



DEFINING DROUGHT: STATEWIDE WATER MANAGEMENT COORDINATION

Kristine Morris, Assistant Deputy Secretary
Ecosystems Restoration
Florida Department of Environmental Protection

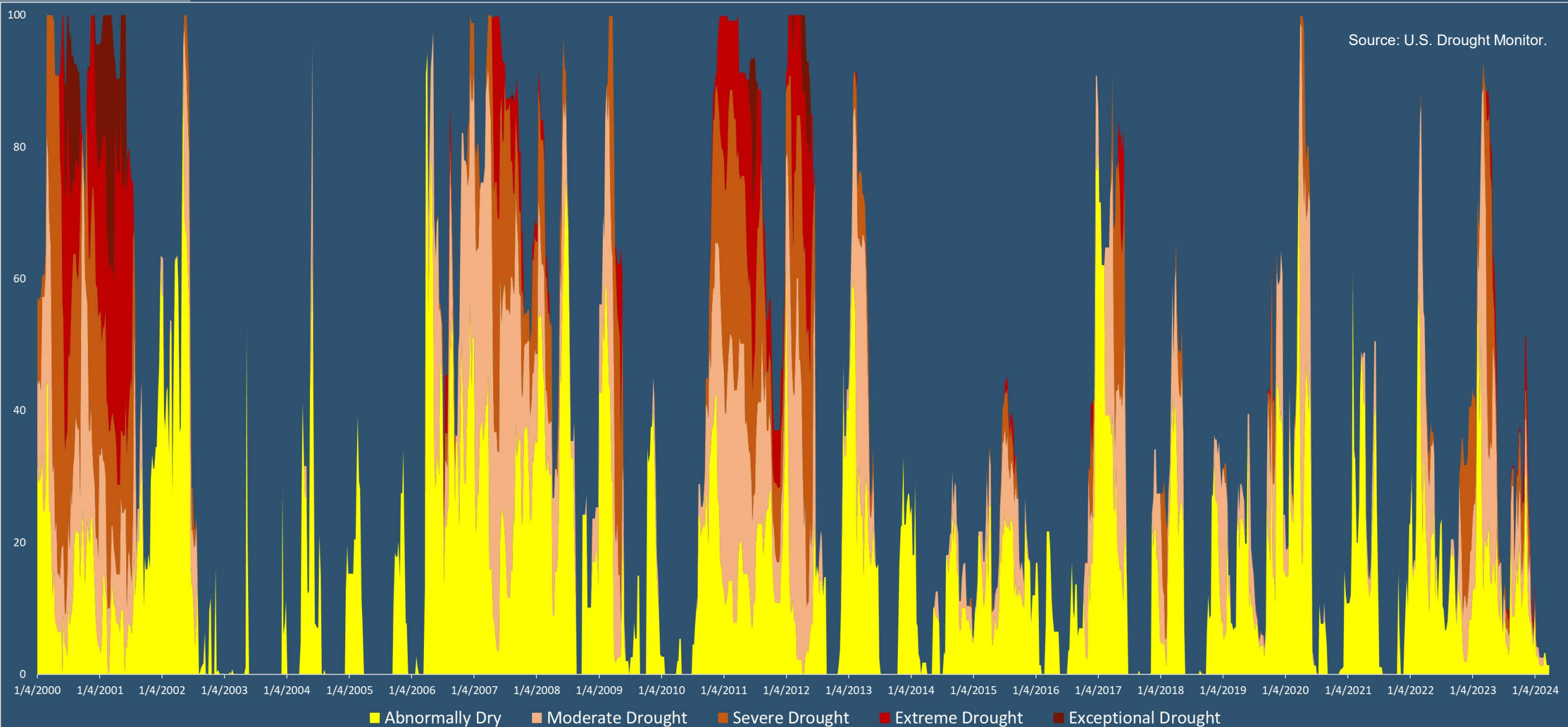
May 30, 2024



DROUGHT IN FLORIDA

PERCENT OF FLORIDA IN DROUGHT BY WEEK, 2000-PRESENT

Source: U.S. Drought Monitor.





CURRENT DROUGHT MANAGEMENT EXISTING WATER MANAGEMENT STRATEGIES

Permitting

- Permit triggers based on resource conditions.
- Redundancy and interconnections.

Water Shortage Orders

- Monthly hydrologic assessments.
- Threshold metrics.

Planning and Monitoring

- Drought planning projections.
- Saline water intrusion monitoring and modeling.



INITIAL COORDINATION MEETINGS

Defining Drought:
Statewide Water Management Coordination



DEFINING DROUGHT

FOR DROUGHT WATER MANAGEMENT

Discuss and define drought types and definitions.



Source: Pexels.



DROUGHT INDICATORS FOR DROUGHT WATER MANAGEMENT

Identify drought indicators and discuss their applicability statewide or by district.





DROUGHT COMMUNICATION STRATEGIES FOR DROUGHT WATER MANAGEMENT



Source: Pexels.

Coordinate for the development of a drought tool kit for social media and education on drought.



DEFINING DROUGHT FOR WATER MANAGEMENT

Defining Drought:
Statewide Water Management Coordination



DEFINING DROUGHT

THREE DROUGHT TYPES

**Meteorological
Drought**

**Agricultural
Drought**

**Hydrological or
Ecological
Drought**



DEFINING DROUGHT

METEOROLOGICAL DROUGHT

The defining characteristic of **meteorological drought** is a precipitation deficiency.

- Can be based on the total amount of rainfall in a given time period as well as the intensity and timing of any rainfall event(s).
- Exacerbating drought conditions:
 - High temperatures, winds and sun exposure.
 - Higher evapotranspiration (ET).

May result in little to no impact on water users or the natural systems, but continued rainfall deficit and high ET can result in worsening drought conditions.

- Meteorological drought must be closely monitored for worsening conditions.
- Some meteorological drought conditions may be part of the natural dry condition of a system.



DEFINING DROUGHT

METEOROLOGICAL DROUGHT – POTENTIAL METRICS

Title	Duration
30-day and 60-day Precipitation, exceeding or equal to 50% deviation from 30/60-day normal.	30- and 60-days rolling average.
Annual Precipitation, exceeding or equal to deviation from cumulative annual average.	Begins at start of wet season/month; concludes within 12 months.
Precipitation, 12- and 24-month moving sum.	12- and 24-month moving sum.
Streamflow conditions, below normal (< 25% of the 30-day moving average surface water flow on that day compared to historical data).	30-day moving average.
Temperature, departure from normal max temperature, 7-day and 30-day anomaly.	7- and 30-day rolling max.



DEFINING DROUGHT

AGRICULTURAL DROUGHT

The defining characteristic of **agricultural drought** is a soil moisture deficiency that directly and exclusively addresses agricultural production.

- Occurs when meteorological drought is persistent.
- Can and often does coincide with other drought stages.

With a loss of soil moisture, there can be an increase in plant stress and a reduction in biomass and crop yield.

Certain crops, both irrigated and unirrigated, may be more susceptible to drought. However, agricultural drought can affect any agricultural commodity.



DEFINING DROUGHT

AGRICULTURAL DROUGHT

At times, an agricultural drought can result from short-term deficit of rainfall coinciding with abnormally high temperatures and rapid intensification of drought conditions.

- When occurring during key time periods of crop production (typically late spring, summer and early fall), this **agricultural flash drought** can crop loss.
- Agricultural flash droughts can be difficult to predict and to mitigate due to their sudden, intense nature.
- Flash droughts that persist can become broader agricultural droughts.



DEFINING DROUGHT

AGRICULTURAL DROUGHT – POTENTIAL METRICS

Title	Duration
Soil Moisture Conditions, top 20 cm soil moisture less than 30% compared to historical measurements on that day.	Begins upon hitting threshold; concludes when exceeds threshold.
A 50% reduction of moist soil (0-50 cm) within no less than 3 weeks	
Crop Moisture Index, Abnormally Dry (-1.0 to -1.9); Excessively Dry (-2.0 to -2.9); Severely Dry (-3.0 or less) ¹ .	Begins upon hitting threshold; concludes when exceeds threshold.
Normalized Difference Vegetation Index	
Temperature, departure from normal max temperature, 7- and 30-day anomaly.	7- and 30-day rolling max.



DEFINING DROUGHT

HYDROLOGICAL OR ECOLOGICAL DROUGHT

The defining characteristic of **hydrological or ecological drought** is observable impacts to water supplies and/or natural systems.

- This can impact a wide variety of users, including agriculture, public supply (utilities) and their customers, domestic self-supply, and commercial and industrial users.

When such drought is occurring, the following impacts may be observed:

- Reduced streamflow.
- Reduced wetland extent.
- Reduced water storage.
- Reduced inflow in waters such as reservoirs, lakes, ponds and wetlands.
- Reduced groundwater levels.
- Reduced spring discharge.
- Increased saline water intrusion or risk of saline water intrusion.
- Reduced or changed ecological habitats.
- Reduced ecosystem resilience.



DEFINING DROUGHT

HYDROLOGICAL OR ECOLOGICAL DROUGHT (GROUNDWATER)

A **groundwater drought** is a specific type of hydrological drought.

Groundwater droughts typically occur when recharge to the aquifer declines over a prolonged period of time, resulting in:

- Depletion in groundwater storage and
- Reduction in availability of groundwater.

Groundwater droughts tend to lag behind meteorological droughts and additionally can persist after a meteorological drought has ended. Groundwater droughts can also exacerbate many of the adverse hydrological and ecological impacts that occurred due to drought.

Ecological droughts, including groundwater droughts, may be more likely to result in water shortages.



DEFINING DROUGHT

HYDROLOGICAL/ECOLOGICAL DROUGHT – POTENTIAL METRICS

Title	Duration
Streamflow Conditions, below normal (% historical streamflow values recorded at that gage on that day).	Begins upon hitting threshold; concludes when exceeds threshold.
Streamflow conditions, 7-day and 8-week moving average.	7-day and 8-week moving average.
Groundwater levels, % below 30 years historical data for varied durations (e.g., 4 weeks, 4-8 weeks or greater than 8 weeks).	Begins upon hitting threshold; concludes when exceeds threshold.
Saltwater intrusion or upconing (surface or groundwater).	
Change to sentinel site ecology over time.	



COMMUNICATING DROUGHT

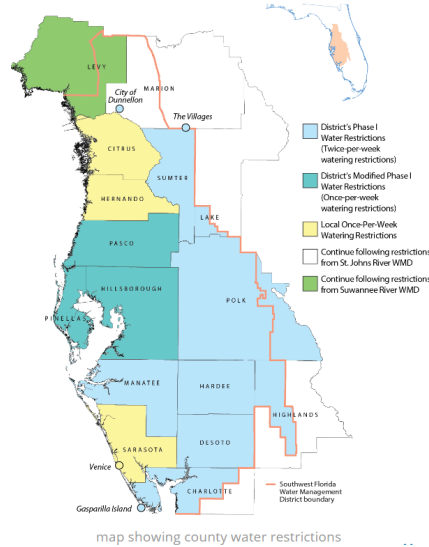
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COMMUNICATING ON DROUGHT

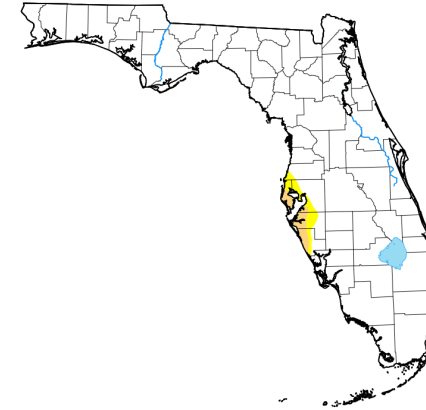
DROUGHT WATER MANAGEMENT DASHBOARD

Water
Shortage
Orders

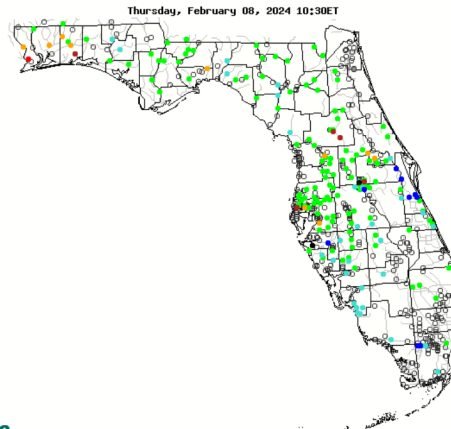


map showing county water restrictions

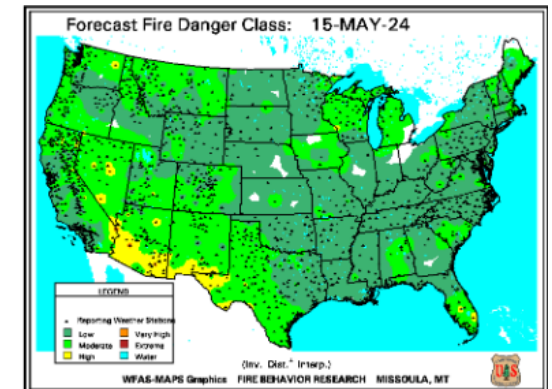
Rainfall
deficit,
30-day,
12-month,
24-month



Daily streamflow
conditions, United
State Geological
Survey (USGS)



Wildfire
Risk,
Keetch-
Byram





THANK YOU

Kristine Morris

Ecosystem Restoration

Florida Department of Environmental Protection

Contact Information:

850-245-3188

Kristine.P.Morris@FloridaDEP.gov