Planning for Possibilities: Conservation Strategies, Forecasts, and Trends During Drought

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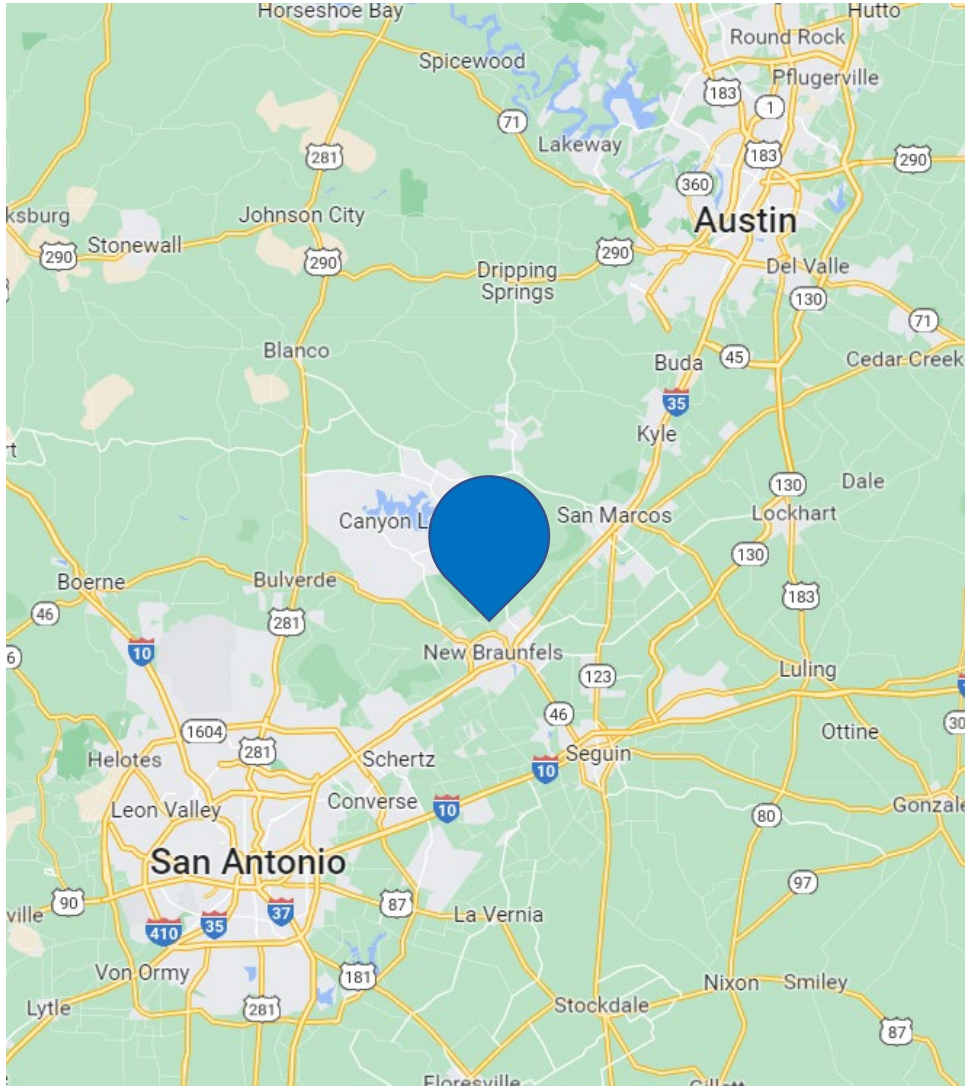
Drought Mitigation Strategies: Summer 2022

Andrew Cummings, Conservation and Customer Solutions Manager

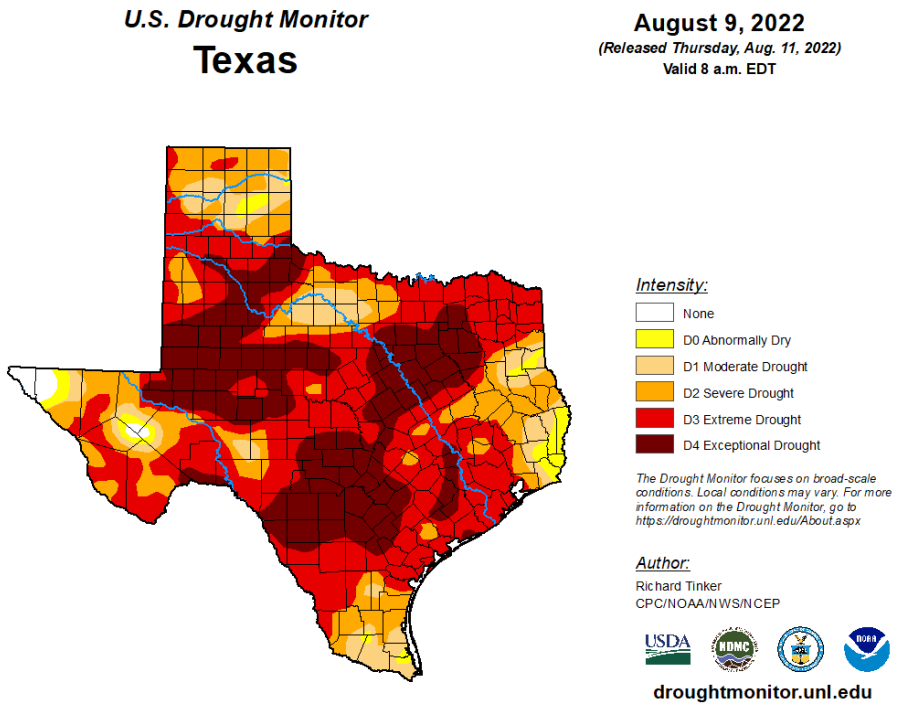
New Braunfels, TX

- Between Austin and San Antonio – I35 & SH46
- Population ~103k
- Water Service Population ~45k
- Max pumping ~35MGD, average of ~20-25MGD
- Home of…
  - Comal and Guadalupe River (tubing!)
  - Schlitterbahn (Master Blaster!)
  - Wurstfest (sausage and beer!)
  - Gruene and Gruene Hall (oldest dance hall in Texas)
  - Buc-cees (beaver nuggets!)
  - 56% population growth in last decade (challenges)



2022 Drought Highlights

- Hottest July on record and second hottest month ever recorded for San Antonio area
  - Only two days in July had high temps of less than 100°F
  - Hottest summer on record for U.S. since 1880
  - Longest duration of above 80°F since 1946 (7/9-7/14) for San Antonio
- Driest 1st half of year thru July on record (5.12”) for San Antonio
  - Second driest year on record for Texas in 128 years
  - Driest summer on record for San Antonio
  - As of 10/17/2022, NB has a 23.7” rainfall deficit comparing CY21 and a 16.52” deficit when comparing annual averages for New Braunfels

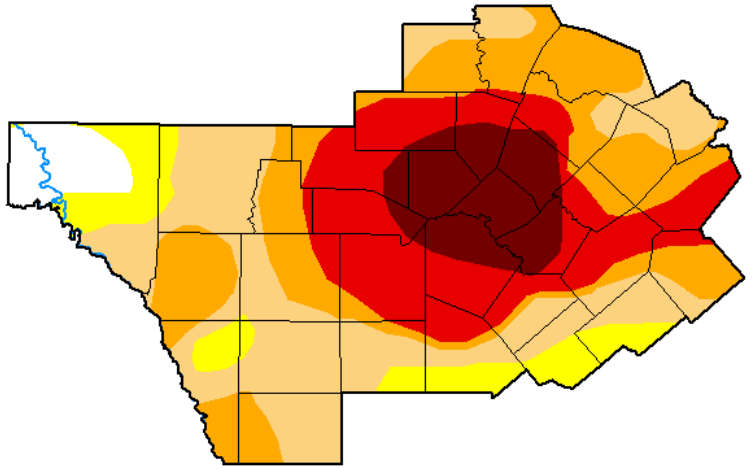


Comal County

- Remained/s one of the hardest hit areas in Texas even after Summer
- Mid-November
  - D3 Extreme – 100%
  - D4 Exceptional – 100%
- As of February 20th
  - D3 Extreme – 100%
  - D4 Exceptional – 74%

U.S. Drought Monitor

Austin/San Antonio, TX WFO



November 15, 2022

(Released Thursday, Nov. 17, 2022)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	4.15	95.85	86.80	58.04	32.27	10.92
Last Week 11-08-2022	4.15	95.85	86.80	58.04	31.00	7.47
3 Months Ago 08-16-2022	0.00	100.00	100.00	99.86	94.57	48.64
Start of Calendar Year 01-04-2022	16.44	83.56	55.77	21.07	1.32	0.00
Start of Water Year 09-27-2022	1.55	98.45	85.39	51.70	21.77	4.98
One Year Ago 11-16-2021	65.38	34.62	16.51	1.72	0.00	0.00

Intensity:

- None
- 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. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:

Brad Rippey

U.S. Department of Agriculture

droughtmonitor.unl.edu

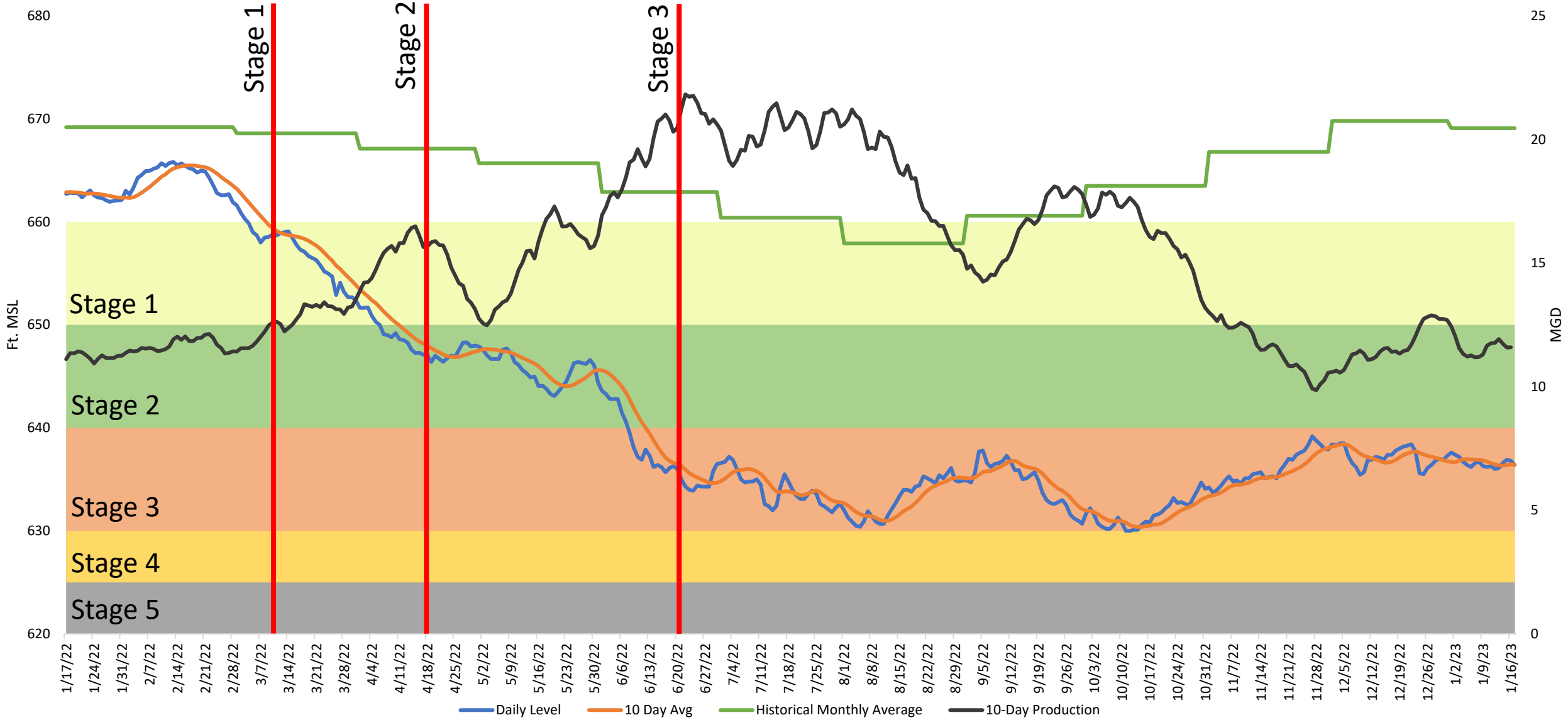
Spring Island Spring Run covered species habitat August 19, 2022

NBU's Drought Timeline

Date Entered	Stage	Days in Stage
March 10	Stage 1	34
April 13	Stage 2	69
June 21	Stage 3	244 days *as of 2/20/23*

EAA declared to Stage 4 on 8/12/2022-8/17/2022 and 10/8/2022-10/26/2022

Pumping (Irrigation) vs Drought



Landa Park
Main Spring (October)

Landa Park
Spring Island (August)

Headwaters at the Comal
Spring Run (October)

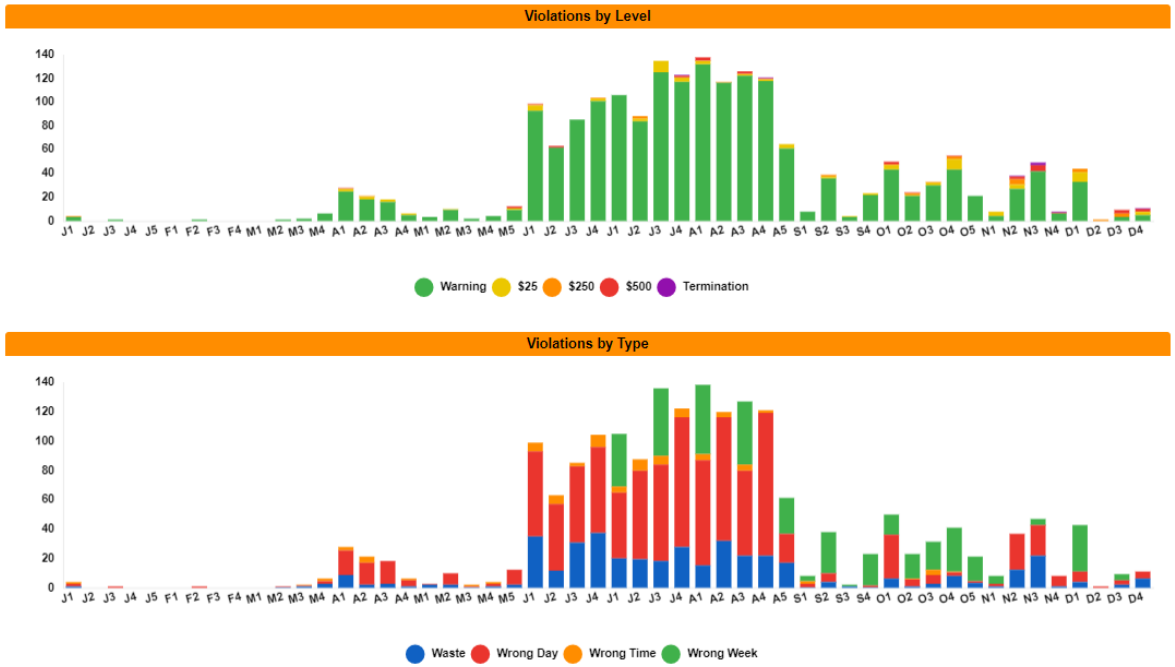
Stage 3: Additional Restrictions

- Move from 1-day/week to 1-day/every-other-week
- Leaks must be repaired within 24 hours of notification
- Drought surcharge of $1.00/1,000gal over 15,000 gallons (domestic) and 7,500 gallons (irrigation)
- No variances issued for new construction landscape exceeding 50% turfgrass
- No swimming pool or spa construction permits issued

NBU NEW BRAUNFELS UTILITIES

Impacts of Additional Measures

- 10.2% average reduction in overall pumping during non-watering weeks when 9mdg baseline removed.
- Average increases of….
  - +86 (77%) water violations per week
    - 281 total from January 1 to June 21
    - 1633 total from June 21 to December 31
  - +24 (85%) water variance requests from builders per week
  - +11 (65%) water assessments conducted per week
  - 18% increase in calls to the conservation department for the year



NBU NEW BRAUNFELS UTILITIES

What we're doing

- Additional monitoring and reporting
- Enhanced communications
- Increased patrolling
- Expedited violation processing
- Direct outreach to HOA, builders and developers

New Braunfels Drought Severity Evaluation Matrix						
Current NBU Stage	3					
Current EAA Stage	4					
Proposed Enhanced Triggers and Monitoring Matrix						
	Triggers	***Stage 1***	***Stage 2***	***Stage 3***	***Stage 4***	***Stage 5***	***Updated as of 10/19/2022***
1	EAA J17 Level 10-Day Average	<660'	<650'	<640'	<630'	<625'	630.63
2	Comal Flow - Daily	<225cfs	<200cfs	<150cfs	<100cfs	<45/40cfs	104
3	Comal Flow 10-Day Average	<225cfs	<200cfs	<150cfs	<100cfs	<45/40cfs	101
4	San Marcos Flow	<96cfs	<80cfs				87
5	Canyon Lake - Level	<895	<890	<885	N/A		900.84
6	Run of River - Canyon Lake - Release Rate	<50cfs					57

	Weather-based Factors						***Updated as of 10/19/2022***
7	Time drought conditions have persisted (months)	<6 mon	>6 mon	>12 mon	>18 mon	> 24 mon	7.3
8	10-day Rain %	<50%		<40%	<30%	<25%	8%
9	10-day Avg Hi-Temp	≥95		>100	>102	>103	89
10	Comal County Drought Monitor - D3 Extreme %	>10%	>25%	>50%	>75%	>90%	100%
11	Comal County Drought Monitor - D4 Exceptional %	>10%		>25%	>50%	>75%	82%
12	Seasonal Drought Outlook	Drought to Persist through the Next 3 Months					Yes
13	Percentage of State in Drought	>50%		>75%	>80%	>90%	94.25%
14	Total Rain YTD (Inches)	Annual Average 2000-2022, 32.31"					8.79
15	Rainfall Defecit YOY (Inches)	2021 YTD	31.85		2022 YTD	8.79	-23.06
		>2.5"	>5"	>7.5"	>10"	>12.5"	
16	Rainfall Defecit vs Avg YTD (Inches)	Avg YTD	24.67		2022 YTD	8.79	-15.88
		>2.5"	>5"	>7.5"	>10"	>12.5"	
17	Comal County Burn Ban Duration	>30 days	>60 Days	>90 Days	>120 Days	>150 days	160
	Comal County Fire Risk (KBDI)	300-399	400-499	500-599	600-699	700-800	729

Infrastructure-based Factors		***Updated as of 10/19/2022***
Maximum NBU Pumping Capacity (MGD)	36MGD	17.0

Availability Water Supply Reduction Requirements					
	Stage 1	***Stage 2***	***Stage 3***	***Stage 4***	***Stage 5***
Edwards Aquifer Authority	20% Reduc	30% Reduc	35% Reduc	40% Reduc	44% Reduc
Canyon Lake	5% Reduc	10% Reduc	15 % Reduc	N/A	
Trinity	No reduction requirements				
City of Seguin	Must Follow CoNB Drought Management Plan				
GVSUD					
Run of River	Not available below 50 cfs				

Challenges and Planned Resolutions

Challenges

- 50% Landscaping Mandate – To wait, or not to wait?
- Swimming Pools – Business Impacts
- Compliance vs Population Growth – A wash?

Planned Changes

- Refocused Efforts on the “Big Fish”
- Clearer Drought Ordinance
- Firmer Variance/Appeals Processes

NBU NEW BRAUNFELS UTILITIES

Thank you!

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Planning for Possibilities: Conservation Strategies, Forecasts, and Trends During Drought

GPCD Trends
Drought Periods Vs. Non-Drought

Karen Guz
Vice President Water Conservation
San Antonio Water System

San Antonio Water System

MAKING SAN ANTONIO WATERFUL

State Water Plan; The Challenge

Texas State Water Plan is based on future conditions specifically for a recurrence of the worst recorded drought in Texas' history…the drought of record.

We plan for a time when generally water supplies are lowest and water demands are highest

What Are Critical Demand Strategies

Two Kinds of Savings Key

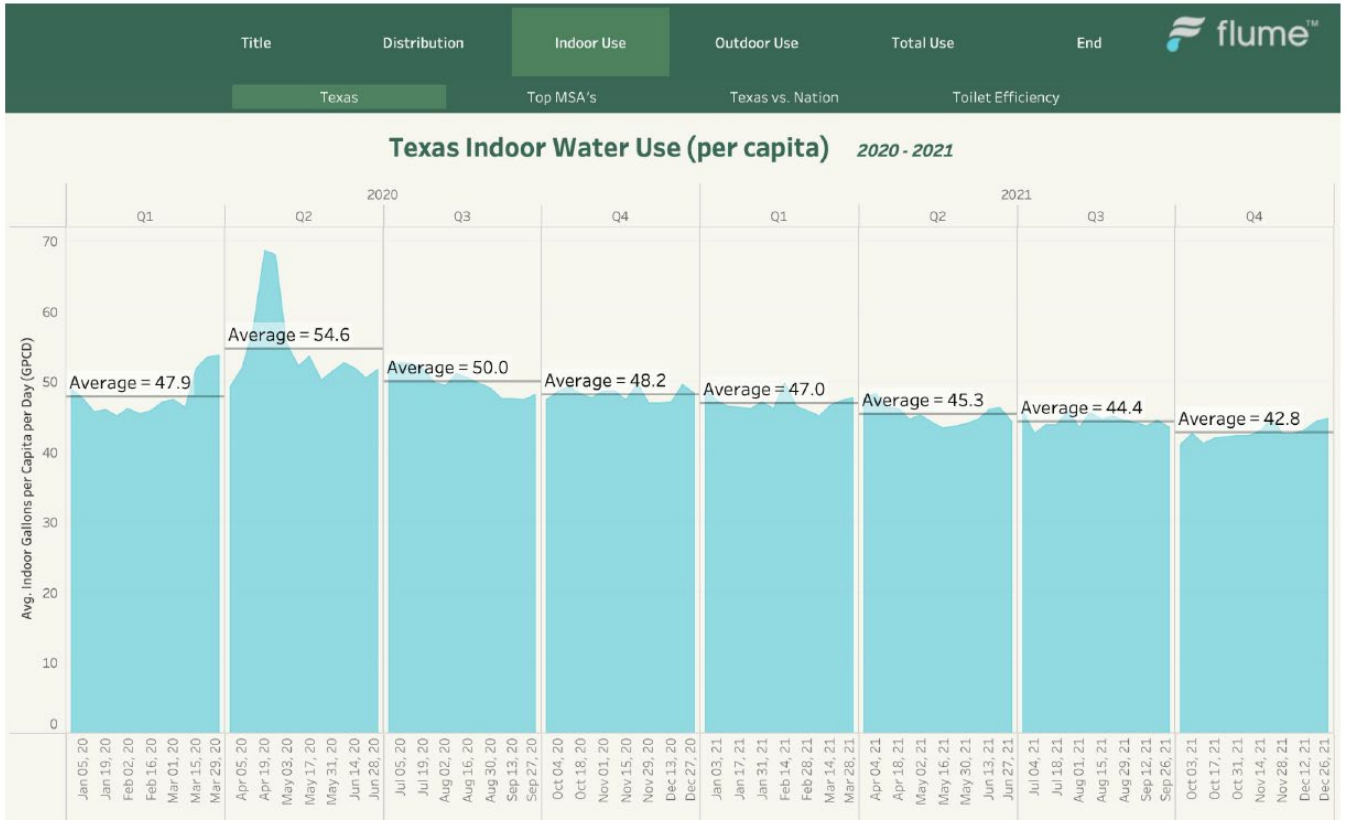
1. Conservation: Permanent Savings making water available for new uses

- Peak savings
- Baseline savings

2. Drought Demand Management

- Preventing demand from increasing AND/OR
- Reducing discretionary uses of water

Indoor Per Capita Looking Pretty Good!



Texas Municipal GPCD Trends

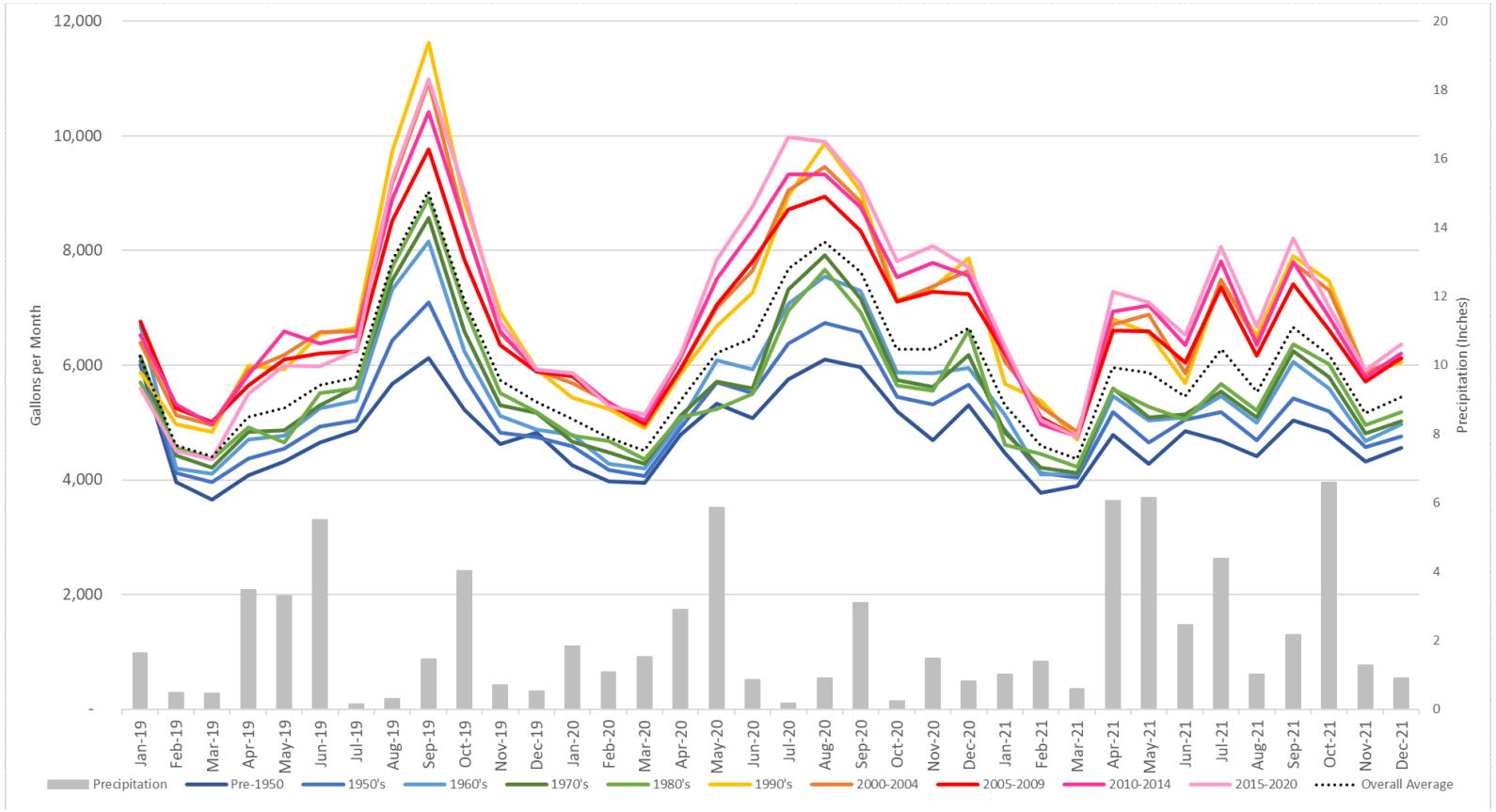
Very confusing "pattern" from TWDB Reports

	5 year average	2017	2018	2019	2020	2021
average	127	126	133	132	137	130
median	120	118	123	122	126	116

- High per capita reports pulling up the average…median gives better picture
- Not consistently going down
- Likely very influenced by variable Texas weather

New Home Trends Are A Challenge

Outdoor Usage Generates Variable Patterns by Housing Age



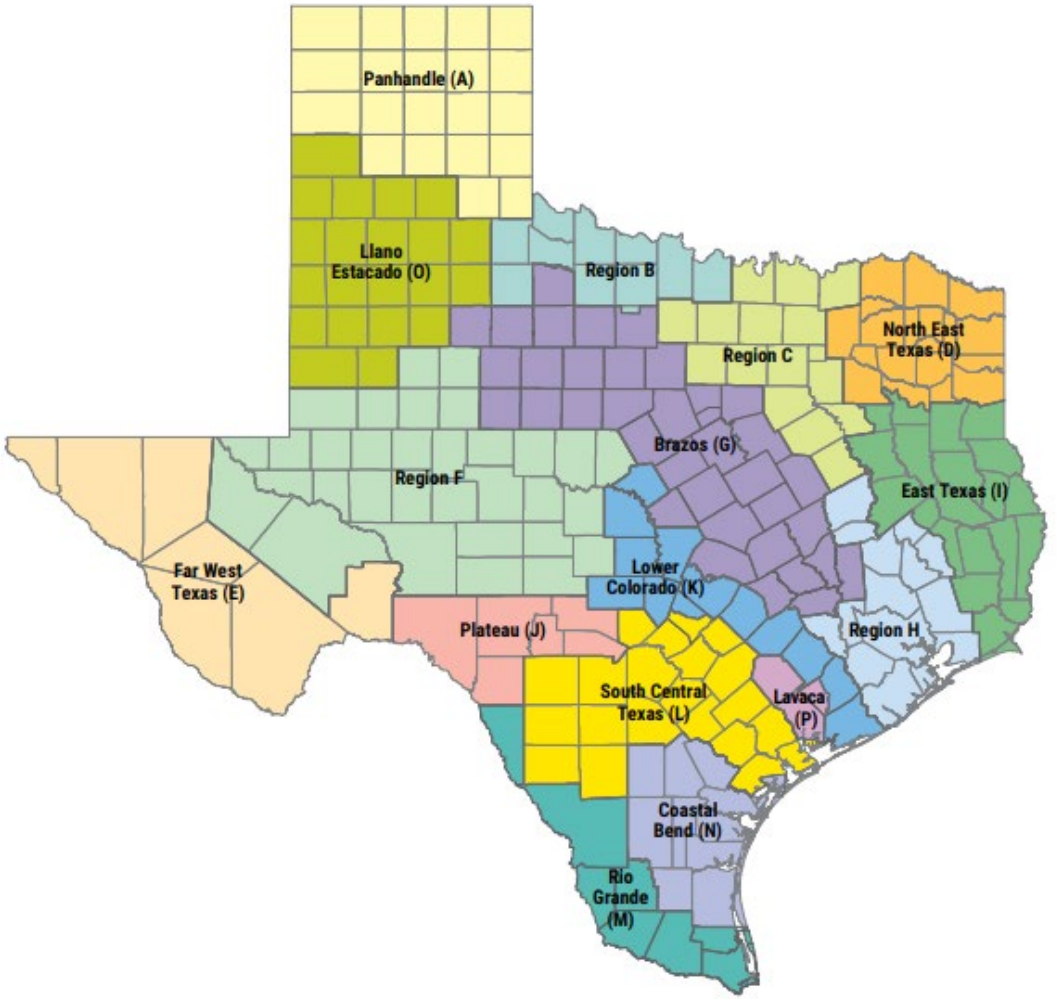
- Automatic irrigation homes use 70% more in summer!
- Automatic irrigation makes hot summer usage even higher
- Water softeners increase indoor by 8%
- Pools very popular; automatic fill valves now standard

Drought Management in State Plan?

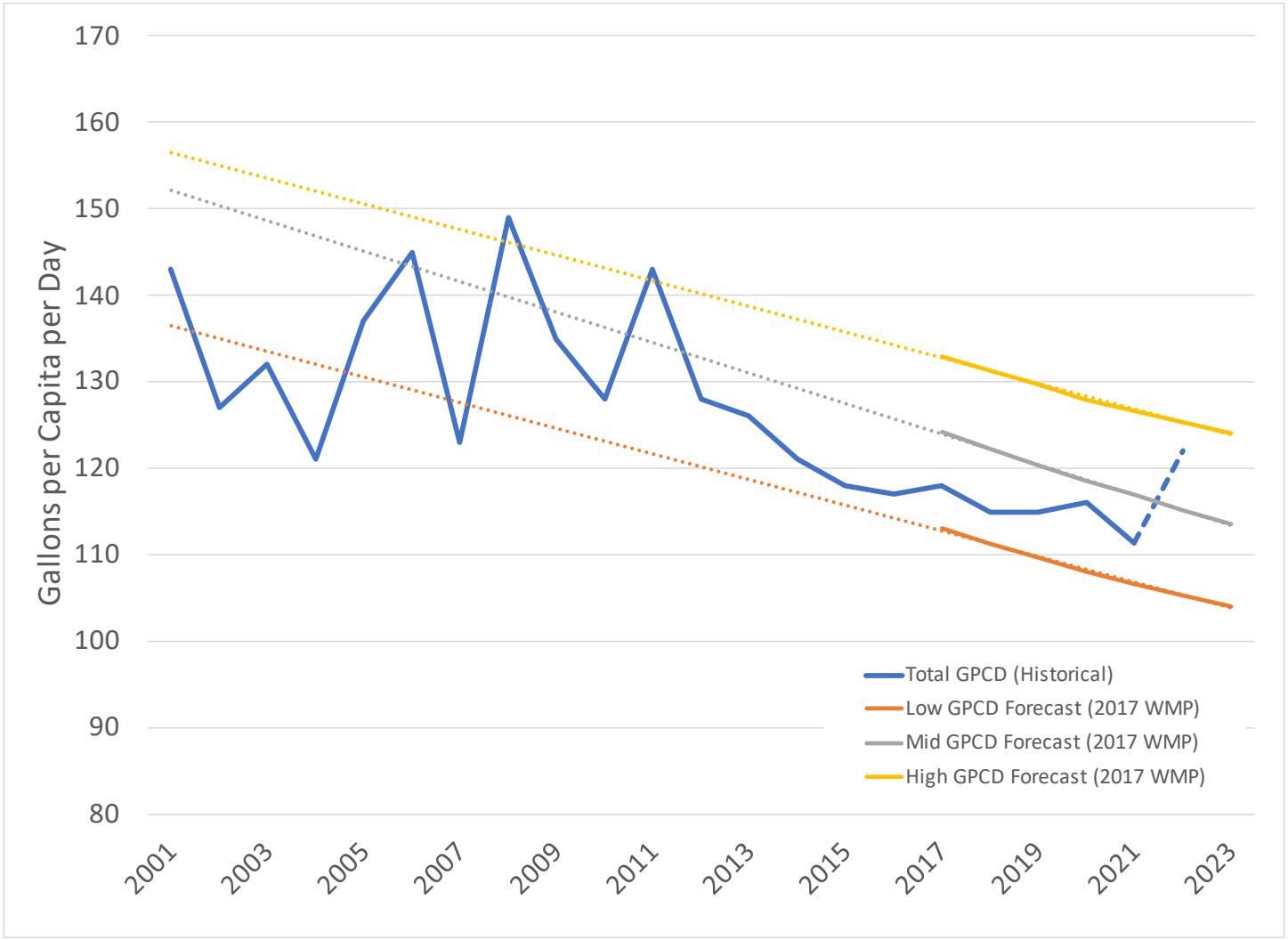
Varies by Region

- Five Regional Planning Groups inserted significant drought demand management as water supply strategy
- Collective savings:
  - **87,000 acre feet by 2020**
  - **158,000 acre feet by 2070**

- Other Regional Planning Groups planned for more water than need to provide cushion



Drought Demand Extreme Weather GPCD Risk



- 2022 GPCD higher
- Extreme weather conditions
- Risk of extreme weather hard to predict

What Can We Expect In Drought?

Year	Single Family GPCD Actual	Days in Restrictions	Percent of Year in Restrictions
2006	99	165	45%
2007	77	22	6%
2008	94	--	
2009	89	213	58%
2010	81	--	
2011	94	263	72%
2012	63	328	90%
2013	60	365	100%
2014	59	365	100%
2015	56	335	92%
2016	55	--	
2017	55	95	26%
2018	53	134	37%
2019	52	--	
2020	55	157	43%
2021	48	201	55%
2022	--	306	84%

- Not every drought year is alike
- Often years are part "wet" and part "dry"
- Exceptional drought years stand out as a challenge
- Supplying for these very rare years would be expensive

Growth Will Require New Drought Options

Utility Service Regulations

- Avoid the issues of city lines

Fees or Rates Based On Cost

- Can use fees/rates for compliance mechanism

Drought Stages & Fees Changes

- Reflect urgency of drought

Surcharges on Excess Usage

- Discourage discretionary uses

Technology Options

Unique AMI Enabled Programs

- Continuous Flow Alerts
- High Bill Alerts
- Monthly Reports AMI Powered
- **Drought Warnings AMI Powered**

Enhancement of Existing Programs

- Landscape Change Programs
- Irrigation System Program Changes
- New Build Variance Follow-Up
- Irrigation Consultations
- Commercial Consultations

Follow Up?

Visit Us:
GardenStyleSA.com
Saws.org

Karen.guz@saws.org
210 233-3671

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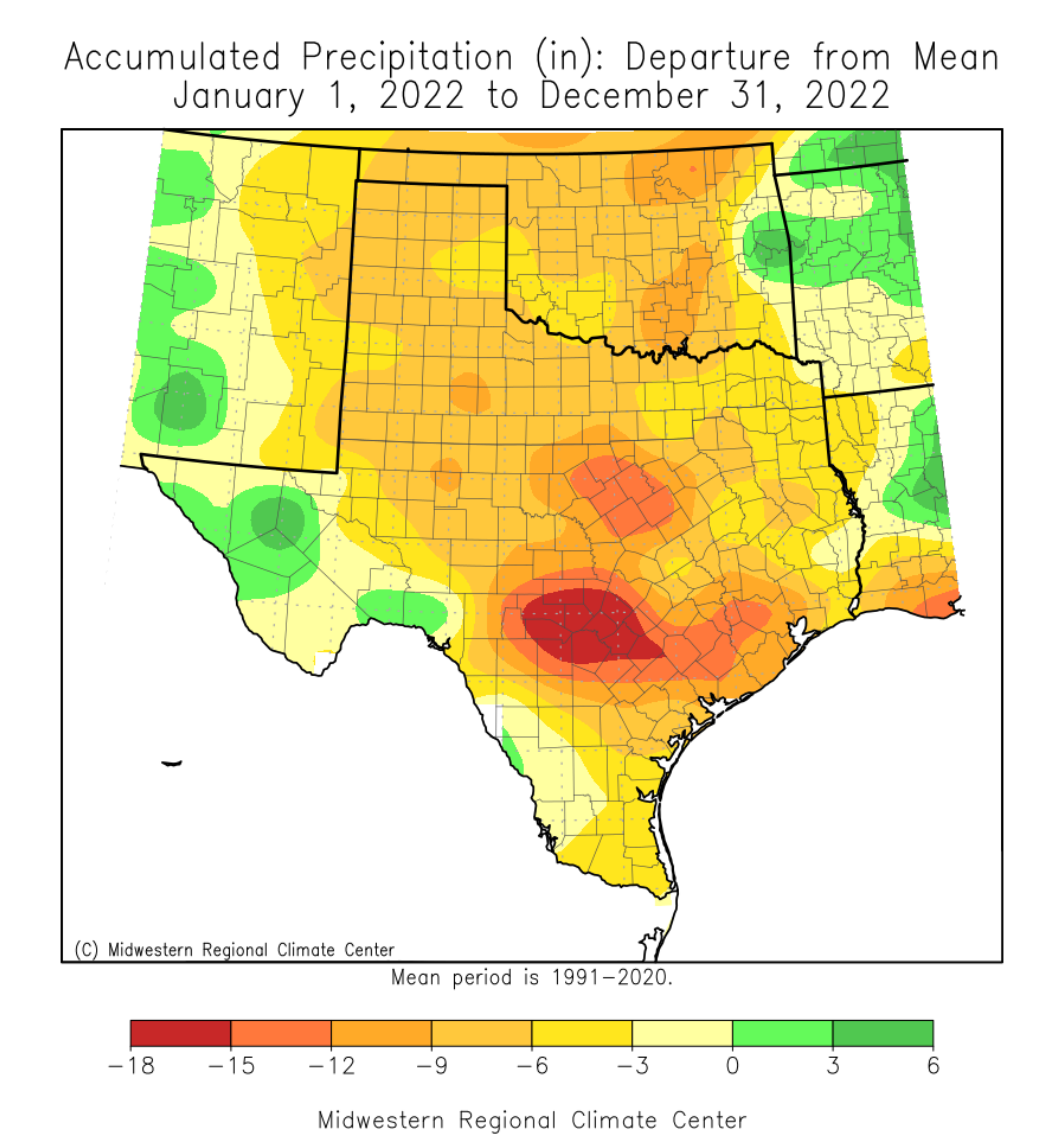
What's Next Following La Niña

2023 Central Texas Water Conservation Symposium

February 22, 2023

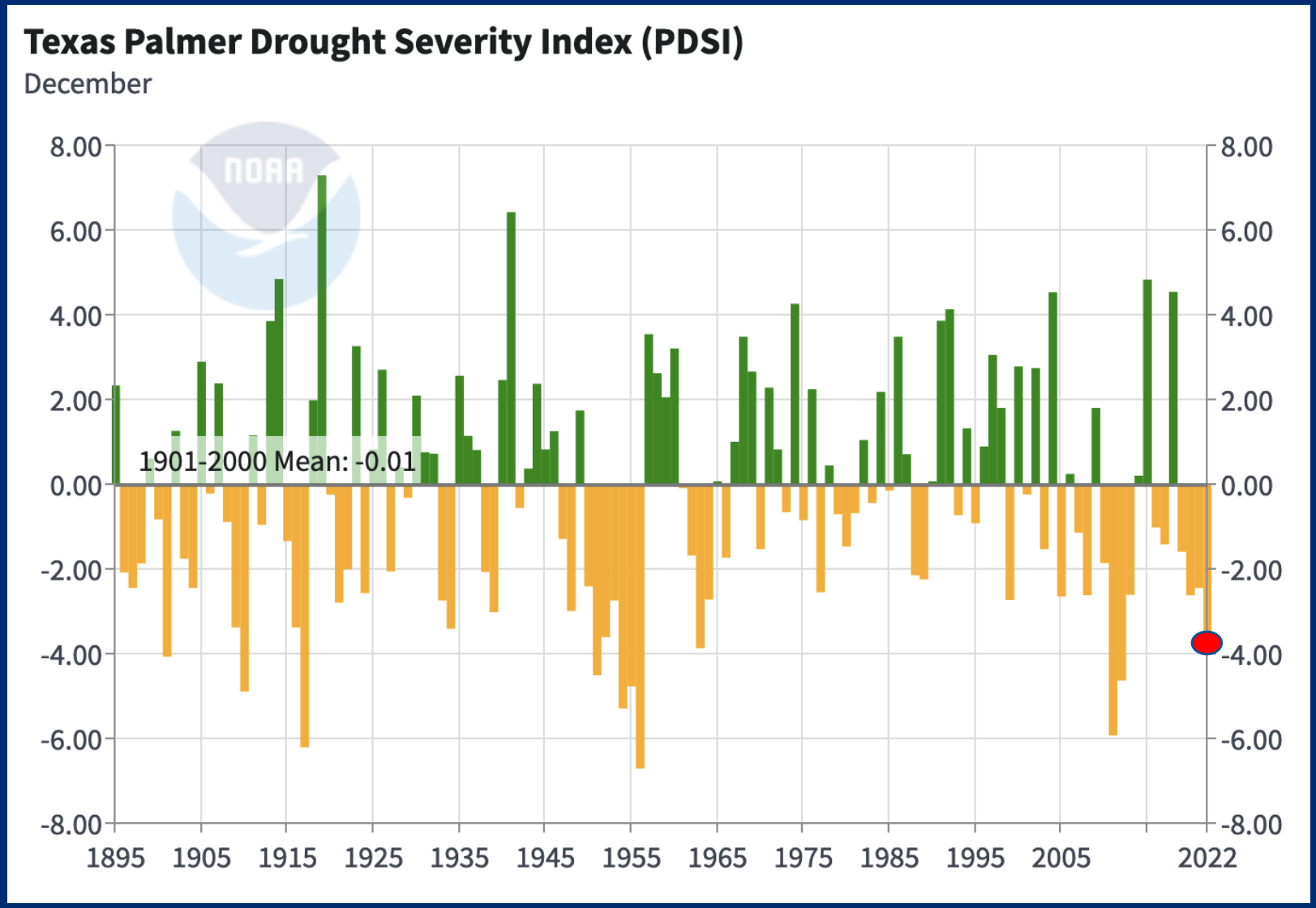
2022 Rainfall Departure From Normal



Rain was 5.5 inches below normal

The 13th-driest year on record for Texas

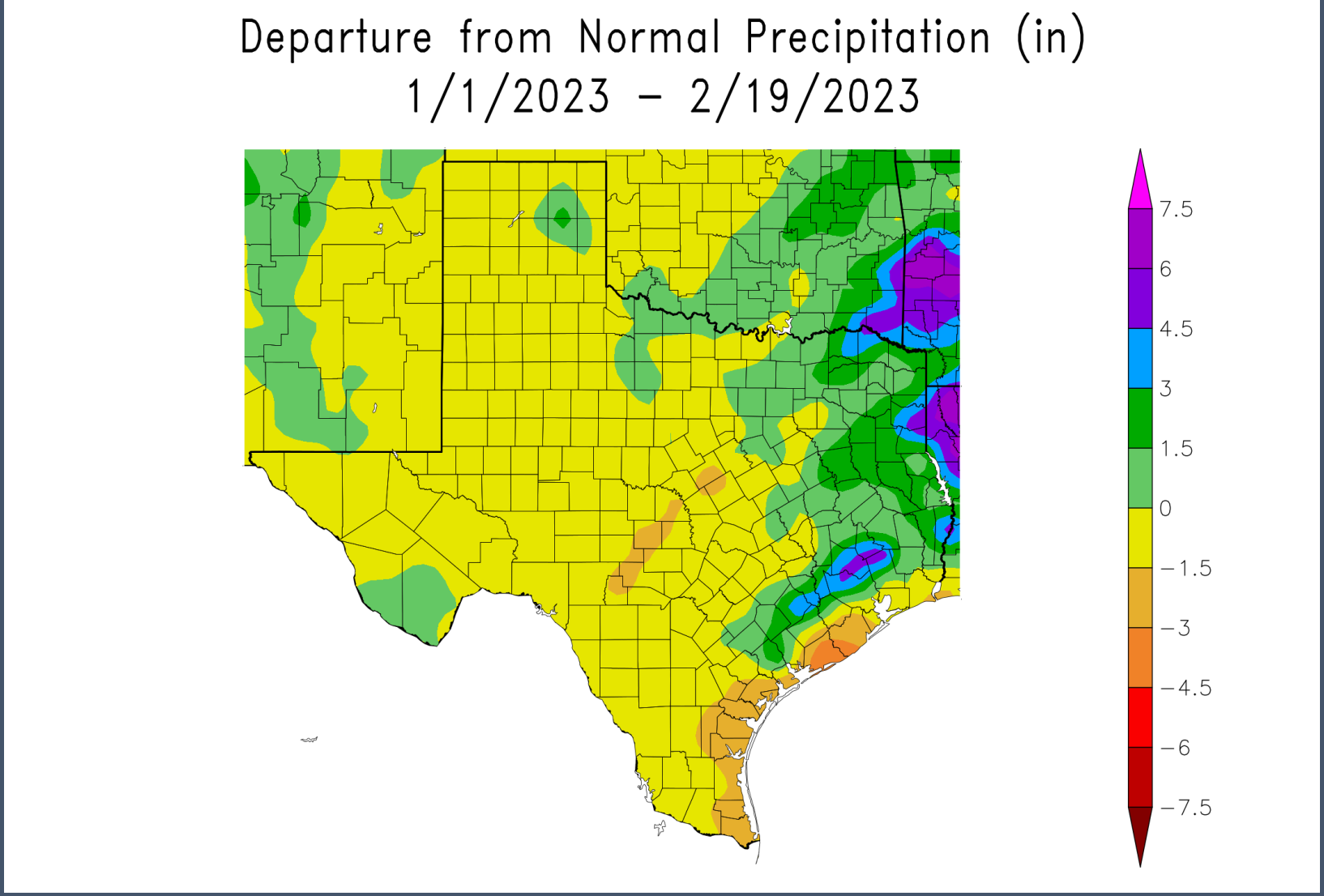
2022 was the Tenth "Drouthiest" on Record



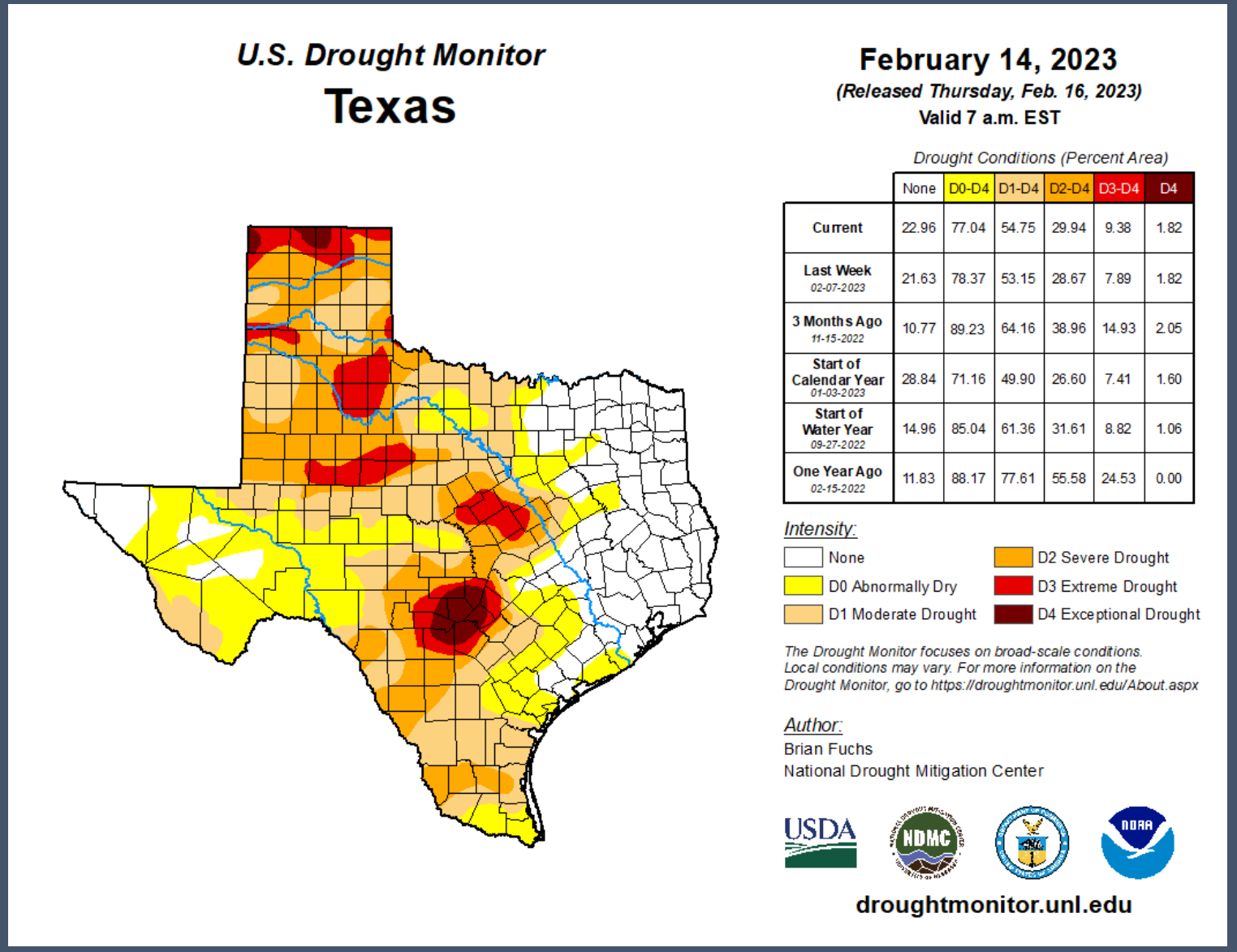
2022 Temperature Data for Texas

- Average temperature was 1.9 degrees above normal
- 2022 ranked the 13th-warmest year on record
- Summer 2022's average temperature was 3.4 degrees above normal
- Summer 2022 ranks as the second-hottest summer on record, behind 2011
- For comparison, 2011's summer temperature averaged 5.5 degrees above normal

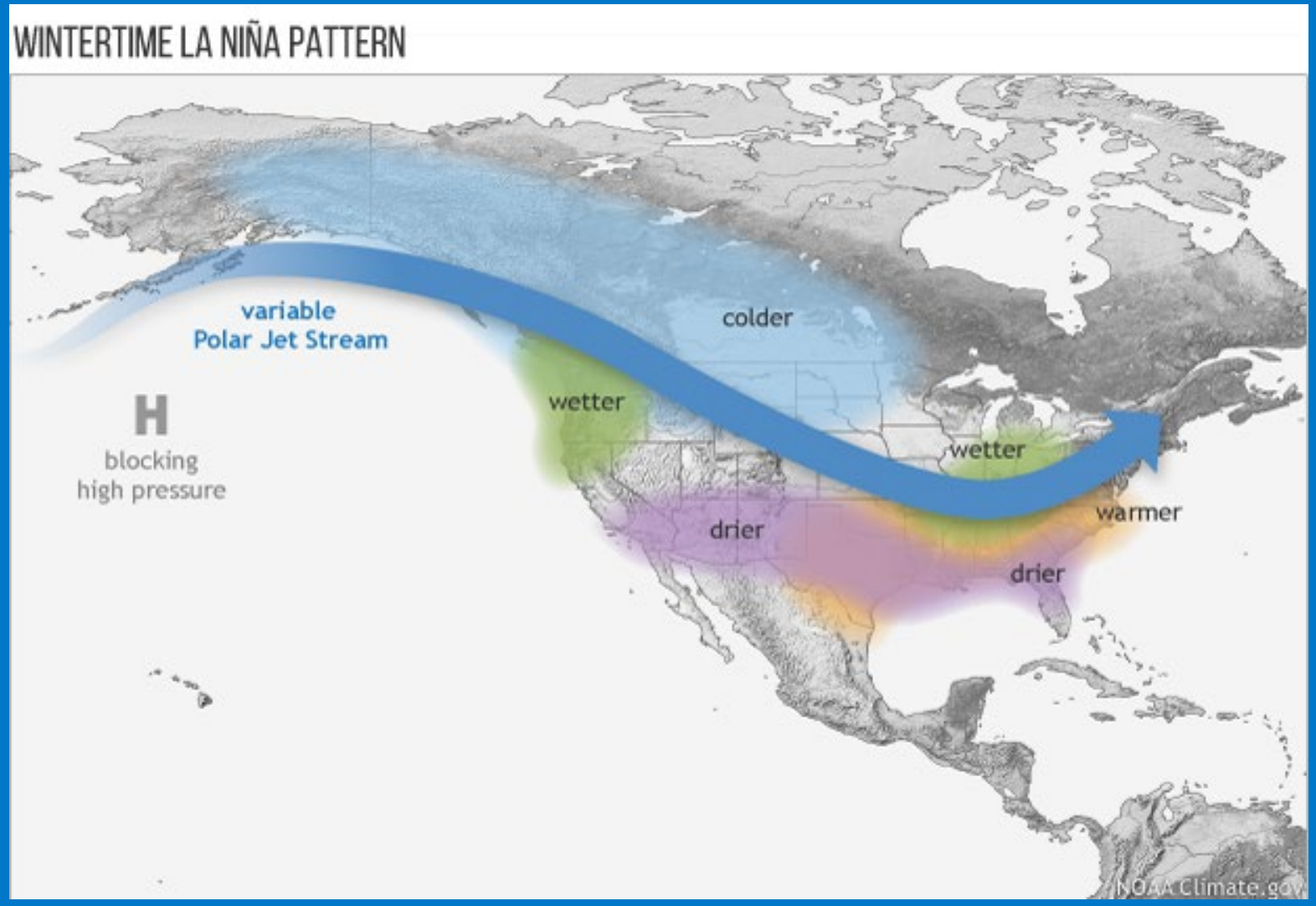
Rainfall Departure From Normal Since January 1:



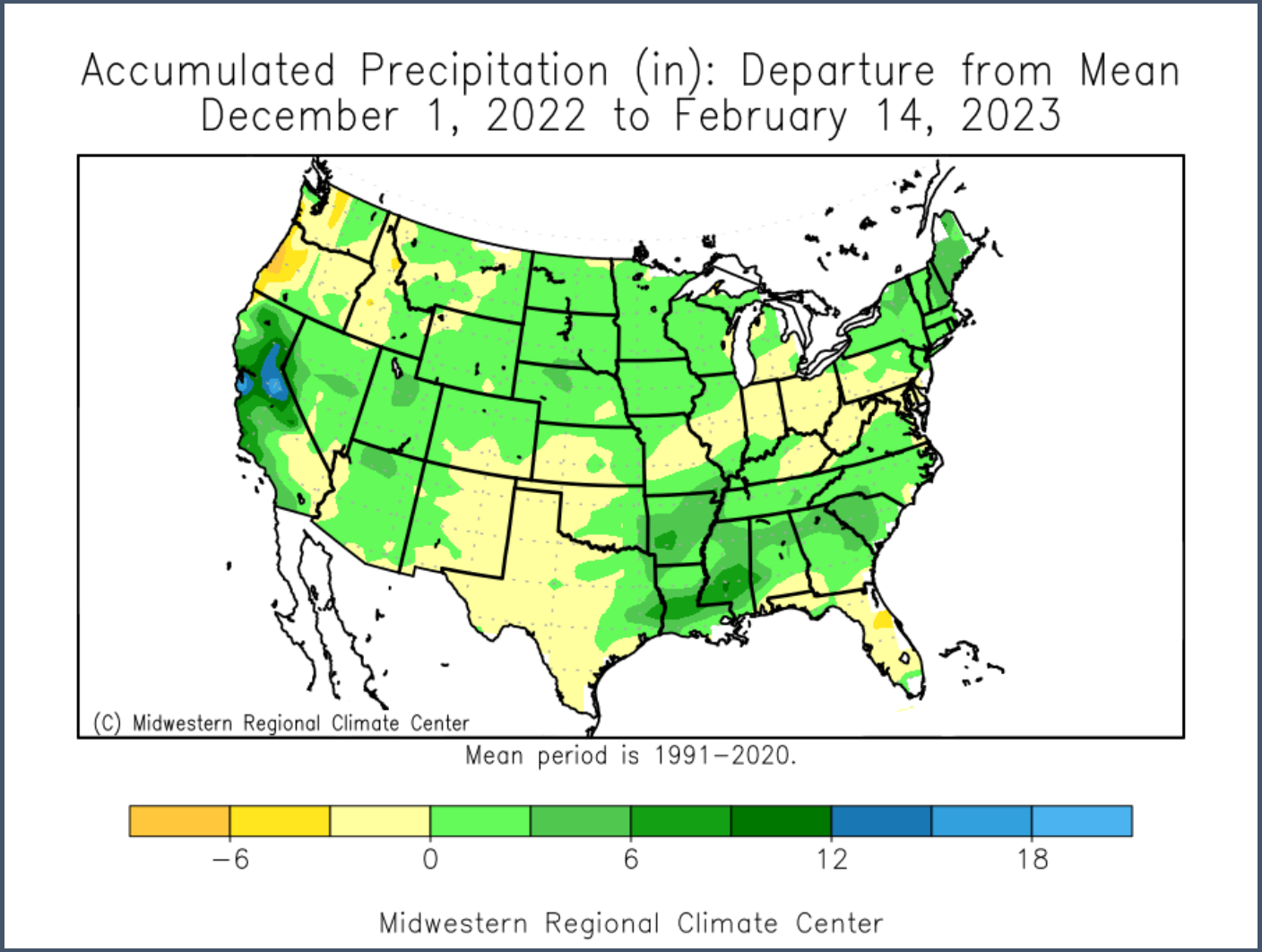
U.S. Drought Monitor



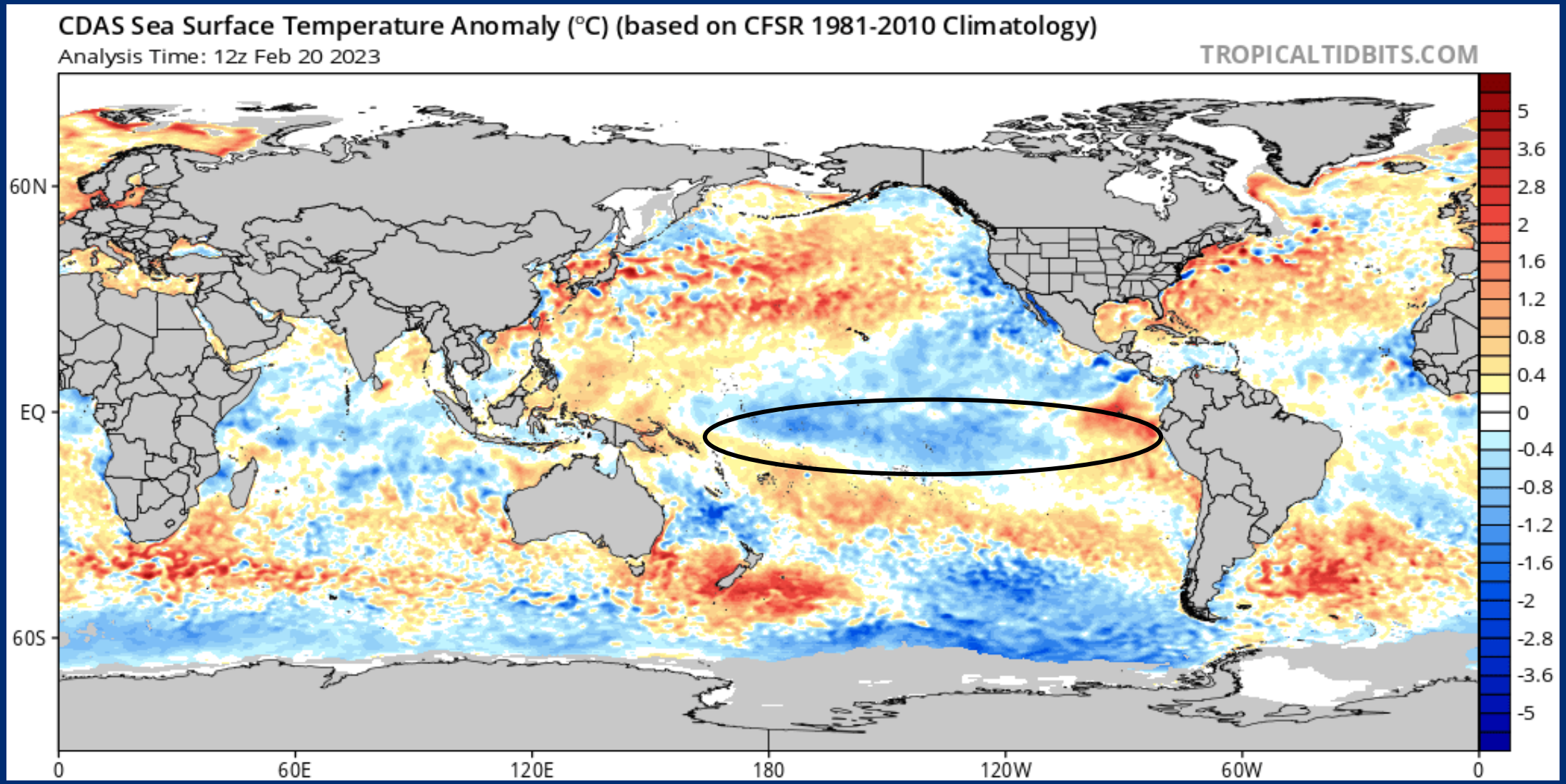
Typical Wintertime La Niña Pattern



Percent of Normal Rainfall, Dec. 1-Feb. 14



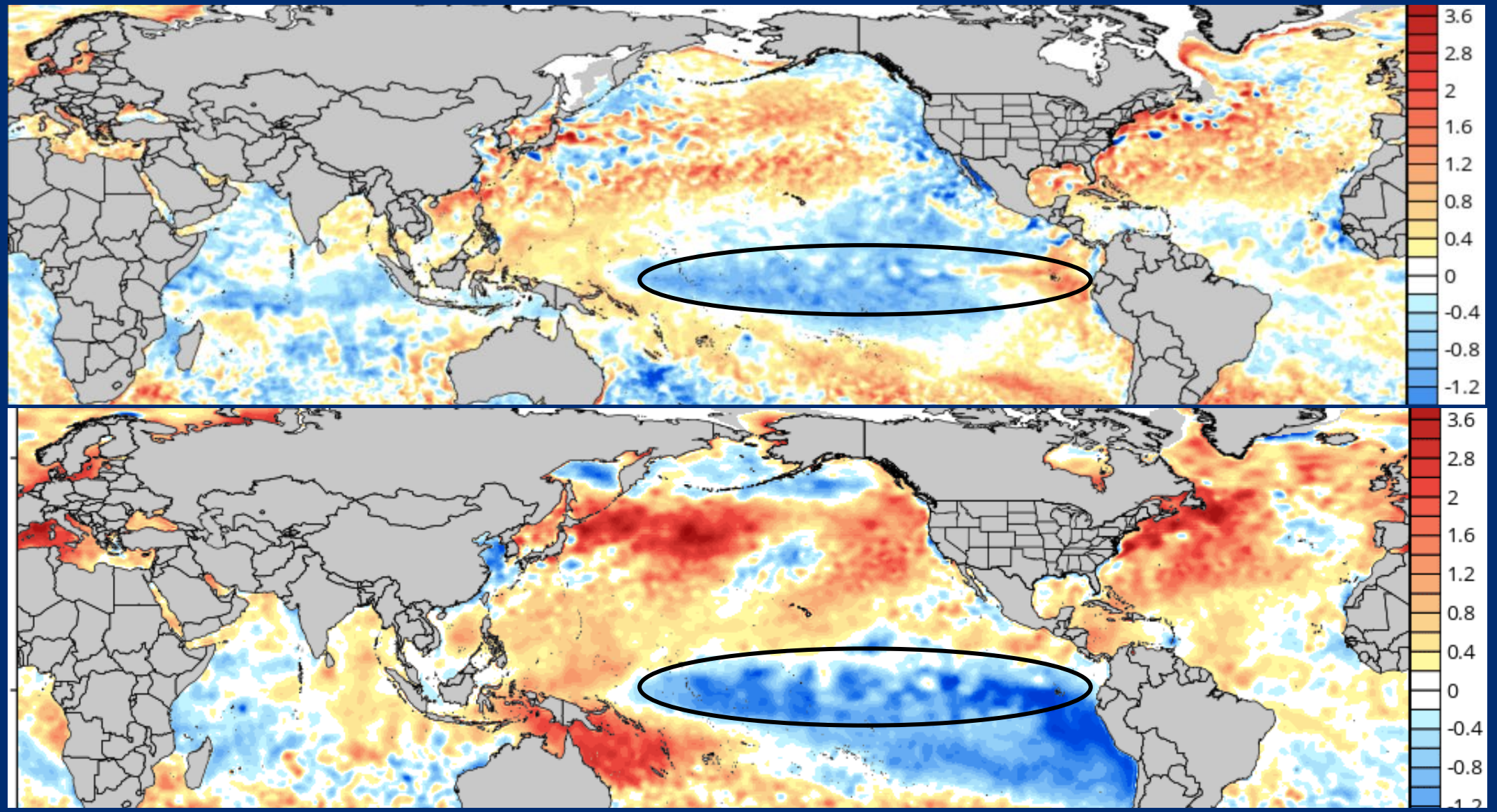
February 2023: A Weak La Niña Continues



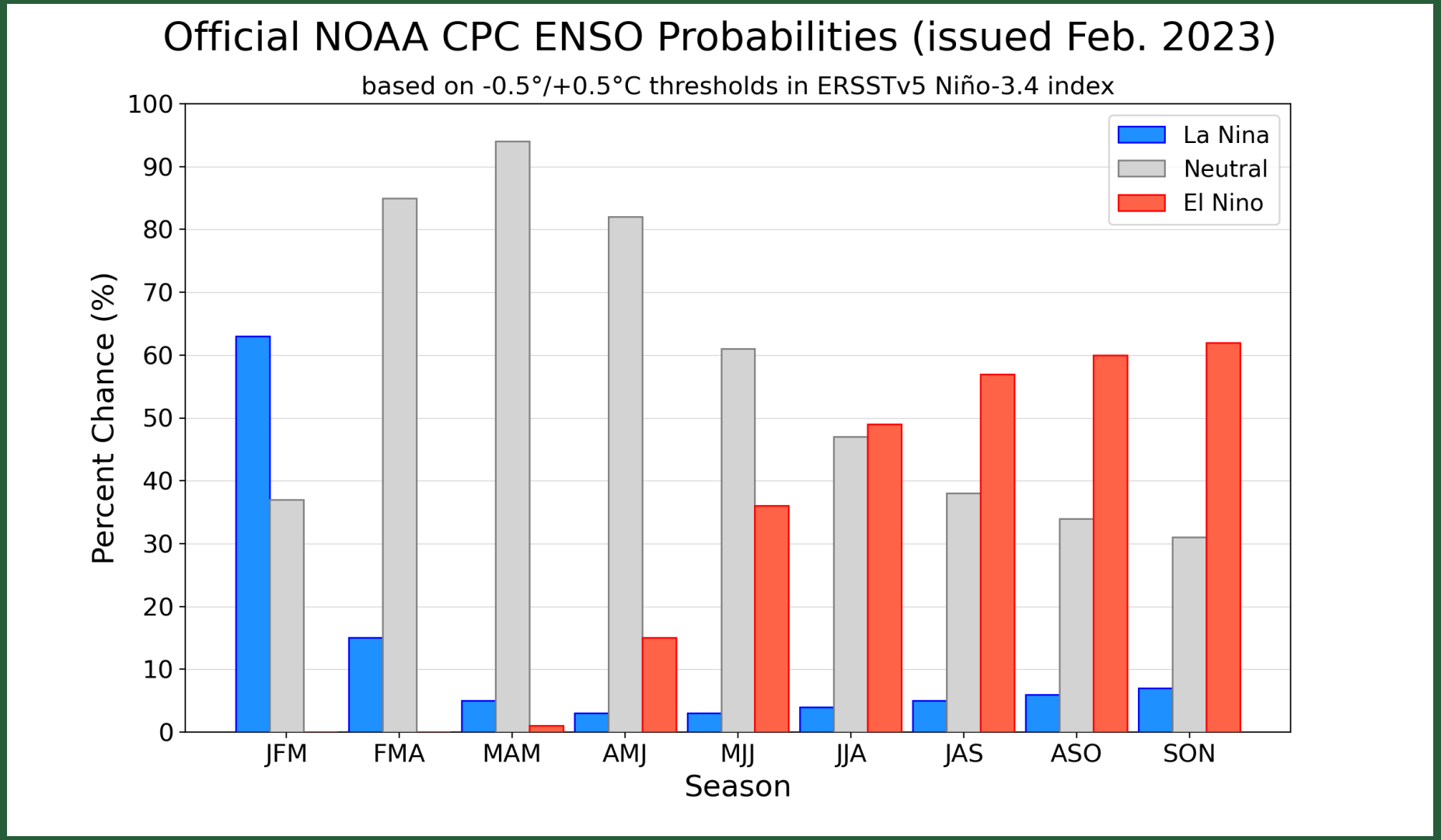
Pacific Waters are Warming

February 2023

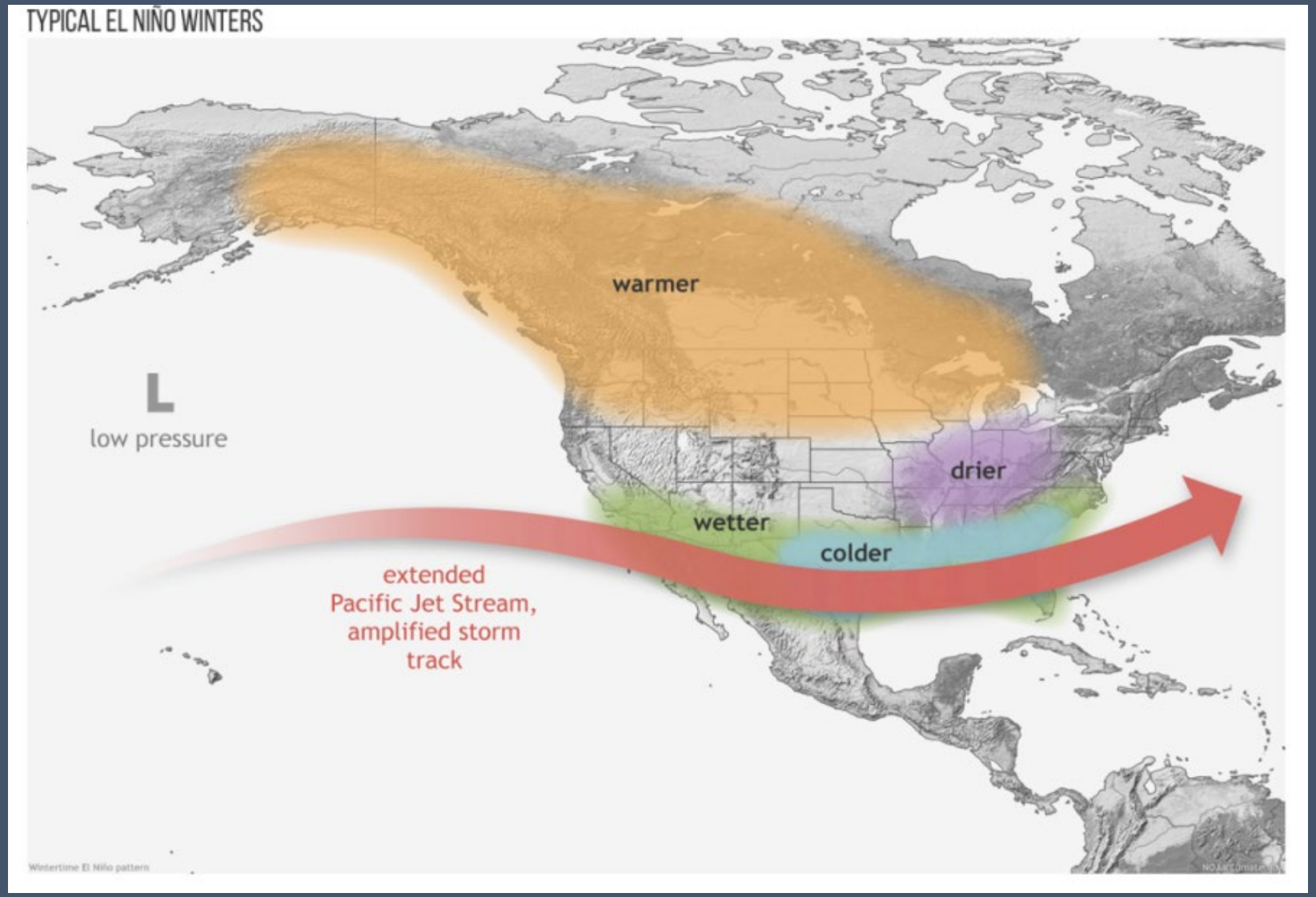
October 2022



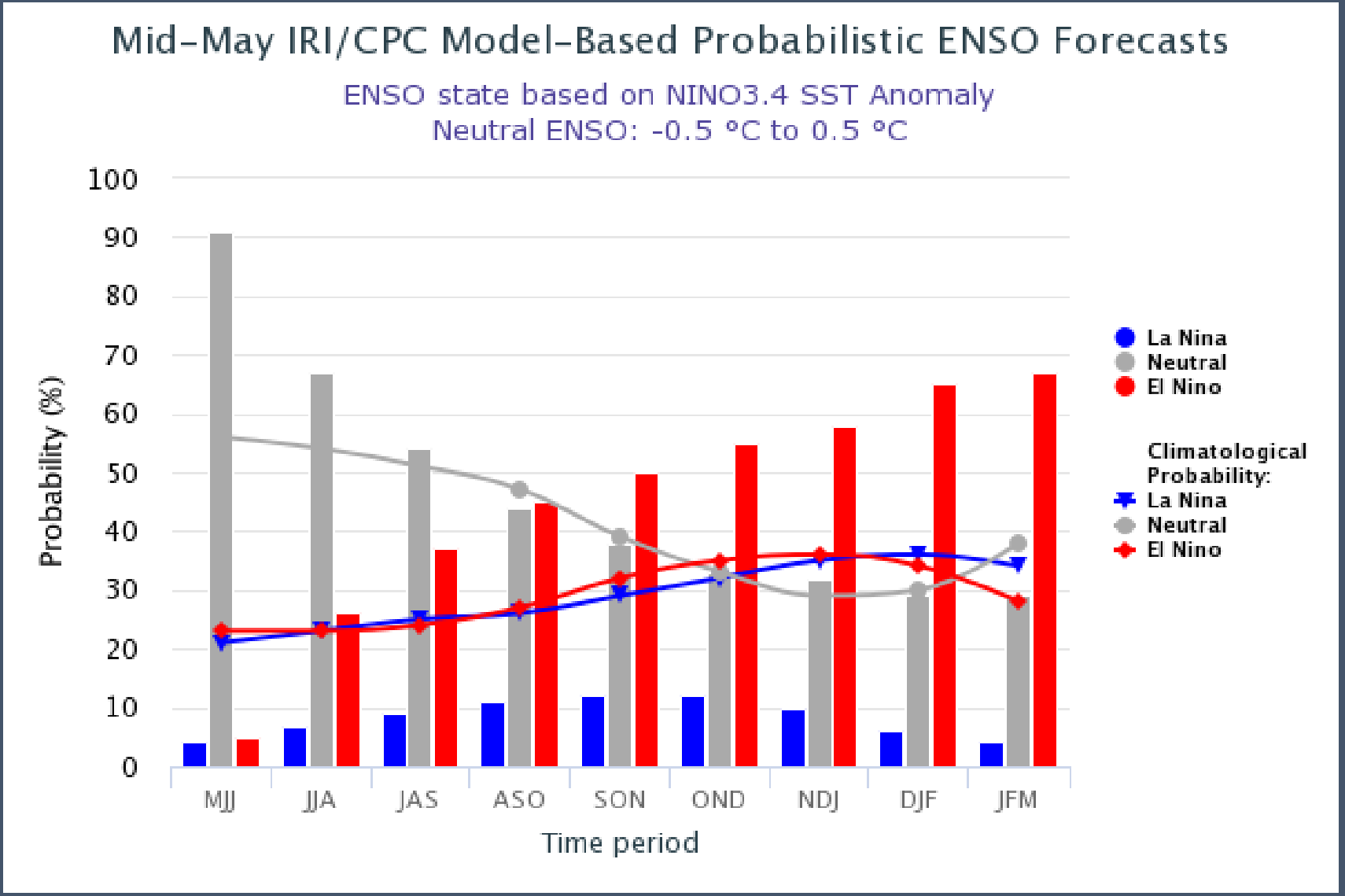
La Niña Ending This Spring; Headed to El Niño by Fall?



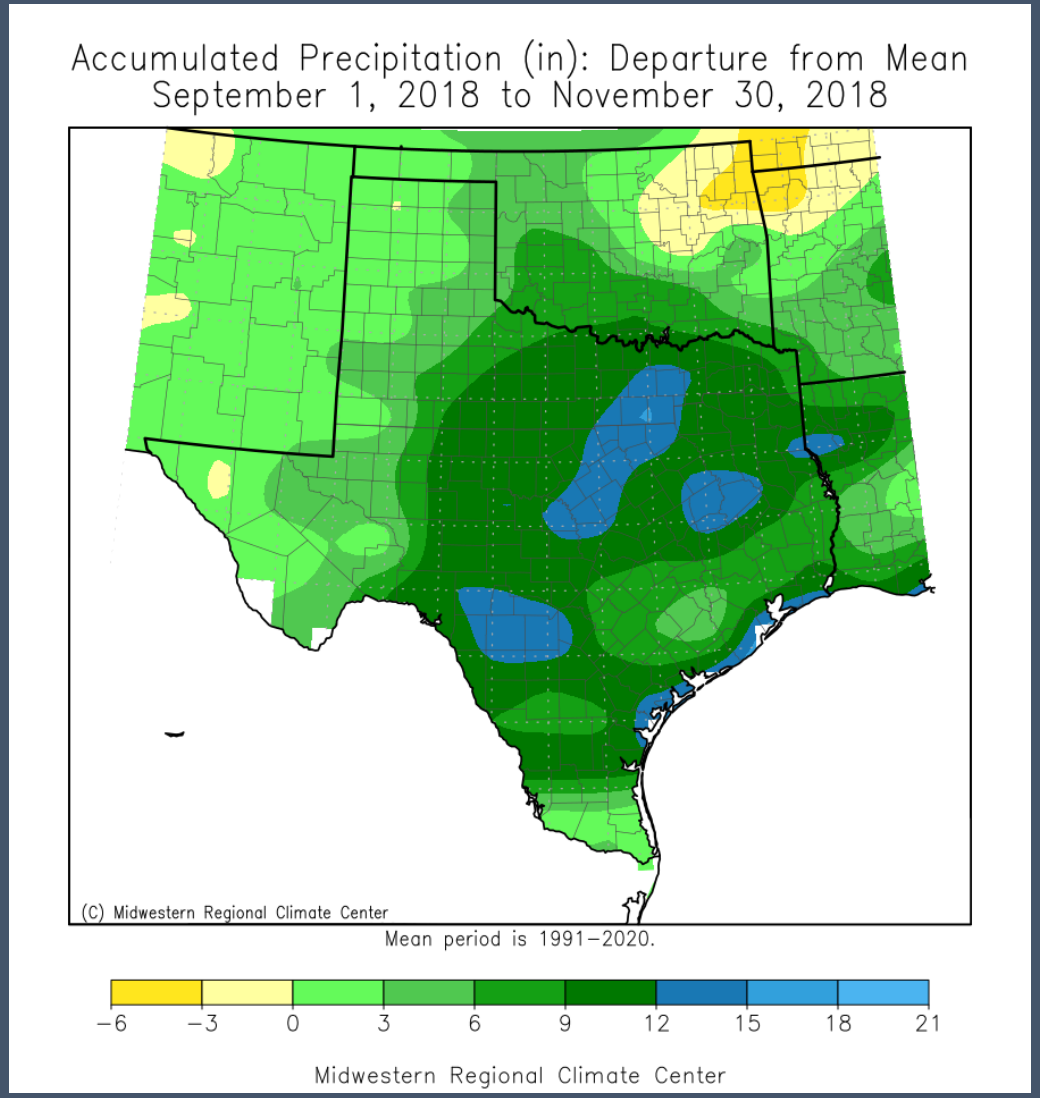
Typical Fall/Wintertime El Niño Pattern



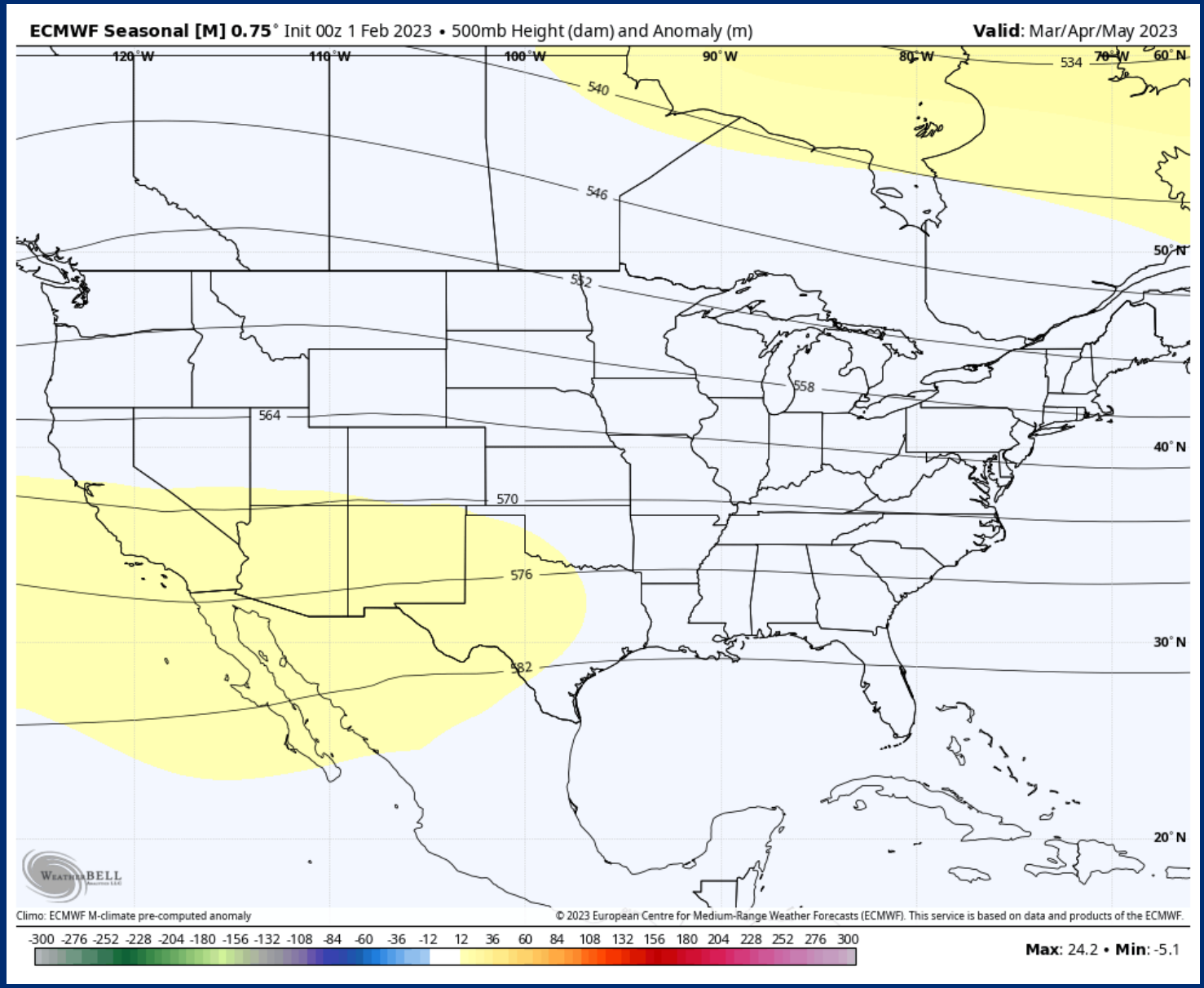
El Niño Forecast from Spring 2018



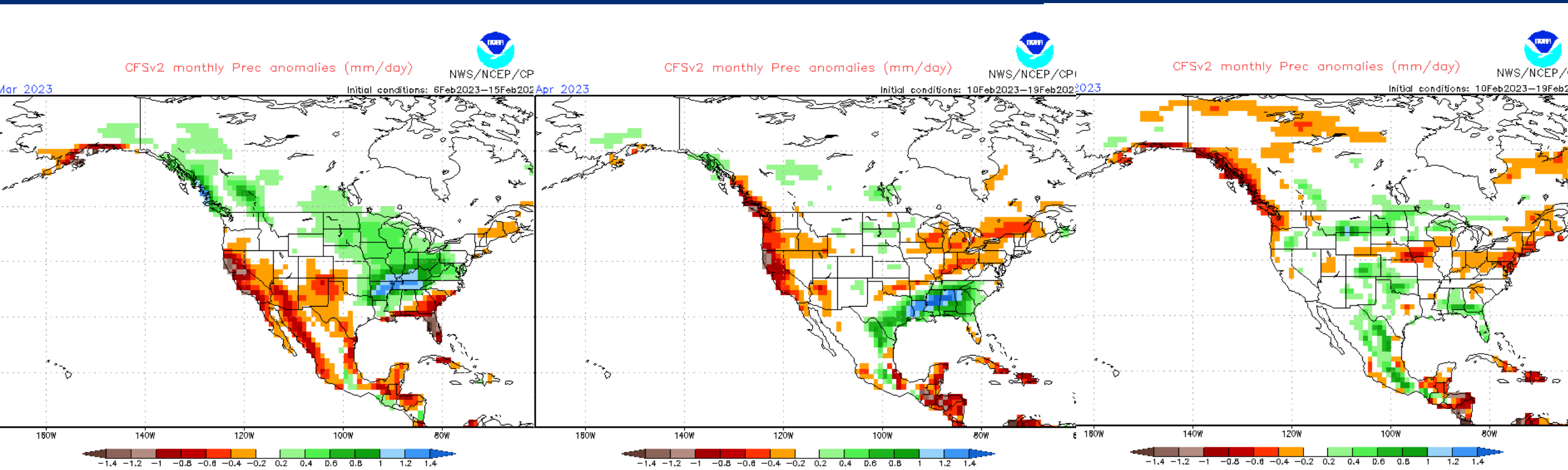
Departure from Normal Rainfall September through November 2018



Forecast Model Jet Stream for Spring

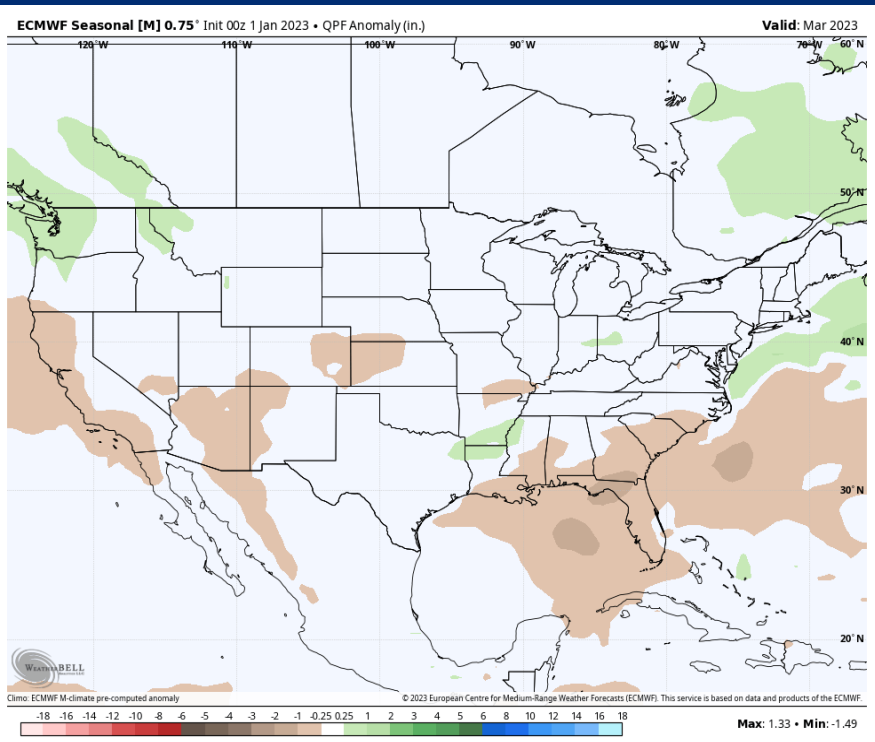


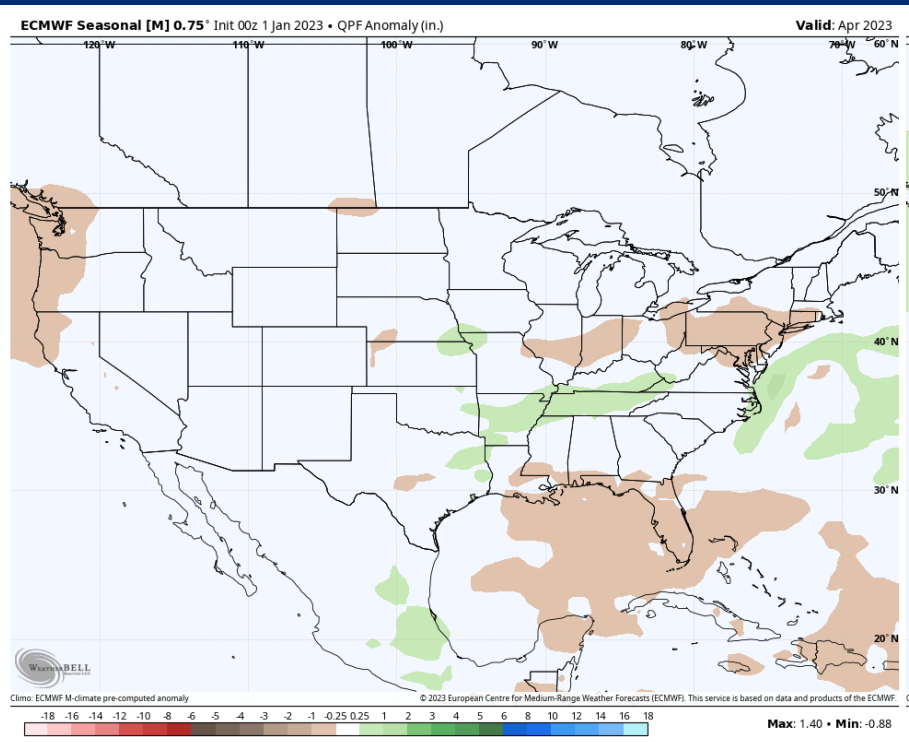
Spring Rain Outlook – Climate Forecast System Model

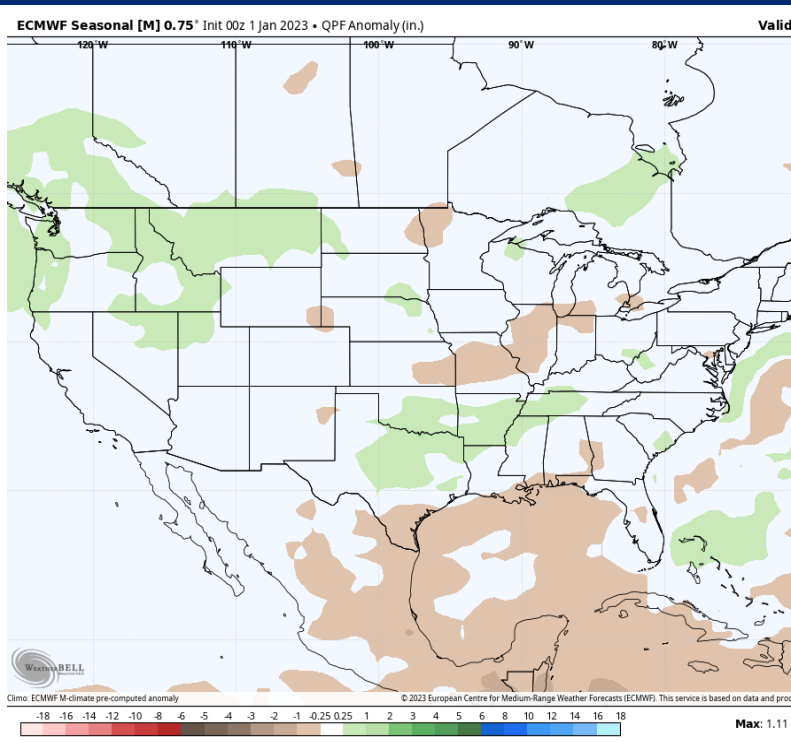


March April May

Spring Rain Outlook – European Model

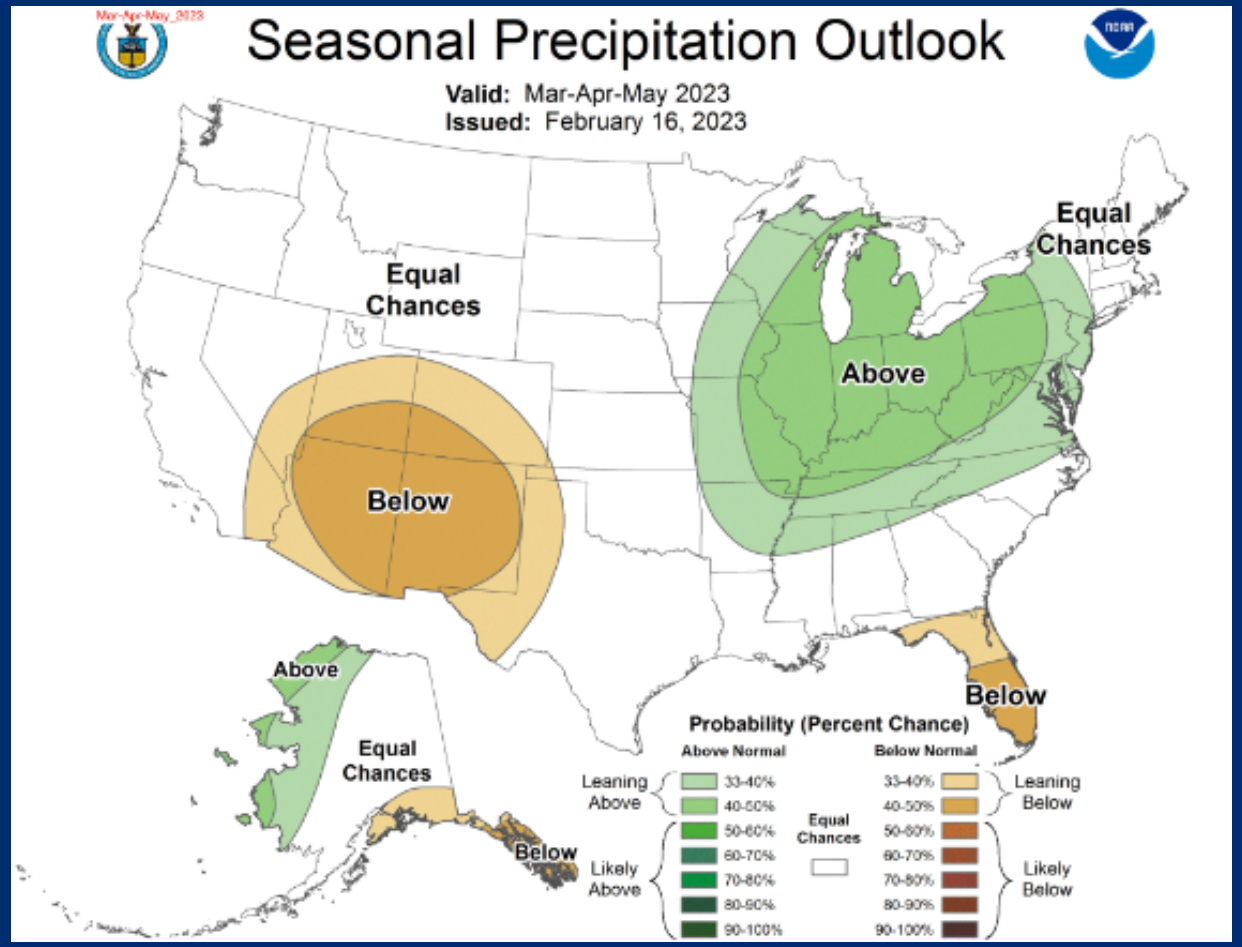


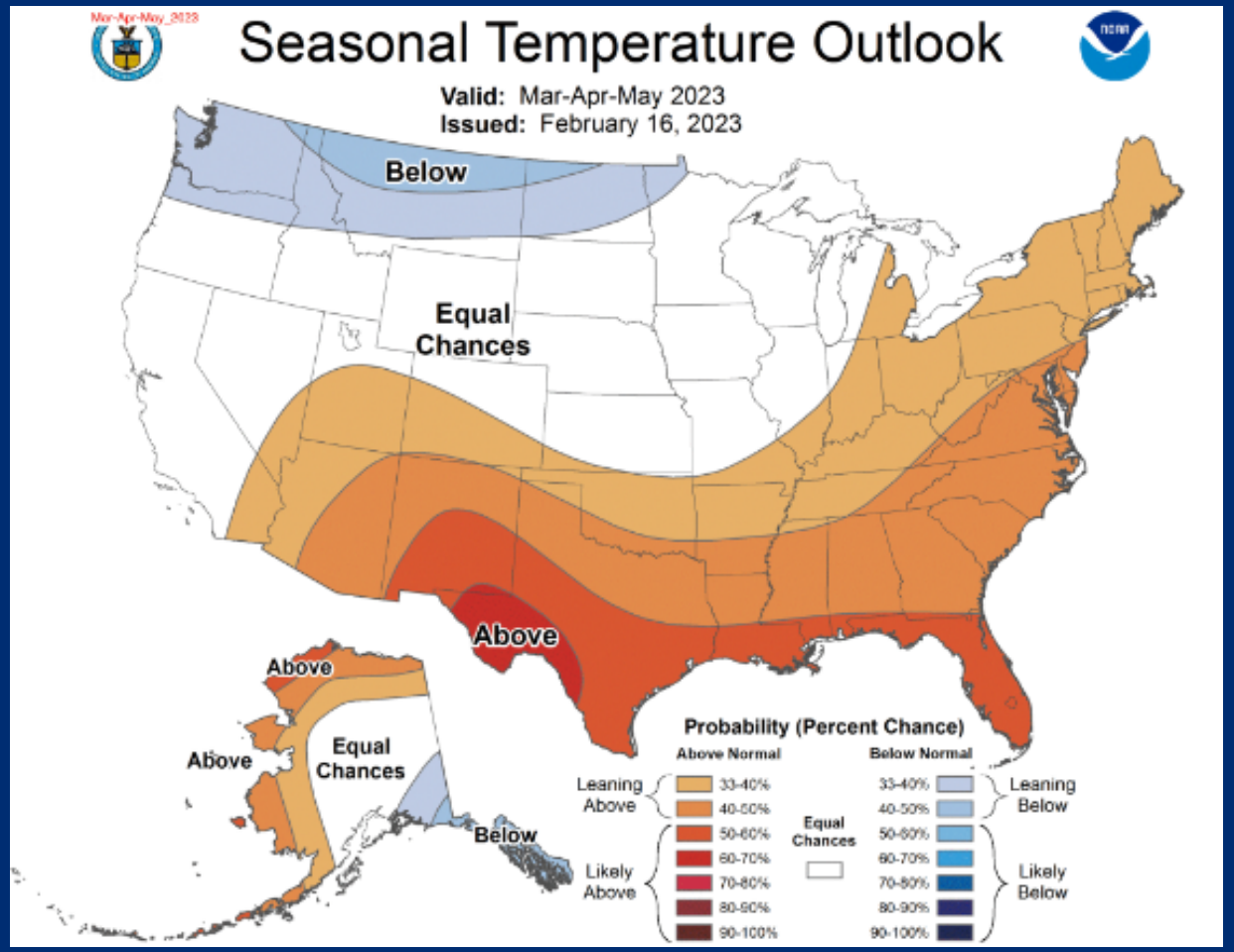




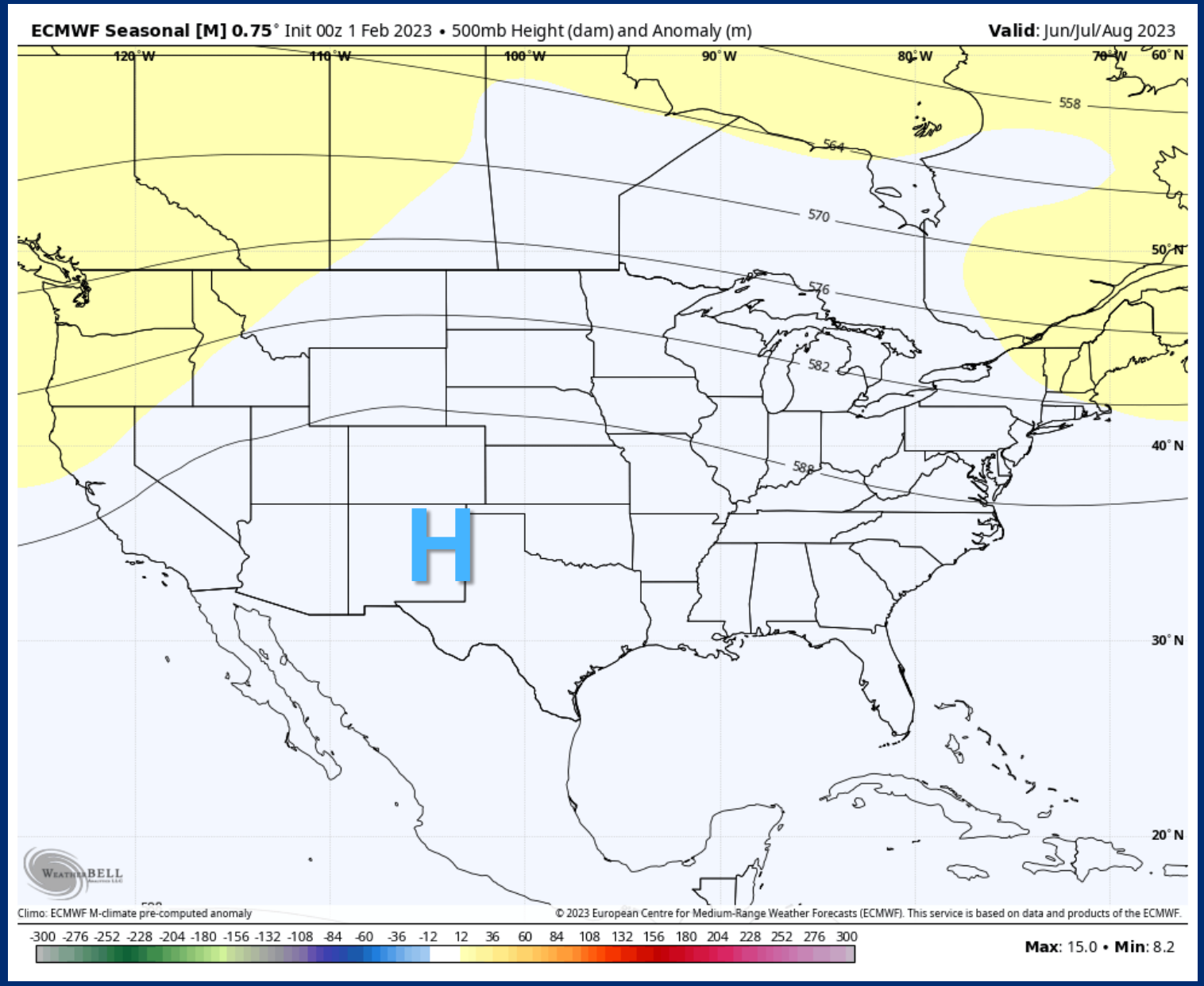
March **April** **May**

National Oceanic and Atmospheric Administration's Spring Outlook

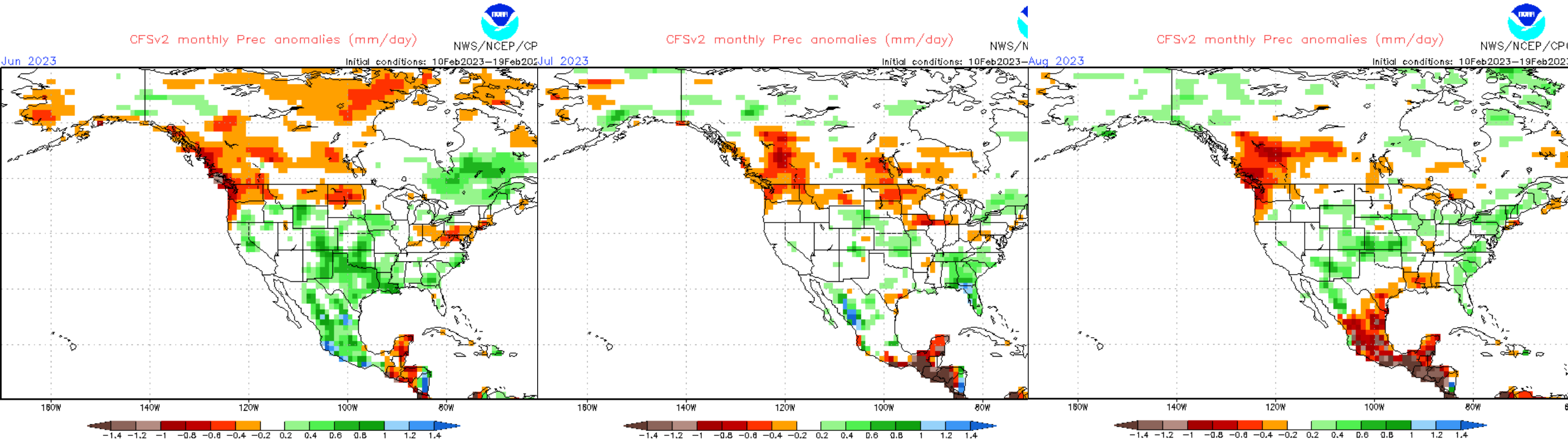




Forecast Model Jet Stream for Summer



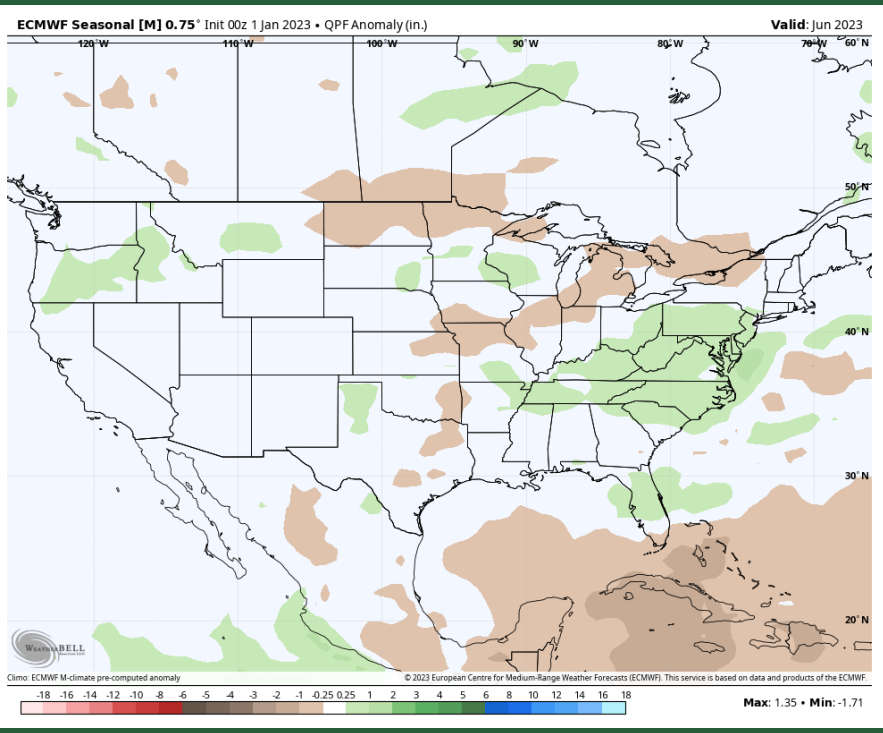
Summer Rain Outlook – CFS Model



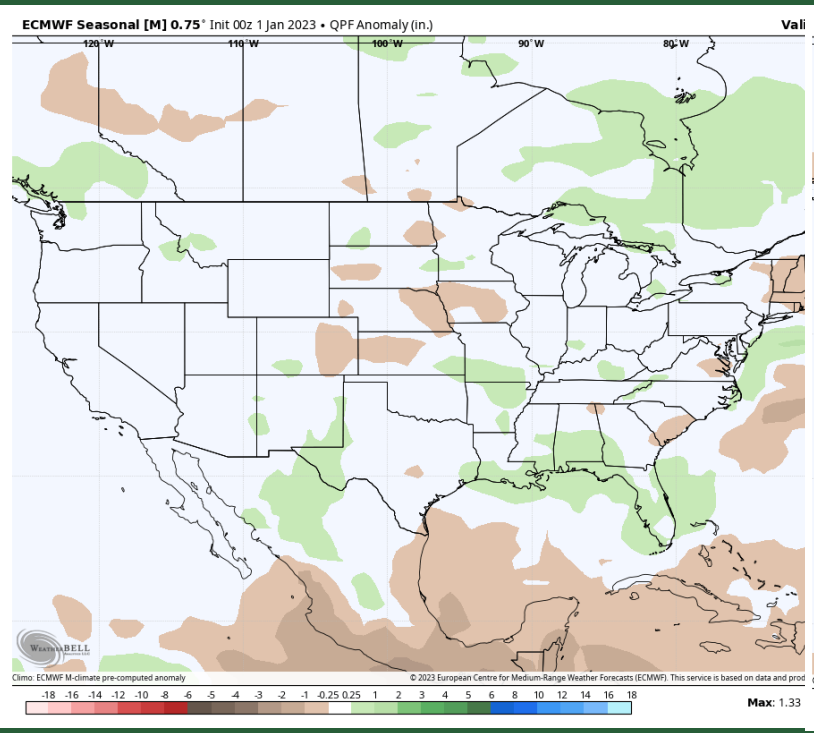
June **July** **August**

CFS: Climate Forecast System

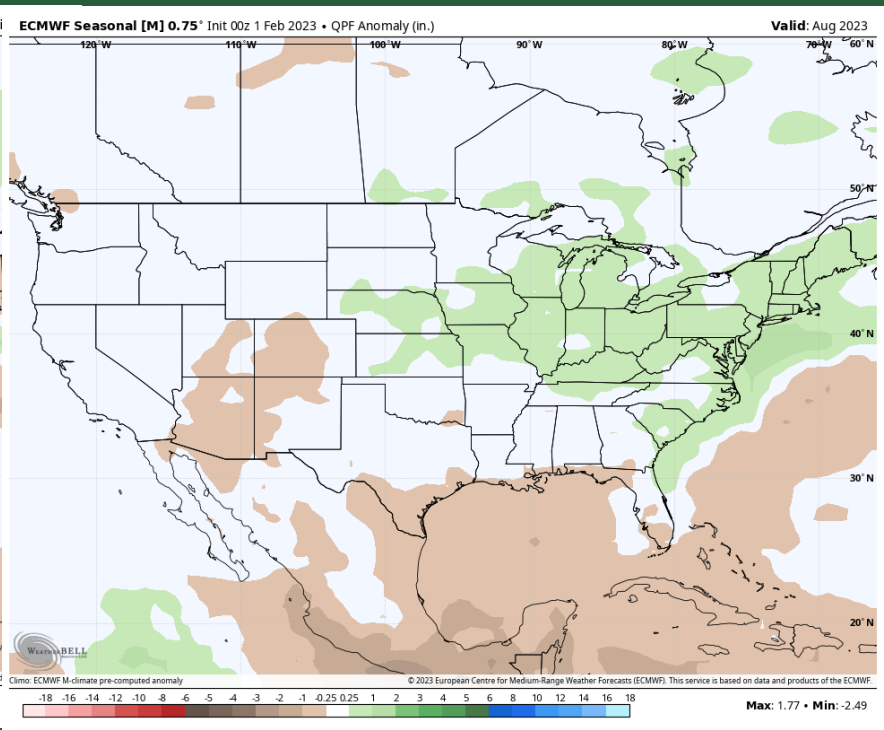
Summer Rain Outlook – European Model



June

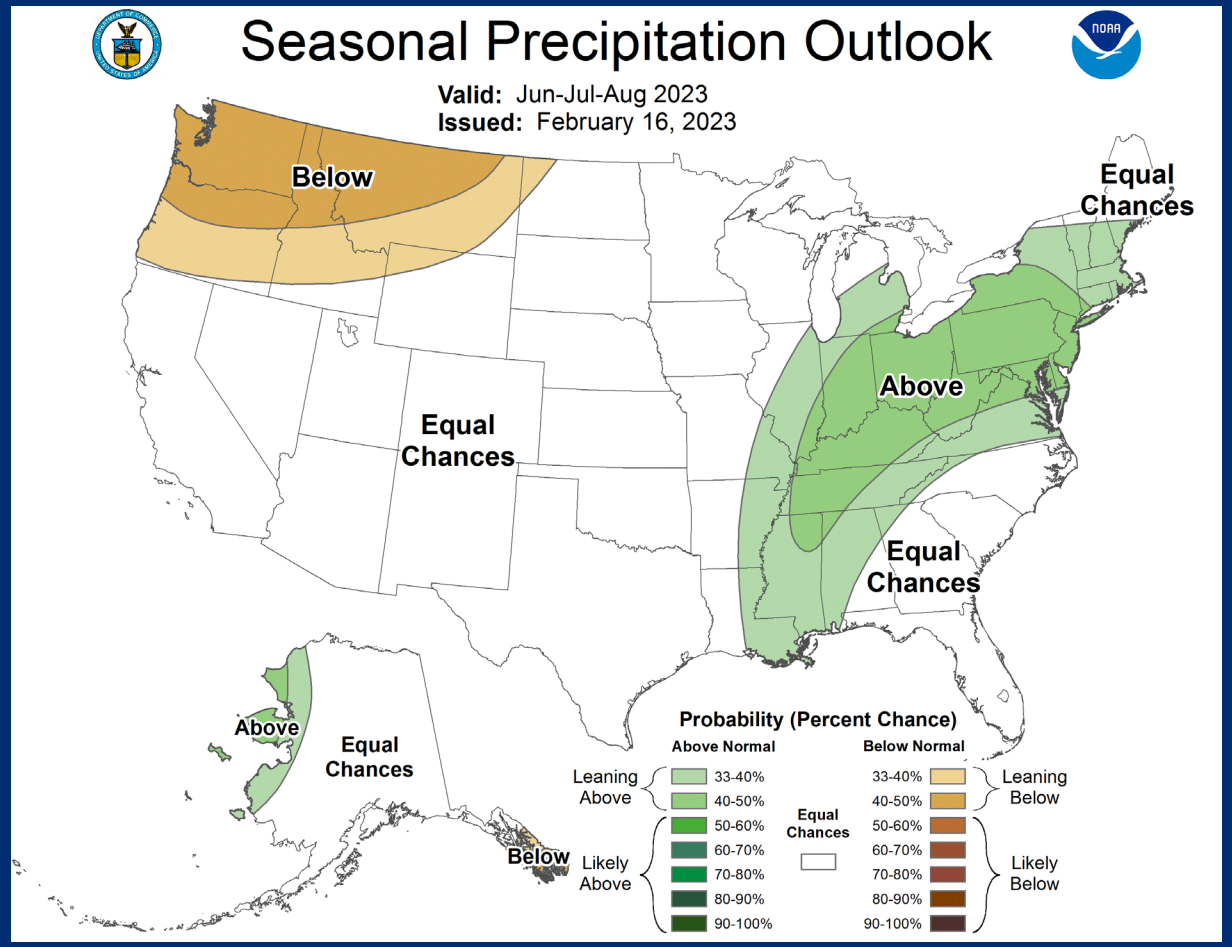


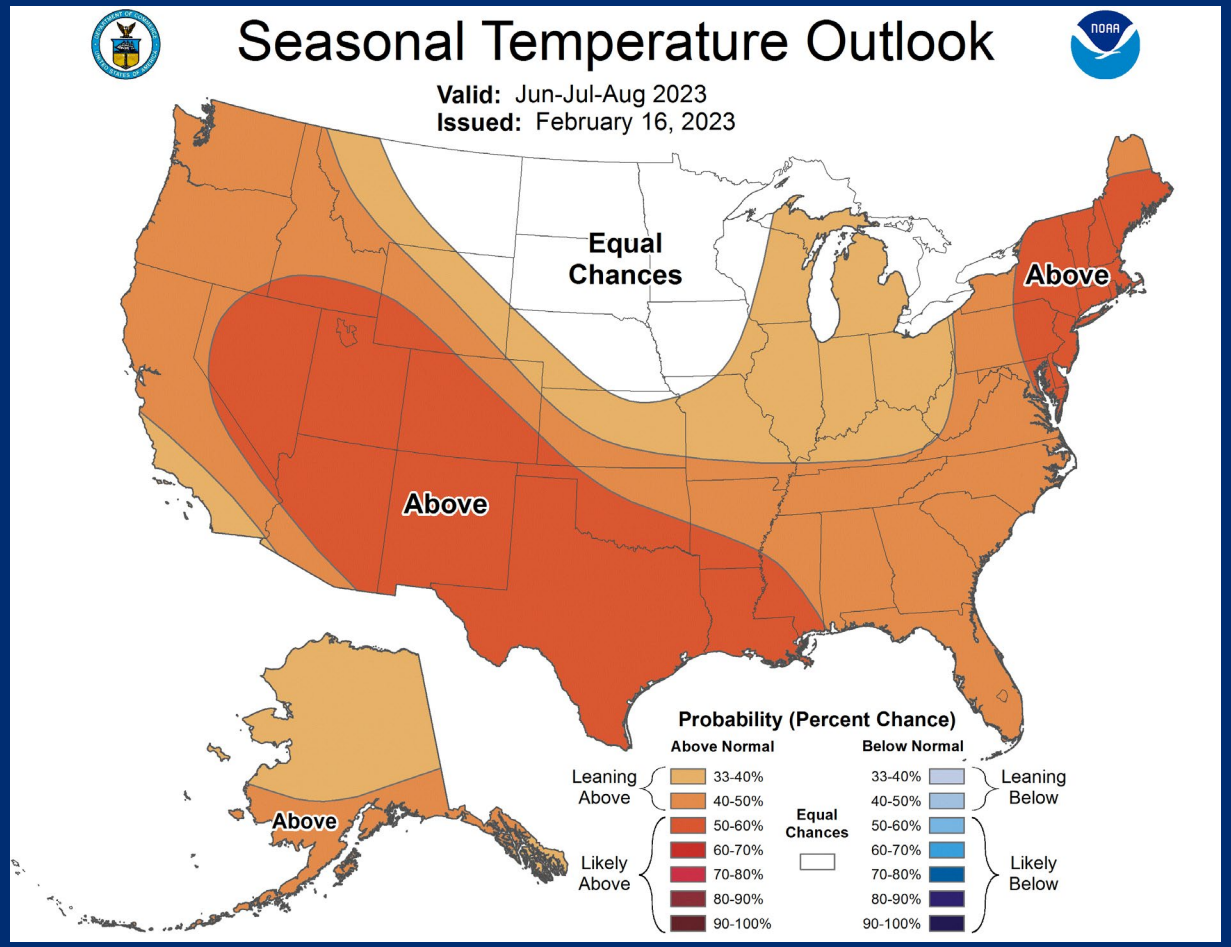
July



August

NOAA's Summer Outlook





Spring Into Summer Outlook

- La Niña should end in March or April, with a neutral Pacific expected late spring through summer
- It's not clear when the atmosphere and jet stream will respond to the end of La Niña
- Near-normal to below-normal rain forecast in March
- Near-normal to slightly above-normal rain forecast April through June
- Summer 2023 is not expected to be as hot or as dry as last summer
- Odds increasing for the development of El Niño by fall

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Planning for Possibilities: Conservation Strategies, Forecasts, and Trends During Drought

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