Application of the Lake Okeechobee Regulation Schedule (LORS2008) on 4/25/2016 (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 El Nino ENSO 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 El Nino ENSO Years[3]		Sub-sampling of AMO Warm + El Nino ENSO Years[4]	
	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition
Current (Apr-Sep)	N/A	N/A	1.44	Normal	1.48	Normal	2.82	Very Wet
Multi Seasonal (May-Apr)	N/A	N/A	2.56	Wet	3.99	Wet	6.05	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:

-274 cfs 14-day running average for Lake Okeechobee Net Inflow through 4/25/2016.
According to the classification in Tributary Hydrologic Conditions table, this condition is Dry.

-0.25 for Palmer Index on 4/24/2016.
According to the classification in Tributary Hydrologic Conditions table, this condition is Normal.

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

LORS2008 Classification Tables:

Lake Okeechobee Stage on 4/25/2016

Lake Okeechobee Stage: **14.47 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		16.76	
Operational Band	High sub-band	16.11	
	Intermediate sub-band	15.30	
	Low sub-band	13.40	← 14.47
Base Flow sub-band		12.60	
Beneficial Use sub-band		11.10	
Water Shortage Management Band			

Part C of LORS2008: Discharge to WCA's

Release Guidance Flow Chart Outcome: Up to Maximum Releases to the WCAs if Desirable or with Minimum Everglades Impacts

Part D of LORS2008: Discharge to Tidewater

Release Guidance Flow Chart Outcome: S-79 up to 3000 cfs and S-80 up to 1170 cfs

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**

Back to Lake Okeechobee Operations Main Page

Back to U.S. Army Corps of Engineers LORSS Homepage

LORS2008 Implementation on 4/25/2016 (ENSO El Nino Condition):

Water Supply Department Technical Input

Water Supply Outlook:

District wide, Raindar rainfall 0.25 inches for the week ending 4/25/2016. Lake stage on 4/25/2016 is 14.47 ft, down 0.21 ft from last week.
The updated April 2016 SFWMM Dynamic Position Analysis percentile graph and tracking chart for Lake Okeechobee show that the lake stage is in the Low Operational Sub-Band.

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

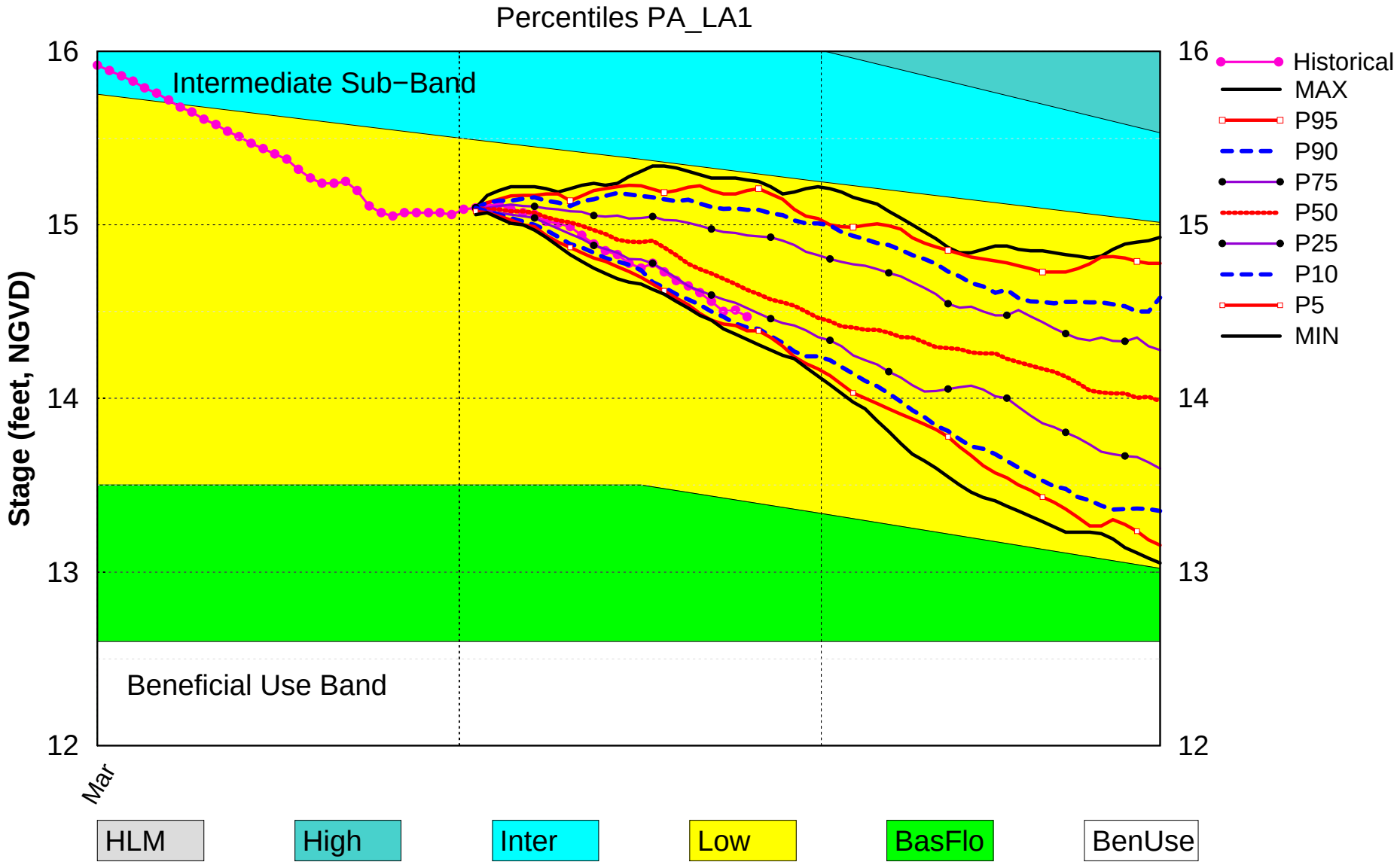
Water Supply Risk Evaluation

Area	Indicator	Value	Color Coded Scoring Scheme
LOK	Projected LOK Stage for the next two months	Low Sub-Band	M
	Palmer Index for LOK Tributary Conditions	-0.25 (Normal)	L
	CPC Precipitation Outlook	1 month: Above Normal	L
		3 months: Above Normal	L
	LOK Seasonal Net Inflow Forecast	1.48 ft (Normal to Extremely Wet)	L
	El Nino		
	LOK Multi-Seasonal Net Inflow Forecast	3.99 ft (Wet)	L
	El Nino		
WCAs	WCA 1: Site 1-7, Site 1-8T, & Site 1-9 Average	Above Line 1 (16.00 ft)	L
	WCA 2A: Site 2-17 HW	Above Line1 (11.68 ft)	L
	WCA-3A: 3 Station Average (Site 63, 64 and 65)	Above Line 1 (9.94 ft)	L
LEC	Service Area 1	Year-Round Irrigation Rule in effect	L
	Service Area 2	Year-Round Irrigation Rule in effect	L
	Service Area 3	Year-Round Irrigation Rule in effect	L

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.

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

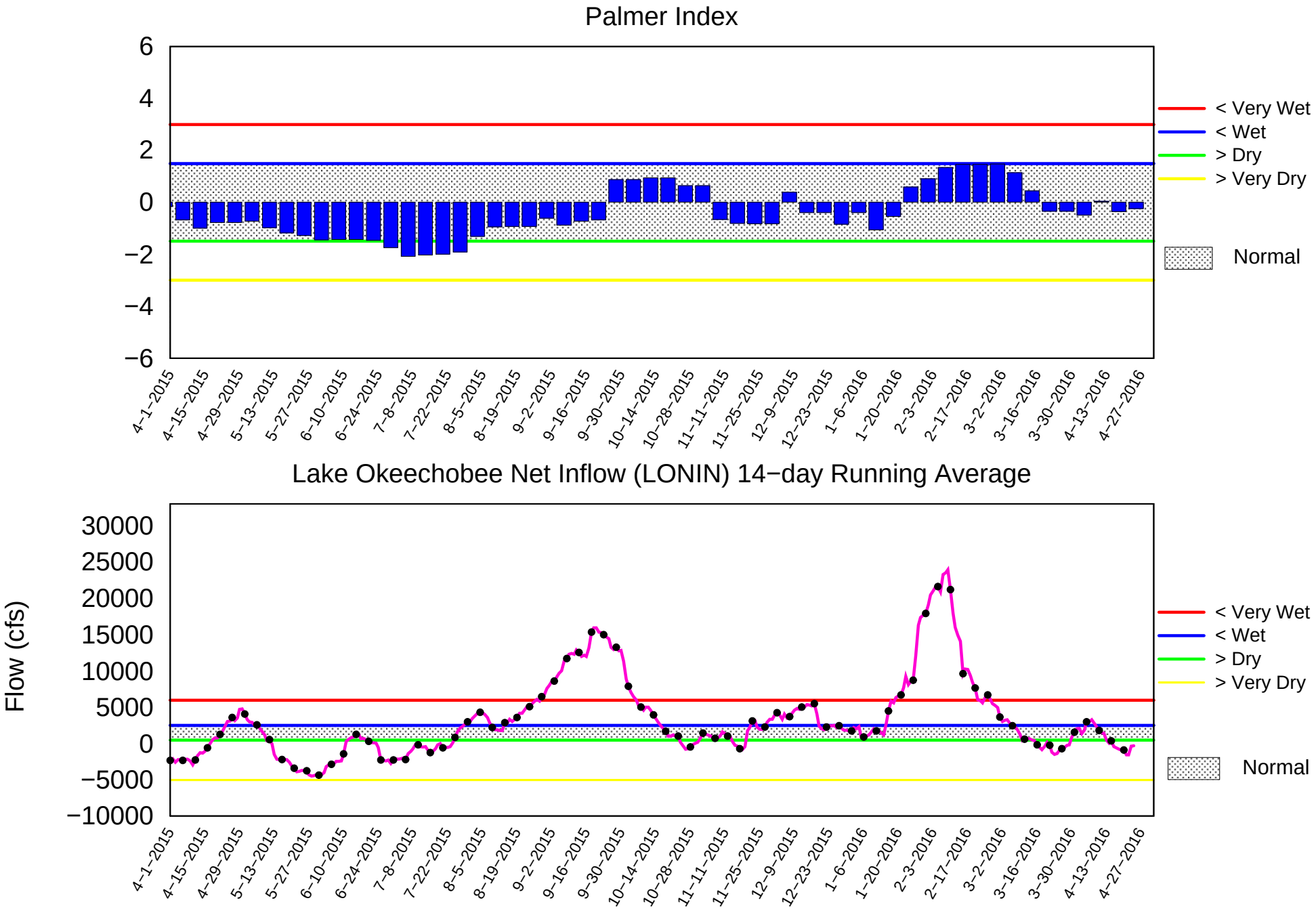
Lake Okeechobee SFWMM April 2016 Position Analysis



(See assumptions on the Position Analysis Results website)

Mon Apr 25 15:05:07 2016

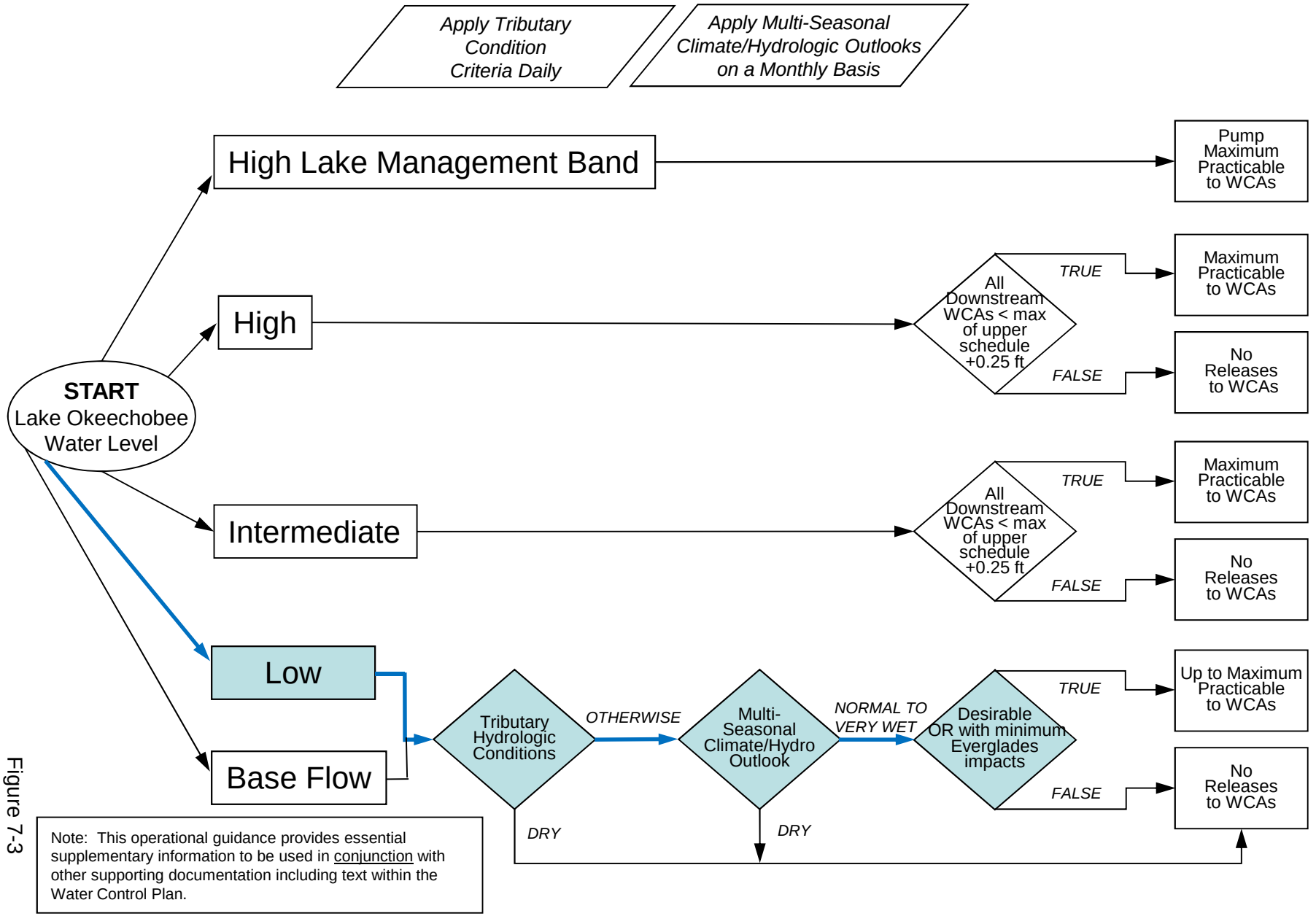
Tributary Basin Condition Indicators as of April 25 2016



Mon Apr 25 13:51:52 EDT 2016

2008 LORS

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



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

Figure 7-3

2008 LORS

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

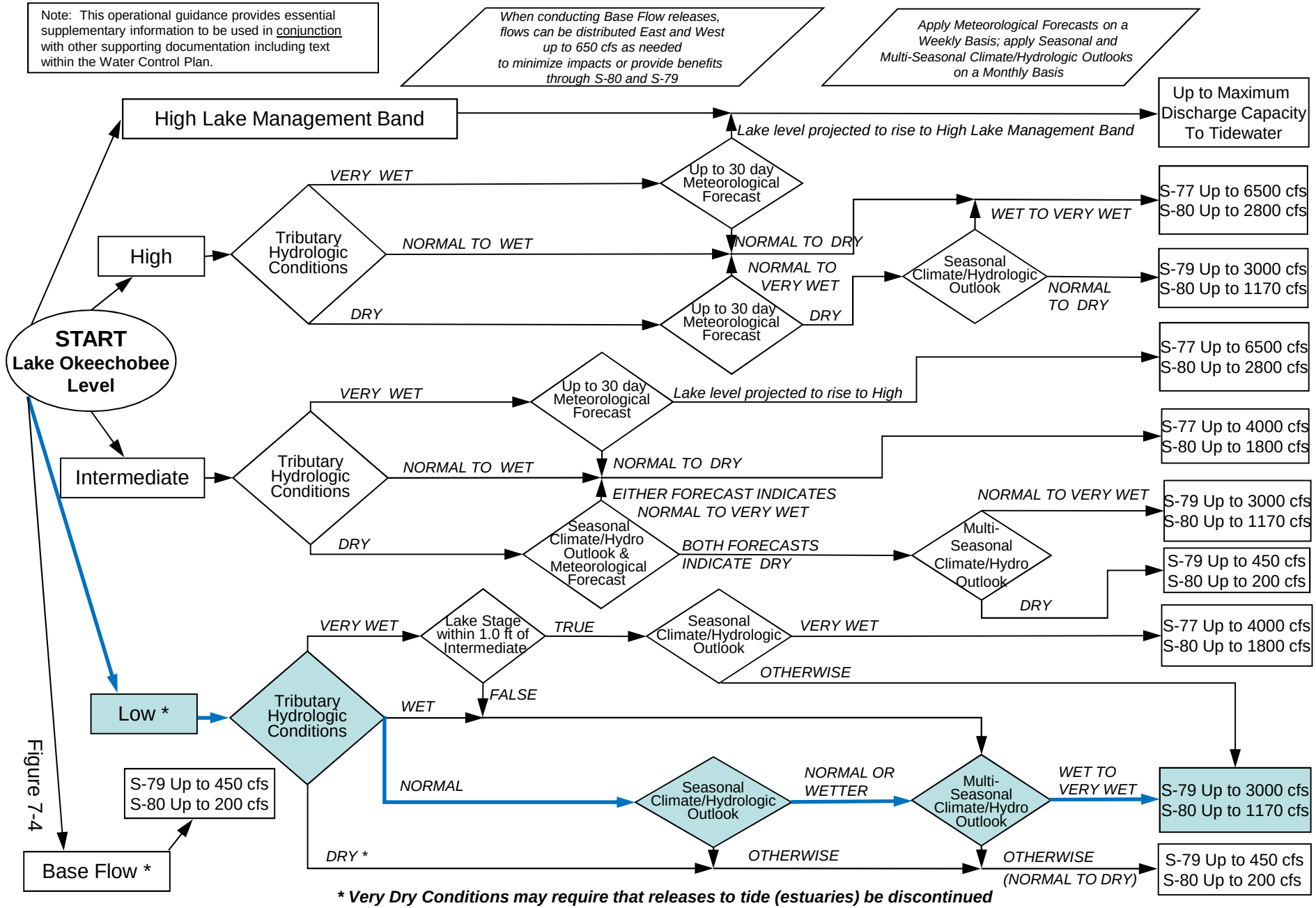


Figure 7-4

2008 LORS FORECAST

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

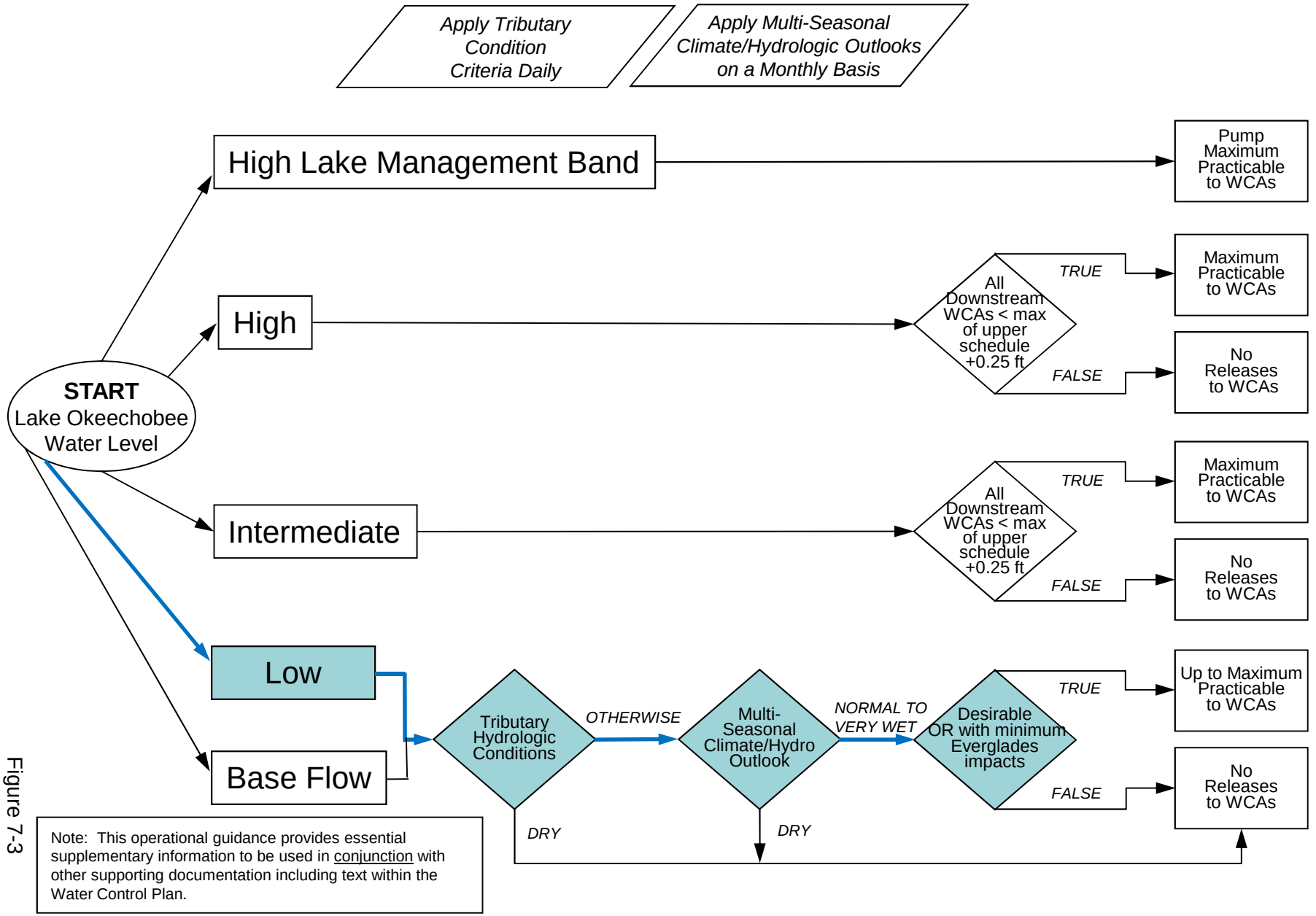


Figure 7-3

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 FORECAST

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

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

When conducting Base Flow releases, flows can be distributed East and West up to 650 cfs as needed to minimize impacts or provide benefits through S-80 and S-79

Apply Meteorological Forecasts on a Weekly Basis; apply Seasonal and Multi-Seasonal Climate/Hydrologic Outlooks on a Monthly Basis

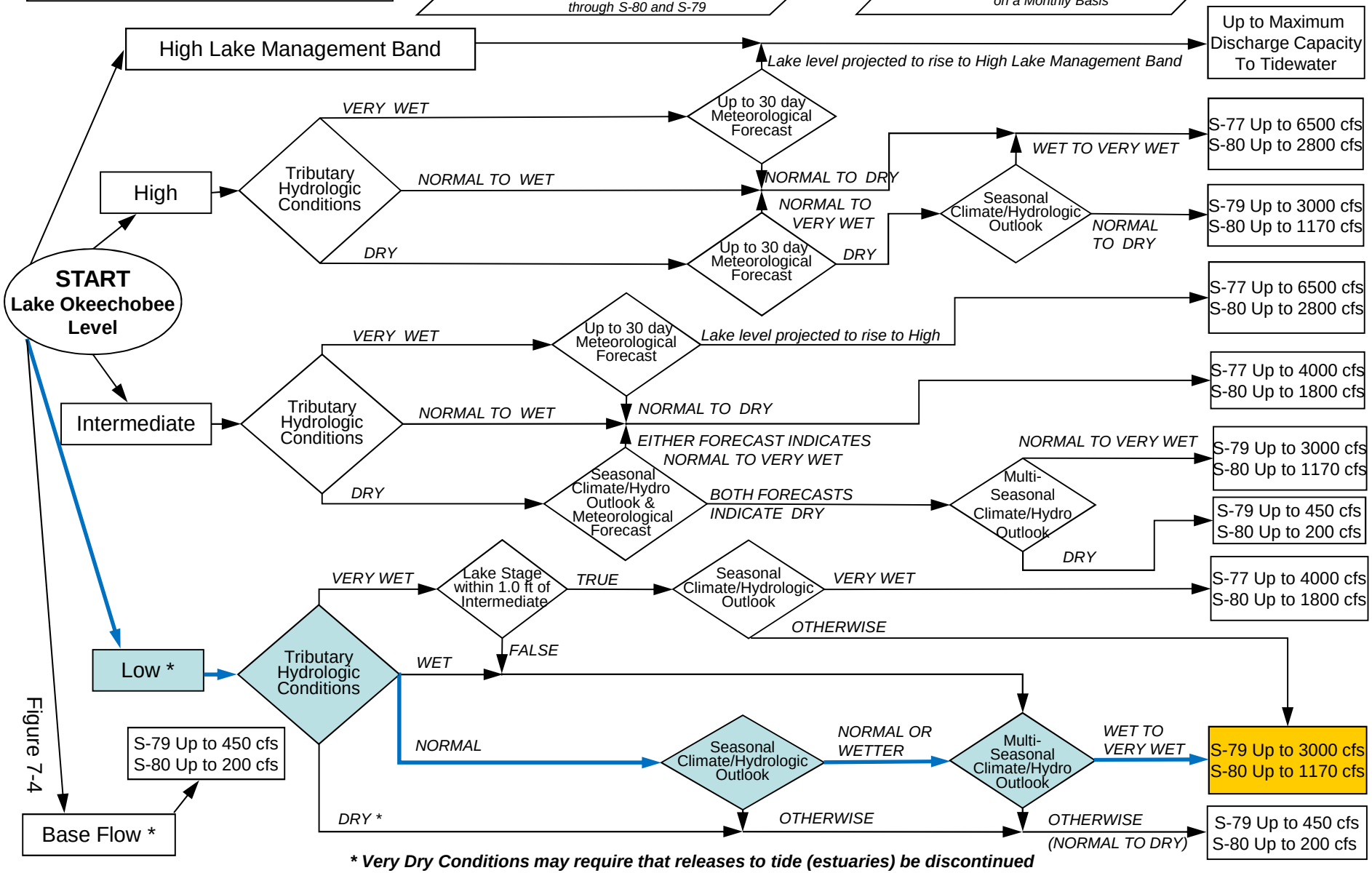
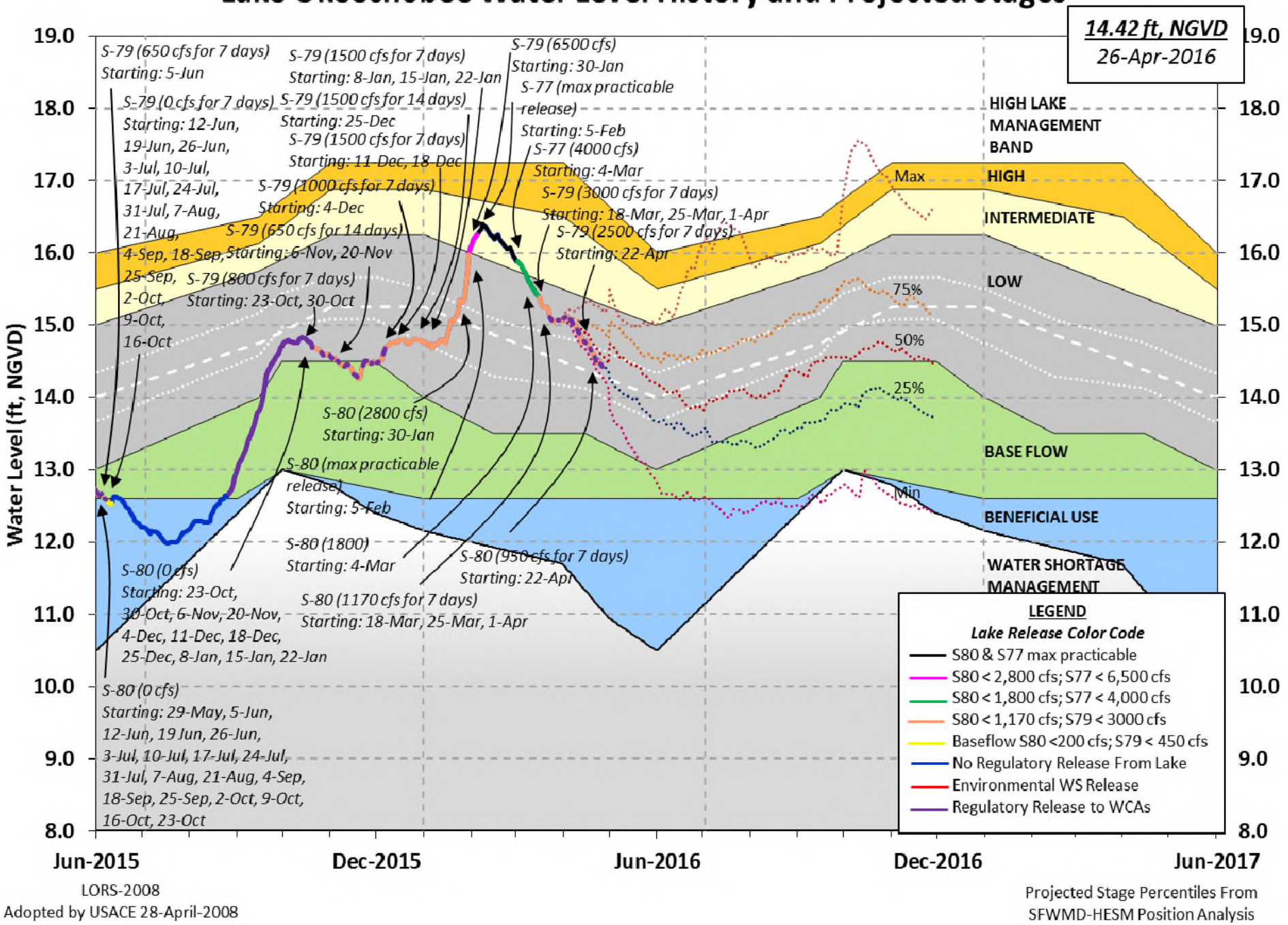


Figure 7-4

**** Very Dry Conditions may require that releases to tide (estuaries) be discontinued***

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 24 APR 2016

Okeechobee Lake Regulation	Elevation (ft-NGVD)	Last Year (ft-NGVD)	2YRS Ago (ft-NGVD)
*Okeechobee Lake Elevation	14.47	13.75	13.23 (Official Elv)

Bottom of High Lake Mngmt= 16.78 Top of Water Short Mngmt= 11.10
Currently in Operational Management Band

Simulated Average LORS2008 [1965-2000] 12.52
Difference from Average LORS2008 1.95

24APR (1965-2007) Period of Record Average 13.74
Difference from POR Average 0.73

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

++Navigation Depth (Based on 2007 Channel Condition Survey) Route 1 ÷ 8.41'
++Navigation Depth (Based on 2008 Channel Condition Survey) Route 2 ÷ 6.61'
Bridge Clearance = -NR-'

---

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

L001	L005	L006	LZ40	S4	S352	S308	S133
14.30	14.53	14.51	14.46	14.54	14.62	14.42	14.35

*Combination Okeechobee Avg-Daily Lake Average = 14.47 (*See Note)

Okeechobee Inflows (cfs):

S65E	2043	C5	0	Fisheating Cr	-NR-
S154	0	S191	0	S135 Pumps	0
S84	0	S133 Pumps	0	S2 Pumps	0
S84X	450	S127 Pumps	0	S3 Pumps	0
S71	0	S129 Pumps	0	S4 Pumps	0
S72	0	S131 Pumps	0		

Total Inflows: 2493

Okeechobee Outflows (cfs):

S135 Culverts	0	S354	418	S77	(Not Used)
S127 Culverts	0	S351	916	S77Below	2169 (USED)
S129 Culverts	-NR-	S352	732	S308	(Not Used)

S131 Culverts -NR- L8 Canal Pt 191 S308Below 698 (USED)
Total Outflows: No Report Due To Missing S77 or S308 Discharge Data

****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 0.21 S308 0.31
Average Pan Evap x 0.75 Pan Coefficient = 0.19" = 0.02'

Lake Average Precipitation using NEXRAD: = 0.00" = 0.00'

Evaporation - Precipitation: = 0.19" = 0.02'
Evaporation - Precipitation using Lake Area of 730 square miles
is equal to 3828 cfs out of the lake.
Lake Okeechobee (Change in Storage) Flow is -8621 cfs or -17100 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:	13.45	14.35	0	0	0	0	0	0	(cfs)		
S193:	_____										
S191:	18.13	14.35	0	0.0	0.0	0.0					
S135 Pumps:	_____	-NR-	0	0	0	0	0	(cfs)			
S135 Culverts:			0	-NR-	-NR-						
North West Shore											
S65E:	21.17	14.28	2043	0.9	0.7	0.7	0.9	0.9	0.4		
S127 Pumps:	13.38	14.45	0	0	0	0	0	0	(cfs)		
S127 Culvert:			0	0.0							
S129 Pumps:	13.04	14.54	0	0	0	0	(cfs)				
S129 Culvert:			-NR-	-NR-							
S131 Pumps:	12.86	14.70	0	0	0	(cfs)					
S131 Culvert:			-NR-								
Fisheating Creek											
nr Palmdale		_____	-NR-								
nr Lakeport		_____									
C5:	14.45	14.51	0	0.0	0.0	0.0					

South Shore

S4 Pumps:	10.96	14.53	0	0	0	0			(cfs)
S169:	14.56	10.97	0	0.0	0.0	0.0			
S310:	14.48		4						
S3 Pumps:	11.89	14.52	0	0	0	0			(cfs)
S354:	14.52	11.89	418	1.2	1.2				
S2 Pumps:	11.17	14.46	0	0	0	0	0		(cfs)
S351:	14.46	11.17	916	1.4	1.3	1.5			
S352:	14.51	11.33	732	1.5	1.5				
C10A:	-NR-	13.69		0.0	0.0	4.0	0.0	0.0	
L8 Canal PT		13.48	191						

S351 and S352 Temporary Pumps/S354 Spillway

S351:	11.17	14.46	916	-NR--NR--NR--NR--NR--NR-
S352:	11.33	14.51	732	-NR--NR--NR--NR-
S354:	11.89	14.52	418	-NR--NR--NR--NR-

Caloosahatchee River (S77, S78, S79)

S47B:	13.12	10.91		0.0	0.0						
S47D:	11.03	11.02	2	4.9							
S77:											
Spillway and Sector Flow:											
	14.23	11.14	2169	2.5	3.0	3.0	2.5				
Flow Due to Lockages+:			7								
S77 Below USGS Flow Gage			2169								
S78:											
Spillway and Sector Flow:											
	11.11	2.98	1894	1.0	2.5	2.5	0.0				
Flow Due to Lockages+:			20								
S79:											
Spillway and Sector Flow:											
	3.09	0.89	2244	1.0	1.0	1.0	1.5	1.5	1.0	1.0	1.0
Flow Due to Lockages+:			9								
Percent of flow from S77			93%								
Chloride		(ppm)	51								

St. Lucie Canal (S308, S80)

S308:											
Spillway and Sector Flow:											
	-NR-	-NR-	698	2.2	2.3	2.3	2.3				
Flow Due to Lockages+:			-NR-								
S308 Below USGS Flow Gage			698								
S153:	18.98	14.03	0	0.0	0.0						
S80:											
Spillway and Sector Flow:											
	14.15	1.70	753	0.0	0.4	0.5	0.0	0.4	0.4	0.0	
Flow Due to Lockages+:			34								
Percent of flow from S308			97%								

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	0.00		
S193:	-NR-	0.00	0.00	-NR-	-NR-
Okeechobee Field Station:	-NR-	0.00	0.00		
S135 Pump Station:	-NR-	0.00	0.00		
S127 Pump Station:	-NR-	0.00	0.00		
S129 Pump Station:	-NR-	0.00	0.00		
S131 Pump Station:	-NR-	0.00	0.00		
S77:	0.00	0.46	0.46	140	3
S78:	0.00	0.14	0.14	127	4
S79:	0.00	0.01	0.01	160	3
S4 Pump Station:	-NR-	0.00	0.00		
Clewiston Field Station:	-NR-	0.00	0.00		
S3 Pump Station:	-NR-	0.00	0.00		
S2 Pump Station:	-NR-	0.00	0.00		
S308:	*******	*******	*******	-NR-	-NR-
S80:	0.00	0.00	0.00	64	1
Okeechobee Average (Sites S78, S79 and S80 not included)	*******	5359.65	*******		
Oke Nexrad Basin Avg	0.00	0.36	0.36		

Okeechobee Lake Elevations	24 APR 2016	14.47	Difference from 24APR16
24APR16 -1 Day =	23 APR 2016	14.51	0.04
24APR16 -2 Days =	22 APR 2016	14.48	0.01
24APR16 -3 Days =	21 APR 2016	14.50	0.03
24APR16 -4 Days =	20 APR 2016	14.56	0.09
24APR16 -5 Days =	19 APR 2016	14.61	0.14
24APR16 -6 Days =	18 APR 2016	14.65	0.18
24APR16 -7 Days =	17 APR 2016	14.68	0.21
24APR16 -30 Days =	25 MAR 2016	15.07	0.60
24APR16 -1 Year =	24 APR 2015	13.75	-0.72
24APR16 -2 Year =	24 APR 2014	13.23	-1.24

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
24APR16	Today =	24 APR 2016	-154	MON	-3498
24APR16	-1 Day =	23 APR 2016	-243	SUN	10982
24APR16	-2 Days =	22 APR 2016	-1610	SAT	1207
24APR16	-3 Days =	21 APR 2016	-1643	FRI	-4330
24APR16	-4 Days =	20 APR 2016	-876	THU	-1908
24APR16	-5 Days =	19 APR 2016	-883	WED	-655
24APR16	-6 Days =	18 APR 2016	-751	TUE	-802
24APR16	-7 Days =	17 APR 2016	-531	MON	-5719
24APR16	-8 Days =	16 APR 2016	-339	SUN	-6142
24APR16	-9 Days =	15 APR 2016	596	SAT	9055
24APR16	-10 Days =	14 APR 2016	209	FRI	-380
24APR16	-11 Days =	13 APR 2016	711	THU	-NR-
24APR16	-12 Days =	12 APR 2016	1470	WED	-NR-
24APR16	-13 Days =	11 APR 2016	1526	TUE	336

S65E

		Average Flow over previous 14 days			Avg-Daily Flow
24APR16	Today=	24 APR 2016	2593	MON	2043
24APR16	-1 Day =	23 APR 2016	2739	SUN	2283
24APR16	-2 Days =	22 APR 2016	2889	SAT	2105
24APR16	-3 Days =	21 APR 2016	3059	FRI	2321
24APR16	-4 Days =	20 APR 2016	3236	THU	2296
24APR16	-5 Days =	19 APR 2016	3439	WED	2118
24APR16	-6 Days =	18 APR 2016	3660	TUE	2175
24APR16	-7 Days =	17 APR 2016	3881	MON	2425
24APR16	-8 Days =	16 APR 2016	4055	SUN	2493
24APR16	-9 Days =	15 APR 2016	4160	SAT	2757
24APR16	-10 Days =	14 APR 2016	4189	FRI	2857
24APR16	-11 Days =	13 APR 2016	4160	THU	3194
24APR16	-12 Days =	12 APR 2016	4079	WED	3368
24APR16	-13 Days =	11 APR 2016	3979	TUE	3867

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)
24 APR 2016			4300	-NR-	3795	4468
23 APR 2016			2573	-NR-	3873	3159
22 APR 2016			4541	-NR-	3017	3272
21 APR 2016			7697	-NR-	6066	6288
20 APR 2016			7906	-NR-	6196	8126
19 APR 2016			6944	-NR-	5662	6639
18 APR 2016			4836	-NR-	4408	5278
17 APR 2016			4449	-NR-	4482	5582
16 APR 2016			3221	-NR-	3460	4830
15 APR 2016			3790	-NR-	2907	3757

14 APR 2016		6223	-NR-	5602	7031
13 APR 2016		8144	-NR-	6765	7963
12 APR 2016		6818	-NR-	5440	6536
11 APR 2016		6642	-NR-	5372	5761

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)
24 APR 2016	8	1816	1452	829	379
23 APR 2016	50	2183	1495	1259	386
22 APR 2016	76	1896	1452	1281	362
21 APR 2016	245	2812	1614	1547	340
20 APR 2016	267	3207	1678	1267	386
19 APR 2016	299	3018	1515	1089	398
18 APR 2016	149	2027	1093	357	397
17 APR 2016	19	1933	1019	456	376
16 APR 2016	62	2263	1289	1001	373
15 APR 2016	44	0	121	109	386
14 APR 2016	185	1045	656	886	390
13 APR 2016	263	-NR-	1047	1668	395
12 APR 2016	251	-NR-	1077	1620	401
11 APR 2016	179	2368	863	1269	349

DATE	S-308 Discharge (ALL DAY) (AC-FT)	Below S-308 Discharge (ALL-DAY) (AC-FT)	S-80 Discharge (ALL-DAY) (AC-FT)
24 APR 2016		1384	867
23 APR 2016		1083	679
22 APR 2016		1460	809
21 APR 2016		2598	1756
20 APR 2016		2768	2189
19 APR 2016		2534	1724
18 APR 2016		2298	1425
17 APR 2016		1420	1083
16 APR 2016		669	807
15 APR 2016		953	911
14 APR 2016		2643	1798
13 APR 2016		2991	2216
12 APR 2016		2712	1756
11 APR 2016		2073	1431

*** 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

---

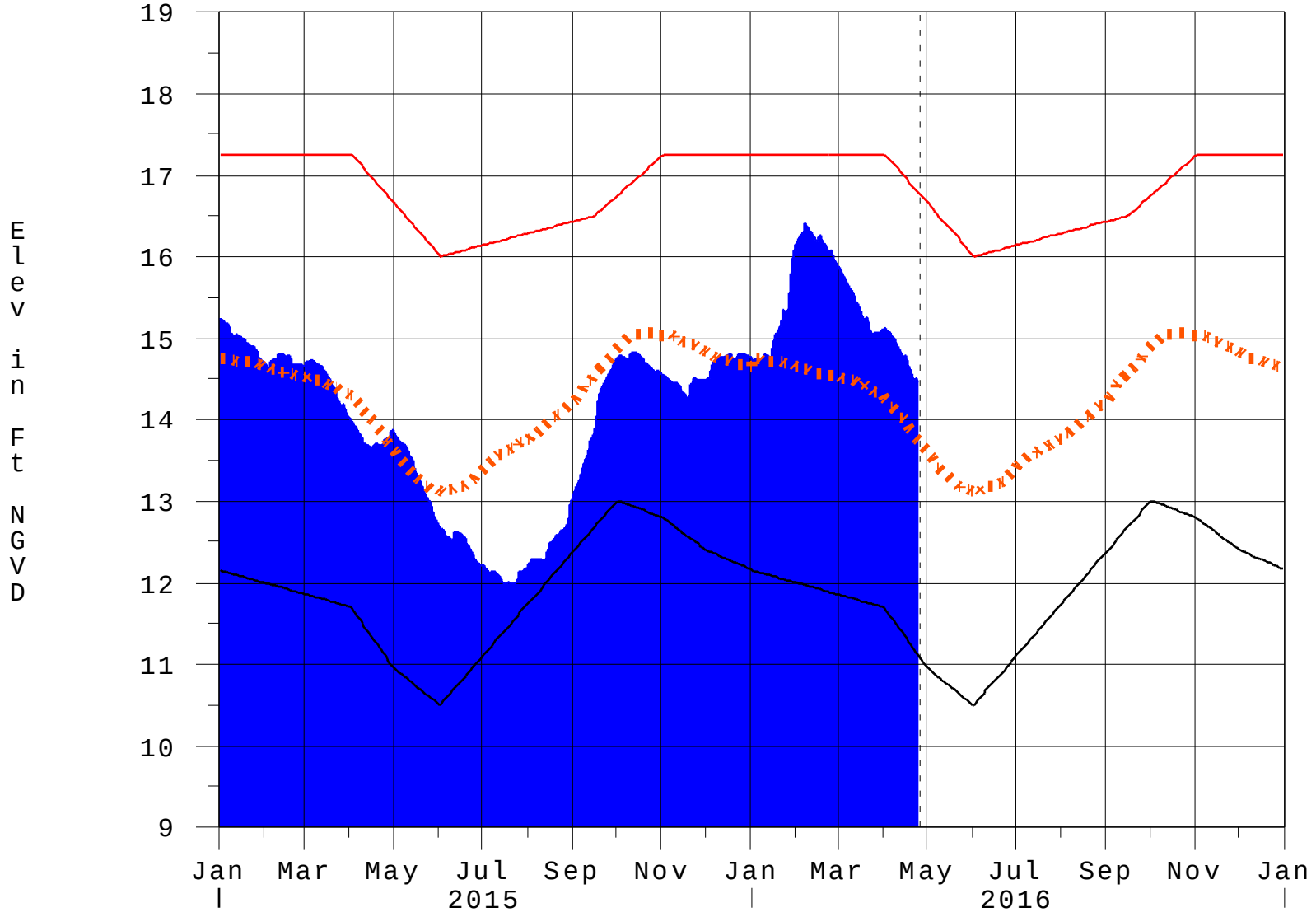
* On 11 May 1999, Lake Okeechobee Elevation was switched from

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 25APR2016 @ 12:15 ** Preliminary Data - Subject to Revision **

Lake Okeechobee

25APR16 11:45:22



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