



City of Fredericksburg Water Supply Update

April 2, 2024

Today's Presentation

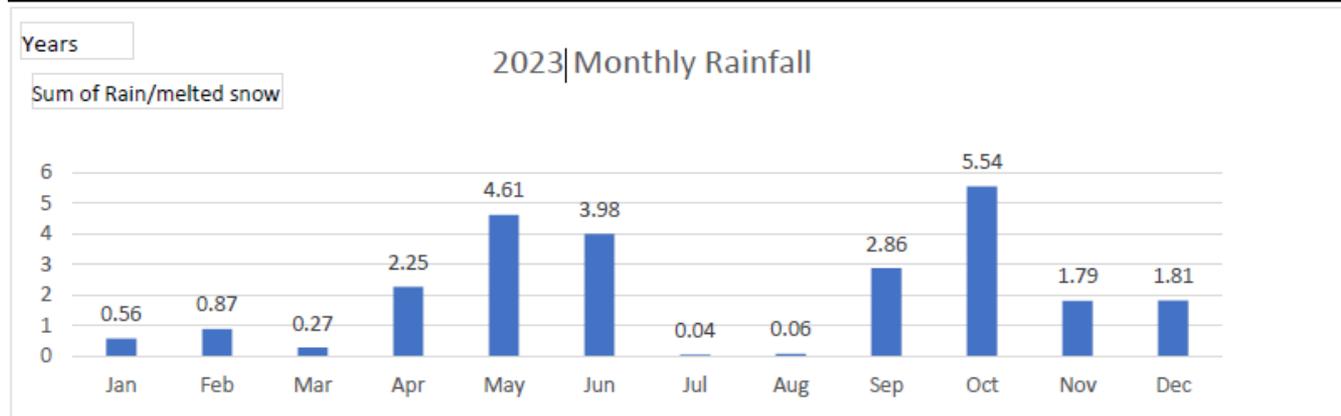
City of Fredericksburg/HCUWCD

1. Historical Local Rainfall
2. Current Water Well Levels, Trends and History
3. Water Conservation Program – Goals and Results
4. Water Rates and Watering Restrictions
5. Water Distribution System Integrity
6. Gillespie County Population Projections and Water Demand
7. Local, State and Nation-Wide Short and Long-Term Weather Forecast

City of Fredericksburg 2023 Rainfall

- Rainfall total 2023: 24.64 inches measured at LBJ Park
- Annual average rainfall for Fredericksburg is about 28 inches

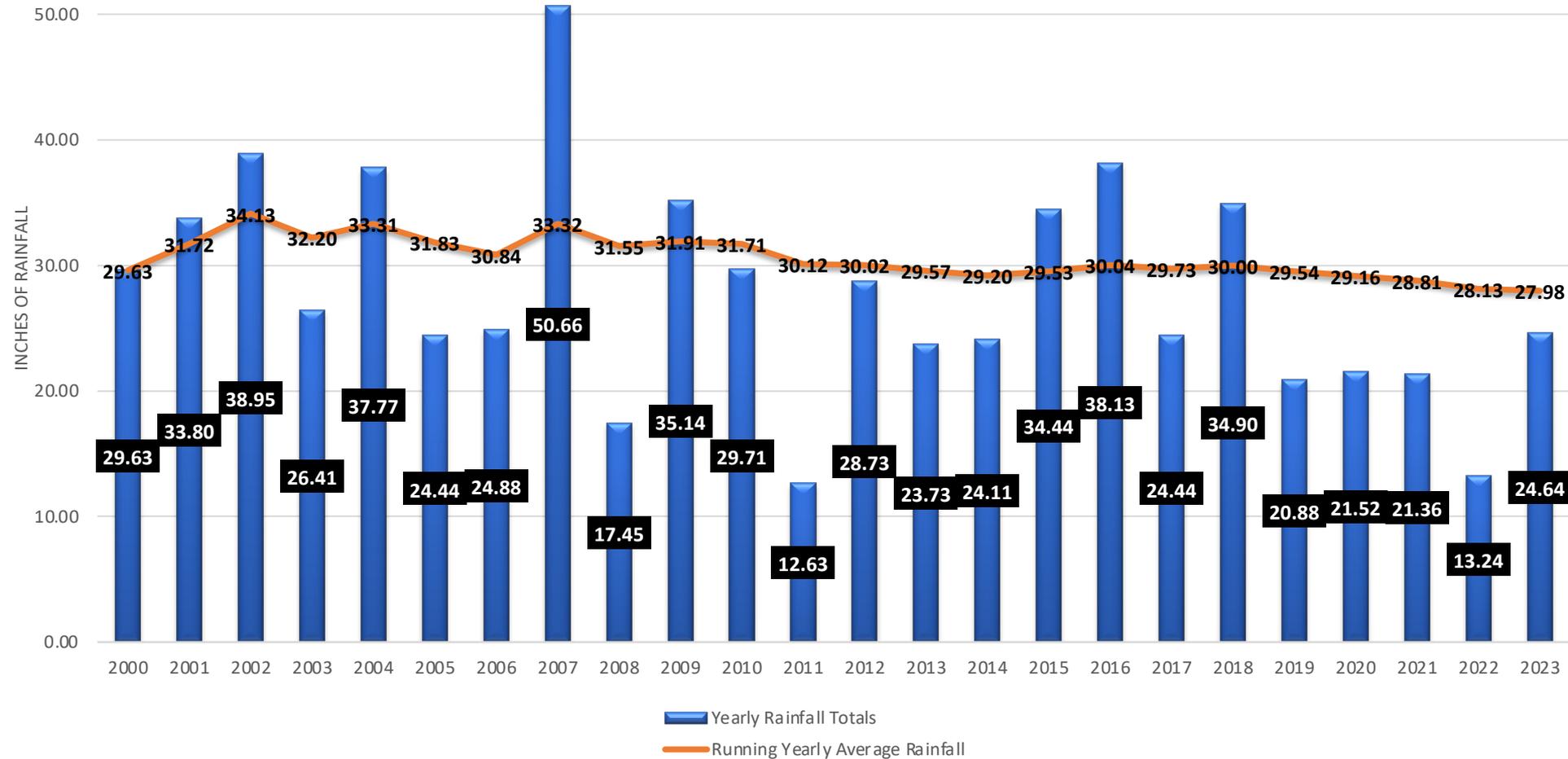
| Engineering Department | | | Year: 2023 | | |
|---|------------------|------------------------|--------------|--------------------|---------------|
| Rainfall Report - Lady Bird Johnson Park Data | | | | | |
| Month | Month's Rainfall | Running Total | Month | Month's Rainfall | Running Total |
| January | 0.56 | 0.56 | July | 0.04 | 12.58 |
| February | 0.87 | 1.43 | August | 0.06 | 12.64 |
| March | 0.27 | 1.70 | September | 2.86 | 15.50 |
| April | 2.25 | 3.95 | October | 5.54 | 21.04 |
| May | 4.61 | 8.56 | November | 1.79 | 22.83 |
| June | 3.98 | 12.54 | December | 1.81 | 24.64 |
| YTD Rainfall: | 24.64 | Annual Average: | 28.13 | Over/Under: | -3.49 |



City of Fredericksburg

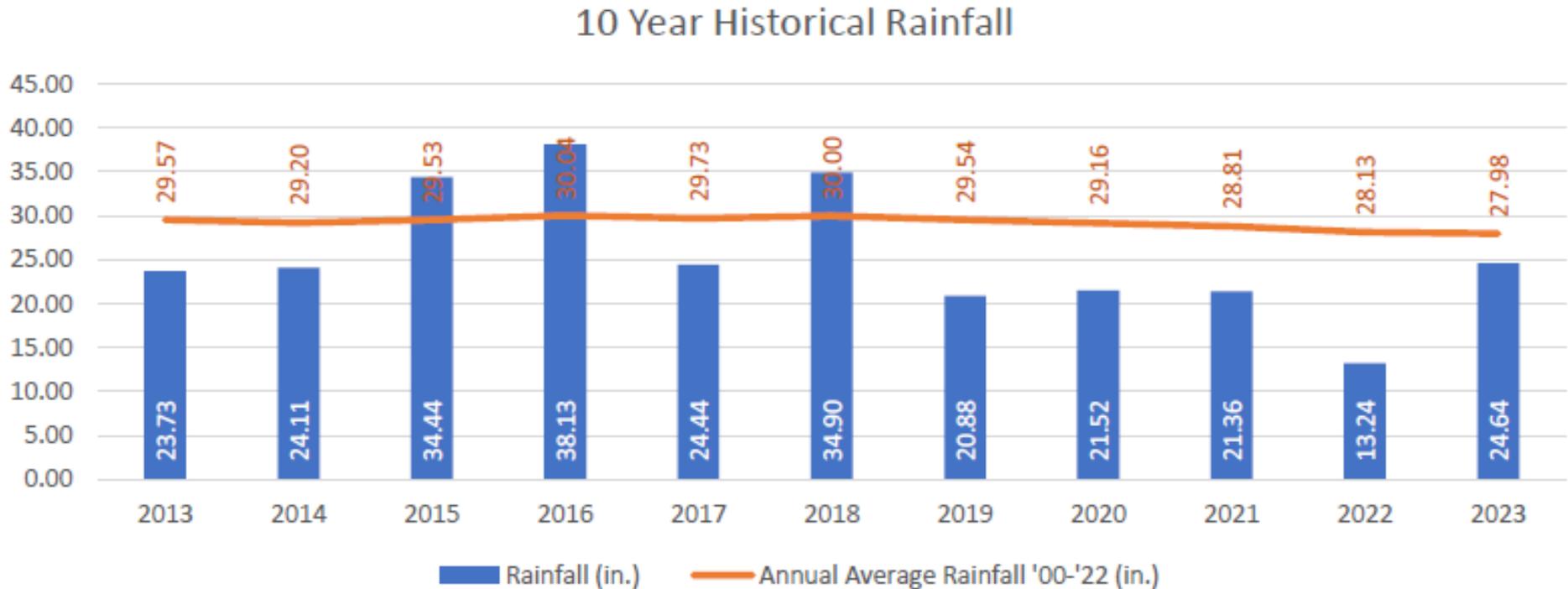
Historical Rainfall: 2000-2023

YEARLY RAINFALL AMOUNTS & AVERAGES



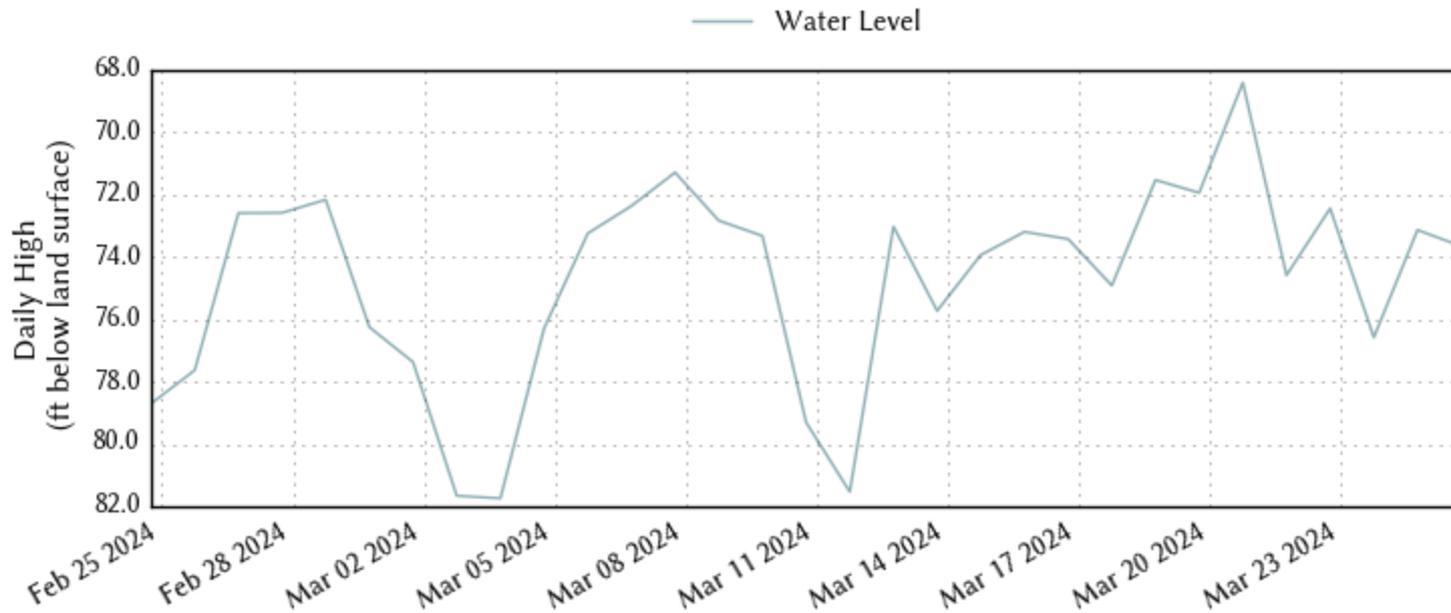
City of Fredericksburg

Historical Rainfall: 2013-2023



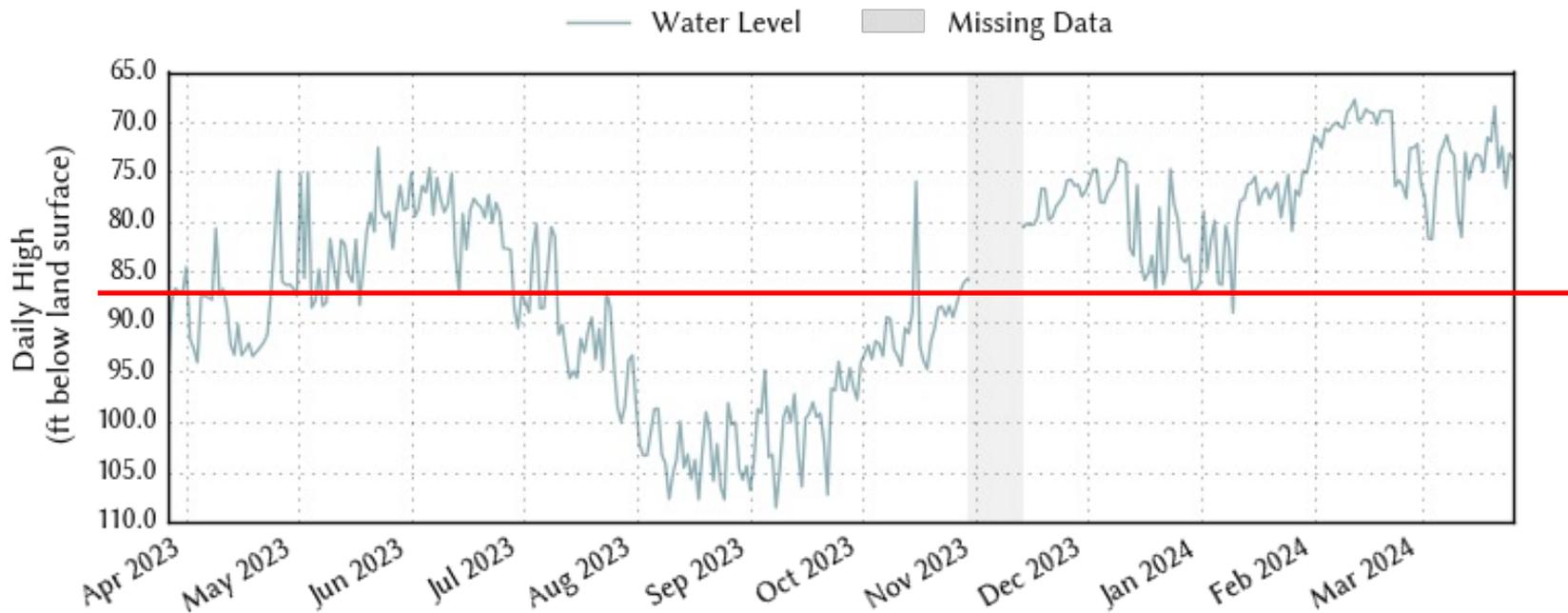
City of Fredericksburg

Knauth Well Field – 30 days



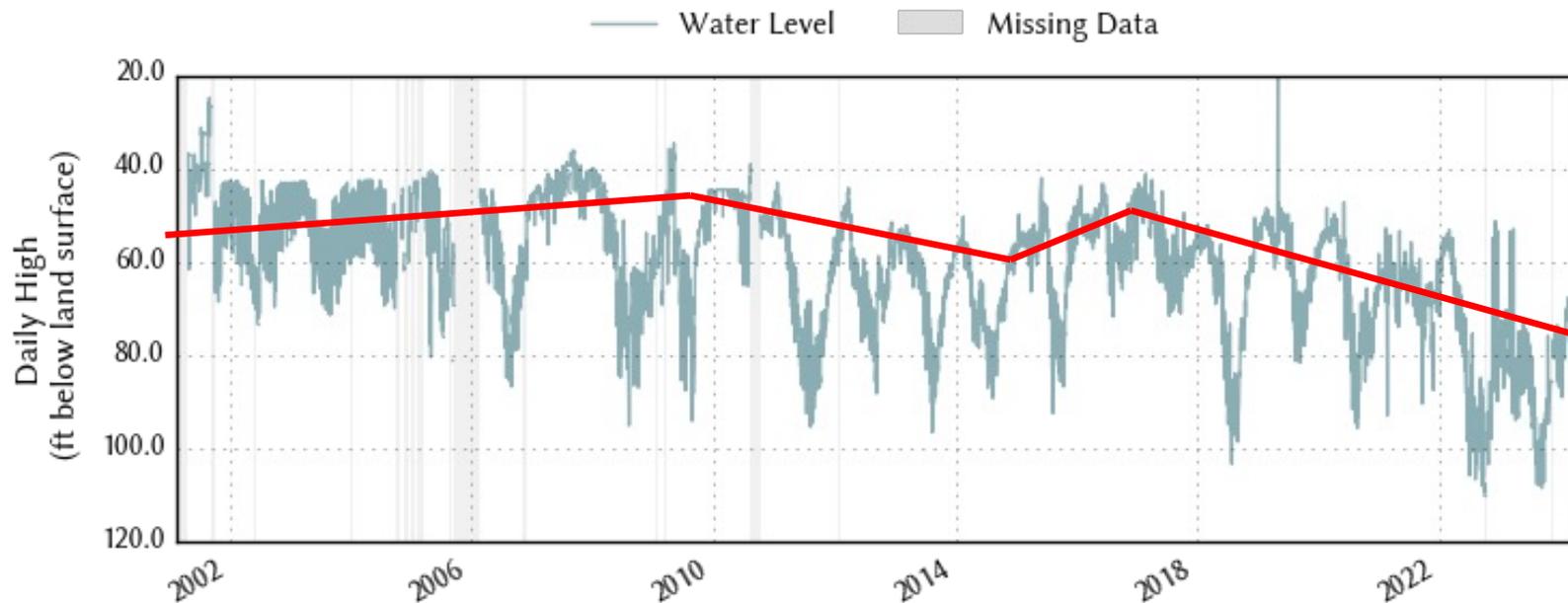
- Measurement below ground surface at well
- On March 26 2024 – 73.67 ft

City of Fredericksburg Knauth Well Field – 1 Year



- Redline indicates aquifer level 12 months prior
- 15 feet above measurement in April 2023

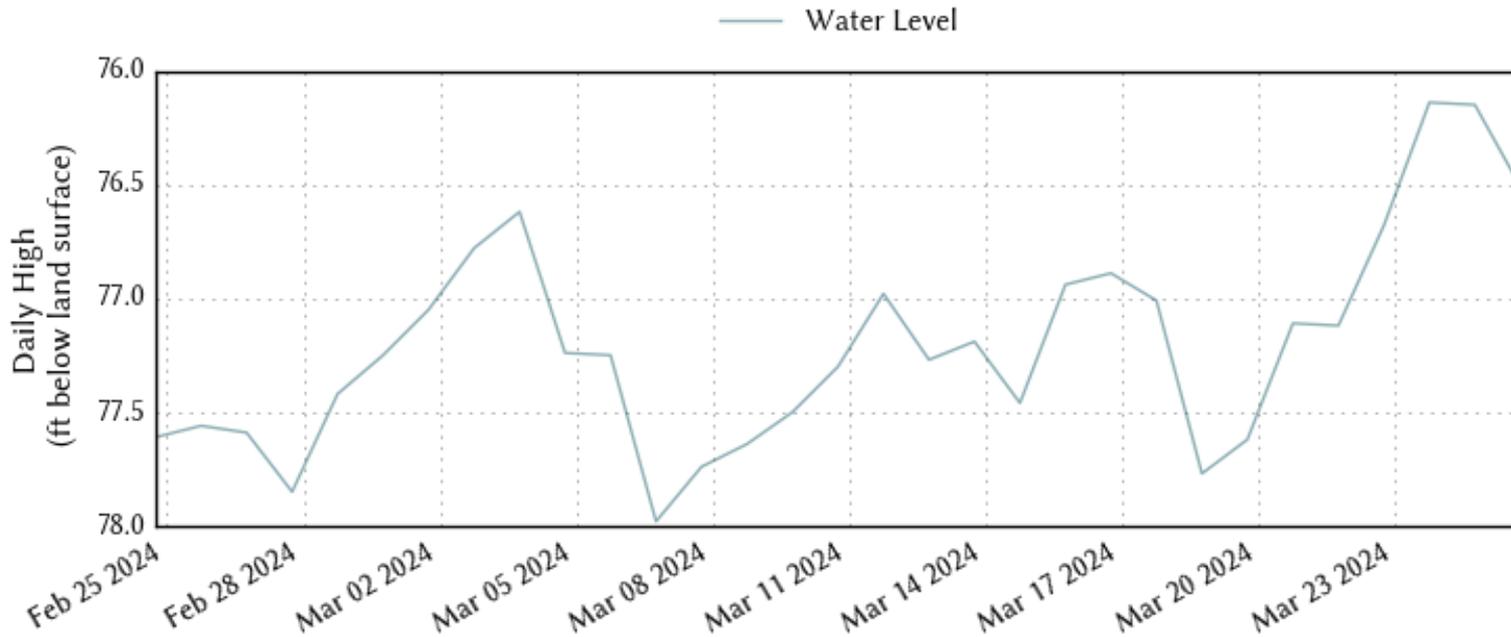
City of Fredericksburg Knauth Well Field – Period of Record



- Redline shows trend line of aquifer

City of Fredericksburg

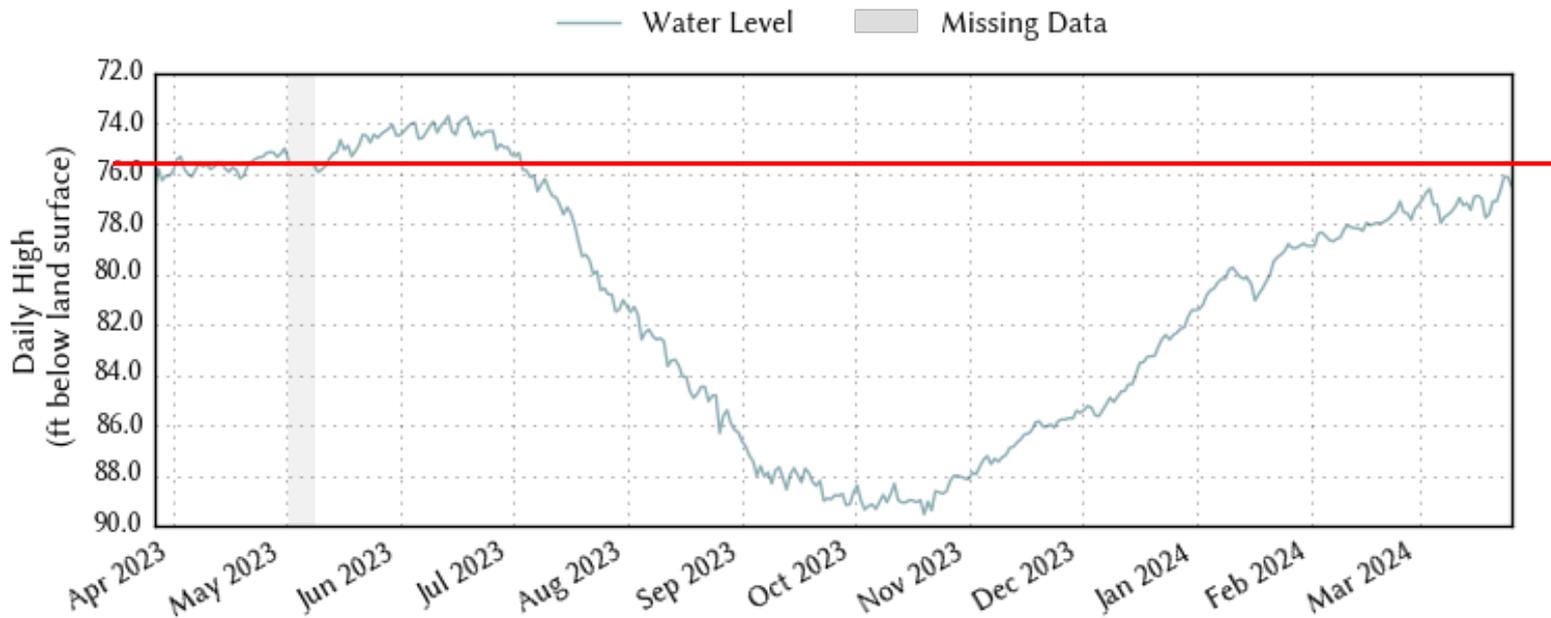
Old SA Rd Well Field – Last 30 days



- Measurement below ground surface at well
- On March 26 2024 – 76.51 ft

City of Fredericksburg

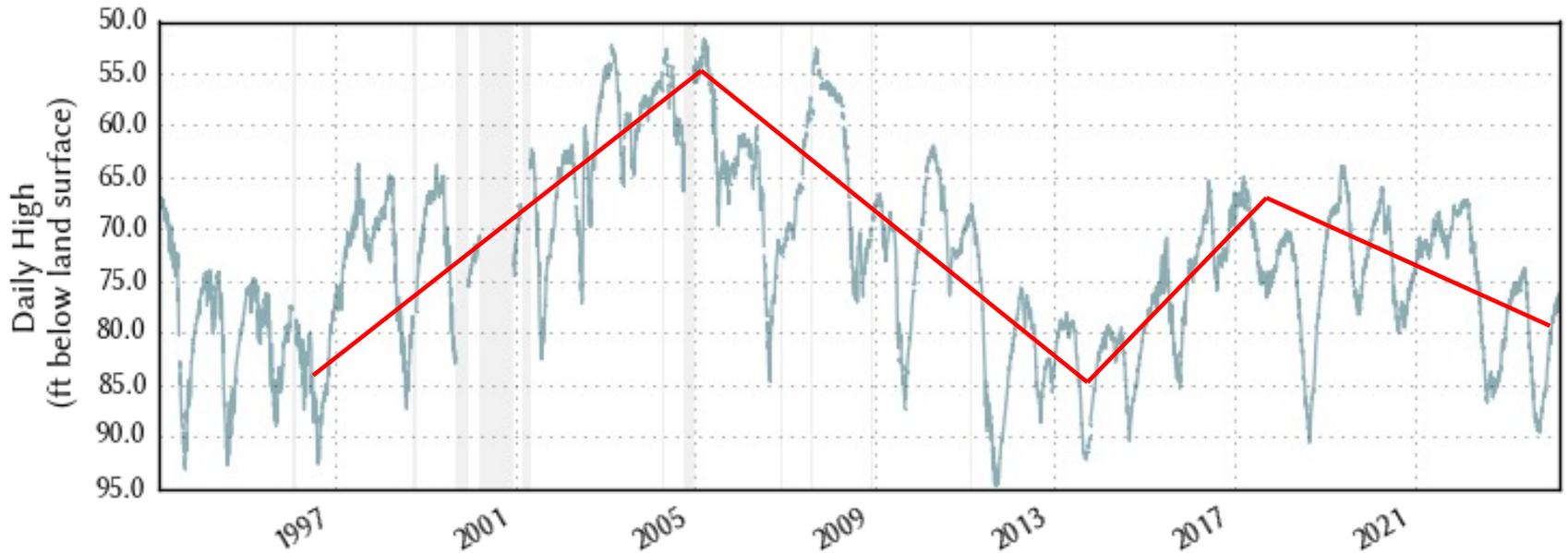
Old SA Rd Well Field – 1 Year



- Redline indicates aquifer level 12 months prior
- 1.3 feet below measurement in April 2023

City of Fredericksburg

Old SA Rd Well Field – Period of Record



- Redline shows trend line of aquifer

Water Distribution System Integrity

Recent Projects

- Windcrest Water Storage Tank Rehabilitation
- New South Heights Water Storage Tank
- New Goehmann Ln Water Storage Tank
- Upper Pressure Plane Pipeline (Cross Mtn. to Stoneridge)
- Recompletion of Knauth #2 Well
- Bell Street Waterline Project
- Sensus Water Meters
- New Pump Station at Knauth Wellfield
- 290 East Water Supply Line
- 3 New 1M Gallon Concrete Water Storage Tanks
- East Main Street Waterline Rehab
- Water Main Replacement Project (various locations in town)

Water Conservation Measures

What have we been doing to conserve water?

1. Water system leak detection survey
2. AMR “smart” meters
3. Re-use of reclaimed water
4. Water rate adjustment/increase
5. Watering restrictions

Current Water Conservation Measures

1. Water System Leak Detection Survey

- Phases 1 completed in November 2022 (FY23)
- Phase 2 completed in February 2024 (FY24)
- Surveys Included:
 - 72 miles of piping
 - 4,000 service lines
 - 250 fire hydrants
- 17 leaks were identified
- Water loss audit
- Phase 3 – FY2025

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
- 2015: 3.4% or 25,059,000 gallons
- 2016: 1.4% or 12,600,000 gallons
- 2017: 4.4% or 36,660,000 gallons
- 2018: 8.7% or 76,298,000 gallons
- 2019: 8.3% or 71,016,000 gallons
- 2020: 6.4% or 57,143,000 gallons
- 2021: 7.0% or 60,046,889 gallons
- 2022: 4.4% or 43,354,354 gallons
- 2023: 6.8% or 57,106,678 gallons

Current Water Conservation Measures

Based on annual production of 900,000,000 gallons

- Annual Savings from 2010 vs. 2020 = 46,757,000 gallons
@ 200 GPCD....
 - Water supply for 640 additional people
 - 4.6 years of growth

Based on annual production of 900,000,000 gallons

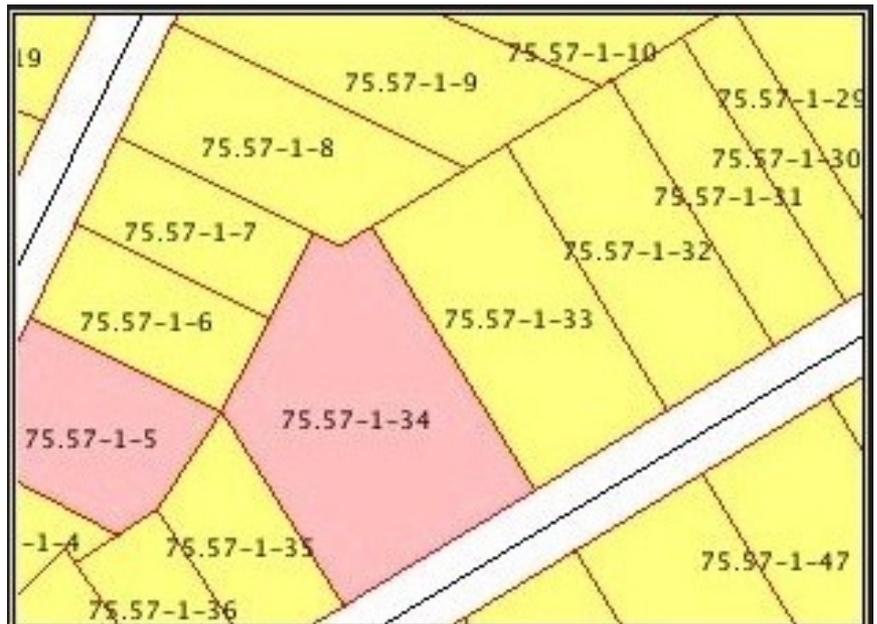
- Annual Savings from 2010 vs. 2016 = 91,300,000 gallons
@ 200 GPCD....
 - Water supply for 1,250 additional people
 - 8 years of growth

** Population growth based on 1.21% annual compounded growth rate*

Current Water Conservation Measures

2. AMR “Smart” Meters

- Meter data from new meters includes date/time/volume of consumption
- Enables utility billing and code enforcement to easily identify leaks and water violations
- Sensus Customer Portal allows customers to monitor water usage and/or receive alerts.
- <https://www.fbgtx.org/1124/Sensus-Customer-Portal>



Current Water Conservation Measures

3. Re-Use of Reclaimed Water

- 500M gallons produced annually (50% of potable water volume)
- 35-40% currently re-used annually, 100% during summer months
- Golf Courses: Boot Ranch and Lady Bird Johnson
- TCEQ 210 permit permitting sale of reclaimed water for construction use
- Frieden Subdivision Development

Current Water Conservation Measures

4. Water Rate Structure Encourages Conservation

- New Rate Structure in October 2013
- Amended Rates with Rate Study in November 2019
- Inclining Block Rate Structure “Tiered”... Higher consumption = higher cost
- Commercial sewer rates based on actual water usage

| Gallon Usage | Rate per thousand |
|---------------|-------------------|
| 0 | \$11.60 |
| 1—6,000 | \$2.45 |
| 6,001—12,000 | \$3.92 |
| 12,001—18,000 | \$6.37 |
| 18,001—25,000 | \$9.31 |
| 25,001—50,000 | \$10.42 |
| Over 50,000 | \$14.09 |

Water Rates and Watering Restrictions

- Current water rates went into effect October 1, 2013
- New watering restrictions went into effect May 1, 2014
 - 5 stages (1-5) of watering restrictions
 - Goal of each stage is to reduce demand of water

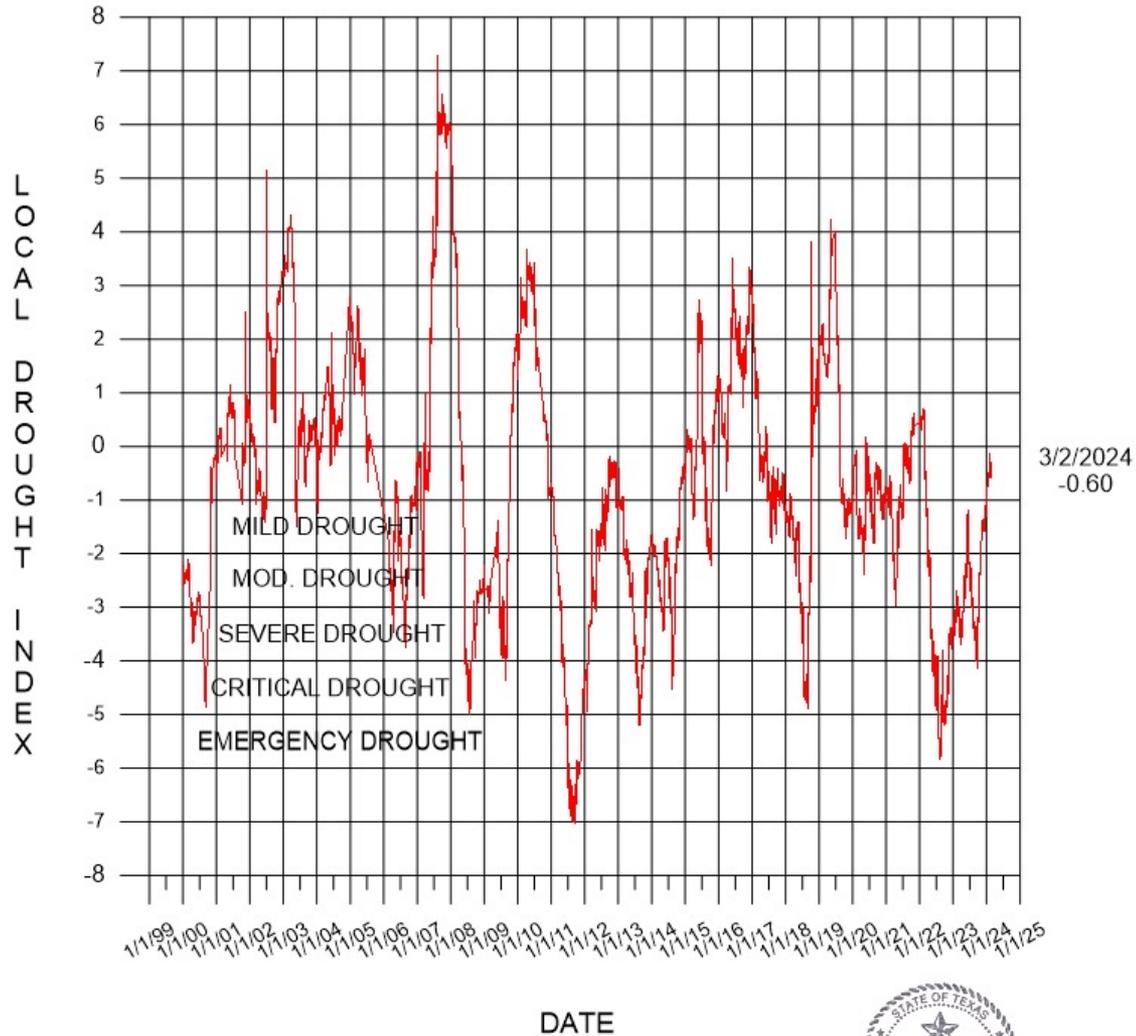
Trigger Conditions

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

** Initiation and Termination of Stages by City Manager proclamation*

GILLESPIE COUNTY LOCAL DROUGHT INDEX AS OF MARCH 2nd., 2024

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



Current Watering Stage

Stage 4 – Critical Water Condition: Watering Days/Times

| Stage | Last Digit of Address | Watering Day | Weekends | Watering Times |
|-------|--|------------------------------------|---|----------------|
| 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 | 6 - 10 a.m. ** |

**Council changed to morning watering 6-10am on October 17th, 2023

| 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 | 6-10 a.m. |
| 5 | All | None | No | None |

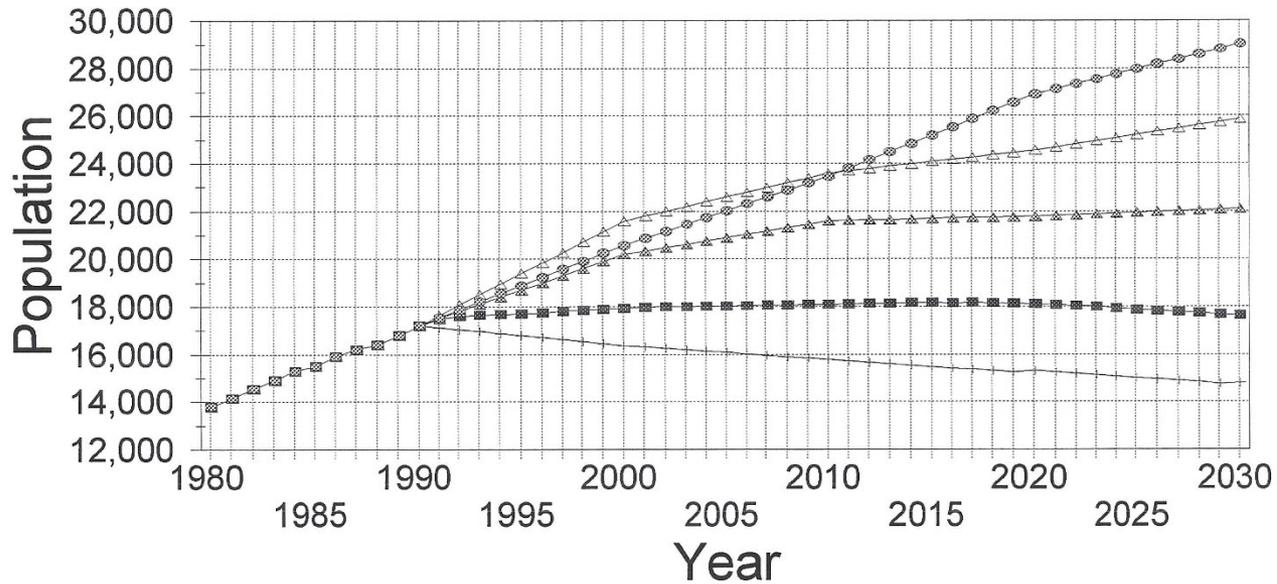
*Discussed changing water times from 6-10am and 6-10pm for all watering stages

Draft Region K Water User Group (WUG) Population

| | WUG Population | | | | | |
|---|----------------|---------------|---------------|---------------|---------------|---------------|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Gillespie County Total | 28,366 | 29,831 | 31,307 | 33,419 | 35,813 | 38,526 |
| Gillespie County / Colorado Basin Total | 27,738 | 29,159 | 30,591 | 32,638 | 34,959 | 37,589 |
| Fredericksburg | 11,261 | 11,529 | 11,794 | 12,138 | 12,539 | 13,005 |
| County-Other | 16,477 | 17,630 | 18,797 | 20,500 | 22,420 | 24,584 |
| Gillespie Total | 27,738 | 29,159 | 30,591 | 32,638 | 34,959 | 37,589 |
| Gillespie County / Guadalupe Basin Total | 628 | 672 | 716 | 781 | 854 | 937 |
| County-Other | 628 | 672 | 716 | 781 | 854 | 937 |

Gillespie County

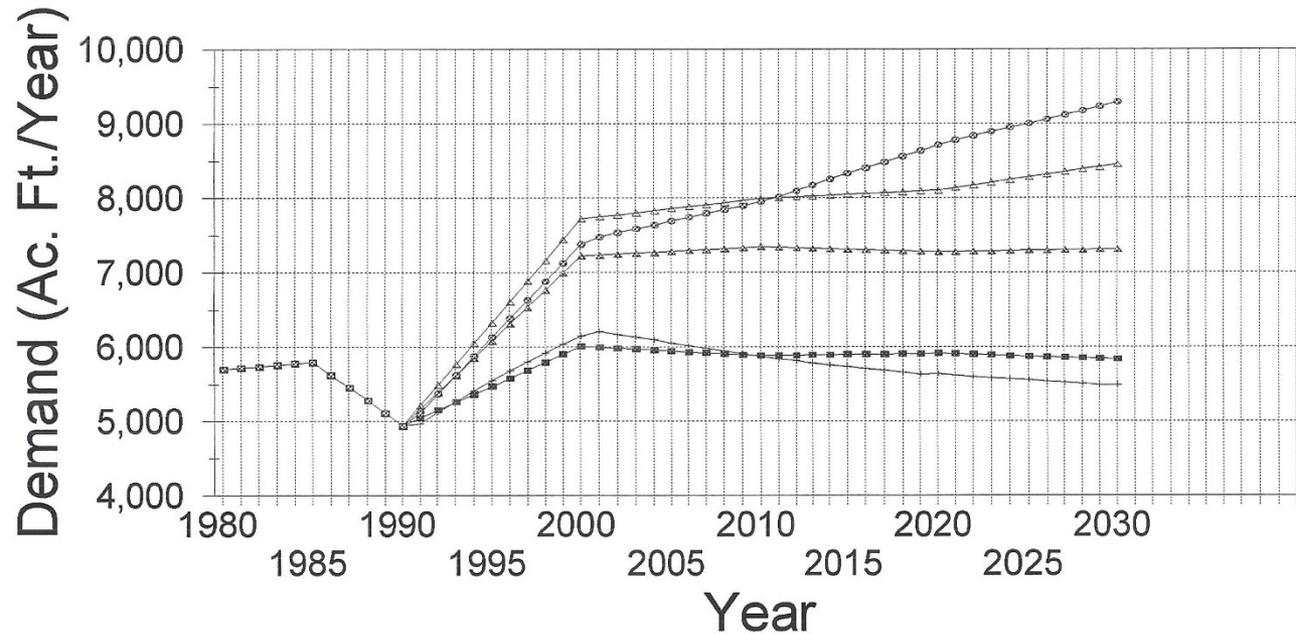
Population Projections



■ John Sharp ▲ TWDB Low ▲ TWDB High
+ TAMU Low ◆ TAMU High

Gillespie County

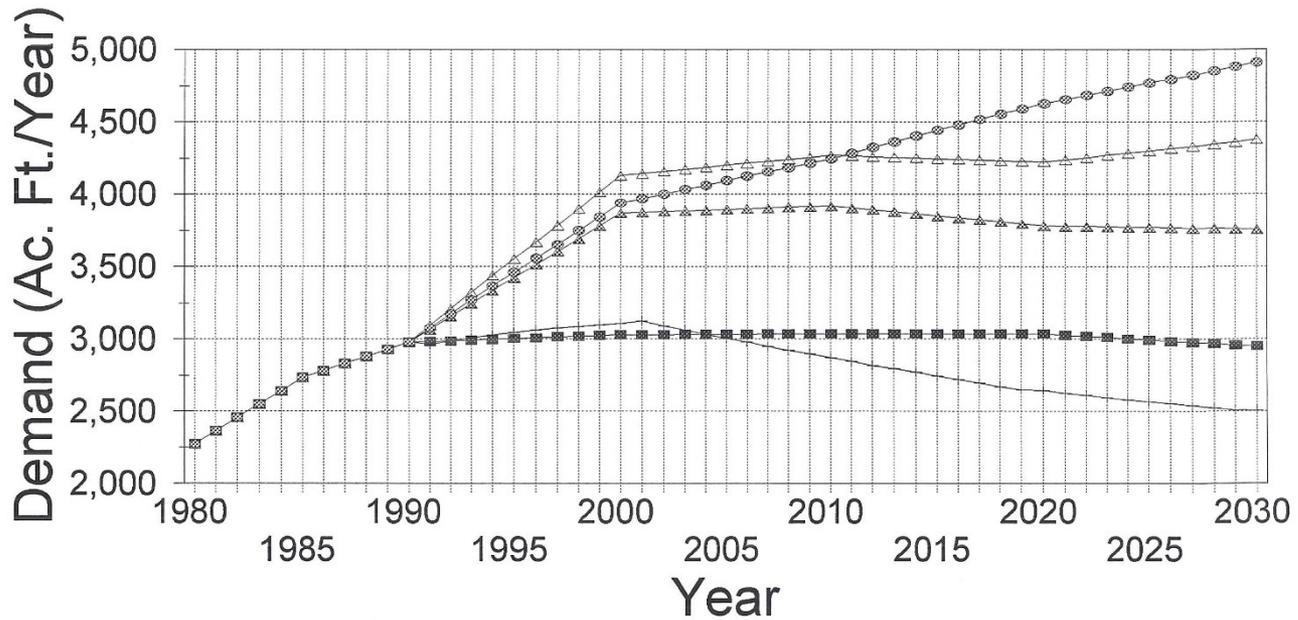
Total Water Demands



—■— John Sharp —▲— TWDB Low —△— TWDB High
—+— TAMU Low —○— TAMU High

Gillespie County

Municipal Water Demands



Draft Region K Water User Group (WUG) Existing Water Supply

| | | | Existing Supply (acre-feet per year) | | | | | |
|--|---------------|---|--------------------------------------|--------------|--------------|--------------|--------------|--------------|
| WUG Name | Source Region | Source Description | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Gillespie County WUG Total | | | 9,967 | 9,967 | 9,967 | 9,967 | 9,967 | 9,967 |
| Gillespie County / Colorado Basin WUG Total | | | 9,871 | 9,871 | 9,871 | 9,871 | 9,871 | 9,871 |
| Fredericksburg | K | Ellenburger-San Saba Aquifer Gillespie County | 3,371 | 3,371 | 3,371 | 3,371 | 3,371 | 3,371 |
| Fredericksburg | K | Hickory Aquifer Gillespie County | 168 | 168 | 168 | 168 | 168 | 168 |

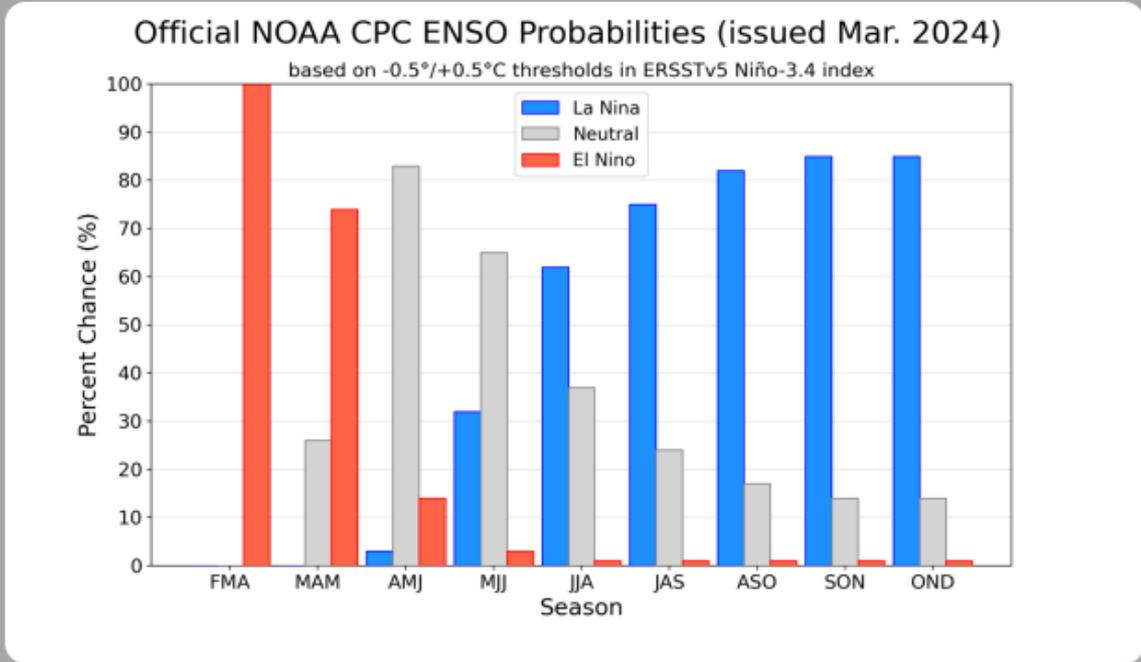
Draft Region K Water User Group (WUG) Needs or Surplus

| | | | Water Supply Needs or Surplus (acre-feet per year) | | | | | |
|----------------|-----------|-----------|--|------|------|------|-------|-------|
| WUG Name | County | Basin | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Fredericksburg | Gillespie | Colorado | 464 | 402 | 330 | 236 | 127 | 0 |
| County-Other | Gillespie | Colorado | 365 | 246 | 114 | (79) | (296) | (539) |
| Manufacturing | Gillespie | Colorado | 194 | 180 | 165 | 150 | 134 | 117 |
| Mining | Gillespie | Colorado | (2) | (3) | (4) | (6) | (7) | (8) |
| Livestock | Gillespie | Colorado | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Gillespie | Colorado | 44 | 44 | 44 | 44 | 44 | 44 |
| County-Other | Gillespie | Guadalupe | 19 | 14 | 9 | 2 | (6) | (16) |
| Livestock | Gillespie | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |

CPC Probabilistic ENSO Outlook

Updated: 14 March 2024

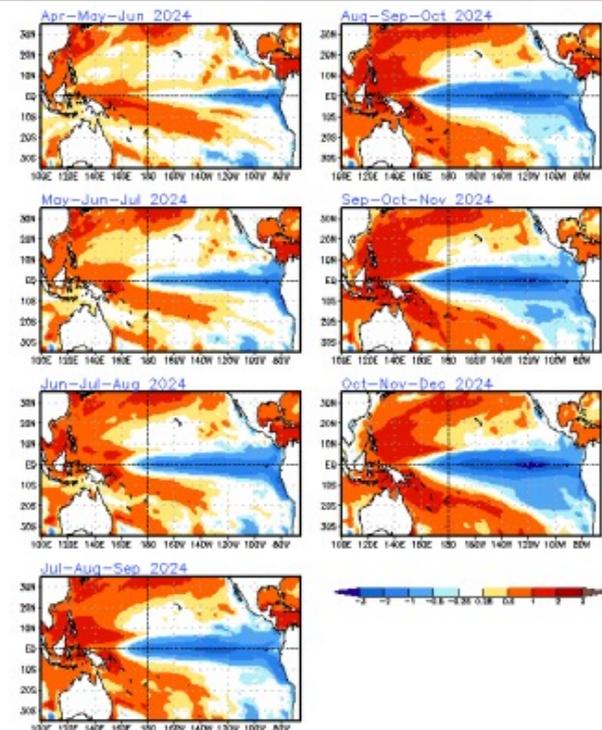
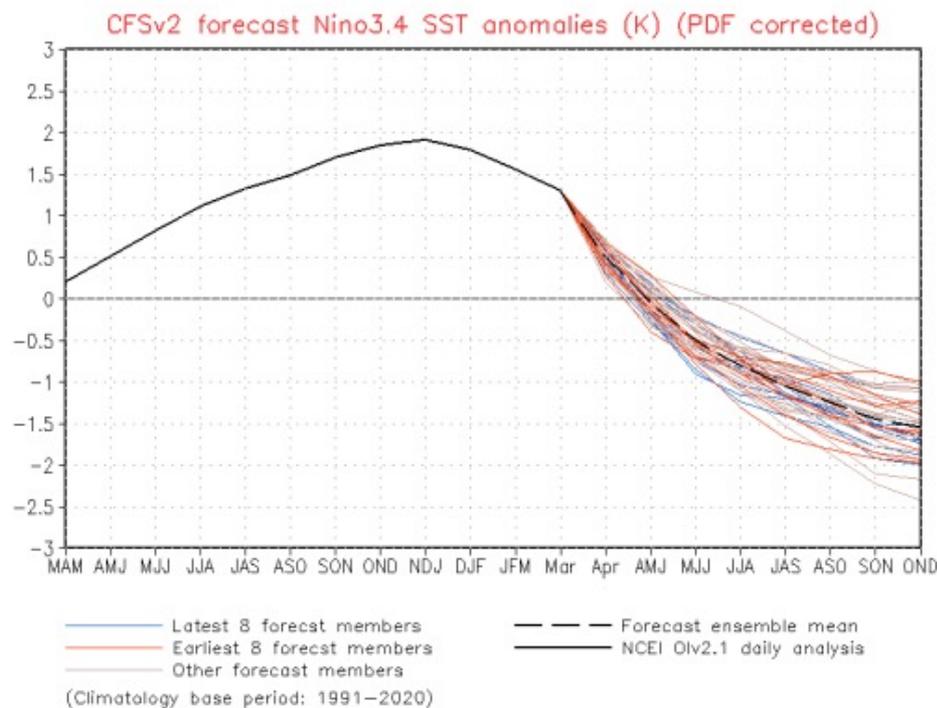
A transition from El Niño to ENSO-neutral is expected by April-June season 2024, with ENSO-neutral persisting through May-July 2024. Thereafter, La Niña is favored in June-August, and chances increase through the October-December season.



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

Issued: 24 March 2024

The CFS.v2 ensemble mean (black dashed line) indicates El Niño may transition to ENSO-neutral around April, followed by a transition to La Niña around May-July 2024.



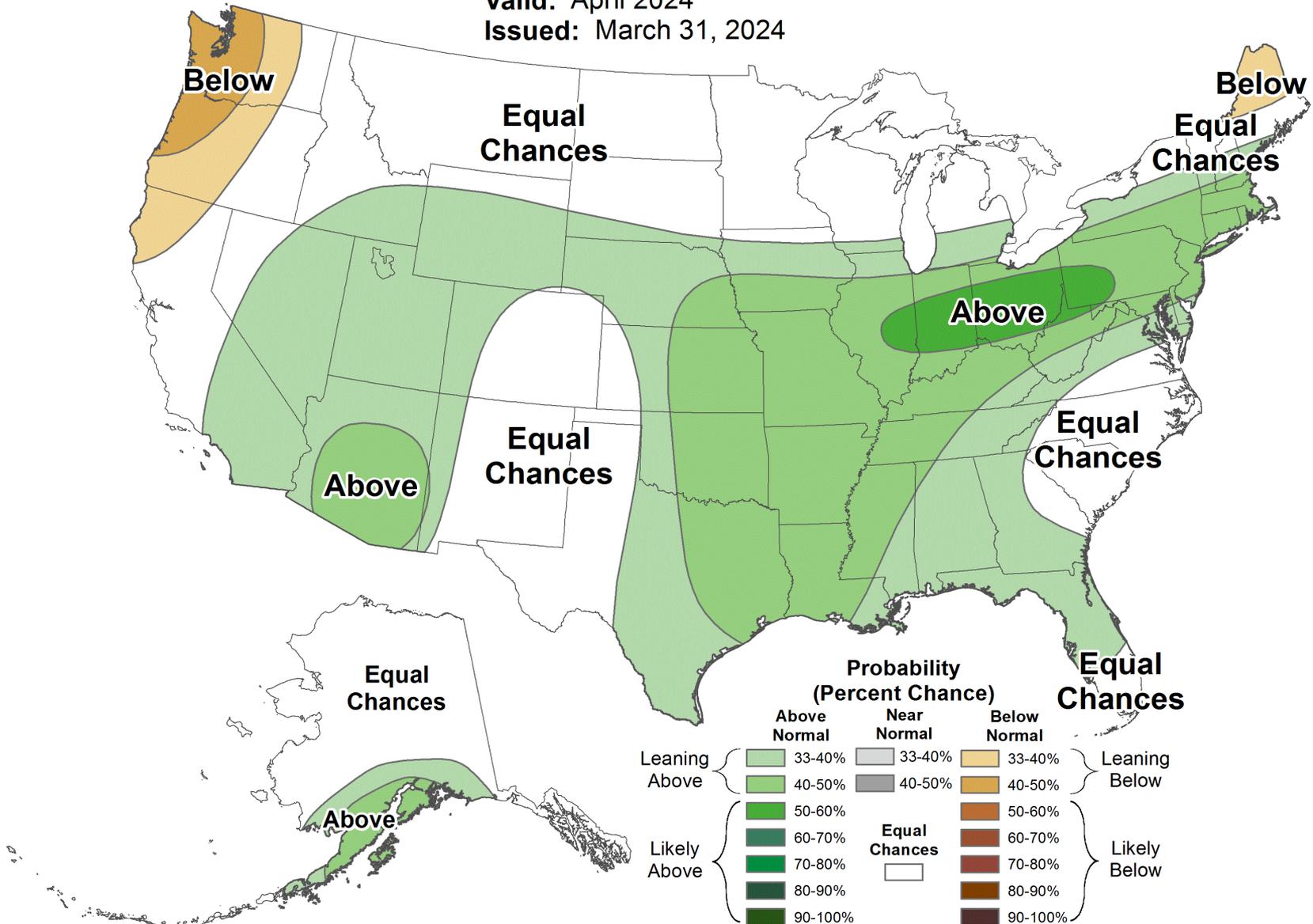


Monthly Precipitation Outlook



Valid: April 2024

Issued: March 31, 2024





Seasonal Precipitation Outlook



Valid: Apr-May-Jun 2024

Issued: March 21, 2024

