SOUTH FLORIDA WATER MANAGEMENT DISTRICT

July 2025: Conditional Positional Analysis (CPA) Implementation – LOSOM

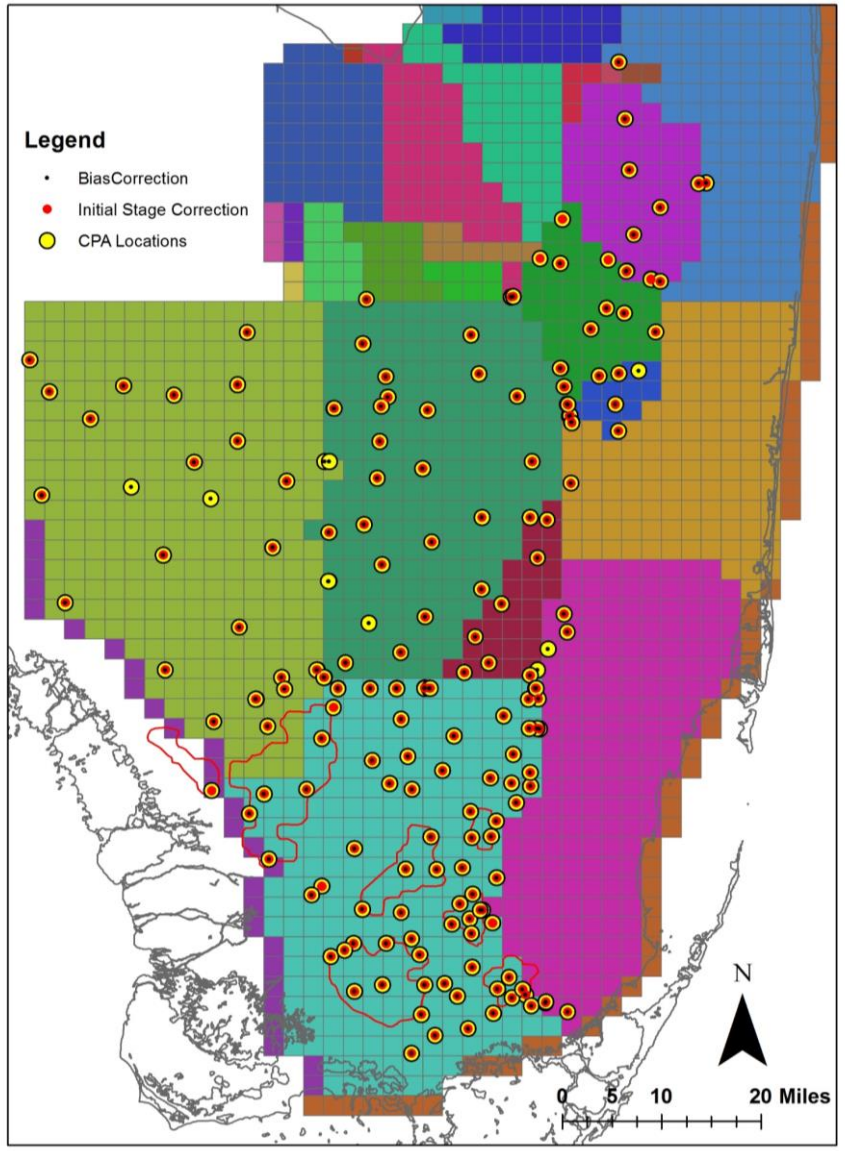
Water Resources & Systems Modeling Bureau, Systems Modeling Unit
SFWMD

sfwmd.gov

CPA Overview

- CPA is a stochastic framework (CPA Overview) that transforms stages obtained from Dynamic Position Analysis (DPA) based on forecasted rainfall conditions over the next twelve months (Ali, 2016).
- CPA depends on DPA - DPA stage outputs are used as inputs to CPA (DPA).
- 3 rainfall outlook scenarios (climatological, CPC, and Preferred Scenario) are used to compare potential stage outlooks.
- CPA is implemented for 200 locations in the Everglades including Lake Okeechobee. Additionally, CPA was implemented for WCA1Avg (avg of Site 7, Site 8T, and Site 9) and WCA3AAvg (avg of Site 63, Site 64, and Site 65) stages (Khare et al., 2024, UF WI Symposium 2024 Presentation).

Conditional Position Analysis (CPA) Gage Locations

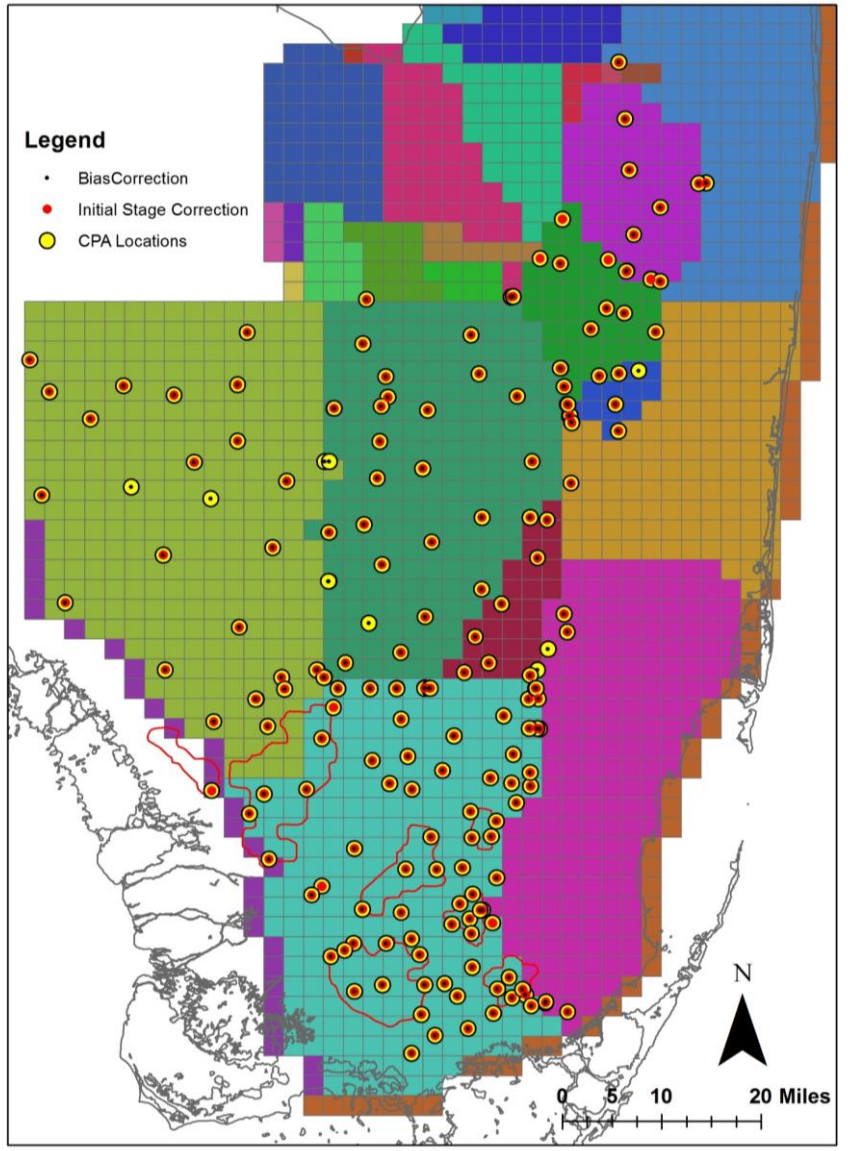


CPA Overview

CPA Outputs

- CPA forecasted stage percentiles from ‘Climatological’ scenario are first collapsed on DPA stage percentiles. Corresponding adjustments are then applied to stage percentile lines for all other rainfall scenarios.

Conditional Position Analysis (CPA) Gage Locations



CPA: Rainfall Scenarios

Climatological

- Climatological scenario assumes equal chances of below-normal/dry, normal, and above-normal/wet rainfall conditions over next twelve 3 monthly seasons (slide 5).
- This scenario is the connecting link between DPA and all other scenarios simulated under CPA.

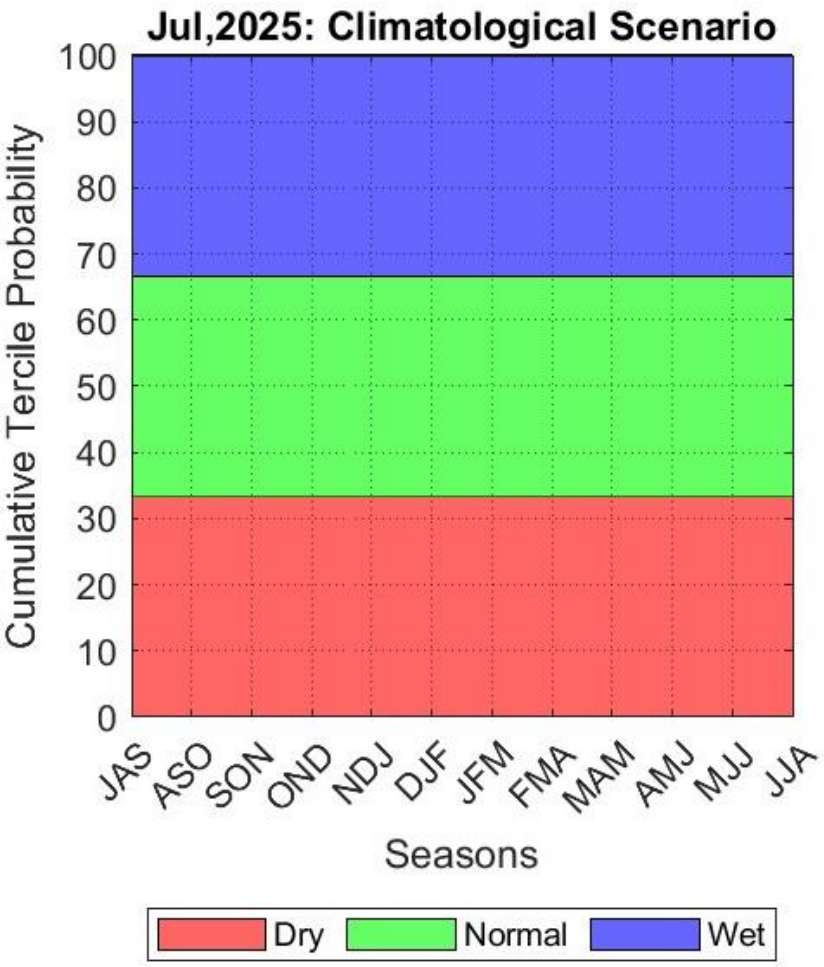
CPC

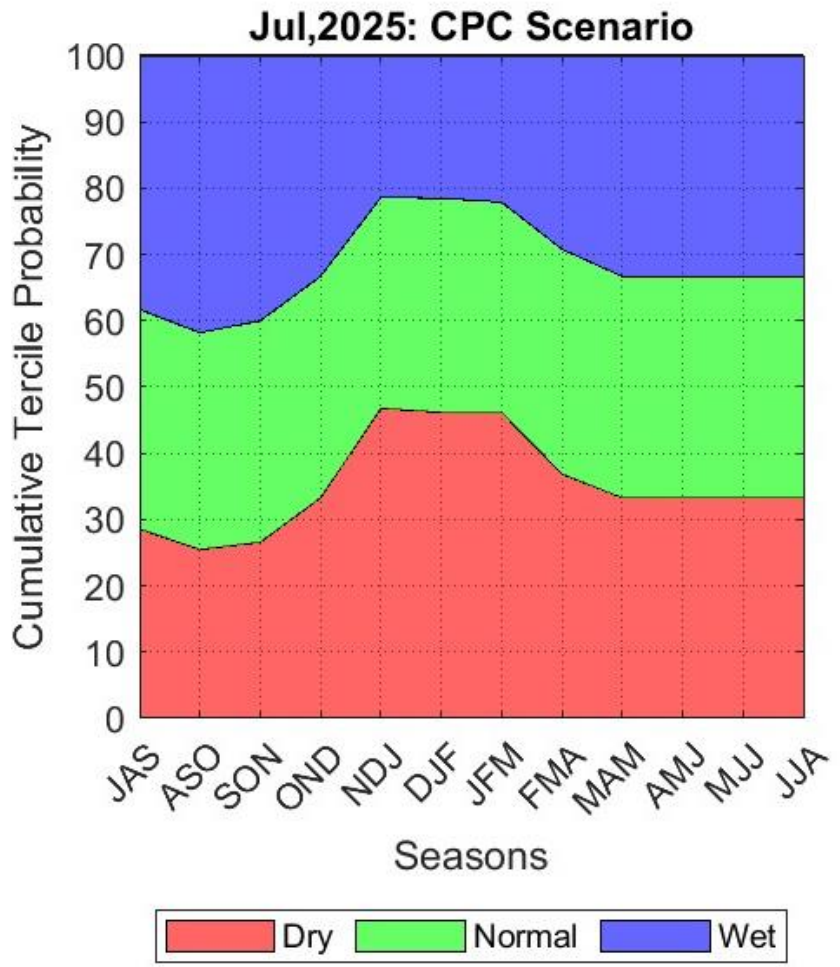
- This is based on official rainfall forecasts published by NOAA's Climate Prediction Center (CPC) every month (Climate Prediction Center - Forecasts & Outlook Maps, Graphs and tables (noaa.gov)).
- It is also used by JEM's EverForecast tool for stage prediction.

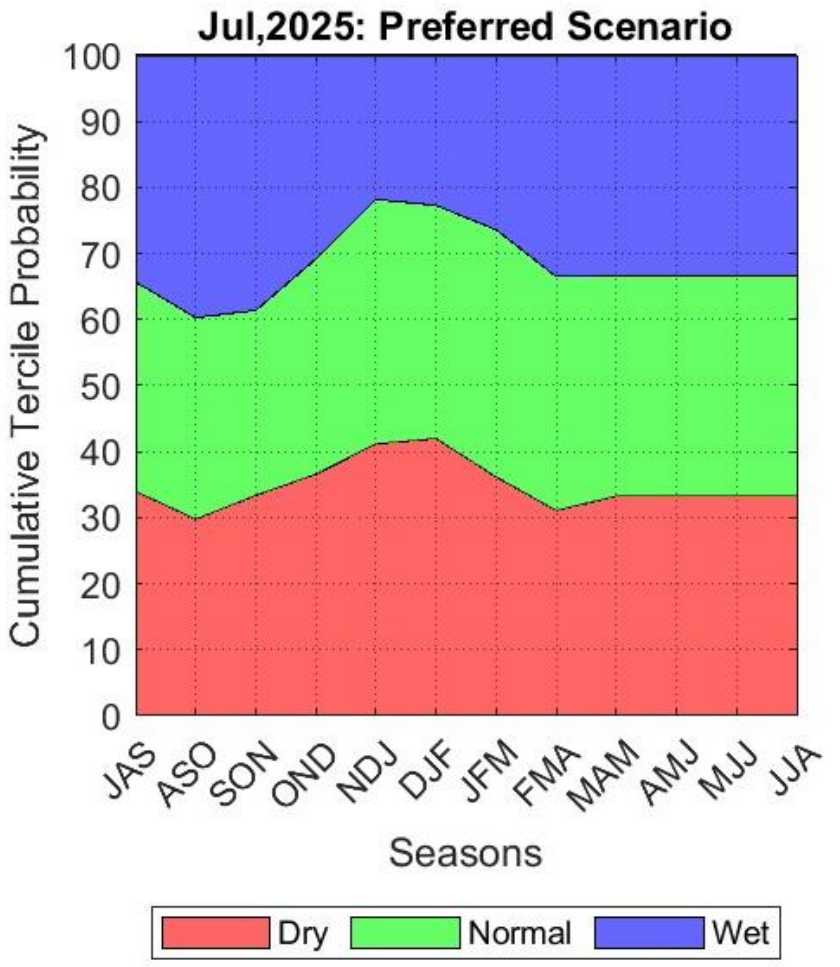
Preferred Scenario (PrefSce)

- Seasonal rainfall probabilities are calculated based on historical data and projected Niño-3.4 Index (Climate Prediction Center - El Nino Southern Oscillation (noaa.gov) published by CPC.
- This scenario developed by System Modeling Unit (**PrefSce Overview**) represents a best professional judgement rainfall outlook.

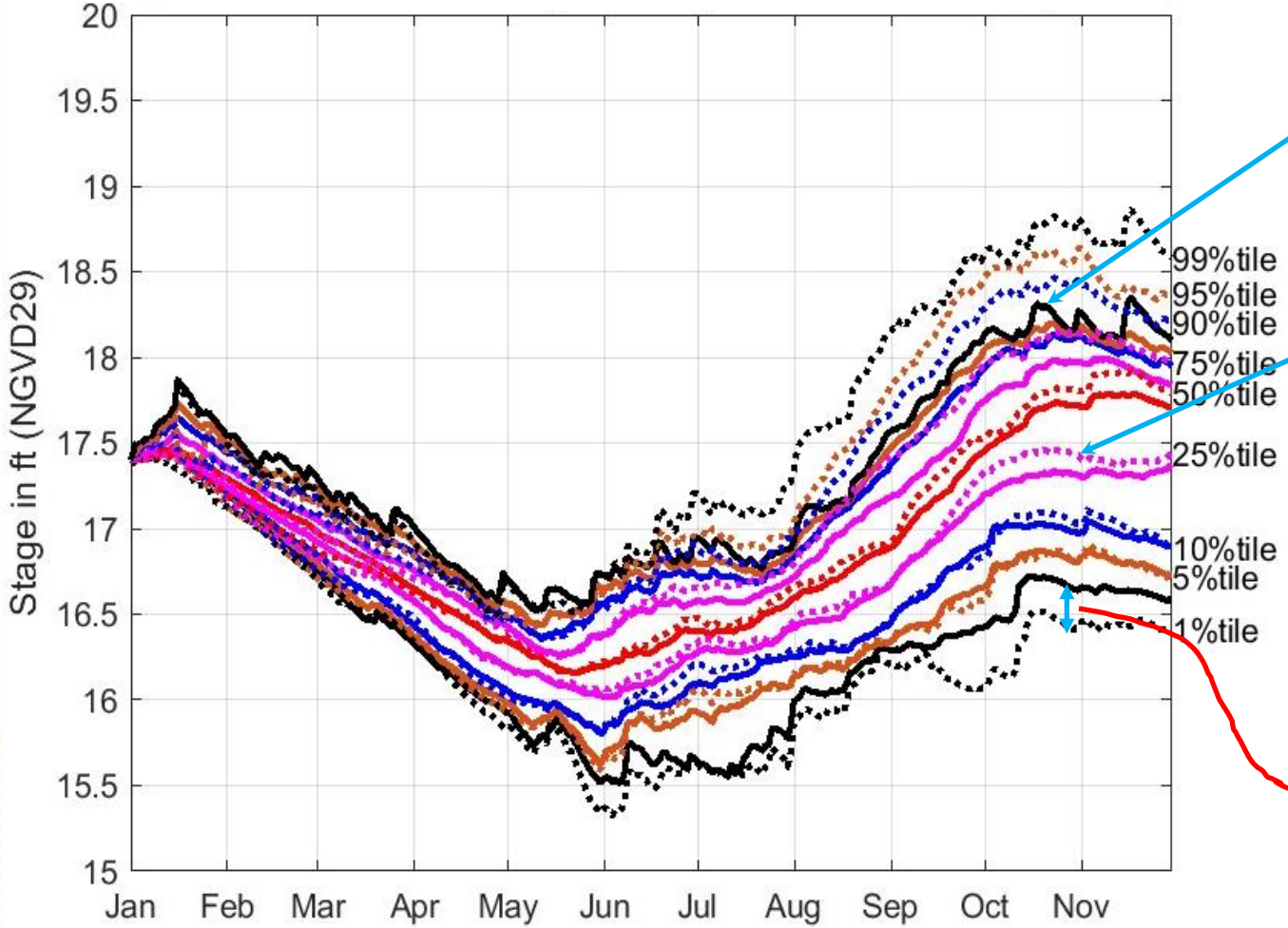
July 2025 CPA: Rainfall Scenarios







CPA: Key to Reading Results



Solid lines → Climatological Scenario/DPA

Dotted lines → Alternative Rainfall Scenario

Black lines → 1% and 99%
Brown lines → 5% and 95%
Blue lines → 10% and 90%
Pink lines → 25% and 75%
Red lines → 50%

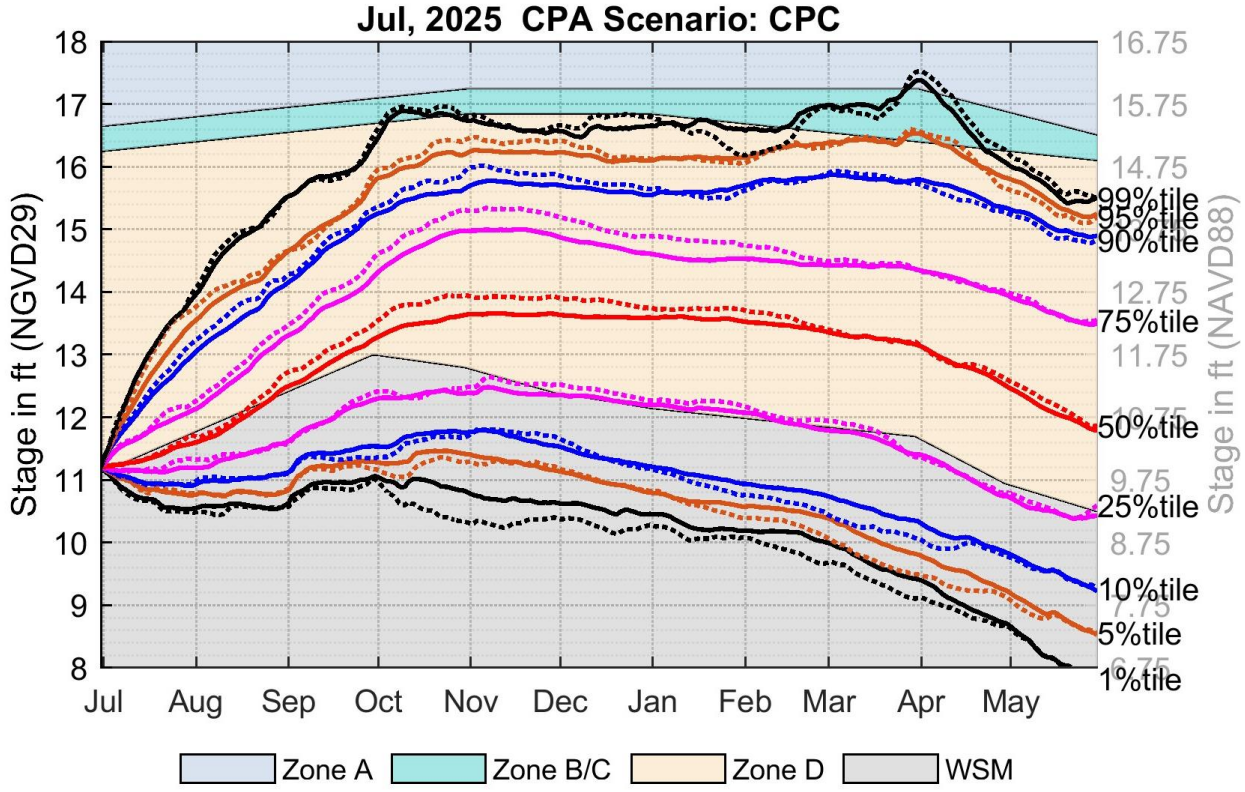
Need to focus on how DPA percentile lines shift under Alternate Rainfall Scenario

LOSOM

July 2025 CPA: LOK

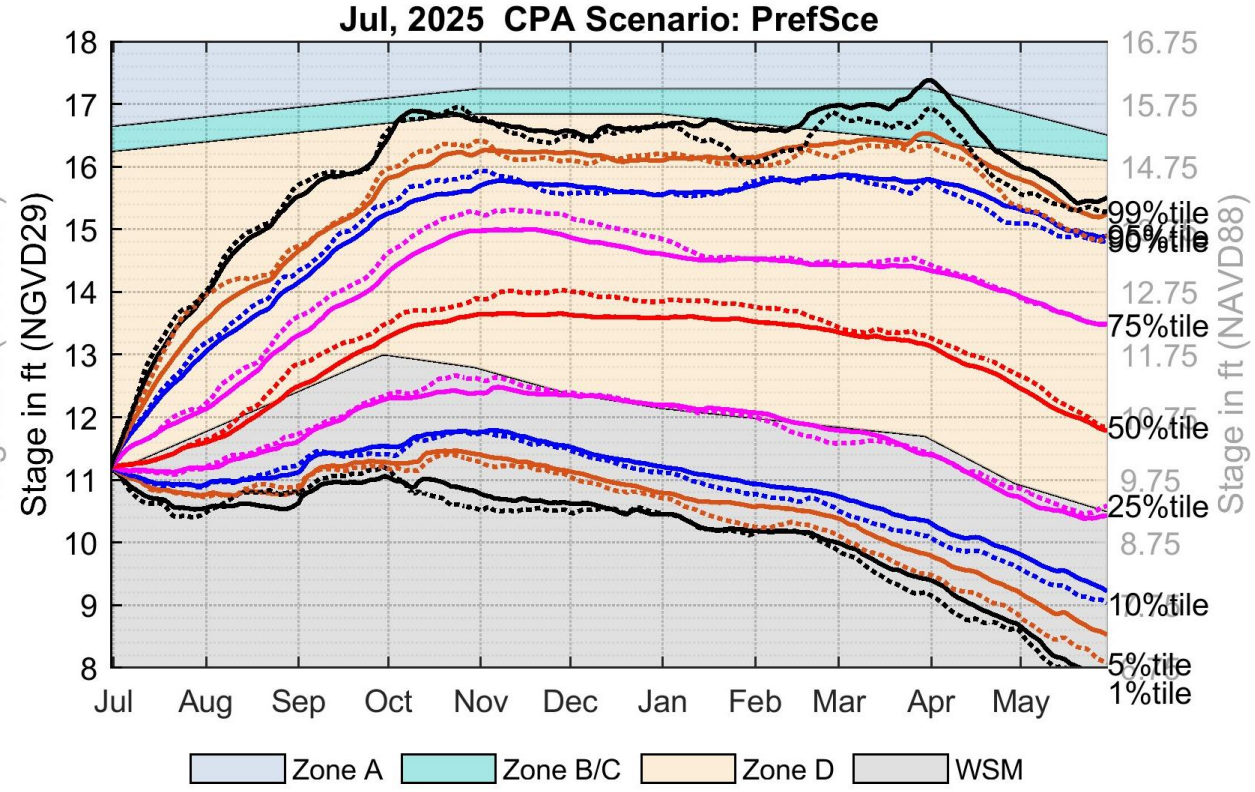
CPC

LOK



PrefSce

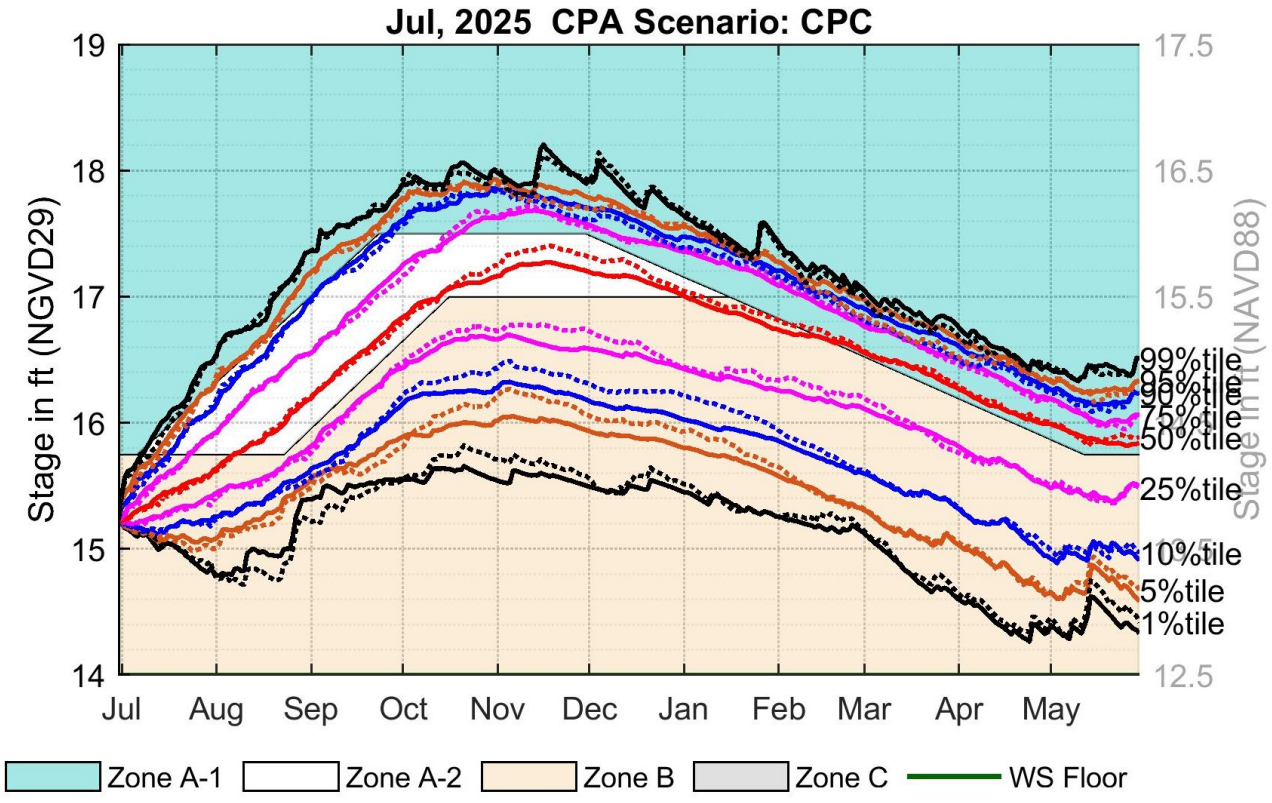
LOK



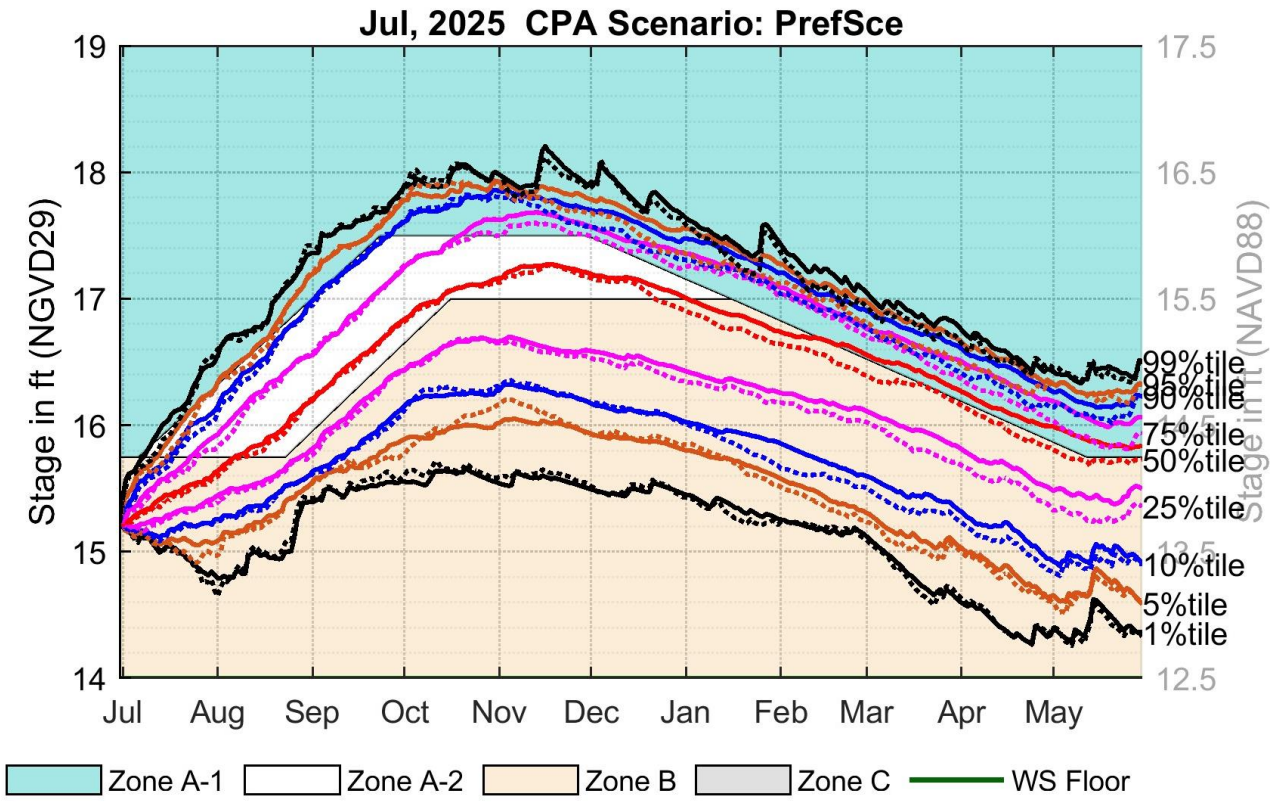
Secondary vertical axis shows stages in NAVD88. These stages are based on Agreed Upon Regulation Schedule Conversion Offsets between NGVD29 and NAVD88 (1.25 ft for Lake Okeechobee).

July 2025 CPA: WCA1 3 Gage Avg.

CPC



PrefSce

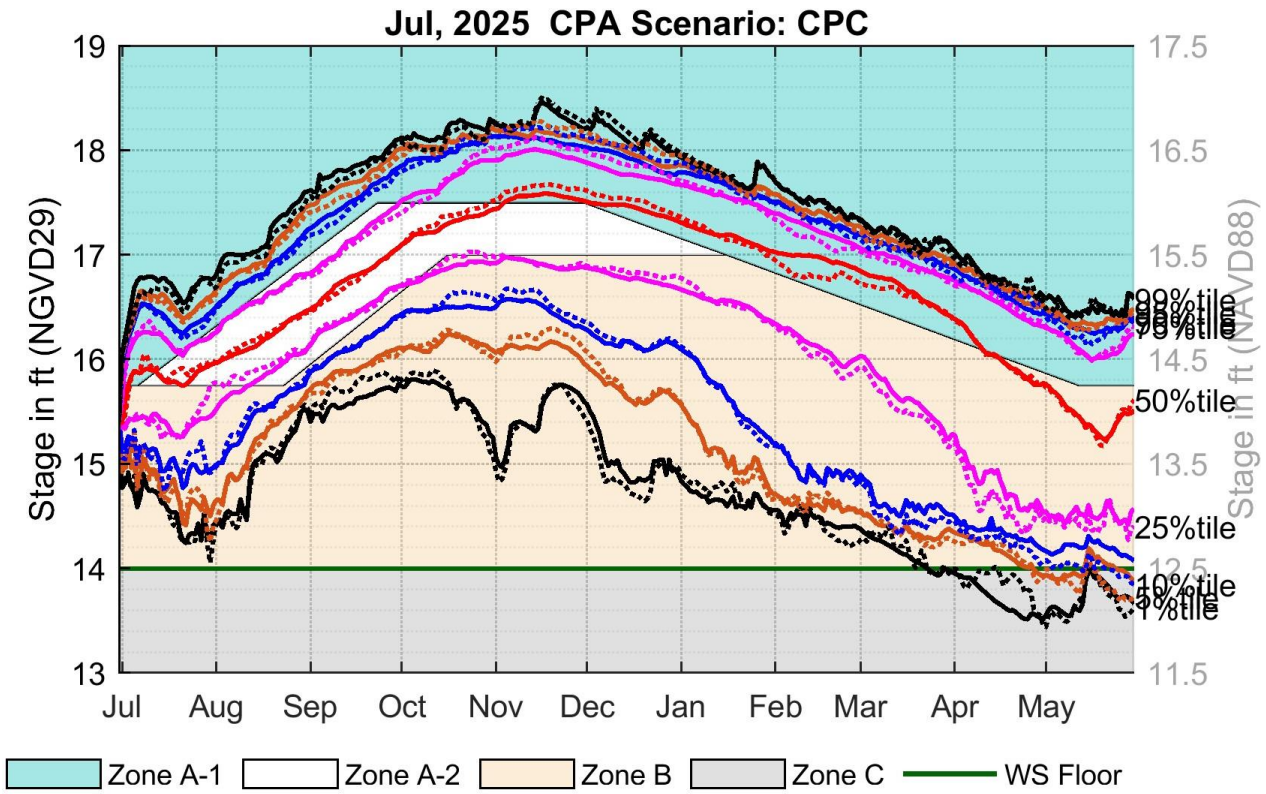


Secondary vertical axis shows stages in NAVD88. These stages are based on Agreed Upon Regulation Schedule Conversion Offsets between NGVD29 and NAVD88 (1.5 ft for WCA1).

July 2025 CPA: WCA1 Site 8-C

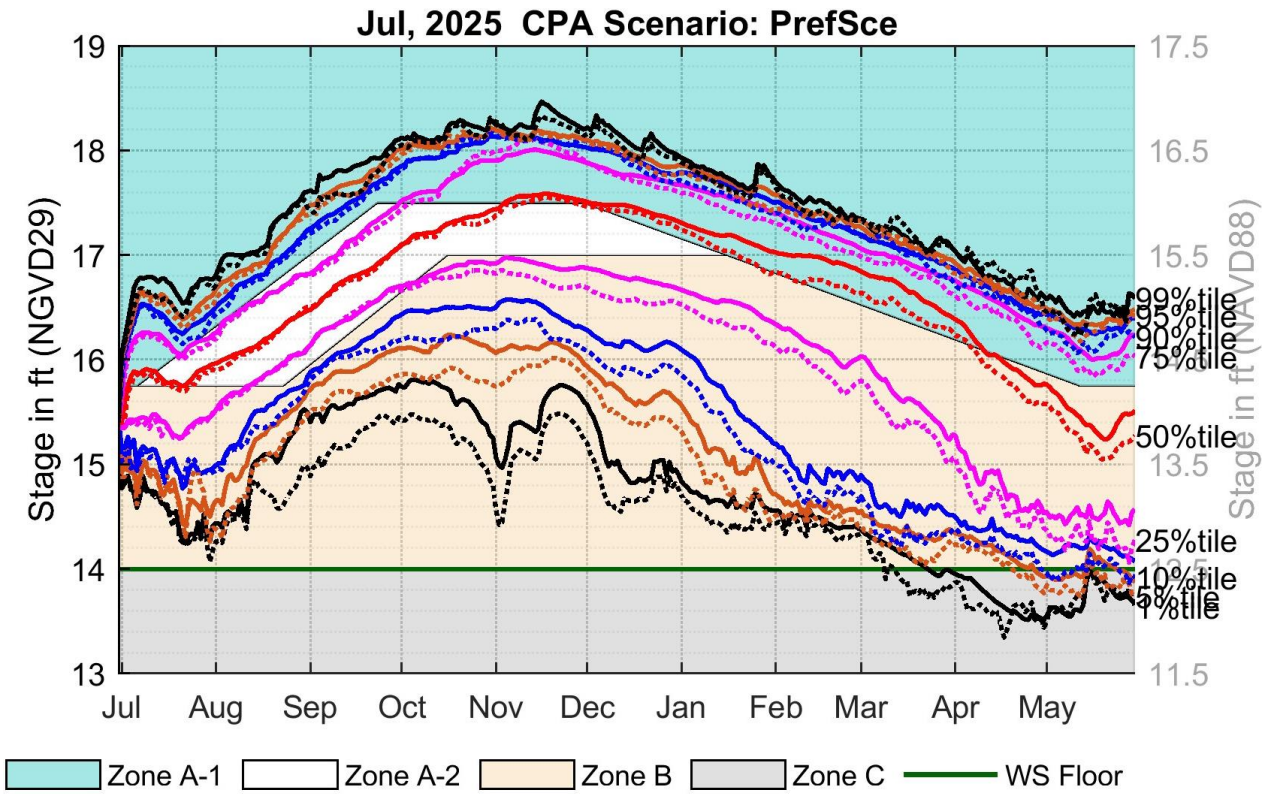
CPC

WCA1 Site 8-C



PrefSce

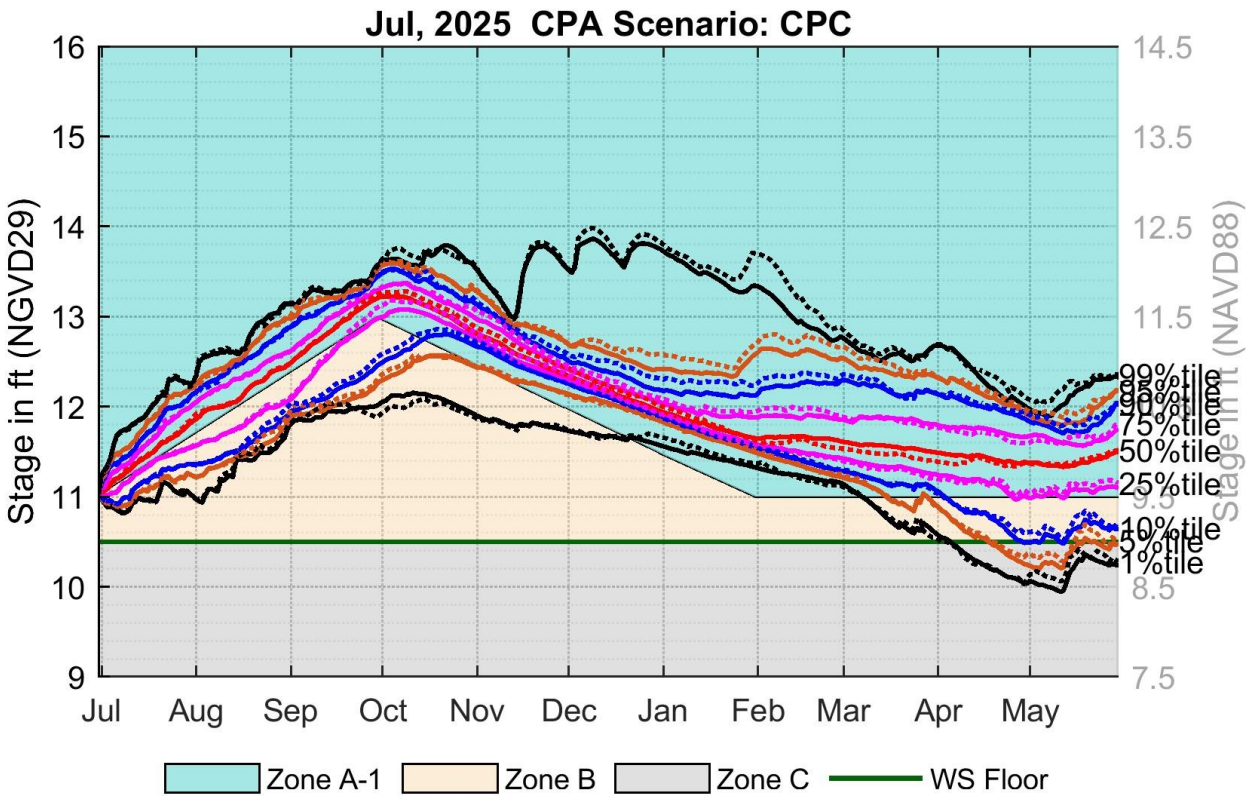
WCA1 Site 8-C



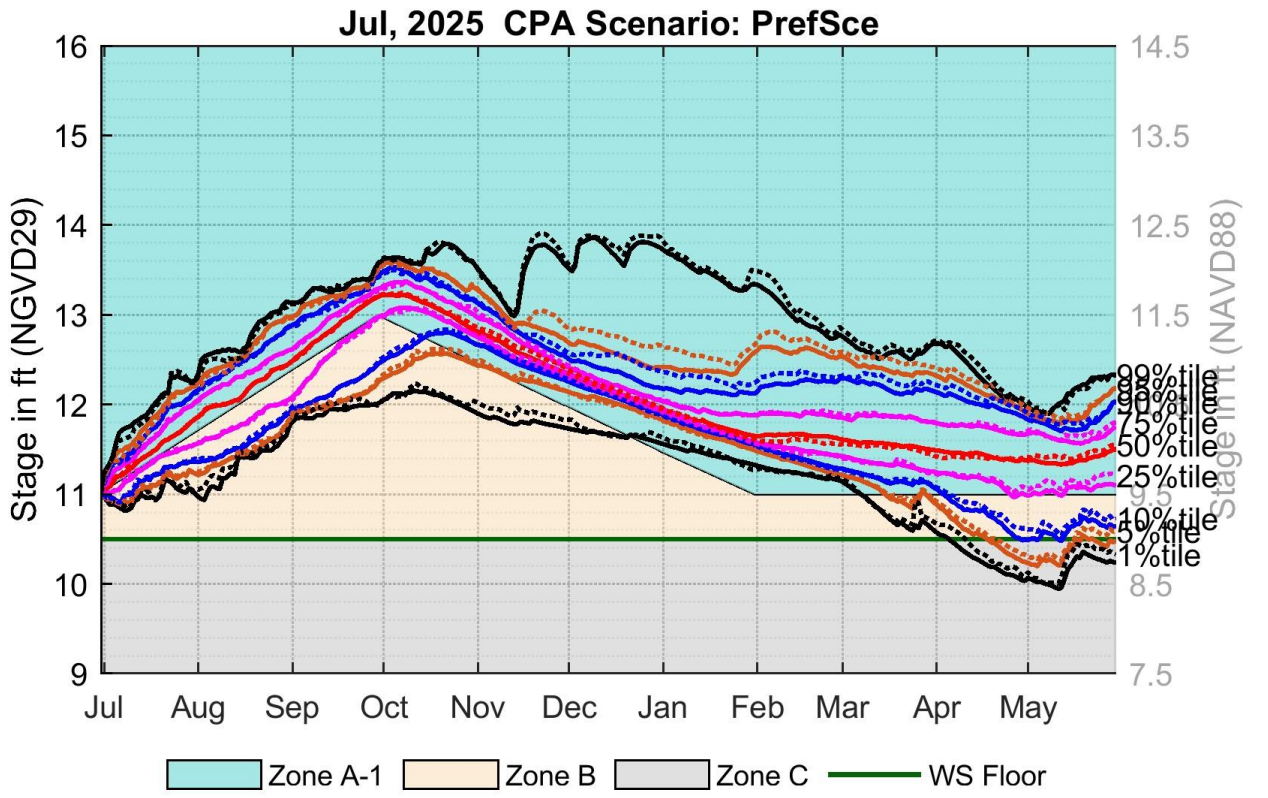
Secondary vertical axis shows stages in NAVD88. These stages are based on Agreed Upon Regulation Schedule Conversion Offsets between NGVD29 and NAVD88 (1.5 ft for WCA1).

July 2025 CPA: WCA2A Site 17

CPC



PrefSce

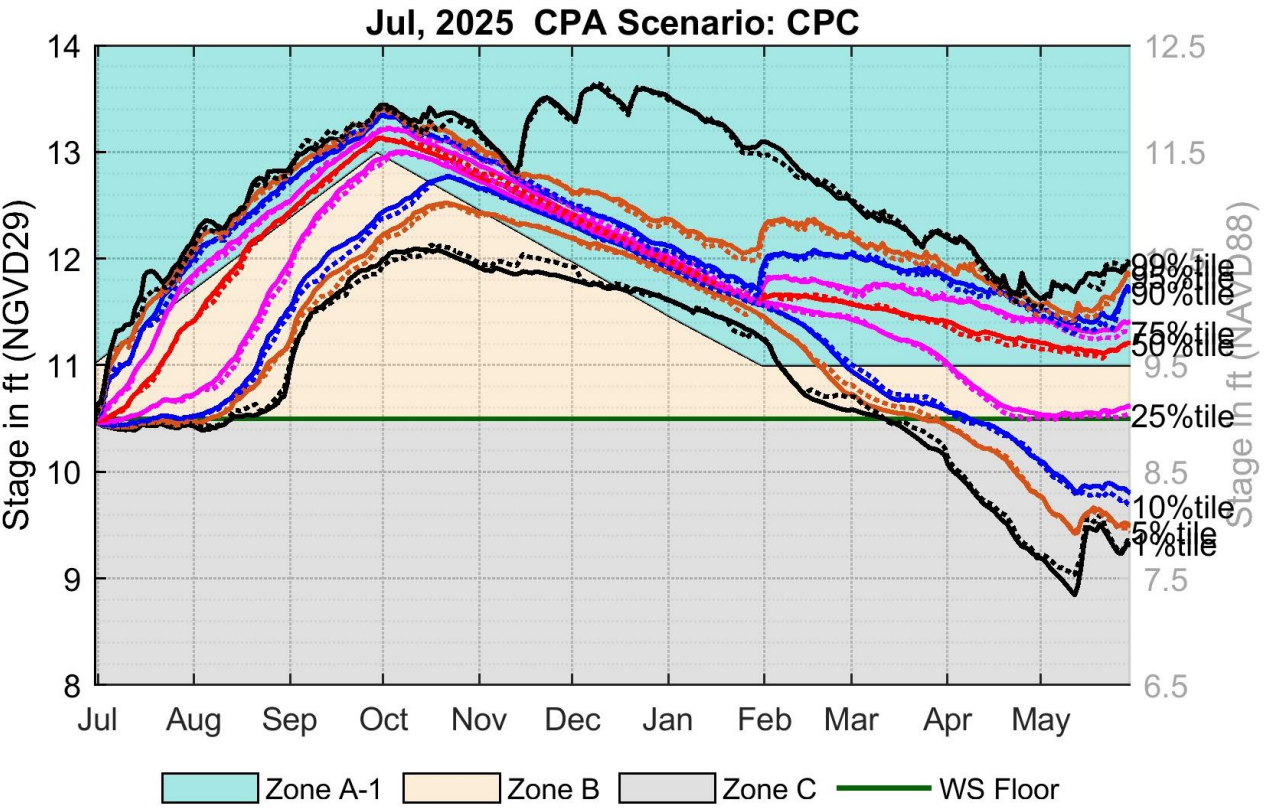


Secondary vertical axis shows stages in NAVD88. These stages are based on Agreed Upon Regulation Schedule Conversion Offsets between NGVD29 and NAVD88 (1.5 ft for WCA2A).

July 2025 CPA: WCA2A S11B_H

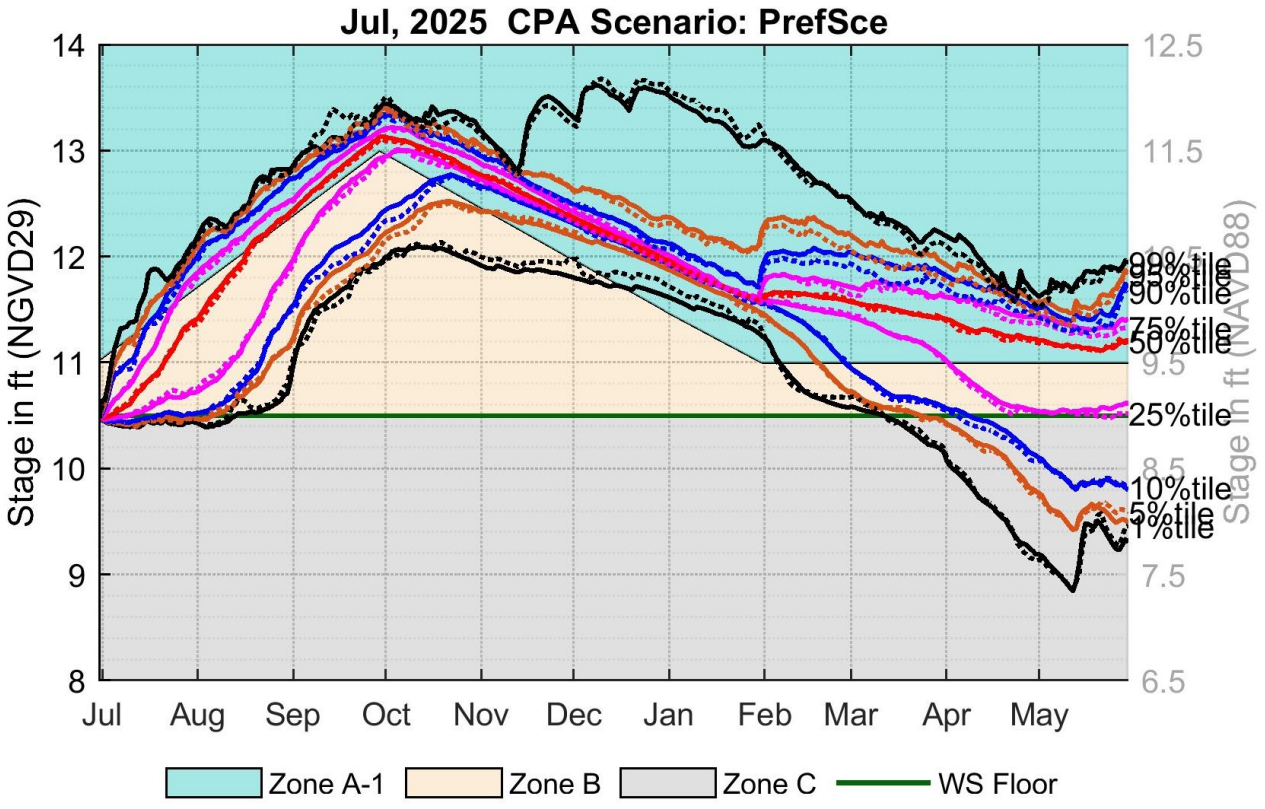
CPC

WCA2A S11B_H



PrefSce

WCA2A S11B_H

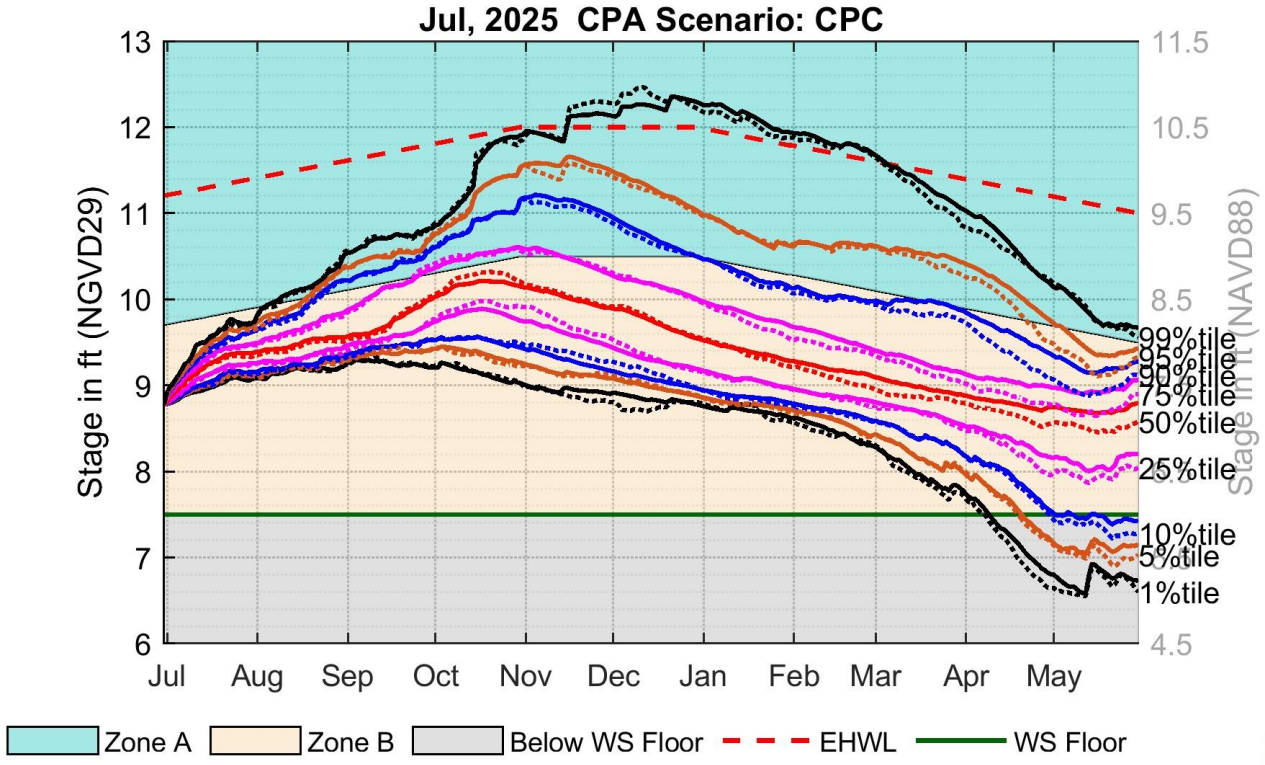


Secondary vertical axis shows stages in NAVD88. These stages are based on Agreed Upon Regulation Schedule Conversion Offsets between NGVD29 and NAVD88 (1.5 ft for WCA2A).

July 2025 CPA: WCA3A 3 Gage Avg.

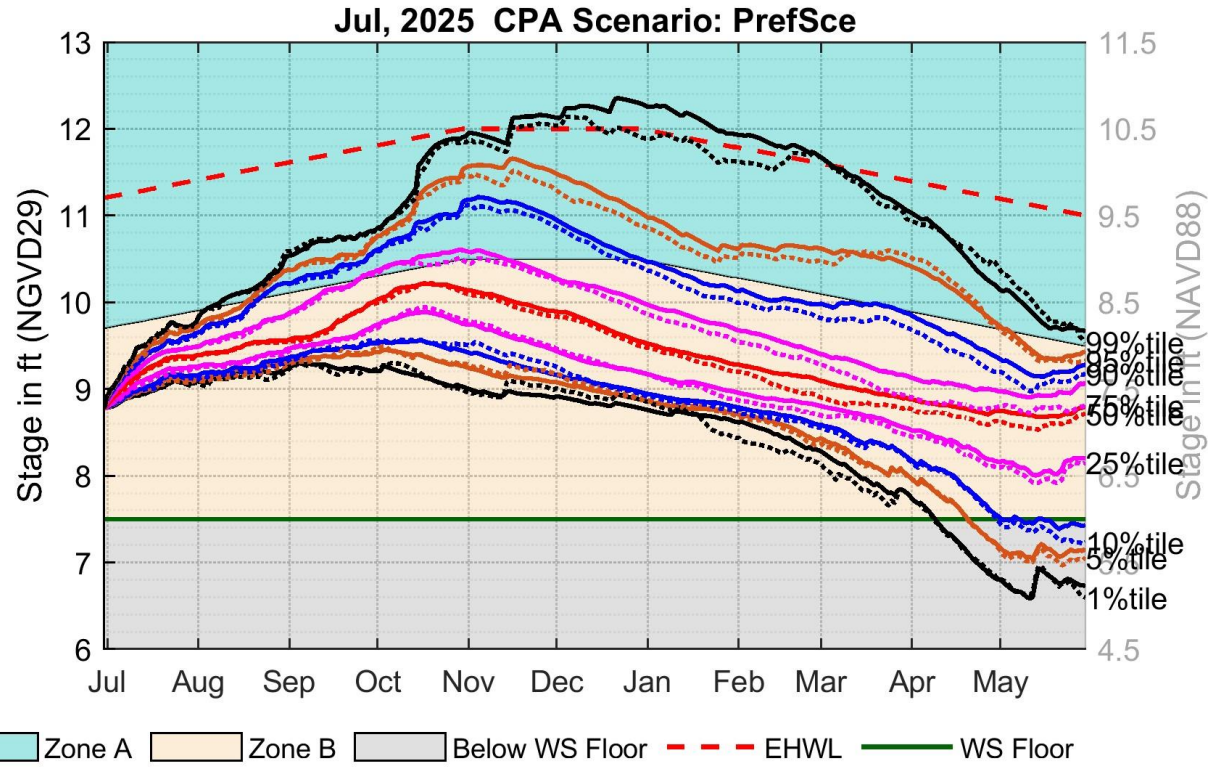
CPC

WCA3AAvg



PrefSce

WCA3AAvg



Secondary vertical axis shows stages in NAVD88. These stages are based on Agreed Upon Regulation Schedule Conversion Offsets between NGVD29 and NAVD88 (1.5 ft for WCA3A).