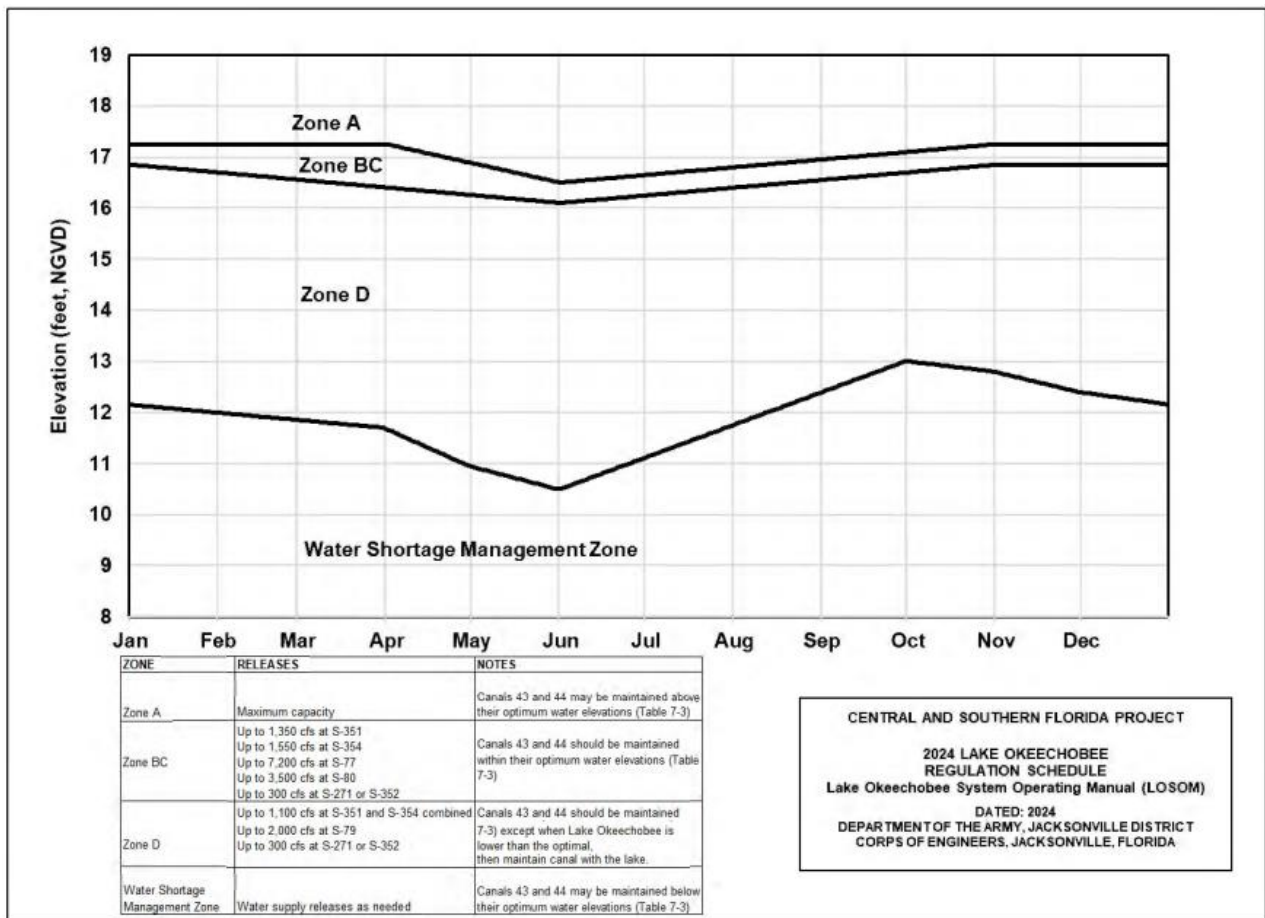


LOSOM Technical Summary August 12, 2024

This technical summary provides insight into the application of the Lake Okeechobee Systems Operation Manual (LOSOM). LOSOM, which went into effect with Record of Decision on August 12, 2024, provides operational guidelines that establishes Lake Okeechobee’s operational strategy for flood risk management, water supply, fish and wildlife enhancement, navigation, and recreation. LOSOM has four zones (three relevant to regulatory release guidance), unlike the previous operations schedule Lake Okeechobee Regulation Schedule (LORS08) which had seven sub-bands (five relevant to regulatory release guidance). As described by the United States Army Corps of Engineers (USACE), LOSOM operational decision making has shifted to an approach that benefits the system by allowing regulatory releases south in all operational zones, while eliminating regulatory releases to the east in zones below Zone B/C.

Below is the Lake Okeechobee Regulation Schedule for LOSOM. Related documentation can be found on the USACE Jacksonville District’s Environmental planning website. (<https://www.saj.usace.army.mil/About/Divisions-Offices/Planning/Environmental-Branch/Environmental-Documents/>)



1. Lake Okeechobee Stage Classification:

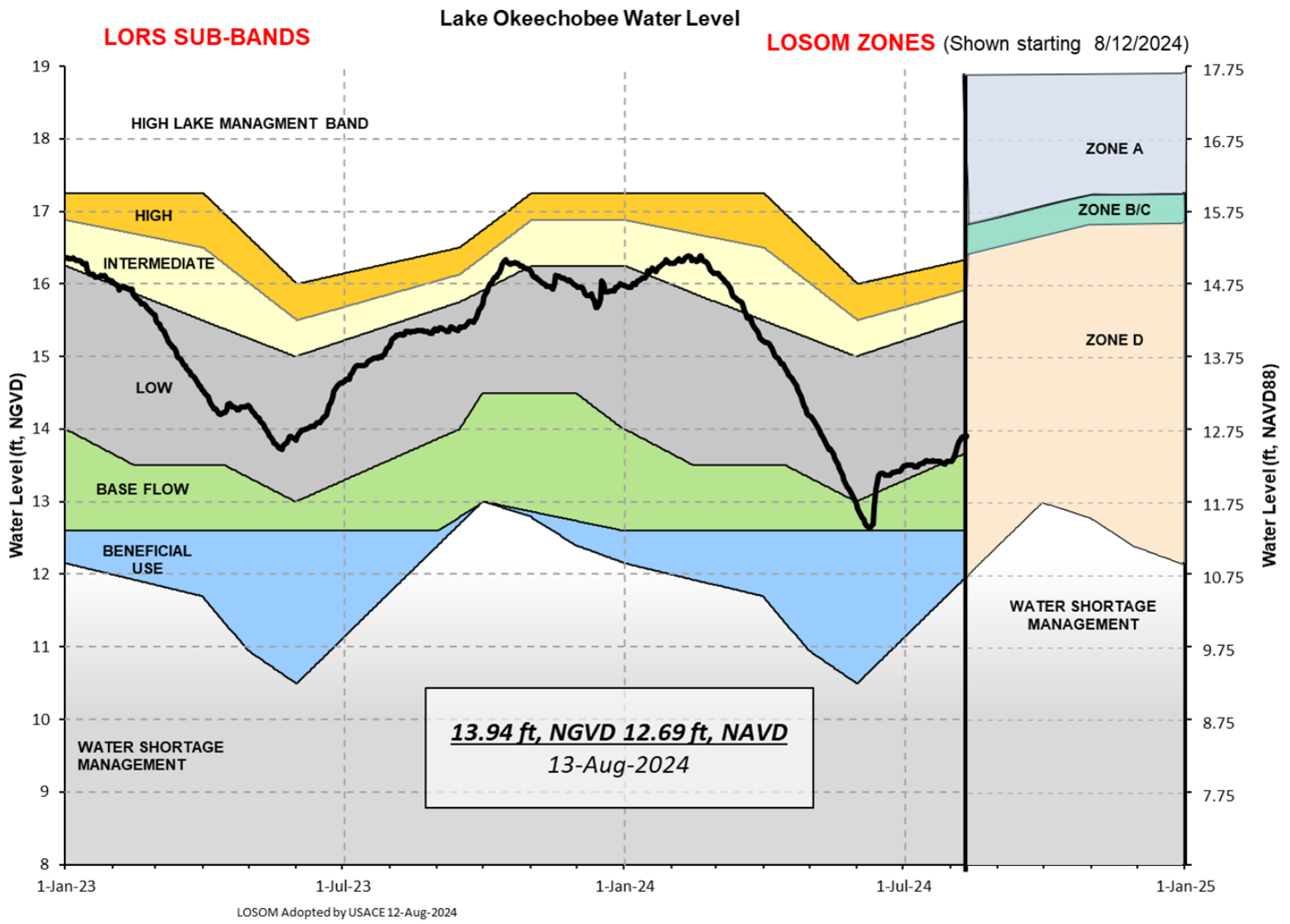
Lake Okeechobee Stage on 8/12/2024:

Lake Okeechobee Stage: **13.92 feet (NGVD29), 12.67 (NAVD88) ***

Lake Okeechobee Management Zone	Bottom Elevation feet, NGVD (feet NAVD)	Current Lake Stage feet, NGVD (feet NAVD)
Zone A	16.85 (15.6)	
Zone B/C	16.44 (15.19)	
Zone D	11.98 (10.73)	← 13.92 (12.67)

*Lake Okeechobee Stage NAVD88 offset of -1.25 is based on Final Regulation Schedule Conversion (5/19/2020). Anything below Zone D is in the Water Shortage Management Band.

USACE Jacksonville District maintains Central and South Florida system-wide database which is updated daily (<https://w3.saj.usace.army.mil/h2o/reports.htm>). These 'Daily Operational Reports' contain information related to Lake Okeechobee regulation schedule, recent stage, and relevant structure flows history. This is the primary source of information used in above table.



2. Release Guidance:

Regulatory Releases*		
East	West	South
S-80: No releases S-271 or S-352: Up to 300 cfs	S-79: Up to 2,000 cfs	S-351 and S-354 combined: Up to 1,100 cfs

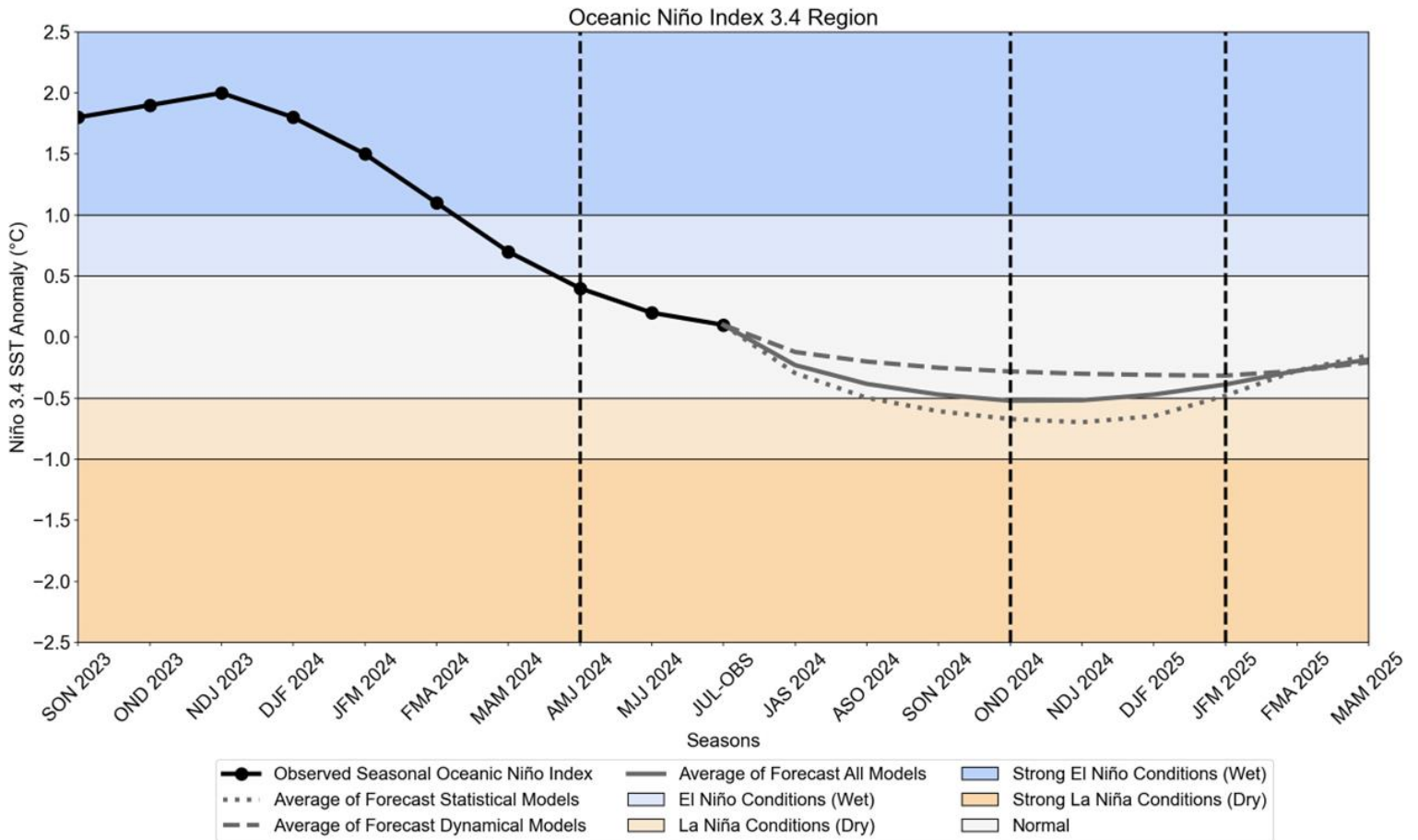
*Release guidance values are based on up to values stated in the Regulation Schedule figure (page 1 of this document) in the LOSOM Water Control Plan (<https://usace.contentdm.oclc.org/utis/getfile/collection/p16021coll7/id/25888>).

3. Water Management Considerations:

LOSOM decision-making on quantity, timing, and duration of releases from Lake Okeechobee should consider recent, current, and forecasted system conditions. While the list of factors that should be considered is elaborate, this report focuses on current climate, weather forecasts (together termed as climatological conditions), and hydrologic conditions.

3.1 Current Climate and Forecast:

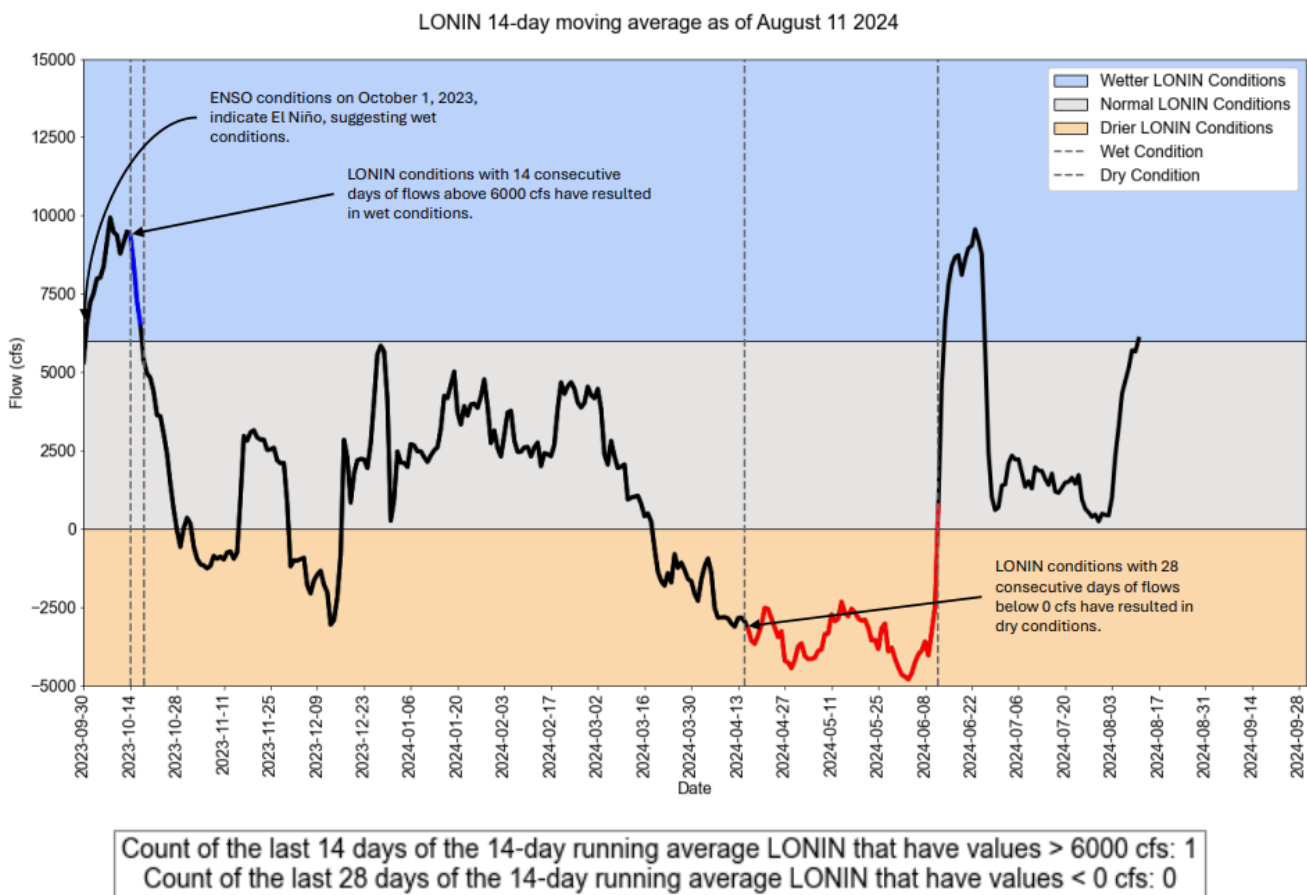
El Niño Southern Oscillation (ENSO) observations and forecasts are used to develop seasonal strategies for Lake Okeechobee operations. The LOSOM water control plan considers ‘moderate-to-strong’ temperature anomalies to be more than 1 °C in the Niño 3.4 Index Region. The Climate Projection Center (CPC) defines warm and cold periods when the Oceanic Niño Index (3-month running mean of Sea Surface Temperature [SST] anomalies) pass the thresholds of +/- 0.5 °C. Water managers should consider ENSO forecasts at three key seasonal assessment points (AMJ, OND, and JFM) for release guidance.



3.2 Hydrological Conditions:

Lake Okeechobee Net Inflow (LONIN) is a surrogate of Lake Okeechobee basin hydrologic condition. This along with climatologic conditions are considered while adopting weekly release strategies. The graphic below provides a historical view of wetness in upstream lake watershed represented by LONIN's 14-day moving average. Based on modeling assumptions for Zone D operations used in LOSOM planning, ENSO-based "wet" or "dry" conditions would be overridden by hydrologic conditions under specific situations. If 14-day moving average LONIN is greater than 6000 cfs for 14 consecutive days would trigger "wet" condition operations until this criterion is no longer satisfied. Similarly, "dry" condition operations would be triggered when 14-day moving average LONIN remains negative for 28 consecutive days. For more detailed information on LOSOM modeling interested readers can refer to <https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll7/id/25896>.

Real-time Lake Okeechobee operations under LOSOM could consider additional metrics beyond ENSO and hydrologic conditions to trigger "wet" or "dry" operations. Meteorological forecasts, tropical activity, recent Lake ascension/recession rates are examples of such metrics. Scope of this report is limited to tracking "wet" and "dry" conditions based on ENSO and LONIN.

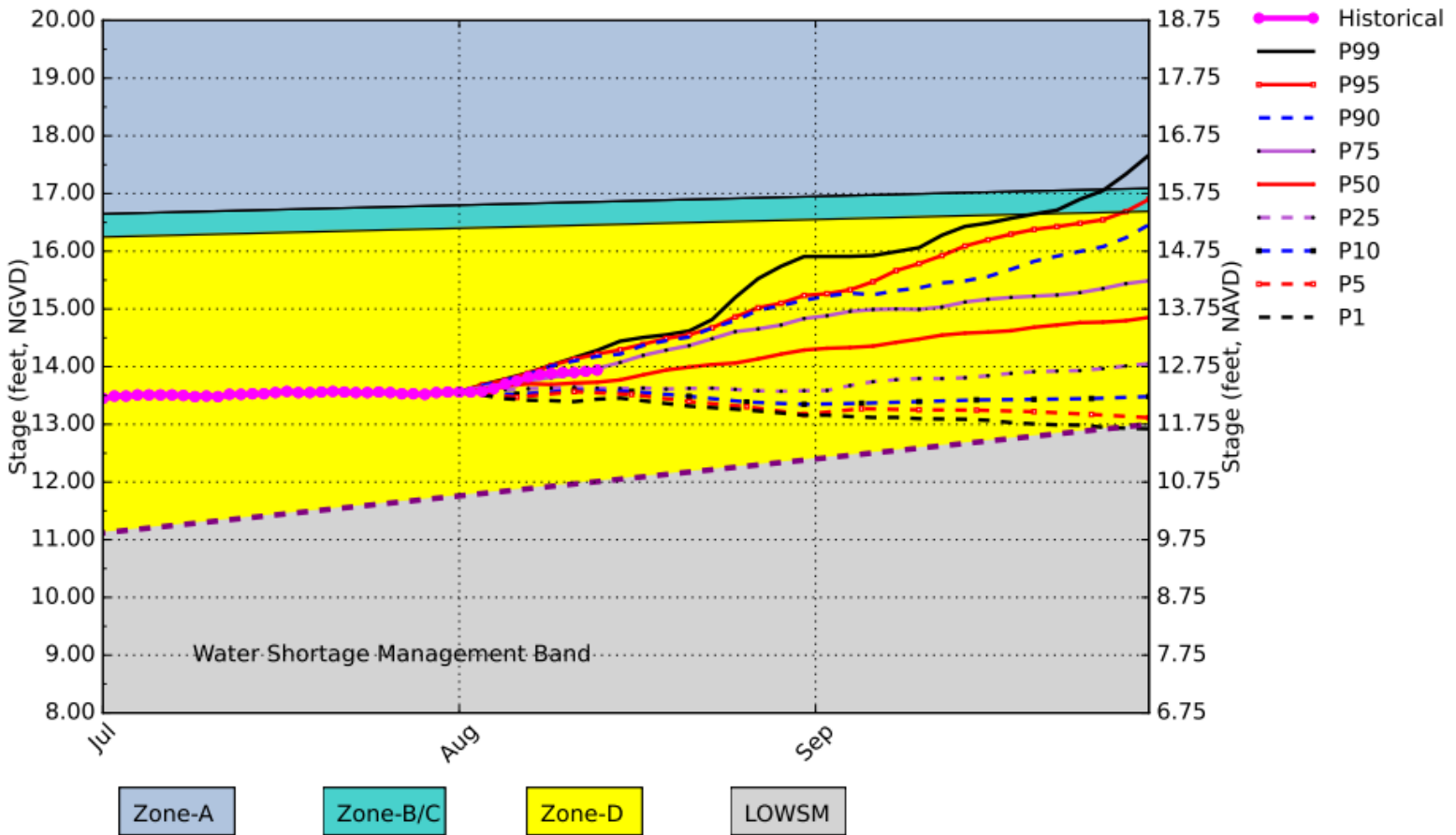


3.3 Lake Okeechobee Stage Projection with Conditional Position Analysis:

The Position Analysis graphic below show stage percentile lines for the next two months along with historical stages. For more information about the Dynamic Position Analysis (DPA) or the Conditional Position Analysis (CPA), please visit the SFWMD operational planning webpage <https://www.sfwmd.gov/science-data/operational-planning>. CPA stochastically transforms stages obtained from the Dynamic Position Analysis (DPA) considering projected rainfall tercile probabilities over next twelve 3-monthly seasons. The preferred scenario calculates tercile probability projections using forecasted SST anomalies published by CPC and conversion matrix based on historical data.

Lake Okeechobee CPA August 2024 Preferred Scenario

Percentiles PA



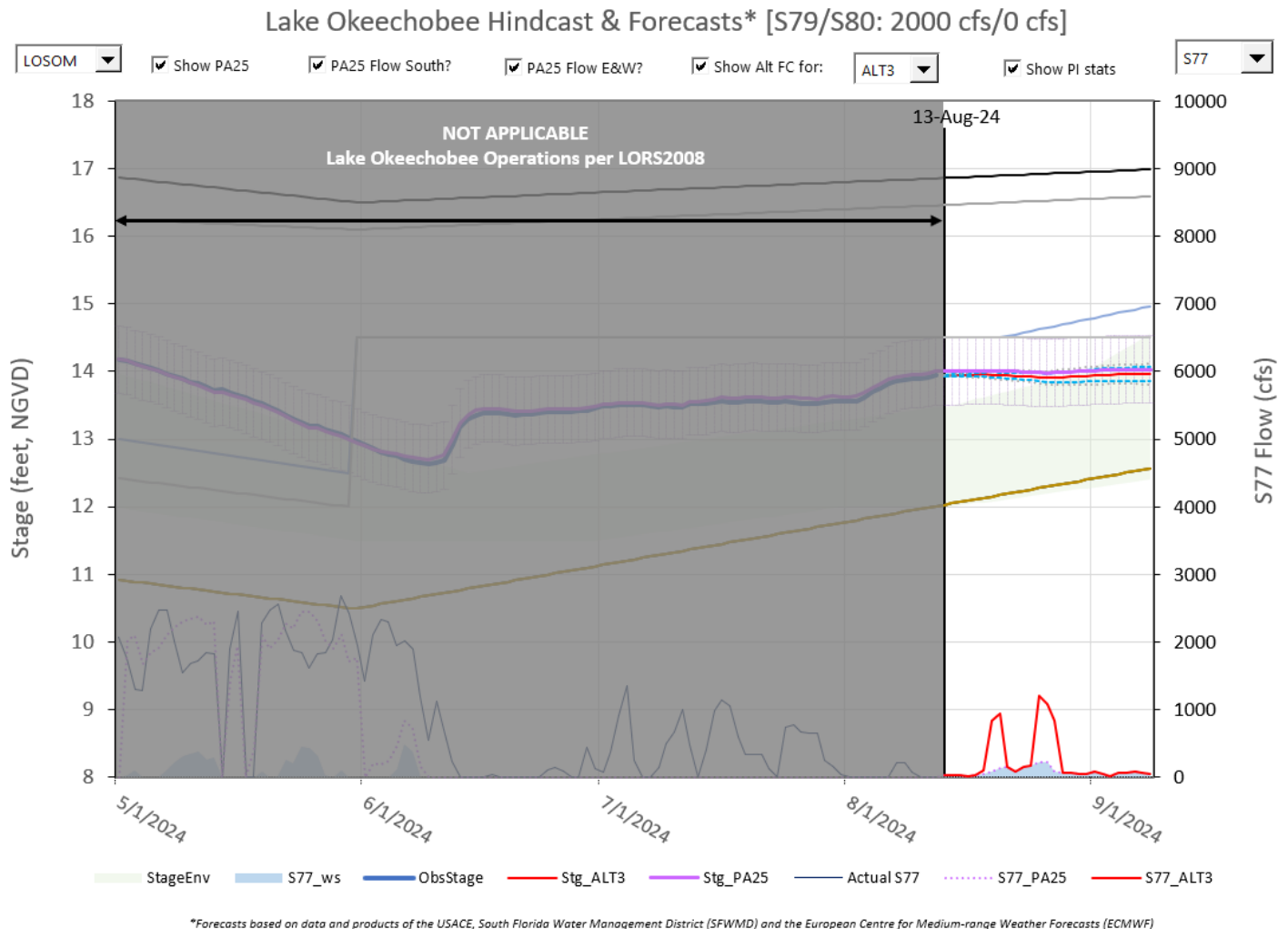
(See assumptions on the Position Analysis Results website)

08/13/24 07:24:00

* Lake Okeechobee stage NAVD88 offset of -1.25 is based on Final Regulation Schedule Conversion (5/19/2020).

3.4 Lake Okeechobee Stage Hindcast with Lane Assist Tool:

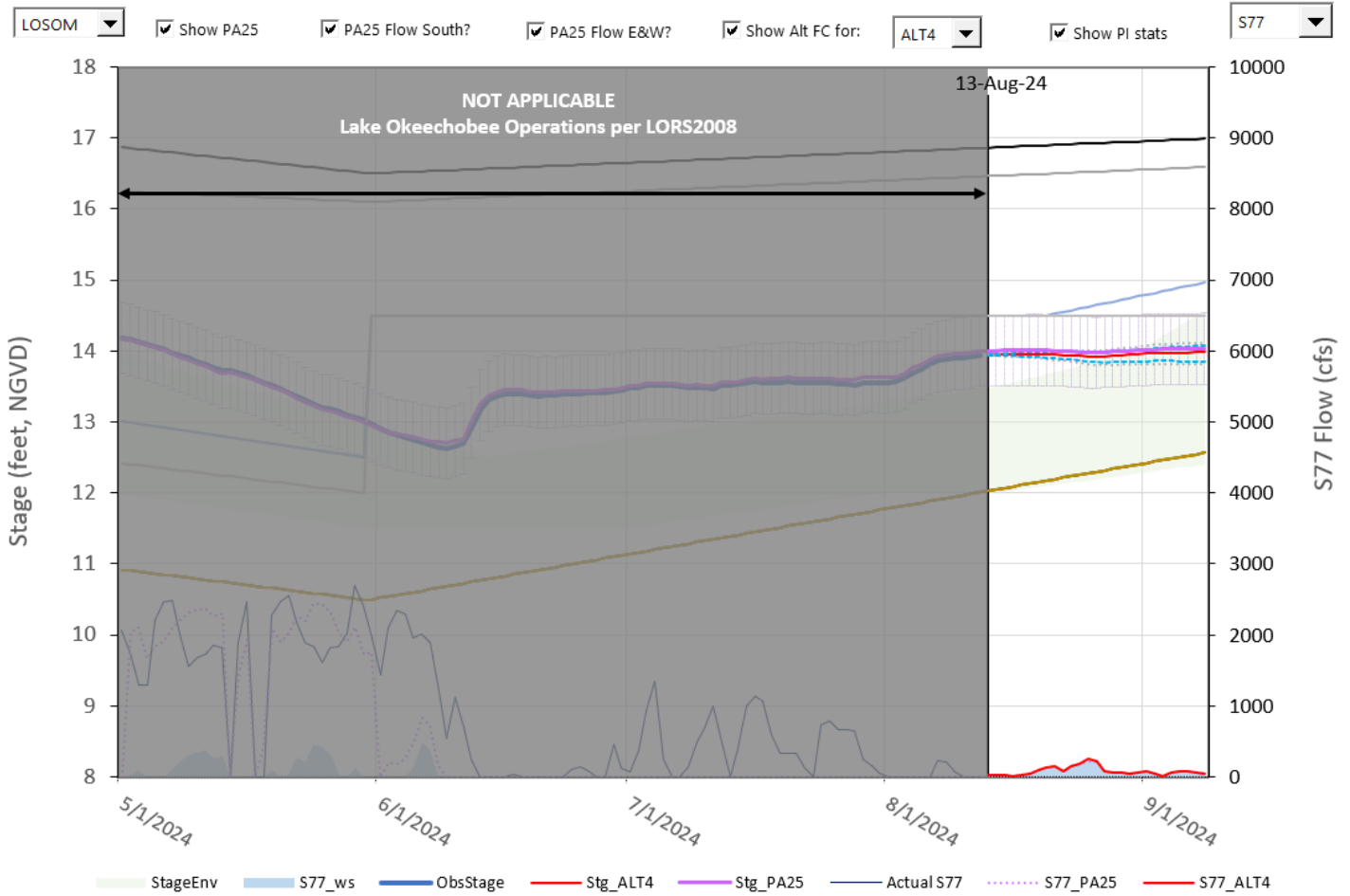
The Interagency Modeling Center (IMC) developed a tool called Lane Assist Tool (LAT) for Lake Okeechobee Water Managers. It provides perspective on hindcast simulated stages compared to actual stages and potential future stages on 4-week horizon. Simulations are based on the modeling assumptions used in LOSOM planning process and help to provide context on how stage observation influenced by real-time operational flexibility relate to planning assumptions and performance. Combination of rainfall forecasts from SFWMD meteorologist and European Center for Medium-Range Weather Forecasts (ECMWF) are used to drive component models. Insights provided by LAT are valuable for situational awareness and potentially exercising real time operational flexibility and should not be used to audit water management decisions which consider several factors not included in the planning modeling. Following three graphics show Lake Okeechobee stages and S-77 flows forecasted under three scenarios (a) target flows at S-79: 2000 cfs, (b) target flows at S-79: 1200 cfs, and (c) target flows at S-79 as 350 cfs.



*Forecasts based on data and products of the USACE, South Florida Water Management District (SFWMD) and the European Centre for Medium-range Weather Forecasts (ECMWF)

(a) LAT forecasted Lake Okeechobee stages and S-77 flows with 2000 cfs flow target at S-79

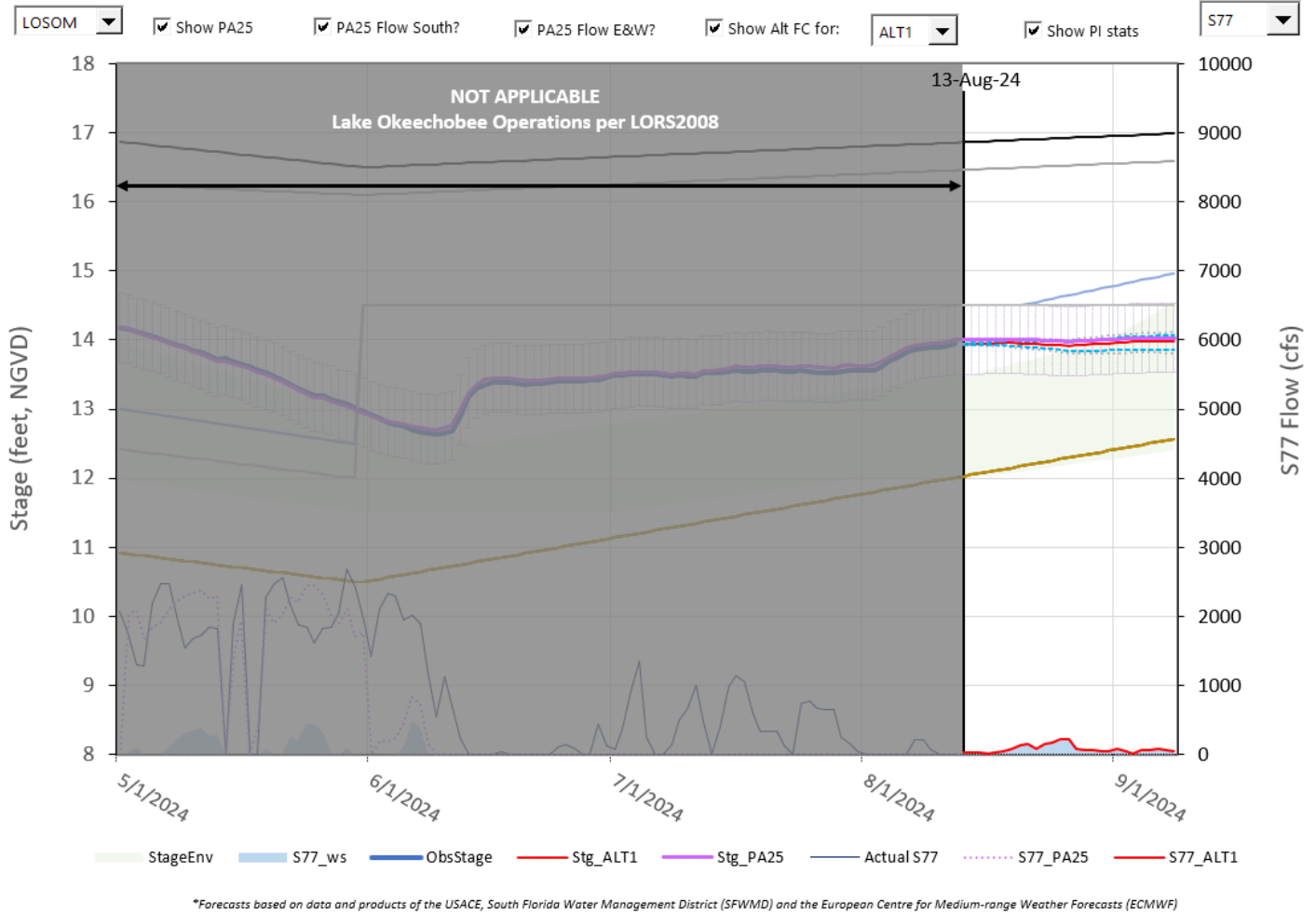
Lake Okeechobee Hindcast & Forecasts* [S79/S80: 1200 cfs/0 cfs]



*Forecasts based on data and products of the USACE, South Florida Water Management District (SFWMDC) and the European Centre for Medium-range Weather Forecasts (ECMWF)

(b) LAT forecasted Lake Okeechobee stages and S-77 flows with 1200 cfs flow target at S-79

Lake Okeechobee Hindcast & Forecasts* [S79/S80: 350 cfs/0 cfs]



(c) LAT forecasted Lake Okeechobee stages and S-77 flows with 350 cfs flow target at S-79

3.5 LOSOM Definition of “Wet” or “Dry” Conditions:

In LOSOM, “Wet” or “Dry” Conditions are determined by a combination of the ENSO 3.4 SST anomaly and the 14-day running average for LONIN. These considerations can be used to help with release decisions in the bounds of the WCP.

October 2023 ENSO 3.4 SST anomaly was **+1.8°C**.

Assuming observed ONI on AMJ 2024 represents the ENSO value at the latest evaluation point for climatological conditions classifying them as **Normal**.

Last change in hydrologic conditions occurred on June 10, 2024 (**Dry to Normal**).

July 4, 2024, ENSO 3.4 SST anomaly was **+0.1°C**

Test for “Wet” hydrologic conditions:

Did each of the past 14 consecutive days of Lake Okeechobee Net Inflow (LONIN) have values **>6000 cfs, NO.**

Test for “Dry” hydrologic conditions:

Did each of the past 28 consecutive days of Lake Okeechobee Net Inflow have values **< 0 cfs, NO.**

The considerations above indicate the conditions are **Normal.**

4. Planning Modeling Considerations:

The LOSOM Water Control Plan makes several provisions for lower releases (compared to the “up-to” release rate). This section helps to provide context on what was assumed in the planning modeling that supported the LOSOM Environmental Impact Statement. While this information is not intended to be prescriptive release guidance and many other factors should be considered in release decisions, this information is helpful to give an additional piece of context that relates back to the modeled performance on the LOSOM plan.

Related to today’s conditions, when Lake Okeechobee stage is in lower portions of Zone D, reducing the risk for water supply is important and SFWMD guidance will be incorporated into release decisions (WCP, USACE 2024). LOSOM modeling documentation can be used for providing modified release guidance under these lower Lake conditions (LOSOM EIS Appendix G, USACE 2024).

Current Lake Okeechobee Stage is in the lower portion of Zone D. As per modeling documentation the current stage is in LOSOM sub-zone, Zone D3 and is 1.94 ft above Water Shortage Management Zone.

Current climatological conditions are Normal but forecasted to turn drier by start of the dry season.

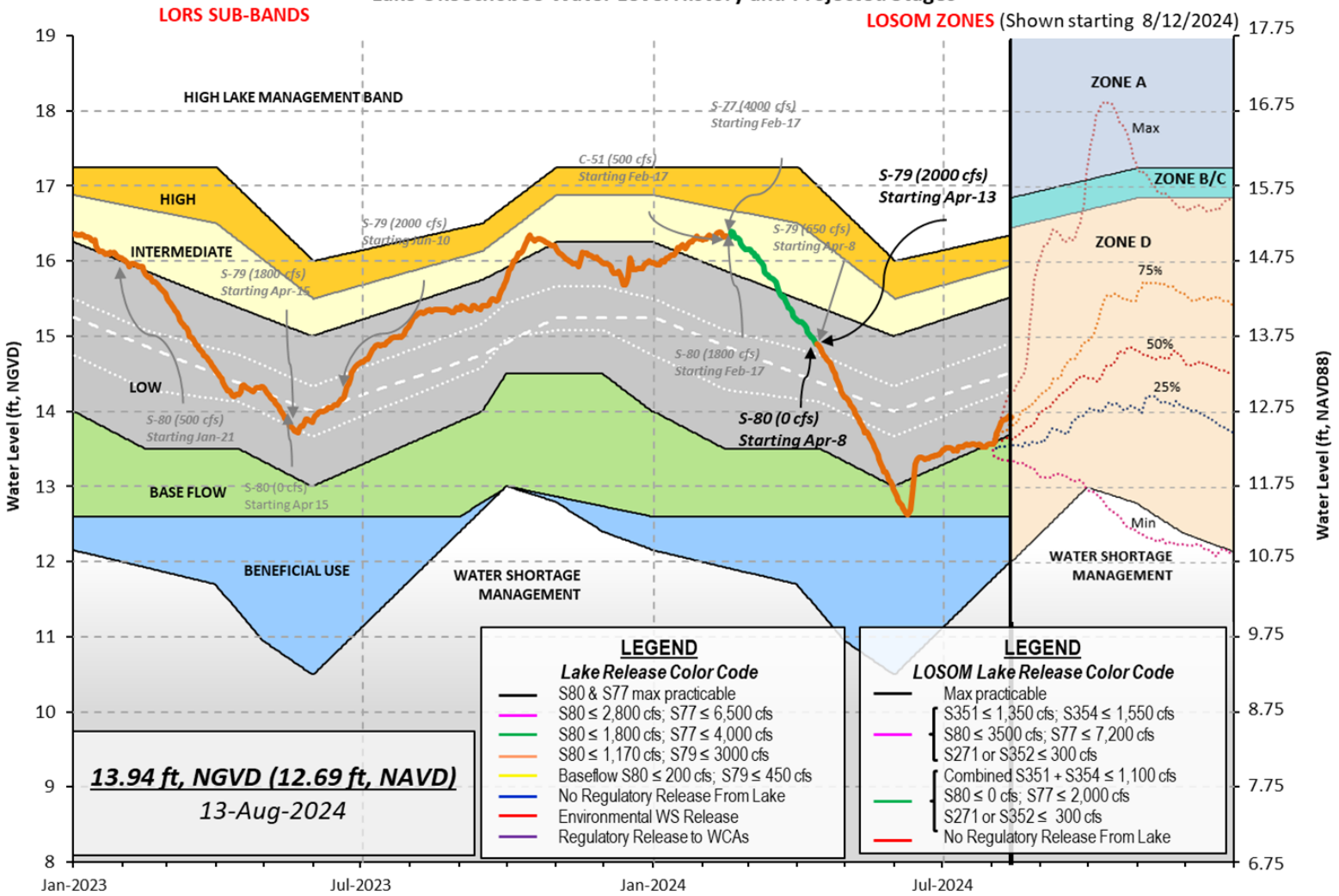
Current hydrological conditions are Normal.

Based on modeling performed during LOSOM planning, following regulatory releases values were modeled:

- No releases at S80
- No releases to Lake Worth Lagoon
- Up to 350 cfs at S79
- Reduce flow south to 60% of the available capacity, e.g. $1100 \text{ cfs} * 60\% = \text{Up to } 660 \text{ cfs}$

5. Lake Okeechobee Hydrographs:

Lake Okeechobee Water Level History and Projected Stages



LOSOM Adopted by USACE 12-Aug-2024

Projected Stage Percentiles From SFWMD- Water Resources & Systems Modeling (WRSM) Bureau Position Analysis

6. Water Supply Risk Evaluation:

Status for week ending 8/12/2024*:

Area	Indicator	Value	Color Coded Scoring Scheme
LOK	Projected LOK Stage for the next two months	Zone-D	TBD
	Palmer Drought Index for LOK Tributary Conditions	-1.09 (Dry)	M
	CPC Precipitation Outlook	1 month: Above Normal	L
		3 months: Above Normal	L
	LOK Seasonal Net Inflow Outlook	2.10 ft	L
	ENSO Forecast	Normal to Extremely Wet	
	LOK Multi-Seasonal Net Inflow Outlook	1.97 ft	M
	ENSO Forecast	Normal	
WCAs	WCA 1: 3 Station Average (Sites 1-7, 1-8T, and 1-9)	Above Line 1 (16.48 ft) (14.98 ft NAVD88)	L
	WCA 2A: Site 2-17	Above Line 1 (12.58 ft) (11.08 ft NAVD88)	L
	WCA-3A: 3 Station Average (Sites 63, 64, and 65)	Above Line 1 (10.74 ft) (9.24 ft NAVD88)	L

*
Lake

Okeechobee stage NAVD88 offset of -1.25 is based on Final Regulation Schedule Conversion (5/19/2020). An updated Table A-9 that classifies Lake Okeechobee projected stage for the next two months is forthcoming to meet the updated regulation schedule under LOSOM.