

# Application of the Lake Okeechobee Regulation Schedule (LORS2008) on 11/21/2016 (ENSO La Nina Condition)

## Lake Okeechobee Net Inflow Outlook:

The Lake Okeechobee Net Inflow Outlook has been computed using 4 methods: Croley's method<sup>1</sup>, the SFWMD empirical method<sup>2</sup>, a sub-sampling of Neutral years<sup>3</sup> and a sub-sampling of warm years of the Atlantic Multi-decadal Oscillation (AMO) in combination with La Nina ENSO years<sup>4</sup>. 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 <sup>1*</sup>		SFWMD Empirical Method <sup>2</sup>		Sub-sampling of La Nina ENSO Years <sup>3</sup>		Sub-sampling of AMO Warm + La Nina ENSO Years <sup>4</sup>	
	Value (ft)	<a href="#">Condition</a>	Value (ft)	<a href="#">Condition</a>	Value (ft)	<a href="#">Condition</a>	Value (ft)	<a href="#">Condition</a>
Current (Nov-Apr)	N/A	N/A	0.14	Dry	-0.24	Dry	-0.46	Dry
Multi Seasonal (Nov-Oct)	N/A	N/A	2.46	Normal	2.71	Wet	2.00	Normal

\*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:](#)

**-1951 cfs** 14-day running average for Lake Okeechobee Net Inflow through 11/20/2016. According to the classification in [Tributary Hydrologic Conditions](#) table, this condition is Dry.

**-0.67** for Palmer Index on 11/19/2016.

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 11/21/2016

Lake Okeechobee Stage: **14.98 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		17.25	
Operational Band	High sub-band	16.88	
	Intermediate sub-band	16.25	
	Low sub-band	14.50	← 14.98
Base Flow sub-band		12.78	
Beneficial Use sub-band		12.53	
Water Shortage Management Band			

**[Part C of LORS2008: Discharge to WCA's](#)**

Release Guidance Flow Chart Outcome: Up to maximum practicable releases to the WCAs if desirable or with minimum everglades impacts; otherwise no releases.

**[Part D of LORS2008: Discharge to Tidewater](#)**

Release Guidance Flow Chart Outcome: S-79 up to 450 cfs and S-80 up to 200 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](#)

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## LORS2008 Implementation on 11/21/2016 (ENSO La Nina Condition):

### Status for week ending 11/21/2016:

District wide, Raindar rainfall was 0.00 inches for the week. Lake stage on 11/21/2016 was 14.98 ft, down 0.17 ft from last week.

The updated November 2016 SFWMM Dynamic Position Analysis [percentile graph](#) for Lake Okeechobee show that the current 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

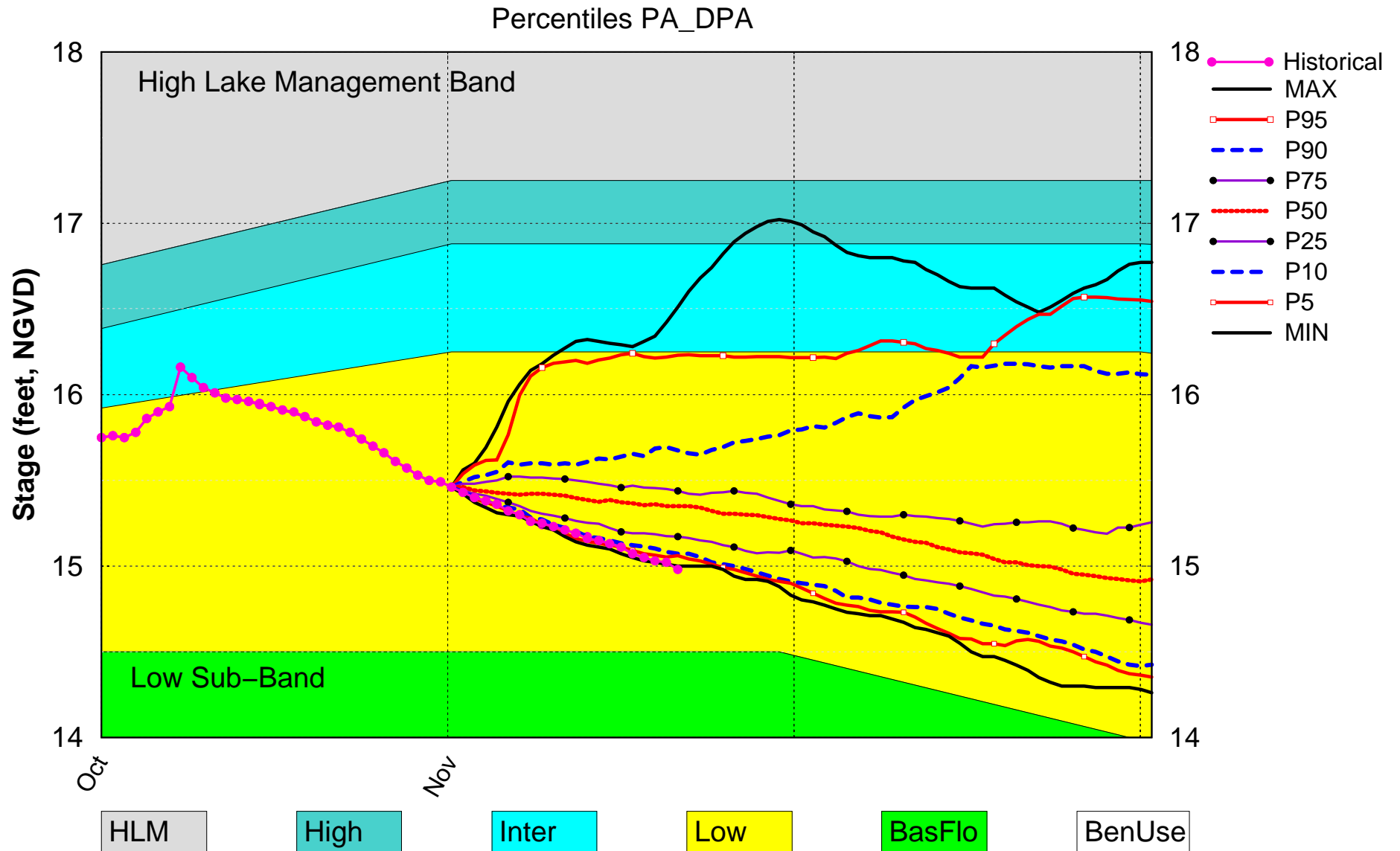
Area	Indicator	Value	Color Coded Scoring Scheme
LOK	Projected LOK Stage for the next two months	Low Sub-Band	L
	Palmer Index for LOK Tributary Conditions	-0.67 (Normal)	L
	CPC Precipitation Outlook	1 month: Below Normal	M
		3 months: Below Normal	M
	LOK Seasonal Net Inflow Outlook ENSO La Nina Years	-0.24 ft (Extremely Dry)	H
	LOK Multi-Seasonal Net Inflow Outlook ENSO La Nina Years	2.71 ft (Normal)	M
WCAs	WCA 1: Site 1-7, Site 1-8T, & Site 1-9 Average	Above Line 1 (16.68 ft)	L
	WCA 2A: Site 2-17 HW	Above Line1 (12.73 ft)	L
	WCA-3A: 3 Station Average (Site 63, 64 and 65)	Above Line 1 (10.13 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 outlooks use slightly different classification intervals than those used by the 2008-LORS.

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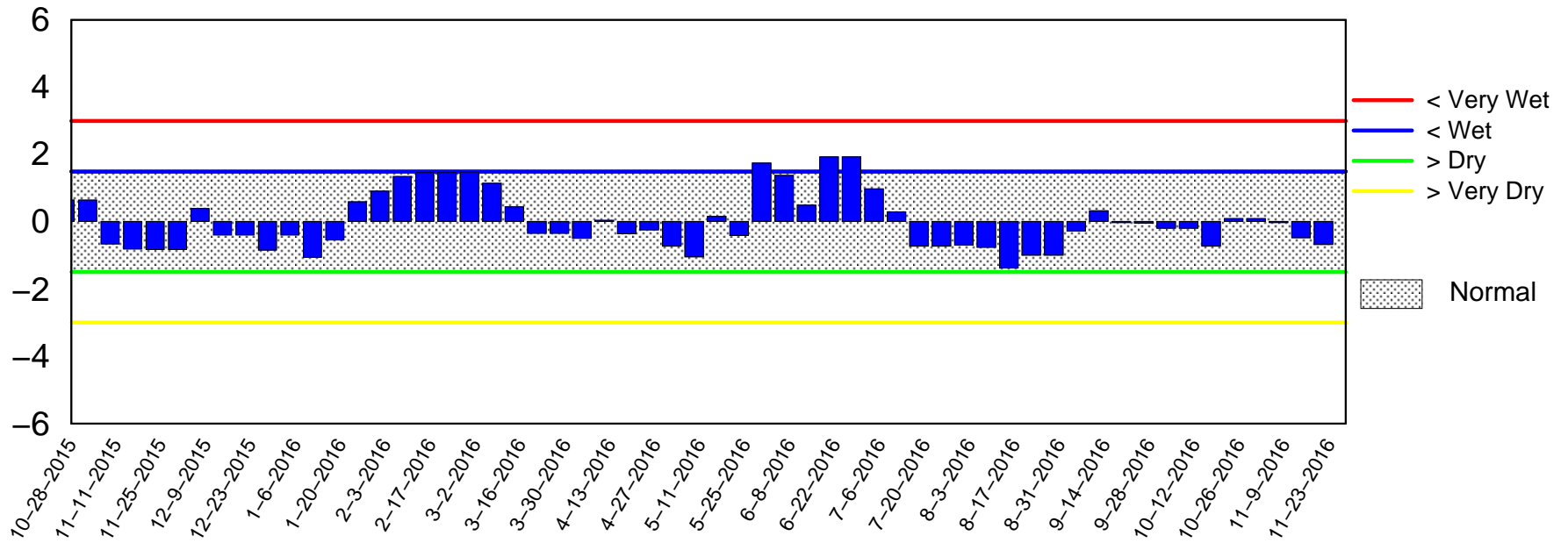
# Lake Okeechobee SFWMM Nov 2016 Dynamic Position Analysis



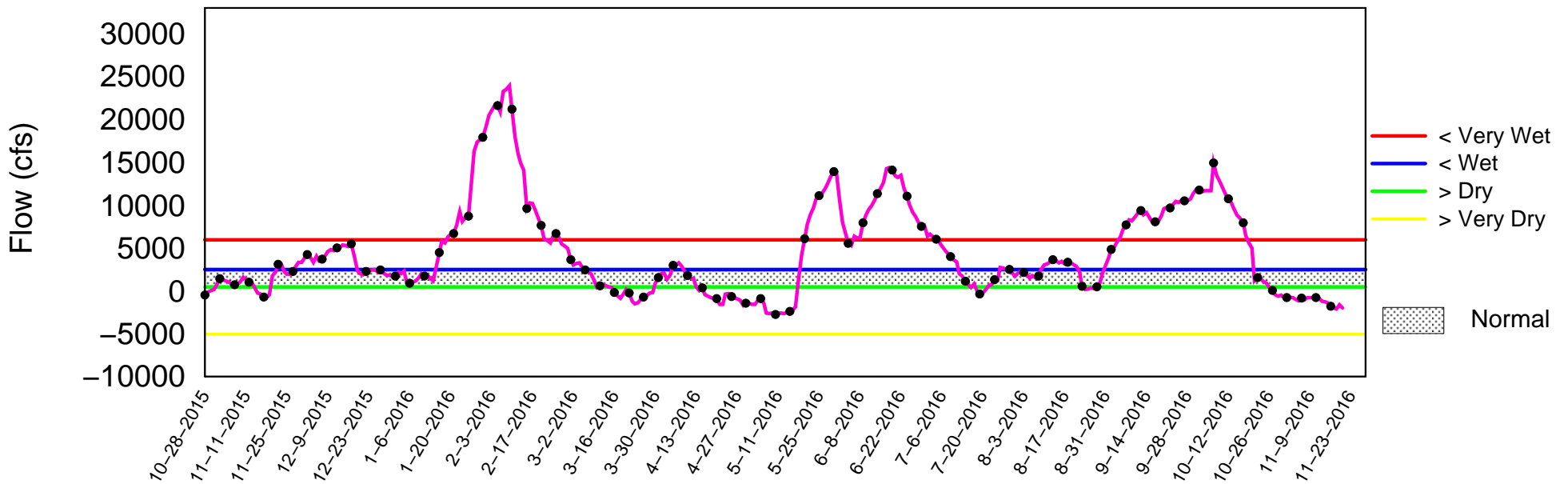
(See assumptions on the Position Analysis Results website)

# Tributary Basin Condition Indicators as of November 21 2016

## Palmer Index



## Lake Okeechobee Net Inflow (LONIN) 14-day Running Average



Mon Nov 21 17:42:11 EST 2016

# 2008 LORS

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

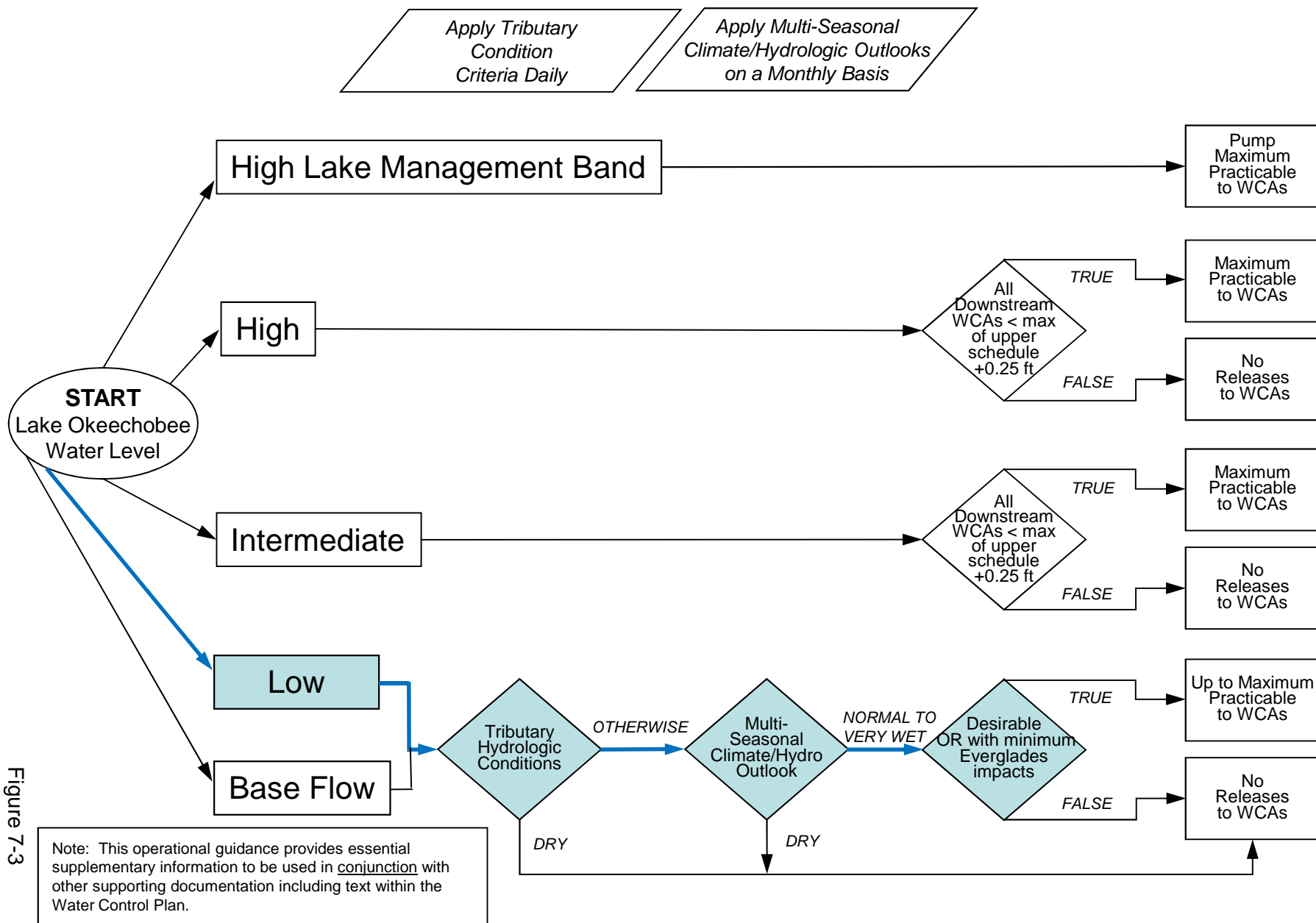


Figure 7-3



# 2008 LORS

## 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

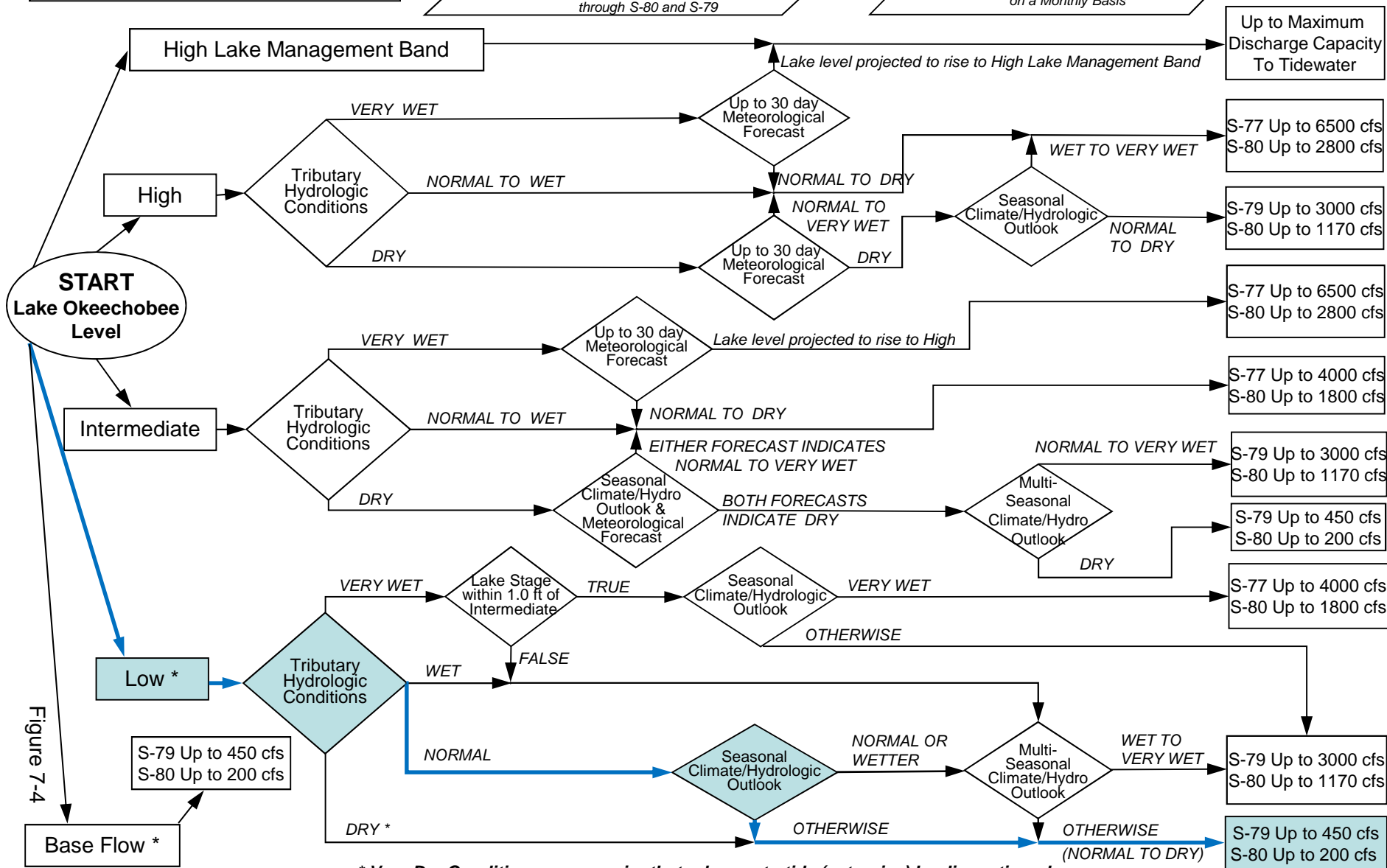
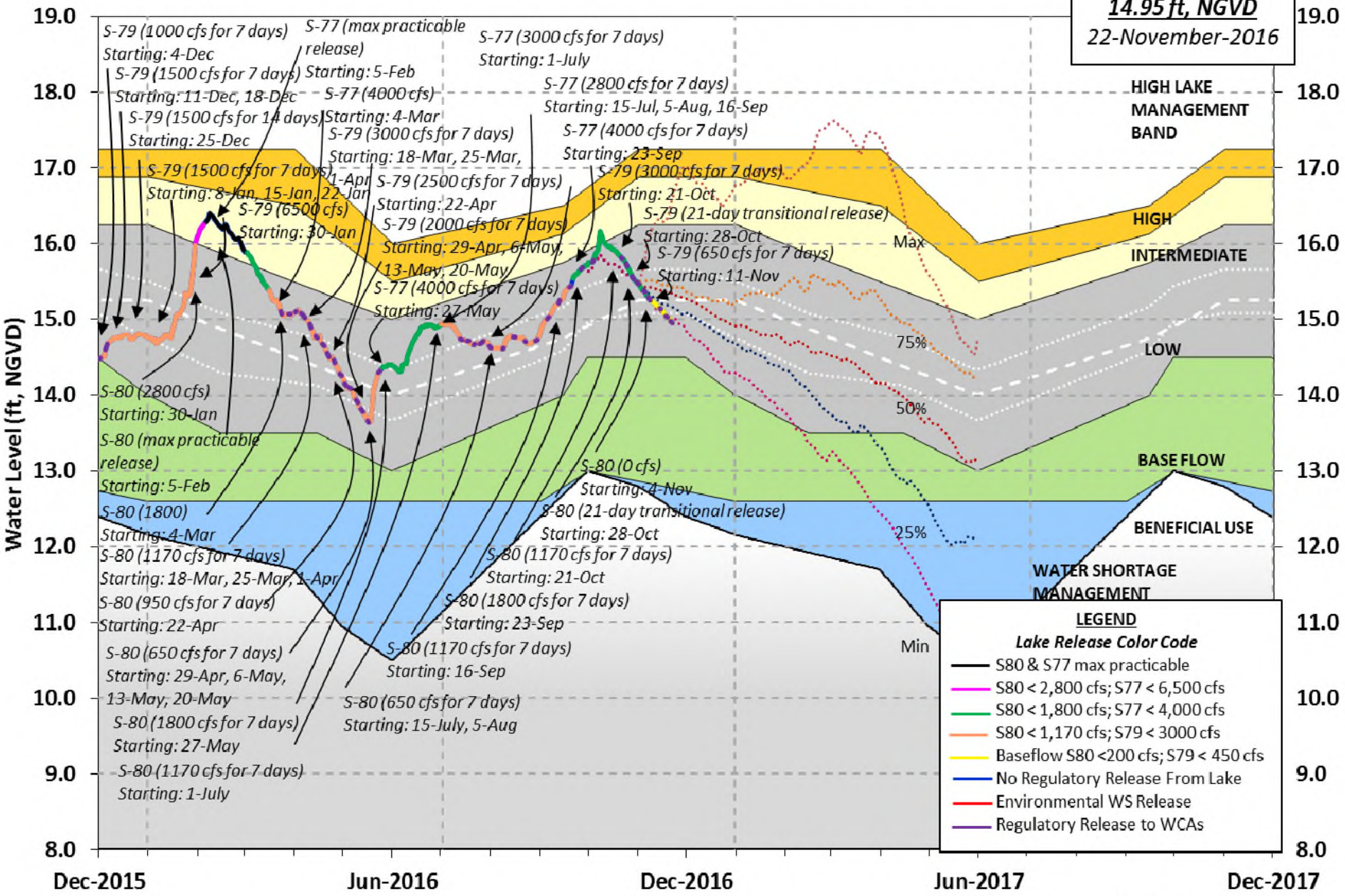


Figure 7-4

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

# Lake Okeechobee Water Level History and Projected Stages

**14.95 ft, NGVD**  
22-November-2016



**LEGEND**

**Lake Release Color Code**

- S80 & S77 max practicable
- S80 < 2,800 cfs; S77 < 6,500 cfs
- S80 < 1,800 cfs; S77 < 4,000 cfs
- S80 < 1,170 cfs; S79 < 3000 cfs
- Baseflow S80 < 200 cfs; S79 < 450 cfs
- No Regulatory Release From Lake
- Environmental WS Release
- Regulatory Release to WCAs

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

Data Ending 2400 hours    20 NOV 2016

Okeechobee Lake Regulation	Elevation	Last Year	2YRS Ago
	(ft-NGVD)	(ft-NGVD)	(ft-NGVD)
*Okeechobee Lake Elevation	14.98	14.42	15.54 (Official Elv)
Bottom of High Lake Mngmt=	17.25	Top of Water Short Mngmt=	12.53
Currently in Operational Management Band			
Simulated Average LORS2008 [1965-2000]		13.85	
Difference from Average LORS2008		1.13	
20NOV (1965-2007) Period of Record Average		14.91	
Difference from POR Average		0.06	

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

++Navigation Depth (Based on 2007 Channel Condition Survey) Route 1 ÷ 8.92'  
 ++Navigation Depth (Based on 2008 Channel Condition Survey) Route 2 ÷ 7.12'  
 Bridge Clearance = 49.36'

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

L001	L005	L006	LZ40	S4	S352	S308	S133
14.70	14.98	15.08	15.01	15.17	15.24	14.96	14.70

\*Combination Okeechobee Avg-Daily Lake Average = 14.98  
 (\*See Note)

Okeechobee Inflows (cfs):

S65E	812	C5	-102	Fisheating Cr	8
S154	0	S191	0	S135 Pumps	0
S84	0	S133 Pumps	0	S2 Pumps	0
S84X	0	S127 Pumps	0	S3 Pumps	0
S71	0	S129 Pumps	0	S4 Pumps	0
S72	0	S131 Pumps	0		
Total Inflows:	718				

Okeechobee Outflows (cfs):

S135 Culverts	0	S354	563	S77	934
S127 Culverts	0	S351	903	S77Below	1219
S129 Culverts	0	S352	175	S308	130
S131 Culverts	0	L8 Canal Pt	218	S308Below	33
Total Outflows:	2923				



S310:	15.10		69						
S3 Pumps:	11.06	15.23	0	0	0	0			(cfs)
S354:	15.23	11.06	563	1.0	0.9				
S2 Pumps:	10.95	15.22	0	0	0	0	0		(cfs)
S351:	15.22	10.95	903	1.4	1.4	1.5			
S352:	15.19	10.83	175	0.2	0.2				
C10A:	-NR-	13.86		0.0	0.0	8.0	0.0	0.0	
L8 Canal PT		13.69	218						

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S351 and S352 Temporary Pumps/S354 Spillway

S351:	10.95	15.22	903	-NR--NR--NR--NR--NR--NR-
S352:	10.83	15.19	175	-NR--NR--NR--NR-
S354:	11.06	15.23	563	-NR--NR--NR--NR-

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Caloosahatchee River (S77, S78, S79)

S47B:	13.82	10.64		0.0	0.0
S47D:	10.79	10.79	5	6.1	

S77:

Spillway and Sector Flow:							
	14.97	10.93	929	0.0	3.5	0.0	0.0
Flow Due to Lockages+:			5				

S77 Below USGS Flow Gage 1219

S78:

Spillway and Sector Flow:							
	10.67	2.82	679	0.0	0.0	0.0	2.0
Flow Due to Lockages+:			17				

S79:

Spillway and Sector Flow:										
	2.81	1.46	1109	0.0	0.0	0.0	1.0	1.0	1.0	1.0

0.0

Flow Due to Lockages+:	9
Percent of flow from S77	84%
Chloride (ppm)	51

St. Lucie Canal (S308, S80)

S308:

Spillway and Sector Flow:							
	14.92	14.14	128	0.0	0.0	0.0	0.0
Flow Due to Lockages+:			2				

S308 Below USGS Flow Gage 33

S153:	18.82	13.92	0	0.0	0.0
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S80:

Spillway and Sector Flow:									
	-NR-	-NR-	-NR-	0.0	0.0	0.0	0.0	0.0	0.0
Flow Due to Lockages+:			-NR-						
Percent of flow from S308			-NR-%						

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.

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	----- Wind ---				
Daily Precipitation Totals	1-Day	3-Day	7-Day	Direction	
Speed	(inches)	(inches)	(inches)	(Degø)	
(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	0.00	0.00	20	1
S78:	0.00	0.00	0.59	288	1
S79:	0.00	0.00	0.00	332	1
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:	0.00	0.00	0.00	270	0
S80:	0.00	0.00	0.00	-NR-	-NR-
Okeechobee Average	0.00	0.00	0.00		
(Sites S78, S79 and S80 not included)					
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Oke Nexrad Basin Avg	0.00	0.00	0.04		
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Okeechobee Lake Elevations	20 NOV 2016	14.98 Difference from
20NOV16		
20NOV16 -1 Day =	19 NOV 2016	15.02 0.04
20NOV16 -2 Days =	18 NOV 2016	15.03 0.05
20NOV16 -3 Days =	17 NOV 2016	15.05 0.07
20NOV16 -4 Days =	16 NOV 2016	15.07 0.09
20NOV16 -5 Days =	15 NOV 2016	15.11 0.13
20NOV16 -6 Days =	14 NOV 2016	15.13 0.15
20NOV16 -7 Days =	13 NOV 2016	15.15 0.17
20NOV16 -30 Days =	21 OCT 2016	15.81 0.83
20NOV16 -1 Year =	20 NOV 2015	14.42 -0.56
20NOV16 -2 Year =	20 NOV 2014	15.54 0.56

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

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Lake Okeechobee Net Inflow (LONIN)

Average Flow over the previous 14 days					Avg-Daily Flow
20NOV16	Today =	20 NOV 2016	-1979	MON	-5530
20NOV16	-1 Day =	19 NOV 2016	-1640	SUN	947
20NOV16	-2 Days =	18 NOV 2016	-2111	SAT	-1080
20NOV16	-3 Days =	17 NOV 2016	-2020	FRI	-1466
20NOV16	-4 Days =	16 NOV 2016	-1794	THU	-6164
20NOV16	-5 Days =	15 NOV 2016	-1348	WED	-NR-
20NOV16	-6 Days =	14 NOV 2016	-1241	TUE	-1319
20NOV16	-7 Days =	13 NOV 2016	-1161	MON	633
20NOV16	-8 Days =	12 NOV 2016	-967	SUN	-3662
20NOV16	-9 Days =	11 NOV 2016	-768	SAT	-1332
20NOV16	-10 Days =	10 NOV 2016	-780	FRI	-950
20NOV16	-11 Days =	09 NOV 2016	-750	THU	-2098
20NOV16	-12 Days =	08 NOV 2016	-796	WED	1409
20NOV16	-13 Days =	07 NOV 2016	-990	TUE	-5110

S65E

Average Flow over previous 14 days					Avg-Daily Flow
20NOV16	Today=	20 NOV 2016	950	MON	932
20NOV16	-1 Day =	19 NOV 2016	957	SUN	915
20NOV16	-2 Days =	18 NOV 2016	965	SAT	912
20NOV16	-3 Days =	17 NOV 2016	973	FRI	918
20NOV16	-4 Days =	16 NOV 2016	980	THU	921
20NOV16	-5 Days =	15 NOV 2016	988	WED	966
20NOV16	-6 Days =	14 NOV 2016	995	TUE	939
20NOV16	-7 Days =	13 NOV 2016	1005	MON	933
20NOV16	-8 Days =	12 NOV 2016	1019	SUN	971
20NOV16	-9 Days =	11 NOV 2016	1034	SAT	980
20NOV16	-10 Days =	10 NOV 2016	1047	FRI	974
20NOV16	-11 Days =	09 NOV 2016	1079	THU	927
20NOV16	-12 Days =	08 NOV 2016	1130	WED	982
20NOV16	-13 Days =	07 NOV 2016	1171	TUE	1026

Lake Okeechobee Outlets Last 14 Days

DATE	S-77	Below S-77	S-78	S-79
	Discharge (ALL DAY) (AC-FT)	Discharge (ALL-DAY) (AC-FT)	Discharge (ALL DAY) (AC-FT)	Discharge (ALL DAY) (AC-FT)
20 NOV 2016	1853	2417	1380	2217
19 NOV 2016	1812	1888	1399	2130
18 NOV 2016	1415	1631	-NR-	1524
17 NOV 2016	1239	1358	-NR-	604
16 NOV 2016	1245	1114	-NR-	629
15 NOV 2016	1643	1802	719	1011
14 NOV 2016	1847	2190	1384	1276
13 NOV 2016	1852	2107	1321	1191
12 NOV 2016	-NR-	1961	1085	1157
11 NOV 2016	-NR-	2158	851	1050
10 NOV 2016	-NR-	2186	710	1147
09 NOV 2016	1960	627	1059	1973
08 NOV 2016	2840	3236	5344	3136

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)
07 NOV 2016	3282	4154	12925	2966	
20 NOV 2016	138	1791	347	978	432
19 NOV 2016	126	1991	960	904	434
18 NOV 2016	136	1920	1251	789	449
17 NOV 2016	119	1896	1063	795	460
16 NOV 2016	133	1600	849	962	448
15 NOV 2016	-NR-	1573	865	984	-NR-
14 NOV 2016	144	1836	700	817	439
13 NOV 2016	150	1664	329	902	453
12 NOV 2016	173	1814	522	894	445
11 NOV 2016	140	1735	718	896	445
10 NOV 2016	59	2076	1077	819	449
09 NOV 2016	40	1826	980	557	447
08 NOV 2016	67	1610	954	775	452
07 NOV 2016	46	1297	734	385	463

DATE	S-308 Discharge (ALL DAY) (AC-FT)	Below S-308 Discharge (ALL-DAY) (AC-FT)	S-80 Discharge (ALL-DAY) (AC-FT)
20 NOV 2016	257	66	-NR-
19 NOV 2016	280	-25	51
18 NOV 2016	541	416	25
17 NOV 2016	4	118	39
16 NOV 2016	6	-10	38
15 NOV 2016	7	12	31
14 NOV 2016	106	-52	56
13 NOV 2016	276	98	64
12 NOV 2016	268	-80	64
11 NOV 2016	249	3	49
10 NOV 2016	465	108	49
09 NOV 2016	237	-58	56
08 NOV 2016	6	65	39
07 NOV 2016	3	31	28

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

(I) - Flows preceded 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 Okeechobee 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/>

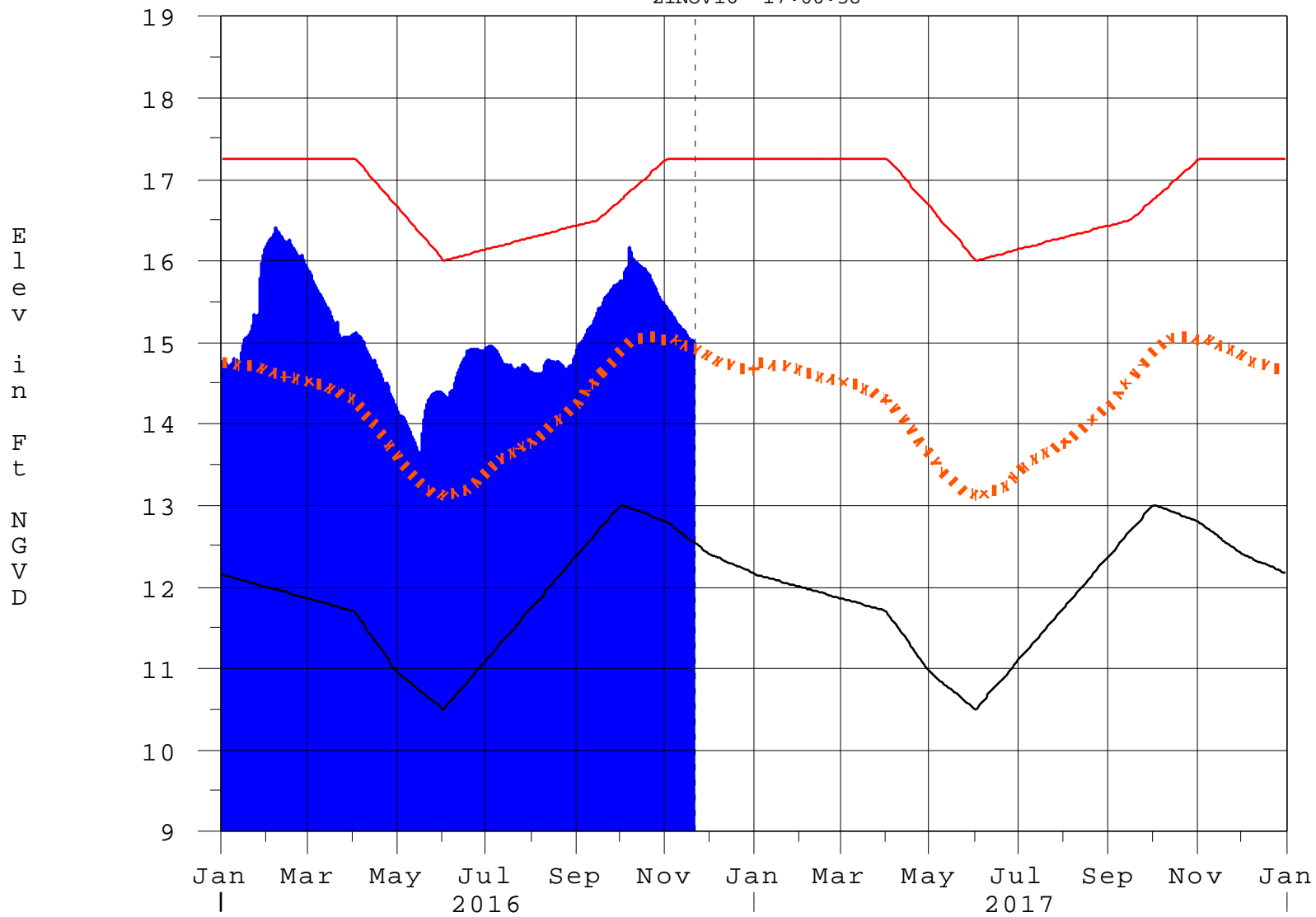
\$ For information regarding Lake Okeechobee Service Area water restrictions please refer to [www.sfwmd.gov](http://www.sfwmd.gov)

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Report Generated 21NOV2016 @ 17:08 \*\* Preliminary Data - Subject to Revision  
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# Lake Okeechobee

21NOV16 17:00:38



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

# Classification Tables

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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

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Tributary Hydrologic Classification*	Palmer Index Class Limits	2-wk Mean L.O. Net Inflow Class Limits
Very Wet	3.0 or greater	Greater $\geq$ 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\***

<b>Lake Net Inflow Prediction</b> <b>[million acre-feet]</b>	<b>Equivalent Depth**</b> <b>[feet]</b>	<b>Lake Okeechobee Net Inflow Seasonal Outlook</b>
> 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\*

<b>Lake Net Inflow Prediction</b> <b>[million acre-feet]</b>	<b>Equivalent Depth**</b> <b>[feet]</b>	<b>Lake Okeechobee</b> <b>Net Inflow</b> <b>Multi-Seasonal Outlook</b>
> 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\***

<b>6-15 Day Precipitation Outlook Categories</b>	<b>WSE Decision Tree Categories</b>
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