Application of the Lake Okeechobee Regulation Schedule (LORS2008) on 11/06/2017 (Developing ENSO La Nina 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 Neutral years[3] and a sub-sampling of warm years of the Atlantic Multi-decadal Oscillation (AMO) in combination with La Nina 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 Neutral ENSO Years[3]		Sub-sampling of AMO Warm + Neutral ENSO Years[4]	
	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition
Current (Nov-Apr)	N/A	N/A	1.21	Normal	1.02	Normal	0.92	Normal
Multi Seasonal (Nov-Oct)	N/A	N/A	3.65	Wet	3.71	Wet	3.38	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:

8492 cfs 14-day running average for Lake Okeechobee Net Inflow through 11/6/2017.
According to the classification in Tributary Hydrologic Conditions table, this condition is Very Wet.

3.00 for Palmer Index on 11/4/2017.
According to the classification in Tributary Hydrologic Conditions table, this condition is Very Wet.

The wetter of the two conditions above is **Very Wet**.

LORS2008 Classification Tables:

Lake Okeechobee Stage on 11/6/2017

Lake Okeechobee Stage: **16.94 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	← 16.94
	Intermediate sub-band	16.25	
	Low sub-band	14.50	
Base Flow sub-band		12.85	
Beneficial Use sub-band		12.75	
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: S-77 Up to 6500 cfs & S-80 Up to 2800 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**
- **Environmental Conditions for Systems Operations**

Back to Lake Okeechobee Operations Main Page

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LORS2008 Implementation on 11/6/2017 (ENSO Neutral Condition):

Status for week ending 11/6/2017:

District wide, Raindar rainfall was 0.08 inches for the week. Lake stage on 11/6/2017 was 16.94 ft, down 0.11 ft from last week.

The updated Mid-October 2017 SFWMM Dynamic Position Analysis percentile graph for Lake Okeechobee show that the current lake stage is in the High Operational Sub-Band.

The 2008 LORS Tributary Hydrologic Condition (THC) tributary is classified as **Very Wet**. The PDSI indicates Very Wet condition and the LONIN is Very Wet. The THC classification is based on the wetter of the two indices .

Water Supply Risk Evaluation

Area	Indicator	Value	Color Coded Scoring Scheme
LOK	Projected LOK Stage for the next two months	Intermediate Sub Band	L
	Palmer Index for LOK Tributary Conditions	3.00 (Normal)	L
	CPC Precipitation Outlook	1 month: Below Normal	M
		3 months: Below Normal	M
	LOK Seasonal Net Inflow Outlook	1.02 ft (Normal)	M
	ENSO La Nina Years		
	LOK Multi-Seasonal Net Inflow Outlook	3.71 ft (Normal)	L
	ENSO La Nina Years		
WCAs	WCA 1: Site 1-7, Site 1-8T, & Site 1-9 Average	Above Line 1 (17.61 ft)	L
	WCA 2A: Site 2-17 HW	Above Line 1 (13.81 ft)	L
	WCA-3A: 3 Station Average (Site 63, 64 and 65)	Above Line 1 (12.28 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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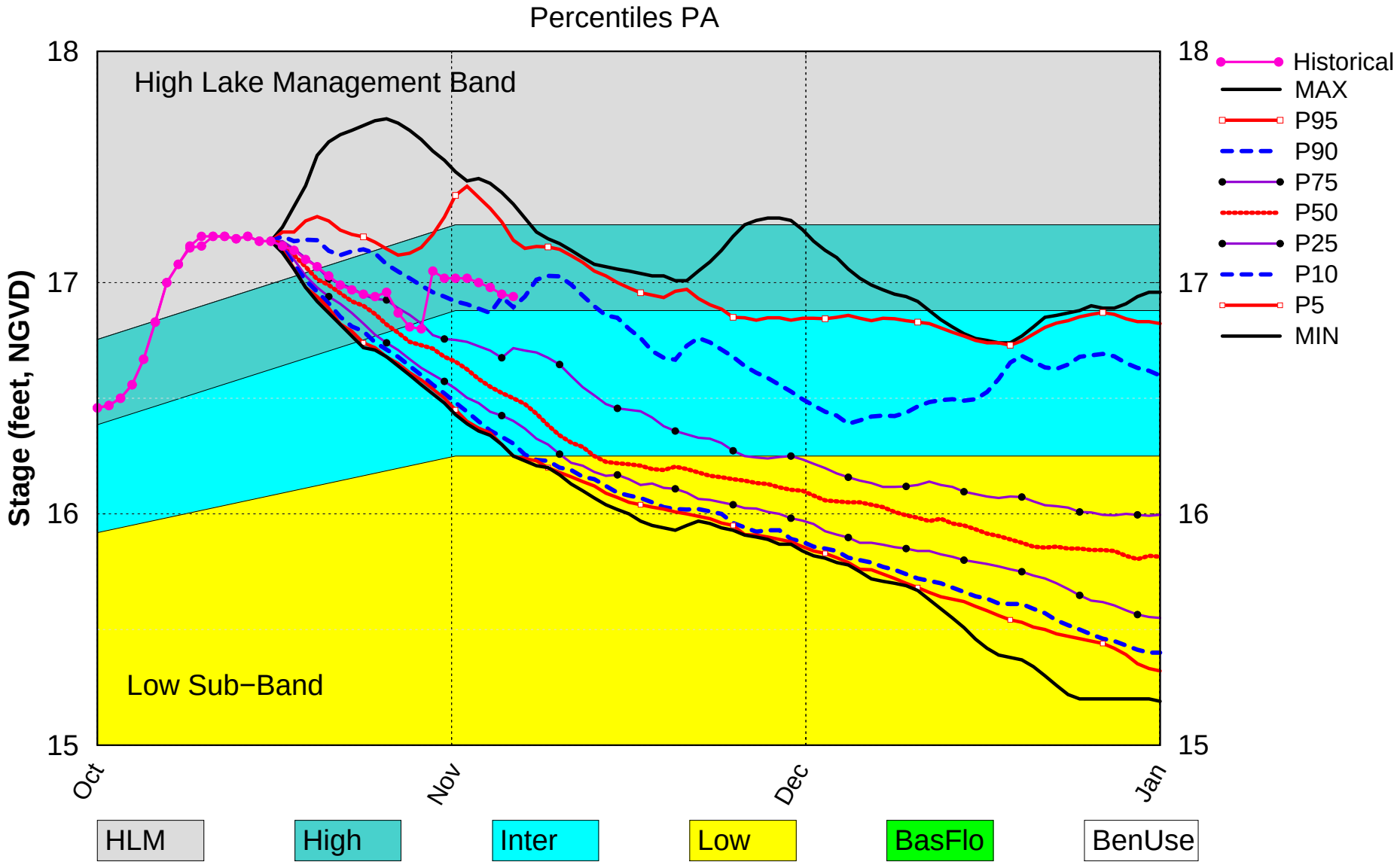
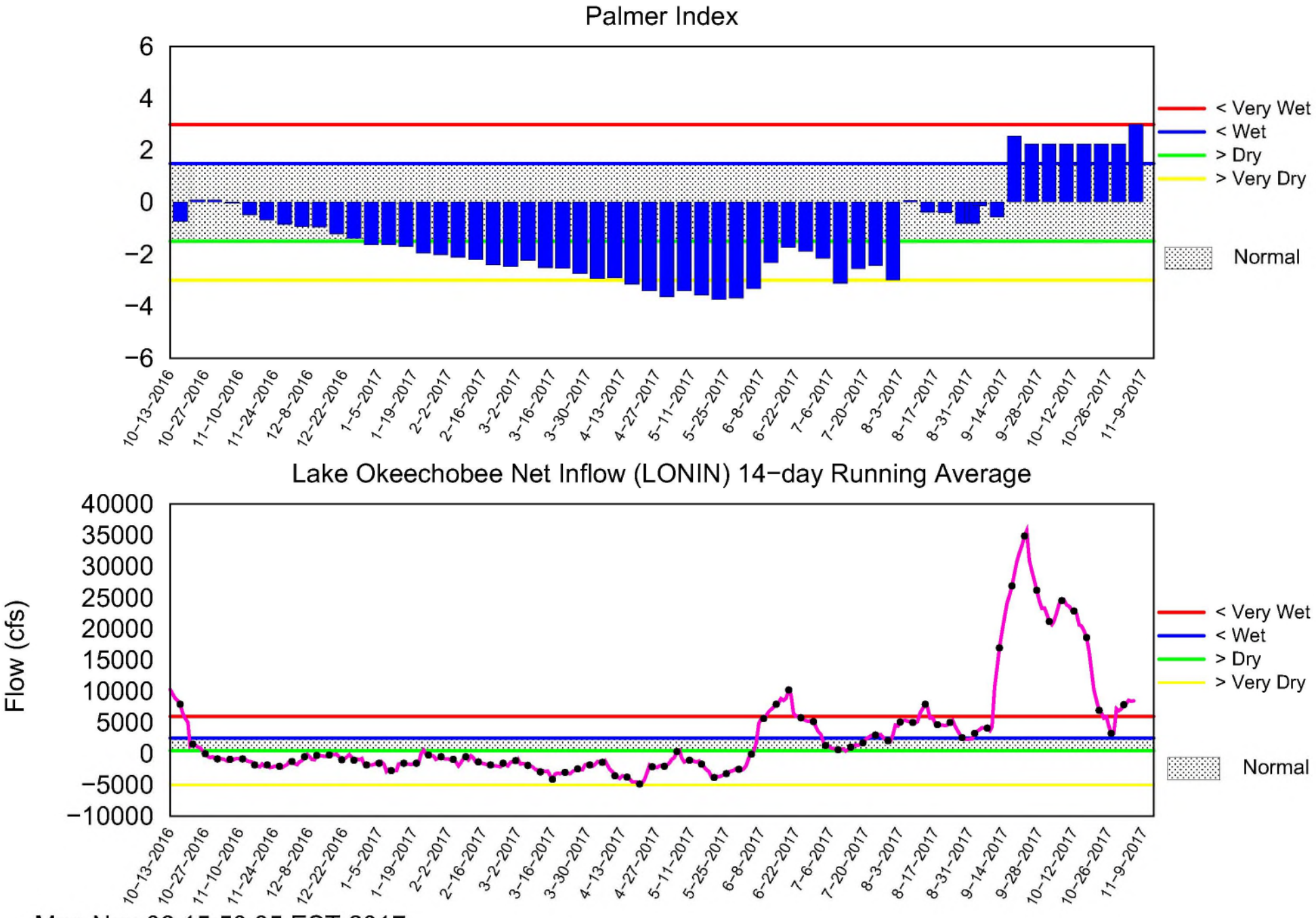
Lake Okeechobee SFWMM Oct 2017 Mid−Mon Dynamic Position Analysis



(See assumptions on the Position Analysis Results website)

Mon Nov 6 17:30:26 EDT 2017

Tributary Basin Condition Indicators as of November 6 2017



Mon Nov 06 15:50:35 EST 2017

2008 LORS

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

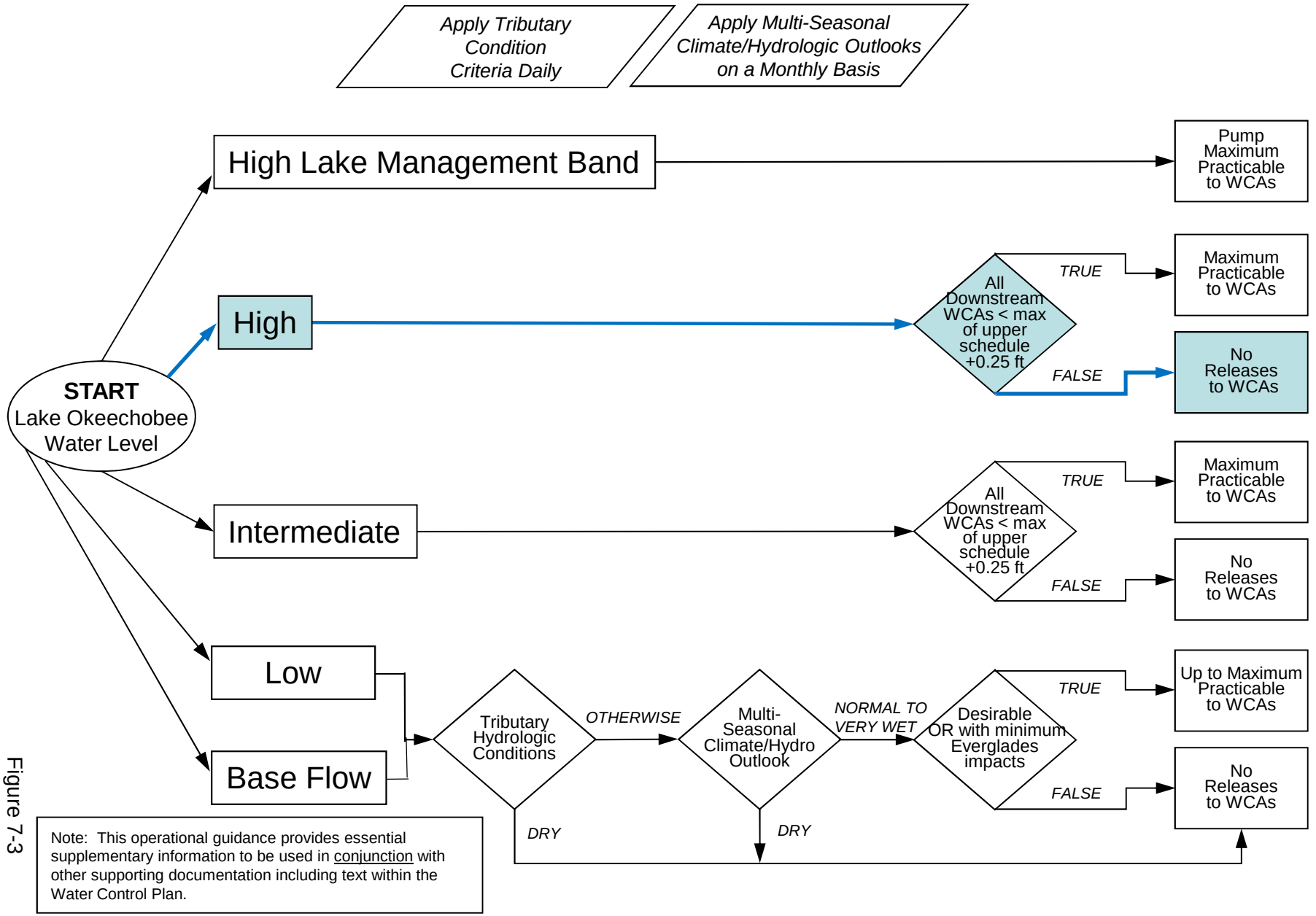


Figure 7-3

2008 LORS

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

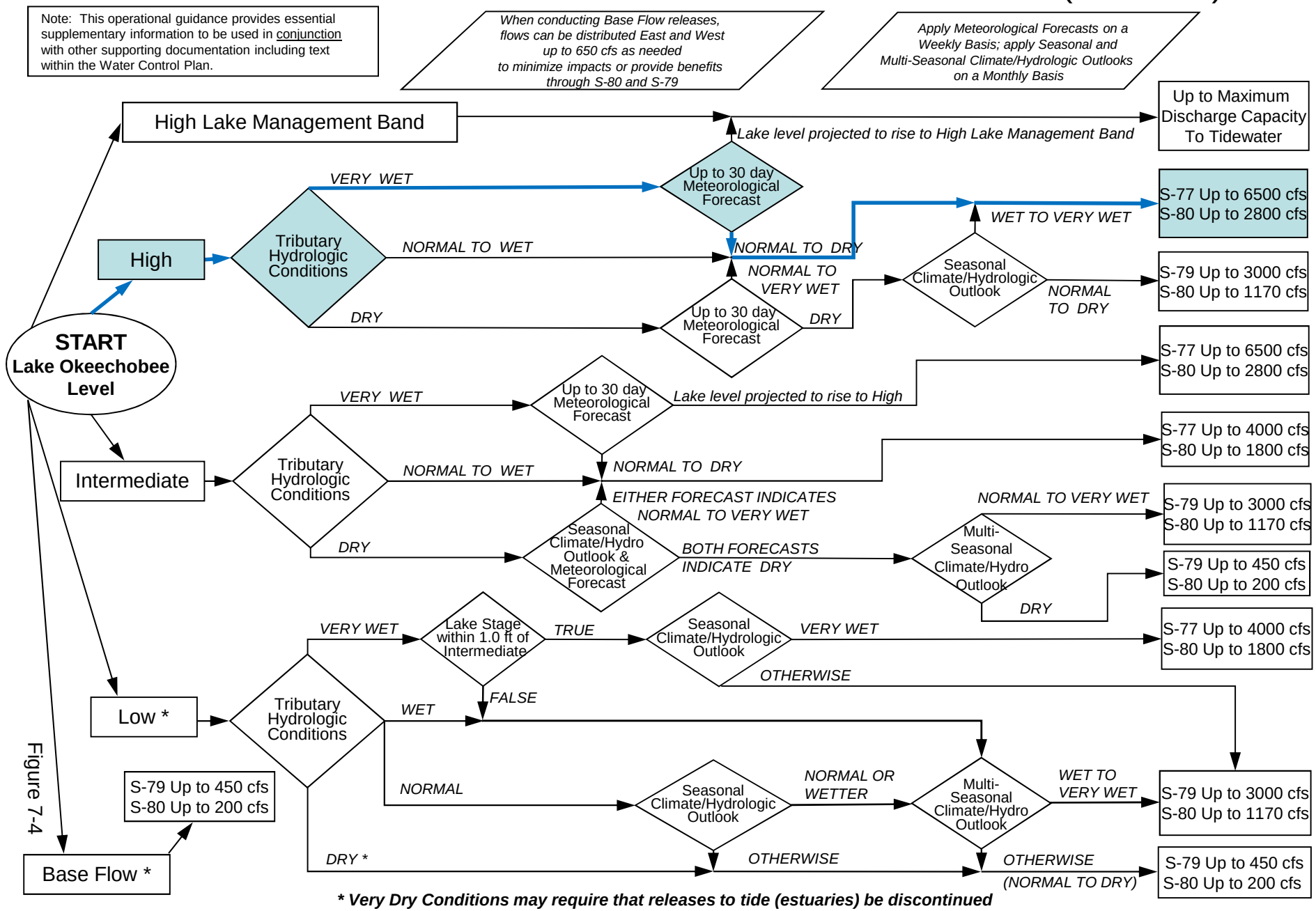
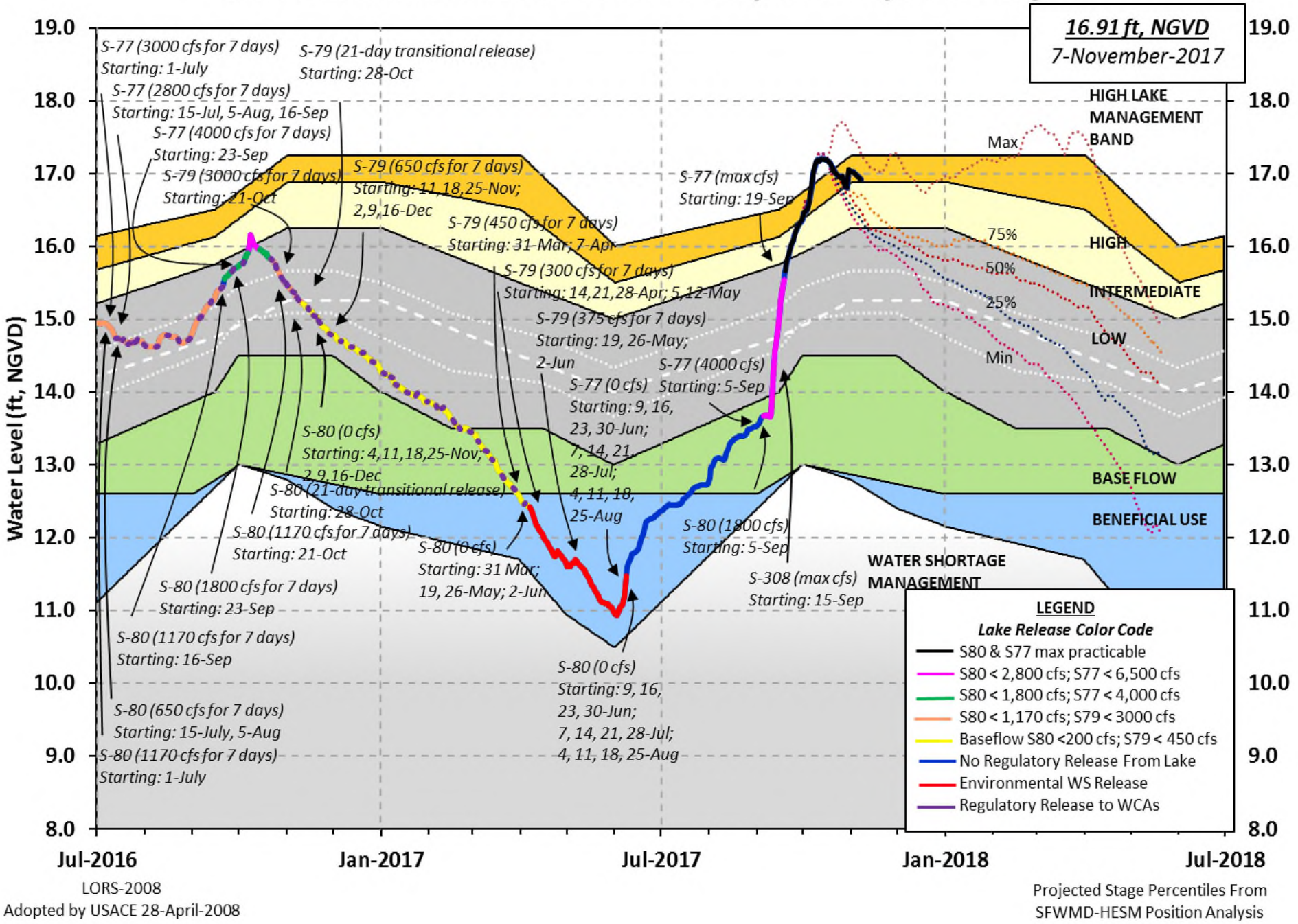


Figure 7-4

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 05 NOV 2017

Okeechobee Lake Regulation	Elevation (ft-NGVD)	Last Year (ft-NGVD)	2YRS Ago (ft-NGVD)
*Okeechobee Lake Elevation	16.94	15.32	14.49 (Official Elv)

Bottom of High Lake Mngmt= 17.25 Top of Water Short Mngmt= 12.73
Currently in Operational Management Band

Simulated Average LORS2008 [1965-2000] 13.96
Difference from Average LORS2008 2.98

05NOV (1965-2007) Period of Record Average 15.05
Difference from POR Average 1.90

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

++Navigation Depth (Based on 2007 Channel Condition Survey) Route 1 ÷ 10.88'
++Navigation Depth (Based on 2008 Channel Condition Survey) Route 2 ÷ 9.08'
Bridge Clearance = 46.97'

---

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

L001	L005	L006	LZ40	S4	S352	S308	S133
16.85	17.10	16.97	16.89	16.98	17.09	16.84	16.79

*Combination Okeechobee Avg-Daily Lake Average = 16.94 (*See Note)

Okeechobee Inflows (cfs):

S65E	2007	S65EX1	1152	Fisheating Cr	958
S154	166	S191	245	S135 Pumps	0
S84	999	S133 Pumps	0	S2 Pumps	0
S84X	0	S127 Pumps	68	S3 Pumps	0
S71	485	S129 Pumps	47	S4 Pumps	0
S72	111	S131 Pumps	0	C5	0

Total Inflows: 6238

Okeechobee Outflows (cfs):

S135 Culverts	0	S354	0	S77	5061
S127 Culverts	0	S351	0	S308	2739
S129 Culverts	-0	S352	0		
S131 Culverts	0	L8 Canal Pt	14		

Total Outflows: 7814

****S77 below flow meter is being used to compute Total Outflow.
****S308 below flow meter is being used to compute Total Outflow.

Okeechobee Pan Evaporation (inches):
  S77 0.17 S308 0.15
  Average Pan Evap x 0.75 Pan Coefficient = 0.12" = 0.01'

Lake Average Precipitation using NEXRAD: = 0.02" = 0.00'

Evaporation - Precipitation: = 0.10" = 0.01'
Evaporation - Precipitation using Lake Area of 730 square miles
  is equal to 1963 cfs out of the lake.
Lake Okeechobee (Change in Storage) Flow is -2269 cfs or -4500 AC-FT

	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:	13.57	16.83	0	0	0	0	0	0	(cfs)		
S193:											
S191:	18.08	16.83	245	0.5	0.0	0.5					
S135 Pumps:	13.41	16.81	0	0	0	0	0		(cfs)		
S135 Culverts:			0	0.0	0.0						
North West Shore											
S65E:	21.05	16.72	2007	0.5	0.9	1.3	1.0	1.2	1.2		
S65EX1:	21.05	16.72	1152								
S127 Pumps:	13.37	16.85	68	35	18	11	0	0	(cfs)		
S127 Culvert:			0	0.0							
S129 Pumps:	12.83	16.88	47	48	0	0			(cfs)		
S129 Culvert:			-0	0.1							
S131 Pumps:	12.89	16.88	0	0	0				(cfs)		
S131 Culvert:			0								
Fisheating Creek											
nr Palmdale		32.69	958								
nr Lakeport											
C5:		-NR-	0	-NR-	-NR-	-NR-					
South Shore											
S4 Pumps:	11.23	16.94	0	0	0	0			(cfs)		
S169:	14.87	11.22	0	0.0	0.0	0.0					
S310:	16.88		9								

```
  S3 Pumps:    10.11     16.97       0      0    0    0            (cfs)
  S354:        16.97     10.11       0    0.0  0.0
  S2 Pumps:     9.17     16.99       0      0    0    0    0       (cfs)
  S351:        16.99      9.17       0    0.0  0.0  0.0
  S352:        17.07      9.45       0    0.0  0.0
  C10A:         -NR-     14.39            8.0   8.0   8.0   0.0   0.0
  L8 Canal PT            14.42      14
```

S351 and S352 Temporary Pumps/S354 Spillway

```
  S351:         9.17     16.99       0  -NR--NR--NR--NR--NR--NR-
  S352:         9.45     17.07       0  -NR--NR--NR--NR-
  S354:        10.11     16.97       0  -NR--NR--NR--NR-
```

```
Caloosahatchee River (S77, S78, S79)
  S47B:        12.81     10.93            0.5  1.0
  S47D:        10.97     10.97      82    6.5
  S77:
    Spillway and Sector Flow:
                16.67     11.17  ******  5.5  5.5  0.0  5.5
    Flow Due to Lockages+:          10

  S77 Below USGS Flow Gage        5051

  S78:
    Spillway and Sector Flow:
                10.54      3.26    5758    5.0  5.0  5.0  4.5
    Flow Due to Lockages+:          15

  S79:
    Spillway and Sector Flow:
                 2.98      1.55    8194    4.0  4.0  4.0  4.0  4.0  4.0  4.0
4.0
    Flow Due to Lockages+:           8
    Percent of flow from S77        62%
    Chloride            (ppm)     53


St. Lucie Canal (S308, S80)
  S308:
    Spillway and Sector Flow:
                16.84     16.53  ******  8.0  8.0  8.0  8.0
    Flow Due to Lockages+:           0

  S308 Below USGS Flow Gage       2739
  S153:        18.49     16.25     188    0.5  0.5
  S80:
    Spillway and Sector Flow:
                11.56      2.76    4336    4.5  2.5  0.0  4.0  2.5  4.0  4.5
    Flow Due to Lockages+:          13
    Percent of flow from S308       63%

  Steele Point Top Salinity    (mg/ml) 9604
  Steele Point Bottom Salinity (mg/ml) ****
```

Speedy Point Top Salinity (mg/ml) 1104
Speedy Point Bottom Salinity (mg/ml) 2318

+ 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)	Wind 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	1.60	1.60	316	3
S78:	0.26	1.43	1.43	322	1
S79:	0.00	10.42	10.42	337	0
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:	0.02	0.05	0.05	69	4
S80:	0.00	0.00	0.00	274	1
Okeechobee Average (Sites S78, S79 and S80 not included)	0.01	0.13	0.13		
Oke Nexrad Basin Avg	0.02	0.04	0.05		

Okeechobee Lake Elevations 05 NOV 2017 16.94 Difference from 05NOV17

05NOV17 -1 Day =	04 NOV 2017	16.95	0.01
05NOV17 -2 Days =	03 NOV 2017	16.98	0.04
05NOV17 -3 Days =	02 NOV 2017	17.00	0.06
05NOV17 -4 Days =	01 NOV 2017	17.02	0.08
05NOV17 -5 Days =	31 OCT 2017	16.16	-0.78
05NOV17 -6 Days =	30 OCT 2017	15.84	-1.10
05NOV17 -7 Days =	29 OCT 2017	17.05	0.11
05NOV17 -30 Days =	06 OCT 2017	17.00	0.06
05NOV17 -1 Year =	05 NOV 2016	15.32	-1.62
05NOV17 -2 Year =	05 NOV 2015	14.49	-2.45

Long Term Mean 30day Avearge ET for Lake Alfred (Inches) = 3.10

Lake Okeechobee Net Inflow (LONIN)

		Average Flow over the previous 14 days			Avg-Daily Flow
05NOV17	Today =	05 NOV 2017	8496	MON	5535
05NOV17	-1 Day =	04 NOV 2017	8474	SUN	1189
05NOV17	-2 Days =	03 NOV 2017	8416	SAT	5475
05NOV17	-3 Days =	02 NOV 2017	8040	FRI	5137
05NOV17	-4 Days =	01 NOV 2017	7854	THU	204438
05NOV17	-5 Days =	31 OCT 2017	-6726	WED	79943
05NOV17	-6 Days =	30 OCT 2017	-12081	TUE	******
05NOV17	-7 Days =	29 OCT 2017	7434	MON	64841
05NOV17	-8 Days =	28 OCT 2017	3266	SUN	7206
05NOV17	-9 Days =	27 OCT 2017	3164	SAT	-3880
05NOV17	-10 Days =	26 OCT 2017	4549	FRI	-8616
05NOV17	-11 Days =	25 OCT 2017	5926	THU	11851
05NOV17	-12 Days =	24 OCT 2017	5934	WED	6878
05NOV17	-13 Days =	23 OCT 2017	6165	TUE	4717

S65E

		Average Flow over previous 14 days			Avg-Daily Flow
05NOV17	Today=	05 NOV 2017	2208	MON	2156
05NOV17	-1 Day =	04 NOV 2017	2162	SUN	2439
05NOV17	-2 Days =	03 NOV 2017	2097	SAT	2661
05NOV17	-3 Days =	02 NOV 2017	2024	FRI	2862
05NOV17	-4 Days =	01 NOV 2017	1951	THU	3166
05NOV17	-5 Days =	31 OCT 2017	1856	WED	3148
05NOV17	-6 Days =	30 OCT 2017	1762	TUE	2895
05NOV17	-7 Days =	29 OCT 2017	1691	MON	2866
05NOV17	-8 Days =	28 OCT 2017	1651	SUN	1563
05NOV17	-9 Days =	27 OCT 2017	1726	SAT	1225
05NOV17	-10 Days =	26 OCT 2017	1881	FRI	1175
05NOV17	-11 Days =	25 OCT 2017	2082	THU	1672
05NOV17	-12 Days =	24 OCT 2017	2196	WED	1558
05NOV17	-13 Days =	23 OCT 2017	2331	TUE	1525

S65EX1

		Average Flow over previous 14 days			Avg-Daily Flow
05NOV17	Today=	05 NOV 2017	1606	MON	1152
05NOV17	-1 Day =	04 NOV 2017	1691	SUN	1148
05NOV17	-2 Days =	03 NOV 2017	1796	SAT	1225
05NOV17	-3 Days =	02 NOV 2017	1906	FRI	1267
05NOV17	-4 Days =	01 NOV 2017	2018	THU	1325
05NOV17	-5 Days =	31 OCT 2017	2144	WED	1566
05NOV17	-6 Days =	30 OCT 2017	2266	TUE	1614
05NOV17	-7 Days =	29 OCT 2017	2397	MON	1680
05NOV17	-8 Days =	28 OCT 2017	2523	SUN	1788
05NOV17	-9 Days =	27 OCT 2017	2643	SAT	1855
05NOV17	-10 Days =	26 OCT 2017	2752	FRI	1833
05NOV17	-11 Days =	25 OCT 2017	2889	THU	1967
05NOV17	-12 Days =	24 OCT 2017	3105	WED	1996
05NOV17	-13 Days =	23 OCT 2017	3368	TUE	2072

Lake Okeechobee Outlets Last 14 Days

DATE	S-77 Discharge (ALL DAY) (AC-FT)	Below S-77 Discharge (ALL-DAY) (AC-FT)	S-78 Discharge (ALL DAY) (AC-FT)	S-79 Discharge (ALL DAY) (AC-FT)
05 NOV 2017	10648	10016	11454	16467
04 NOV 2017	11827	10579	12379	16943
03 NOV 2017	13275	14177	15651	21036
02 NOV 2017	13217	14255	15750	22535
01 NOV 2017	12887	13131	15966	24143
31 OCT 2017	12575	12677	15164	24763
30 OCT 2017	11512	10632	14923	25929
29 OCT 2017	11470	12109	14806	27618
28 OCT 2017	13040	14211	14667	20792
27 OCT 2017	13061	14269	15126	19125
26 OCT 2017	12485	14044	15405	19963
25 OCT 2017	12571	13431	14151	19236
24 OCT 2017	13110	13241	13423	17914
23 OCT 2017	13648	13471	13565	17692

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)
05 NOV 2017	18	0	0	0	27
04 NOV 2017	14	0	0	0	56
03 NOV 2017	19	0	0	0	52
02 NOV 2017	-1	0	0	0	44
01 NOV 2017	0	0	0	0	27
31 OCT 2017	11	0	0	0	-17
30 OCT 2017	0	0	0	0	-46
29 OCT 2017	9	0	0	0	10
28 OCT 2017	31	0	0	0	25
27 OCT 2017	24	0	0	0	32
26 OCT 2017	13	0	0	0	27
25 OCT 2017	17	0	0	0	5
24 OCT 2017	49	0	0	0	1
23 OCT 2017	61	0	0	0	54

DATE	S-308 Discharge (ALL DAY) (AC-FT)	Below S-308 Discharge (ALL-DAY) (AC-FT)	S-80 Discharge (ALL-DAY) (AC-FT)
05 NOV 2017	9951	5431	8596
04 NOV 2017	9971	5220	9240
03 NOV 2017	9672	5626	9782
02 NOV 2017	10262	5084	9801
01 NOV 2017	9498	5134	9814
31 OCT 2017	8294	5084	9865
30 OCT 2017	8626	4022	9984
29 OCT 2017	7409	3488	9281
28 OCT 2017	9583	4553	8631
27 OCT 2017	8984	4999	8583
26 OCT 2017	10090	4835	8661
25 OCT 2017	9294	5566	8739
24 OCT 2017	8211	4894	8554

23 OCT 2017   9969   4827   8462

*** NOTE: 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

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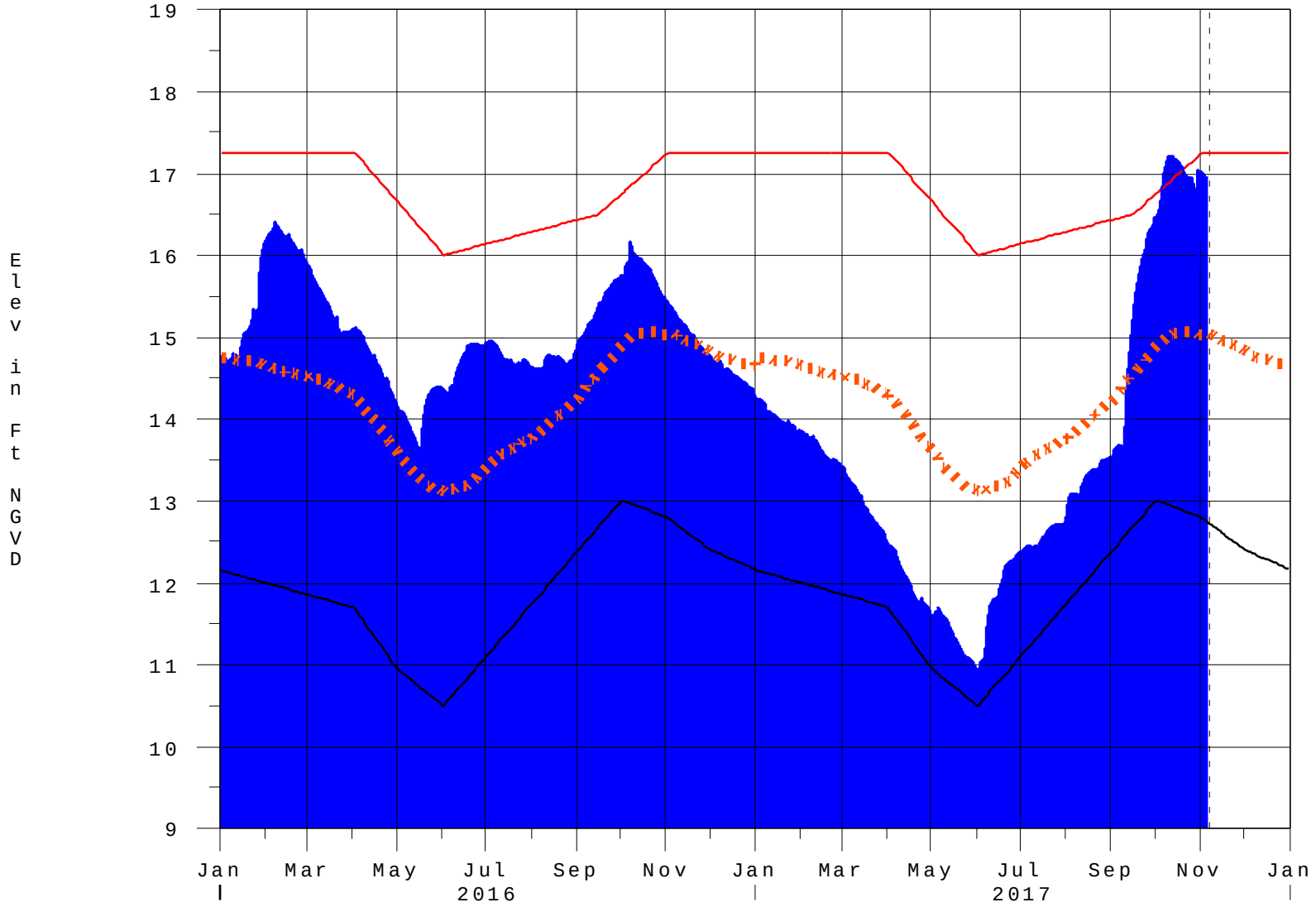
* On 11 May 1999, Lake Okeechobee Elevation was switched from
Instantaneous 2400 value to an average-daily lake average.
On 14 Mar 2001, due to the isolation of various gages within the standard
10 stations, the average of the interior 4 station gages was used
as the Lake Okeechobee Elevation.
On 05 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 06NOV2017 @ 14:41 ** Preliminary Data - Subject to Revision **

Lake Okeechobee

06NOV17 14:45:36



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