Upper Colorado River Basin

Texas Clean Rivers Program (CRP) Water Quality Advisory Committee (WQAC)

# WELCOME

April 5, 2023

9AM to 12PM

*Held at the Upper Colorado River Authority*

*512 Orient Street, San Angelo, Texas*

THE TEXAS CLEAN RIVERS PROGRAM

UCRA

# WELCOME & INTRODUCTIONS

Nancy Blackwell

Board of Directors Chairperson

Upper Colorado River Authority (UCRA)

# WATER QUALITY REPORTS

## Scott McWilliams

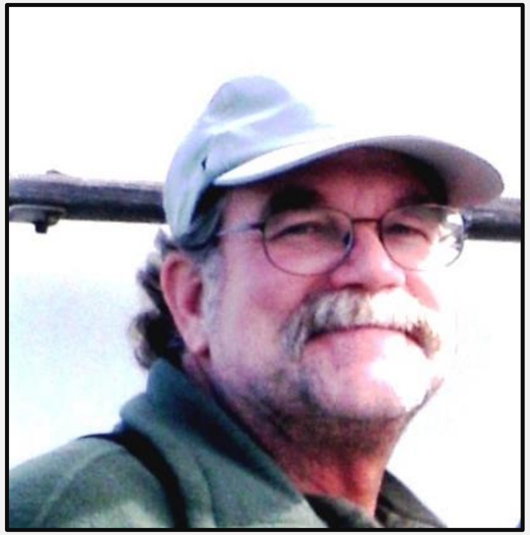
General Manager

Upper Colorado River Authority (UCRA)

## John Burch

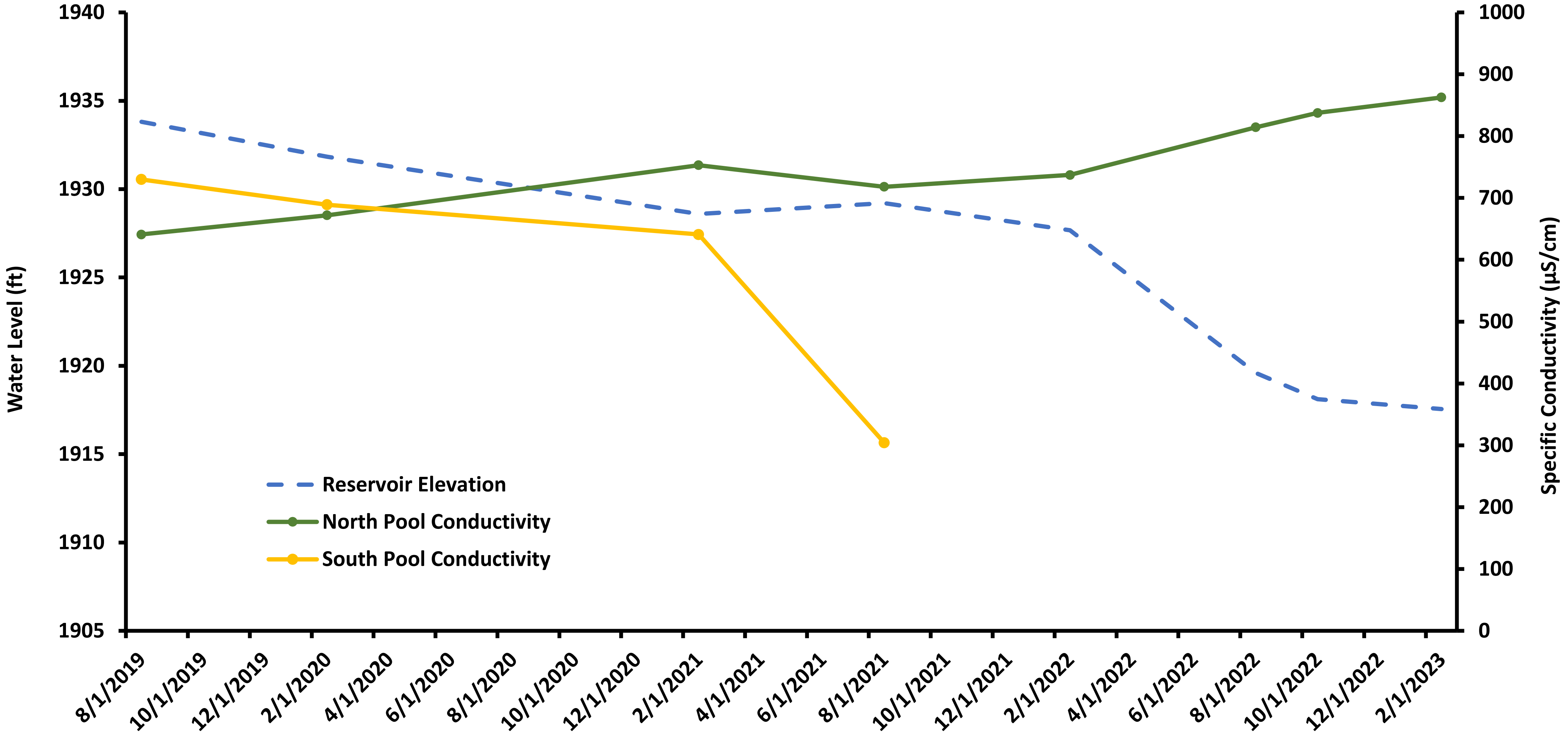
Water Quality Supervisor & Aquatic Biologist

Colorado River Municipal Water District (CRMWD)



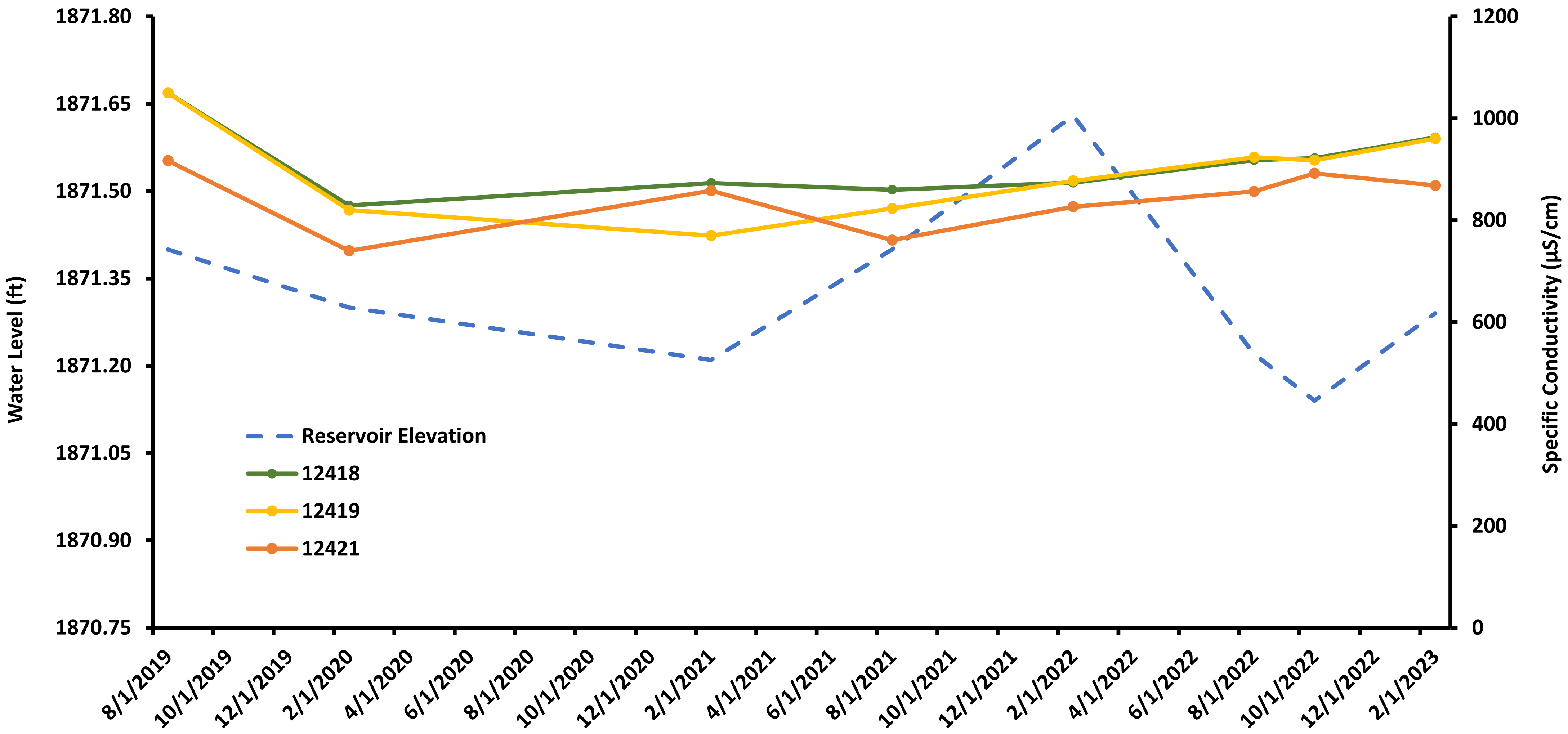

# Water Quality Reports

Upper Basin Reservoirs




# Twin Buttes Reservoir

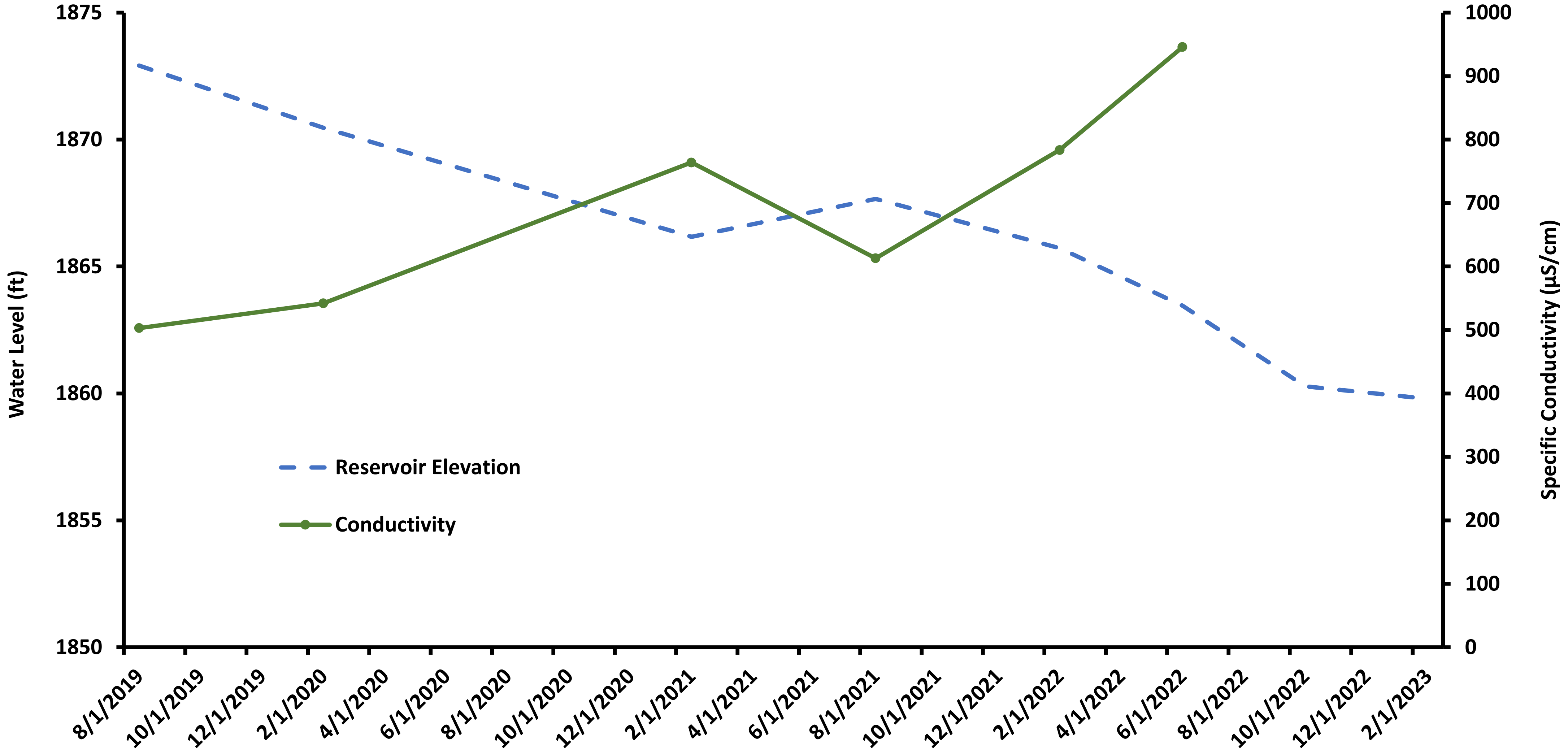
Data collected via UCRA routine monitoring for CRP and TWDB database. Some data pictured is not yet published.




# Lake Nasworthy

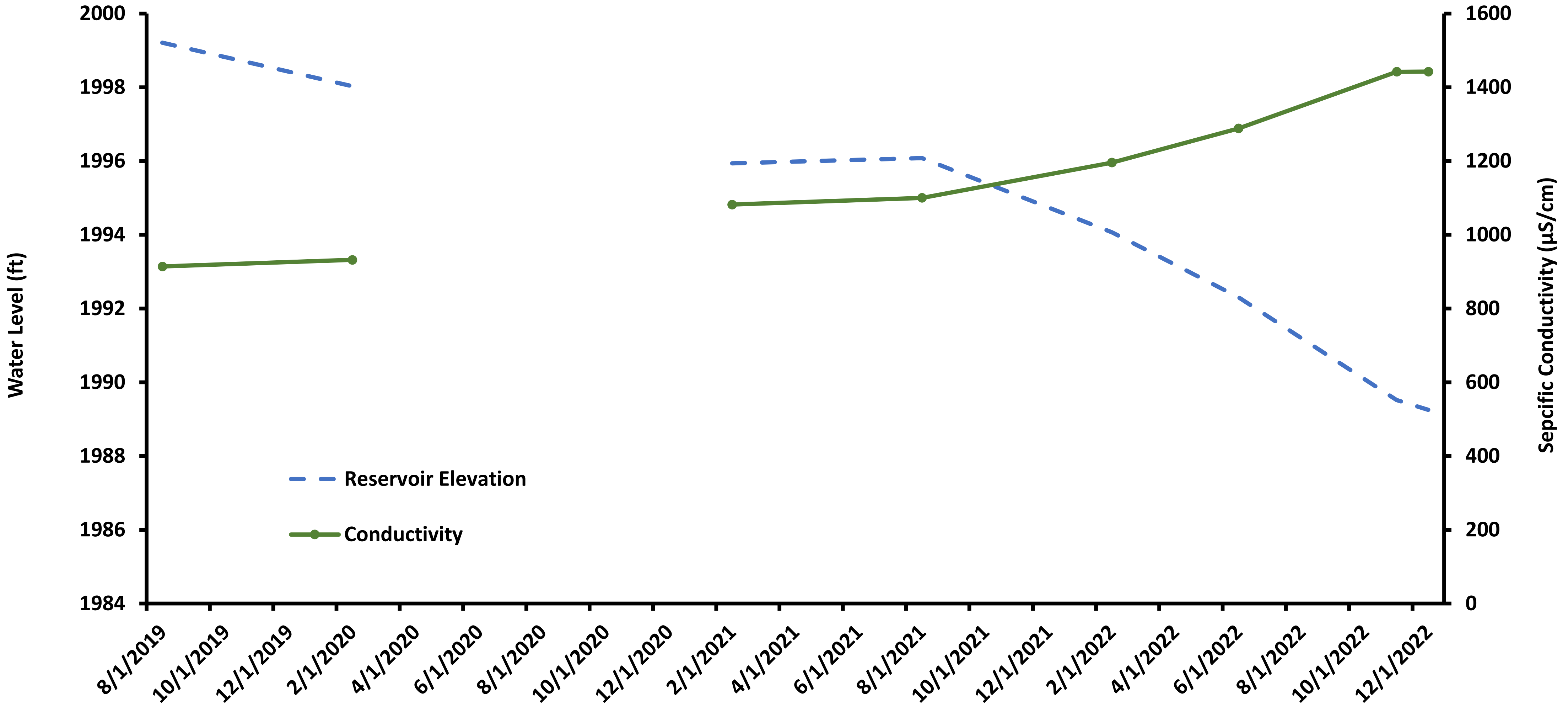
Data collected via UCRA routine monitoring for CRP and TWDB database. Some data pictured is not yet published.

UCRA




# O. C. Fisher Reservoir

Data collected via UCRA routine monitoring for CRP and TWDB database. Some data pictured is not yet published.




# Oak Creek Reservoir

Data collected via UCRA routine monitoring for CRP and TWDB database. Some data pictured is not yet published.

# WATER QUALITY REPORTS

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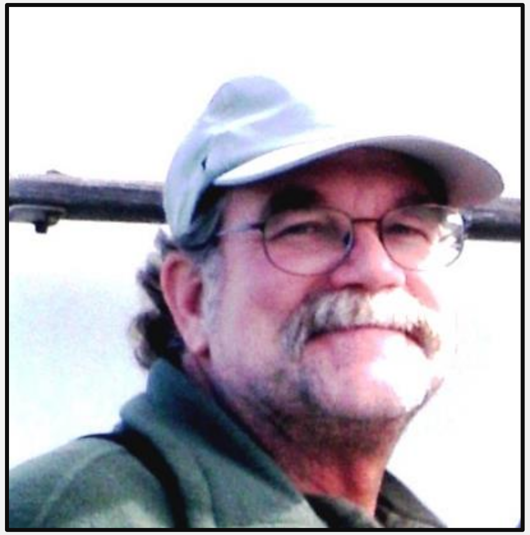
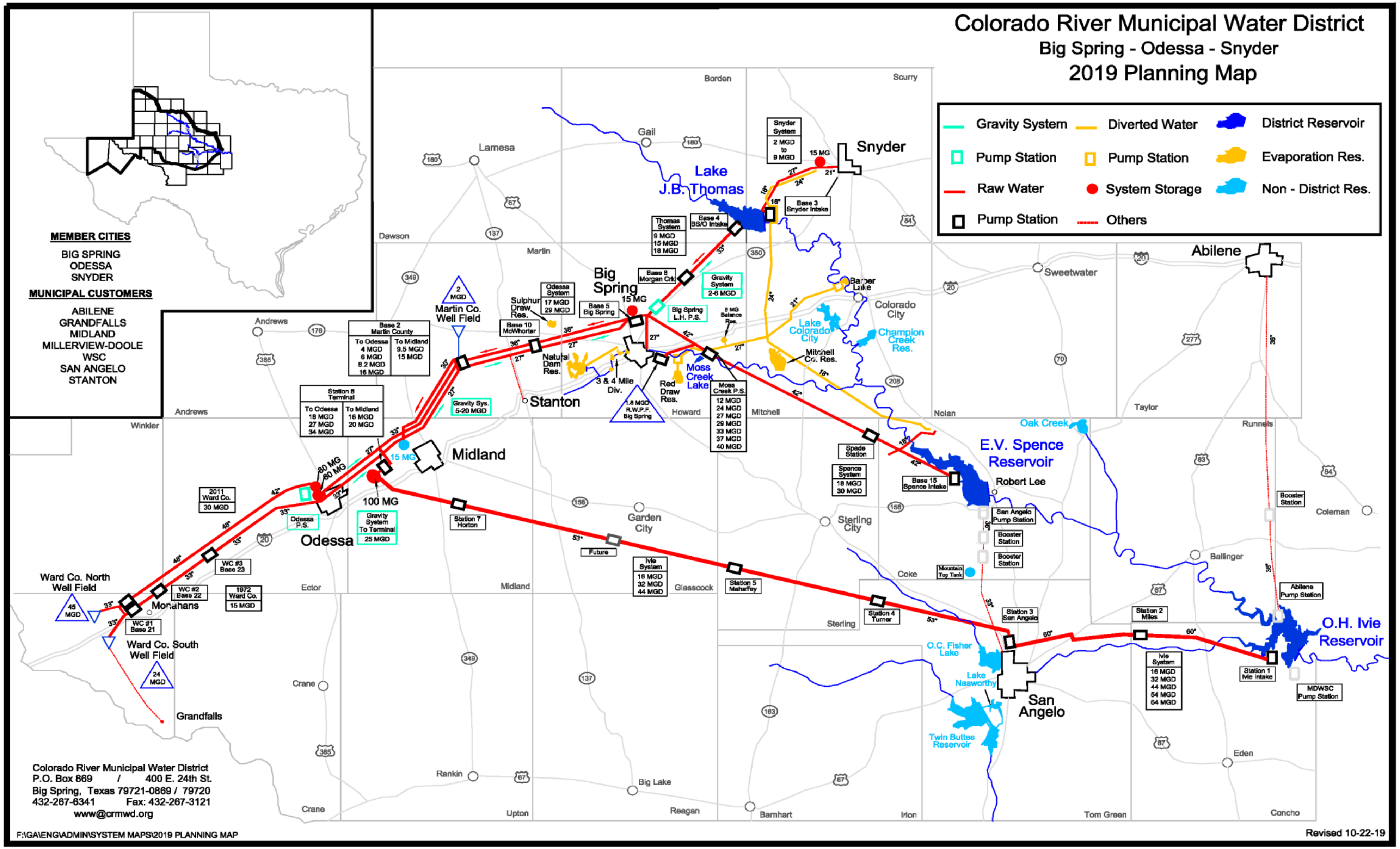
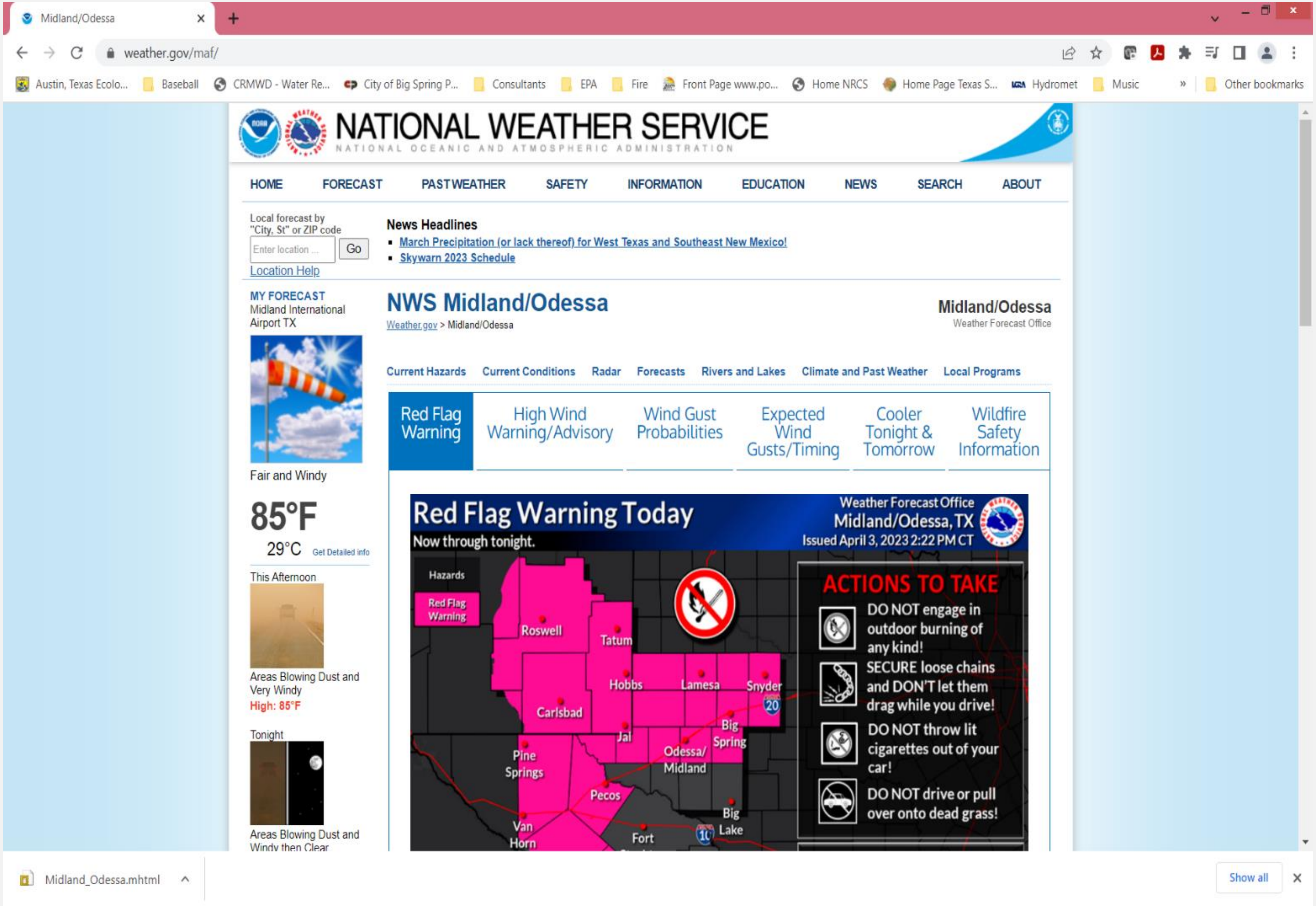


CRMWD

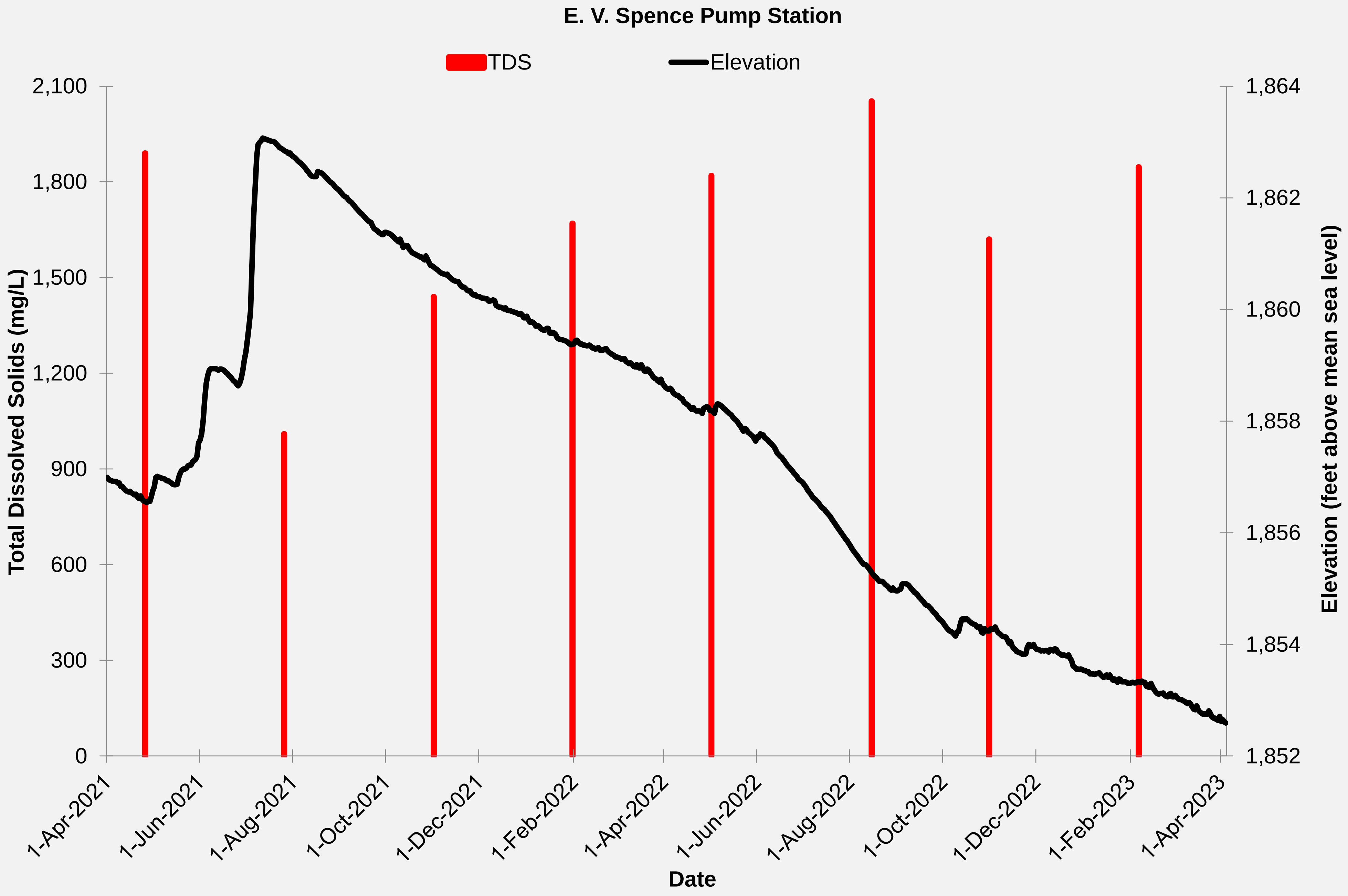
UCRA



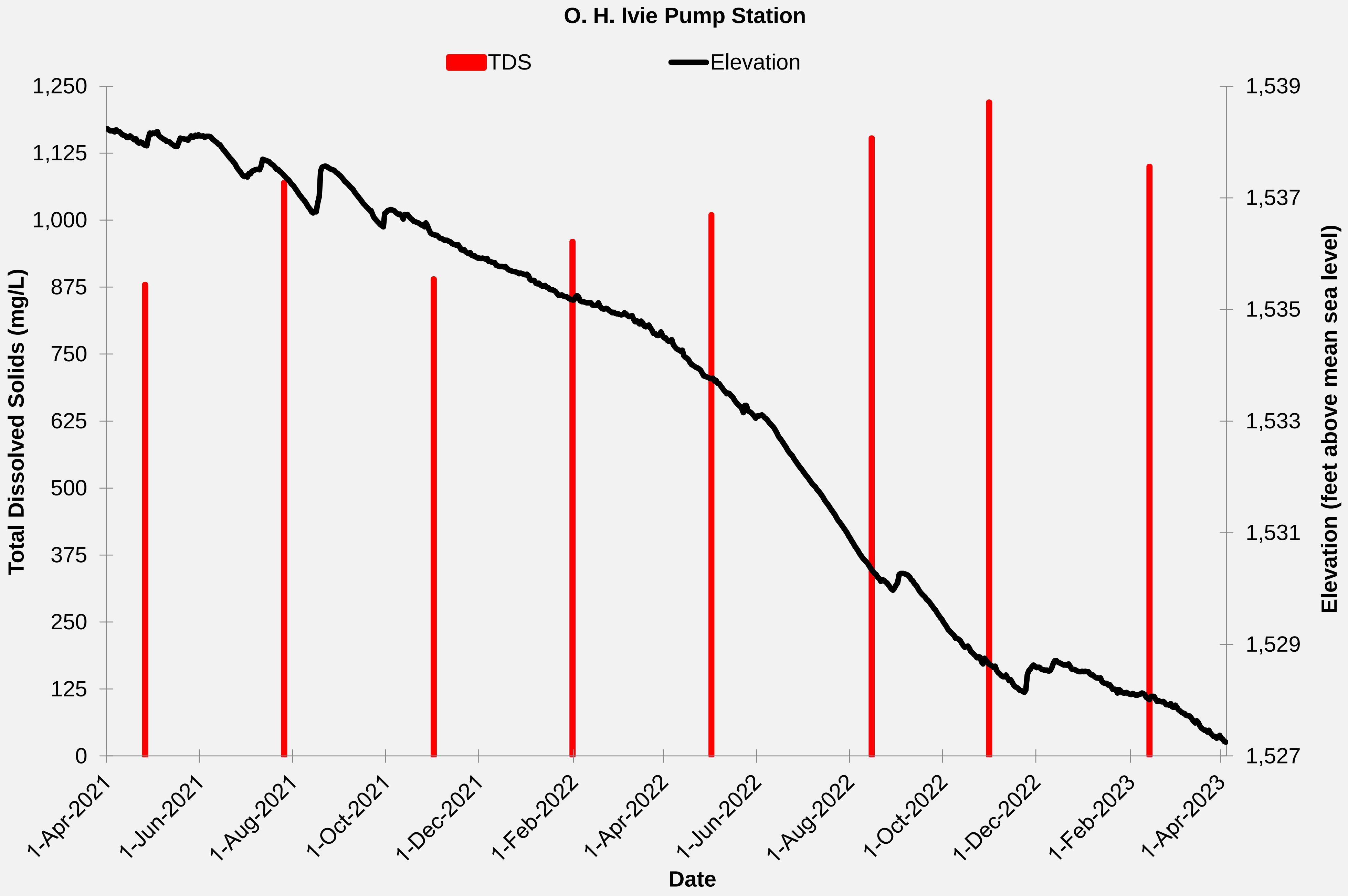

| | |
|---|---|
| J. B. Thomas | 22.0% Capacity (78.0% Empty) |
| E. V. Spence | 17.5% Capacity (82.5% Empty) |
| O. H. Ivie | 37.6% Capacity (62.4% Empty) |


Midland/Odessa
weather.gov/maf/
Austin, Texas Ecolo...
Baseball
CRMWD - Water Re...
City of Big Spring P...
Consultants
EPA
Fire
Front Page www.po...
Home NRCS
Home Page Texas S...
Hydromet
Music
Other bookmarks
NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
HOME
FORECAST
PAST WEATHER
SAFETY
INFORMATION
EDUCATION
NEWS
SEARCH
ABOUT
Local forecast by "City, St" or ZIP code
Enter location ...
Go
Location Help
News Headlines
March Precipitation (or lack thereof) for West Texas and Southeast New Mexico!
Skywarn 2023 Schedule
MY FORECAST
Midland International Airport TX
Fair and Windy
85°F
29°C
Get Detailed info
This Afternoon
Areas Blowing Dust and Very Windy
High: 85°F
Tonight
Areas Blowing Dust and Windy then Clear
NWS Midland/Odessa
Weather.gov > Midland/Odessa
Midland/Odessa
Weather Forecast Office
Current Hazards
Current Conditions
Radar
Forecasts
Rivers and Lakes
Climate and Past Weather
Local Programs
Red Flag Warning
High Wind Warning/Advisory
Wind Gust Probabilities
Expected Wind Gusts/Timing
Cooler Tonight & Tomorrow
Wildfire Safety Information
Red Flag Warning Today
Now through tonight.
Weather Forecast Office
Midland/Odessa, TX
Issued April 3, 2023 2:22 PM CT
Hazards
Red Flag Warning
Roswell
Tatum
Hobbs
Lamesa
Snyder
Carlsbad
Jal
Big Spring
Odessa/Midland
Pine Springs
Pecos
Van Horn
Fort
Big Lake
ACTIONS TO TAKE
DO NOT engage in outdoor burning of any kind!
SECURE loose chains and DON'T let them drag while you drive!
DO NOT throw lit cigarettes out of your car!
DO NOT drive or pull over onto dead grass!
Midland_Odessa.mhtml
Show all

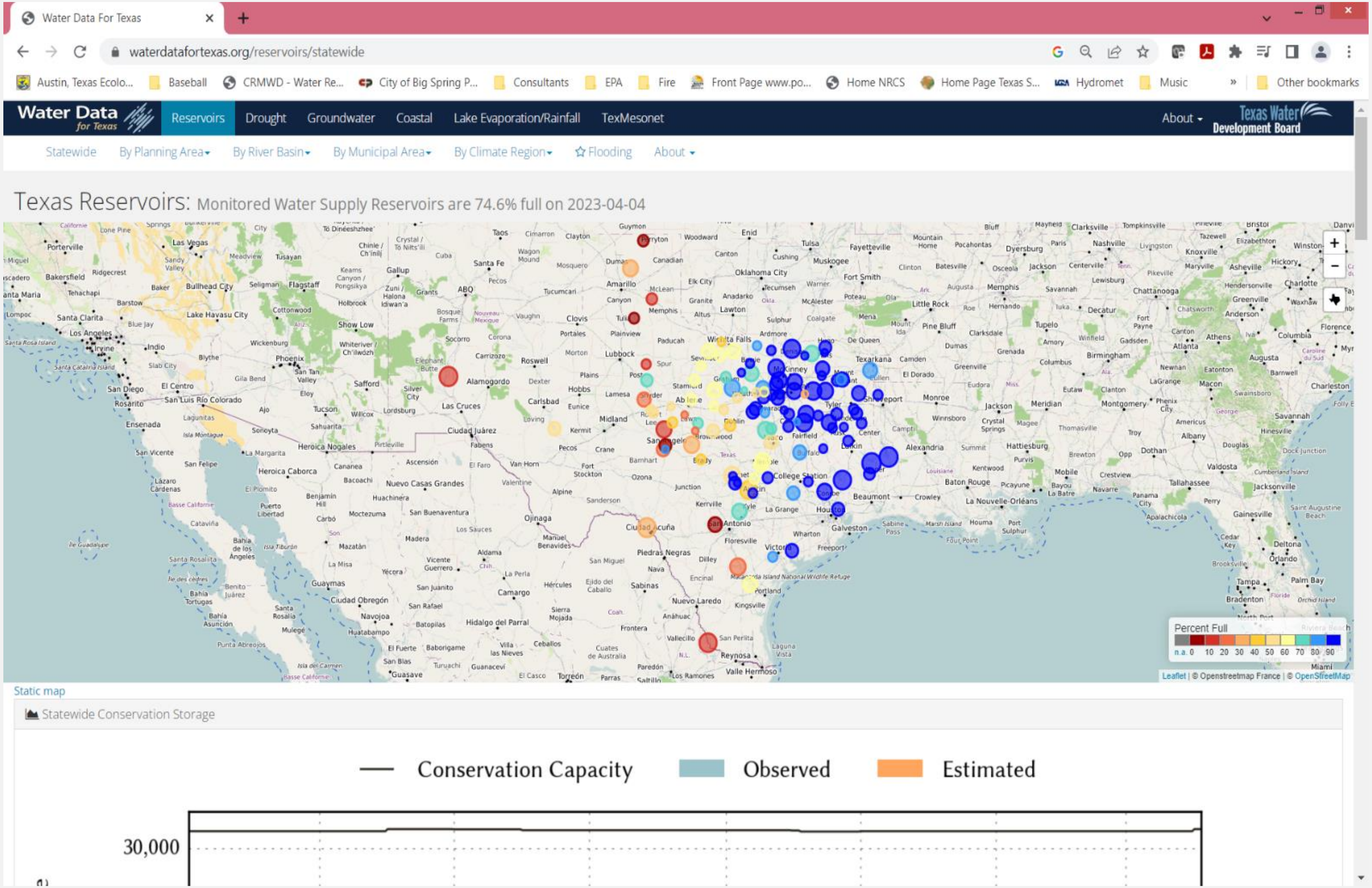
| | |
|---|---|
| 0.00 | BIG SPRING AWOS |
| **0.01** | **FLUVANNA** 3WNW MESONET |
| 0.00 | GAIL 2ESE MESONET |
| 0.00 | GAIL RAWS |
| 0.00 | GAIL COOP |
| 0.00 | LAMESA MUNICIPAL AWOS |
| 0.00 | LAMESA 1S MESONET |
| **0.79** | **SNYDER** AWOS |
| **0.34** | **SNYDER** 3E MESONET |
| **0.19** | **SNYDER** 3SSW MESONET |
| **0.47** | **SNYDER** COOP |



E. V. Spence Pump Station
TDS
Elevation
Total Dissolved Solids (mg/L)
Elevation (feet above mean sea level)
Date
2,100
1,800
1,500
1,200
900
600
300
0
1,864
1,862
1,860
1,858
1,856
1,854
1,852
1-Apr-2021
1-Jun-2021
1-Aug-2021
1-Oct-2021
1-Dec-2021
1-Feb-2022
1-Apr-2022
1-Jun-2022
1-Aug-2022
1-Oct-2022
1-Dec-2022
1-Feb-2023
1-Apr-2023



O. H. Ivie Pump Station
TDS
Elevation
Total Dissolved Solids (mg/L)
1,250
1,125
1,000
875
750
625
500
375
250
125
0
Elevation (feet above mean sea level)
1,539
1,537
1,535
1,533
1,531
1,529
1,527
1-Apr-2021
1-Jun-2021
1-Aug-2021
1-Oct-2021
1-Dec-2021
1-Feb-2022
1-Apr-2022
1-Jun-2022
1-Aug-2022
1-Oct-2022
1-Dec-2022
1-Feb-2023
1-Apr-2023
Date


Water Data For Texas
waterdatafortexas.org/reservoirs/statewide
Water Data for Texas
Reservoirs
Drought
Groundwater
Coastal
Lake Evaporation/Rainfall
TexMesonet
About
Texas Water Development Board
Statewide
By Planning Area
By River Basin
By Municipal Area
By Climate Region
Flooding
About
Texas Reservoirs: Monitored Water Supply Reservoirs are 74.6% full on 2023-04-04
Percent Full
n.a. 0 10 20 30 40 50 60 70 80 90
Leaflet | © Openstreetmap France | © OpenStreetMap
Static map
Statewide Conservation Storage
Conservation Capacity
Observed
Estimated
30,000

Water Data For Texas
waterdatafortexas.org/lake-evaporation-rainfall
Austin, Texas Ecolo... Baseball CRMWD - Water Re... City of Big Spring P... Consultants EPA Fire Front Page www.po... Home NRCS Home Page Texas S... Hydromet Music Other bookmarks

# Lake Evaporation and Precipitation

| Parameter | Quad ID | Start Date | End Date |
|---|---|---|---|
| Gross Evaporation | 710 | 01/1940 | 06/2022 |

Download Data

Selected Quad | Quad Statistics | Precipitation | Gross Evaporation | Net Evaporation | Pan-to-Lake Coefficients

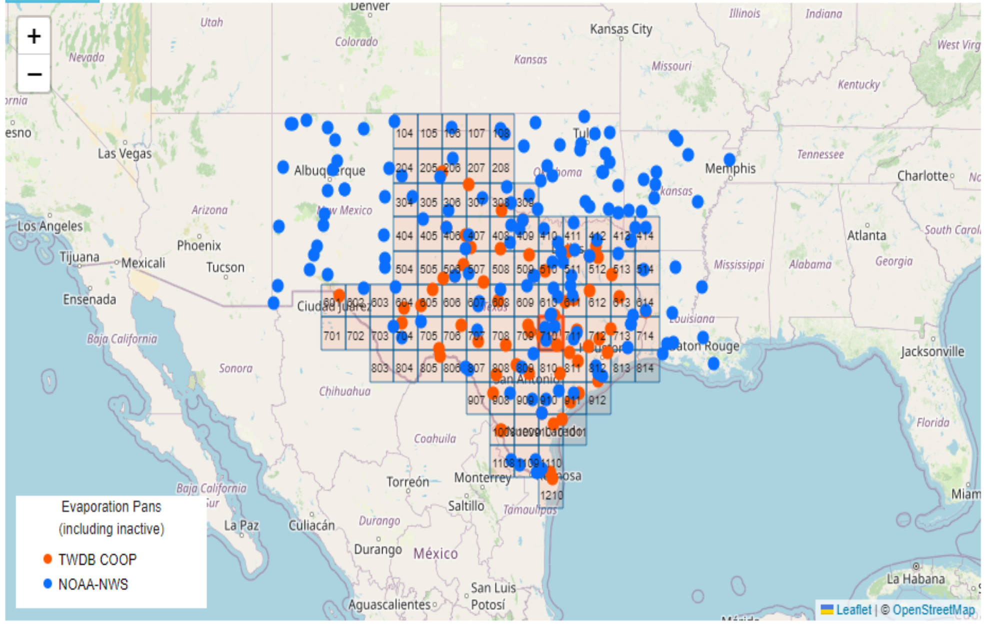
The Texas Water Development Board compiles and provides monthly and annual precipitation and gross lake evaporation rates to support water resources planning in the state. The data are provide here as gridded one-degree latitude by one-degree longitude quadrangles that cover Texas. The gross lake evaporation rate is defined as water loss caused by evaporation from the lake surface, while net lake evaporation rate is defined as the gross rate minus the precipitation rate over the lake surface. Precipitation data are available from 1940 through 2022 while gross lake evaporation data are available from 1954 through 2022. Data for a calendar year are typically added in the spring of the next year. Click here for more information on the data. Read Disclaimer below before retrieving the data. Datasets were last updated on 12/01/2022, adding data through June 2022.

**Disclaimer**

The precipitation and gross lake evaporation data posted here are based on raw data collected by multiple organizations, processed by the method for spatial distribution as specified in the information page, and are subject to revision as additional data and/or updates are made available to the TWDB. The data may be continuously updated in the future without notice. Neither the State of Texas nor the Texas Water Development Board (TWDB) assumes any legal liability or responsibility for or makes any guarantees or warranties as to the accuracy, completeness, or suitability of the information for any purpose. Please contact TWDB customer service if you have any questions or comments about the data.

Hide Info

How to Use App




Water Data For Texas

waterdatafortexas.org/lake-evaporation-rainfall

Austin, Texas Ecolo... Baseball CRMWD - Water Re... City of Big Spring P... Consultants EPA Fire Front Page www.po... Home NRCS Home Page Texas S... Hydromet Music Other bookmarks

quadrangles that cover Texas. The gross lake evaporation rate is defined as water loss caused by evaporation from the lake surface, while net lake evaporation rate is defined as the gross rate minus the precipitation rate over the lake surface. Precipitation data are available from 1940 through 2022 while gross lake evaporation data are available from 1954 through 2022. Data for a calendar year are typically added in the spring of the next year. Click here for more information on the data. Read Disclaimer below before retrieving the data. Datasets were last updated on 12/01/2022, adding data through June 2022.

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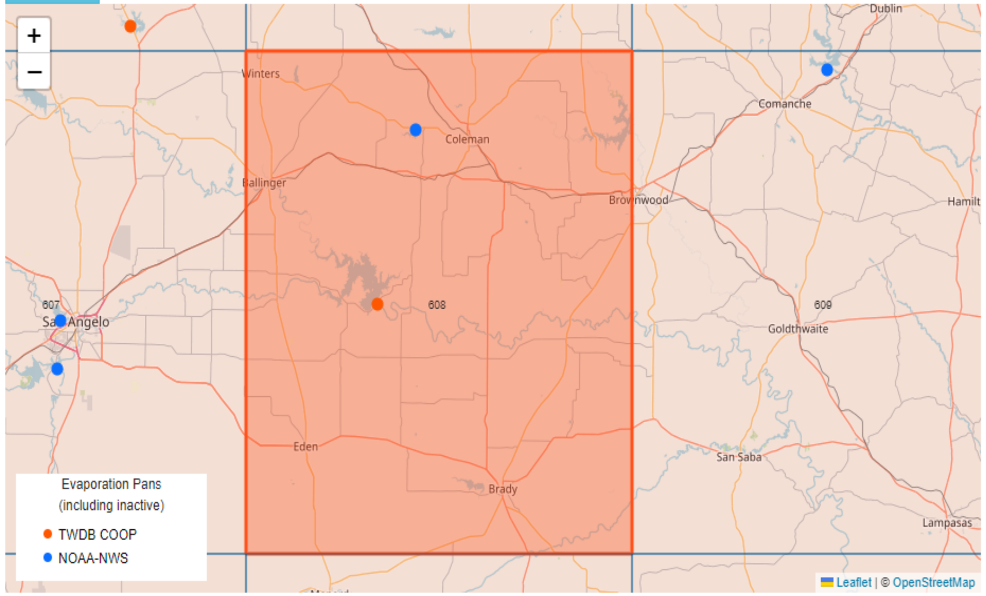


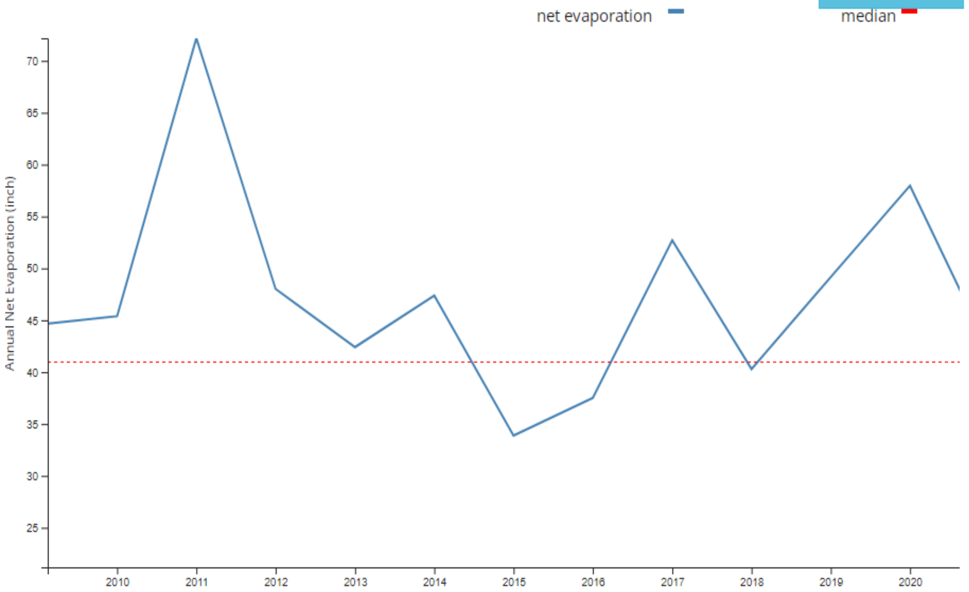


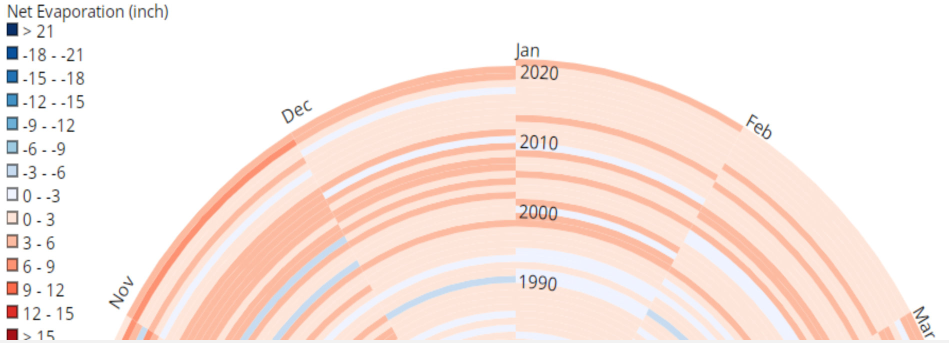


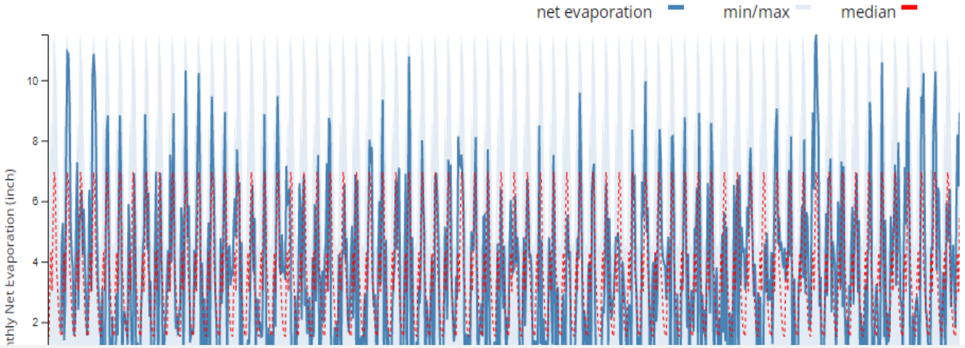

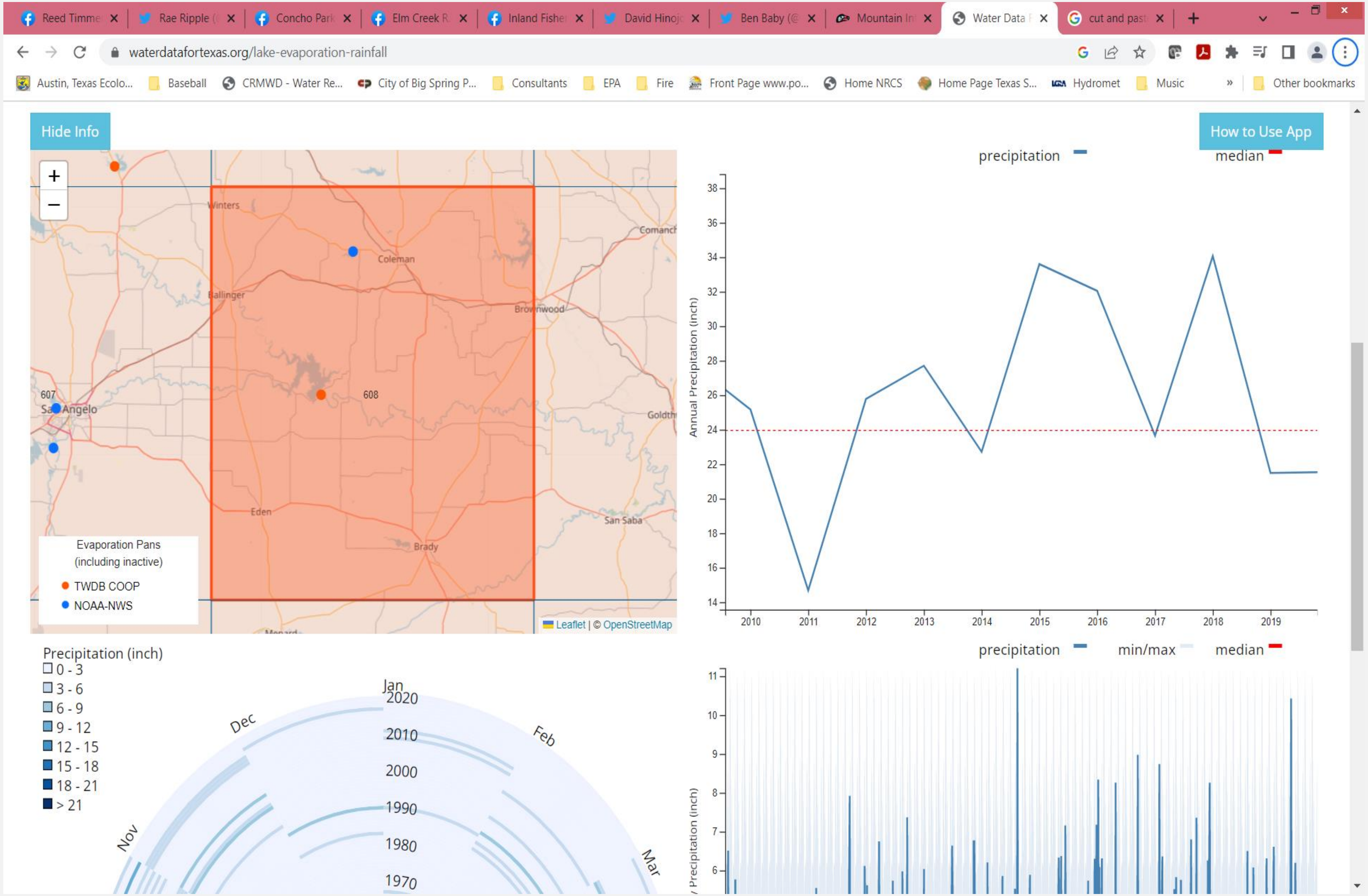
Reed Timme
Rae Ripple
Concho Park
Elm Creek R
Inland Fishe
David Hinojo
Ben Baby
Mountain In
Water Data
cut and past
waterdatafortexas.org/lake-evaporation-rainfall
Austin, Texas Ecolo...
Baseball
CRMWD - Water Re...
City of Big Spring P...
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EPA
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Music
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Hide Info
How to Use App
Winters
Coleman
Comanch
Ballinger
Brownwood
607
608
San Angelo
Goldth
Eden
San Saba
Brady
Evaporation Pans
(including inactive)
TWDB COOP
NOAA-NWS
Leaflet | © OpenStreetMap
precipitation
median
Annual Precipitation (inch)
38
36
34
32
30
28
26
24
22
20
18
16
14
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Precipitation (inch)
0 - 3
3 - 6
6 - 9
9 - 12
12 - 15
15 - 18
18 - 21
> 21
Jan
Feb
Mar
Nov
Dec
2020
2010
2000
1990
1980
1970
precipitation
min/max
median
11
10
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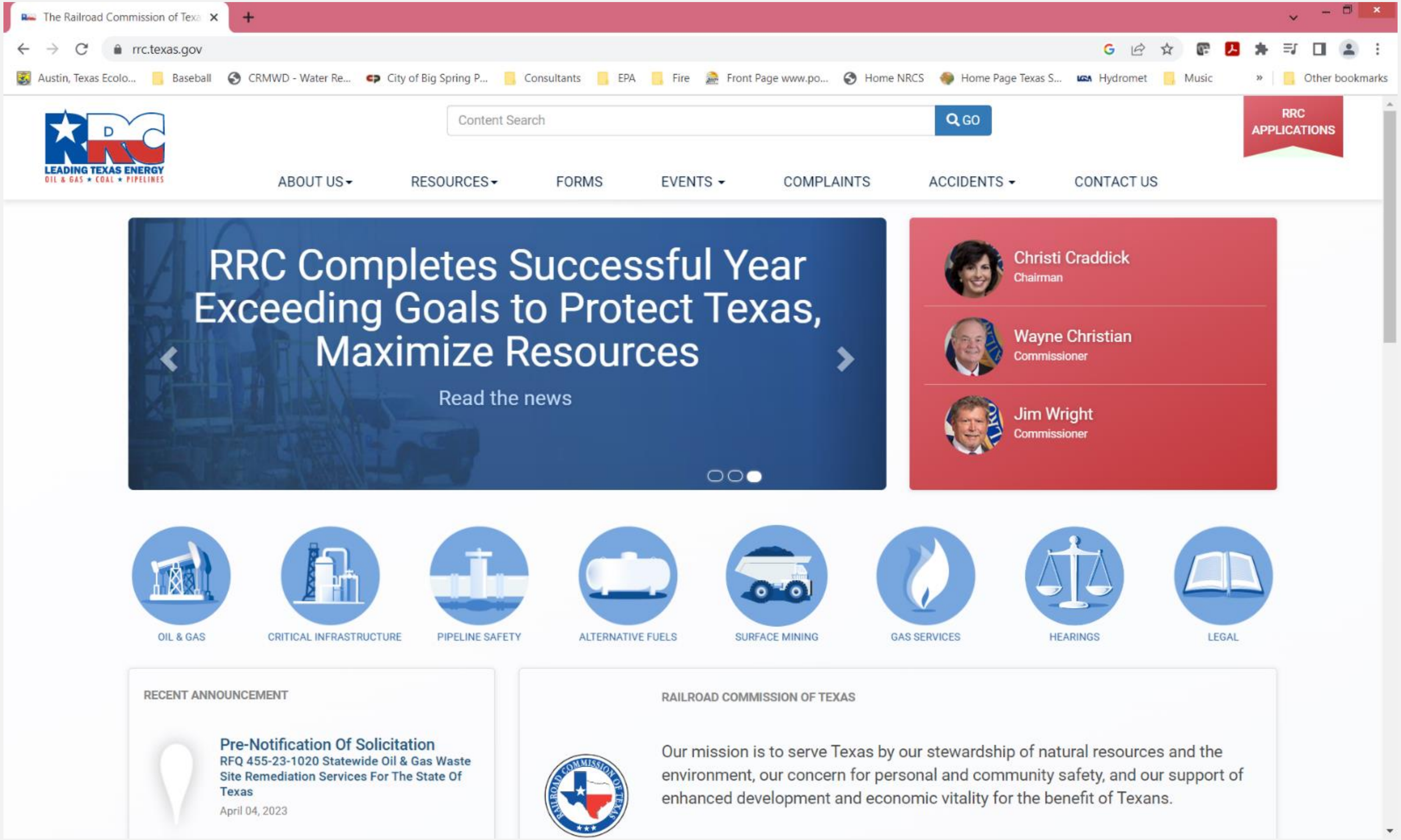
8
7
6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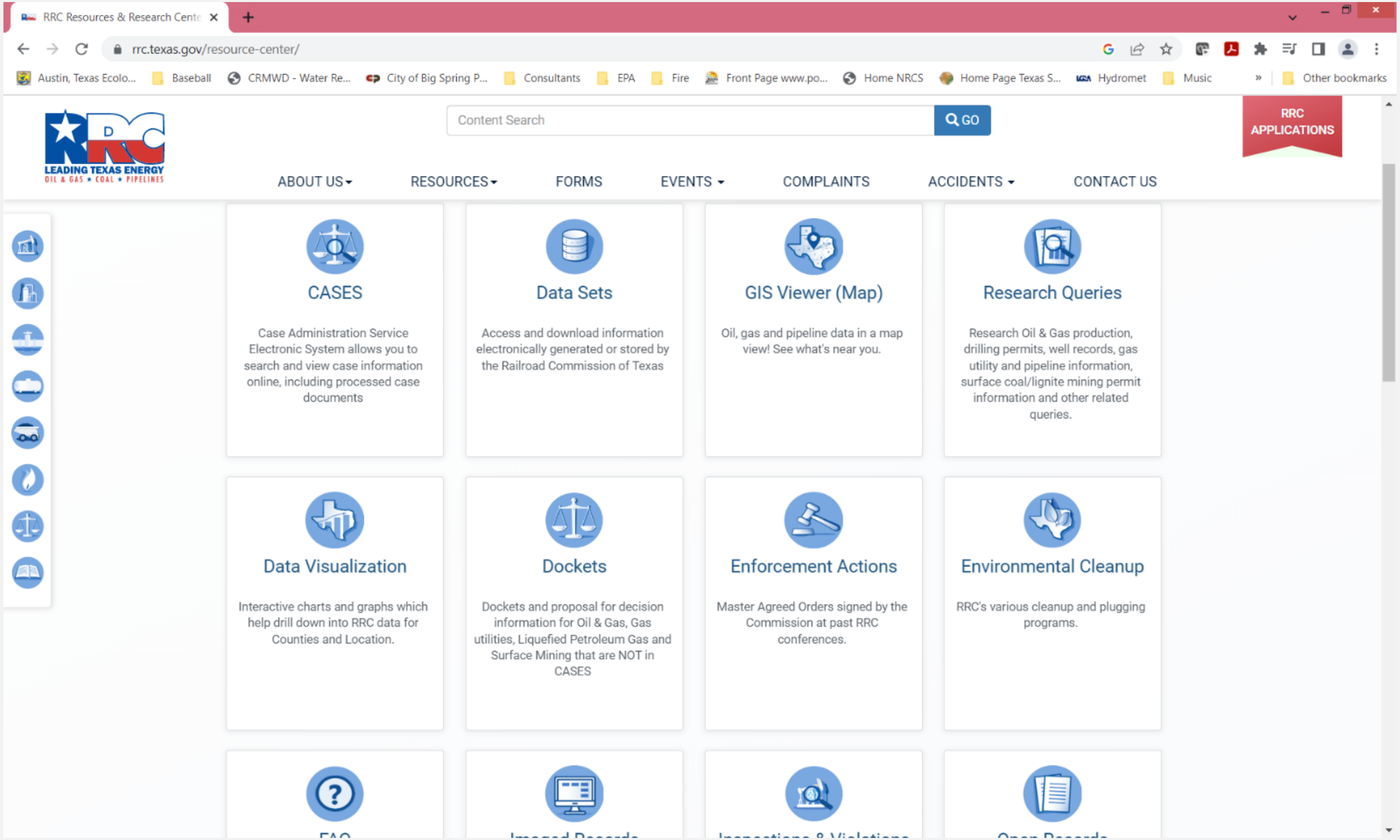
RESOURCES
FORMS
EVENTS
COMPLAINTS
ACCIDENTS
CONTACT US
RRC Completes Successful Year Exceeding Goals to Protect Texas, Maximize Resources
Read the news
Christi Craddick
Chairman
Wayne Christian
Commissioner
Jim Wright
Commissioner
OIL & GAS
CRITICAL INFRASTRUCTURE
PIPELINE SAFETY
ALTERNATIVE FUELS
SURFACE MINING
GAS SERVICES
HEARINGS
LEGAL
RECENT ANNOUNCEMENT
Pre-Notification Of Solicitation
RFQ 455-23-1020 Statewide Oil & Gas Waste Site Remediation Services For The State Of Texas
April 04, 2023
RAILROAD COMMISSION OF TEXAS
Our mission is to serve Texas by our stewardship of natural resources and the environment, our concern for personal and community safety, and our support of enhanced development and economic vitality for the benefit of Texans.


RRC Resources & Research Cente
rrc.texas.gov/resource-center/
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Content Search
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ABOUT US
RESOURCES
FORMS
EVENTS
COMPLAINTS
ACCIDENTS
CONTACT US
CASES
Case Administration Service Electronic System allows you to search and view case information online, including processed case documents
Data Sets
Access and download information electronically generated or stored by the Railroad Commission of Texas
GIS Viewer (Map)
Oil, gas and pipeline data in a map view! See what's near you.
Research Queries
Research Oil & Gas production, drilling permits, well records, gas utility and pipeline information, surface coal/lignite mining permit information and other related queries.
Data Visualization
Interactive charts and graphs which help drill down into RRC data for Counties and Location.
Dockets
Dockets and proposal for decision information for Oil & Gas, Gas utilities, Liquefied Petroleum Gas and Surface Mining that are NOT in CASES
Enforcement Actions
Master Agreed Orders signed by the Commission at past RRC conferences.
Environmental Cleanup
RRC's various cleanup and plugging programs.

# Environmental Cleanup Programs

This section of the RRC website includes information relating to the Commission's various cleanup and plugging programs

- Bid Opportunities and Awards
- Federally Funded Well Plugging
- Guidance Documents and Helpful Links
- Groundwater Management
- Oil & Gas Regulation and Cleanup Fund
- Site Remediation
- State Managed Plugging

**DATA VISUALIZATION**

- Federally Funded (IIJA) Well Plugging
- State Managed Site Cleanup
- Operator Cleanup Program
- VCP & Brownfield Sites

# State Managed Well Plugging

Although most oil and gas wells that are no longer productive are plugged by the responsible operators, the Railroad Commission administers a program to plug abandoned oil and gas wells.

Wells Remaining to be Plugged with State Managed Funds

This list shows wells which remain to be plugged with State funds. It includes wells where plugging operations may be ongoing or the wells may be included in a plugging contract that: has either been awarded, a bid award is pending; or the initiation of the formal bid process is pending. If you have questions regarding the status of these wells, please contact the appropriate district office.

State Managed Plugging Activities Monthly Reports

These reports include data by month and year of the Railroad Commission of Texas' (Commission) activities related to plugging orphan wells using the Oil & Gas Regulation and Cleanup Fund.

Approved Cementers List

This is a list of Approved Cementers that have an active Organizational Report (Form P-5) on file with the Commission.

Formations Required to be Isolated Upon Well Plugging

This document provides information by Commission District and County of Fields/Zones that must be isolated in accordance with 16 Texas Administrative Code §3.13 (Statewide Rule 13).

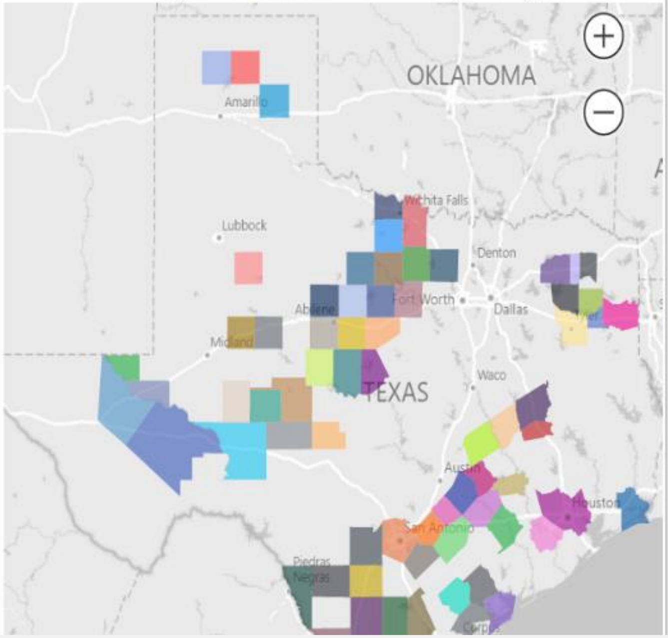
ENVIRONMENTAL CLEANUP PROGRAMS
- Oil & Gas Regulation and Cleanup Fund
- State Managed Well Plugging
- Site Remediation
- Bid Opportunities and Awards
- Guidance Documents and Helpful Links
- Federally Funded Well Plugging
- Well Plugging Data Visualization

# State Managed Well Plugging Data

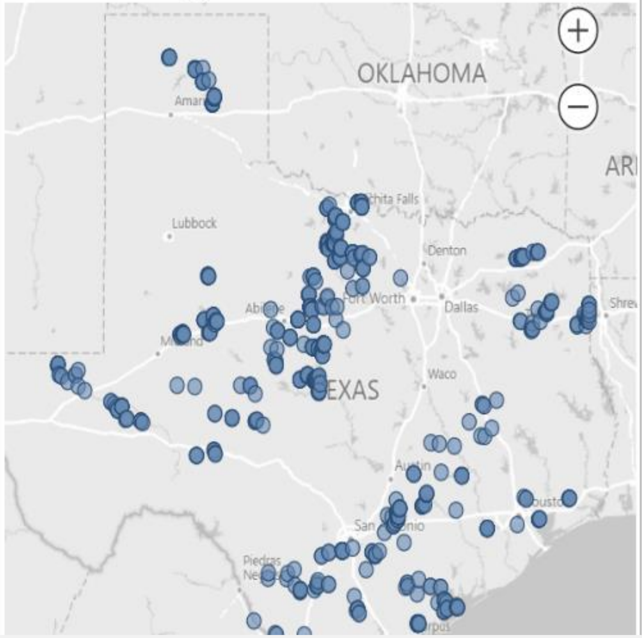
## 1068 - Total Wells Plugged and Closed by Fiscal Year

(Fiscal Year : Sept 1 to Aug 31)

Plugged and Closed Well Count by County



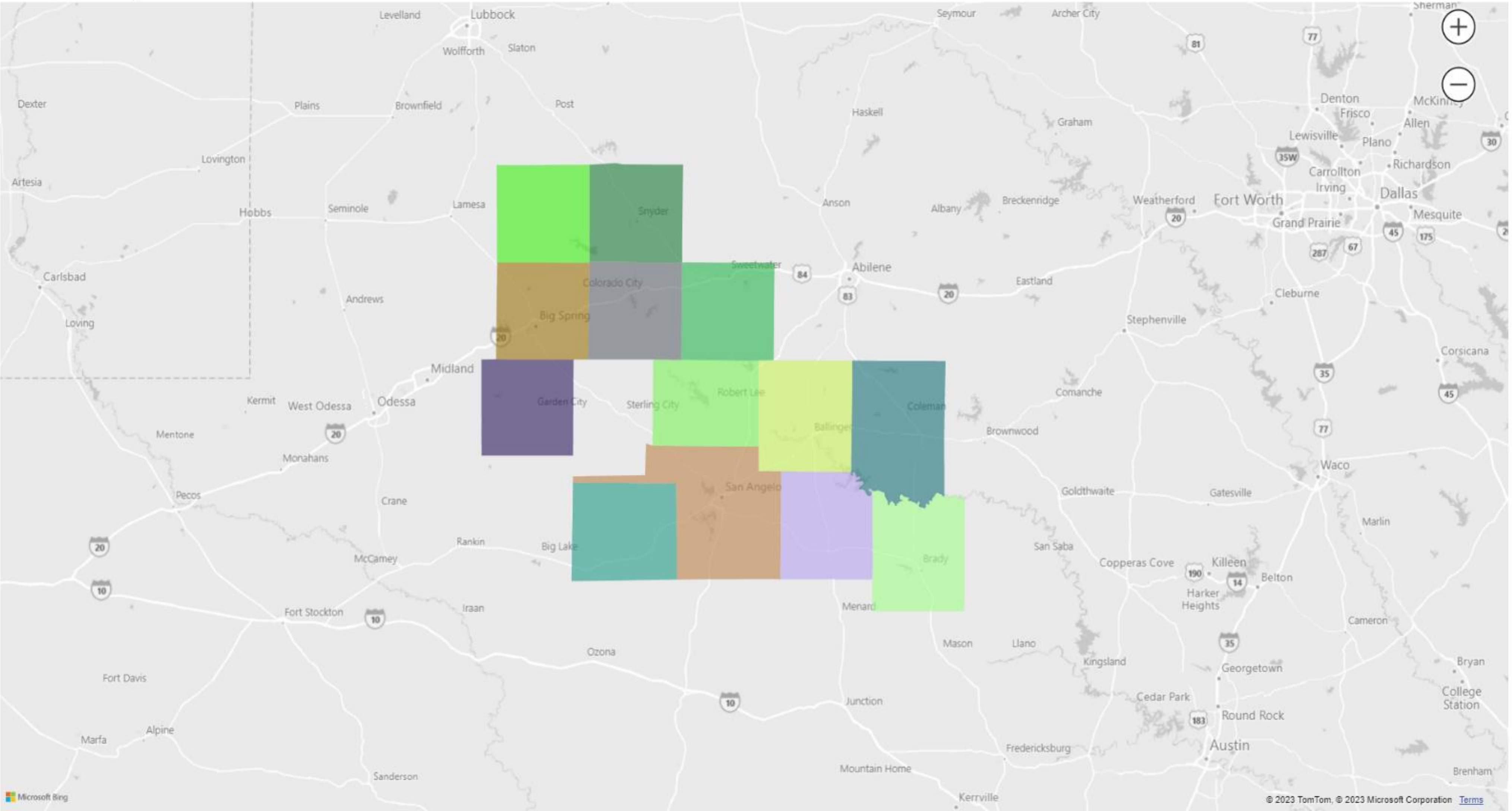

Plugged and Closed Well Location




Fiscal Year
- Select all
- 2022
- 2021
- 2020
- 2019
- 2018

County
Search
- Select all
- Archer
- Bastrop
- Bexar
- Brown
- Caldwell
- CALHOUN
- Callahan
- Clay
- Coleman
- Colorado
- Crockett
- Duval
- Eastland
- Fayette

Back to report | PLUGGED AND CLOSED WELL COUNT BY COUNTY



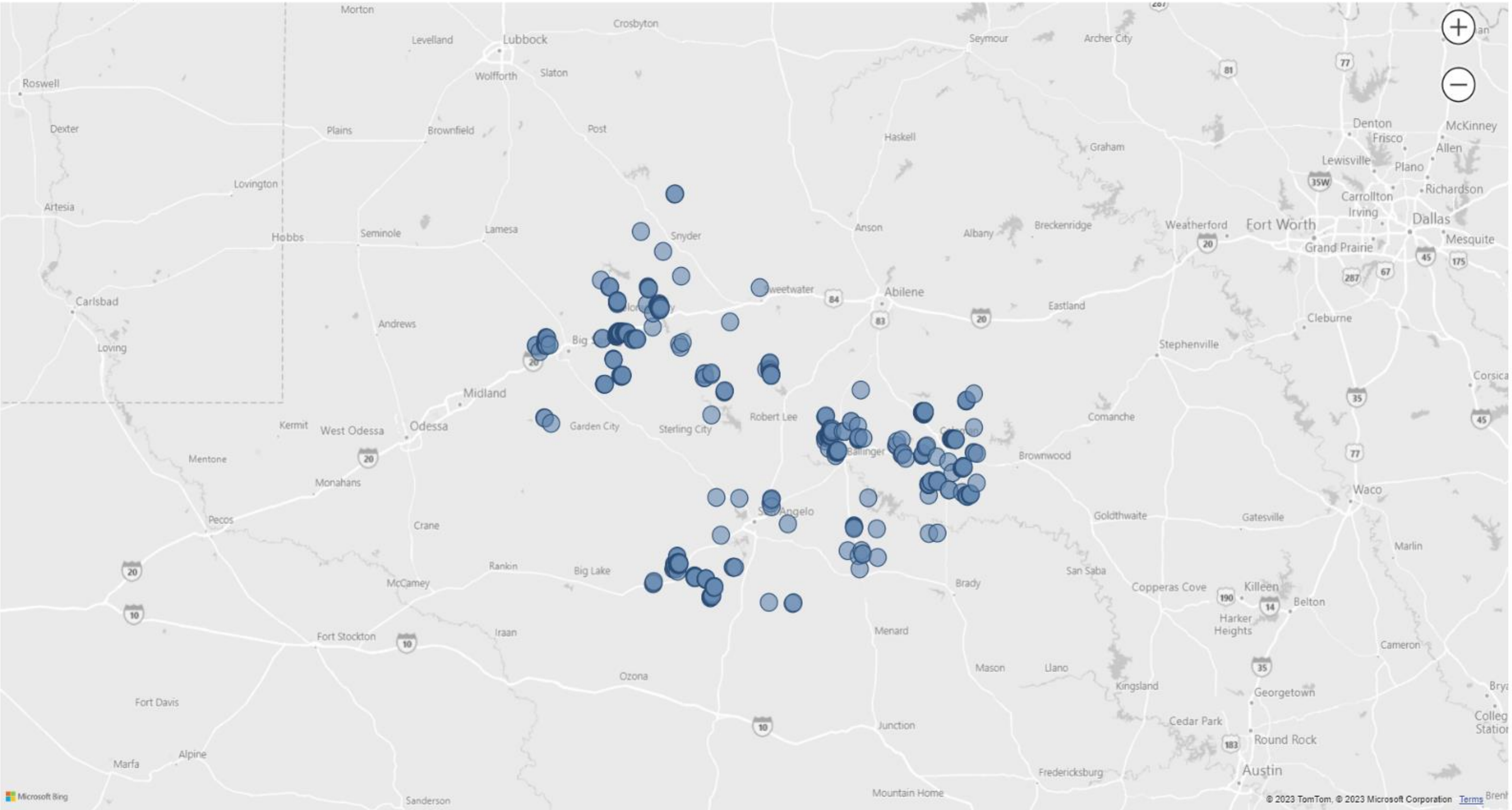

Go back | SMP

100%

Microsoft Power BI

Back to report

PLUGGED AND CLOSED WELL LOCATION




Go back

SMP

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Microsoft Power BI

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- Oil & Gas Regulation and Cleanup Fund
- State Managed Well Plugging
- Site Remediation
- Bid Opportunities and Awards
- Guidance Documents and Helpful Links
- Federally Funded Well Plugging
- Well Plugging Data Visualization

Federally Funded Well plugging
rrc.texas.gov/oil-and-gas/environmental-cleanup-programs/federally-funded-well-plugging/
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# Federally Funded Well Plugging

## Orphaned Well Site Plugging, Remediation and Restoration

The Railroad Commission of Texas is receiving federal funds from the Infrastructure Investment and Jobs Act (IIJA) to plug, remediate, and reclaim orphaned wells located on state-owned or privately owned land in Texas. Funding may also be used for other allowed activities including to remediate soil and restore native species habitat on land adjacent to orphaned wells, and to decommission or remove associated pipelines, facilities, and infrastructure.

Orphaned Well

Texas received $25,000,000 in Initial Grant funds in August 2022, and anticipates receiving $82,563,000 in the first allocation of Formula Grant funds in 2023. In total, Texas could receive approximately $318,695,000 in multiple rounds of Formula Grant funds based on current data estimates, in addition to the $25,000,000 in Initial Grant funds, for a total of $343,695,000. These amounts are subject to change.

The RRC will utilize its existing State Managed Plugging Program to oversee this effort, and will issue solicitations for contractors for well plugging. The solicitation process and other information are in the links below.

Wells to be Plugged with IIJA Funds | Data Visualization

Well Plugging Prioritization System

Sistema de prioridades para taponamiento de pozos

**RRC WELL PLUGGING CONTRACTING**

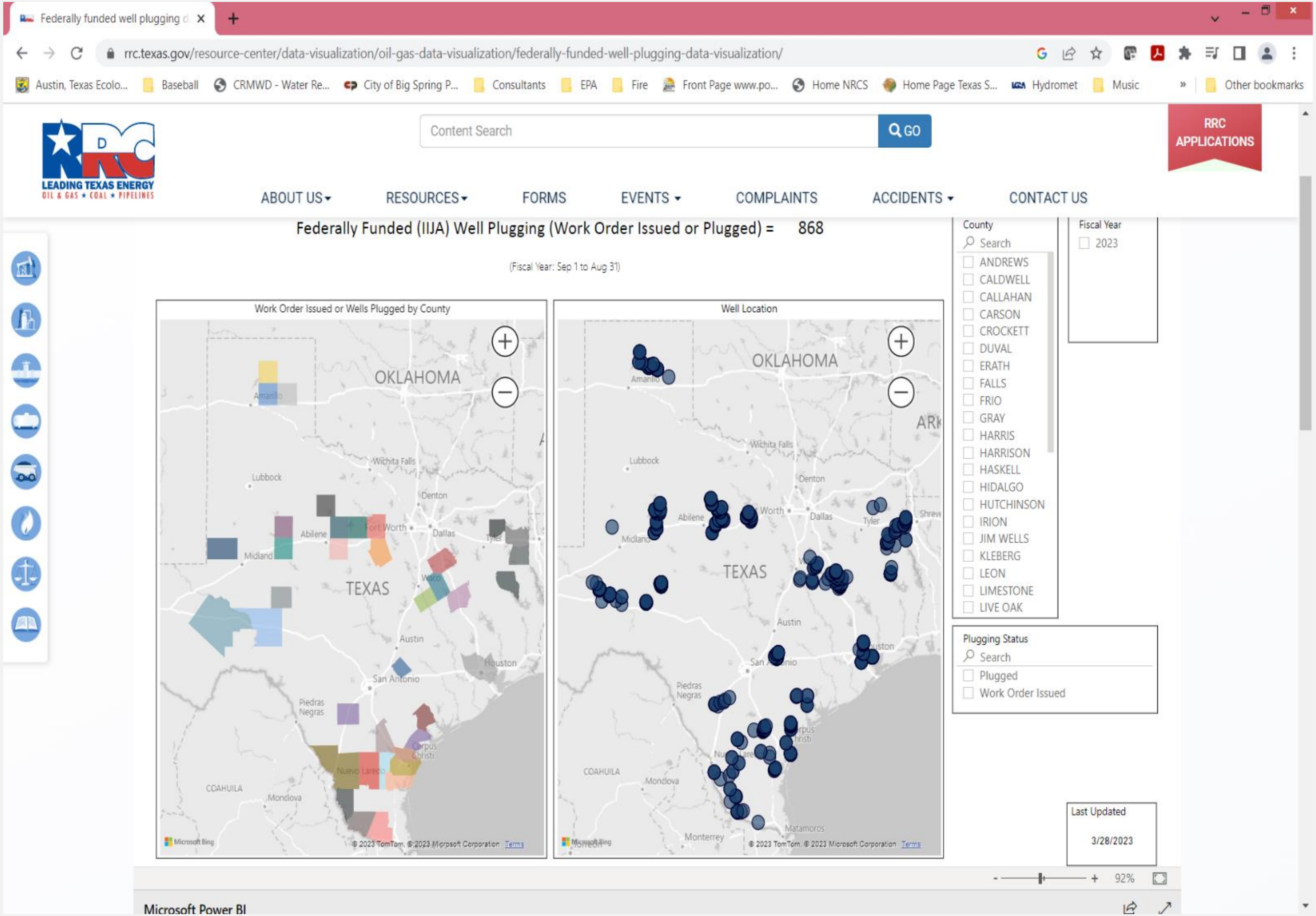
SUBMIT CONTACT INFORMATION

Solicitation Process Overview

**EXTERNAL LINKS**

Interstate Oil & Gas Compact Commission (IOGCC) Report on Idle and Orphan Wells

IOGCC Chart on Well Plugging by State Through 2020



Federally funded well plugging d
rrc.texas.gov/resource-center/data-visualization/oil-gas-data-visualization/federally-funded-well-plugging-data-visualization/
Austin, Texas Ecolo... Baseball CRMWD - Water Re... City of Big Spring P... Consultants EPA Fire Front Page www.po... Home NRCS Home Page Texas S... Hydromet Music Other bookmarks
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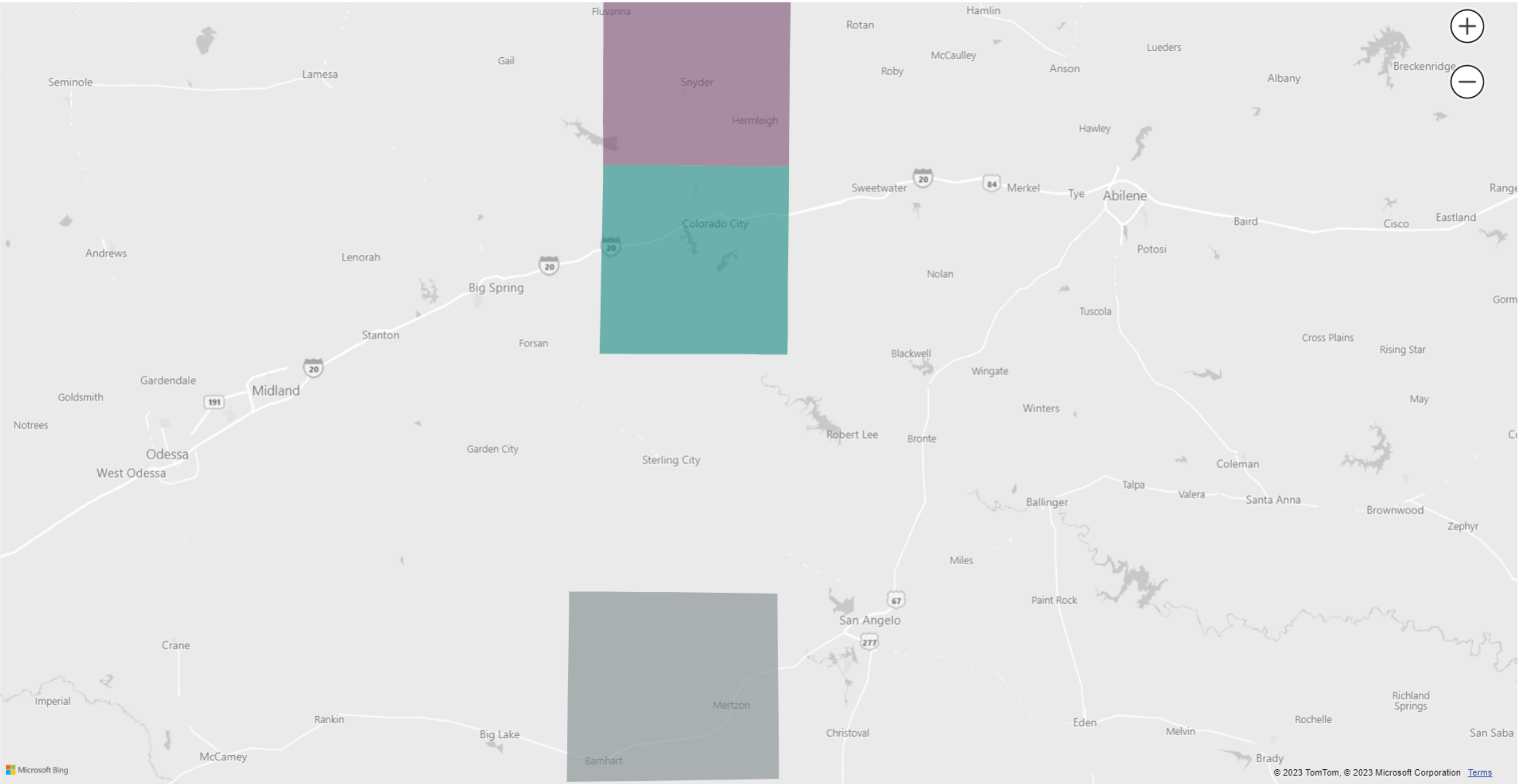
RESOURCES
FORMS
EVENTS
COMPLAINTS
ACCIDENTS
CONTACT US
Federally Funded (IIJA) Well Plugging (Work Order Issued or Plugged) = 868
(Fiscal Year: Sep 1 to Aug 31)
Work Order Issued or Wells Plugged by County
Well Location
OKLAHOMA
TEXAS
Amarillo
Lubbock
Wichita Falls
Denton
Abilene
Fort Worth
Dallas
Midland
Tyler
Waco
Austin
Houston
San Antonio
Piedras Negras
Nuevo Laredo
Corpus Christi
COAHUILA
Monclova
Monterrey
Matamoros
© 2023 TomTom, © 2023 Microsoft Corporation Terms
County
Search
ANDREWS
CALDWELL
CALLAHAN
CARSON
CROCKETT
DUVAL
ERATH
FALLS
FRIO
GRAY
HARRIS
HARRISON
HASKELL
HIDALGO
HUTCHINSON
IRION
JIM WELLS
KLEBERG
LEON
LIMESTONE
LIVE OAK
Fiscal Year
2023
Plugging Status
Search
Plugged
Work Order Issued
Last Updated
3/28/2023
92%
Microsoft Power BI

Back to report | WORK ORDER ISSUED OR WELLS PLUGGED BY COUNTY

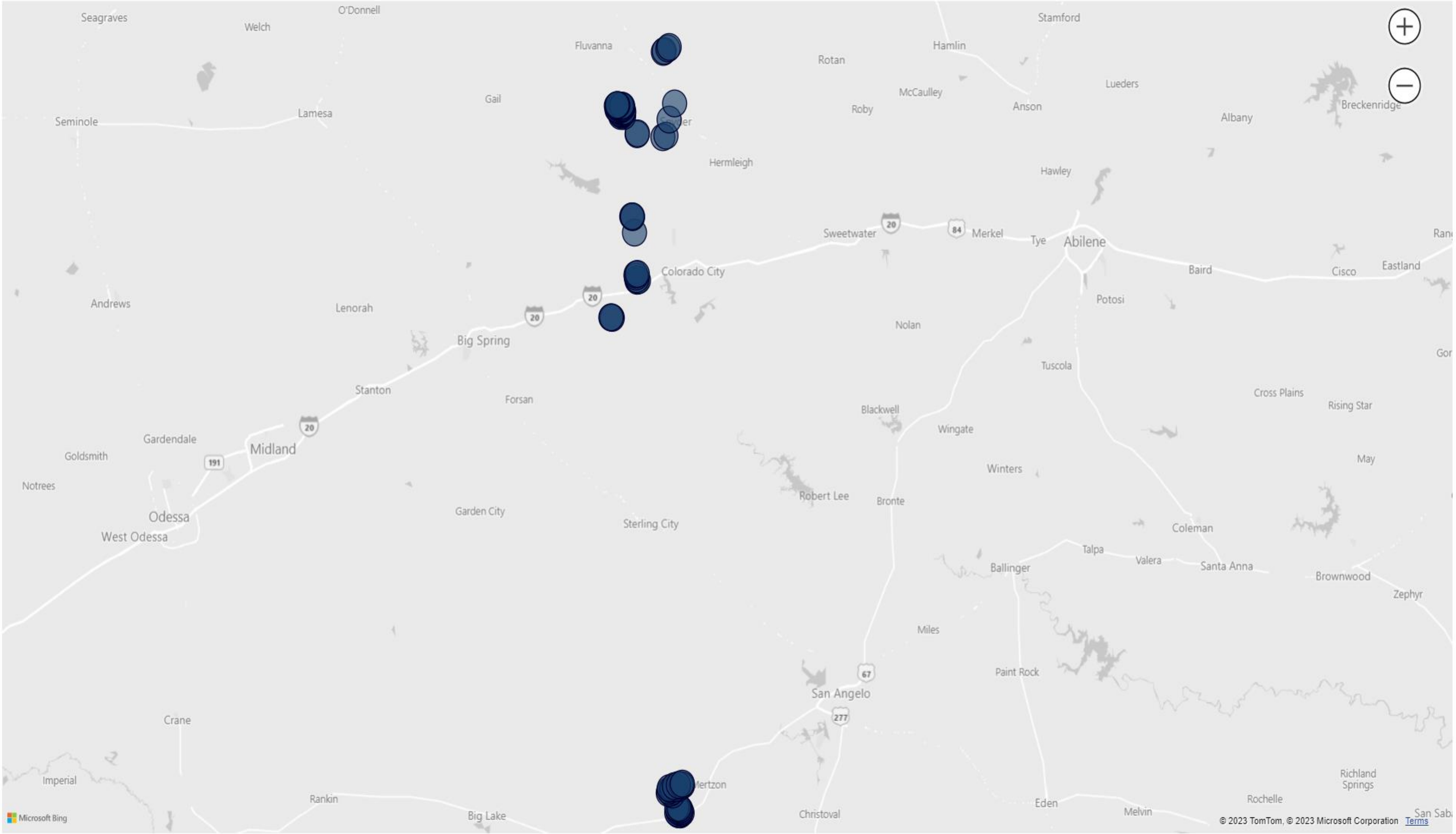



Go back | FEDERAL FUNDED WELL P...

100%

Microsoft Power BI

Back to report | WELL LOCATION




Go back | ≡FEDERAL FUNDED WELL P...

100%

Microsoft Power BI

John W. Grant Water Production Facility

10th Year of Operation

Seeking Third TPDES Permit (2013, 2018, and 2023)

John D. Burch

jburch@crmwd.org

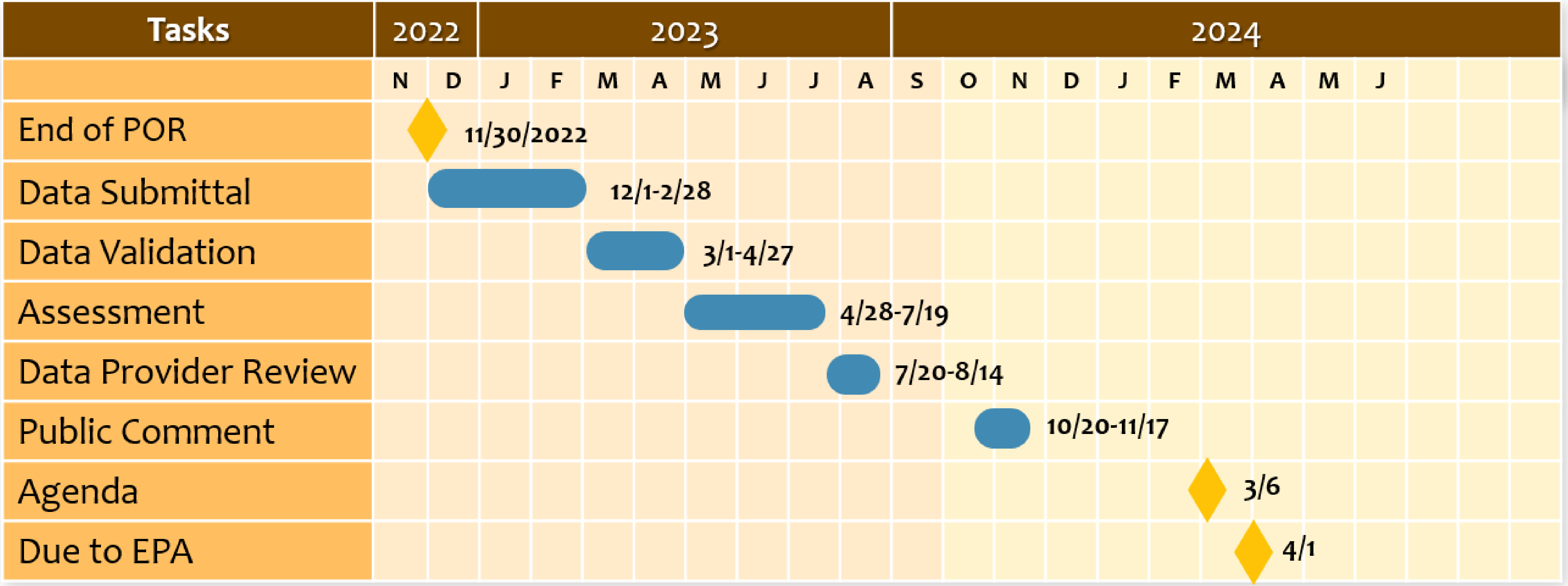
# INTEGRATED REPORT STATUS & UPDATES


Robin Cypher

Water Quality Assessor

Texas Commission on Environmental Quality
(TCEQ)

# 2024 IR Conceptual Timeline



# CONCHO RIVER PROJECT // WATER SUPPLY & INFRASTRUCTURE IMPROVEMENTS


## Andy Vecellio

Water Utilities Assistant Director

City of San Angelo (COSA)


# UCRA NONPOINT SOURCE PROJECT UPDATES

Scott McWilliams

General Manager

Upper Colorado River Authority (UCRA)

UCRA

# BASIN SUMMARY REPORT 2023 & CRP ACTIVITIES


Aaron Richter

Water Quality Coordinator

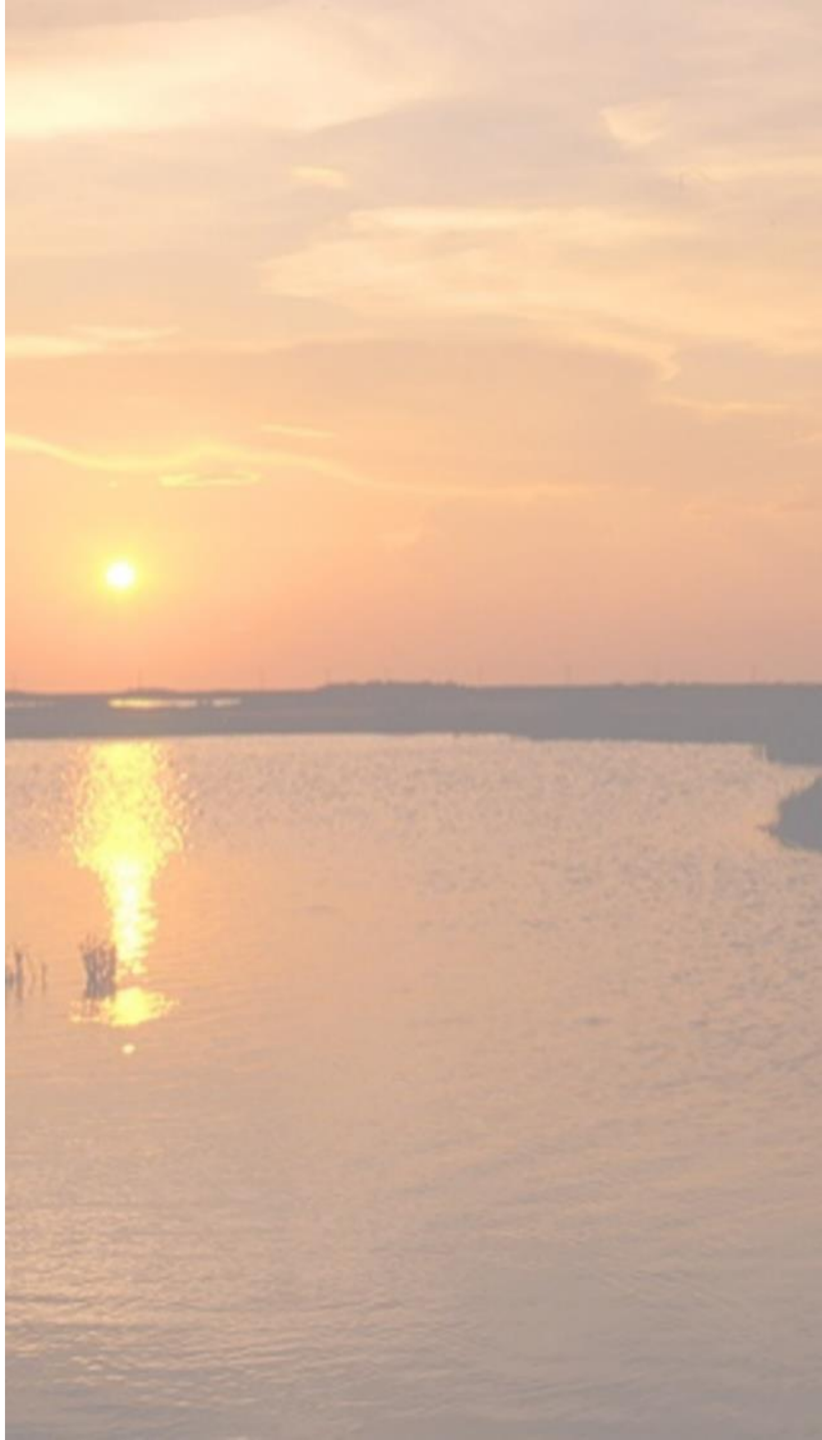
Lower Colorado River Authority (LCRA)


# Basin Summary Report 2023

Lower Colorado River Authority
Texas Clean Rivers Program

# Basin Summary Report Overview

- **What?**
  - Decision making aid for water quality
  - Prioritize water bodies for action
  - Select watersheds for special studies
  - Identify sections of the basin that have data gaps
- **Why?**
  - Understand water quality conditions, trends, changes, and possible sources of degradation



# Analysis Methodology

- **Temporal Trends (changes over time)**
  - Data in SWQMIS collected from 2011 through 2021
  - At least 20 points of data
  - Less than 50% of data is censored (below or above the limit of detection)
- **Spatial Comparison (where are parameters different)**
  - Similar to temporal trends
  - At least 10 points of data

Parameter List

Water Temperature
pH
Dissolved Oxygen
Secchi Depth

Total Suspended Solids
Chloride
Sulfate

Nitrate
Total Kjeldahl Nitrogen
Ammonia
Total Phosphorus
Chlorophyll *a*

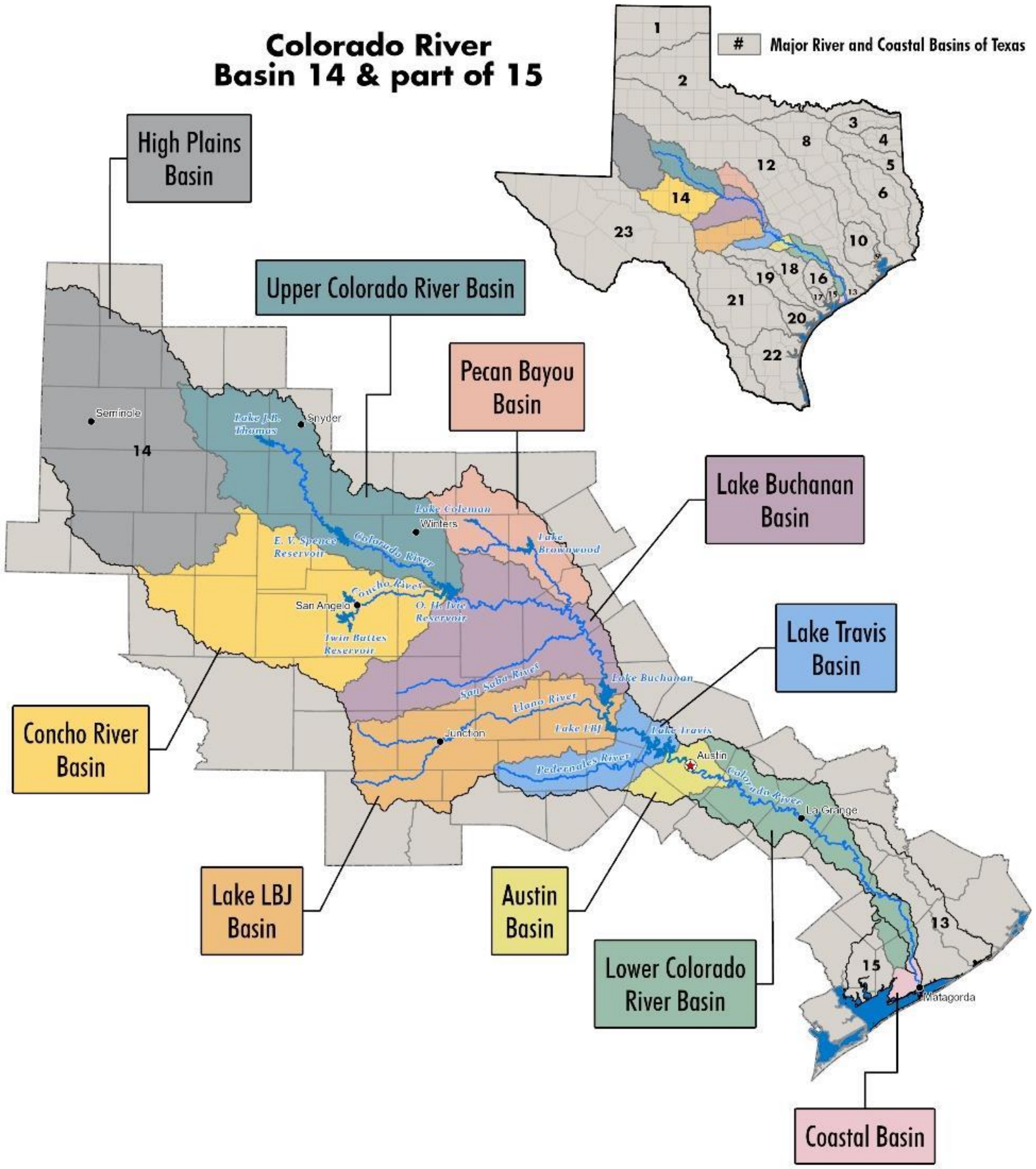
*E. coli* (freshwater)
*Enterococci* (saltwater)

Assessment Units: 174
Stations: 219

# General Results

| | Parameter | Increases | Decreases | Concerns | Impairments |
|---|---|---|---|---|---|
| | Water Temperature | 4 | 1 | | |
| | **pH** | **9** | **41** | | **1** |
| Water Clarity | Dissolved Oxygen | 6 | 29 | 10 | 4 |
| | Secchi Depth | 24 | 5 | | |
| Salts | TSS | 11 | 10 | | |
| | **Chloride** | **13** | **54** | | **2** |
| Nutrients | **Sulfate** | **9** | **48** | | **3** |
| | Nitrate | 20 | 12 | 32 | |
| | **TKN** | **8** | **39** | | |
| | Ammonia | 3 | 8 | | |
| | Total Phosphorus | 4 | 10 | 8 | |
| | Chlorophyll *a* | 15 | 16 | 32 | 11 |
| | Bacteria | 6 | 1 | 9 | 13 |

# Colorado River Basin



# Impairments and Concerns in each Sub-Basin

| Sub-Basin | Concerns | Impairments |
|---|---|---|
| Upper Colorado | 24 | 9 |
| Concho | 19 | 2 |
| Pecan Bayou | 8 | 1 |
| Lake Buchanan | 8 | 1 |
| Lake LBJ | 1 | 13 |
| Lake Travis | 4 | 2 |
| Austin | 29 | 12 |
| Lower Colorado | 21 | 2 |
| Coastal | 2 | 0 |

# Upper Colorado River Basin

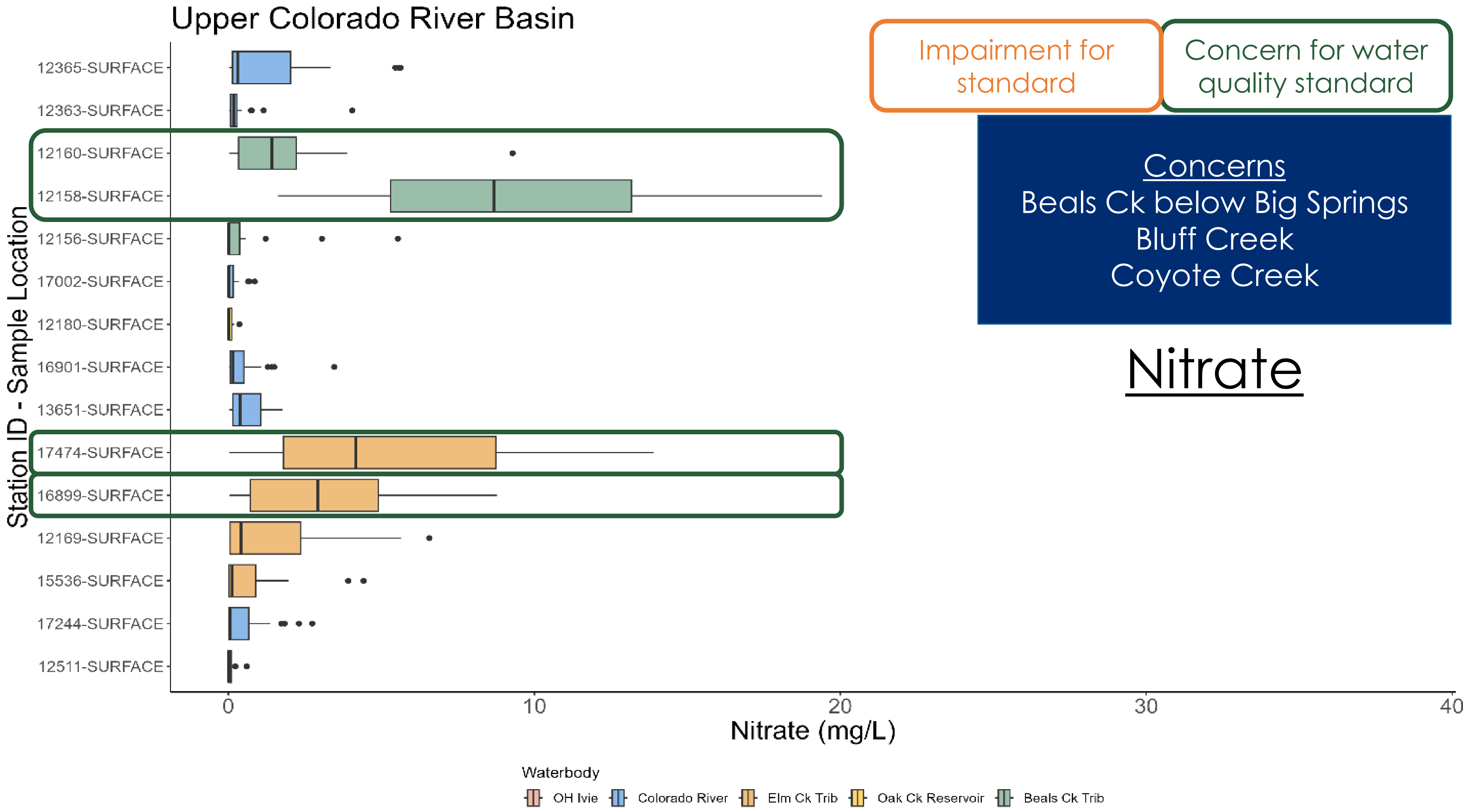
## Data Trends

# Upper Colorado River Basin

## Nitrate Concerns or Impairments

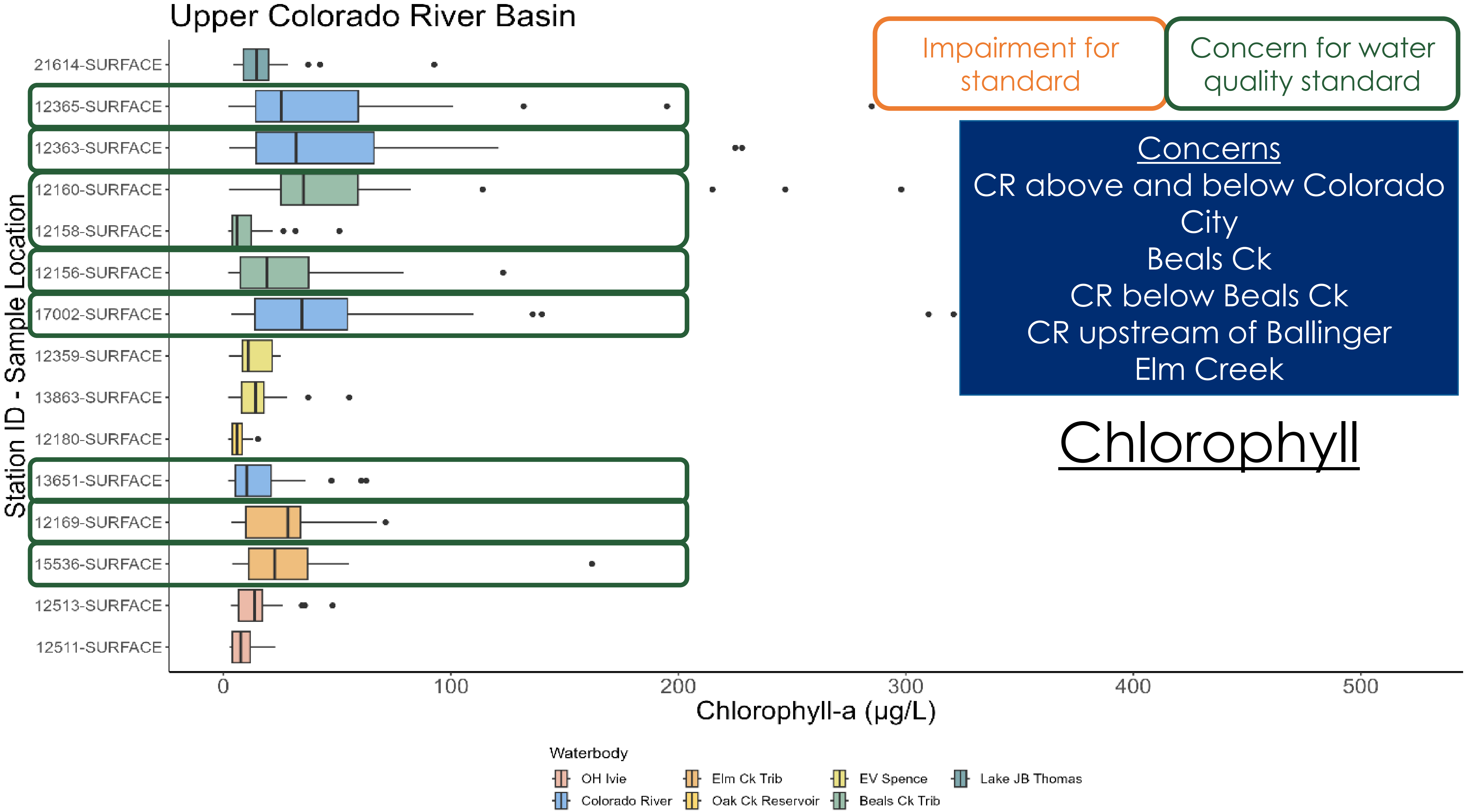
| Assessment Unit | Station | Concerns | Impairments |
|---|---|---|---|
| 1412_03 | 12365 | | |
| 1412_02 | 12363 | | |
| 1412B_03 | 12160 | X | |
| 1412B_03 | 12158 | X | |
| 1412B_01 | 12156 | | |
| 1412_01 | 17002 | | |
| 1426A_01 | 12180 | | |
| 1426_02 | 16901 | | |
| 1426_02 | 13651 | | |
| 1426C_01 | 17474 | X | |
| 1426D_01 | 16899 | X | |
| *1426B_02* | *12169* | | |
| 1426B_01 | 15536 | | |
| 1426_01 | 17244 | | |
| 1433_01 | 12511 | | |

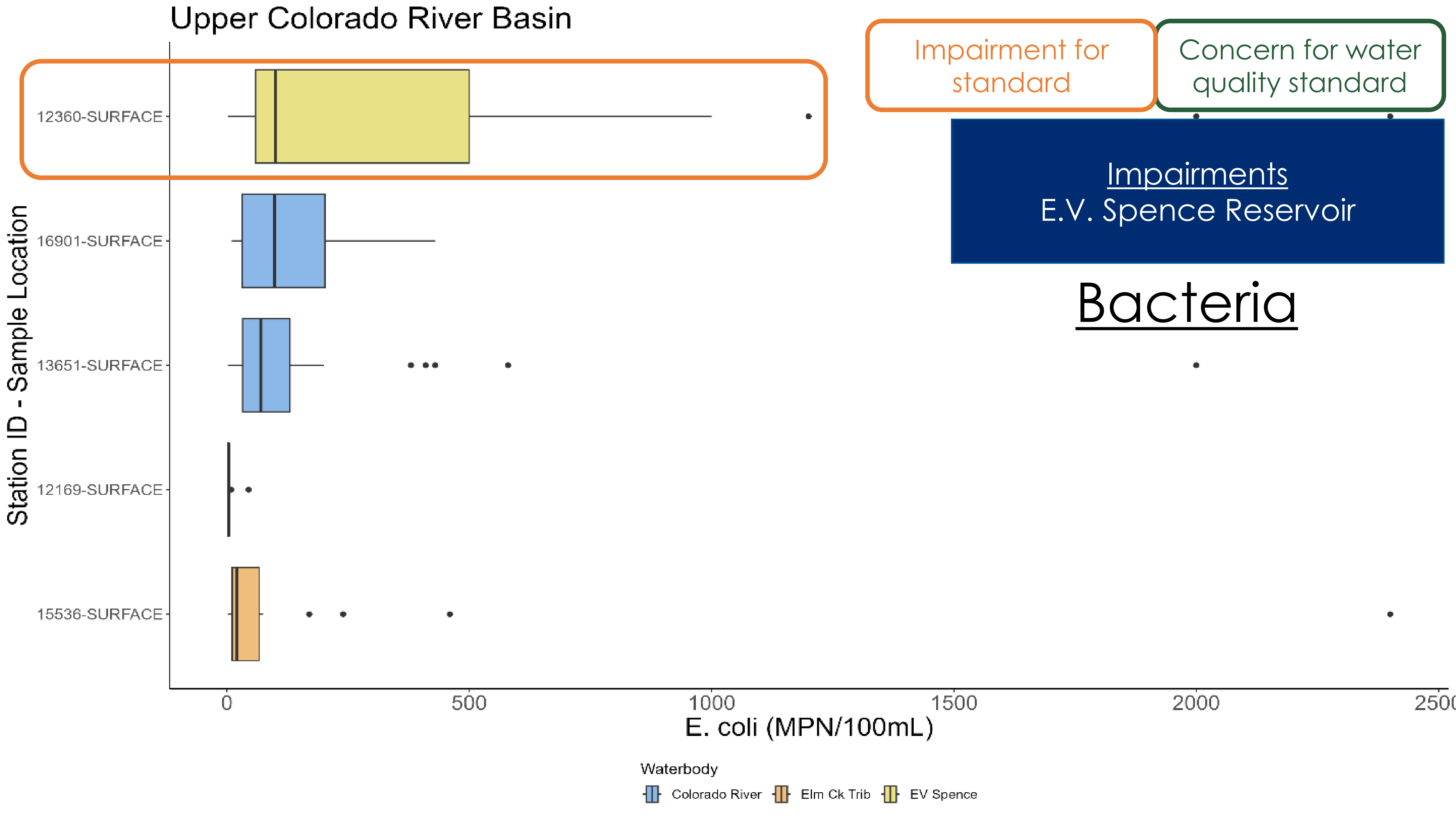
Concerns
Beals Ck below Big Springs
Bluff Creek
Coyote Creek

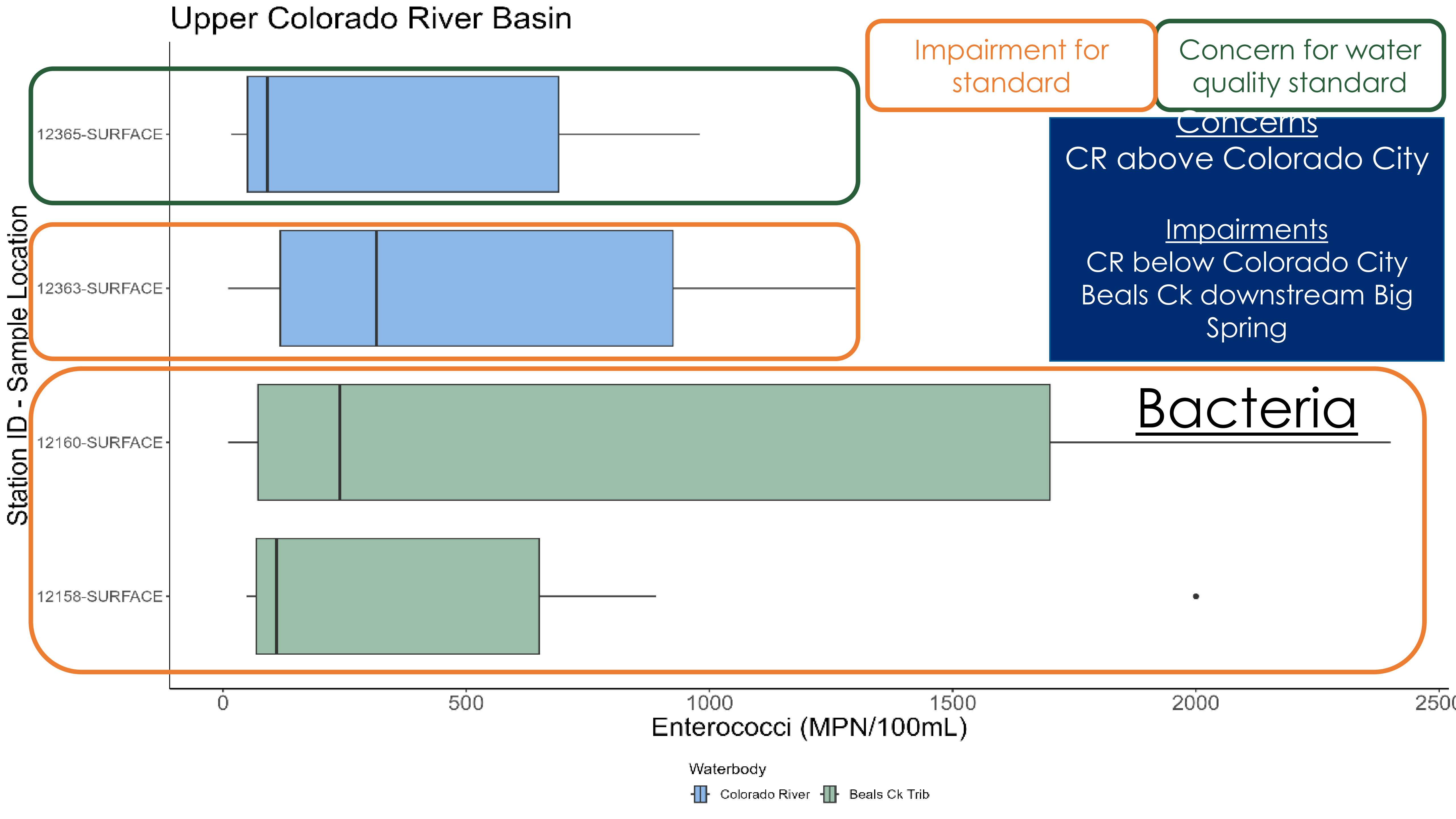



<u>Concerns</u>
Beals Ck below Big Springs
Bluff Creek
Coyote Creek

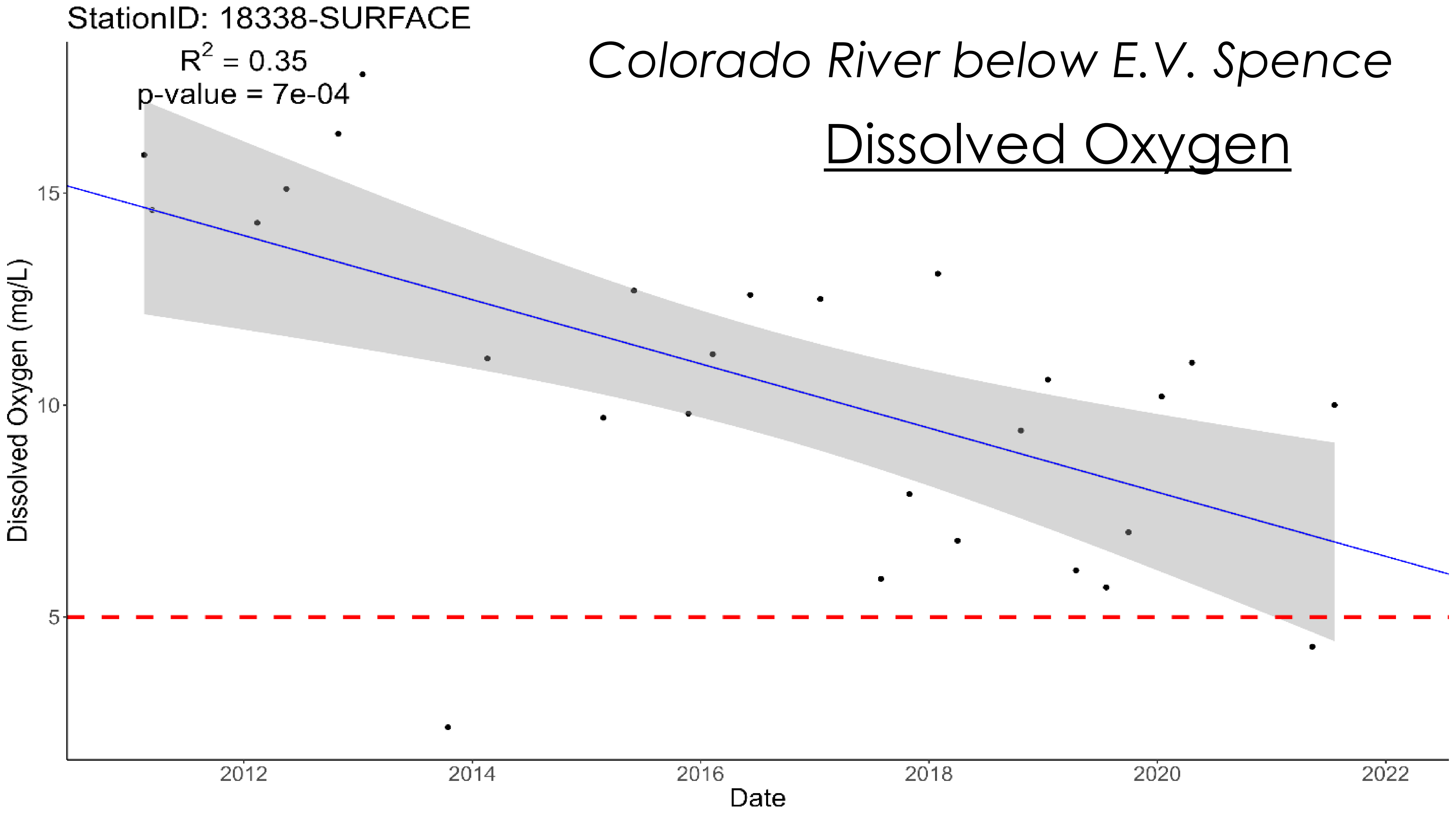
# <u>Nitrate</u>


Upper Colorado River Basin
Impairment for standard
Concern for water quality standard
Concerns
CR above and below Colorado City
Beals Ck
CR below Beals Ck
CR upstream of Ballinger
Elm Creek
Chlorophyll
Station ID - Sample Location
21614-SURFACE
12365-SURFACE
12363-SURFACE
12160-SURFACE
12158-SURFACE
12156-SURFACE
17002-SURFACE
12359-SURFACE
13863-SURFACE
12180-SURFACE
13651-SURFACE
12169-SURFACE
15536-SURFACE
12513-SURFACE
12511-SURFACE
0
100
200
300
400
500
Chlorophyll-a (µg/L)
Waterbody
OH Ivie
Colorado River
Elm Ck Trib
Oak Ck Reservoir
EV Spence
Beals Ck Trib
Lake JB Thomas


Upper Colorado River Basin
Impairment for standard
Concern for water quality standard
Impairments
E.V. Spence Reservoir
Bacteria
Station ID - Sample Location
12360-SURFACE
16901-SURFACE
13651-SURFACE
12169-SURFACE
15536-SURFACE
0
500
1000
1500
2000
2500
E. coli (MPN/100mL)
Waterbody
Colorado River
Elm Ck Trib
EV Spence



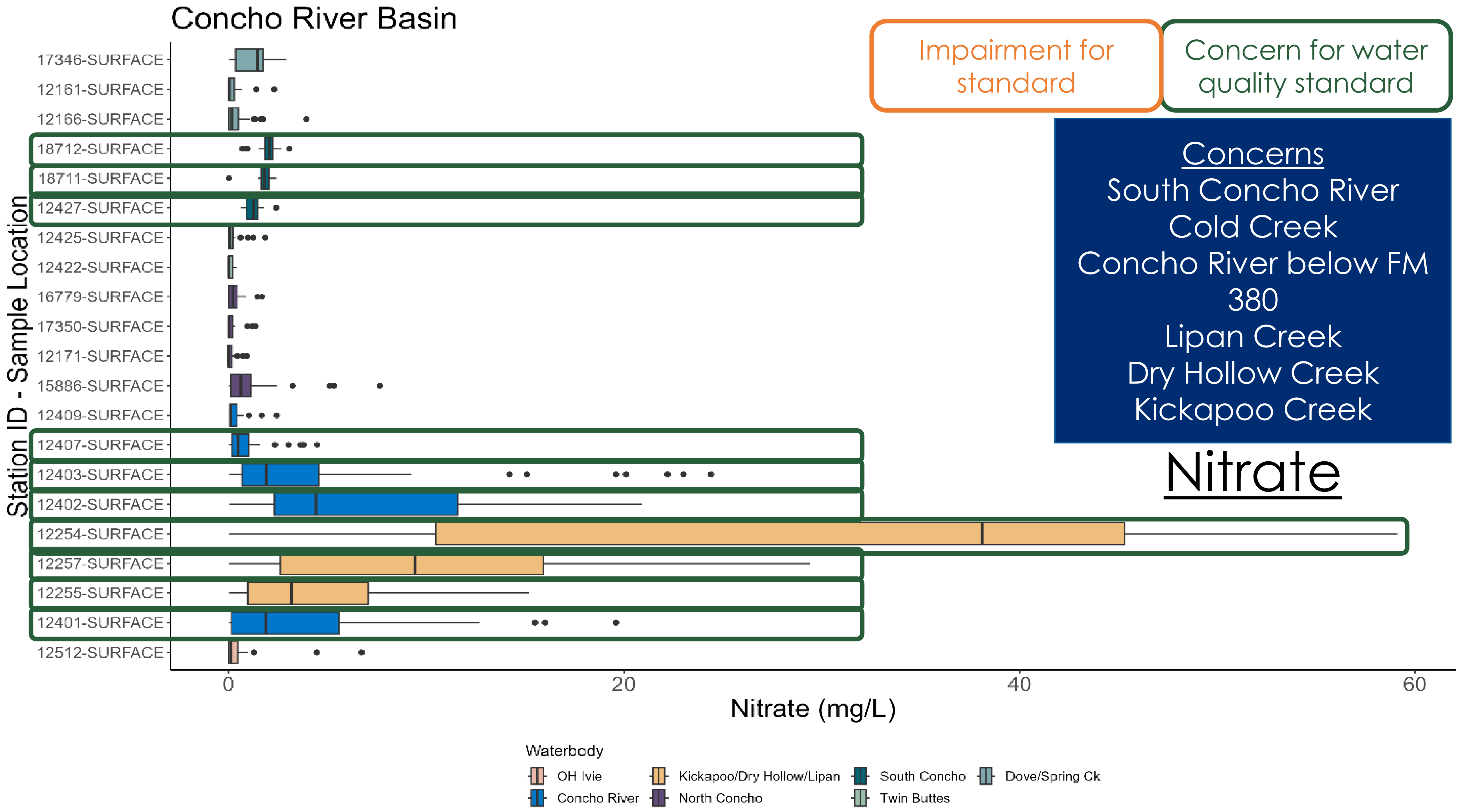
Upper Colorado River Basin
Impairment for standard
Concern for water quality standard
Concerns
CR above Colorado City
Impairments
CR below Colorado City
Beals Ck downstream Big Spring
Bacteria
12365-SURFACE
12363-SURFACE
12160-SURFACE
12158-SURFACE
Station ID - Sample Location
0
500
1000
1500
2000
2500
Enterococci (MPN/100mL)
Waterbody
Colorado River
Beals Ck Trib



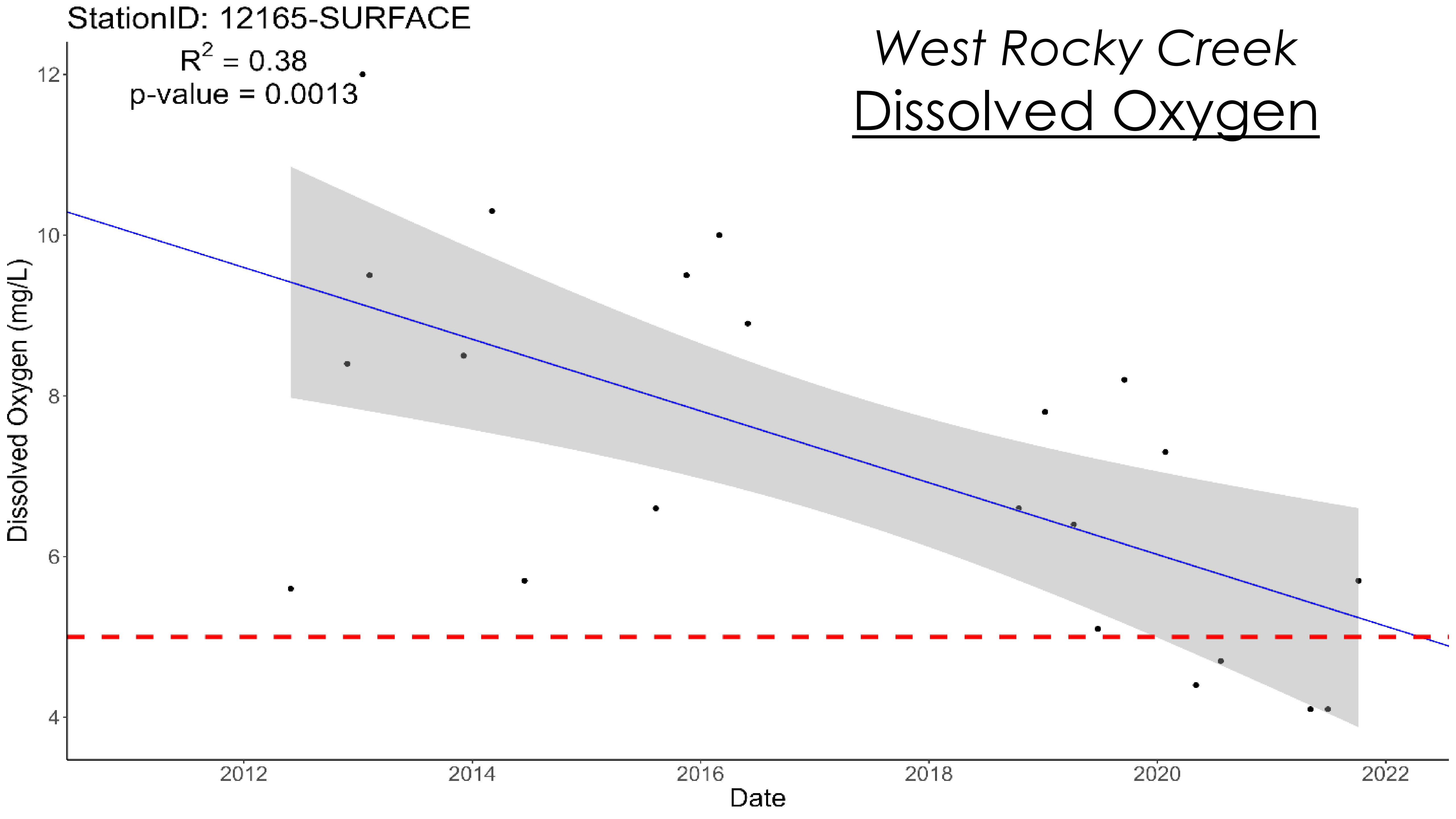
StationID: 18338-SURFACE
Colorado River below E.V. Spence
Dissolved Oxygen
$R^2$ = 0.35
p-value = 7e-04
Dissolved Oxygen (mg/L)
15
10
5
2012
2014
2016
2018
2020
2022
Date

# Concho River Basin

## Data Trends



Concho River Basin
Impairment for standard
Concern for water quality standard
Concerns
South Concho River
Cold Creek
Concho River below FM 380
Lipan Creek
Dry Hollow Creek
Kickapoo Creek
Nitrate
Station ID - Sample Location
17346-SURFACE
12161-SURFACE
12166-SURFACE
18712-SURFACE
18711-SURFACE
12427-SURFACE
12425-SURFACE
12422-SURFACE
16779-SURFACE
17350-SURFACE
12171-SURFACE
15886-SURFACE
12409-SURFACE
12407-SURFACE
12403-SURFACE
12402-SURFACE
12254-SURFACE
12257-SURFACE
12255-SURFACE
12401-SURFACE
12512-SURFACE
0
20
40
60
Nitrate (mg/L)
Waterbody
OH Ivie
Concho River
Kickapoo/Dry Hollow/Lipan
North Concho
South Concho
Twin Buttes
Dove/Spring Ck


StationID: 12165-SURFACE
$R^2$ = 0.38
p-value = 0.0013
West Rocky Creek
Dissolved Oxygen
Dissolved Oxygen (mg/L)
12
10
8
6
4
2012
2014
2016
2018
2020
2022
Date

# Pecan Bayou

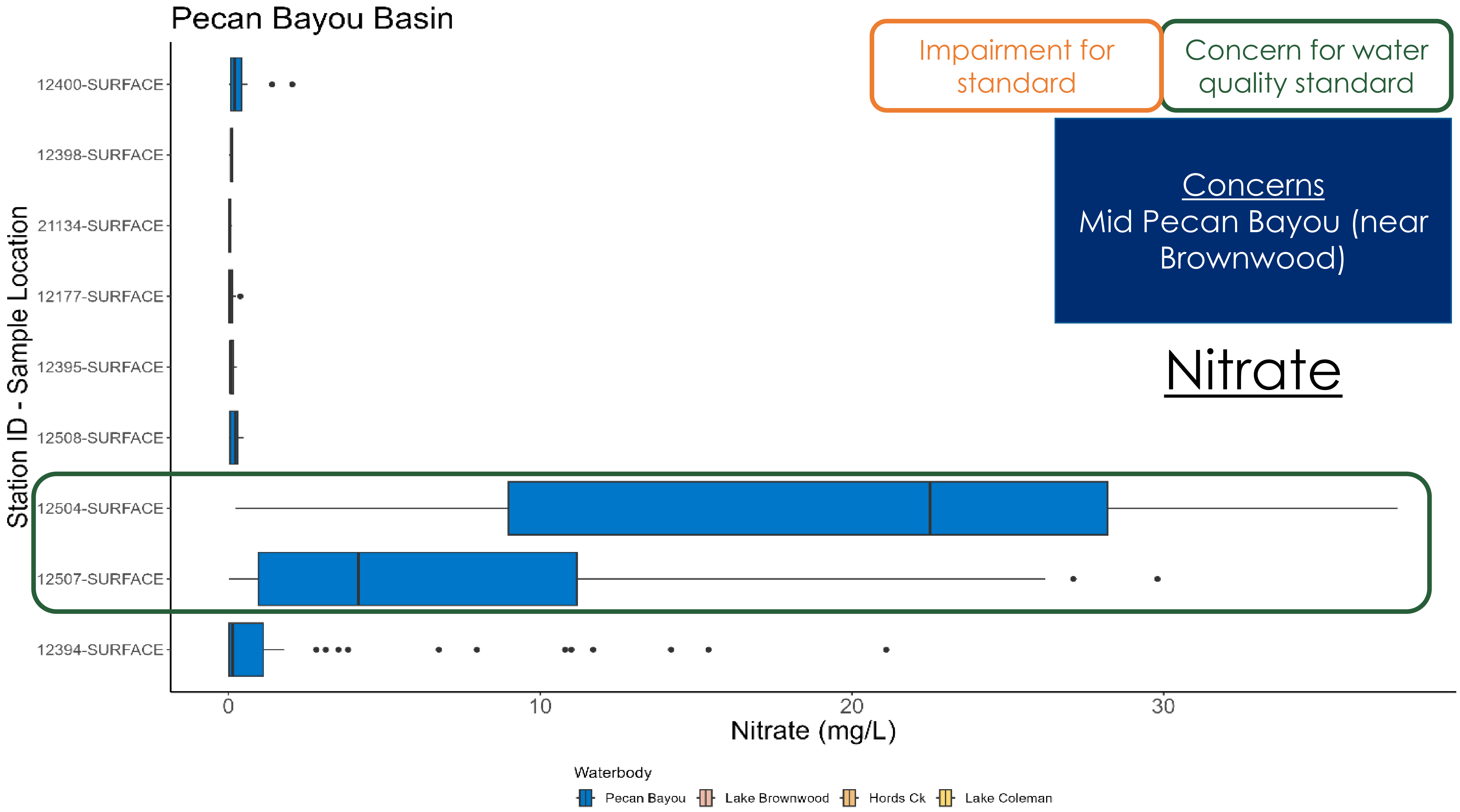
## Data Trends

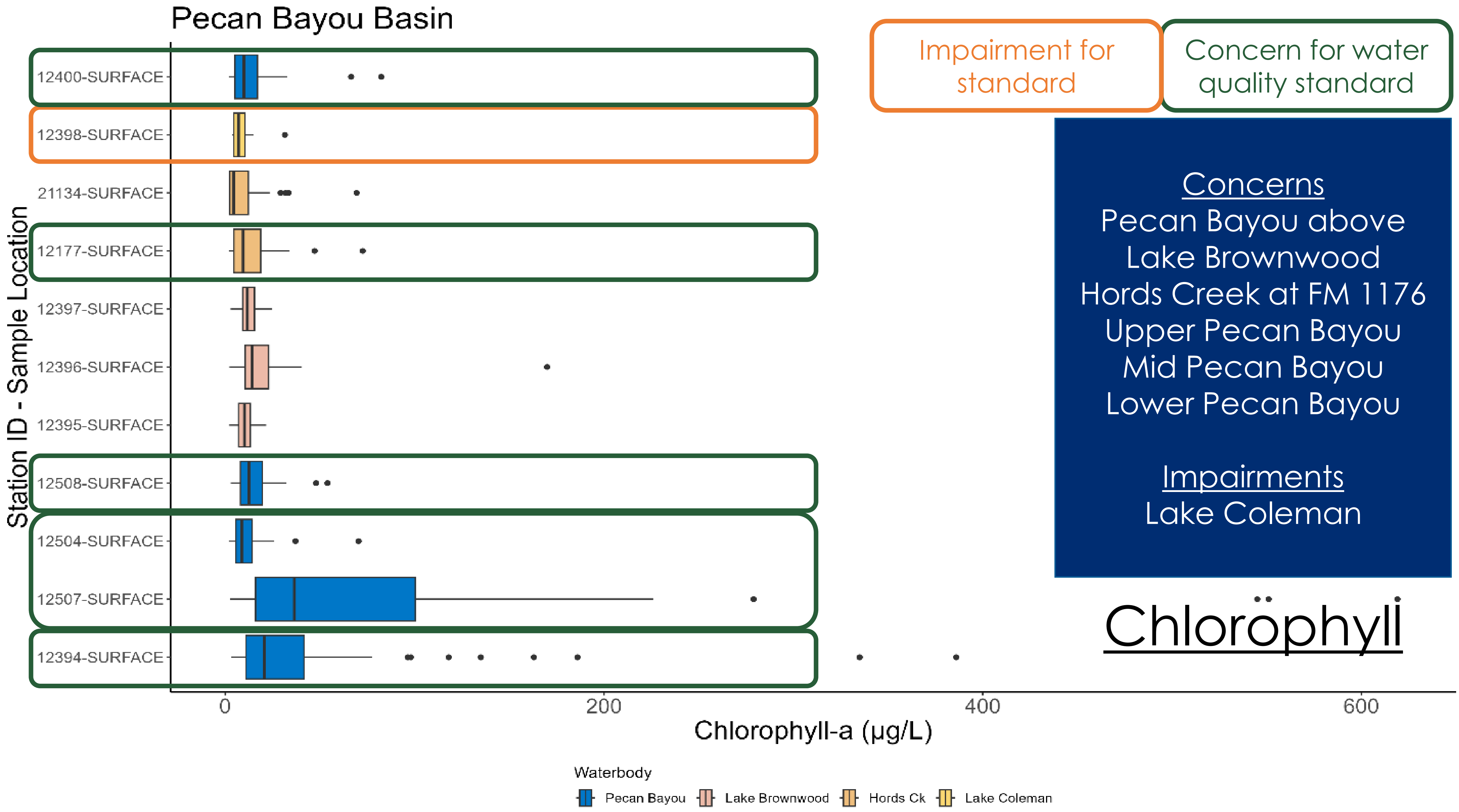
Impairment for standard

Concern for water quality standard

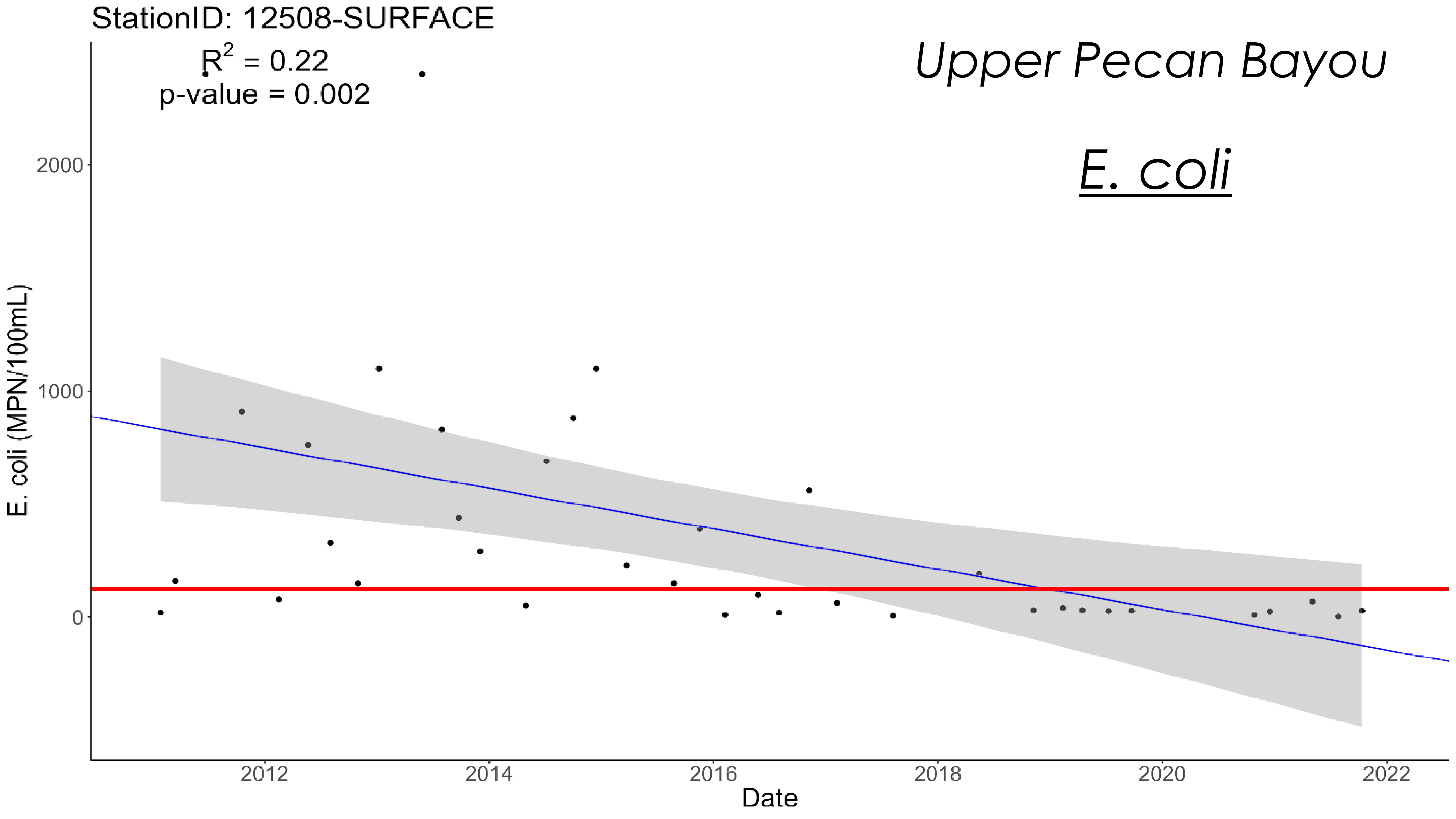
<u>Concerns</u>
Mid Pecan Bayou (near Brownwood)

# <u>Nitrate</u>





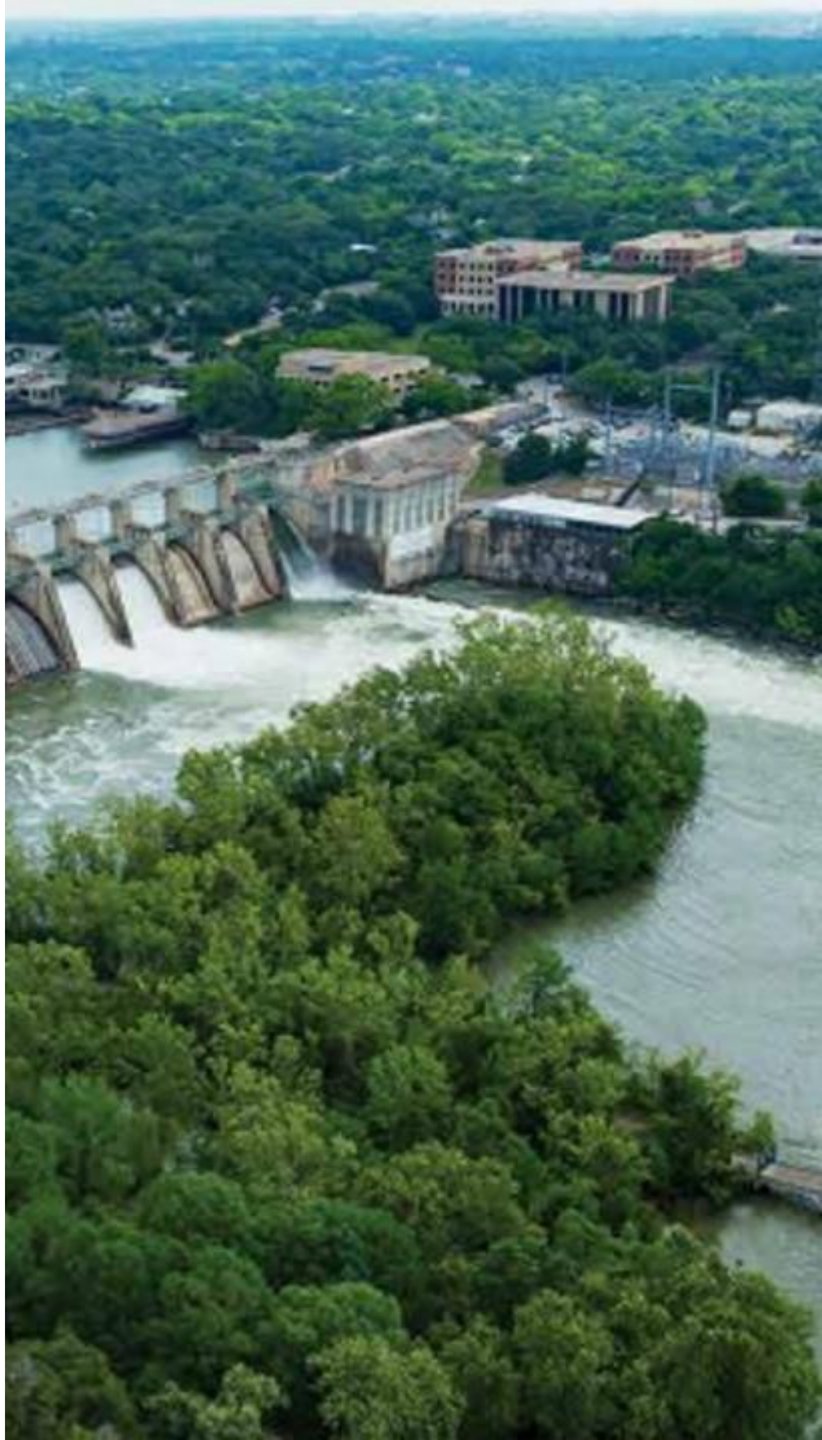
Pecan Bayou Basin
Impairment for standard
Concern for water quality standard
Concerns
Pecan Bayou above Lake Brownwood
Hords Creek at FM 1176
Upper Pecan Bayou
Mid Pecan Bayou
Lower Pecan Bayou
Impairments
Lake Coleman
Chlorophyll
Station ID - Sample Location
12400-SURFACE
12398-SURFACE
21134-SURFACE
12177-SURFACE
12397-SURFACE
12396-SURFACE
12395-SURFACE
12508-SURFACE
12504-SURFACE
12507-SURFACE
12394-SURFACE
0
200
400
600
Chlorophyll-a (µg/L)
Waterbody
Pecan Bayou
Lake Brownwood
Hords Ck
Lake Coleman



StationID: 12508-SURFACE
Upper Pecan Bayou
E. coli
$R^2$ = 0.22
p-value = 0.002
E. coli (MPN/100mL)
2000
1000
0
2012
2014
2016
2018
2020
2022
Date

# Summary

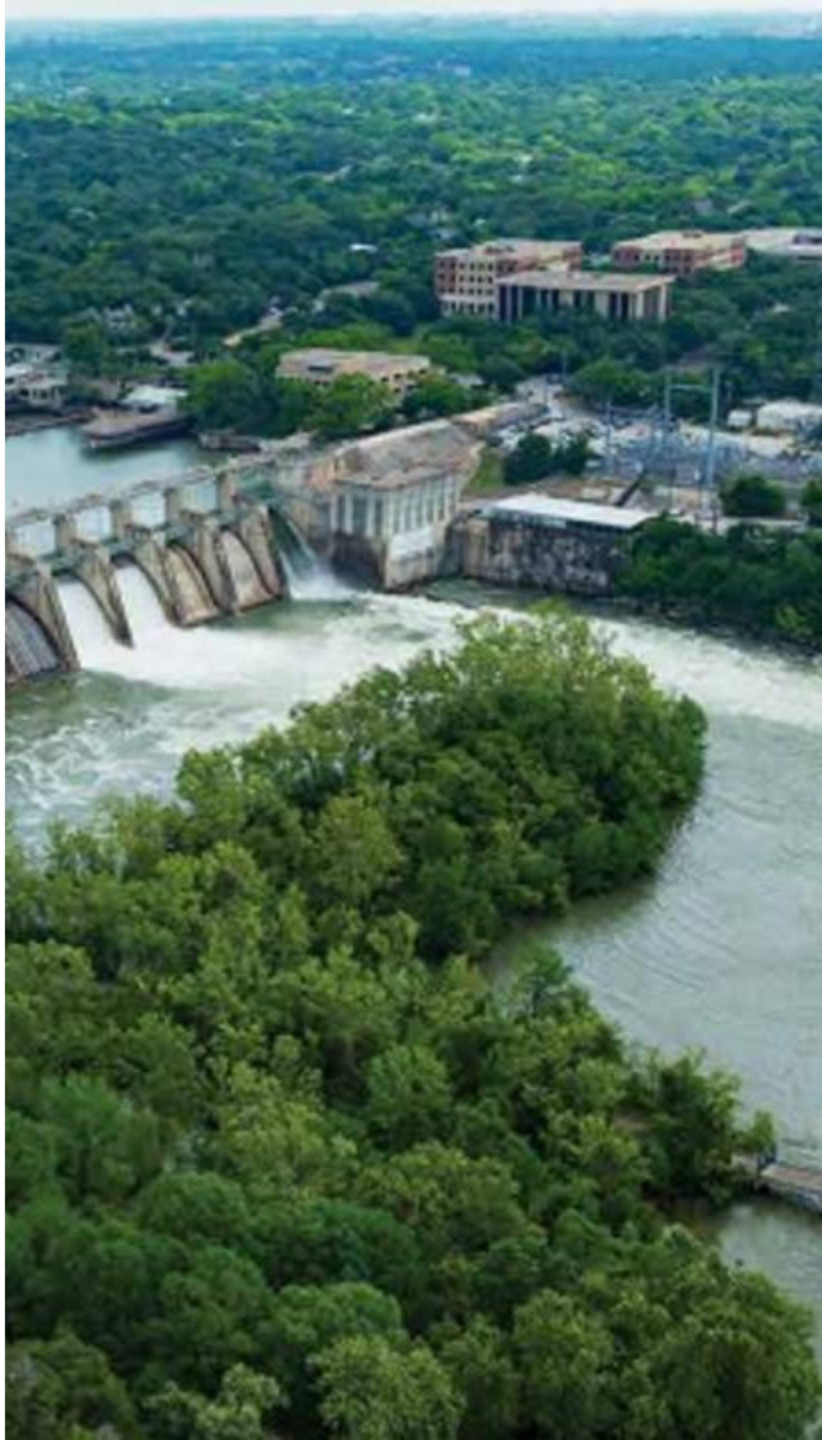
- **Drought Recovery**
  - Decreasing chloride, sulfate, TKN
- **Concerns for nutrients (especially nitrates) throughout the basin**
  - Especially downstream of urban areas
- **Concerns for chlorophyll *a* throughout basin**
  - Likely due to nutrient loads
- **Increasing trends in bacteria in specific areas**



# Next Steps

- **Basin Summary Report Review**
  - Contact Aaron.Richter@lcra.org to be included in review
  - Deadline of notification is Friday, March 31

- **Stakeholder Review of BSR**
  - Report to be sent out Wednesday, April 5
  - Deadline for comments/edits is COB Friday, April 14



# Questions?


LCRA
ENERGY • WATER • COMMUNITY SERVICES

Upper Colorado River Basin

Texas Clean Rivers Program (CRP) Water Quality Advisory Committee (WQAC)

# BREAK

& GROUP PHOTO

April 5, 2023

9AM to 12PM

*Held at the Upper Colorado River Authority*

*512 Orient Street, San Angelo, Texas*

THE TEXAS CLEAN RIVERS PROGRAM

UCRA

# COMMUNITY OUTREACH INITIATIVES

Charlotte Anderson

Executive Director

Keep San Angelo Beautiful (KSAB)

THE CITY OF SAN ANGELO TEXAS

Keep SAN ANGELO Beautiful

UCRA


# City Council

February 21, 2023

## Keep San Angelo Beautiful
## 2023 ANNUAL REPORT

CHARLOTTE ANDERSON
Executive Director


# MISSION -

To create awareness and maintain clean, green and beautiful spaces through art science and education

# VISION -

To take action each and every day to promote safe neighborhoods, thriving communities and beautification to impact the economic growth of our businesses

# CORE 4 – culture, principles & values

1. Serve the community and citizens
2. Respect for the individual
3. Strive for excellence
4. Integrity in all endeavors


# TRASH CLEANUPS

- 11 CLEANUPS
- 5,340 LBS OF TRASH
- 14,038 LBS OF HAZARDOUS WASTE
- 7,019 TIRES


www.cosatx


Keep SAN ANGELO Beautiful
PLEDGE TO BE
LITTER FREE
TIRE'S TO GO! TIRE DROP OFF
NOV 19 FOSTER COLISEUM 7AM-9:30AM

# TIRES

# 7,019


Keep SAN ANGELO Beautiful


# HAZARDOUS WASTE 14,038 lbs.




www.cosatx.us

# TREES – 200



# ELLA SAVES THE OCEANS 12,250 BAGS


# STAR SPANGLED CELEBRATION


# CUB SCOUTS WORLD CONSERVATION AWARD

# EDUCATION


## GO AS A RAM!

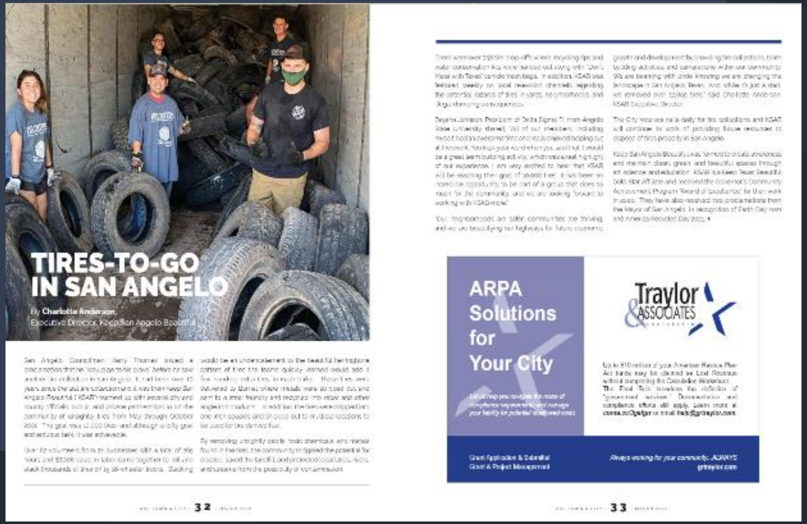


www.cosatx.us

# KEEP SAN ANGELO BEAUTIFUL HIGHLIGHTS



- Keep Texas Beautiful Gold Star Affiliate – 3 years
- Governor's Community Achievement Award of Excellence 2 years
- Keep Texas Beautiful Affiliate Mentor – Little Elm - Brazos
- Texas Town & City - "Tires To-Go"
- Keep Texas Beautiful Judge GCAA
- Keep Texas Beautiful Webinar Presenter
- KTB - HEB Grant recipient on recycling

# AWARENESS


Keep
SAN ANGELO
Beautiful
REAL TEXANS
DON'T LITTER
HAZARDOUS WASTE & ECO-FAIR
June 11 • 7am • Coliseum

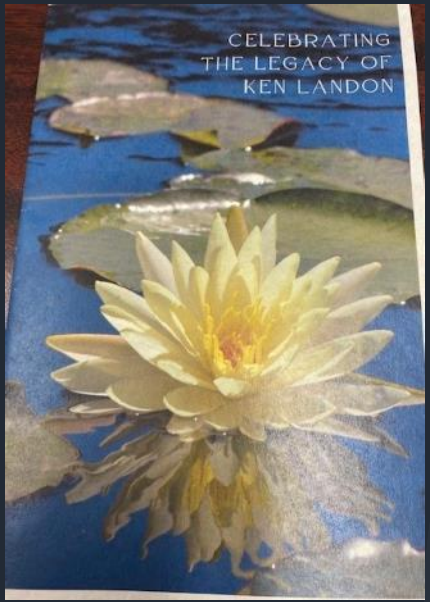

Support us by volunteering or
purchasing a bag of our gourmet
Keep San Angelo Beautiful coffee!
Keep
SAN ANGELO
Beautiful
CLICK
HERE
FOR INFO
Powered by
DECOTY


Plastic
Paper
TLCA
Recycles
Metal Cans
Glass


Keep
SAN ANGELO
Beautiful
So San Angelo can
do beautiful things!
May the joy of giving warm
your heart this Christmas!
Cheers to clean, green
& beautiful spaces!


COFFEE
TALK
DECOTY
KLST
T 104 EAST 17TH STREET IN SAN ANGELO. THE SPECIAL SPEAKERS V COMMUNITY

# BEAUTIFICATION





# GRATITUDE

## 140 PUBLIC/PRIVATE PARTNERSHIPS

THE CITY OF SAN ANGELO TEXAS

Take Care of Texas H-E-B

Ella Saves the Oceans Project

SHANNON MEDICAL CENTER

Tom Green County The State of Texas


ART IN UNCOMMON PLACES

Keep Texas Beautiful
KEEP AMERICA BEAUTIFUL AFFILIATE

Olive's Grow Happy

CONTERRA NETWORKS
Fiber Driven. People Powered.

HOWARD HC COLLEGE

REPUBLIC SERVICES

the YMCA

BRI RECYCLING SOLUTIONS

DECOTY COFFEE • TEA • SPICES

Texas Department of Transportation

CITY OF SAN ANGELO TEXAS Development Corporation

Nexstar MEDIA GROUP, INC.

Walmart

TLCA

TAKE CARE OF TEXAS PROUD PARTNER

ETHICON a Johnson & Johnson company

Norwex INDEPENDENT CONSULTANT

SAN ANGELO Chamber of Commerce

hcs BUSINESS SOLUTIONS

LAMAR


GREAT FUTURES START HERE.
BOYS & GIRLS CLUBS OF SAN ANGELO

BES-TEX
325.653.1300

ART& EVA TUCKER FOUNDATION

ASU

TRINITY LUTHERAN SAN ANGELO


Chocolate... how the West was fun.
COWBOY-UP chocolates

Take Care of Texas
It's the Only One We've Got!
TakeCareOfTexas.org
A PROGRAM OF TCEQ

BUFFALO WILD WINGS

ALLIANCE RECOVERY

BIG COUNTRY RECYCLING

BlueCross BlueShield

Girl Scouts
Where Girls Grow Strong

# SPORTFISH POPULATION MONITORING & GOLDEN ALGAE UPDATES


Lynn Wright

District Fisheries Biologist

Texas Parks & Wildlife Department (TPWD)

Inland Fisheries Division


TEXAS PARKS & WILDLIFE

UCRA

# Sportfish Monitoring and Angler Utilization of O.H. Ivie and E.V. Spence Reservoirs

# Golden Algae Updates

Lynn Wright
Texas Parks & Wildlife Department
Inland Fisheries Division

# Golden Algae Monitoring (cells/ml)

- E.V. Spence Reservoir
  - 2023 – 0, no toxicity
  - 2022 – 0-17,000, low toxicity
  - 2021 – 3,000-8,000, low toxicity
  - 2020 – 3,000-18,000, moderately toxic

- Colorado City Reservoir
  - 2023 – 2,000, no toxicity
  - 2022 – 3,000-115,000, highly toxic
  - 2021 – 0-12,000, moderately toxic
  - 2020 – 0-17,000, low toxicity

- Moss Creek
  - 2023 – 0, no toxicity
  - 2022 – 2,000-15,000, no toxicity
  - 2021 – 5,000-10,000, moderate toxicity
  - 2020 – 4,000-11,000, moderate toxicity

- Balmorhea
  - 2023 – 39,000-44,000, highly toxic

  - Last documented bloom was 2010
  - Last highly toxic bloom was 2006

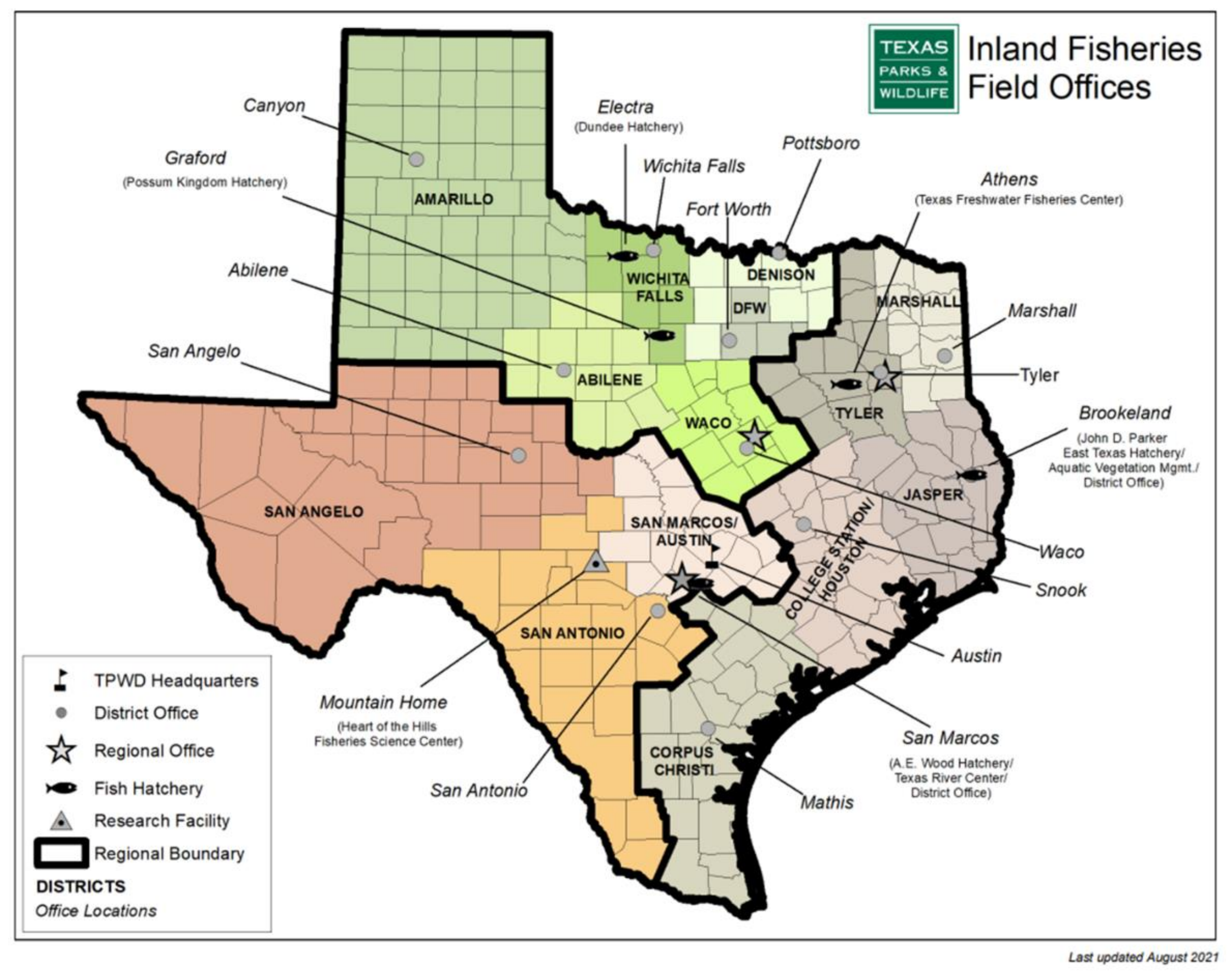
# Reservoir Monitoring

## Creel Surveys (year-round)

- Effort, Catch, Harvest
- Travel Distance, Expenditures

## Fall Electrofishing (October)

- Abundance
- Size Structure
- Condition



# Creel Surveys

- <u>O.H. Ivie</u>
  - Effort – 133,062 hours
    - Largemouth Bass – 62.9%
    - White Bass – 14.5%
    - Catfishes – 11.6%
    - Crappie – 7.3%
- Angler Expenditures
  - $1,237,161
  - $9.30 per hour of fishing

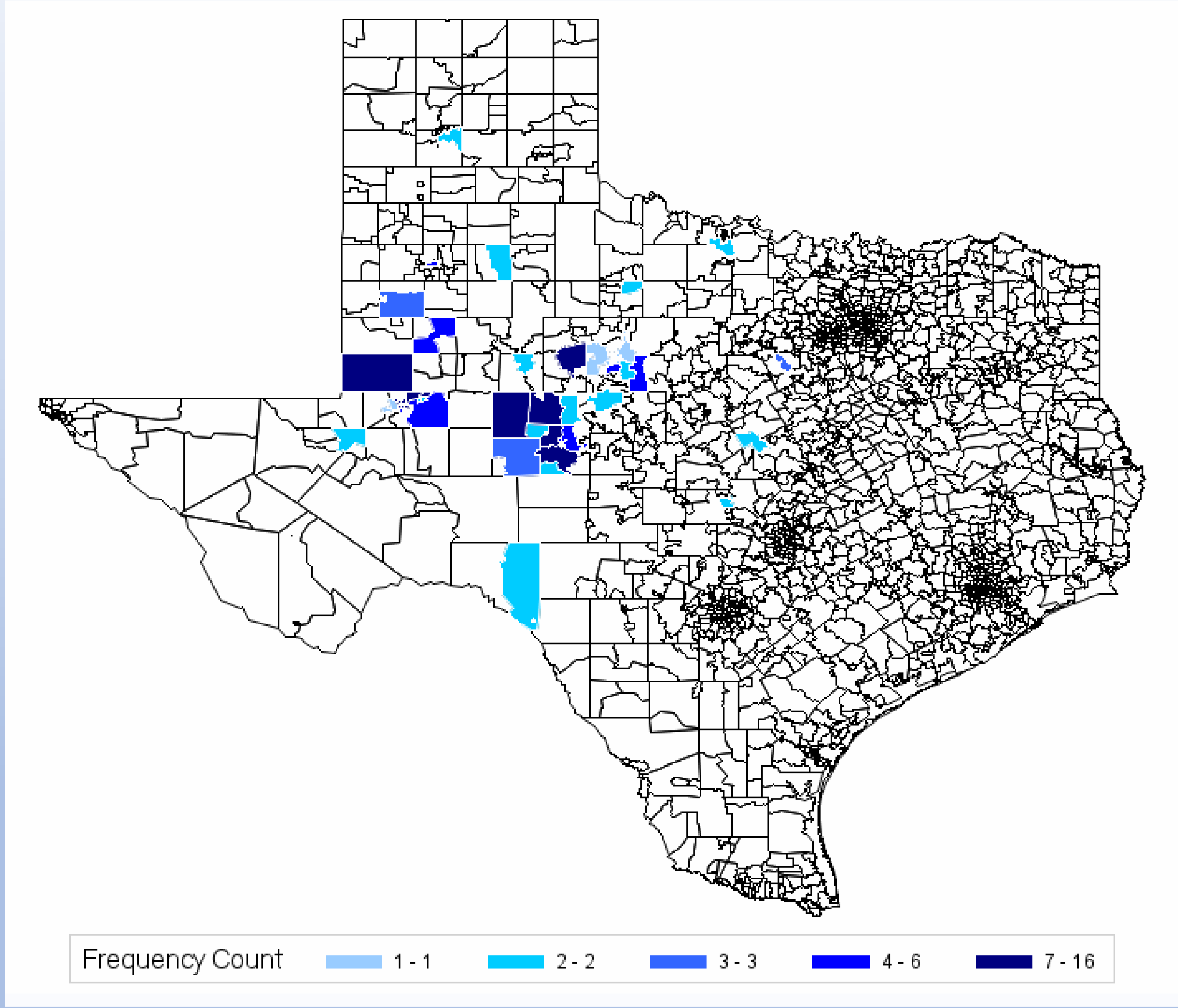
- <u>E.V. Spence</u>
  - Effort – 36,871 hours
    - Largemouth Bass – 85.4%
    - Catfishes – 10.2%
    - White Bass – 1.1%
- Angler Expenditures
  - $313,663
  - $8.51 per hour of fishing


# Harvest

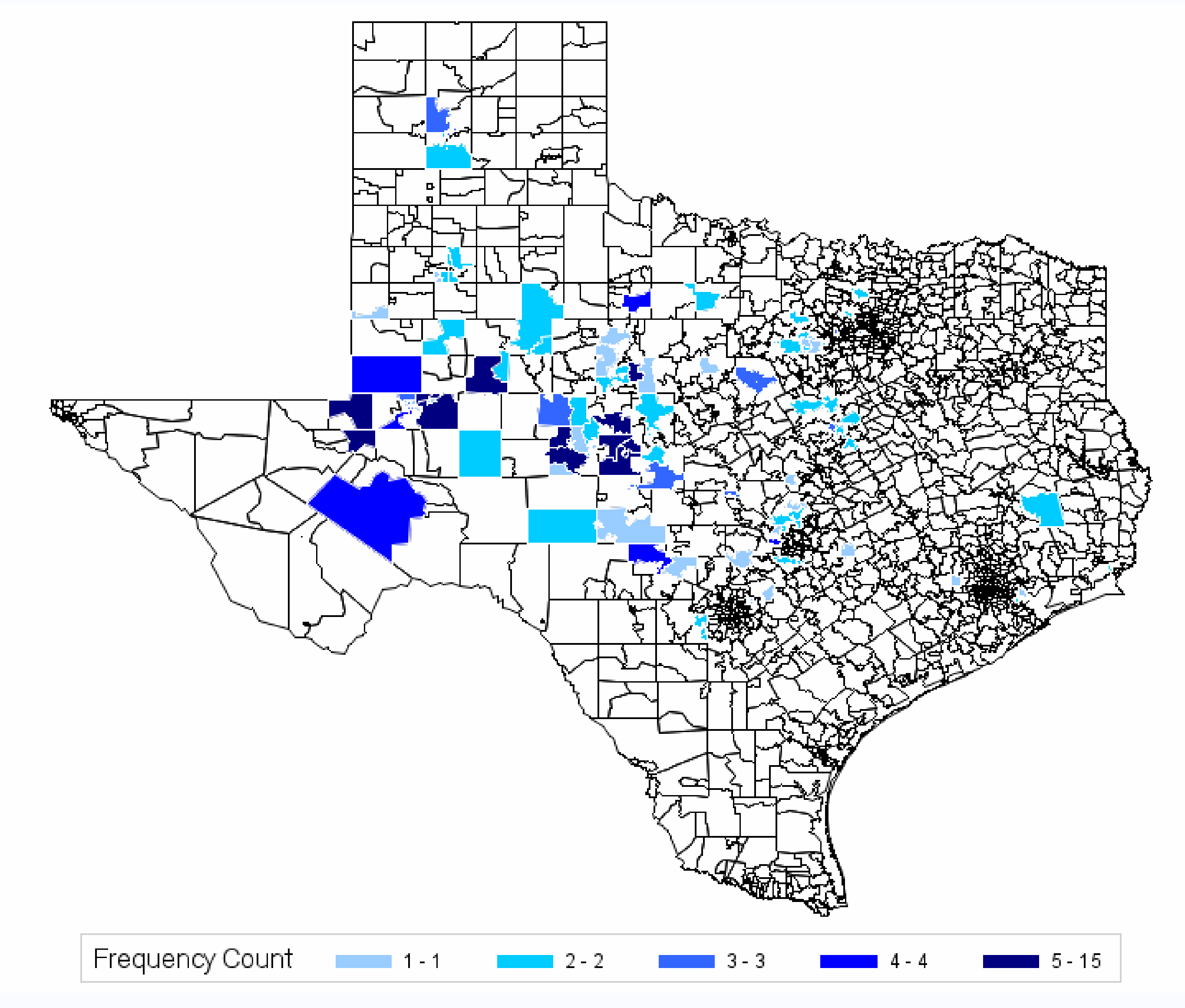
- <u>O.H. Ivie June 2019-May 2020</u>
  - White Bass – 8,367
  - Crappies – 1,487
  - Catfishes – 1,254
  - Largemouth Bass - 328
    - Legal Release – 99%

- <u>E.V. Spence June 2020-May 2021</u>
  - Catfishes – 1,278
  - Largemouth Bass - 204
    - Legal Release – 96%

- E.V. Spence– ZIP codes 2020-2021
  - 206 anglers interviewed
  - 37.4% traveled over 100 miles
  - 1.9% from out of state



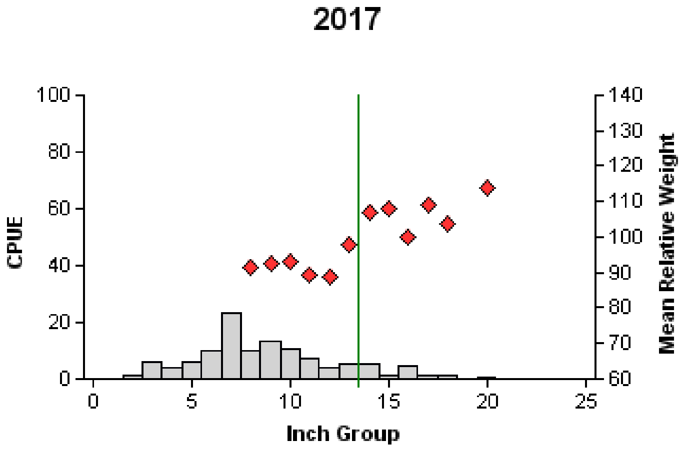
- O.H. Ivie – ZIP codes Spring 2022
  - 336 anglers interviewed
  - 67.0% traveled over 100 miles
  - 19.9% traveled over 200 miles
  - 10.4% from out of state
    - 13 different states documented



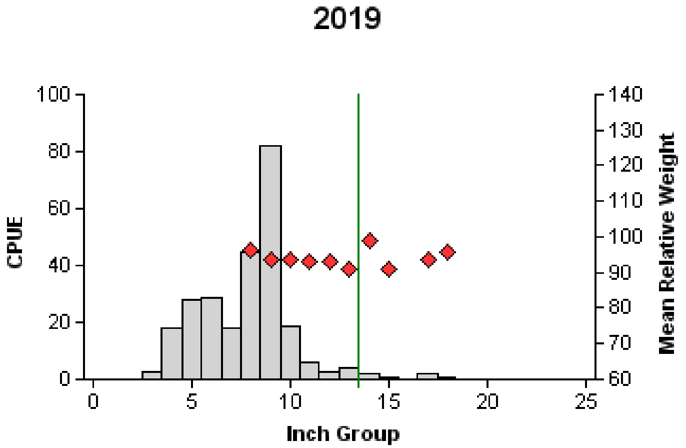
# E.V. Spence

# Largemouth Bass

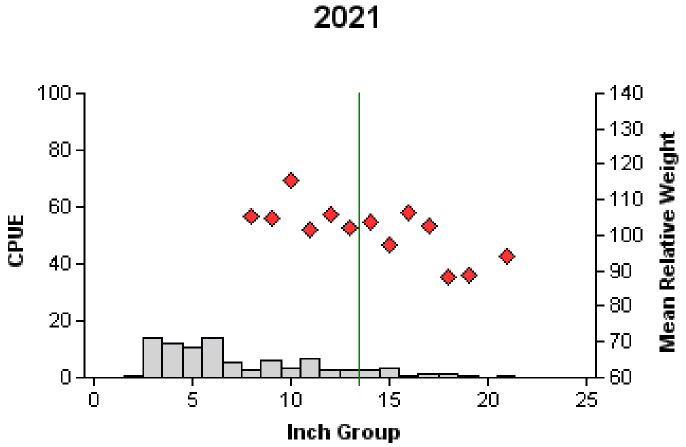
- Record high catch rate in 2019 (261/h)
- - 82/h for 9 inch fish, all age-1 from the 2018 year-class.
- Relative weight were adequate (mid-90’s)
- Successful Florida Bass Stockings
  - - FLMB alleles = 94%
  - - Pure FLMB = 70%




Effort = 1.5
Total CPUE = 116.0 (16; 174)
Stock CPUE = 65.3 (16; 98)
PSD = 37 (6)
PSD-P = 14 (4)




Effort = 1.0
Total CPUE = 261.0 (18; 261)
Stock CPUE = 165.0 (22; 165)
PSD = 8 (3)
PSD-P = 2 (1)




Effort = 1.5
Total CPUE = 91.3 (14; 137)
Stock CPUE = 34.7 (21; 52)
PSD = 46 (6)
PSD-P = 23 (6)

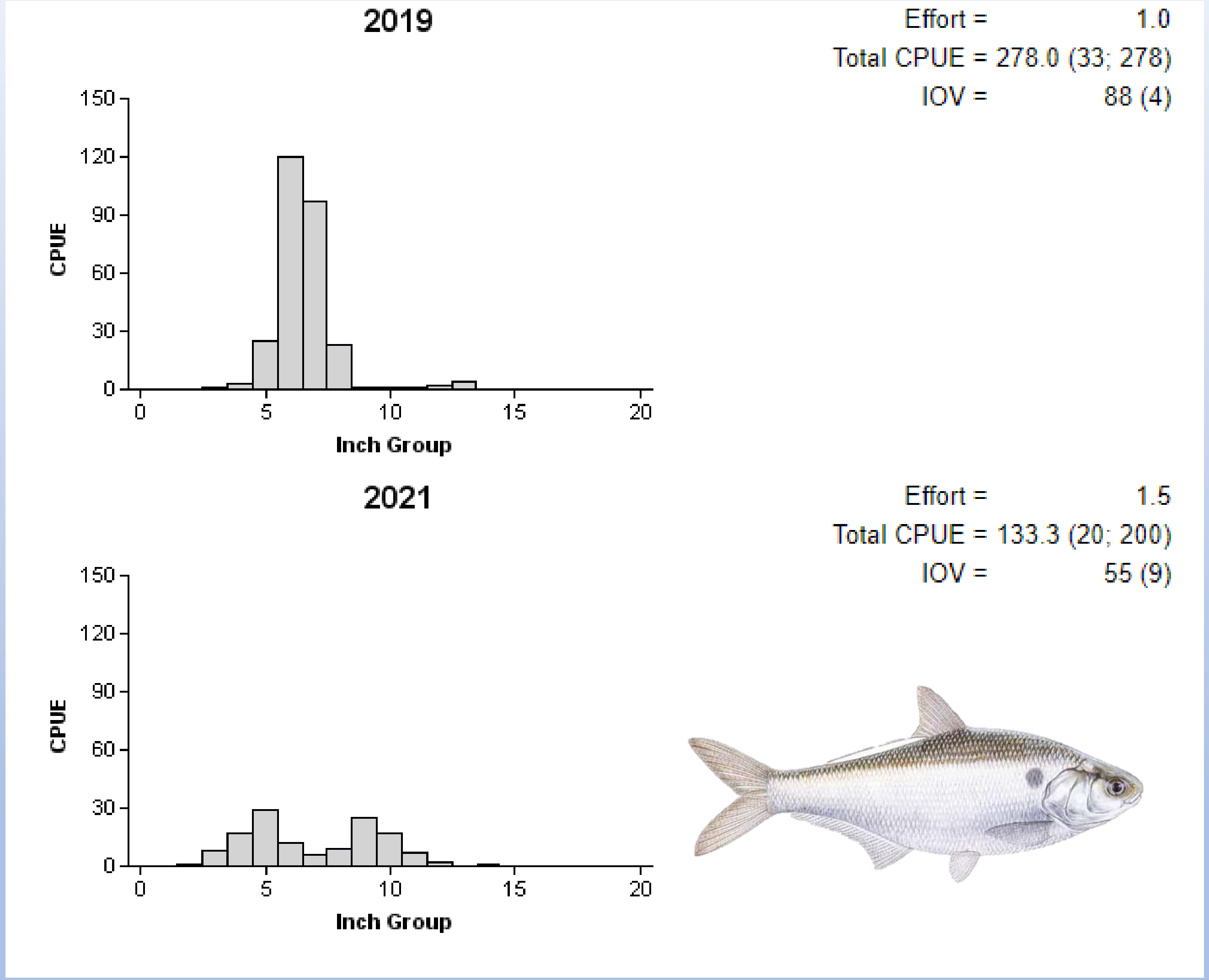
# Prey Base – E.V. Spence

- 2017 and 2019 highest Gizzard Shad CPUE-T, double the historic average.

- Gizzard Shad – CPUE-T
  - - 2017 = 385.3
  - - 2019 = 278.0
  - - 2021 = 133.3

  - - **Long-term average 135.3/h**

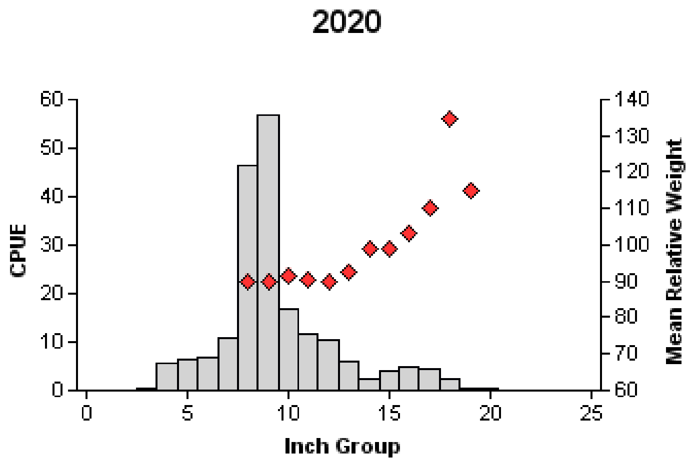
- Golden algae impacts minimal



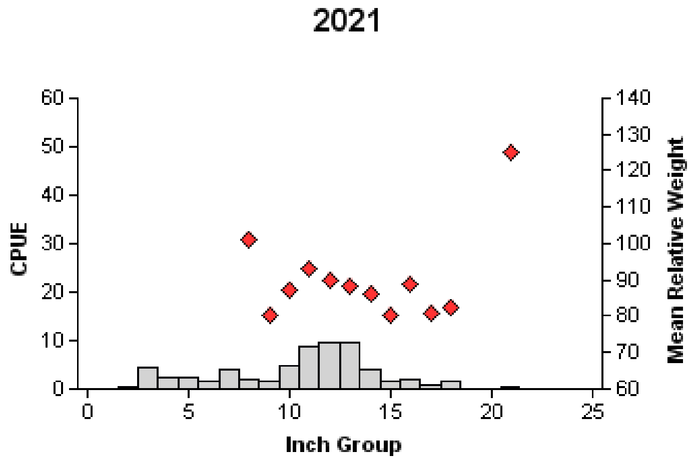
# O.H. Ivie Reservoir

# Largemouth Bass

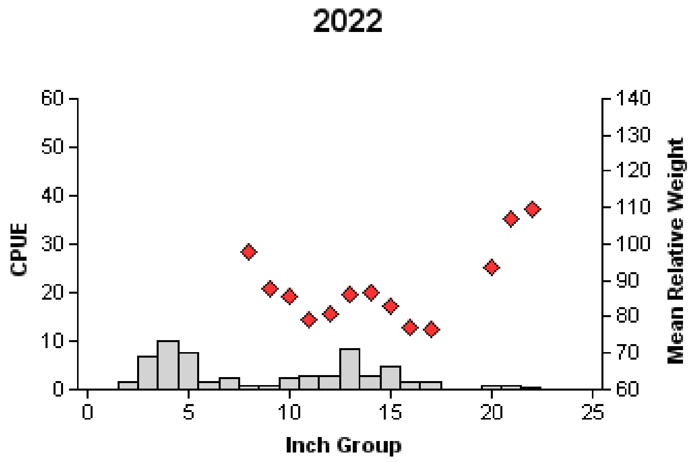
- 2020 highest LMB catch on record
  - Historical average 72.7/h
- Strong year-class in 2019
- Successful Florida Bass Stockings
  - - FLMB alleles = 84%
  - - Pure FLMB = 27%




Effort = 2.0
Total CPUE = 198.5 (17; 397)
Stock CPUE = 168.0 (17; 336)
PSD = 21 (5)
PSD-P = 10 (2)




Effort = 2.0
Total CPUE = 62.5 (15; 125)
Stock CPUE = 47.0 (18; 94)
PSD = 63 (5)
PSD-P = 14 (3)




Effort = 2.0
Total CPUE = 62.5 (18; 125)
Stock CPUE = 32.5 (20; 65)
PSD = 77 (6)
PSD-P = 32 (4)

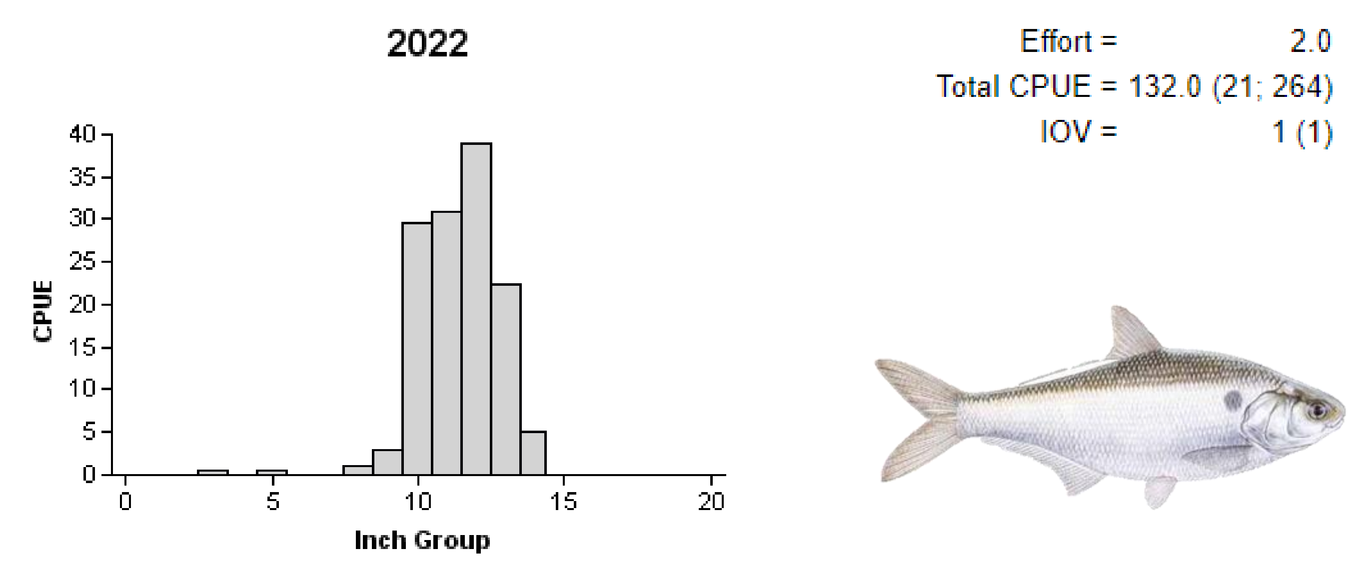
# Prey Base – O.H. Ivie

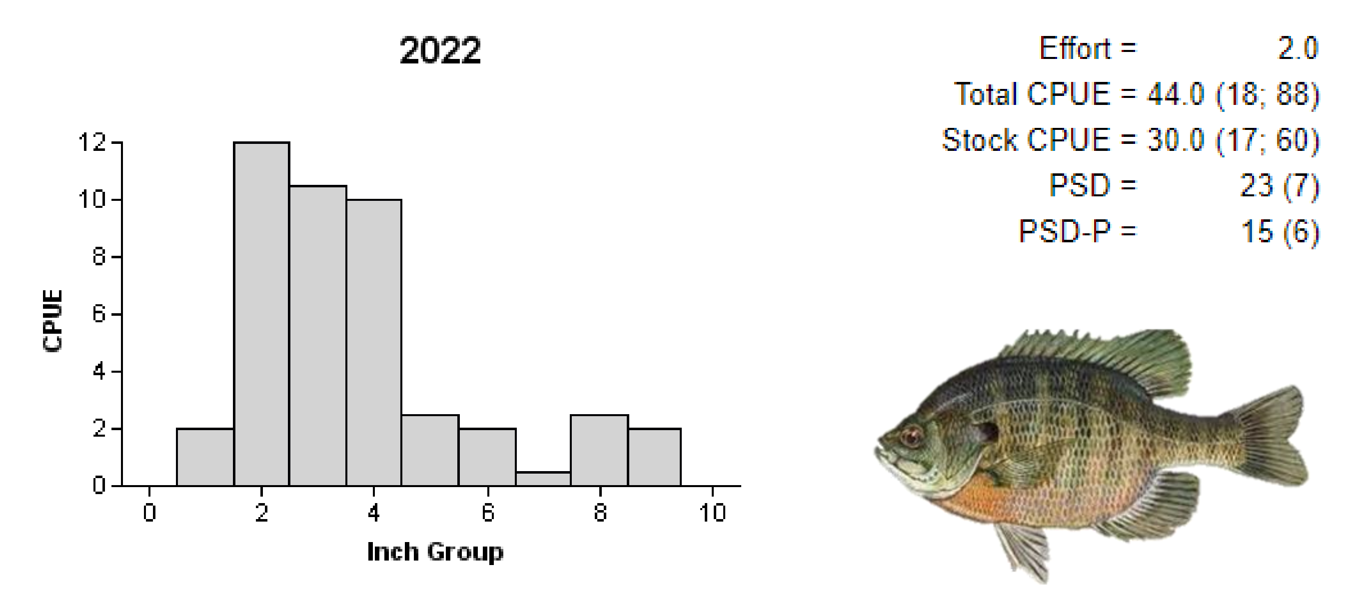
- Gizzard Shad
  - 2019 – 223.5/h, IOV = 52
  - 2020 – 141.5/h, IOV = 1
  - 2021 – 126.5/h, IOV = 1
  - 2022 – 132.0/h, IOV = 1

  - **Long-term average = 150.2/h**

- Bluegill
  - 2019 – 59.0/h, PSD = 45
  - 2020 – 67.5/h, PSD = 45
  - 2021 – 109.0/h, PSD = 12
  - 2022 – 44.0/h, PSD = 23

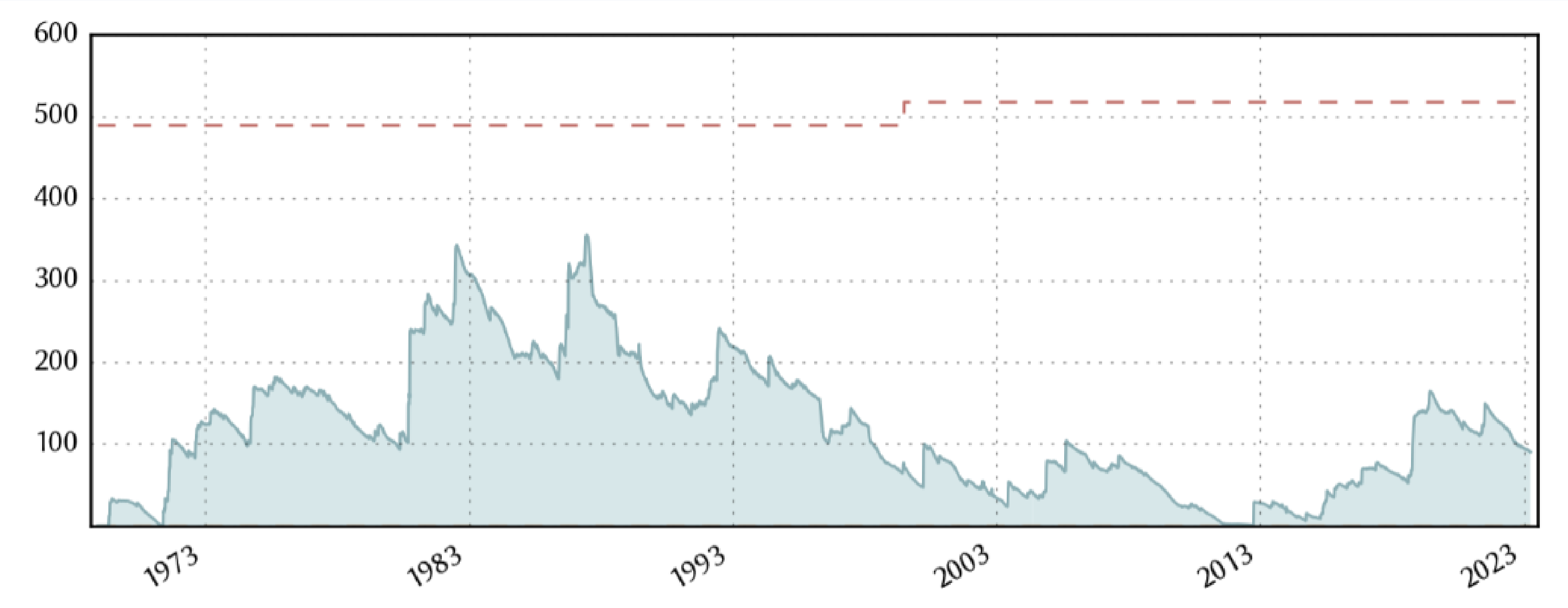
  - **Long-term average = 113.0/h**



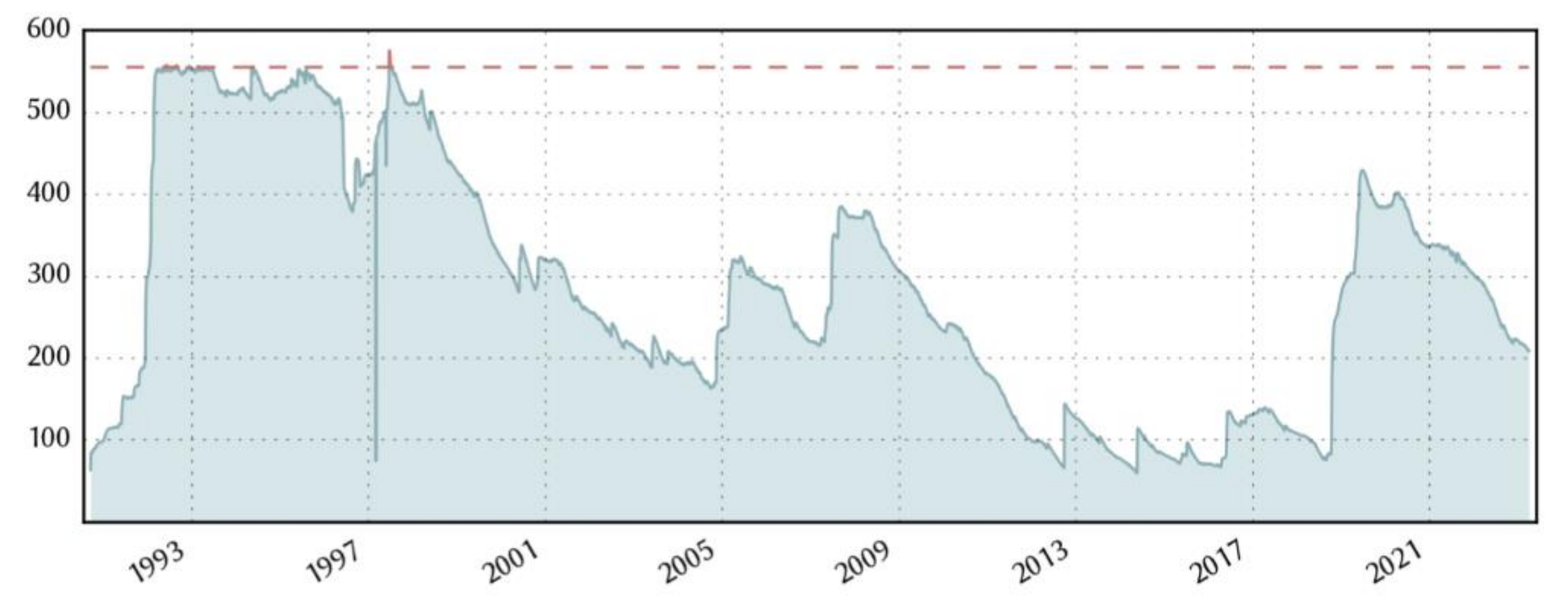
E.V. Spence

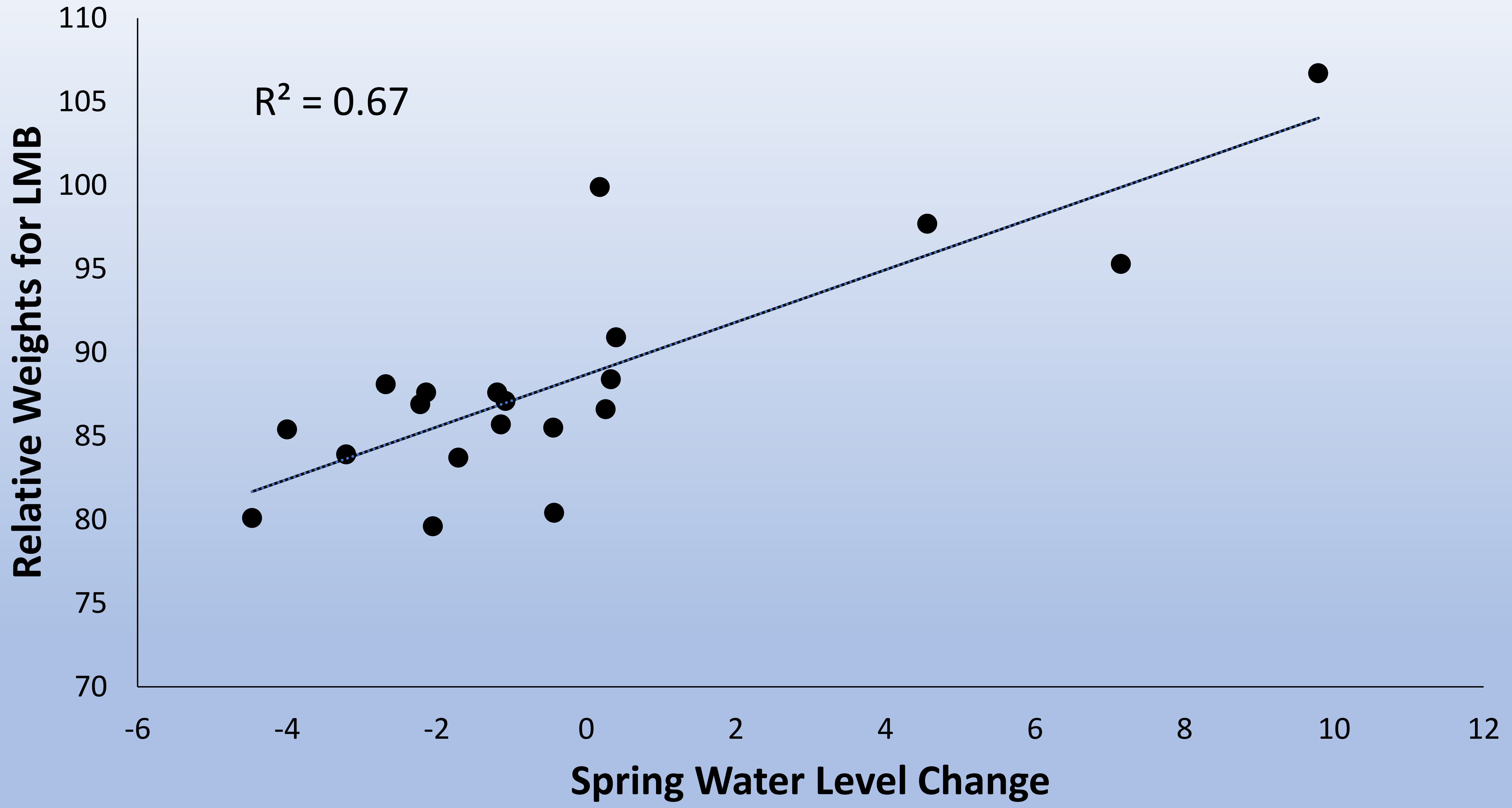
17.5% Capacity




O.H. Ivie

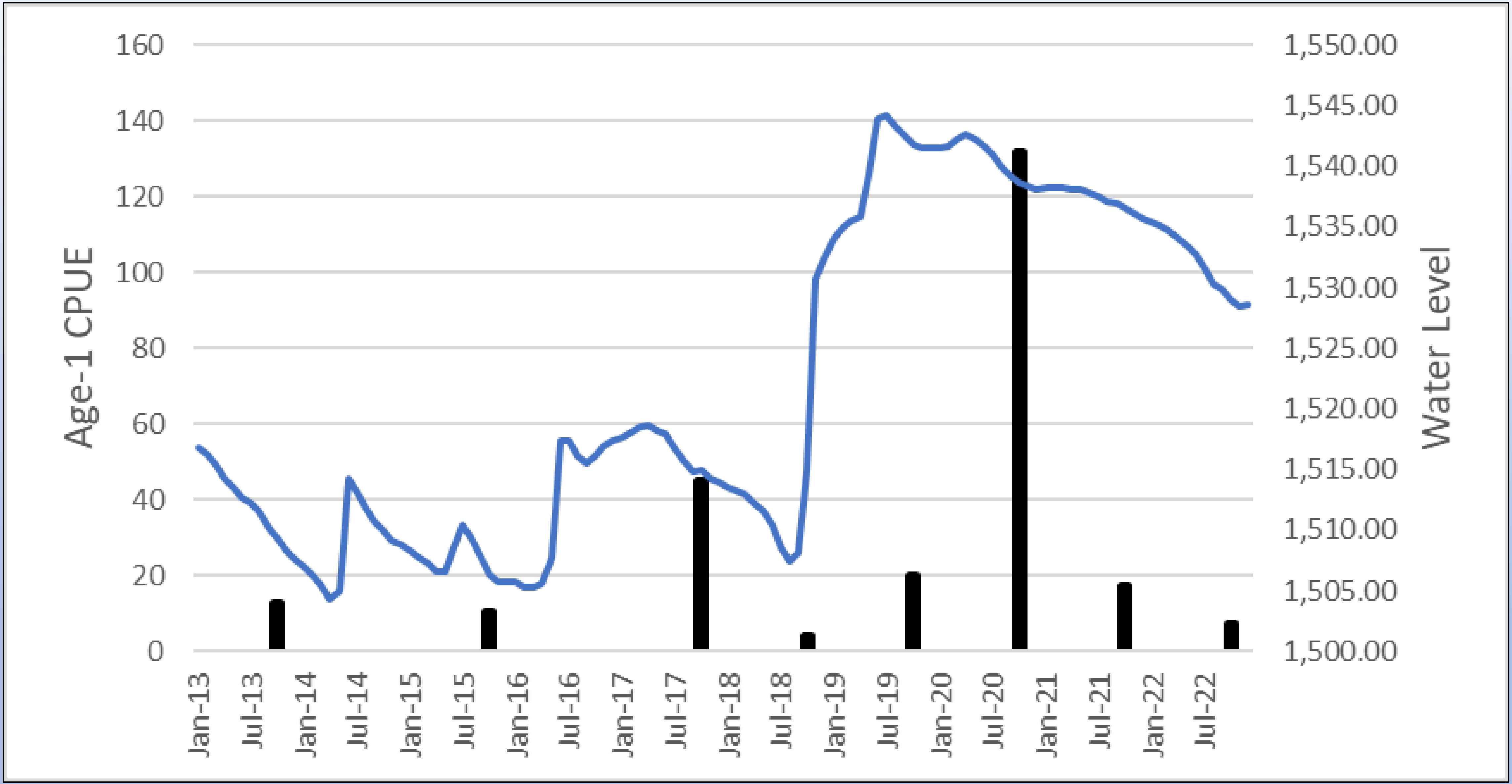
37.7% Capacity



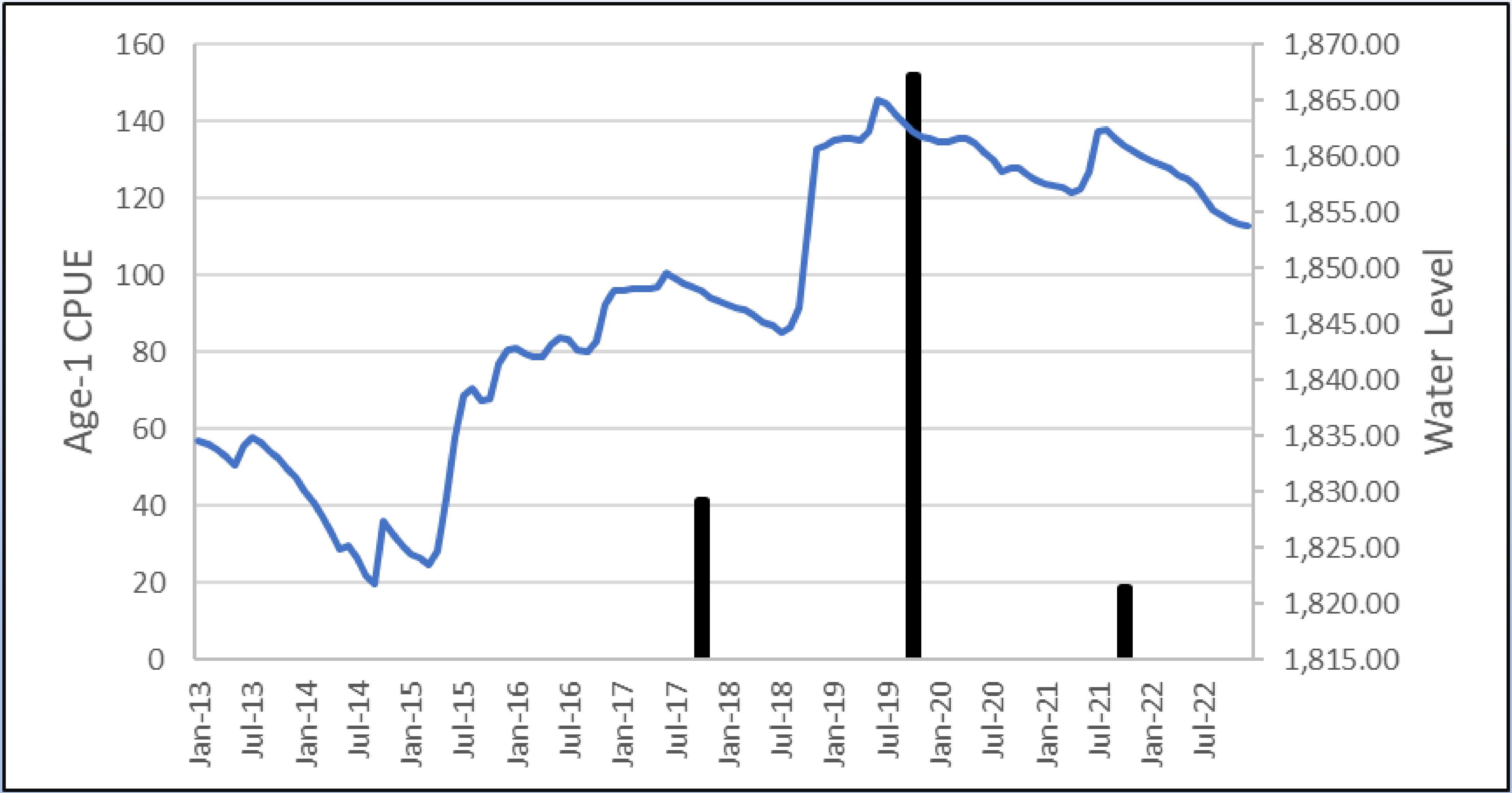


R² = 0.67
110
105
100
95
90
85
80
75
70
-6
-4
-2
0
2
4
6
8
10
12
Relative Weights for LMB
Spring Water Level Change

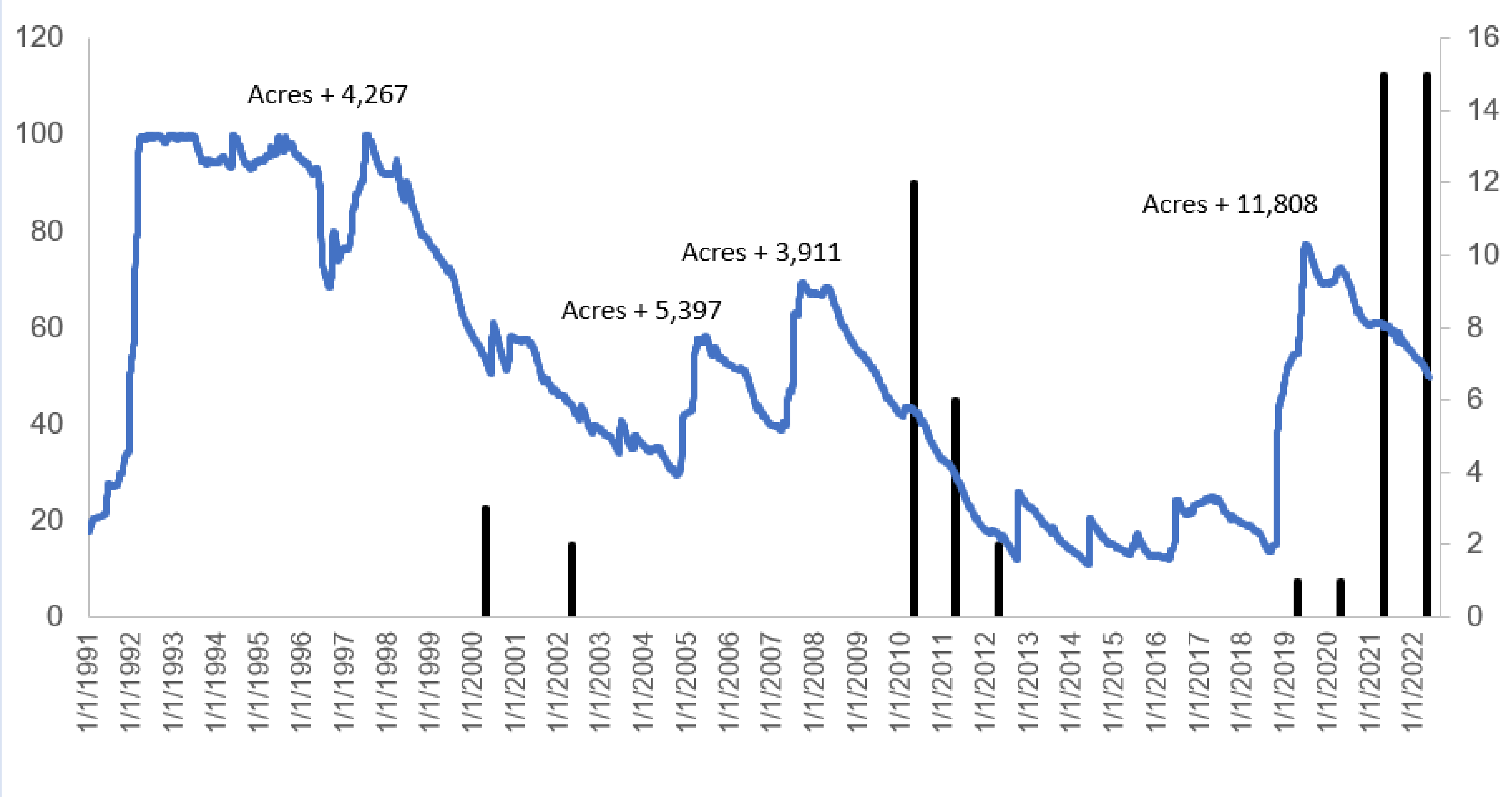
# O.H. Ivie Reservoir



# E.V. Spence Reservoir



## O.H. Ivie – ShareLunker's (13+ lb. bass)



TEXAS

PARKS &

WILDLIFE

# NATIVE MUSSELS NEWS & UPDATES

Lisa Benton

Aquatic Biologist & CRP Program Coordinator

Lower Colorado River Authority (LCRA)

Photo taken by Anthea Fredrickson

# EMERGING WATER QUALITY ISSUES


## Scott McWilliams

General Manager

Upper Colorado River Authority (UCRA)


# PFAS / PFOS Discussion

SCOTT MCWILLIAMS

UPPER COLORADO RIVER AUTHORITY

# History of PFAS

| PFAS[1] | Development Time Period | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1930s | 1940s | 1950s | 1960s | 1970s | 1980s | 1990s | 2000s |
| PTFE | Invented | Non-Stick Coatings | | | Waterproof Fabrics | | | |
| PFOS | | Initial Production | Stain & Water Resistant Products | Firefighting foam | | | | U.S. Reduction of PFOS, PFOA, PFNA (and other select PFAS[2]) |
| PFOA | | Initial Production | Protective Coatings | | | | | |
| PFNA | | | | | Initial Production | Architectural Resins | | |
| Fluoro-telomers | | | | | Initial Production | Firefighting Foams | | Predominant form of firefighting foam |
| Dominant Process[3] | | Electrochemical Fluorination (ECF) | | | | | | Fluoro-telomerization (shorter chain ECF) |

Pre-Invention of Chemistry / Initial Chemical Synthesis / Production Commercial Products Introduced and Used

**Notes:**
1. This table includes fluoropolymers, PFAAs, and fluorotelomers. PTFE (polytetrafluoroethylene) is a fluoropolymer. PFOS, PFOA, and PFNA (perfluorononanoic acid) are PFAAs.
2. Refer to Section 3.4.
3. The dominant manufacturing process is shown in the table; note, however, that ECF and fluorotelomerization have both been, and continue to be, used for the production of select PFAS.

**Sources:** Prevedouros et al. 2006; Concawe 2016; Chemours 2017; Gore-Tex 2017; US Naval Research Academy 2017

ITRC @ https://pfas-1.itrcweb.org/

# Per- and Polyfluoroalkyl Substances (PFAS): Manufactured Chemicals

PFAS are a group of manufactured chemicals that have been used in industry and consumer products since the 1940s because of their useful properties. There are thousands of different PFAS, some of which have been more widely used and studied than others.

Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS), for example, are two of the most widely used and studied chemicals in the PFAS group. PFOA and PFOS have been replaced in the United States with other PFAS in recent years.

One common characteristic of concern of PFAS is that many break down very slowly and can build up in people, animals, and the environment over time.

# PFAS Can Be Found in Many Places

**Drinking water** – in public drinking water systems and private drinking water wells.

**Soil and water at or near waste sites** - at landfills, disposal sites, and hazardous waste sites such as those that fall under the federal Superfund and Resource Conservation and Recovery Act programs.

**Fire extinguishing foam** - in aqueous film-forming foams (or AFFFs) used to extinguish flammable liquid-based fires. Such foams are used in training and emergency response events at airports, shipyards, military bases, firefighting training facilities, chemical plants, and refineries.

**Manufacturing or chemical production facilities that produce or use PFAS** – for example at chrome plating, electronics, and certain textile and paper manufacturers.

**Food** – for example in fish caught from water contaminated by PFAS and dairy products from livestock exposed to PFAS.

**Food packaging** – for example in grease-resistant paper, fast food containers/wrappers, microwave popcorn bags, pizza boxes, and candy wrappers.

**Household products and dust** – for example in stain and water-repellent used on carpets, upholstery, clothing, and other fabrics; cleaning products; non-stick cookware; paints, varnishes, and sealants.

**Personal care products** – for example in certain shampoo, dental floss, and cosmetics.

**Biosolids** – for example fertilizer from wastewater treatment plants that is used on agricultural lands can affect ground and surface water and animals that graze on the land.

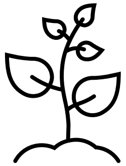
# Variety of PFAS Exposure

Working in occupations such as firefighting or chemicals manufacturing and processing.

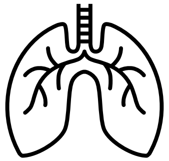
Drinking water contaminated with PFAS.

Eating certain foods that may contain PFAS, including fish.

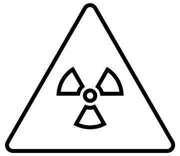
Swallowing contaminated soil or dust.

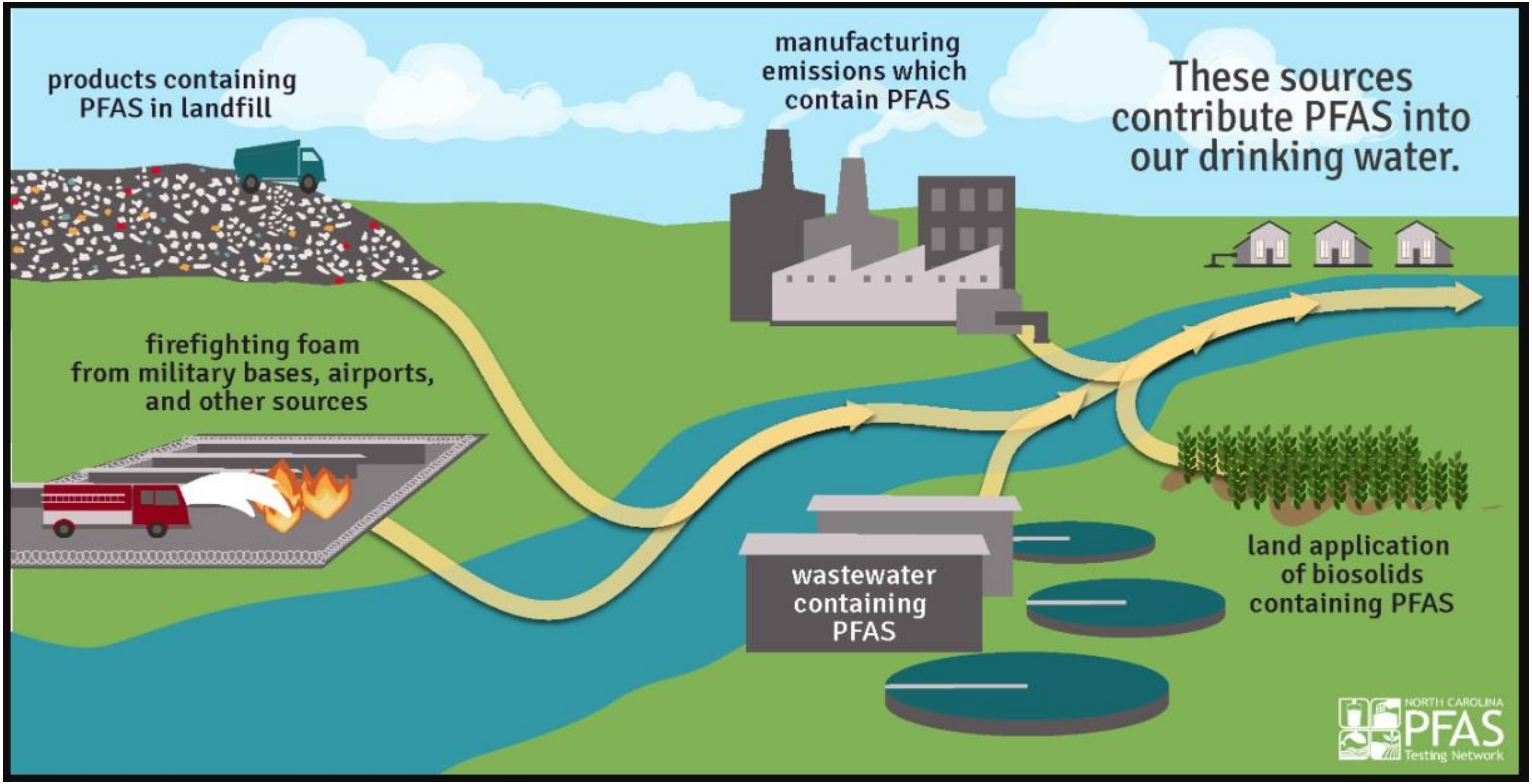


Breathing air containing PFAS.

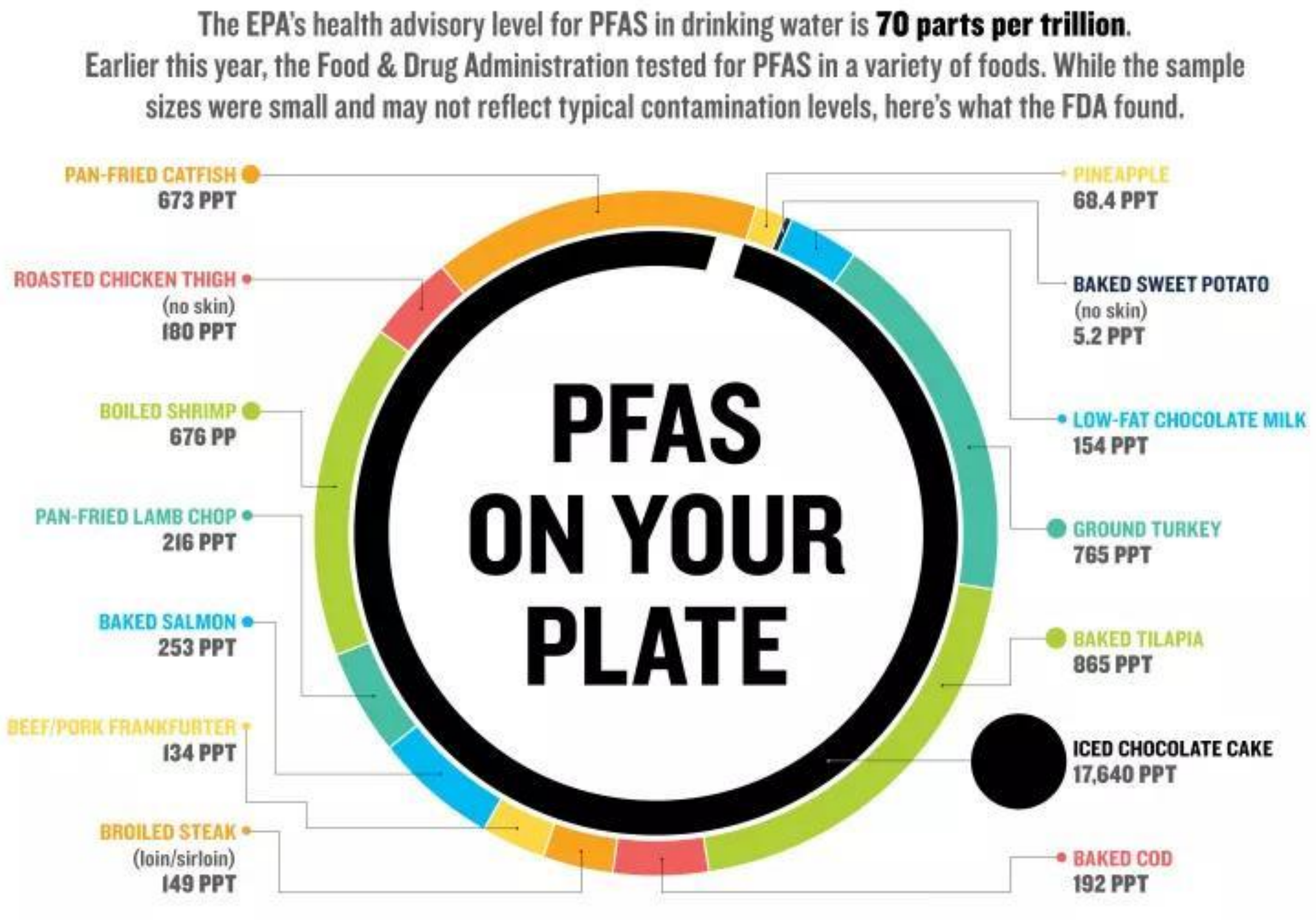


Using products made with PFAS or that are packaged in materials containing PFAS.





products containing PFAS in landfill
manufacturing emissions which contain PFAS
These sources contribute PFAS into our drinking water.
firefighting foam from military bases, airports, and other sources
wastewater containing PFAS
land application of biosolids containing PFAS
NORTH CAROLINA PFAS Testing Network


The EPA's health advisory level for PFAS in drinking water is 70 parts per trillion.
Earlier this year, the Food & Drug Administration tested for PFAS in a variety of foods. While the sample sizes were small and may not reflect typical contamination levels, here's what the FDA found.
PFAS ON YOUR PLATE
PAN-FRIED CATFISH 673 PPT
ROASTED CHICKEN THIGH (no skin) 180 PPT
BOILED SHRIMP 676 PP
PAN-FRIED LAMB CHOP 216 PPT
BAKED SALMON 253 PPT
BEEF/PORK FRANKFURTER 134 PPT
BROILED STEAK (loin/sirloin) 149 PPT
PINEAPPLE 68.4 PPT
BAKED SWEET POTATO (no skin) 5.2 PPT
LOW-FAT CHOCOLATE MILK 154 PPT
GROUND TURKEY 765 PPT
BAKED TILAPIA 865 PPT
ICED CHOCOLATE CAKE 17,640 PPT
BAKED COD 192 PPT

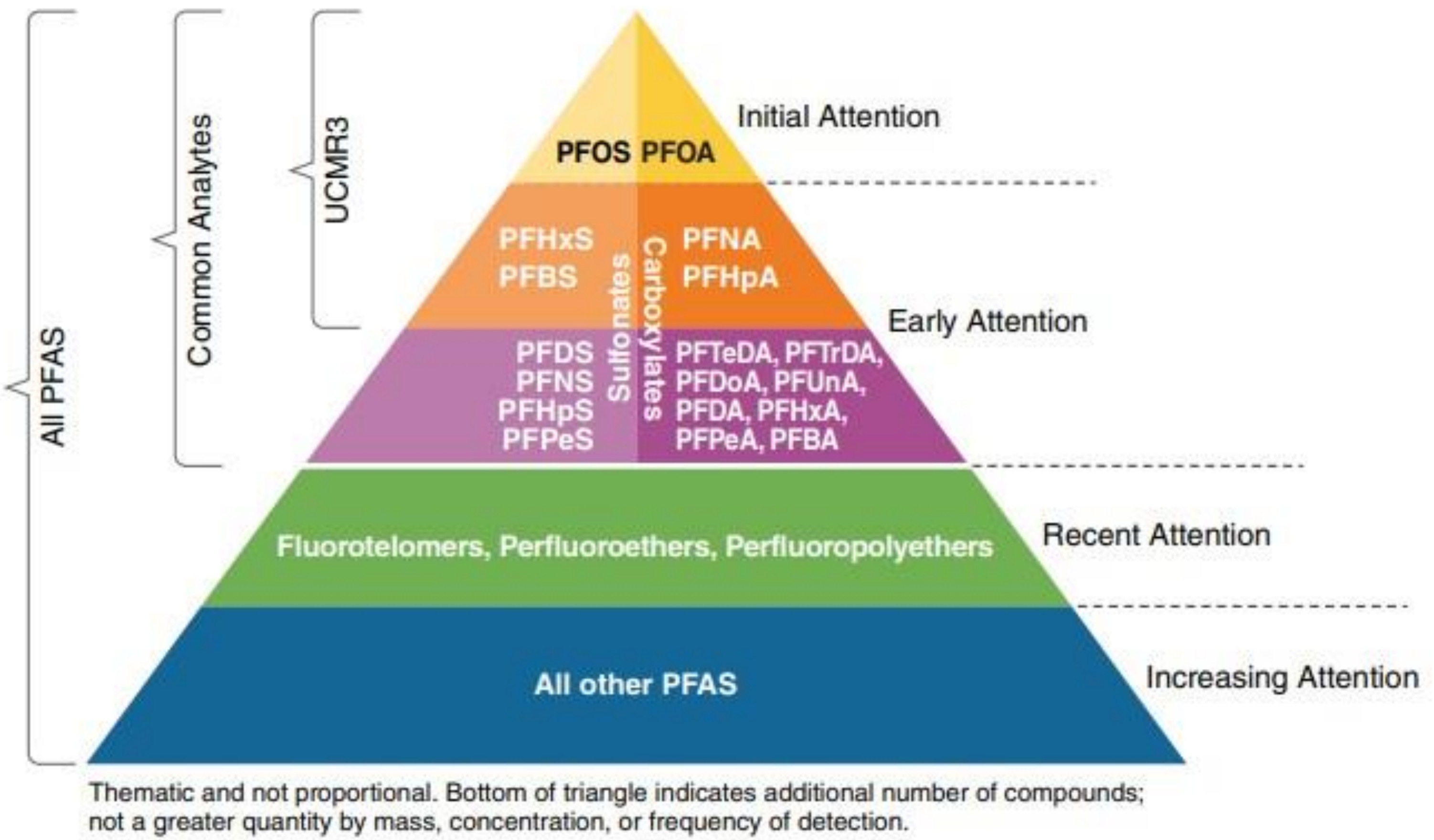



**Figure 3-1. Emerging awareness and emphasis on PFAS occurrence in the environment**
*(Source: J. Hale, Kleinfelder, used with permission)*

# EPA Awareness and Emphasis

(2006 – in absence of regulations, DuPont and 3M voluntarily agree to phase out use of PFOA and PFOS)

# What We Know about Health Effects

**Current peer-reviewed scientific studies have shown that exposure to certain levels of PFAS may lead to:**

- **Reproductive effects** such as decreased fertility or increased high blood pressure in pregnant women.
- **Developmental effects** or delays in children, including low birth weight, accelerated puberty, bone variations, or behavioral changes.
- **Increased risk** of some cancers, including prostate, kidney, and testicular cancers.
- **Reduced ability** of the body's immune system to fight infections, including reduced vaccine response.
- Interference with the body's **natural hormones**.
- **Increased cholesterol** levels and/or risk of obesity.

# Additional Health Effects are Difficult to Determine

Scientists at EPA, in other federal agencies, and in academia and industry are continuing to conduct and review the growing body of research about PFAS. However, health effects associated with exposure to PFAS are difficult to specify for many reasons, such as:

- There are **thousands of PFAS** with potentially varying effects and toxicity levels, yet most studies focus on a limited number of better known PFAS compounds.
- People can be exposed to PFAS in different ways and at different stages of their life.
- The types and uses of PFAS change over time, which makes it **challenging to track** and assess how exposure to these chemicals occurs and how they will affect human health.

# History of EPA Health Advisories (HAs)

| Compound Abbreviation | Compound Name | 2009 EPA HAs | 2016 Revised HAs | 2022 EPA HAs |
|---|---|---|---|---|
| PFOA | Perfluorooctanoic acid | 400 ppt | 70 ppt (individual and combined sum with PFOS) | 0.004 ppt* |
| PFOS | Perfluorooctanesulfonic acid | 200 ppt | 70 ppt (individual and combined sum with PFOA) | 0.02 ppt* |
| GenX | Hexafluoropropylene oxide dimer acid | NA | NA | 10 ppt |
| PFBS | Perfluorobutane sulfonic acid | NA | NA | 2000 ppt |

ppt = parts per trillion

# EPA's Proposed National Primary Drinking Water Regulations (March 2023)

| Compound | Proposed MCLG | Proposed MCL (enforceable levels) |
|---|---|---|
| PFOA | zero | 4.0 ppt* |
| PFOS | zero | 4.0 ppt* |
| PFNA | 1.0 (unitless) Hazard Index | 1.0 (unitless) Hazard Index |
| PFHxS | | |
| PFBS | | |
| HFPO-DA (commonly referred to as GenX Chemicals) | | |

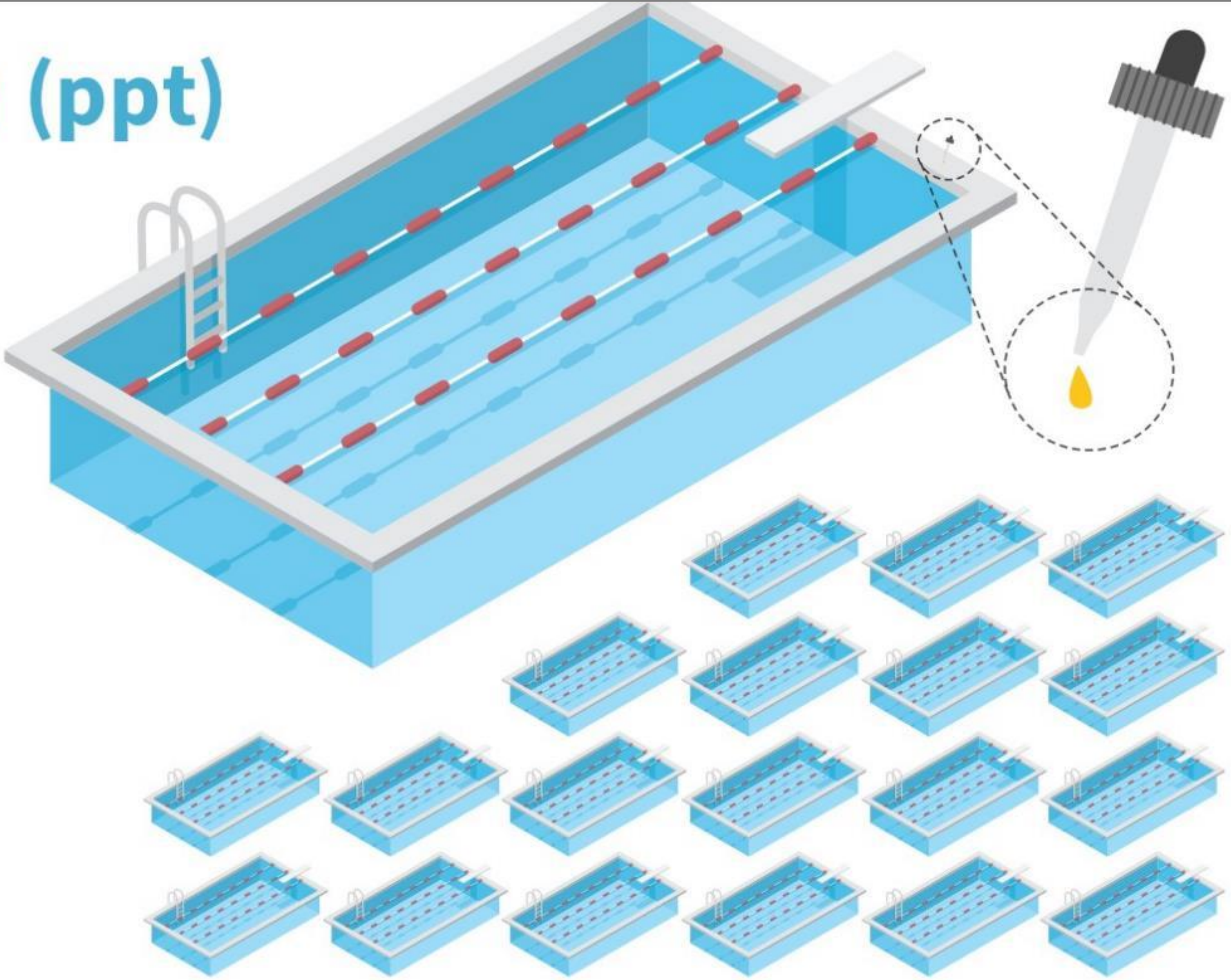
The Hazard Index is a tool used to evaluate potential health risks from exposure to chemical mixtures.

*ppt = parts per trillion (also expressed as ng/L)

# 1 part per trillion (ppt)

**IS EQUIVALENT TO A SINGLE DROP OF WATER IN**

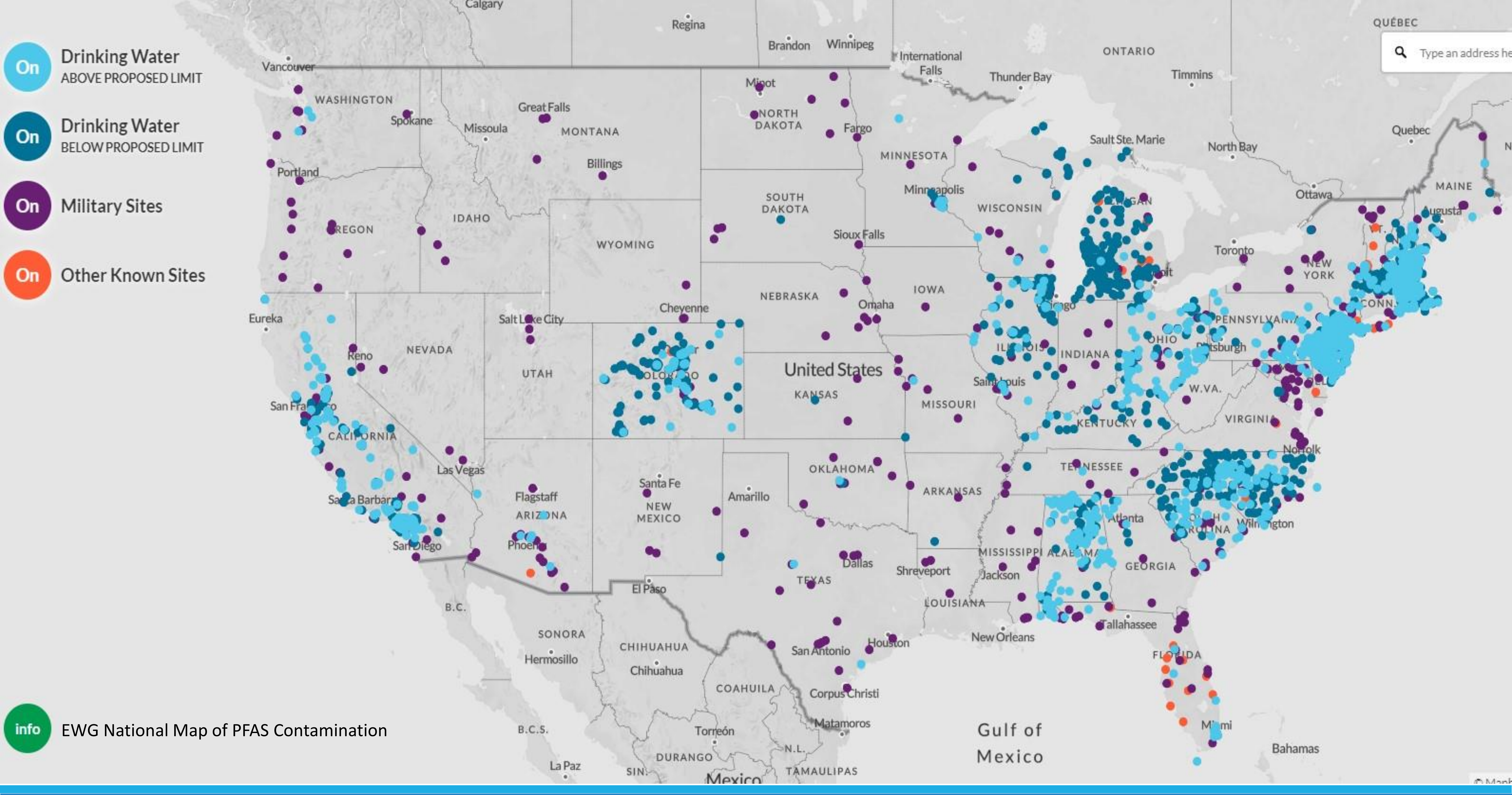
## 20 olympic-sized swimming pools




## Article - New Mexico dairy farm with PFAS contamination loses entire herd, 2022

**"New Mexico dairy farm with PFAS contamination loses entire herd"**

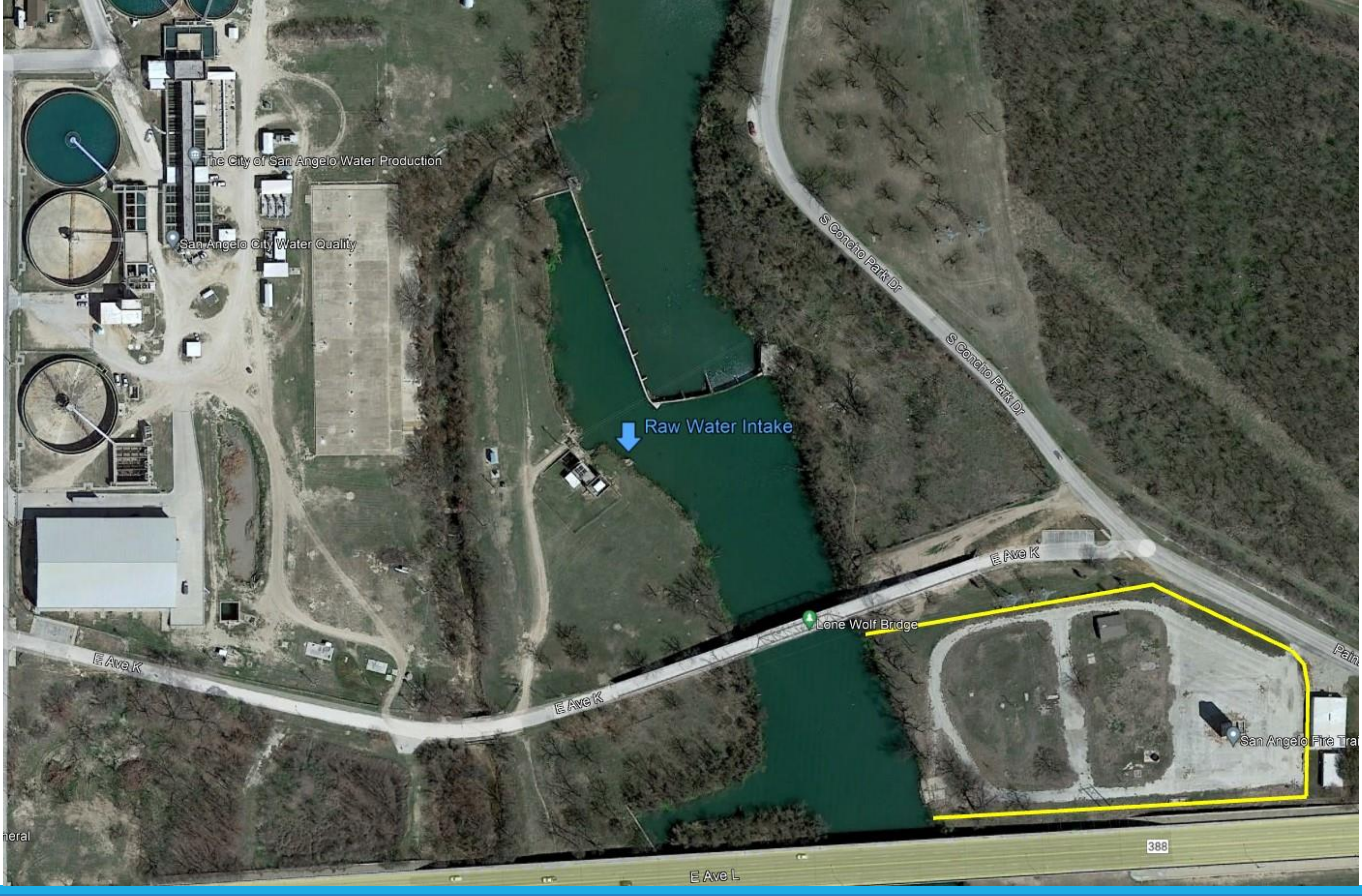
*3,665 cows euthanized*


On Drinking Water ABOVE PROPOSED LIMIT
On Drinking Water BELOW PROPOSED LIMIT
On Military Sites
On Other Known Sites
info EWG National Map of PFAS Contamination
Type an address he
United States
WASHINGTON
OREGON
IDAHO
MONTANA
WYOMING
NEVADA
UTAH
CALIFORNIA
ARIZONA
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
WISCONSIN
INDIANA
KENTUCKY
TENNESSEE
MISSISSIPPI
GEORGIA
FLORIDA
W.VA.
VIRGINIA
PENNSYLVANIA
NEW YORK
MAINE
ONTARIO
QUÉBEC
SONORA
CHIHUAHUA
COAHUILA
DURANGO
TAMAULIPAS
Gulf of Mexico
Bahamas

# Goodfellow AFB San Angelo, TX

| PFA | Location detected (on-base sites) | Maximum Level (ppt) | Years tested |
|---|---|---|---|
| **PFOS** | Soil | 110,000 | 2017 |
| **PFOA** | Soil | 14,000 | 2017 |
| **PFBS** | Soil | 540 | 2017 |
| **PFHxS** | Soil | 38,000 | 2017 |
| **PFOS** | Groundwater | 28 | 2017-2022 |
| **PFOA** | Groundwater | 628 | 2017-2022 |
| **PFBS** | Groundwater | 986 | 2017-2022 |
| **4:2 FTS** | Groundwater | 47 | 2017-2022 |
| **6:2 FTS** | Groundwater | 1.0 | 2017-2022 |
| **8:2 FTS** | Groundwater | 569 | 2017-2022 |
| **PFBA** | Groundwater | 705 | 2017-2022 |
| **PFDA** | Groundwater | 35 | 2017-2022 |
| **PFHpA** | Groundwater | 1.0 | 2017-2022 |
| **PFHpS** | Groundwater | 343 | 2017-2022 |
| **PFHxA** | Groundwater | 2.0 | 2017-2022 |
| **PFHxS** | Groundwater | 5.0 | 2017-2022 |
| **PFNA** | Groundwater | 72 | 2017-2022 |
| **PFNS** | Groundwater | 90 | 2017-2022 |
| **PFPeA** | Groundwater | 2.0 | 2017-2022 |
| **PFPeS** | Groundwater | 1.0 | 2017-2022 |

ppt = parts per trillion



The City of San Angelo Water Production
San Angelo City Water Quality
Raw Water Intake
S Concho Park Dr
S Concho Park Dr
E Ave K
E Ave K
E Ave K
Lone Wolf Bridge
San Angelo Fire Trai
388
E Ave L

# COMMENTS, DISCUSSION, & DISMISSAL

THE TEXAS CLEAN RIVERS PROGRAM

Upper Colorado River Basin

Texas Clean Rivers Program (CRP) Water Quality Advisory Committee (WQAC)

THANK YOU!

UCRA