Coronado National Forest Climate Report: August 2023

Highlights

- The Current Average 3-month (June-August) Standardized Precipitation Index (SPI) for Coronado National Forest is **-2.22** (Extremely Dry).
- Average June-August precipitation was 4.09 inches, which was -4.51 inches different from the long-term average. This value ranks 127th out of 129 years in total precipitation (Rank 1 is the wettest year).
- Average June-August temperature was 77.2 degrees F, which was 3.2 degrees F different from the long-term average. This value ranks 1st out of 129 years in average temperature (Rank 1 is the warmest year).
- The 1-month outlook for September predicts equal chances of above, below or normal precipitation and a 40-50% chance of warmer-than-average temperatures. The 3-month seasonal outlook for September-November predicts a 33-40% chance of drier-than-average precipitation and a 50-60% chance of warmer-than-average temperatures. (More information at NOAA Climate Prediction Center, https://www.cpc.ncep.noaa.gov/)

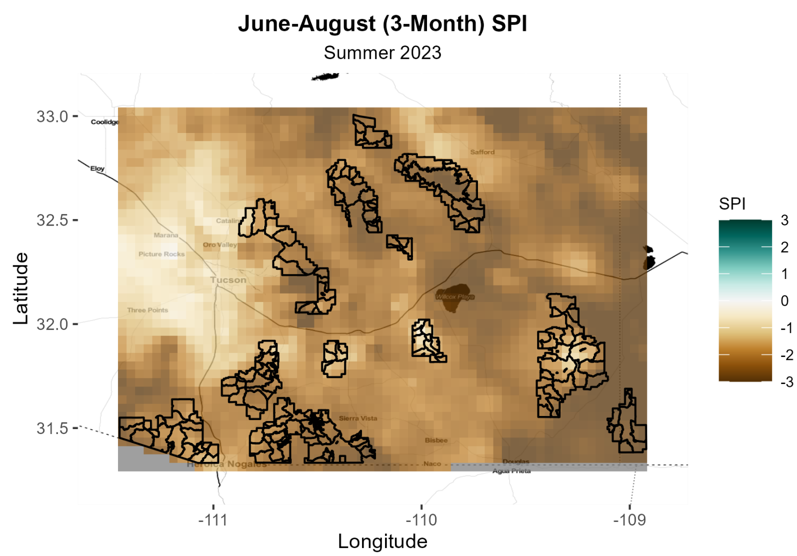

Figure 1: Summer 2023 Drought Status for the Coronado National Forest (August 2023 3-Mo. SPI)

Table 1: CNF District-level Climate Metrics

District	Minimum SPI	Mean SPI	Maximum SPI	Total Precip [in.]	Anomaly [in.]
Sierra Vista	-3.08	-2.25	-1.25	4.72	-4.93
Douglas	-3.34	-2.18	-0.54	4.30	-4.56
Safford	-3.31	-2.52	-1.53	2.94	-4.07
Santa Catalina	-3.03	-2.01	-0.79	3.74	-4.00
Nogales	-2.93	-2.12	-1.08	4.78	-4.96

Note:

Summer 2023 (June-August) SPI and climate statistics for each district within the Coronado National Forest are calculated based on the average of all PRISM grid cells lying within a district boundary.

Seasonal Drought Index Progression

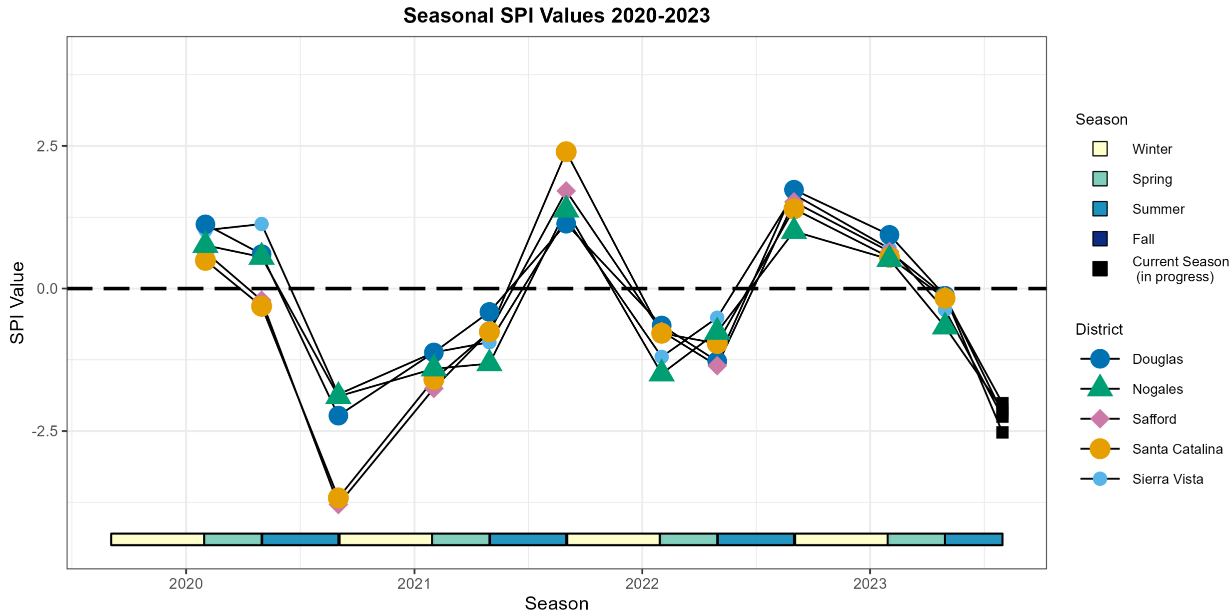

Figure 2: Seasonal SPI values for districts within the Coronado National Forest (2020-2023). Seasonal monthly definitions are as follows: Winter(Oct-Feb); Spring(Mar-May); Summer(Jun-Sep); Fall (NA).The displayed SPI value represents the final month within each season at a timescale of the number of months within that season

Table 2: CNF District-level Seasonal Difference Metrics from Previous Year

District	2021 Summer SPI	2022 Summer SPI	Current 2023 Summer SPI	Current SPI Difference From 2022 Summer	2021 Summer Precip [in.]	2022 Summer Precip [in.]	Current 2023 Summer Precip [in.]	Current Precip Anomaly From Long-term Mean [in.]
Sierra Vista	1.01	1.99	-2.25	-4.24	12.27	15.52	4.72	-4.92
Douglas	1.11	2.31	-2.18	-4.49	11.87	16.47	4.30	-4.56
Safford	1.37	2.09	-2.52	-4.61	9.74	11.68	2.94	-4.07
Santa Catalina	2.04	1.91	-2.01	-3.92	13.21	13.36	3.74	-4
Nogales	1.39	1.33	-2.12	-3.45	13.72	13.62	4.78	-4.96

Note:

Recent Summer (June-August) SPI and climate statistics for districts within the Coronado National Forest. Values are calculated based on the average of all PRISM grid cells lying within a district boundary.

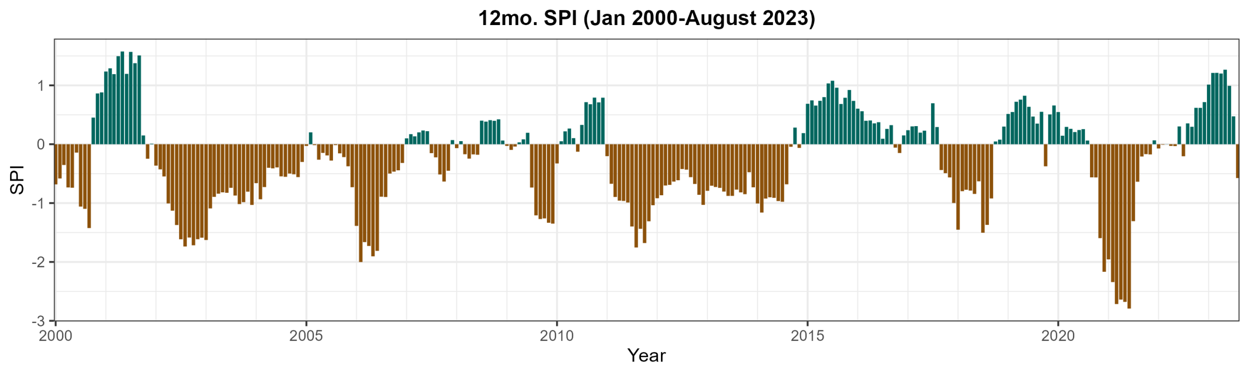

Figure 3: 12mo. SPI for the Coronado National Forest (2000-2023)

Station Climate Summaries

Summaries from climate stations with relatively long periods of record, minimal missing data (<10% of days), and within and near the Coronado National Forest are presented in the following tables (5 and 6) as reference locations. These stations are a select subset of stations that contribute to the gridded climate maps. Red circles on map indicate locations of NOAA Global Historical Climate Network stations while blue asterisks are USDA-NRCS SNOTEL (Snow Telemetry) station locations.

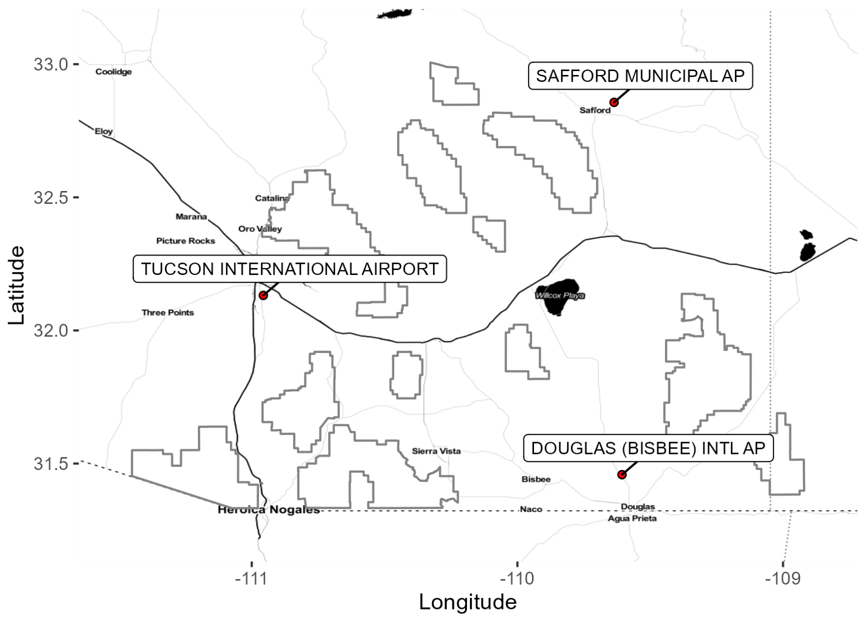

Figure 4: NOAA and SNOTEL Station Locations within and near CNF.

Table 3: NOAA Climate Station Observations (2023-06-01 to 2023-08-31)

Station	Elev (ft)	POR	Total Precip (in)	Precip Anom (in)	Days with Precip	Total Snow (in)	Avg Temp (F)	Temp Anom (F)	Freeze Days
TUCSON INTERNATIONAL AIRPORT	2551	1949-2023	4.39	-0.44	16	0	89.6	3.92	0
SAFFORD MUNICIPAL AP	3175	1998-2023	1.46	-1.64	8	0	86.9	1.71	0
DOUGLAS (BISBEE) INTL AP	4105	1949-2023	2.19	-4.35	23	0	80.5	2.21	0

Note:

June-August 2023 summary statistics of select NOAA stations accessed through RCC-ACIS within and near the Coronado National Forest

Mechanics Behind the Standardized Precipitation Index (SPI)

The SPI is a meteorological drought index which use monthly precipitation sums to calculate a time series of z-score values. The SPI uses z-score values to represent the number of standard deviations a monthly precipitation total is from the long-term mean. The sign (positive or negative) of a z-score value represents if the monthly total precipitation is above (+, water surplus) or below (-, water deficit) the long-term mean for *all other instances of that month on record*. Furthermore, the size of the z-score value represents the frequency of drought conditions (Table . Smaller SPI values (i.e. falling near zero) represent more frequent drought events while larger SPI values (positive or negative) are less frequent drought events.

Table 4: SPI Drought Categories

SPI Value	SPI Category
≥ 2	Extremely Wet
1.5 to 1.99	Very Wet
1 to 1.49	Moderately Wet
-0.99 to 0.99	Near Average
-1 to -1.49	Moderately Dry
-1.5 to -1.99	Very Dry
≤ -2	Extremely Dry

Note:

Table adapted from https://drought.unl.edu/Monitoring/SPI/MapInterpretation.aspx

An important feature of the SPI is the ability to be calculated at a variety of monthly timescales. This flexibility allows the SPI to evaluate drought conditions for different time periods. For example, a 3-month SPI calculation compares total precipitation from the 3 months with all other instances of those same 3 months on record. Land managers can assess SPI values of different timescales to interpret short and long-term drought conditions on their land.

About the data used in this report

- PRISM Climate: The gridded used in mapping and forest and district level climate summaries is provided by the PRISM (Parameter elevation Regression on Independent Slopes Model) statistical mapping system. This system uses a weighted regression scheme to interpolate station data while accounting complexities like topography and rain shadows. The PRISM mapping system relies on a high density of stations to account for small variations in temperature and precipitation. Use caution in interpreting fine-scale patterns (or lack thereof) in regions with low station density. More information on PRISM can be found at https://prism.oregonstate.edu/ and https://climatedataguide.ucar.edu/climate-data/prism-high-resolution-spatial-climate-data-united-states-maxmin-temp-dewpoint.
- Climate Stations: Station-level data used in this report consist of NOAA Global Historical Climatology Network(NOAA-GHCN) stations and USDA NRCS Snow Telemetry sites which include Cooperative Observer sites, Airports, and CoCoRAHS volunteer observations and also USDA NRCS Snow Telemetry(SNOTEL) sites. NOAA-GHCN stations consist of Cooperative Observer sites, Airports, and CoCoRAHS volunteer precipitation observations. SNOTEL sites are automated stations located in key snow monitoring locations, often in forested locations. NOAA-GHCN data were accessed through the Regional Climate Center-Applied Climate Information System(RCC-ACIS) and SNOTEL data were downloaded using the ‘snotelr’ package.

Past reports can be found at: https://cals.arizona.edu/climate/reports/CNF/

Contact information

Direct any questions, comments, or suggestions to:

- Mike Crimmins, Professor and Extension Specialist (crimmins@arizona.edu)
- Trevor McKellar, Post-doctoral Researcher (tmckella@arizona.edu)

https://cals.arizona.edu/climate