit a Drought Contingency Plan
- Drought Contingency Plans Should Include
  1. Specific quantified targets for water use reductions
  2. Drought response stages
  3. Triggers to begin and end each stage
  4. Supply management measures
  5. Descriptions of drought indicators
  6. Enforcement procedures
  7. Procedures for granting exceptions
  8. Public input to the plan
  9. Ongoing public education
  10. Coordination with regional water planning group

Current Water Conservation Measures

8. Public Education

- Indoor Water Conservation Forum – November 6, 2014
- Outdoor Water Conservation Forum – April 9, 2015

City of Fredericksburg Water Demand

City of Fredericksburg Water Distribution System

- 9 production wells
- Total well field production capacity: 8.2MGD
- Total capacity to deliver water to system: 5.8 MGD

Water Demands

- Year 2000
  - Population: 8,911
  - Average daily water use: 2.2 million gallons per day (MGD)
  - Total annual water production: 813,950,000 gallons
  - Per capita water use: 250 GPCD

City of Fredericksburg Water Demand

Water Demands

- Year 2013
  - Population: 11,598
  - Average daily water use: 2.5 MGD
  - Total annual water production: 912,500,000 gallons
  - Per capita water use: 215 GPCD
- Year 2014
  - Population: 11,784
  - Average daily water use: 2.03 MGD
  - Total annual water production: 742,190,000 gallons
  - Per capita water use: 172 GPCD

City of Fredericksburg Water Demand

Future Water Demands

- Year 2020
  - Population: 12,961
  - Per capita water use: 216 GPCD
  - Average daily water use: 2.8 MGD
  - Maximum daily water use: 2 x 2.8 = 5.6 MGD
  - Total annual water production: 1,025,127,246 gallons
- Year 2070
  - Population: 15,083
  - Per capita water use: 240 GPCD
  - Average daily water use: 3.6 MGD
  - Maximum daily water use: 2 x 3.6 = 7.2 MGD
  - Total annual water production: 1,322,303,358 gallons

Drought Response Stages

Trigger Conditions

1. Drought response stages 1-5 correspond to "Local Drought Index"
2. Stage of the Local Drought Index based on local drought sensitive parameters
   1. Daily Average water levels from two Ellenburger aquifer wells
   2. Average daily flow of the Pedernales River
   3. Prior 10-month cumulative rainfall amount
   4. Palmer Drought Index
3. Pumping capacity of pumps that transfer water into the City's distribution system
4. Decrease in well field production capacity

Initiation and Termination of Stages by City Manager proclamation by May 1st of each year

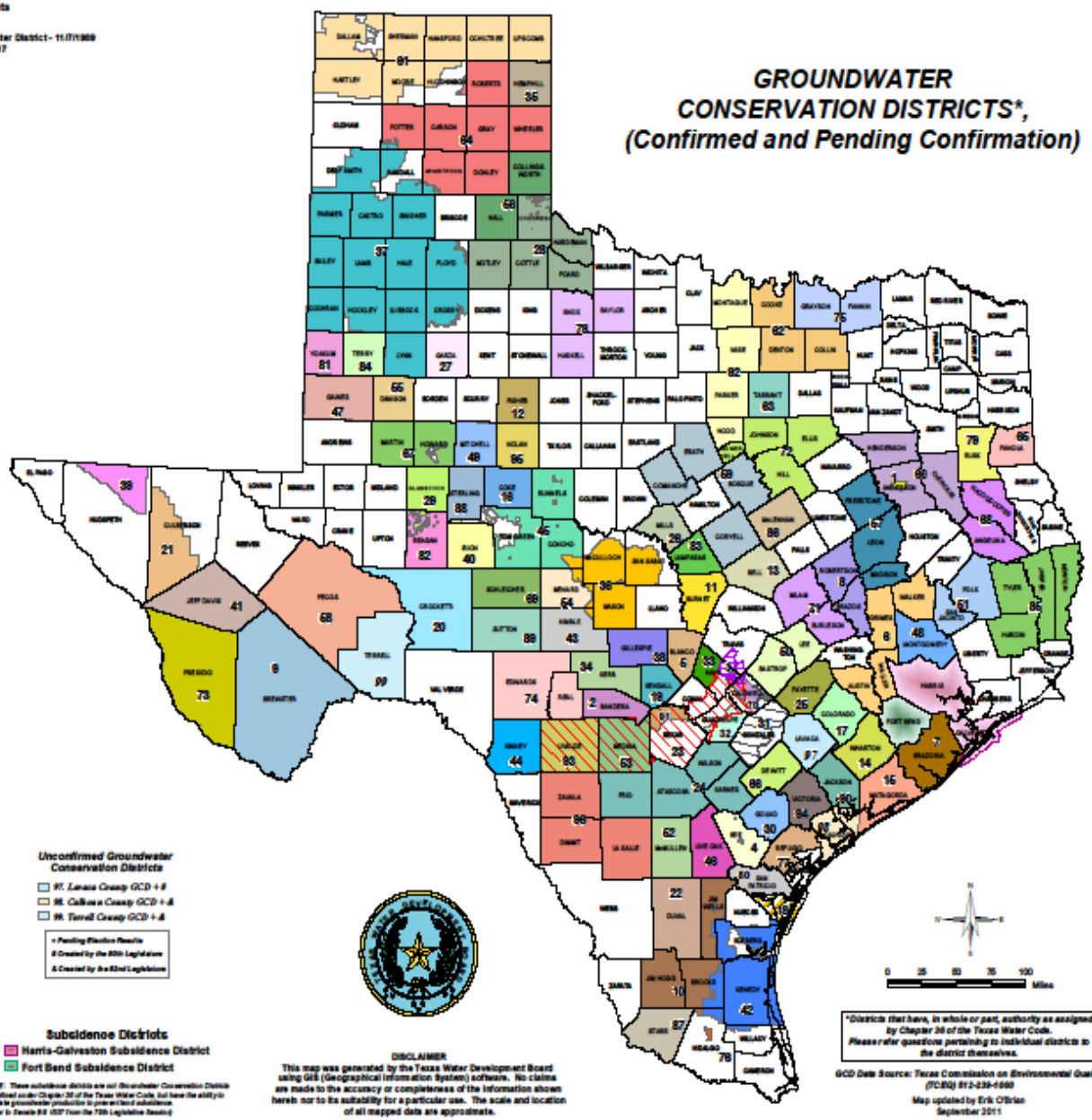
Current Watering Restrictions

Stage 3 – severe conditions: Watering Days/Times

Stage	Last Digit of Address	Watering Day	Weekends	Watering Times
3	1 or 2 3 or 4 5 or 6 7 or 8 9 or 0	Mon Tues Wed Thurs Fri	Yes but with handheld hose, bucket or drip only	5-9 a.m. 7-11 p.m.

Stage	Last Digit of Address	Watering Day	Weekends	Watering Times
1	All	Mon. – Sun.	Yes	5-9 a.m. 7-11 p.m.
2	1 or 2 3 or 4 5 or 6 7 or 8 9 or 0	Mon & Sat Tues & Sat Wed & Sun Thurs & Sun Fri & Sun	Yes	5-9 a.m. 7-11 p.m.
3	1 or 2 3 or 4 5 or 6 7 or 8 9 or 0	Mon Tues Wed Thurs Fri	Yes but with handheld hose, bucket or drip only	5-9 a.m. 7-11 p.m.
4	1 or 2 3 or 4 5 or 6 7 or 8 9 or 0	Mon Tues Wed Thurs Fri	Yes but with handheld hose, bucket or drip only	7-11 p.m.
5	All	None	No	None

GROUNDWATER CONSERVATION DISTRICTS*, (Confirmed and Pending Confirmation)



Confirmed Groundwater Conservation Districts

1. Anderson County UWCD - 10/17/1987
2. Bandera County River Authority & Ground Water District - 11/7/1989
3. Barton Springs/Edwards Aquifer CD - 8/13/1987
4. Bee GCD - 1/20/2001
5. Blanco-Pedernales GCD - 1/23/2001
6. Bluebonnet GCD - 11/6/2002
7. Brazoria County GCD - 11/6/2006
8. Brazos Valley GCD - 11/6/2002
9. Brewster County GCD - 11/6/2001
10. Brush Country GCD - 11/3/2009
11. Central Texas GCD - 8/24/2006
12. Clear Fork GCD - 11/6/2002
13. Clearwater UWCD - 8/21/1999
14. Coastal Bend GCD - 11/6/2001
15. Coastal Plains GCD - 11/6/2001
16. Coke County UWCD - 11/6/1996
17. Colorado County GCD - 11/6/2007
18. Corpus Christi A&RCD - 6/17/2006
19. Cow Creek GCD - 11/5/2002
20. Crockett County GCD - 1/26/1991
21. Culberson County GCD - 8/2/1999
22. Duval County GCD - 7/26/2009
23. Edwards Aquifer Authority - 7/2/1996
24. Evergreen UWCD - 8/30/1988
25. Fayette County GCD - 11/6/2001
26. Fox Crossing Water District - 4/4/1996
27. Garza County UWCD - 11/5/1996
28. Gateway GCD - 5/5/2005
29. Glasscock GCD - 8/23/1991
30. Goliad County GCD - 11/6/2001
31. Gonzales County UWCD - 11/3/1994
32. Guadalupe County GCD - 11/14/1999
33. Hays Trinity GCD - 5/5/2005
34. Headwaters GCD - 11/5/1991
35. Hemphill County UWCD - 11/6/1997
36. Hickory UWCD No. 1 - 8/14/1982
37. High Plains UWCD No.1 - 9/29/1951
38. Hill Country UWCD - 5/8/1987
39. Hudspeth County UWCD No. 1 - 10/6/1987
40. Iron County WCD - 8/2/1985
41. Jeff Davis County UWCD - 11/2/1993
42. Kenedy County GCD - 11/3/2004
43. Kimble County GCD - 5/3/2002
44. Kinney County GCD - 1/13/2002
45. Upper-Kickapoo WCD - 11/5/1987
46. Live Oak UWCD - 11/7/1989
47. Llano Estacado UWCD - 11/5/1996
48. Lone Star GCD - 11/6/2001
49. Lone Wolf GCD - 2/2/2002
50. Lost Pines GCD - 11/6/2002
51. Lower Trinity GCD - 11/7/2006
52. McMullen GCD - 11/6/2001
53. Medina County GCD - 8/26/1991
54. Menard County UWD - 8/14/1999
55. Mesa UWCD - 1/20/1989
56. Mesquite GCD - 11/4/1986
57. Mid-East Texas GCD - 11/5/2002
58. Middle Pecos GCD - 11/5/2002
59. Middle Trinity GCD - 5/4/2002
60. Neches & Trinity Valleys GCD - 11/6/2001
61. North Plains GCD - 1/2/1955
62. North Texas GCD - 12/1/2009
63. Northern Trinity GCD - 5/15/2007
64. Panhandle GCD - 1/21/1956
65. Panola County GCD - 11/6/2007
66. Pecan Valley GCD - 11/6/2001
67. Permian Basin UWCD - 8/21/1985
68. Pineywoods GCD - 11/6/2001
69. Plateau UWC and Supply District - 3/4/1974
70. Plum Creek CD - 8/1/1993
71. Post Oak Savannah GCD - 11/5/2002
72. Prairielands GCD - 8/1/2009
73. Presidio County UWCD - 8/31/1989
74. Real-Edwards C and R District - 8/30/1989
75. Red River GCD - 8/1/2009
76. Red Sands GCD - 11/5/2002
77. Refugio GCD - 11/6/2001
78. Rolling Plains GCD - 1/28/1989
79. Rusk County GCD - 8/8/2004
80. San Patricio County GCD - 8/12/2007
81. Sandy Land UWCD - 11/7/1989
82. Santa Rita UWCD - 8/19/1989
83. Saratoga UWCD - 11/7/1989
84. South Plains UWCD - 2/8/1992
85. Southeast Texas GCD - 11/3/2004
86. Southern Trinity GCD - 6/16/2009
87. Starr County GCD - 1/8/2007
88. Sterling County UWCD - 11/3/1997
89. Sutton County UWCD - 4/8/1998
90. Texana GCD - 11/6/2001
91. Trinity Glen Rose GCD - 11/5/2002
92. Upper Trinity GCD - 11/6/2007
93. Uvalde County UWCD - 9/11/1993
94. Victoria County GCD - 8/8/2005
95. Wes-Tex GCD - 11/5/2002
96. Wintergarden GCD - 1/17/1989

Unconfirmed Groundwater Conservation Districts

97. W. Lavaca County GCD + #
98. W. Calhoun County GCD + #
99. W. Terrell County GCD + #

+ Pending Election Results
# Created by the 80th Legislature
& Created by the 82nd 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 75th Legislative Session)

DISCLAIMER

This map was generated by the Texas Water Development Board using GIS (Geographical 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.

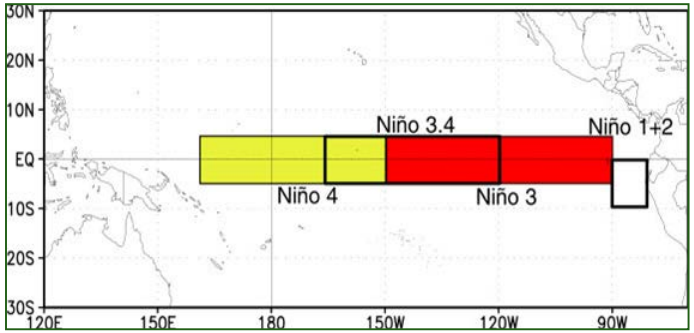
*Districts that have, in whole or part, authority as assigned by Chapter 36 of the Texas Water Code. Please refer questions pertaining to individual districts to the district themselves.

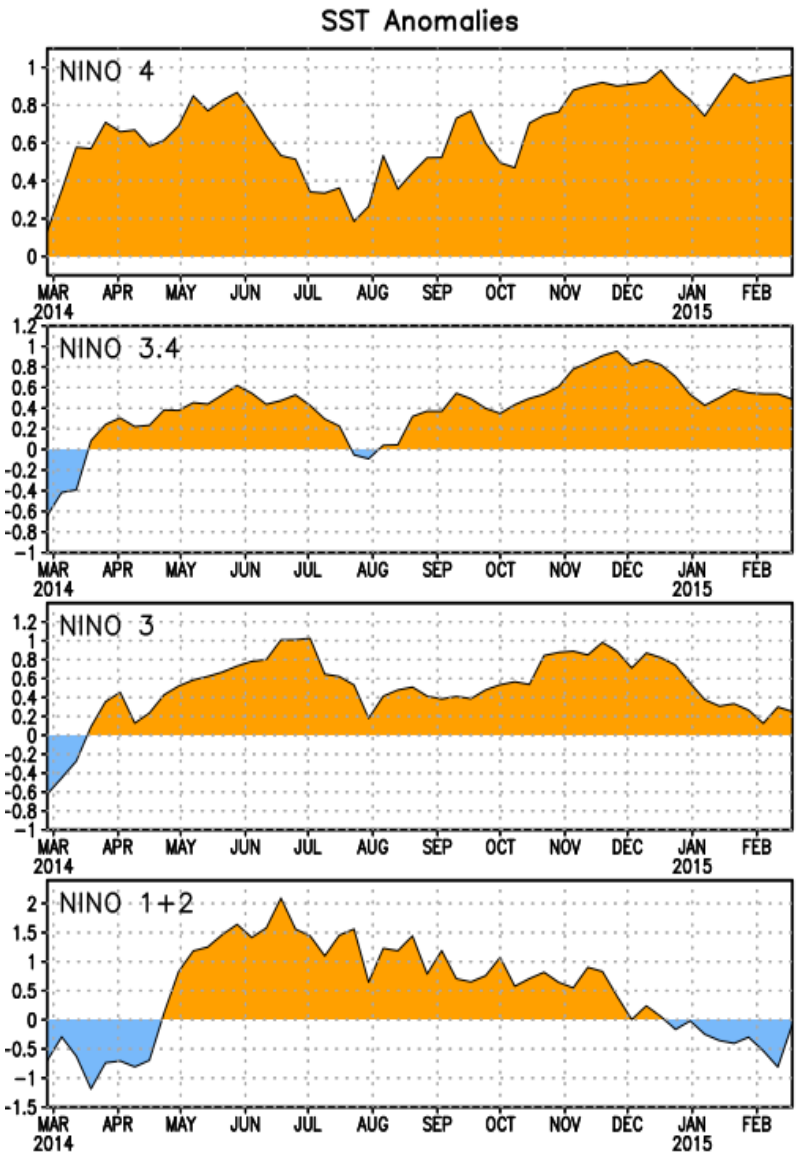
GCD Data Source: Texas Commission on Environmental Quality (TCEQ) 512-239-1000

Map updated by Erik O'Brien September 2011

Niño Region SST Departures (ºC) Recent Evolution

The latest weekly SST departures are:





Historical El Niño and La Niña Episodes Based on the ONI computed using ERSST.v3b

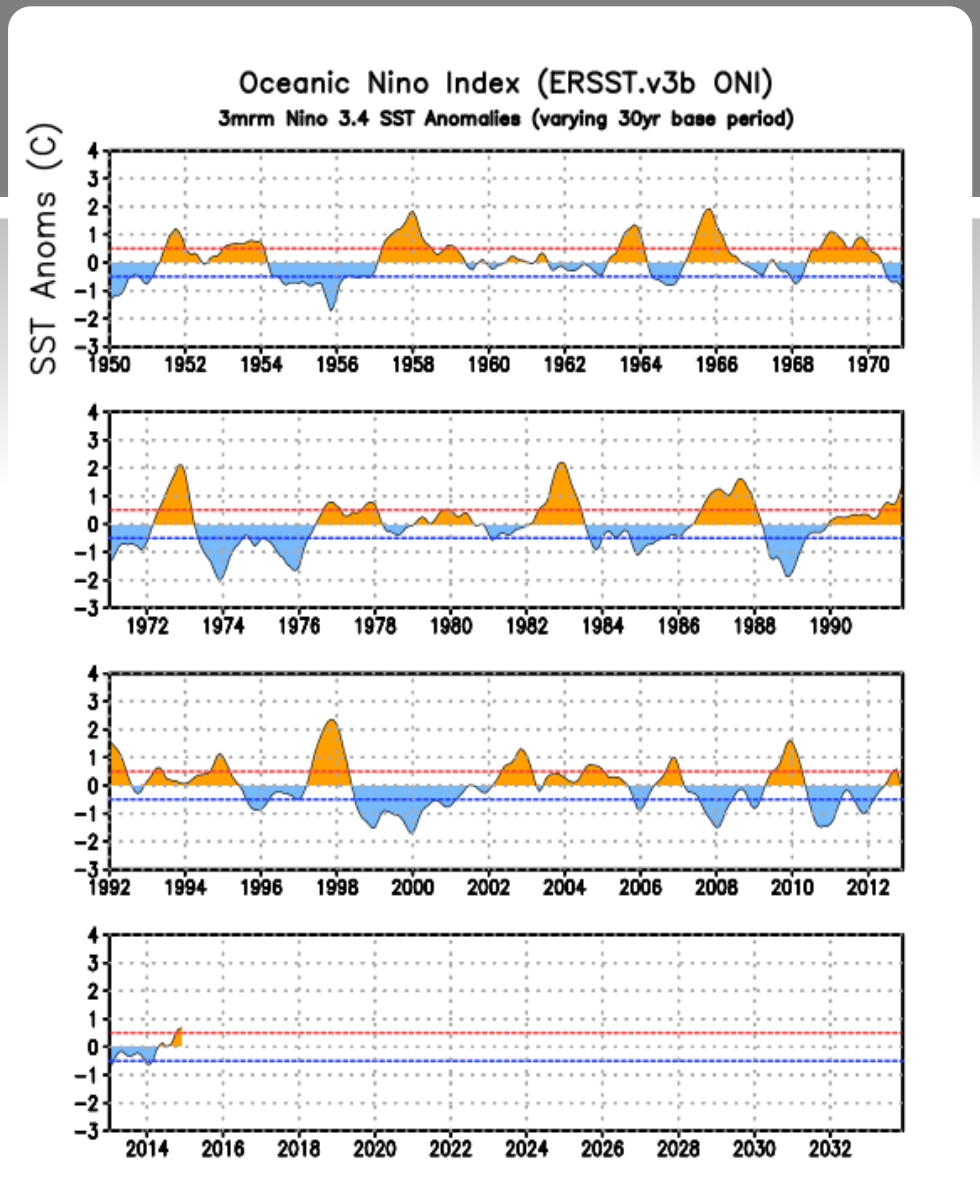
Recent Pacific warm (red) and cold (blue) episodes based on a threshold of +/- 0.5 °C for the Oceanic Nino Index (ONI) [3 month running mean of ERSST.v3b SST anomalies in the Nino 3.4 region (5N-5S, 120-170W)]. For historical purposes El Niño and La Niña episodes are defined when the threshold is met for a minimum of 5 consecutive over-lapping seasons. The complete table going back to DJF

here

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2002	-0.2	0.0	0.1	0.3	0.5	0.7	0.8	0.8	0.9	1.2	1.3	1.3
2003	1.1	0.8	0.4	0.0	-0.2	-0.1	0.2	0.4	0.4	0.4	0.4	0.3
2004	0.3	0.2	0.1	0.1	0.2	0.3	0.5	0.7	0.8	0.7	0.7	0.7
2005	0.6	0.4	0.3	0.3	0.3	0.3	0.2	0.1	0.0	-0.2	-0.5	-0.8
2006	-0.9	-0.7	-0.5	-0.3	0.0	0.1	0.2	0.3	0.5	0.8	1.0	1.0
2007	0.7	0.3	-0.1	-0.2	-0.3	-0.3	-0.4	-0.6	-0.8	-1.1	-1.2	-1.4
2008	-1.5	-1.5	-1.2	-0.9	-0.7	-0.5	-0.3	-0.2	-0.1	-0.2	-0.5	-0.7
2009	-0.8	-0.7	-0.5	-0.2	0.2	0.4	0.5	0.6	0.8	1.1	1.4	1.6
2010	1.6	1.3	1.0	0.6	0.1	-0.4	-0.9	-1.2	-1.4	-1.5	-1.5	-1.5
2011	-1.4	-1.2	-0.9	-0.6	-0.3	-0.2	-0.2	-0.4	-0.6	-0.8	-1.0	-1.0
2012	-0.9	-0.6	-0.5	-0.3	-0.2	0.0	0.1	0.4	0.5	0.6	0.2	-0.3
2013	-0.6	-0.6	-0.4	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	-0.2	-0.3	-0.4
2014	-0.6	-0.6	-0.5	-0.1	0.1	0.1	0.0	0.0	0.2	0.5	0.7	0.7

ONI (ºC): Evolution since 1950

The most recent ONI value (November 2014 – January 2015) is 0.7ºC.



El Niño ↑

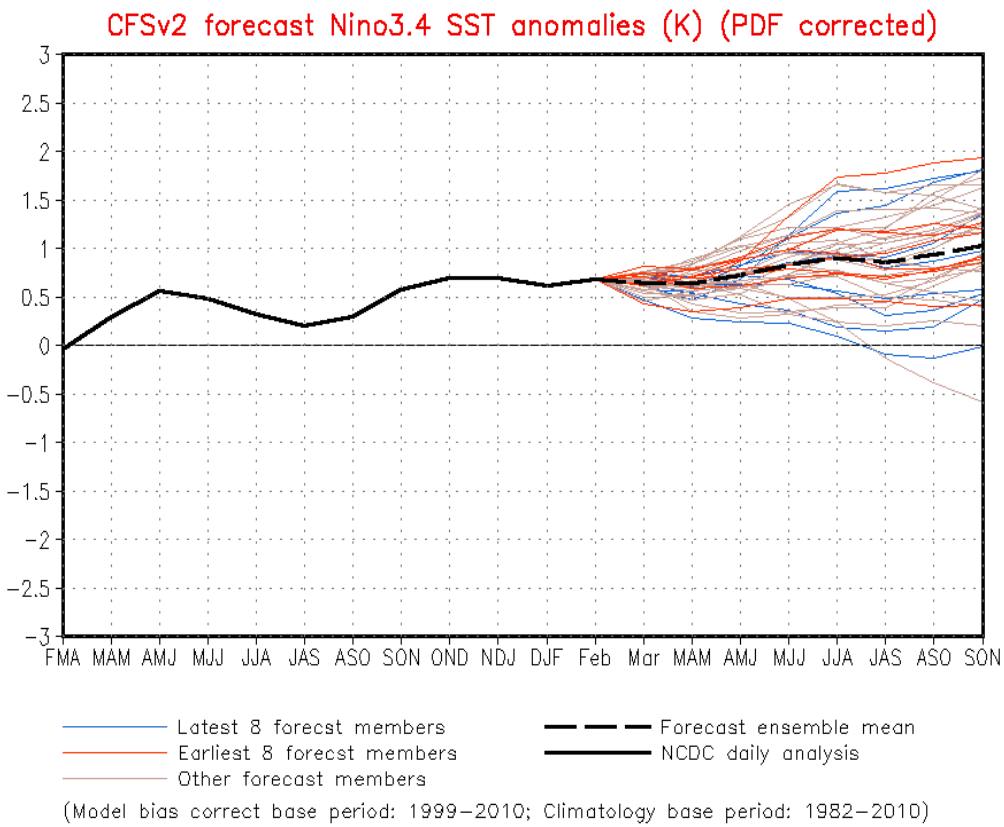
Neutral

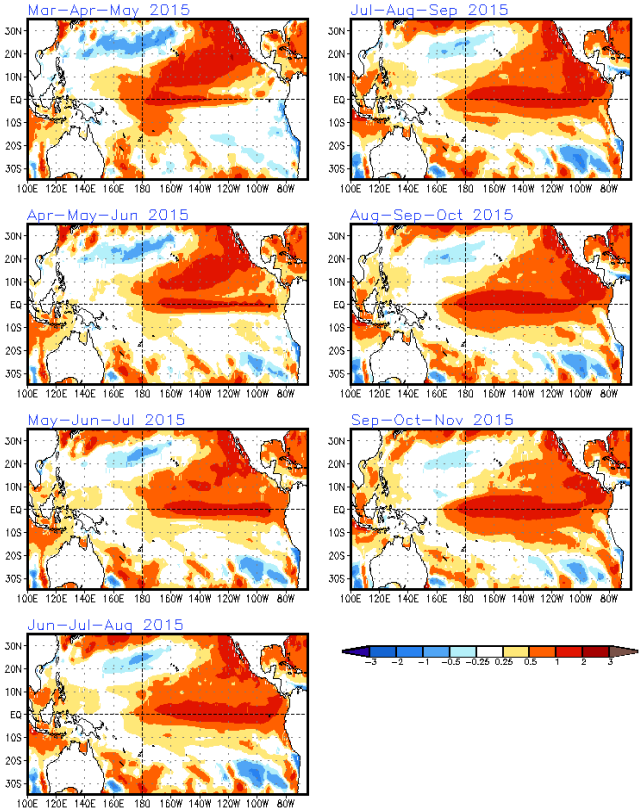
La Niña ↓

SST Outlook: NCEP CFS.v2 Forecast (PDF corrected)

Issued: 23 February 2015

The CFS.v2 ensemble mean (black dashed line) predicts Niño 3.4 SST anomalies to be near or greater than +0.5C through mid-2015.

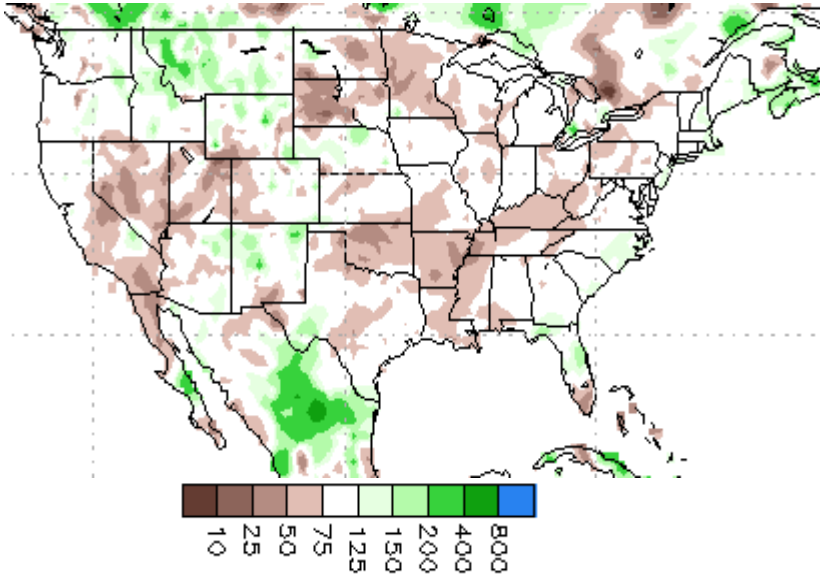




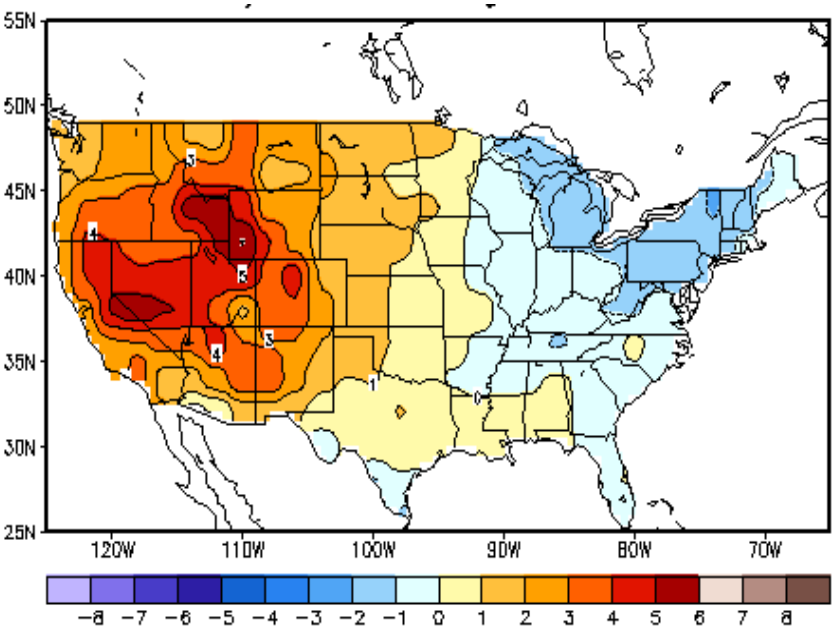
U.S. Temperature and Precipitation Departures During the Last 90 Days

End Date: 21 February 2015

Percent of Average Precipitation



Temperature Departures (degree C)

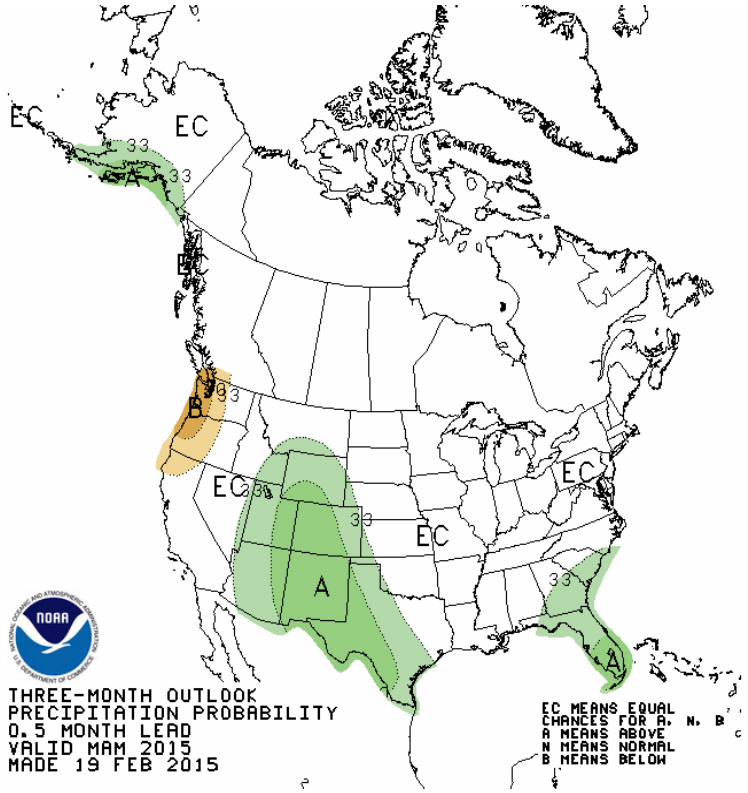


U. S. Seasonal Outlooks

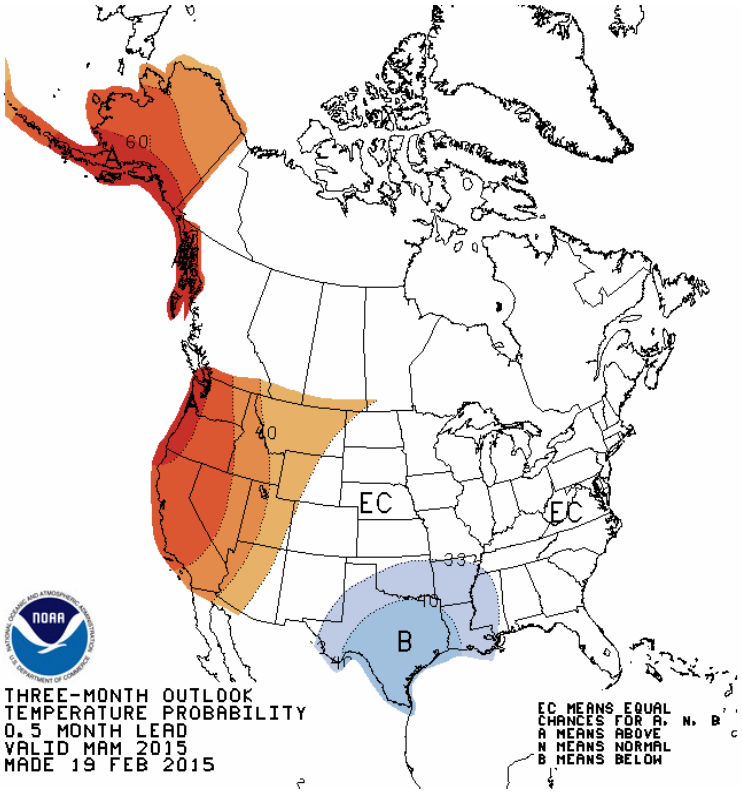
March – May 2015

The seasonal outlooks combine the effects of long-term trends, soil moisture, and, when appropriate, ENSO.

Precipitation



Temperature

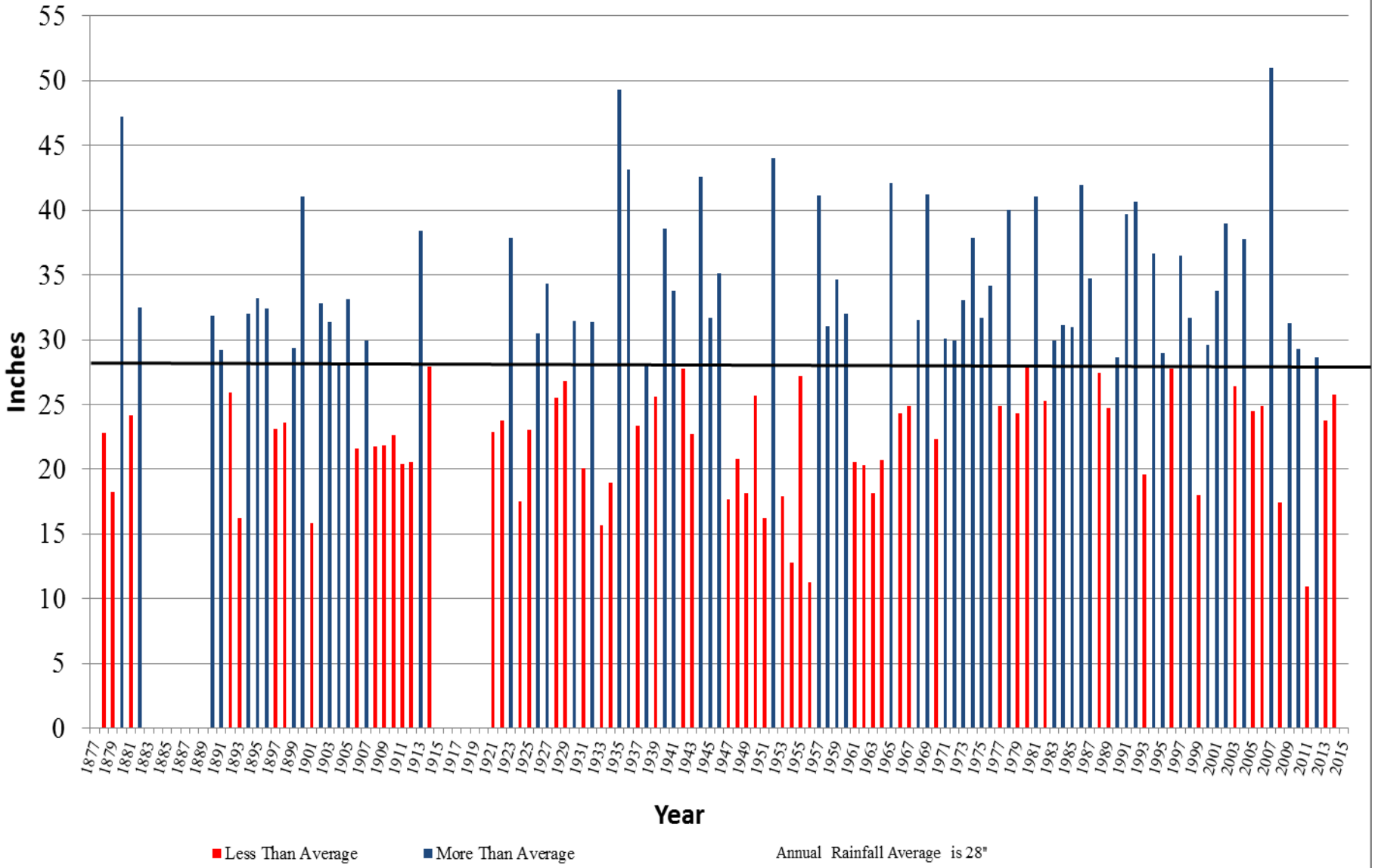


Summary

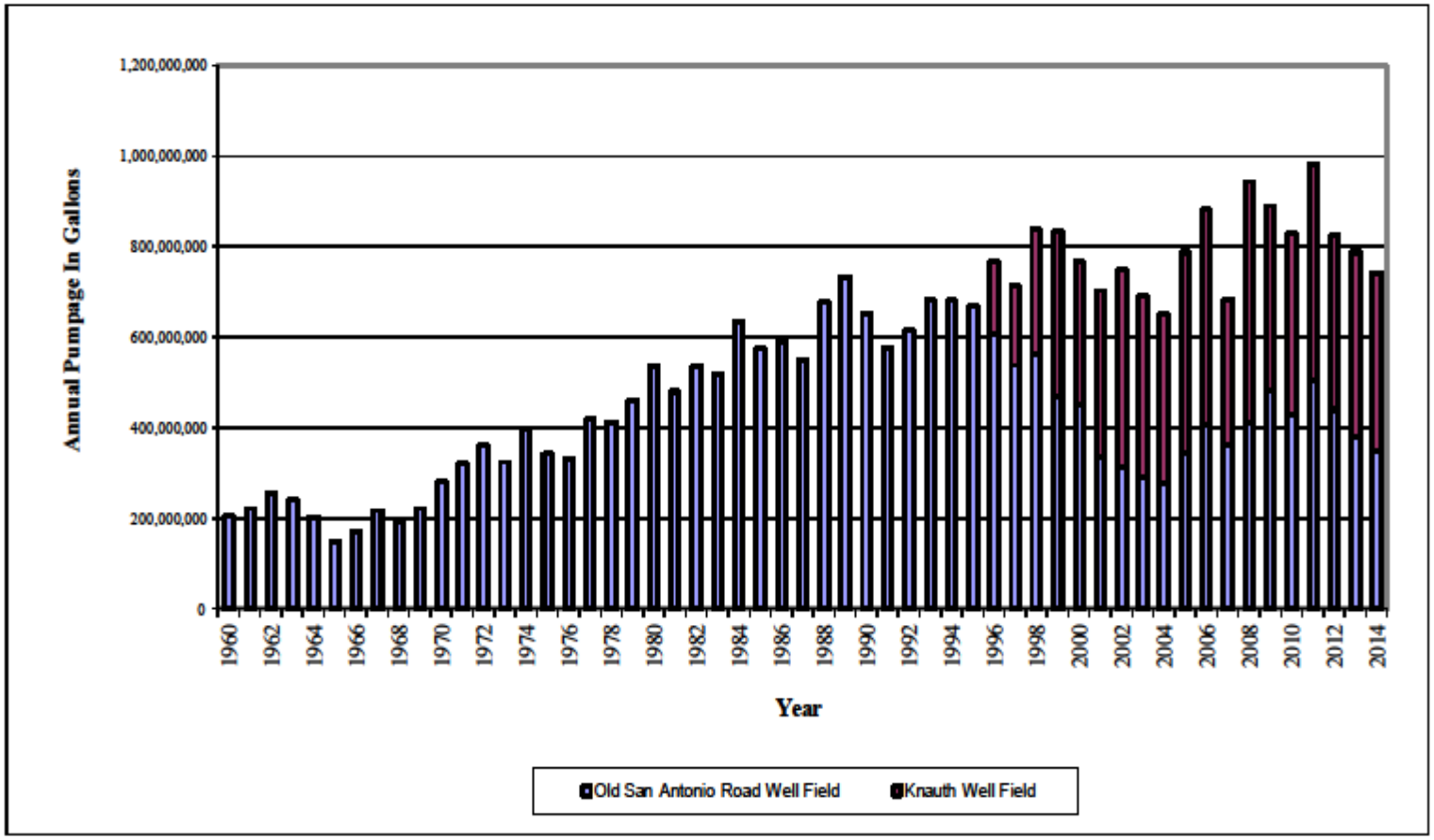
ENSO Alert System Status: El Niño Watch

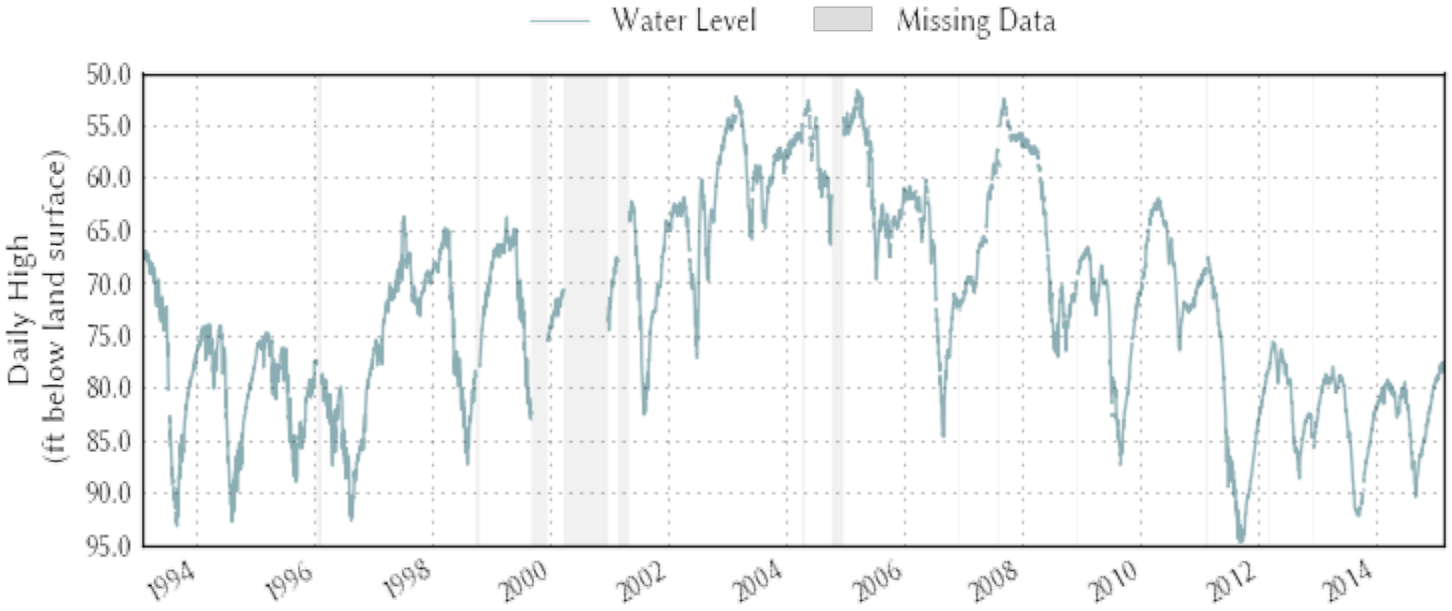
here

CITY OF FREDERICKSBURG ANNUAL RAINFALL

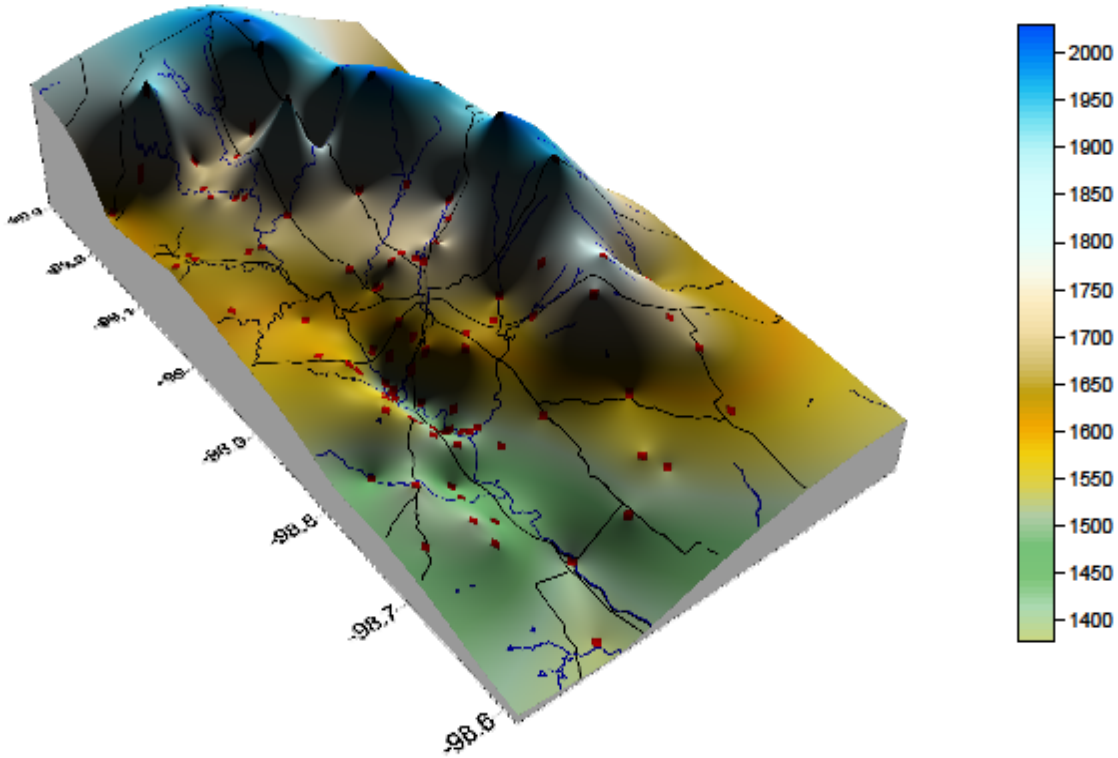


CITY OF FREDERICKSBURG - ELLENBURGER WELL FIELDS




Water Level
Missing Data
Daily High
(ft below land surface)
50.0
55.0
60.0
65.0
70.0
75.0
80.0
85.0
90.0
95.0
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014

Countywide 3D Water Level Surface
Fall 2014



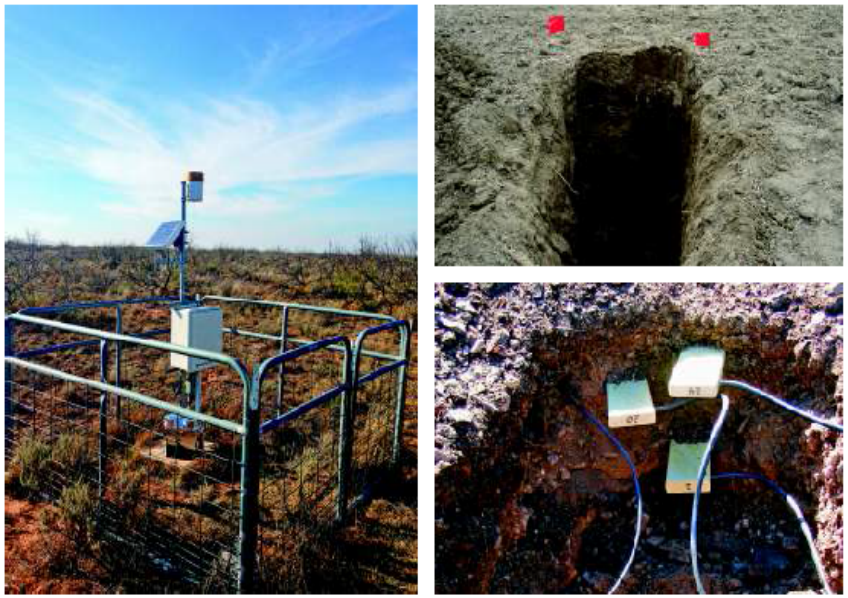
◆Monitor Well Location

*Low areas are due to wells being pumped at the time being measured.

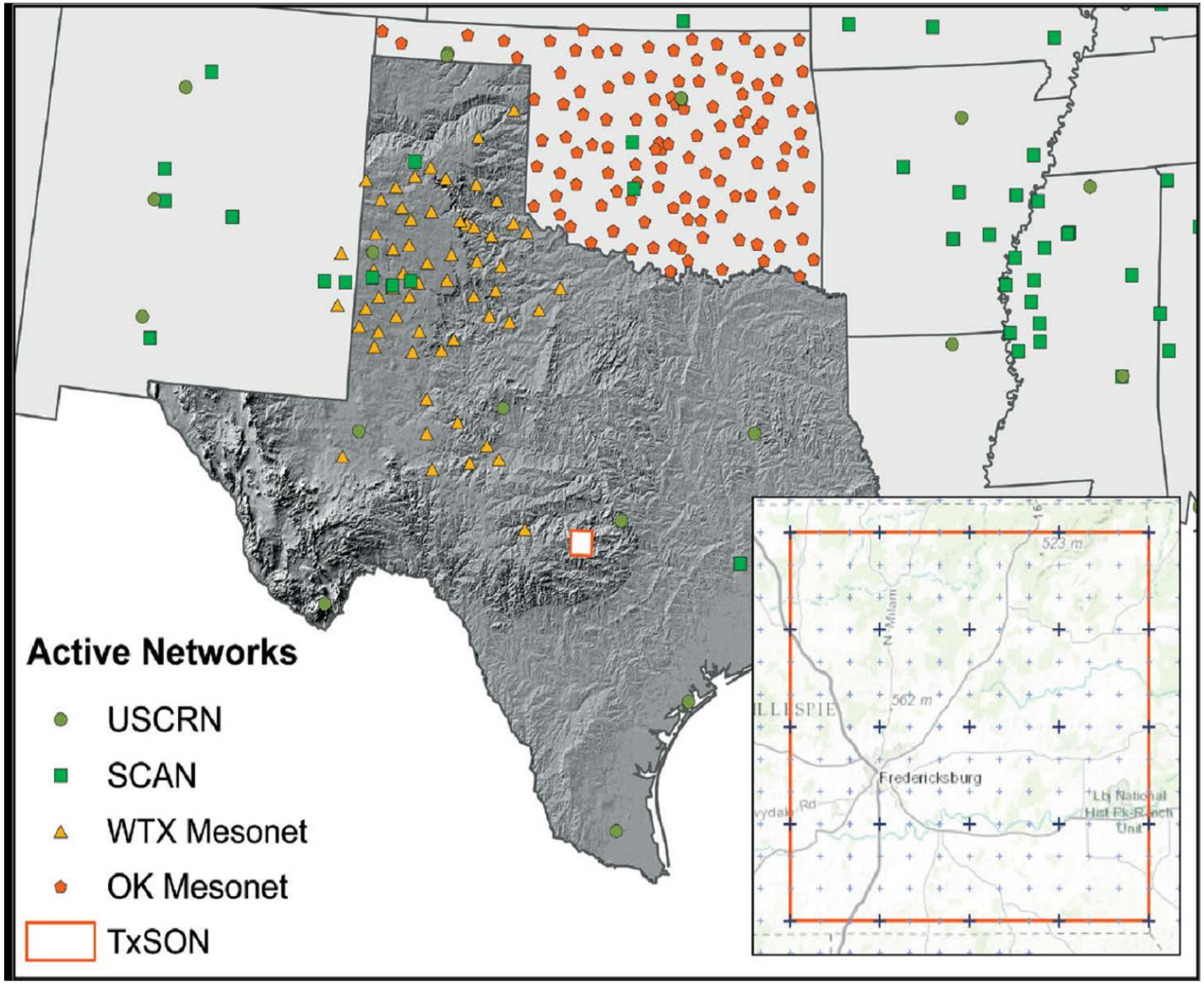
Texas Soil Observation Network (TxSON)

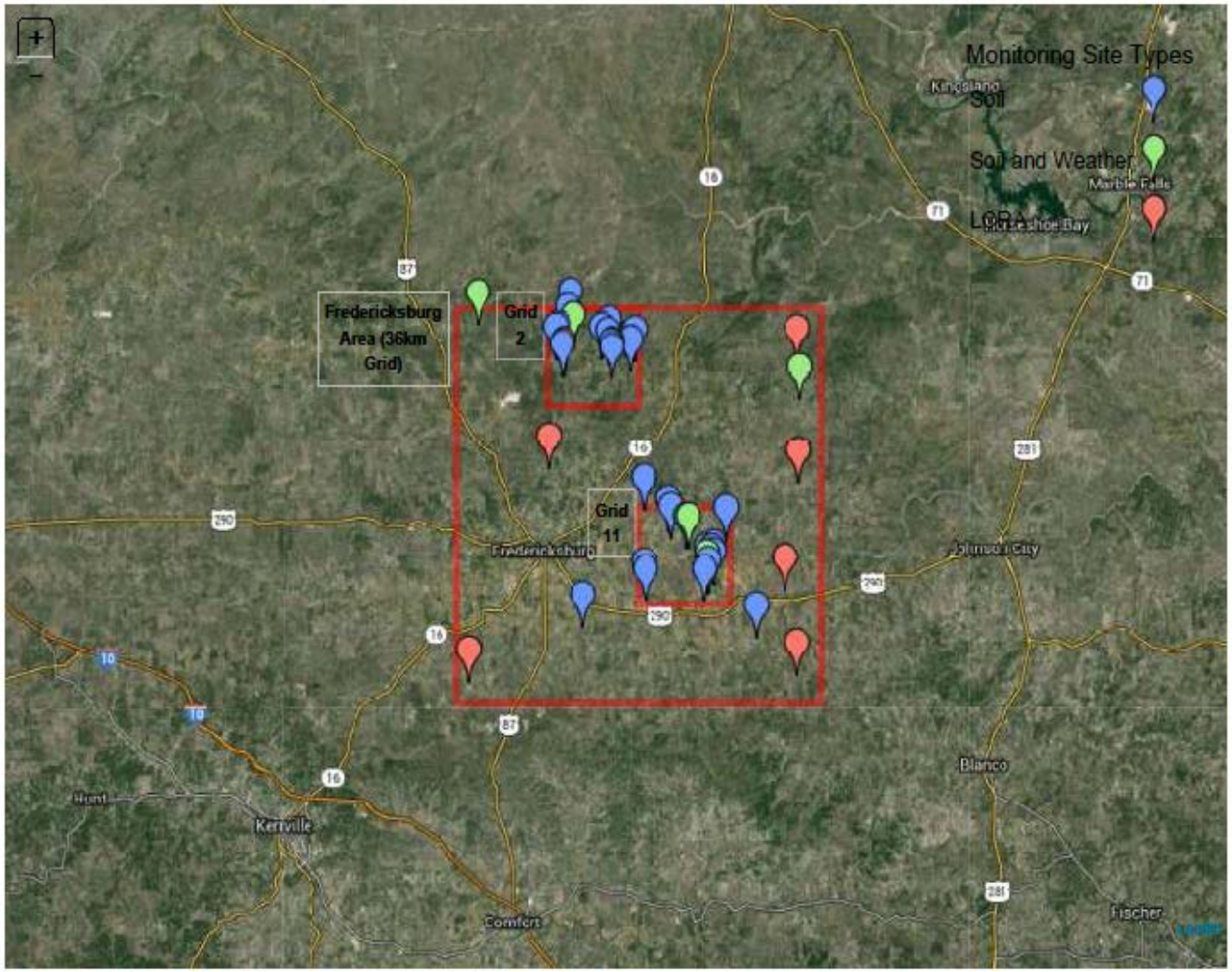
The TxSON will be an intensively monitored area (500 square miles) located near Fredericksburg, Texas, along the Pedernales River and within the middle reaches of the Colorado River. The TxSON will consist of 39 new monitoring stations along with 7 existing stations of the LCRA Hydromet network. Data will be made available to anybody with access to the internet, allowing near real-time decisions to be made by water managers, irrigation districts, and educators. The TxSON will also support NASA's Soil Moisture Active Passive (SMAP) program, which will produce maps of soil moisture across the entire State of Texas. The network will help residents, and local and State agencies of Texas recognize the linkages between soil moisture, crop/rangeland production and water resources while generating high quality data for the NASA mission. This unique network will produce:

1. A focal point for hydrologic monitoring in a vital area for Texas water resources
2. An important first step in building a monitoring network across Texas, one of the most under-monitored areas in the country
3. A unique opportunity for educational outreach, both for K-12 and the University of Texas at Austin, by enlisting students and teachers in field activities and long-term maintenance

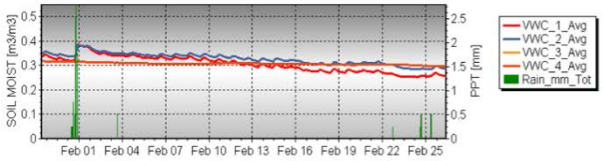


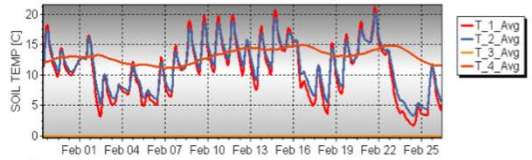
Typical layout of a TxSON soil moisture monitoring station (left). The soil pit (top right) is excavated and soil moisture sensor are inserted into the trench face (bottom right). The wires are routed below ground to a tripod containing additional meteorological sensors, a solar panel, and a data logger.

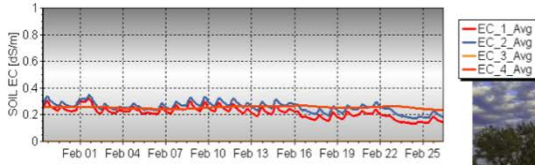

Active Networks
USCRN
SCAN
WTX Mesonet
OK Mesonet
TxSON
523 m
562 m
Fredericksburg

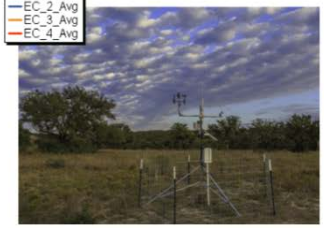

Monitoring Site Types
Soil
Soil and Weather
LCRA
Fredericksburg Area (36km Grid)
Grid 2
Grid 11
Fredericksburg
Johnson City
Marble Falls
Horseshoe Bay
Kingsland
Blanco
Kerrville
Comfort
Fischer
Hunt

CR1000_5 (ALTH): Brackett soils







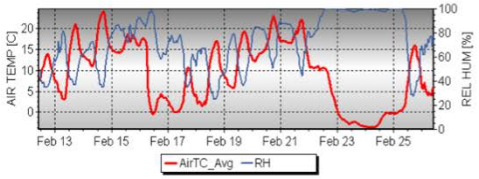


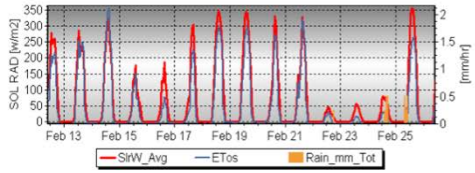
SENSOR DEPTHS: 5, 10, 20, 50 cm

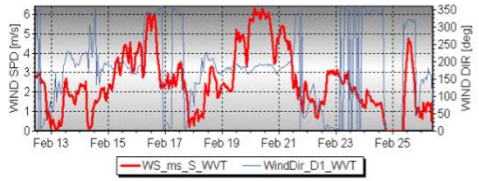
Last Collection: 2/26/2015 11:00:00 AM

Battery Min (V): 13.6

CR1000_5 (ALTH): Brackett soils







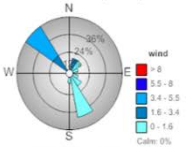
CURRENT CONDITIONS 02/26 11:00 AM

Air Temperature	6.9C	44.4F
Rel. Humidity	74.3%	
Wind Speed	3.4m/s	7.6mph
Solar Radiation	206.2w/m2	
Potential ET	0.8mm/hr	

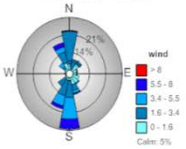
PRECIPITATION

Last hr	0.0mm	0.00in
24 hrs	0.0mm	0.00in
7 days	2.8mm	0.11in
30 days	13.2mm	0.52in

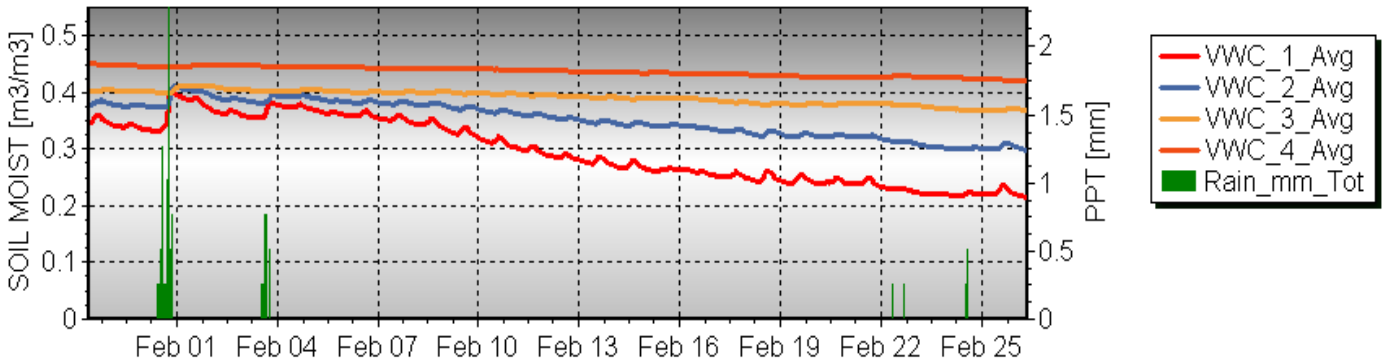
Wind Rose [24 hrs]

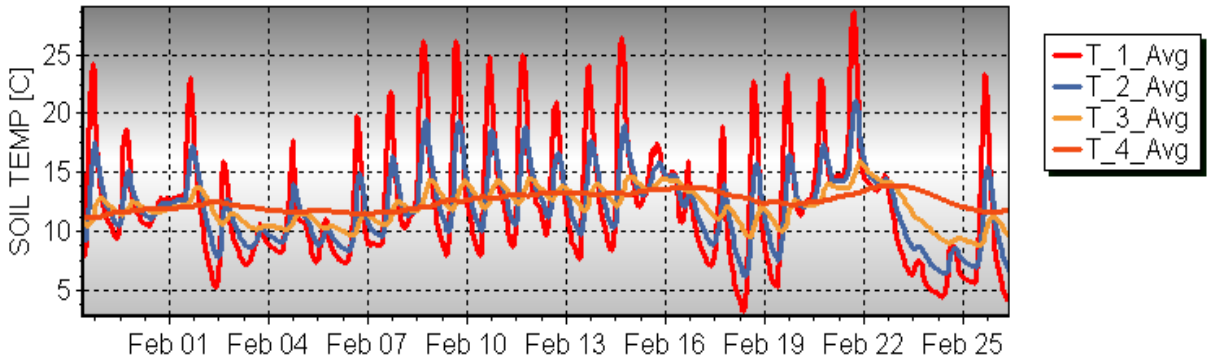


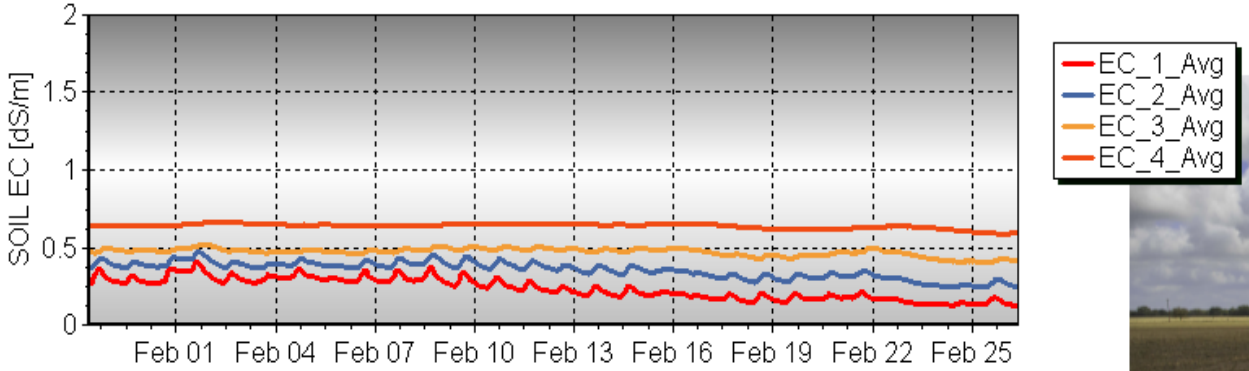
Wind Rose [14 days]



CR200_12 (CoF): Oakalla silty clay loam







SENSOR DEPTHS: 5, 10, 20, 50 cm

Last Collection: 2/26/2015 10:00:00 AM

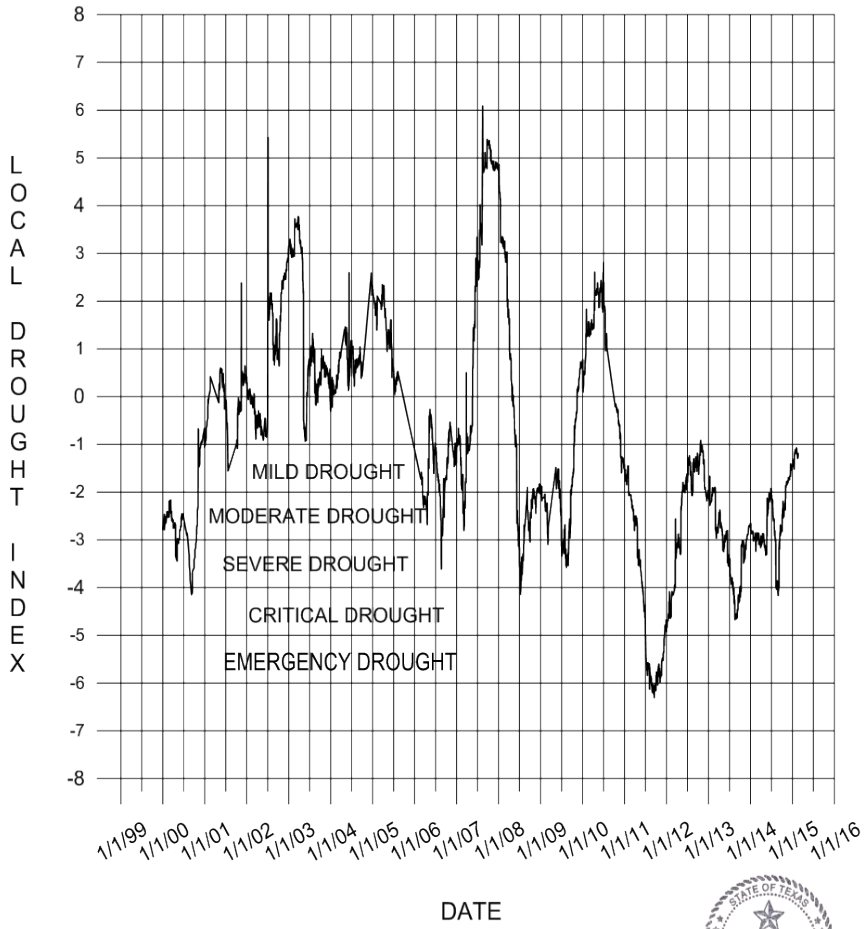
Battery Min (V): 13.9

PRECIPITATION

Last hr	0.0mm	0.00in
24 hrs	0.0mm	0.00in
7 days	1.3mm	0.05in
30 days	11.4mm	0.45in

GILLESPIE COUNTY
LOCAL DROUGHT INDEX
AS OF FEBUARY 21st, 2015

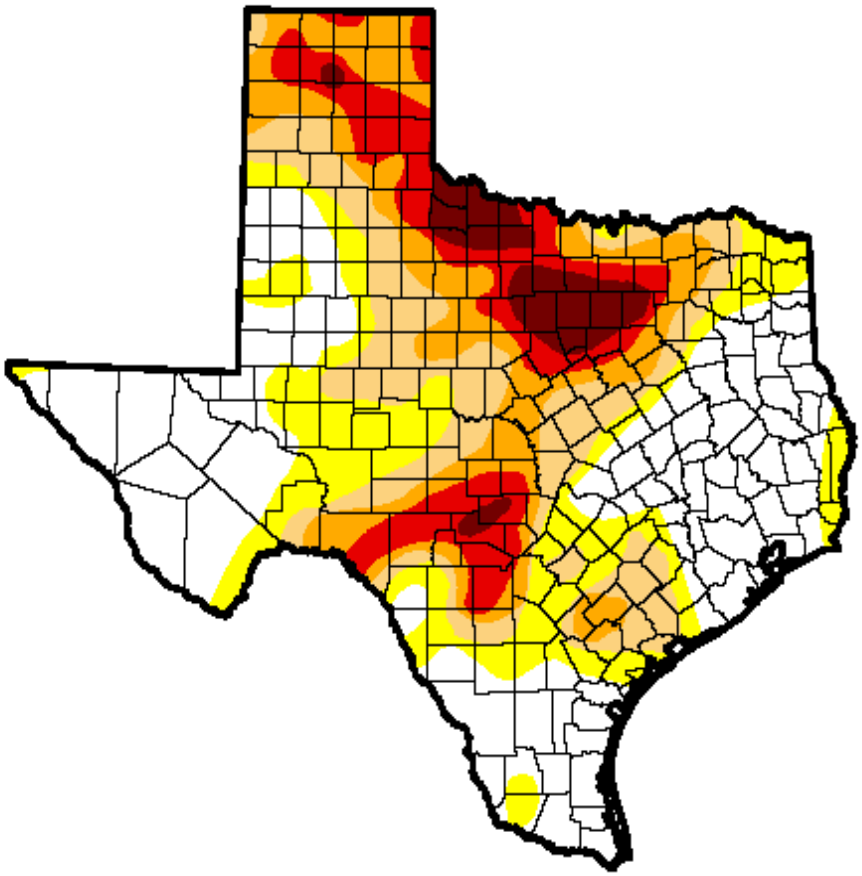
(Based upon Ellenburger Aquifer Water Levels, Previous Weekly 10 Month Cumulative Rainfall, Pedernales River Flow and Palmer Hydrological Drought Index)



Prepared by the Hill Country Underground Water Conservation District

U.S. Drought Monitor

Texas



February 24, 2015

(Released Thursday, Feb. 26, 2015)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	38.35	61.65	43.39	27.86	14.34	4.46
Last Week *2/17/2015*	39.21	60.79	43.39	27.81	13.92	4.46
3 Months Ago *11/25/2014*	34.11	65.89	42.56	22.05	9.50	2.57
Start of Calendar Year *12/30/2014*	34.37	65.63	44.68	25.73	11.70	3.17
Start of Water Year *9/30/2014*	28.92	71.08	48.95	29.54	11.26	2.69
One Year Ago *2/25/2014*	7.38	92.62	67.88	33.55	9.45	0.93

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Richard Heim
NCDC/NOAA

http://droughtmonitor.unl.edu/

Figure 3.5: Trinity Aquifer Within the Lower Colorado Regional Water Planning Area

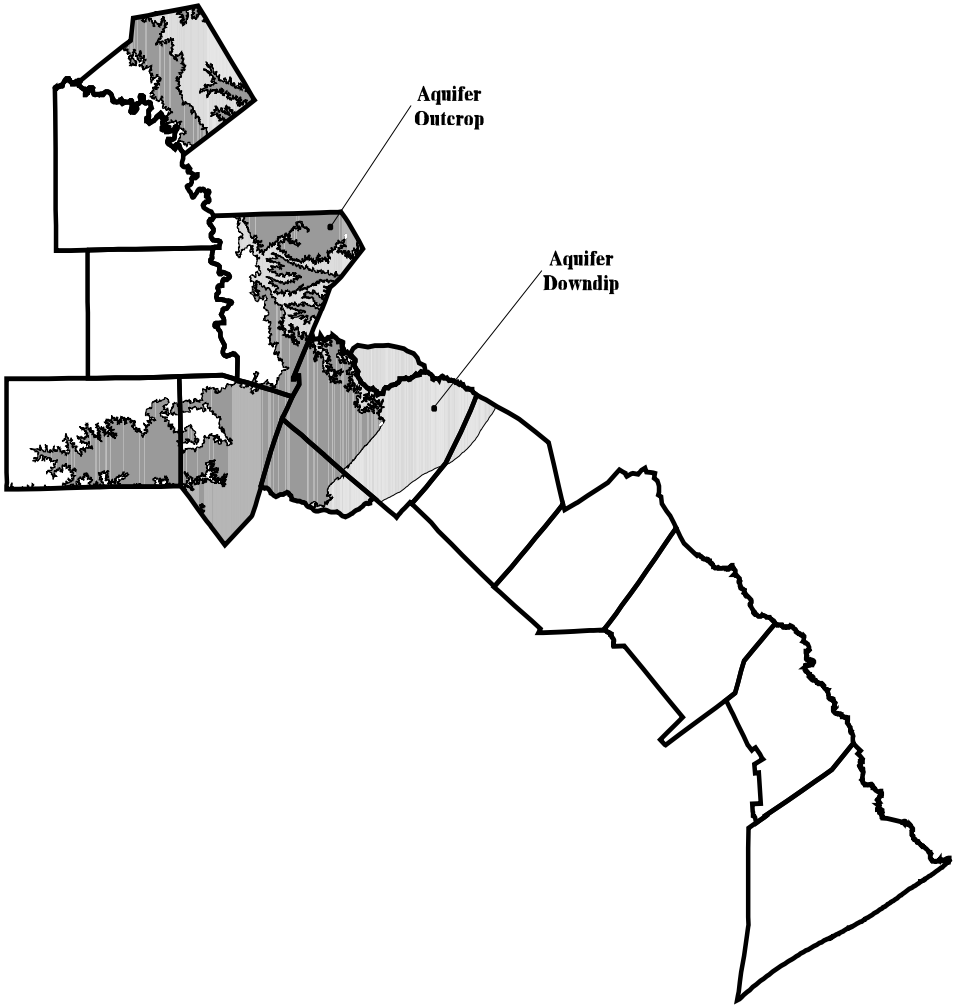


Table 3.15 Water Availability for the Trinity Aquifer (ac-ft/yr)

County	Basin	2020	2030	2040	2050	2060	2070
Blanco	Colorado	1,322	1,322	1,322	1,322	1,322	1,322
Blanco	Guadalupe	1,251	1,251	1,251	1,251	1,251	1,251
	County Total	***2,573***	***2,573***	***2,573***	***2,573***	***2,573***	***2,573***
Burnet	Brazos	2,723	2,723	2,723	2,723	2,723	2,723
Burnet	Colorado	823	823	823	823	823	823
	County Total	***3,546***	***3,546***	***3,546***	***3,546***	***3,546***	***3,546***
Gillespie	Colorado	2,482	2,482	2,482	2,482	2,482	2,482
Gillespie	Guadalupe	46	46	46	46	46	46
	County Total	***2,528***	***2,528***	***2,528***	***2,528***	***2,528***	***2,528***
Hays	Colorado	5,665	5,662	5,661	5,661	5,661	5,661
	County Total	***5,665***	***5,662***	***5,661***	***5,661***	***5,661***	***5,661***
Mills	Brazos	1,273	1,273	1,273	1,273	1,273	1,273
Mills	Colorado	1,128	1,128	1,128	1,128	1,128	1,128
	County Total	***2,401***	***2,401***	***2,401***	***2,401***	***2,401***	***2,401***
Travis	Brazos	8	8	8	8	8	8
Travis	Colorado	13,188	13,171	13,159	13,143	13,114	13,114
Travis	Guadalupe	7	7	7	7	7	7
	County Total	***13,203***	***13,186***	***13,174***	***13,158***	***13,129***	***13,129***
Williamson	Brazos	157	157	157	157	157	157
Williamson	Colorado	61	61	61	61	61	61
	County Total	***218***	***218***	***218***	***218***	***218***	***218***
Region K	**Region Total**	**30,134**	**30,114**	**30,101**	**30,085**	**30,056**	**30,056**

Note: An explanation of the numbers presented in this table is provided in Section 3.2.2.1.4 *Availability*.

Figure 3.6: Edwards Trinity Aquifer Within the Lower Colorado Regional Water Planning Area

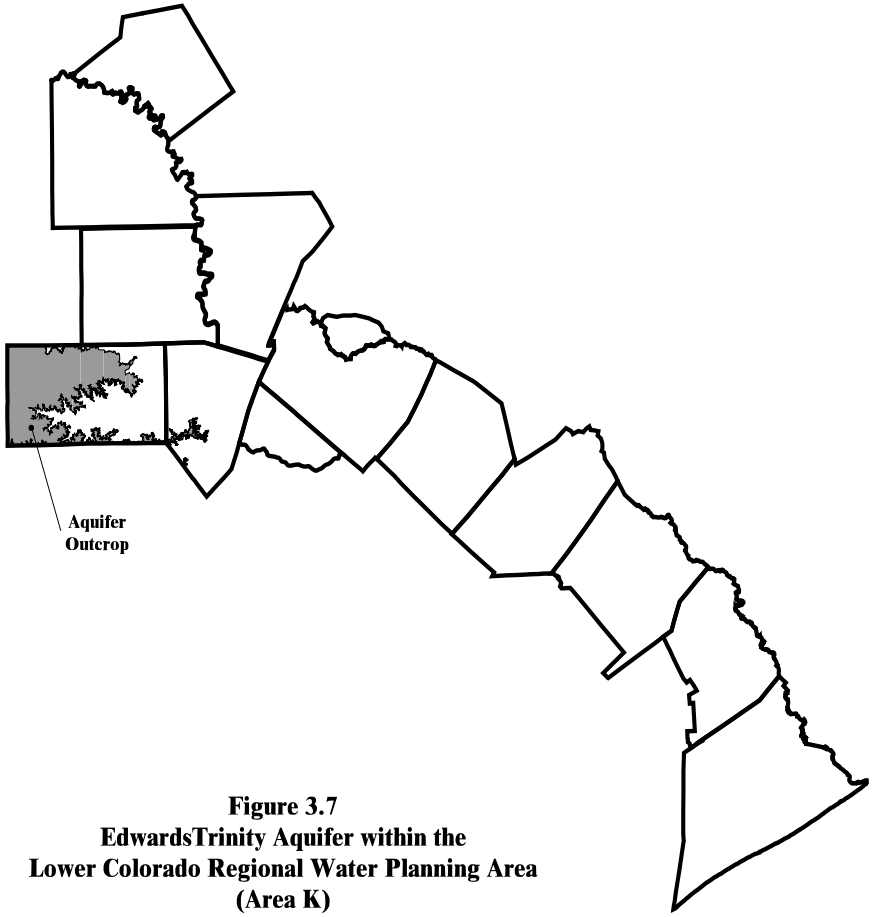


Figure 3.7
EdwardsTrinity Aquifer within the
Lower Colorado Regional Water Planning Area
(Area K)

Table 3.16 Water Availability from the Edwards-Trinity Aquifer (ac-ft/yr)

County	Basin	2020	2030	2040	2050	2060	2070
Gillespie	Colorado	2,378	2,378	2,378	2,378	2,378	2,378
Gillespie	Guadalupe	136	136	136	136	136	136
	County Total	***2,514***	***2,514***	***2,514***	***2,514***	***2,514***	***2,514***
Region K	**Region Total**	**2,514**	**2,514**	**2,514**	**2,514**	**2,514**	**2,514**

Note: An explanation of the numbers presented in this table is provided in Section 3.2.2.1.5 *Availability*.

Figure 3.7: Hickory Aquifer Within the Lower Colorado Regional Water Planning Area

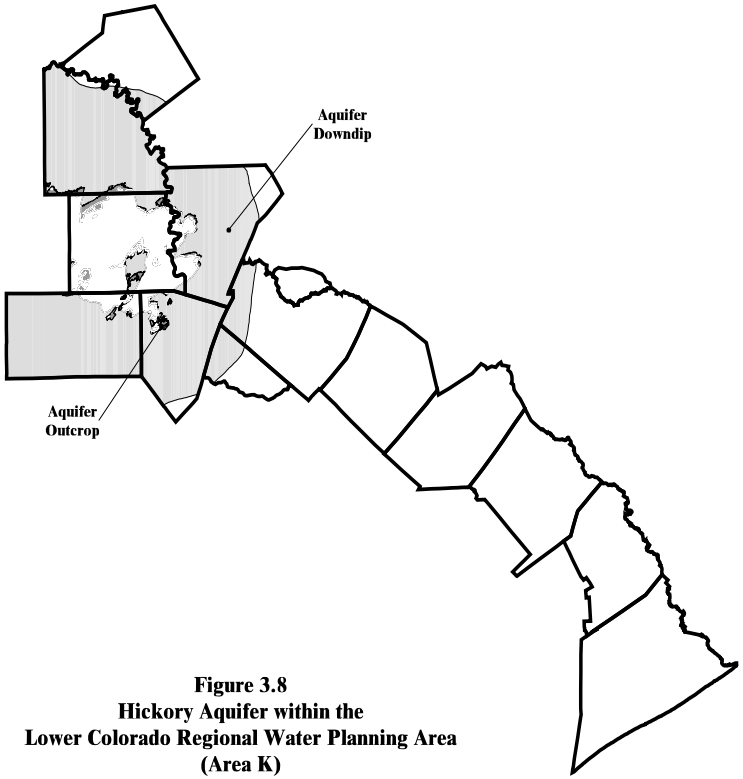


Figure 3.8
Hickory Aquifer within the
Lower Colorado Regional Water Planning Area
(Area K)

Table 3.17 Water Availability from the Hickory Aquifer (ac-ft/yr)

County	Basin	2020	2030	2040	2050	2060	2070
Blanco	Colorado	1,162	1,162	1,162	1,162	1,162	1,162
Blanco	Guadalupe	1	1	1	1	1	1
	County Total	***1,163***	***1,163***	***1,163***	***1,163***	***1,163***	***1,163***
Burnet	Brazos	0	0	0	0	0	0
Burnet	Colorado	2,148	2,148	2,148	2,148	2,148	2,148
	County Total	***2,148***	***2,148***	***2,148***	***2,148***	***2,148***	***2,148***
Gillespie	Colorado	1,659	1,659	1,659	1,659	1,659	1,659
Gillespie	Guadalupe	0	0	0	0	0	0
	County Total	***1,659***	***1,659***	***1,659***	***1,659***	***1,659***	***1,659***
Llano	Colorado	2,018	2,018	2,018	2,018	2,018	2,018
Mills	Brazos	1	1	1	1	1	1
Mills	Colorado	35	35	35	35	35	35
	County Total	***36***	***36***	***36***	***36***	***36***	***36***
San Saba	Colorado	1,479	1,479	1,479	1,479	1,479	1,479
Travis	Brazos	0	0	0	0	0	0
Travis	Colorado	22	22	22	22	22	22
	County Total	***22***	***22***	***22***	***22***	***22***	***22***
Region K	**Region Total**	**8,525**	**8,525**	**8,525**	**8,525**	**8,525**	**8,525**

Note: An explanation of the numbers presented in this table is provided in Section 3.2.2.2.1 *Availability*.

Figure 3.10: Ellenburger-San Saba Aquifer Within the Lower Colorado Regional Water Planning Area

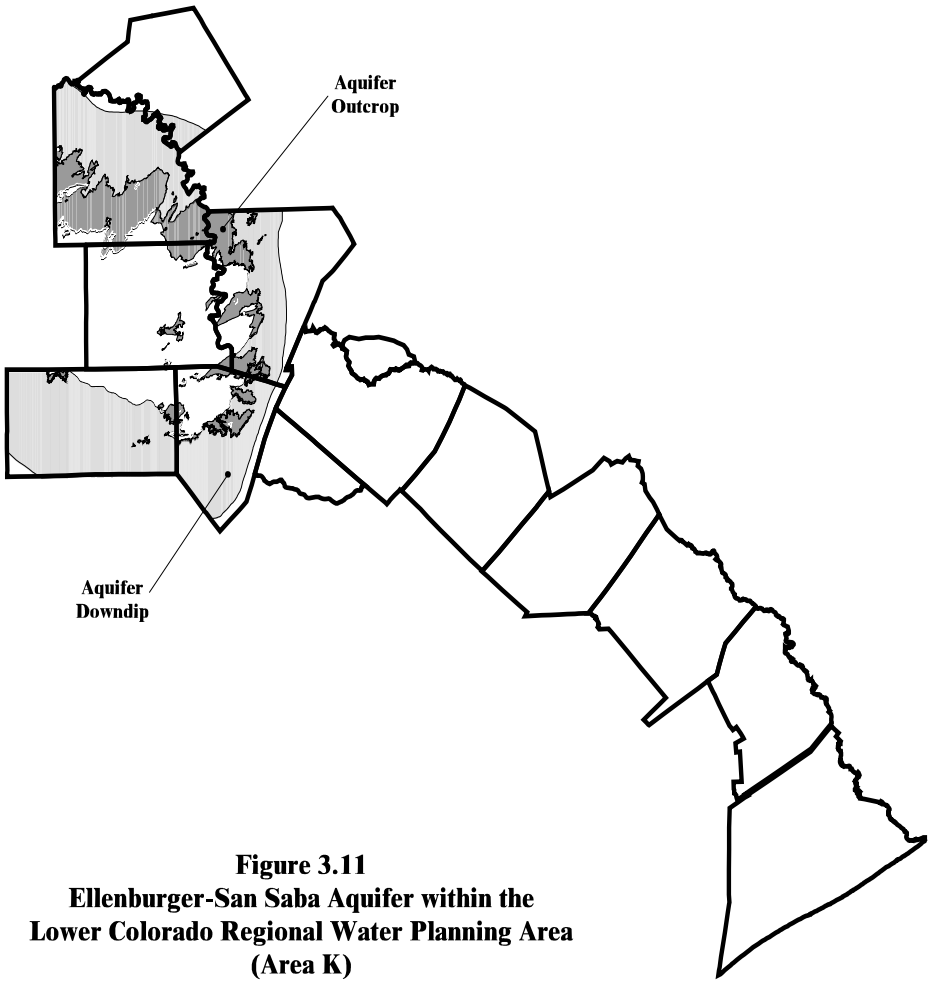


Figure 3.11
Ellenburger-San Saba Aquifer within the
Lower Colorado Regional Water Planning Area
(Area K)

Table 3.20 Water Availability from the Ellenburger-San Saba Aquifer (ac-ft/yr)

County	Basin	2020	2030	2040	2050	2060	2070
Blanco	Colorado	2,655	2,655	2,655	2,655	2,655	2,655
Blanco	Guadalupe	6	6	6	6	6	6
	County Total	***2,661***	***2,661***	***2,661***	***2,661***	***2,661***	***2,661***
Burnet	Brazos	123	123	123	123	123	123
Burnet	Colorado	5,403	5,403	5,403	5,403	5,403	5,403
	County Total	***5,526***	***5,526***	***5,526***	***5,526***	***5,526***	***5,526***
Gillespie	Colorado	6,270	6,270	6,270	6,270	6,270	6,270
Gillespie	Guadalupe	1	1	1	1	1	1
	County Total	***6,271***	***6,271***	***6,271***	***6,271***	***6,271***	***6,271***
Llano	Colorado	2,057	2,057	2,057	2,057	2,057	2,057
Mills	Brazos	5	5	5	5	5	5
Mills	Colorado	494	494	494	494	494	494
	County Total	***499***	***499***	***499***	***499***	***499***	***499***
San Saba	Colorado	10,893	10,893	10,893	10,893	10,893	10,893
Region K	**Region Total**	**27,907**	**27,907**	**27,907**	**27,907**	**27,907**	**27,907**

Note: An explanation of the numbers presented in this table is provided in Section 3.2.2.2.4 *Availability*.

Figure 2.1: Lower Colorado Region Population Projections

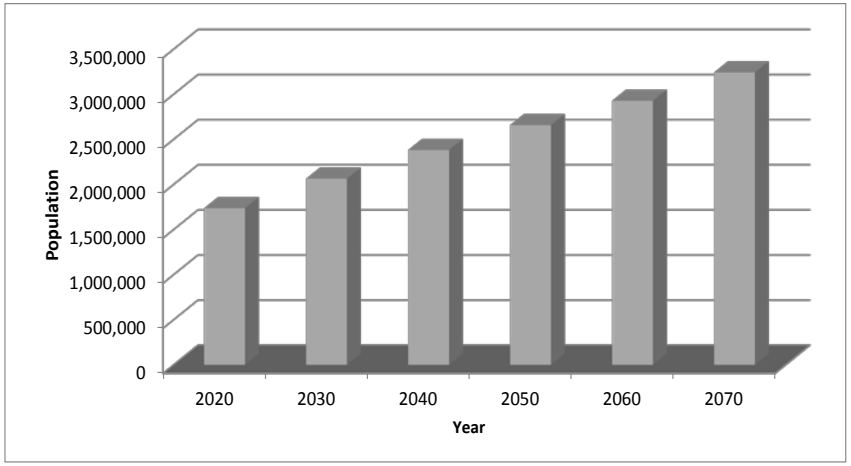


Table 2.2 Population Projection by County*

County	2020	2030	2040	2050	2060	2070
Bastrop	95,487	125,559	164,648	217,608	289,140	384,244
Blanco	13,015	15,475	16,917	17,672	18,175	18,472
Burnet	53,114	64,268	73,673	82,668	90,571	97,426
Colorado	21,884	22,836	23,544	24,582	25,449	26,293
Fayette	28,373	32,384	35,108	37,351	39,119	40,476
Gillespie	26,795	28,852	30,548	32,536	34,365	36,142
Hays (p)	55,584	73,243	94,747	121,629	152,007	186,579
Llano	21,291	22,453	22,422	22,035	22,779	23,549
Matagorda	39,166	41,226	42,548	43,570	44,296	44,815
Mills	4,912	5,076	5,213	5,417	5,625	5,859
San Saba	6,484	6,793	6,833	6,722	6,879	7,039
Travis	1,273,260	1,508,642	1,732,860	1,897,769	2,033,120	2,185,909
Wharton (p)	27,184	28,928	30,322	31,529	32,643	33,629
Williamson (p)	70,678	88,787	102,566	117,404	134,232	152,695
TOTAL	**1,737,227**	**2,064,522**	**2,381,949**	**2,658,492**	**2,928,400**	**3,243,127**

(p) Denotes that the county is shared between multiple regions. The population shown is only the portion within the Lower Colorado Region.

* Population projections by city, county, and portion of a river basin within a county for each of the 14 counties in the Lower Colorado Region are provided in Appendix 2A.

Figure 2.2: Lower Colorado Region Total Water Demand Projections

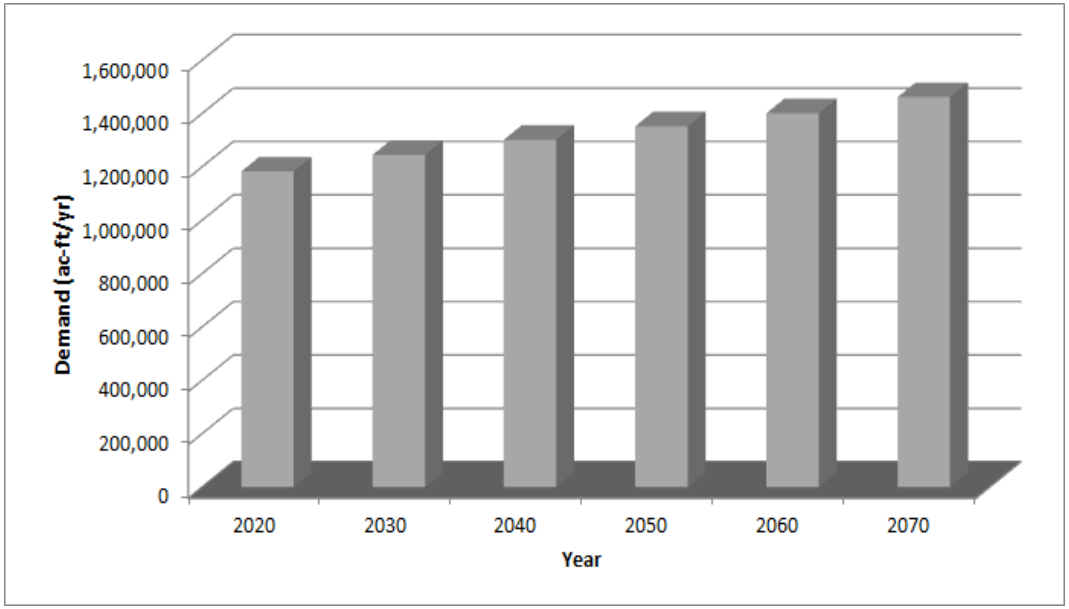
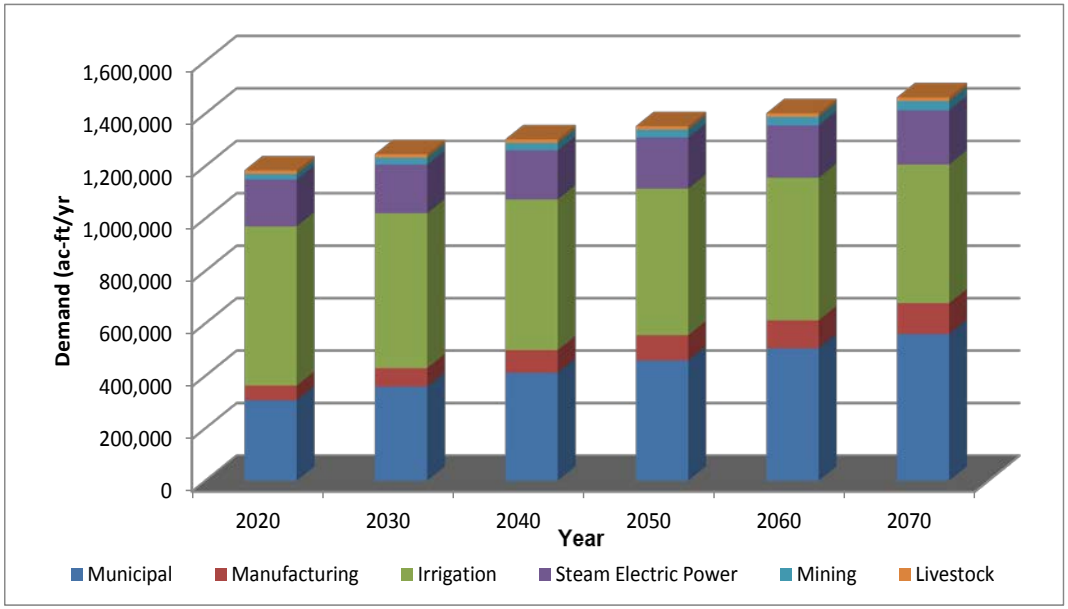


Figure 2.3: Total Water Demand by Type of Use



Region K Gallons per Capita per Day (GPCD) Projections

					GPCD Projections					
CityID	RG	COUNTY	WATER USER GROUP	BASIN	g2020	g2030	g2040	g2050	g2060	g2070
4006	K	BASTROP	AQUA WSC	BRAZOS	146	143	141	140	140	140
4006	K	BASTROP	AQUA WSC	COLORADO	147	143	141	140	140	140
4006	K	BASTROP	AQUA WSC	GUADALUPE	149	145	142	141	141	140
40	K	BASTROP	BASTROP	COLORADO	181	177	175	174	174	174
4011	K	BASTROP	BASTROP COUNTY WCID #2	COLORADO	86	83	82	81	81	81
757	K	BASTROP	COUNTY-OTHER	BRAZOS	167	164	161	161	158	157
757	K	BASTROP	COUNTY-OTHER	COLORADO	162	160	159	158	158	158
757	K	BASTROP	COUNTY-OTHER	GUADALUPE	166	165	160	162	160	161
4076	K	BASTROP	CREEDMOOR-MAHA WSC	COLORADO	103	95	94	92	91	90
188	K	BASTROP	ELGIN	COLORADO	125	122	120	119	119	119
4231	K	BASTROP	LEE COUNTY WSC	BRAZOS	115	111	109	108	107	107
4231	K	BASTROP	LEE COUNTY WSC	COLORADO	113	110	108	107	107	106
4306	K	BASTROP	POLONIA WSC	COLORADO	112	109	106	105	104	105
564	K	BASTROP	SMITHVILLE	COLORADO	153	148	146	145	145	145
60	K	BLANCO	BLANCO	GUADALUPE	151	147	145	144	144	144
4044	K	BLANCO	CANYON LAKE WATER SERVICE COMPANY	GUADALUPE	112	110	110	109	109	109
757	K	BLANCO	COUNTY-OTHER	COLORADO	111	107	105	104	104	104
757	K	BLANCO	COUNTY-OTHER	GUADALUPE	110	107	105	104	104	104
307	K	BLANCO	JOHNSON CITY	COLORADO	154	150	149	148	147	147
826	K	BURNET	BERTRAM	BRAZOS	218	214	212	211	211	211
88	K	BURNET	BURNET	BRAZOS	238	223	218	233	228	227
88	K	BURNET	BURNET	COLORADO	222	218	216	216	215	215
4054	K	BURNET	CHISHOLM TRAIL SUD	BRAZOS	168	164	164	163	163	162
850	K	BURNET	COTTONWOOD SHORES	COLORADO	145	142	140	139	139	139
757	K	BURNET	COUNTY-OTHER	BRAZOS	137	134	132	131	131	131
757	K	BURNET	COUNTY-OTHER	COLORADO	137	134	132	131	131	131
775	K	BURNET	GRANITE SHOALS	COLORADO	96	93	92	91	91	91
1098	K	BURNET	HORSESHOE BAY	COLORADO	559	556	554	553	553	553
4219	K	BURNET	KEMPNER WSC	BRAZOS	157	154	152	150	150	150
4221	K	BURNET	KINGSLAND WSC	COLORADO	98	95	95	93	94	93
385	K	BURNET	MARBLE FALLS	COLORADO	239	235	233	233	233	233
913	K	BURNET	MEADOWLAKES	COLORADO	343	341	340	340	339	339
127	K	COLORADO	COLUMBUS	COLORADO	264	260	257	255	255	255
757	K	COLORADO	COUNTY-OTHER	BRAZOS-COLORADO	110	106	104	101	101	101
757	K	COLORADO	COUNTY-OTHER	COLORADO	110	106	103	101	101	101
757	K	COLORADO	COUNTY-OTHER	LAVACA	110	106	103	102	101	101
172	K	COLORADO	EAGLE LAKE	BRAZOS-COLORADO	123	118	115	113	113	113
172	K	COLORADO	EAGLE LAKE	COLORADO	122	118	115	113	113	113
636	K	COLORADO	WEIMAR	COLORADO	221	216	213	212	211	211
636	K	COLORADO	WEIMAR	LAVACA	220	216	212	211	211	210
4006	K	FAYETTE	AQUA WSC	COLORADO	149	165	149	144	162	158
757	K	FAYETTE	COUNTY-OTHER	COLORADO	102	98	95	94	93	93
757	K	FAYETTE	COUNTY-OTHER	GUADALUPE	101	96	93	93	93	94
757	K	FAYETTE	COUNTY-OTHER	LAVACA	102	98	95	94	94	94
4110	K	FAYETTE	FAYETTE WSC	COLORADO	110	107	105	104	104	104
4110	K	FAYETTE	FAYETTE WSC	GUADALUPE	112	108	105	105	104	105
4110	K	FAYETTE	FAYETTE WSC	LAVACA	112	107	106	105	105	104
202	K	FAYETTE	FLATONIA	GUADALUPE	189	184	181	180	178	178
202	K	FAYETTE	FLATONIA	LAVACA	186	182	179	177	178	178
334	K	FAYETTE	LA GRANGE	COLORADO	144	140	137	136	136	136
4231	K	FAYETTE	LEE COUNTY WSC	COLORADO	114	110	108	108	107	107
544	K	FAYETTE	SCHULENBURG	LAVACA	199	195	192	191	191	190
757	K	GILLESPIE	COUNTY-OTHER	COLORADO	105	101	99	98	97	97
757	K	GILLESPIE	COUNTY-OTHER	GUADALUPE	105	101	98	97	97	97
216	K	GILLESPIE	FREDERICKSBURG	COLORADO	248	245	242	241	240	240
30	K	HAYS	AUSTIN	COLORADO	163	149	149	149	149	149
761	K	HAYS	BUDA	COLORADO	161	158	158	157	157	157
4057	K	HAYS	CIMARRON PARK WATER COMPANY	COLORADO	103	100	97	96	95	95
757	K	HAYS	COUNTY-OTHER	COLORADO	110	107	105	104	104	104
769	K	HAYS	DRIPPING SPRINGS	COLORADO	211	207	205	204	204	204
4092	K	HAYS	DRIPPING SPRINGS WSC	COLORADO	157	154	153	152	152	152
4140	K	HAYS	GOFORTH SUD	COLORADO	96	93	92	91	91	91
1043	K	HAYS	MOUNTAIN CITY	COLORADO	104	102	98	98	98	98
4304	K	HAYS	PLUM CREEK WATER COMPANY	COLORADO	60	60	60	60	60	60
4390	K	HAYS	WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY	COLORADO	384	382	381	381	381	381
757	K	LLANO	COUNTY-OTHER	COLORADO	95	94	93	93	93	93
1098	K	LLANO	HORSESHOE BAY	COLORADO	560	556	554	553	553	553

Figure 2.4: Lower Colorado Region Municipal Water Demand Projections

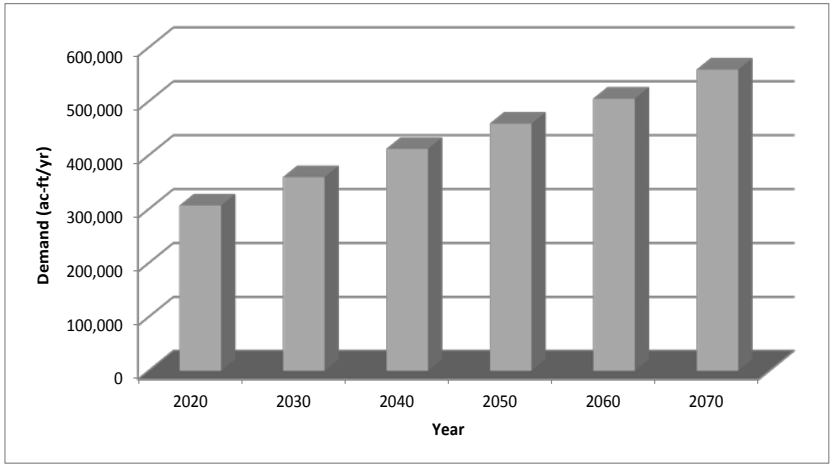


Table 2.4 Municipal Water Demand Projections by County* (ac-ft/yr)

County	2020	2030	2040	2050	2060	2070
Bastrop	15,732	20,149	26,036	34,163	45,264	60,058
Blanco	1,811	2,094	2,254	2,336	2,398	2,438
Burnet	10,823	13,235	15,538	17,510	19,204	20,601
Colorado	3,689	3,746	3,781	3,902	4,031	4,162
Fayette	4,079	4,511	4,792	5,046	5,274	5,455
Gillespie	4,969	5,225	5,438	5,737	6,043	6,349
Hays (p)	10,548	13,997	18,311	23,849	30,279	37,687
Llano	4,306	4,479	4,436	4,337	4,476	4,625
Matagorda	5,123	5,193	5,202	5,259	5,332	5,394
Mills	754	754	753	775	802	835
San Saba	1,622	1,670	1,657	1,623	1,658	1,696
Travis	227,879	266,070	303,161	331,059	354,312	380,499
Wharton (p)	4,050	4,163	4,255	4,398	4,543	4,678
Williamson (p)	11,175	13,908	16,147	18,594	21,393	24,472
TOTAL	**306,560**	**359,194**	**411,761**	**458,588**	**505,009**	**558,949**

(p) Denotes that the county is shared between multiple regions. The municipal demand shown is only the portion within the Lower Colorado Region.

* Municipal water demand projections by city, county, and portion of a river basin within a county for each of the 14 counties in the Lower Colorado Region are provided in Appendix 2A.

Figure 2.5: Lower Colorado Region Manufacturing Water Demand Projections

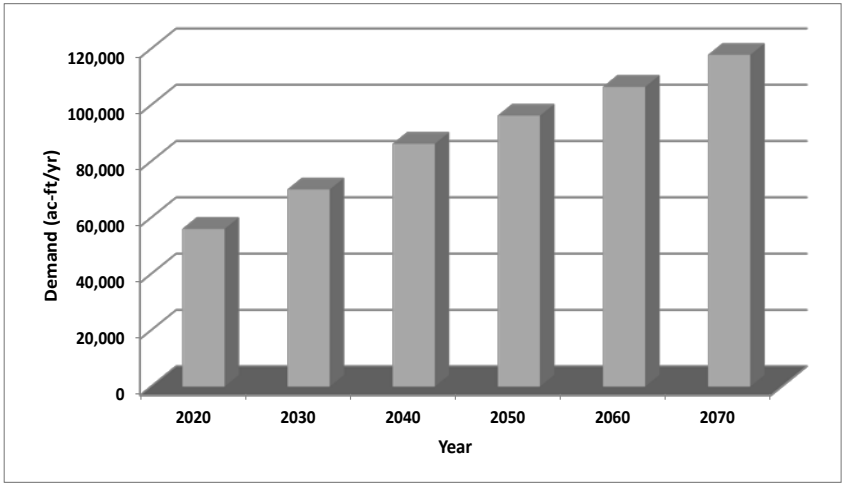


Table 2.6 Manufacturing Water Demand Projections by County* (ac-ft/yr)

County	2020	2030	2040	2050	2060	2070
Bastrop	194	227	262	295	319	345
Blanco	20	20	20	20	20	20
Burnet	1,109	1,248	1,384	1,502	1,636	1,782
Colorado	383	409	433	453	489	528
Fayette	358	395	431	462	501	543
Gillespie	1,049	1,102	1,151	1,192	1,276	1,366
Hays (p)	347	398	449	495	537	583
Llano	3	3	3	3	3	3
Matagorda	16,253	16,991	17,686	18,259	19,267	20,342
Mills	2	2	2	2	2	2
San Saba	8	8	8	8	8	8
Travis	35,790	48,710	63,858	72,991	81,781	91,630
Wharton (p)	503	537	572	601	648	699
Williamson (p)	0	0	0	0	0	0
TOTAL	**56,019**	**70,050**	**86,259**	**96,283**	**106,487**	**117,851**

(p) Denotes that the county is shared between multiple regions. The manufacturing demand shown is only the portion within the Lower Colorado Region.

* Manufacturing water demand projections by city, county, and portion of a river basin within a county for each of the 14 counties in the Lower Colorado Region are provided in Appendix 2A.

Figure 2.6: Lower Colorado Region Irrigation Water Demand Projections

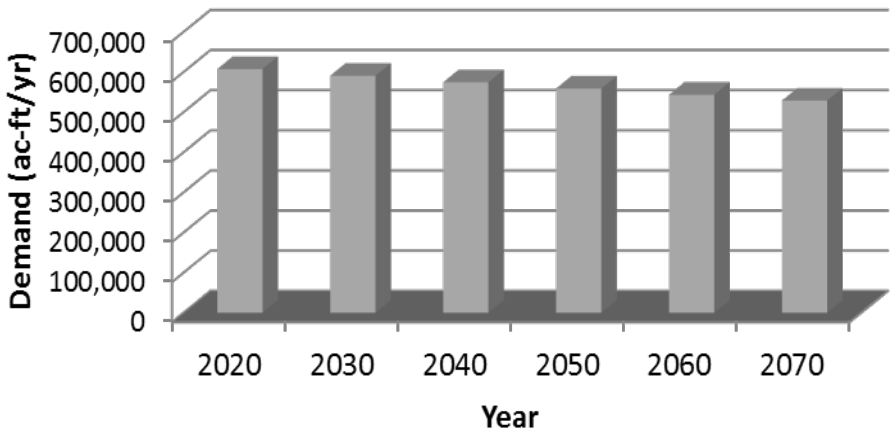


Table 2.8 Irrigation Water Demand Projections by County* (ac-ft/yr)

County	2020	2030	2040	2050	2060	2070
Bastrop	852	742	649	565	492	443
Blanco	256	240	225	217	213	204
Burnet	1,504	1,504	1,504	1,504	1,504	1,504
Colorado	165,846	161,385	157,044	152,819	148,709	144,708
Fayette	623	583	545	511	480	453
Gillespie	2,058	2,031	2,003	1,978	1,953	1,928
Hays (p)	107	107	107	107	107	107
Llano	1,936	1,902	1,870	1,840	1,810	1,781
Matagorda	209,087	203,382	197,830	192,428	187,171	182,055
Mills	3,074	3,008	2,943	2,879	2,817	2,759
San Saba	5,539	5,361	5,188	5,018	4,856	4,709
Travis	4,322	3,975	3,657	3,364	3,097	2,885
Wharton (p)	212,229	206,520	200,965	195,559	190,298	185,179
Williamson (p)	0	0	0	0	0	0
TOTAL	**607,433**	**590,740**	**574,530**	**558,789**	**543,507**	**528,715**

(p) Denotes that the county is shared between multiple regions. The irrigation demand shown is only the portion within the Lower Colorado Region.

* Irrigation water demand projections by city, county, and portion of a river basin within a county for each of the 14 counties in Lower Colorado Region are provided in Appendix 2A.

Figure 2.7: Lower Colorado Region Steam Electric Water Demand Projections

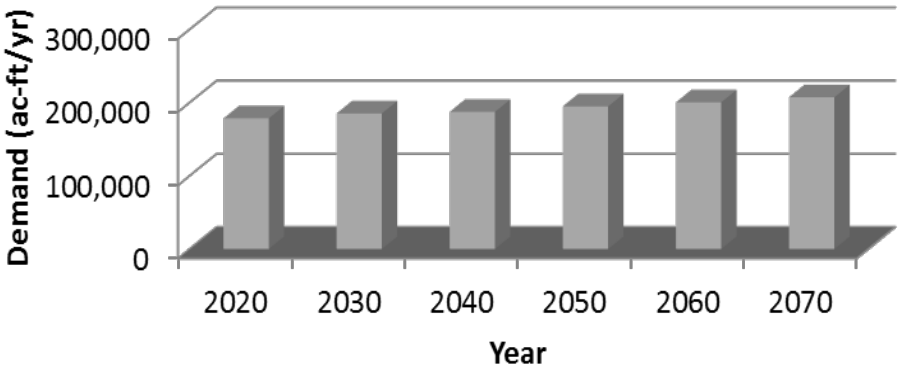


Table 2.10 Steam-Electric Water Demand Projections by County* (ac-ft/yr)

County	2020	2030	2040	2050	2060	2070
Bastrop	14,000	16,720	16,720	16,720	16,720	16,720
Blanco	0	0	0	0	0	0
Burnet	0	0	0	0	0	0
Colorado	0	0	0	0	0	0
Fayette	35,702	35,702	37,802	44,102	48,602	53,402
Gillespie	0	0	0	0	0	0
Hays (p)	0	0	0	0	0	0
Llano	2,500	2,500	2,500	2,500	2,500	2,500
Matagorda	105,000	105,000	105,000	105,000	105,000	105,000
Mills	0	0	0	0	0	0
San Saba	0	0	0	0	0	0
Travis	18,500	22,500	22,500	23,500	24,500	26,500
Wharton (p)	2,751	2,813	2,888	2,980	3,091	3,197
Williamson (p)	0	0	0	0	0	0
TOTAL	**178,453**	**185,235**	**187,410**	**194,802**	**200,413**	**207,319**

(p) Denotes that the county is shared between multiple regions. The steam-electric demand shown is only the portion within the Lower Colorado Region.

* Steam-electric water demand projections by city, county, and portion of a river basin within a county for each of the 14 counties in the Lower Colorado Region are provided in Appendix 2A.

Figure 2.8: Lower Colorado Region Mining Water Demand Projections

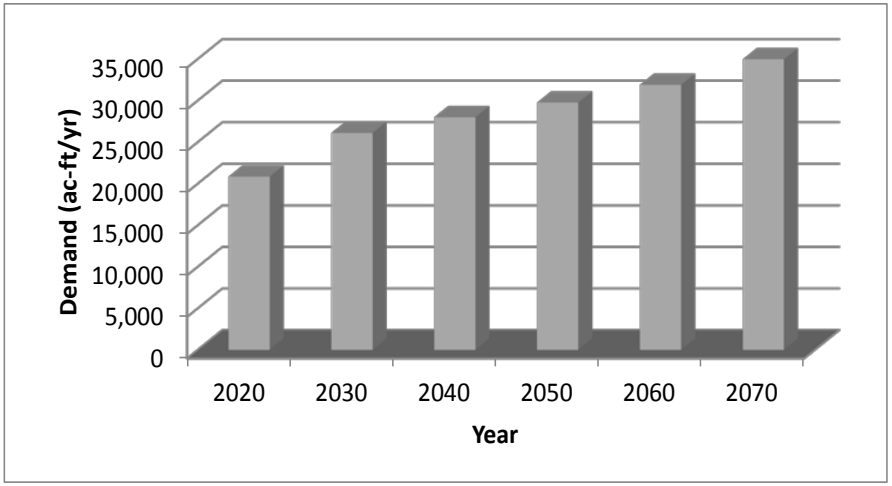


Table 2.12 Mining Water Demand Projections by County* (ac-ft/yr)

County	2020	2030	2040	2050	2060	2070
Bastrop	2884	6813	7498	8263	9085	9996
Blanco	5	5	5	5	5	5
Burnet	4490	5412	6379	7255	8263	9412
Colorado	5325	5378	5433	5487	5542	5597
Fayette	2526	2032	1465	918	359	350
Gillespie	4	4	4	4	4	4
Hays (p)	845	1075	1361	1445	1654	1893
Llano	3	3	3	3	3	3
Matagorda	96	100	75	55	35	22
Mills	4	4	4	4	4	4
San Saba	1088	1093	944	900	864	838
Travis	3502	4108	4762	5374	6046	6817
Wharton (p)	71	74	55	41	26	17
Williamson (p)	5	3	3	3	3	3
TOTAL	**20,848**	**26,104**	**27,991**	**29,757**	**31,893**	**34,961**

(p) Denotes that the county is shared between multiple regions. The mining demand shown is only the portion within the Lower Colorado Region.

* Mining water demand projections by city, county, and portion of a river basin within a county for each of the 14 counties in the Lower Colorado Region are provided in Appendix 2A.

Figure 2.9: Lower Colorado Region Livestock Water Demand Projections

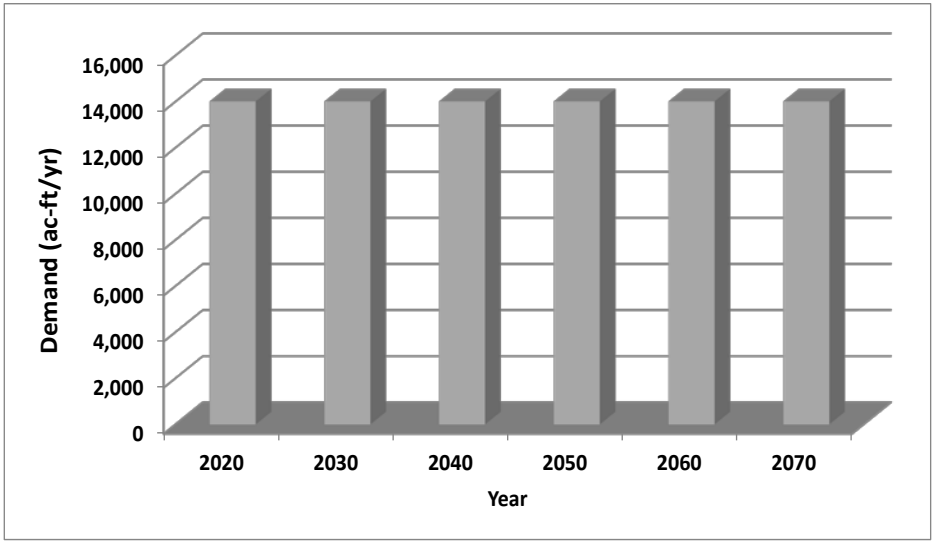


Table 2.14 Livestock Water Demand Projections by County* (ac-ft/yr)

County	2020	2030	2040	2050	2060	2070
Bastrop	1,522	1,522	1,522	1,522	1,522	1,522
Blanco	564	564	564	564	564	564
Burnet	835	835	835	835	835	835
Colorado	1,590	1,590	1,590	1,590	1,590	1,590
Fayette	2,397	2,397	2,397	2,397	2,397	2,397
Gillespie	1,062	1,062	1,062	1,062	1,062	1,062
Hays (p)	220	220	220	220	220	220
Llano	751	751	751	751	751	751
Matagorda	1,503	1,503	1,503	1,503	1,503	1,503
Mills	944	944	944	944	944	944
San Saba	1,191	1,191	1,191	1,191	1,191	1,191
Travis	704	704	704	704	704	704
Wharton (p)	728	728	728	728	728	728
Williamson (p)	1	1	1	1	1	1
TOTAL	**14,012**	**14,012**	**14,012**	**14,012**	**14,012**	**14,012**

(p) Denotes that the county is shared between multiple regions. The livestock demand shown is only the portion within the Lower Colorado Region.

* Livestock water demand projections by city, county, and portion of a river basin within a county for each of the 14 counties in the Lower Colorado Region are provided in Appendix 2A.

	Gillespie County Water Demands (AFY)					
	D2020	D2030	D2040	D2050	D2060	D2070
Total Municipal Water Demands	4,969	5,225	5,438	5,737	6,043	6,349
Total Irrigation Water Demands	2,058	2,031	2,003	1,978	1,953	1,928
Total Livestock Water Demands	1,062	1,062	1,062	1,062	1,062	1,062
Total Manufacturing Water De-	1,049	1,102	1,151	1,192	1,276	1,366
Total Mining Water Demands	4	4	4	4	4	4
Total Steam Electric Water De-	0	0	0	0	0	0
GILLESPIE COUNTY TOTALS	**9,142**	**9,424**	**9,658**	**9,973**	**10,338**	**10,709**

	DRAFT Gillespie County Water Needs (AFY)					
	N2020	N2030	N2040	N2050	N2060	N2070
Total Municipal Water Needs	0	0	0	0	(30)	(222)
Total Irrigation Water Needs	0	0	0	0	0	0
Total Livestock Water Needs	0	0	0	0	0	0
Total Manufacturing Water Needs	(309)	(362)	(411)	(452)	(536)	(626)
Total Mining Water Needs	0	0	0	0	0	0
Total Steam Electric Water Needs	0	0	0	0	0	0
GILLESPIE COUNTY TOTALS	**(309)**	**(362)**	**(411)**	**(452)**	**(566)**	**(848)**

For More Information…

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