Application of the Lake Okeechobee Regulation Schedule (LORS2008) on 7/13/2015 (Developing El Nino Condition)

Lake Okeechobee Net Inflow Outlook:

The Lake Okeechobee Net Inflow Outlook has been computed using 4 methods: Croley's method[1], the SFWMD empirical method[2], a sub-sampling of El Nino years[3] and a sub-sampling of warm years of the Atlantic Multi-decadal Oscillation (AMO) in combination with ENSO El Nino years[4]. The results for Croley's method and the SFWMD empirical method are based on the CPC Outlook.

Table of the Lake Okeechobee Net Inflow Outlooks in feet of equivalent depth. All methods are updated on a weekly basis with observed net inflow for the current month.

Season	Croley's Method[1*]		SFWMD Empirical Method[2]		Sub-sampling of ENSO El Nino Years[3]		Sub-sampling of AMO Warm + ENSO El Nino Years[4]	
	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition
Current (Jul-Dec)	N/A	N/A	2.32	Very Wet	2.36	Very Wet	2.57	Very Wet
Multi Seasonal (Jul-Apr)	N/A	N/A	2.79	Wet	3.66	Wet	4.30	Very Wet

*Croley's Method Not Produced For This Report

See Seasonal and Multi-Seasonal tables for the classification of Lake Okeechobee Outlooks.

The recommended methods and values for estimating the Lake Okeechobee Net Inflow Outlook are shaded and should be used in the LORS2008 Release Guidance Flow Charts.

Tributary Hydrologic Conditions Graph:

-489 cfs 14-day running average for Lake Okeechobee Net Inflow through 7/12/2015.
According to the classification in Tributary Hydrologic Conditions table, this condition is Dry.

-2.03 for Palmer Index on 7/11/2015.
According to the classification in Tributary Hydrologic Conditions table, this condition is Dry.

The wetter of the two conditions above is **Dry**.

LORS2008 Classification Tables:

Lake Okeechobee Stage on 7/13/2015

Lake Okeechobee Stage: **12.08 feet**

USACE Report for Lake Okeechobee

Lake Okeechobee Stage Hydrograph

Lake Okeechobee Management Zone/Band		Bottom Elevation (feet, NGVD)	Current Lake Stage
High Lake Management Band		16.20	
Operational Band	High sub-band	15.75	
	Intermediate sub-band	15.29	
	Low sub-band	13.39	
Base Flow sub-band		12.60	
Beneficial Use sub-band		11.36	← 12.08
Water Shortage Management Band			

Part C of LORS2008: Discharge to WCA's

Release Guidance Flow Chart Outcome: No Releases to the WCAs

Part D of LORS2008: Discharge to Tidewater

Release Guidance Flow Chart Outcome: No Releases to the Estuaries

Technical Input Summaries from:

- **Lake Okeechobee Division**
- **Coastal Ecosystems**
- **Everglades Ecosystems Division**
- **Water Supply Department**
- **Water Resource Management Release Recommendation**
- **Kissimmee Watershed Environmental Conditions**
- **Operations Department**

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LORS2008 Implementation on 7/13/2015 (ENSO Neutral Condition):

Water Supply Department Technical Input

Water Supply Outlook:

District wide, Raindar rainfall 0.69 inches for the week ending 7/13/2015. Lake stage on 7/13/2015 is 12.08 ft, down 0.03 ft from last week.
The updated July 2015 SFWMM Dynamic Position Analysis percentile graph and tracking chart for Lake Okeechobee show that the lake stage is in the Low Flow Operational Sub-Band.

The LORS2008 tributary indices are classified as **Dry**. The PDSI indicates dry condition and the LONIN is Dry. The classification is based on the wetter of the two.

Water Supply Risk Evaluation

Area	Indicator	Value	Color Coded Scoring Scheme
LOK	Projected LOK Stage for the next two months	Base Flow Sub-Band	M
	Palmer Index for LOK Tributary Conditions	-2.03 (Extremely Dry)	H
	CPC Precipitation Outlook	1 month: Normal	L
		3 months: Normal	L
	LOK Seasonal Net Inflow Forecast AMO warm/El Nino	2.57 ft (Normal to Extremely Wet)	L
	LOK Multi-Seasonal Net Inflow Forecast AMO warm/El Nino	4.30 ft (Wet)	L
WCAs	WCA 1: Site 1-8C	Between Line 1 & 2 (14.83 ft)	M
	WCA 2A: Site 2-17 HW	Above Line 1 (11.61 ft)	L
	WCA-3A: 3 Station Average (Site 63, 64 and 65)	Between Line 1 & 2 (8.70 ft)	M
LEC	Service Area 1	Year-Round Irrigation Rule in effect	L
	Service Area 2	50% or more of USGS wells are within the lowest 10% to 30% of past water elevations and more than 25% are in the lowest 10% of past water elevations	H
	Service Area 3	50% or more of USGS wells are within the lowest 10% to 30% of past water elevations and more than 25% are in the lowest 10% of past water elevations	H

Note: The water supply risk classification based on the Palmer index, as well as the LOK seasonal and multi-seasonal net inflow forecasts use slightly different classification intervals than those used by the 2008-LORS for classifying the tributary hydrologic condition (THC).

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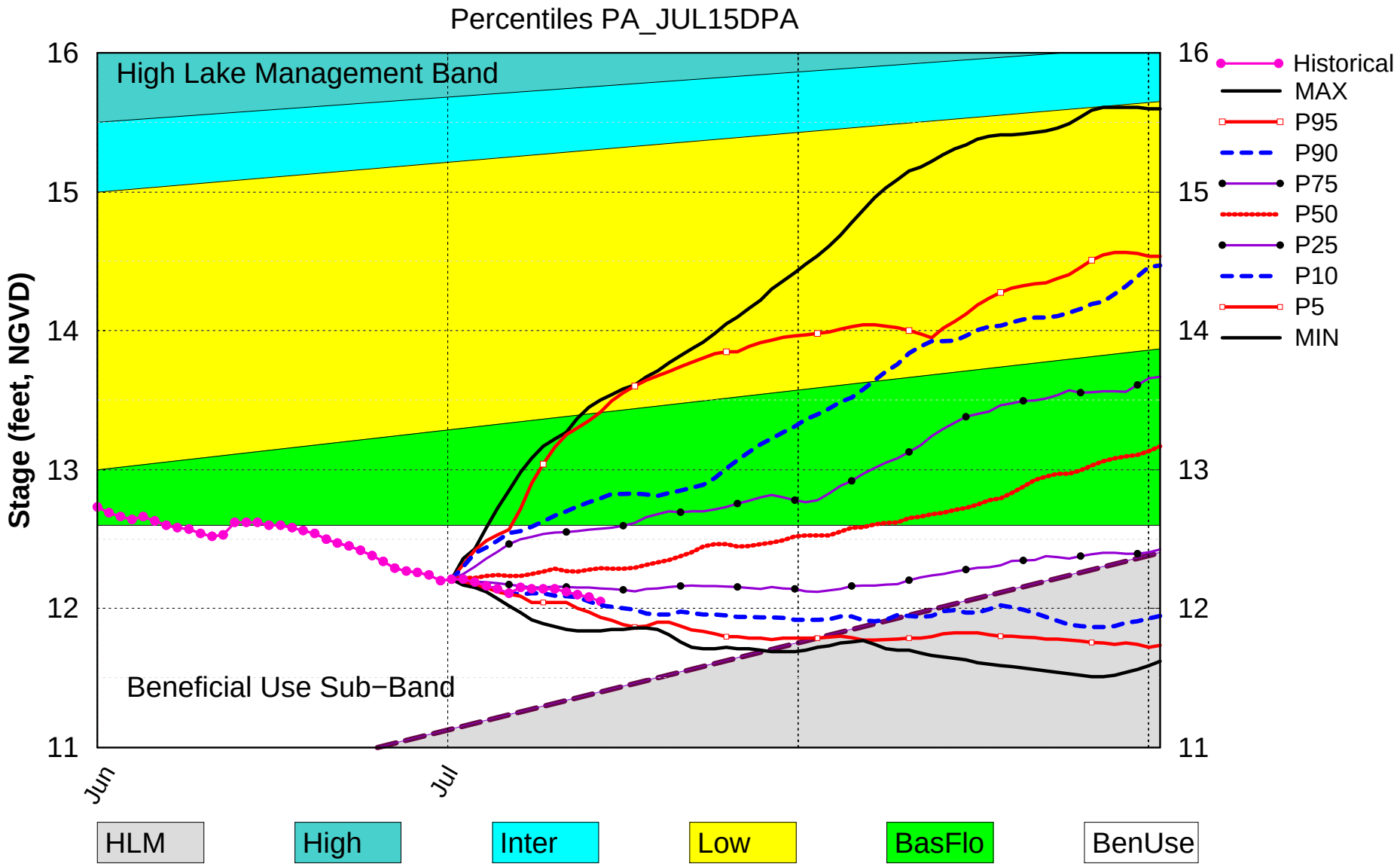
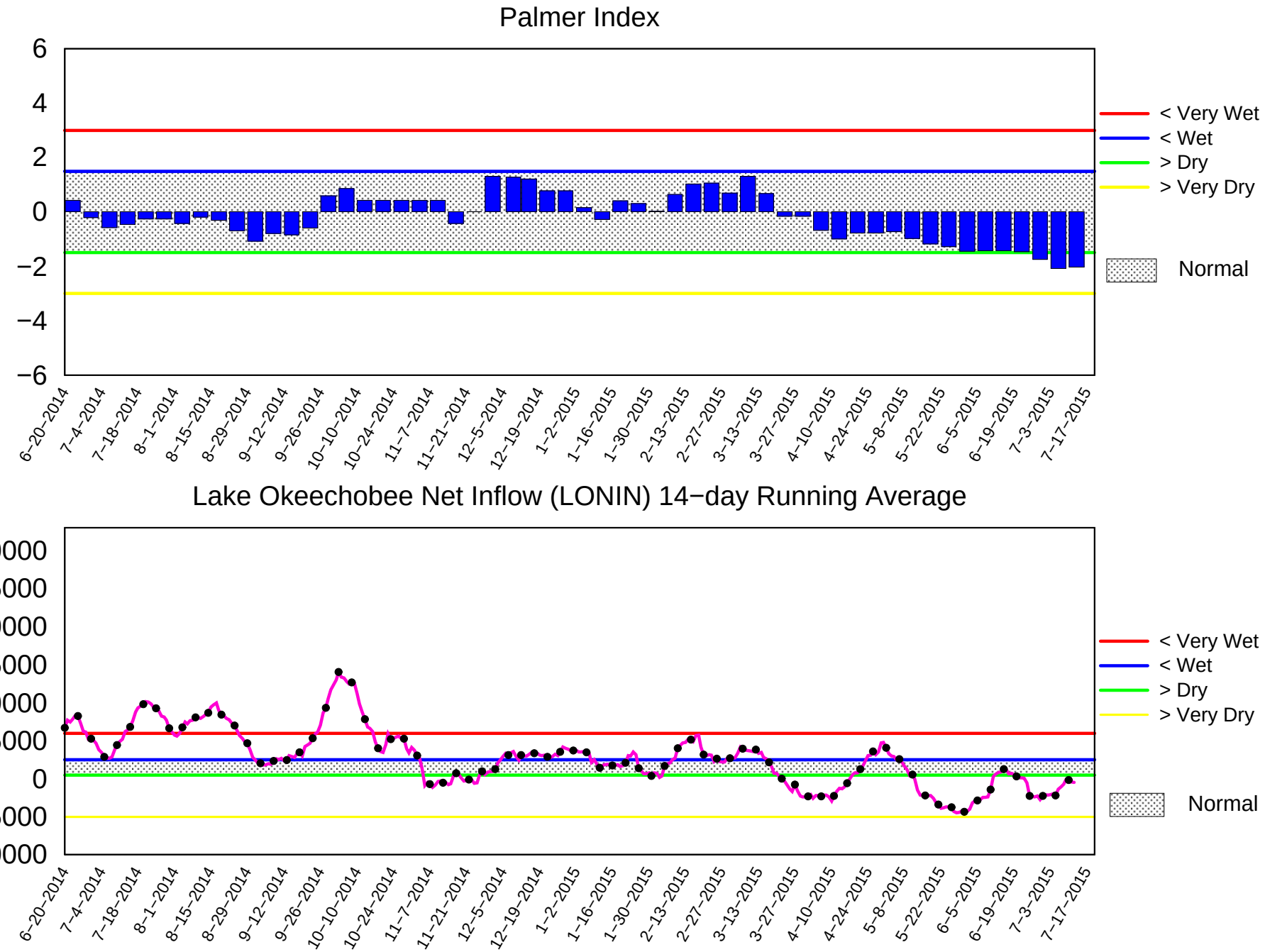
Lake Okeechobee SFWMM July 2015 Position Analysis



(See assumptions on the Position Analysis Results website)

Tue Jul 14 10:20:44 EDT 2015

Tributary Basin Condition Indicators as of July 13 2015



Mon Jul 13 15:12:28 EDT 2015

2008 LORS

Part C: Establish Allowable Lake Okeechobee Releases to the Water Conservation Areas

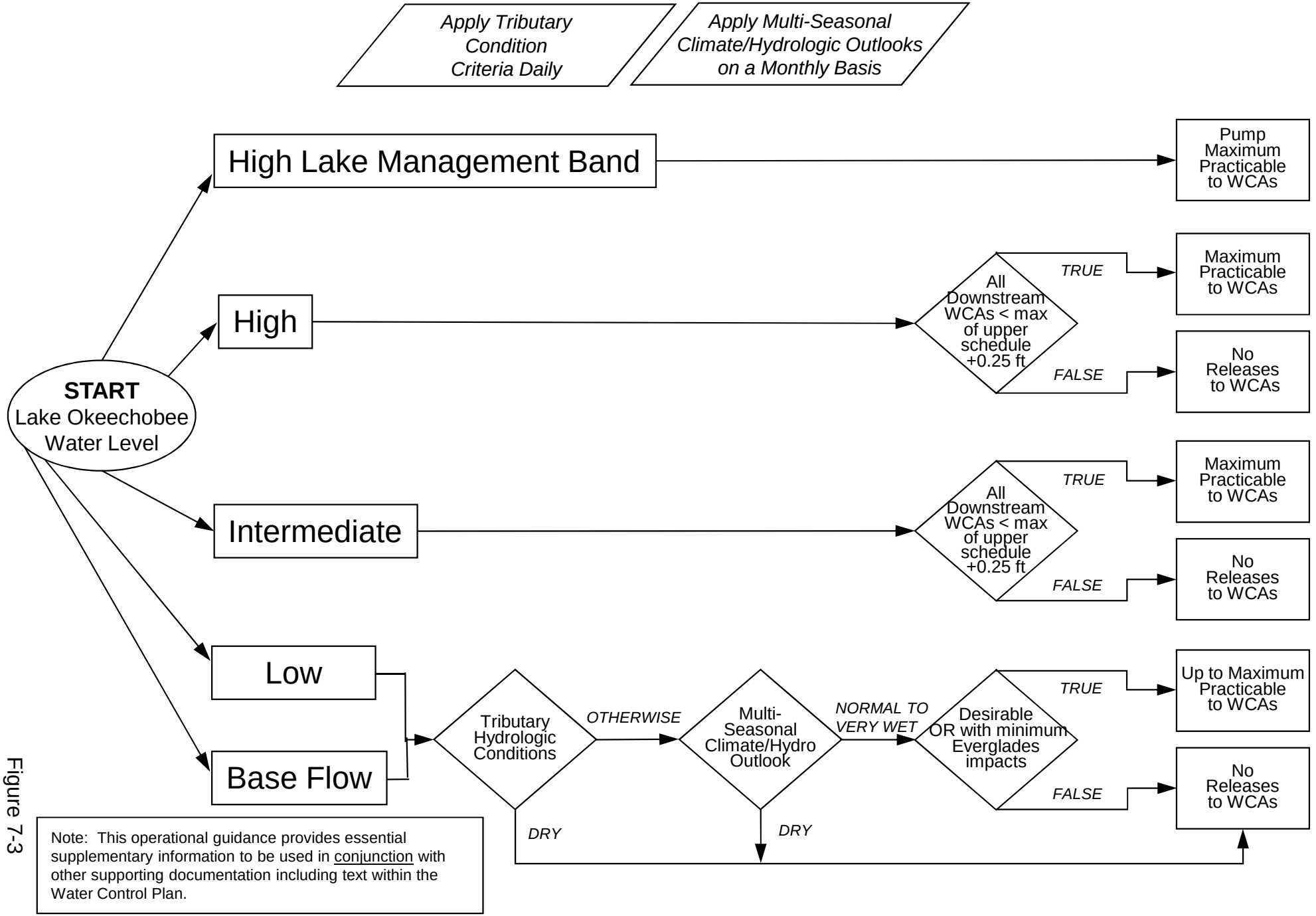


Figure 7-3

Note: This operational guidance provides essential supplementary information to be used in conjunction with other supporting documentation including text within the Water Control Plan.

2008 LORS

Part D: Establish Allowable Lake Okeechobee Releases to Tide (Estuaries)

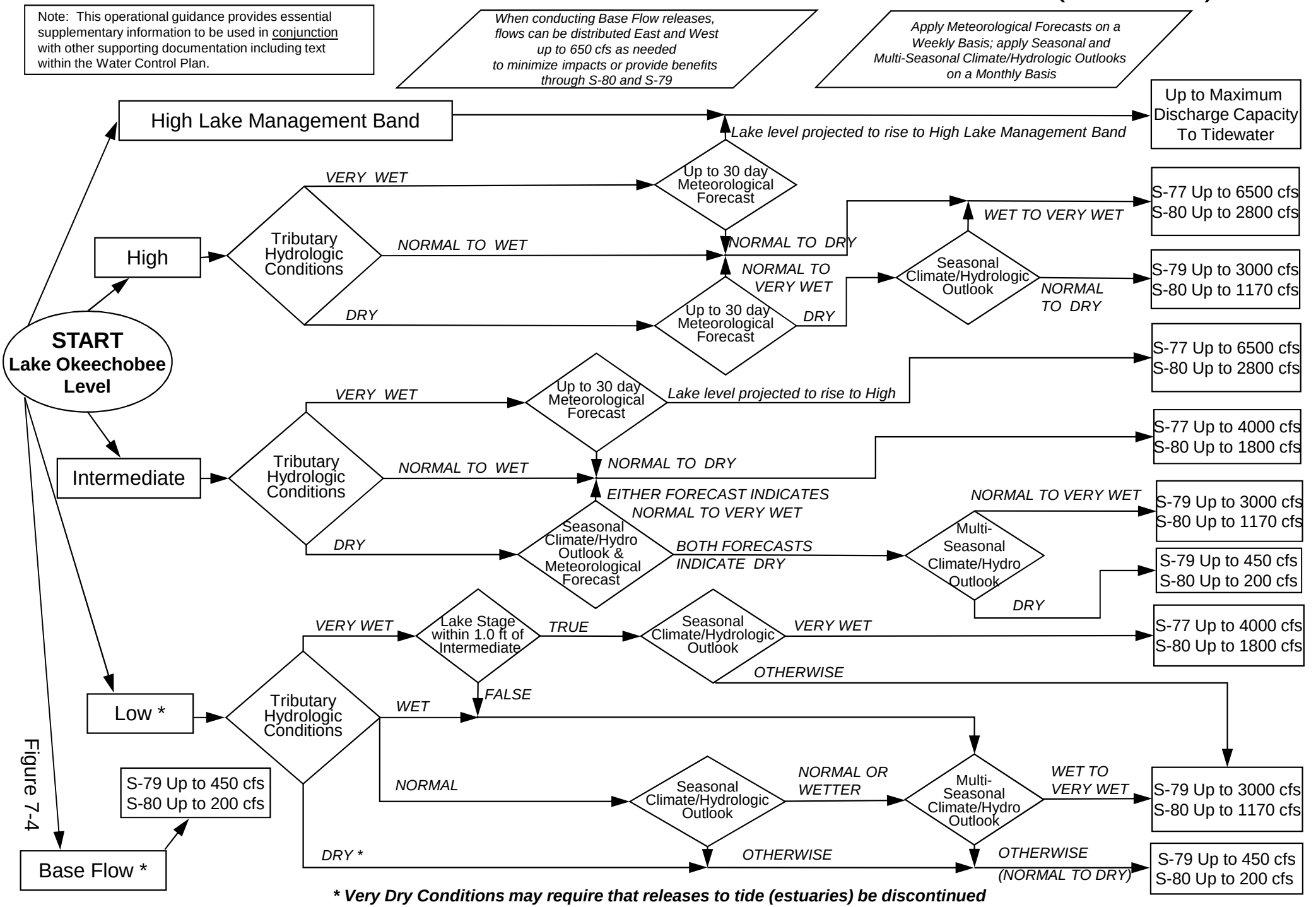
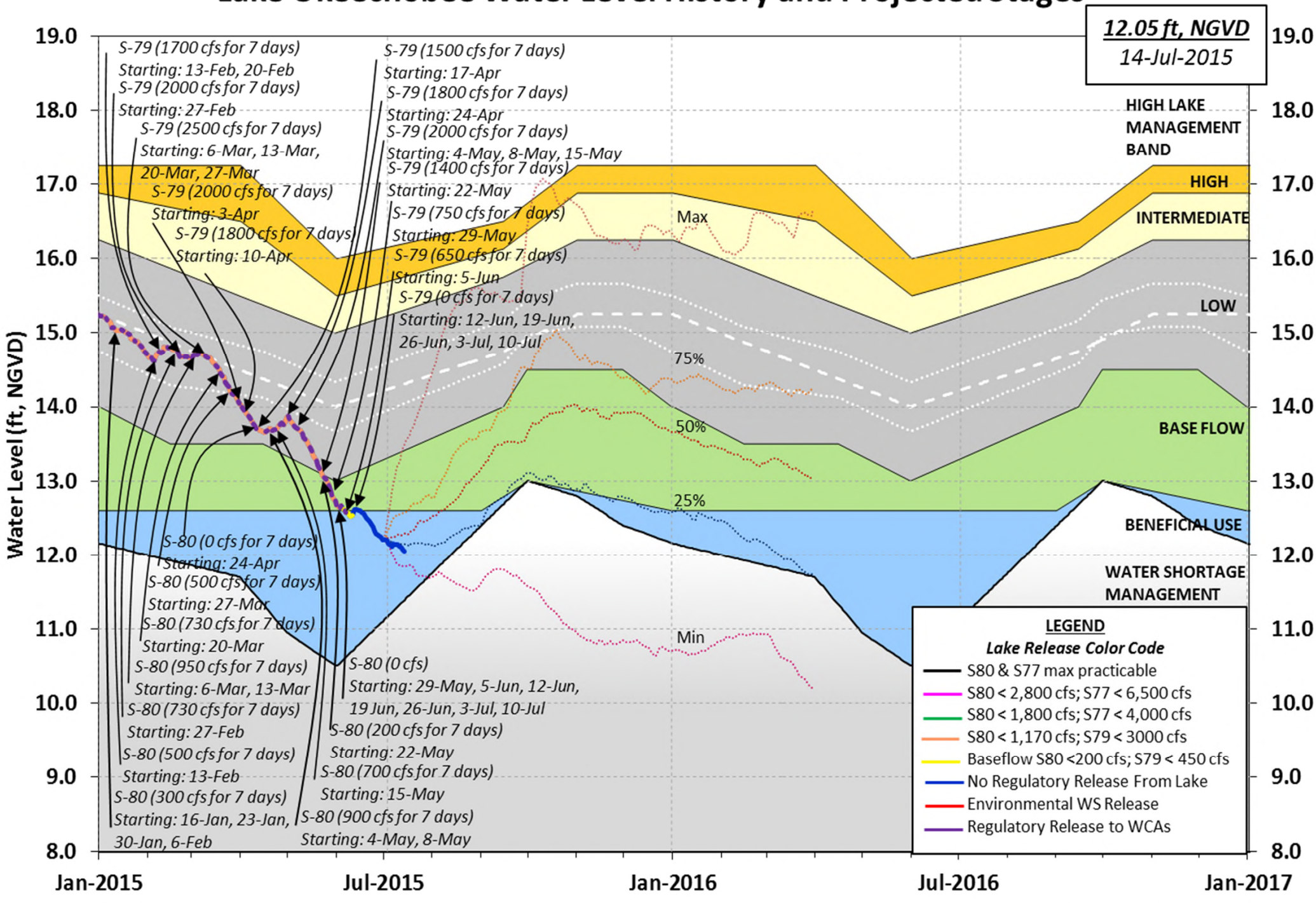


Figure 7-4

Lake Okeechobee Water Level History and Projected Stages



LORS-2008
Adopted by USACE 28-April-2008

Projected Stage Percentiles From
SFWMD-HESM Position Analysis

U. S. Army Corps of Engineers, Jacksonville District
Lake Okeechobee and Vicinity Report
** Preliminary Data - Subject to Revision **

Data Ending 2400 hours 12 JUL 2015

Okeechobee Lake Regulation	Elevation (ft-NGVD)	Last Year (ft-NGVD)	2YRS Ago (ft-NGVD)
*Okeechobee Lake Elevation	12.08	13.26	14.82 (Official Elv)

Bottom of High Lake Mngmt= 16.19 Top of Water Short Mngmt= 11.35
Currently in Operational Management Band

Simulated Average LORS2008 [1965-2000] 12.45
Difference from Average LORS2008 -0.37

12JUL (1965-2007) Period of Record Average 13.57
Difference from POR Average -1.49

Today Lake Okeechobee elevation is determined from the 4 Int & 4 Edge stations

++Navigation Depth (Based on 2007 Channel Condition Survey) Route 1 ÷ 6.02'
++Navigation Depth (Based on 2008 Channel Condition Survey) Route 2 ÷ 4.22'
Bridge Clearance = 50.02'

---

4 Interior and 4 Edge Okeechobee Lake Average (Avg-Daily values):

L001	L005	L006	LZ40	S4	S352	S308	S133
11.99	12.13	12.08	-NR-	12.07	12.17	11.99	12.11

*Combination Okeechobee Avg-Daily Lake Average = 12.08 (*See Note)

Okeechobee Inflows (cfs):

S65E	1134	C5	0	Fisheating Cr	780
S154	0	S191	0	S135 Pumps	0
S84	0	S133 Pumps	0	S2 Pumps	0
S84X	156	S127 Pumps	0	S3 Pumps	0
S71	0	S129 Pumps	0	S4 Pumps	0
S72	0	S131 Pumps	0		

Total Inflows: 2070

Okeechobee Outflows (cfs):

S135 Culverts	-NR-	S354	502	S77	57 (Used)
S127 Culverts	0	S351	877	S77Below	20 (NOT USED)

```
  S129 Culverts     0      S352            505      S308             -3
(Used)
  S131 Culverts            L8 Canal Pt    -181      S308Below       -66 (NOT
USED)
Total Outflows:   1758

****S77 Structure outflow is being used to compute Total Outflow.
****S308 Structure outflow is being used to compute Total Outflow.

Okeechobee Pan Evaporation (inches):
  S77            0.36      S308           0.35
  Average Pan Evap x 0.75 Pan Coefficient =  0.27" =  0.02'

Lake Average Precipitation using NEXRAD: =  -NR-" =  -NR-'

Evaporation - Precipitation:             =  -NR-" =  -NR-'
Evaporation - Precipitation using Lake Area of 730 square miles
  is equal to   -NR-
Lake Okeechobee (Change in Storage) Flow is  -3933 cfs or  -7800 AC-FT
```

Note: Headwater, tailwater, and stage values below are instantaneous values unless otherwise specified.

	Headwater Elevation (ft-msl)	Tailwater Elevation (ft-msl)	Disch (cfs)	Gate Positions #1 (ft)	#2 (ft)	#3 (ft)	#4 (ft)	#5 (ft)	#6 (ft)	#7 (ft)	#8 (ft)
			(I) see note at bottom								
North East Shore											
S133 Pumps:	13.04	12.28	0	0	0	0	0	0	(cfs)		
S193:	_____										
S191:	18.54	12.21	0	0.0	0.0	0.0					
S135 Pumps:	_____	-NR-	0	0	0	0	0		(cfs)		
S135 Culverts:			-NR-	-NR-	-NR-						
North West Shore											
S65E:	20.95	11.97	1134	0.5	0.5	0.5	0.5	0.3	0.0		
S127 Pumps:	13.04	12.22	0	0	0	0	0	0	(cfs)		
S127 Culvert:			0	0.0							
S129 Pumps:	12.46	11.52	0	0	0	0			(cfs)		
S129 Culvert:			0	0.1							
S131 Pumps:	13.13	12.16	0	0	0				(cfs)		
S131 Culvert:											
Fisheating Creek											
nr Palmdale		32.54	780								
nr Lakeport		12.68									

C5:	14.03	12.13	0	0.0	0.0	0.0					
South Shore											
S4 Pumps:	11.79	12.00	0	0	0	0					(cfs)
S169:	11.93	11.89	90	5.0	5.0	5.0					
S310:	11.90		145								
S3 Pumps:	11.33	12.00	0	0	0	0					(cfs)
S354:	12.00	11.33	502	2.3	2.4						
S2 Pumps:	11.05	11.88	0	0	0	0	0				(cfs)
S351:	11.88	11.05	877	2.3	2.3	2.5					
S352:	12.12	11.07	505	1.9	1.9						
C10A:	-NR-	12.23		8.5	8.5	8.5	8.5	8.5			
L8 Canal PT		12.02	-181								

S351 and S352 Temporary Pumps/S354 Spillway

S351:	11.05	11.88	877	-NR-	-NR-	-NR-	-NR-	-NR-	-NR-		
S352:	11.07	12.12	505	-NR-	-NR-	-NR-	-NR-				
S354:	11.33	12.00	502	-NR-	-NR-	-NR-	-NR-				

Caloosahatchee River (S77, S78, S79)											
S47B:	14.16	11.02		0.0	0.0						
S47D:	10.98	10.98	-9	5.0							
S77:											
Spillway and Sector Flow:											
	11.89	11.02	56	0.0	0.0	0.0	0.0				
Flow Due to Lockages+:			1								
S77 Below USGS Flow Gage			20								
S78:											
Spillway and Sector Flow:											
	10.85	2.75	0	0.0	0.0	0.0	0.0				
Flow Due to Lockages+:			9								
S79:											
Spillway and Sector Flow:											
	2.99	0.51	828	0.0	0.0	0.0	1.0	0.5	0.0	0.0	0.0
Flow Due to Lockages+:			5								
Percent of flow from S77			7%								
Chloride	(ppm)		66								
St. Lucie Canal (S308, S80)											
S308:											
Spillway and Sector Flow:											
	11.94	13.48	0	0.0	0.0	0.0	0.0				
Flow Due to Lockages+:			-3								
S308 Below USGS Flow Gage			-66								
S153:	18.92	13.34	0	0.0	0.0						
S80:											
Spillway and Sector Flow:											
	13.59	0.55	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Flow Due to Lockages+: 18
Percent of flow from S308 NA %

Steele Point Top Salinity (mg/ml) ****
Steele Point Bottom Salinity (mg/ml) ****

Speedy Point Top Salinity (mg/ml) ****
Speedy Point Bottom Salinity (mg/ml) ****

+ Flow Due to lockages is computed utilizing average daily headwater and tailwater along with total number of lockages for the day to calculate a volume which is then converted to an average discharge in cfs.

Daily Precipitation Totals	1-Day (inches)	3-Day (inches)	7-Day (inches)	----- Wind ----- Direction (Degø)	Speed (mph)
S133 Pump Station:	-NR-	0.00	0.04		
S193:	-NR-	0.00	0.00	-NR-	-NR-
Okeechobee Field Station:	-NR-	0.00	0.00		
S135 Pump Station:	-NR-	0.00	0.23		
S127 Pump Station:	-NR-	0.00	0.00		
S129 Pump Station:	-NR-	0.00	0.01		
S131 Pump Station:	-NR-	0.00	0.00		
S77:	0.00	0.00	1.06	143	2
S78:	0.00	0.00	0.07	254	0
S79:	0.00	0.00	0.02	184	1
S4 Pump Station:	-NR-	0.00	0.00		
Clewiston Field Station:	-NR-	0.00	0.00		
S3 Pump Station:	-NR-	0.00	0.03		
S2 Pump Station:	-NR-	0.00	1.05		
S308:	0.00	0.00	0.12	129	8
S80:	0.00	0.00	0.82	200	1
Okeechobee Average (Sites S78, S79 and S80 not included)	0.00	0.00	0.20		
Oke Nexrad Basin Avg	-NR-	0.00	0.07		

Okeechobee Lake Elevations			12 JUL 2015	12.08 Difference from 12JUL15
12JUL15	-1 Day =		11 JUL 2015	12.10	0.02
12JUL15	-2 Days =		10 JUL 2015	12.12	0.04
12JUL15	-3 Days =		09 JUL 2015	12.14	0.06
12JUL15	-4 Days =		08 JUL 2015	12.14	0.06
12JUL15	-5 Days =		07 JUL 2015	12.14	0.06
12JUL15	-6 Days =		06 JUL 2015	12.15	0.07
12JUL15	-7 Days =		05 JUL 2015	12.11	0.03
12JUL15	-30 Days =		12 JUN 2015	12.62	0.54
12JUL15	-1 Year =		12 JUL 2014	13.26	1.18
12JUL15	-2 Year =		12 JUL 2013	14.82	2.74

Long Term Mean 30day Avearge ET for Lake Alfred (Inches) = -NR-

Lake Okeechobee Net Inflow (LONIN)

		Average Flow over the previous 14 days			Avg-Daily Flow
12JUL15	Today =	12 JUL 2015	-304	MON	-1993
12JUL15	-1 Day =	11 JUL 2015	-221	SUN	-1288
12JUL15	-2 Days =	10 JUL 2015	-28	SAT	-1726
12JUL15	-3 Days =	09 JUL 2015	78	FRI	1331
12JUL15	-4 Days =	08 JUL 2015	-36	THU	1405
12JUL15	-5 Days =	07 JUL 2015	-180	WED	-159
12JUL15	-6 Days =	06 JUL 2015	-182	TUE	9684
12JUL15	-7 Days =	05 JUL 2015	-1579	MON	-4284
12JUL15	-8 Days =	04 JUL 2015	-1277	SUN	-2434
12JUL15	-9 Days =	03 JUL 2015	-2226	SAT	-4261
12JUL15	-10 Days =	02 JUL 2015	-1971	FRI	-NR-
12JUL15	-11 Days =	01 JUL 2015	-1906	THU	-NR-
12JUL15	-12 Days =	30 JUN 2015	-1906	WED	4926
12JUL15	-13 Days =	29 JUN 2015	-2677	TUE	-4853

S65E

		Average Flow over previous 14 days			Avg-Daily Flow
12JUL15	Today=	12 JUL 2015	738	MON	1134
12JUL15	-1 Day =	11 JUL 2015	683	SUN	1185
12JUL15	-2 Days =	10 JUL 2015	625	SAT	1173
12JUL15	-3 Days =	09 JUL 2015	569	FRI	1045
12JUL15	-4 Days =	08 JUL 2015	526	THU	870
12JUL15	-5 Days =	07 JUL 2015	492	WED	782
12JUL15	-6 Days =	06 JUL 2015	460	TUE	795
12JUL15	-7 Days =	05 JUL 2015	420	MON	516
12JUL15	-8 Days =	04 JUL 2015	415	SUN	323
12JUL15	-9 Days =	03 JUL 2015	409	SAT	469
12JUL15	-10 Days =	02 JUL 2015	409	FRI	-NR-
12JUL15	-11 Days =	01 JUL 2015	419	THU	-NR-
12JUL15	-12 Days =	30 JUN 2015	419	WED	331
12JUL15	-13 Days =	29 JUN 2015	433	TUE	227

Lake Okeechobee Outlets Last 14 Days

DATE	S-77 Discharge (0700-2100) (AC-FT)	S-77 Discharge (ALL DAY) (AC-FT)	Below S-77 Discharge (ALL-DAY) (AC-FT)	S-78 Discharge (0700-2100) (AC-FT)	S-78 Discharge (ALL DAY) (AC-FT)	S-79 Discharge (ALL DAY) (AC-FT)
12 JUL 2015	4	-NA-	39	0	18	1651
11 JUL 2015	263	439	463	0	23	900
10 JUL 2015	139	-NA-	81	0	13	2490
09 JUL 2015	0	2	-267	61	161	1802
08 JUL 2015	0	3	-226	172	310	4005
07 JUL 2015	0	1	-133	171	303	4844
06 JUL 2015	7	-NA-	-49	123	178	3650
05 JUL 2015	148	250	263	0	22	122

04 JUL 2015	153	224	220	0	13	12
03 JUL 2015	58	-NA-	72	0	7	625
02 JUL 2015	0	2	-118	0	18	434
01 JUL 2015	0	44	-62	0	20	595
30 JUN 2015	40	56	72	0	22	279
29 JUN 2015	0	3	-130	42	316	833

DATE	S-310 Discharge (ALL DAY) (AC-FT)	S-351 Discharge (ALL DAY) (AC-FT)	S-352 Discharge (ALL DAY) (AC-FT)	S-354 Discharge (ALL DAY) (AC-FT)	L8 Canal Pt Discharge (ALL DAY) (AC-FT)
12 JUL 2015	287	1739	1001	995	-359
11 JUL 2015	221	2023	960	1626	-317
10 JUL 2015	104	1634	710	1634	-359
09 JUL 2015	-45	1202	260	1178	-460
08 JUL 2015	-249	1481	139	1166	-588
07 JUL 2015	118	1805	603	1077	-565
06 JUL 2015	276	1569	912	1456	-589
05 JUL 2015	217	1073	779	805	-273
04 JUL 2015	256	940	873	740	-287
03 JUL 2015	222	1364	845	652	-200
02 JUL 2015	-3	-NR-	-NR-	-NR-	-164
01 JUL 2015	-191	-NR-	-NR-	-NR-	-178
30 JUN 2015	-118	2905	1110	1801	-96
29 JUN 2015	359	2965	1225	1783	-2

DATE	S-308 Discharge (ALL DAY) (AC-FT)	Below S-308 Discharge (ALL-DAY) (AC-FT)	S-80 Discharge (ALL-DAY) (AC-FT)
12 JUL 2015	-5	-130	35
11 JUL 2015	-5	-124	23
10 JUL 2015	-5	-153	19
09 JUL 2015	-4	63	31
08 JUL 2015	-8	156	42
07 JUL 2015	-2	90	15
06 JUL 2015	-7	-84	30
05 JUL 2015	-8	-11	23
04 JUL 2015	-4	146	31
03 JUL 2015	-4	20	27
02 JUL 2015	-7	21	19
01 JUL 2015	-8	132	32
30 JUN 2015	-11	97	41
29 JUN 2015	-7	-72	33

*** NOTE: 1) Discharge from (0700-2100) is computed using Spillway and Sector
Gate Discharges from 0700 hrs to 2100 hrs.
2) Discharge (ALL DAY) is computed using Spillway, Sector Gate and
Lockages Discharges from 0015 hrs to 2400 hrs.

(I) - Flows preceeded by "I" signify an instantaneous
flow computed from the single value reported for the day

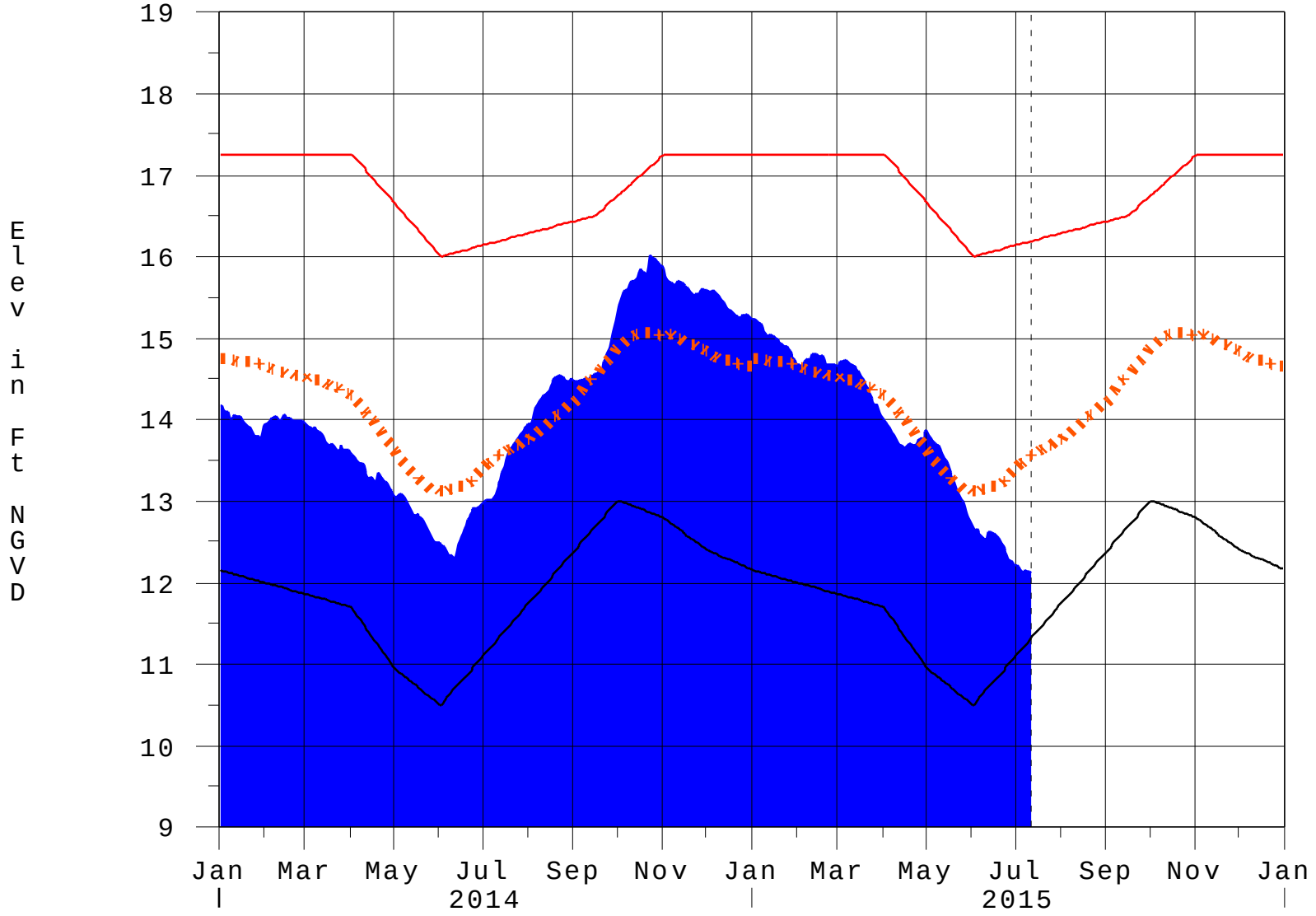
---

* On 11 May 1999, Lake Okeechobee Elevation was switched from
Instantaneous 2400 value to an average-daily lake average.
On 14 Mar 2001, due to the isolation of various gages within the standard
10 stations, the average of the interior 4 station gages was used
as the Lake Okeechobee Elevation.
On 05 November 2010, Lake Okeechobee Elevation was switched to a 9 gage
mix of interior and edge gages to obtain a more reliable representation
of the lake level.
On 09 May 2011, Lake Okeechobee Elevation was switched to a 8 gage
mix of interior and edge gages to obtain a more reliable representation
of the lake level due to isolation of S135 from low lake levels.
Today Lake Okechobee elevation is determined from the 4 Int & 4 Edge stations
++ For more information see the Jacksonville District Navigation website
at http://www.saj.usace.army.mil/
$ For information regarding Lake Okeechobee Service Area water restrictions
please refer to www.sfwmd.gov

Report Generated 13JUL2015 @ 11:38 ** Preliminary Data - Subject to Revision **

Lake Okeechobee

11JUL15 10:45:31



High Lake Management
Okeechobee Avg Elev
Average Elev [1965-2007]
Water Shortage Management

Classification Tables

Supplemental Tables used in conjunction with the LORS2008 Release

Guidance Flow Charts

- Class Limits for Tributary Hydrologic Conditions

Table K-2 in the Lake Okeechobee Water Control Plan

- 6-15 Day Precipitation Outlook Categories

Table ?? in the Lake Okeechobee Water Control Plan

- Classification of Lake Okeechobee Net Inflow for Seasonal Outlook

Table K-3 in the Lake Okeechobee Water Control Plan

- Classification of Lake Okeechobee Net Inflow for Multi-Seasonal Outlook

Table K-4 in the Lake Okeechobee Water Control Plan

Back to Lake Okeechobee Operations Main Page

Back to U.S. Army Corps of Engineers Lake Okeechobee Operations Homepage

Tributary Hydrologic Classification*	Palmer Index Class Limits	2-wk Mean L.O. Net Inflow Class Limits
Very Wet	3.0 or greater	Greater >= 6000 cfs
Wet	1.5 to 2.99	2500 - 5999 cfs
Near Normal	-1.49 to 1.49	500 - 2499 cfs
Dry	-2.99 to -1.5	-5000 – 500 cfs
Very Dry	-3.0 or less	Less than -5000 cfs

* use the wettest of the two indicators

Classification of Lake Okeechobee Net Inflow Seasonal Outlook*

Lake Net Inflow Prediction [million acre-feet]	Equivalent Depth** [feet]	Lake Okeechobee Net Inflow Seasonal Outlook
> 0.93	> 2.0	Very Wet
0.71 to 0.93	1.51 to 2.0	Wet
0.35 to 0.70	0.75 to 1.5	Normal
< 0.35	< 0.75	Dry

****Volume-depth conversion based on average lake surface area of 467,000 acres**

Classification of Lake Okeechobee Net Inflow Multi-Seasonal Outlook*

Lake Net Inflow Prediction [million acre-feet]	**Equivalent Depth** [feet]**	**Lake Okeechobee Net Inflow Multi-Seasonal Outlook**
> 2.0	> 4.3	Very Wet
1.18 to 2.0	2.51 to 4.3	Wet
0.5 to 1.17	1.1 to 2.5	Normal
< 0.5	< 1.1	Dry

****Volume-depth conversion based on average lake surface area of 467,000 acres**

6-15 Day Precipitation Outlook Categories*

6-15 Day Precipitation Outlook Categories	WSE Decision Tree Categories
Above Normal	Wet to Very Wet
Normal	Normal
Below Normal	Dry

*** Corresponds to Table 7-6 in the Lake Okeechobee Water Control Plan**

Under Construction