Application of the Lake Okeechobee Regulation Schedule (LORS2008) on 7/18/2016 (ENSO Neutral 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 Neutral 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 (Jul-Dec)	N/A	N/A	2.26	Very Wet	3.06	Very Wet	3.95	Very Wet
Multi Seasonal (Jul-Apr)	N/A	N/A	2.37	Normal	3.24	Wet	4.13	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:

853 cfs 14-day running average for Lake Okeechobee Net Inflow through 7/17/2016.
According to the classification in Tributary Hydrologic Conditions table, this condition is Normal.

-0.73 for Palmer Index on 7/16/2016.
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 7/18/2016

Lake Okeechobee Stage: **14.72 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		16.22	
Operational Band	High sub-band	15.78	
	Intermediate sub-band	15.33	
	Low sub-band	13.44	← 14.72
Base Flow sub-band		12.60	
Beneficial Use sub-band		11.46	
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**

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LORS2008 Implementation on 7/18/2016 (ENSO Neutral Condition):

Status for week ending 7/18/2016:
District wide, Raindar rainfall was 1.49 inches for the week. Lake stage on 7/18/2016 was 14.72 ft, down 0.10 ft from last week.
The updated July 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 Normal. 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	-0.73 (Normal)	L
	CPC Precipitation Outlook	1 month: Above Normal	L
		3 months: Above Normal	L
	LOK Seasonal Net Inflow Forecast	3.06 ft (Normal to Extremely Wet)	L
	ENSO Neutral Years		
	LOK Multi-Seasonal Net Inflow Forecast	3.24 ft (Wet)	L
	ENSO Neutral Years		
WCAs	WCA 1: Site 1-7, Site 1-8T, & Site 1-9 Average	Above Line 1 (15.77 ft)	L
	WCA 2A: Site 2-17 HW	Above Line1 (12.00 ft)	L
	WCA-3A: 3 Station Average (Site 63, 64 and 65)	Above Line 1 (9.79 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.

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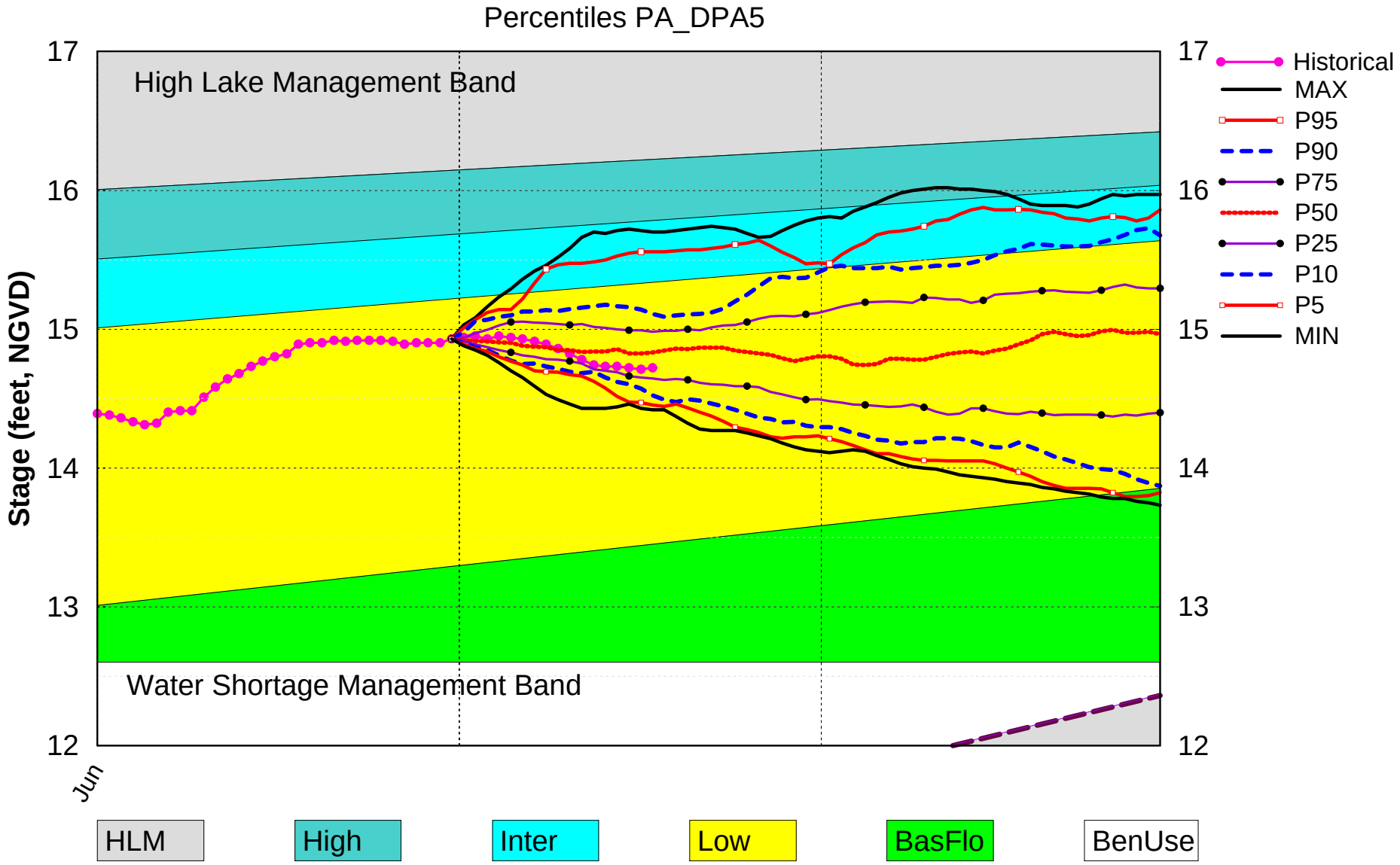
Lake Okeechobee SFWMM July 2016 Position Analysis

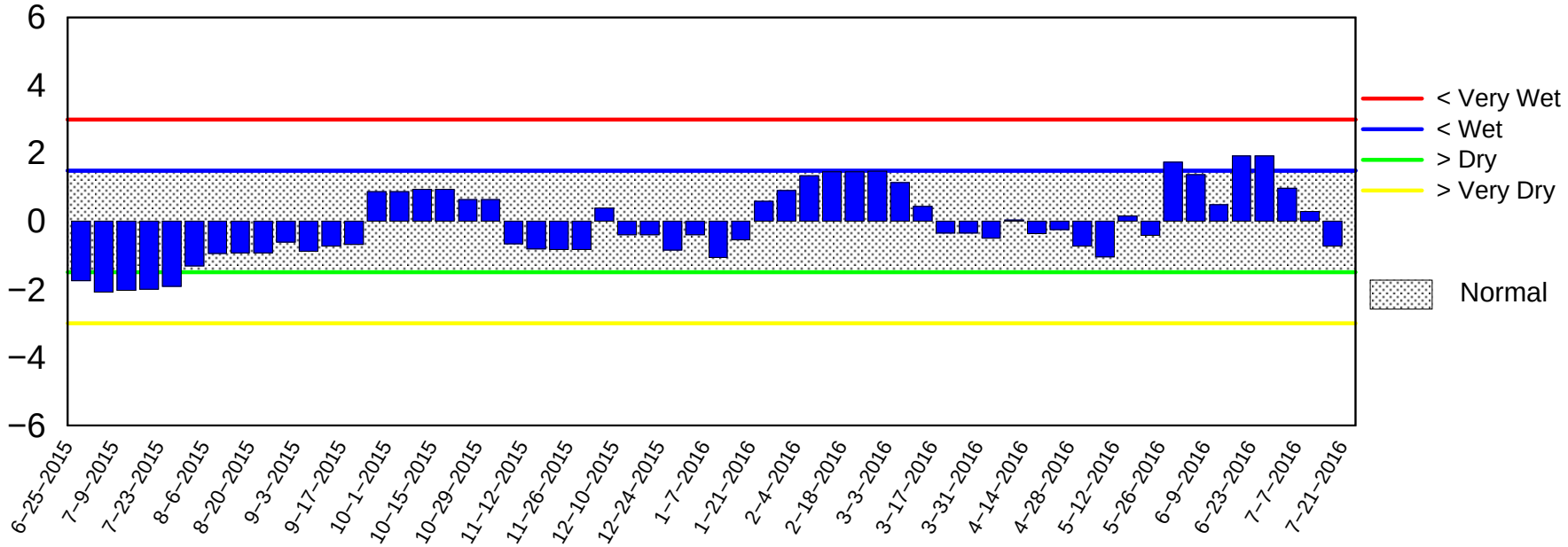


(See assumptions on the Position Analysis Results website)

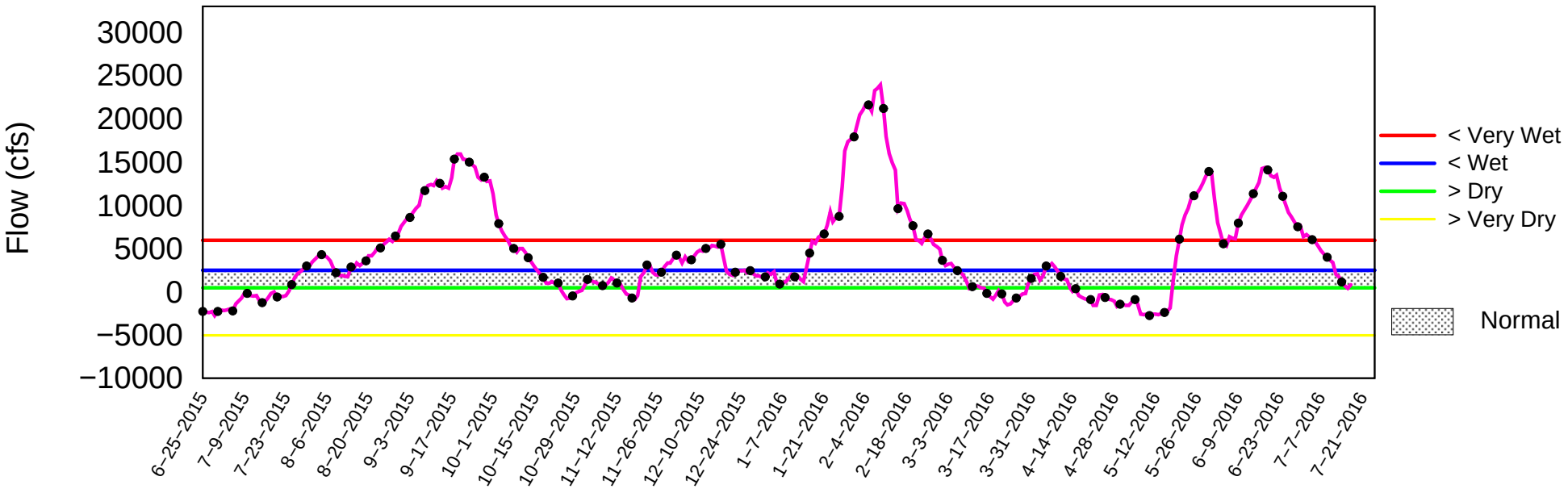
Mon Jul 18 15:55:46 2016

Tributary Basin Condition Indicators as of July 18 2016

Palmer Index



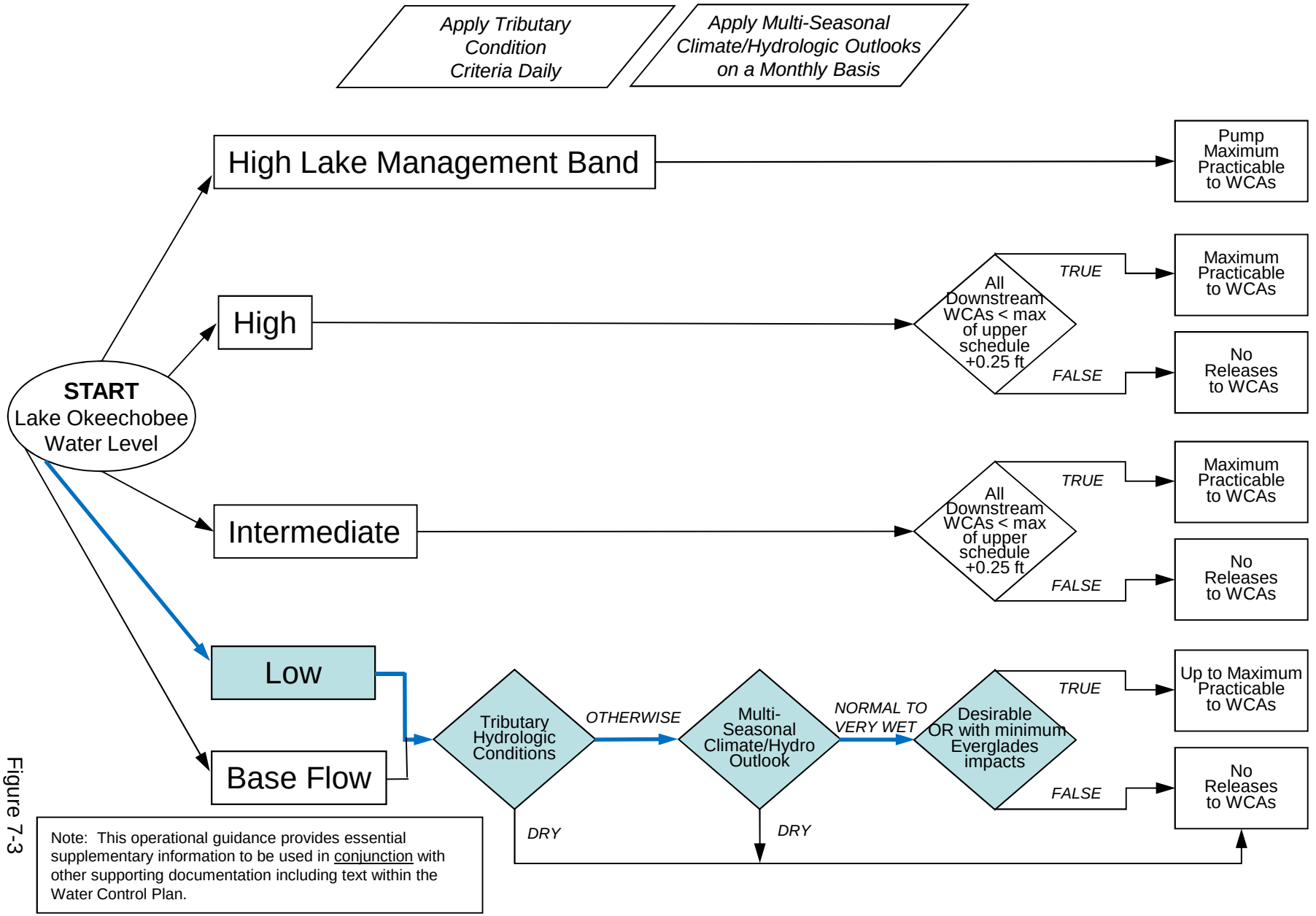
Lake Okeechobee Net Inflow (LONIN) 14−day Running Average



Mon Jul 18 14:35:42 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)

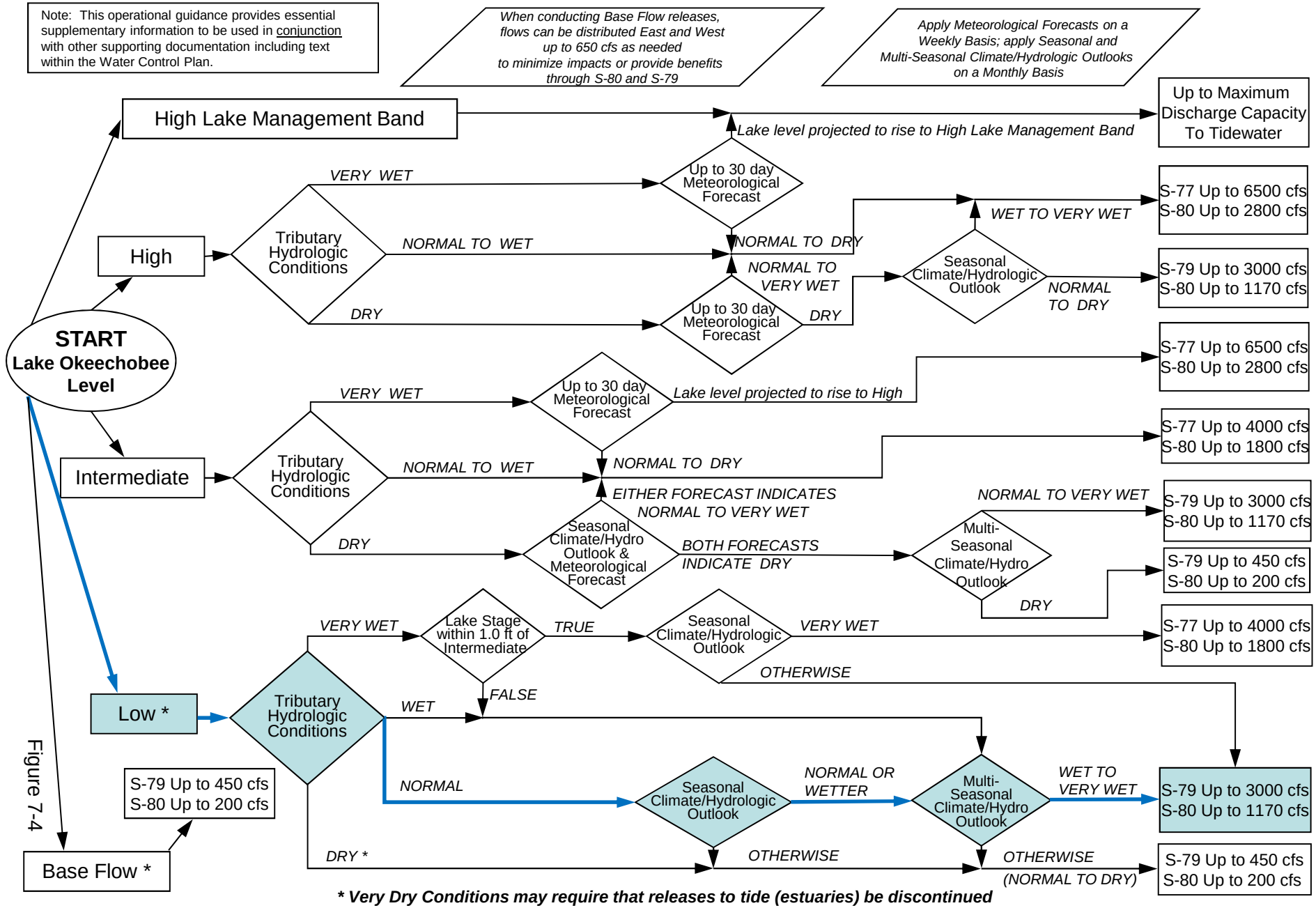
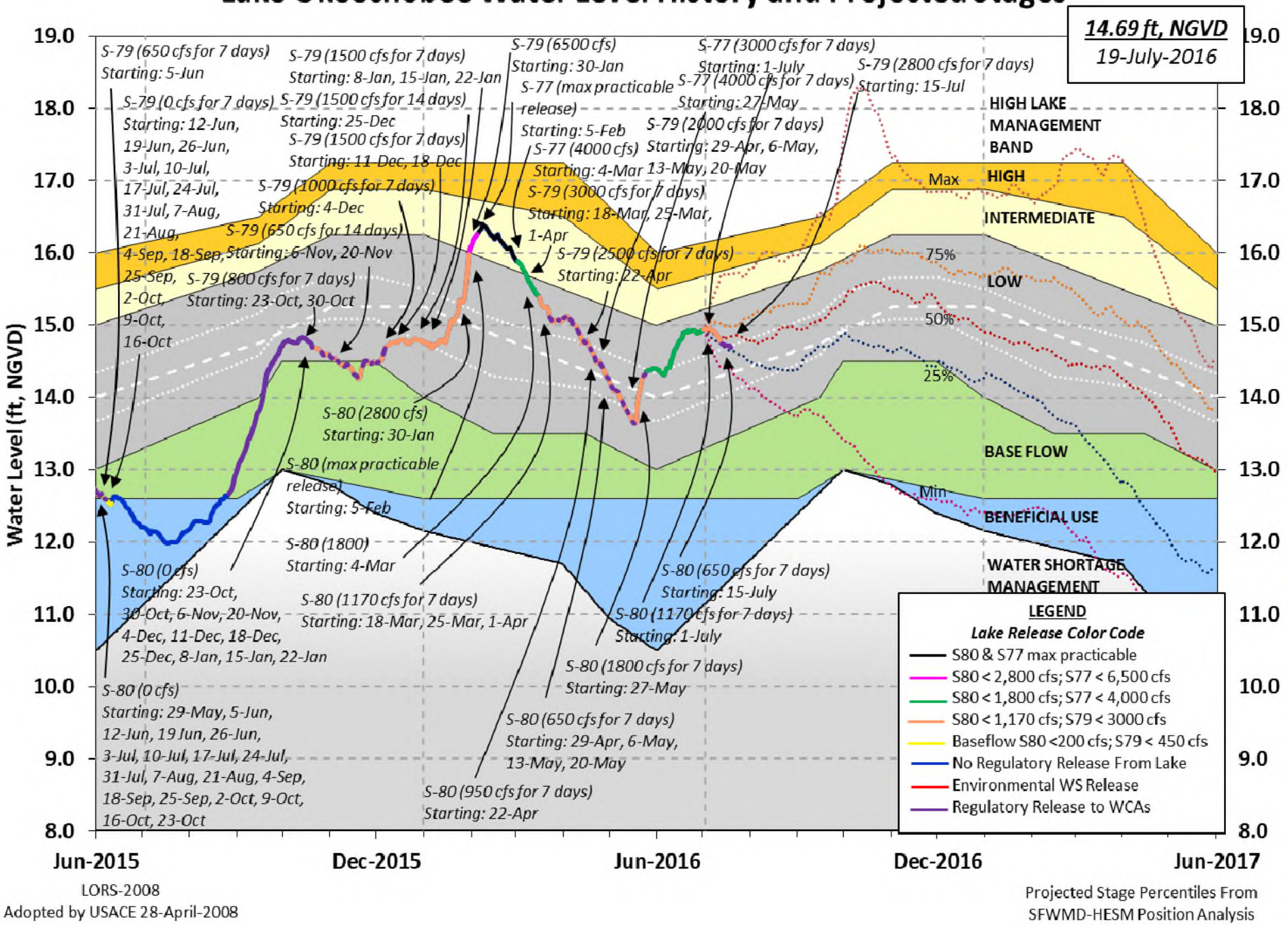


Figure 7-4

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 17 JUL 2016

Okeechobee Lake Regulation	Elevation (ft-NGVD)	Last Year (ft-NGVD)	2YRS Ago (ft-NGVD)
*Okeechobee Lake Elevation	14.72	11.98	13.58 (Official Elv)

Bottom of High Lake Mngmt= 16.22 Top of Water Short Mngmt= 11.45
Currently in Operational Management Band

Simulated Average LORS2008 [1965-2000] 12.52
Difference from Average LORS2008 2.20

17JUL (1965-2007) Period of Record Average 13.63
Difference from POR Average 1.09

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

++Navigation Depth (Based on 2007 Channel Condition Survey) Route 1 ÷ 8.66'
++Navigation Depth (Based on 2008 Channel Condition Survey) Route 2 ÷ 6.86'
Bridge Clearance = 49.18'

---

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

L001	L005	L006	LZ40	S4	S352	S308	S133
14.59	14.83	14.72	14.69	14.79	14.82	14.62	14.66

*Combination Okeechobee Avg-Daily Lake Average = 14.72 (*See Note)

Okeechobee Inflows (cfs):

S65E	1241	C5	-94	Fisheating Cr	530
S154	0	S191	0	S135 Pumps	0
S84	87	S133 Pumps	0	S2 Pumps	0
S84X	801	S127 Pumps	0	S3 Pumps	0
S71	181	S129 Pumps	51	S4 Pumps	0
S72	122	S131 Pumps	0		

Total Inflows: 2919

Okeechobee Outflows (cfs):

S135 Culverts	-NR-	S354	1616	S77	(Not Used)
S127 Culverts	0	S351	379	S77Below	1977 (USED)
S129 Culverts	0	S352	129	S308	(Not Used)

```
  S131 Culverts     0      L8 Canal Pt     306      S308Below      1308
(USED)
Total Outflows:   5715

****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            0.28      S308           0.30
  Average Pan Evap x 0.75 Pan Coefficient =  0.22" =  0.02'

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

Evaporation - Precipitation:             =  0.20" =  0.02'
Evaporation - Precipitation using Lake Area of 730 square miles
  is equal to   3877 cfs out of the lake.
Lake Okeechobee (Change in Storage) Flow is   2118 cfs or   4200 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:	13.41	14.46	0	0	0	0	0	0	(cfs)		
S193:											
S191:	18.44	14.46	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:	21.08	14.31	1241	0.5	0.6	0.7	0.5	0.5	0.5		
S127 Pumps:	13.59	14.69	0	0	0	0	0	0	(cfs)		
S127 Culvert:			0	0.0							
S129 Pumps:	12.86	14.82	51	12	49	12			(cfs)		
S129 Culvert:			0	0.0							
S131 Pumps:	13.02	15.02	0	0	0				(cfs)		
S131 Culvert:			0								
Fisheating Creek											
nr Palmdale	32.30	530									
nr Lakeport											
C5:	14.93	14.89	-94	5.3	5.2	5.2					

```
South Shore
  S4 Pumps:    11.11     14.84       0      0    0    0            (cfs)
  S169:        14.85     11.08       0    0.0  0.0  0.0
  S310:        14.80                32
  S3 Pumps:     9.66     14.86       0      0    0    0            (cfs)
  S354:        14.86      9.66    1616    2.6  2.6
  S2 Pumps:    10.48     14.78       0      0    0    0    0       (cfs)
  S351:        14.78     10.48     379    0.6  0.6  0.4
  S352:        14.87     10.34     129    0.2  0.3
  C10A:         -NR-     14.68            0.0   0.0   8.0   0.0   0.0
  L8 Canal PT            14.48     306
```

S351 and S352 Temporary Pumps/S354 Spillway

```
  S351:        10.48     14.78     379  -NR--NR--NR--NR--NR--NR-
  S352:        10.34     14.87     129  -NR--NR--NR--NR-
  S354:         9.66     14.86    1616  -NR--NR--NR--NR-
```

```
Caloosahatchee River (S77, S78, S79)
  S47B:        14.06     12.19            3.0  3.0
  S47D:        11.17     11.09     151    6.0
  S77:
    Spillway and Sector Flow:
                14.86     11.15    1977   0.0  3.5  3.5  0.0
    Flow Due to Lockages+:            5

  S77 Below USGS Flow Gage        1977

  S78:
    Spillway and Sector Flow:
                11.16      3.16    1880    0.0  0.0  2.5  2.5
    Flow Due to Lockages+:           11

  S79:
    Spillway and Sector Flow:
                 3.25      0.66    4249    2.0  2.0  2.0  2.0  2.0  2.0  2.0
1.0
    Flow Due to Lockages+:            7
    Percent of flow from S77         43%
    Chloride             (ppm)     39


St. Lucie Canal (S308, S80)
  S308:
    Spillway and Sector Flow:
                14.60     14.32    1308  3.0  3.0  3.0  3.0
    Flow Due to Lockages+:            0

  S308 Below USGS Flow Gage       1308
  S153:        18.95     14.11      28    0.1  0.0
  S80:
    Spillway and Sector Flow:
                14.23      0.95    1099    0.3  0.4  0.4  0.0  0.4  0.4  0.0
    Flow Due to Lockages+:           20
    Percent of flow from S308       143%
```

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:	0.12	4.14	4.68	82	2
S78:	0.20	0.42	2.20	97	2
S79:	0.00	0.00	0.00	155	2
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	1157.19	43	1
S80:	0.16	0.16	0.16	0	0
Okeechobee Average (Sites S78, S79 and S80 not included)	0.06	0.32	89.37		
Oke Nexrad Basin Avg	0.02	0.96	1.38		

Okeechobee Lake Elevations	17 JUL 2016	14.72	Difference from 17JUL16
17JUL16 -1 Day =	16 JUL 2016	14.71	-0.01
17JUL16 -2 Days =	15 JUL 2016	14.72	0.00
17JUL16 -3 Days =	14 JUL 2016	14.73	0.01
17JUL16 -4 Days =	13 JUL 2016	14.73	0.01
17JUL16 -5 Days =	12 JUL 2016	14.74	0.02
17JUL16 -6 Days =	11 JUL 2016	14.78	0.06
17JUL16 -7 Days =	10 JUL 2016	14.82	0.10
17JUL16 -30 Days =	17 JUN 2016	14.89	0.17
17JUL16 -1 Year =	17 JUL 2015	11.98	-2.74
17JUL16 -2 Year =	17 JUL 2014	13.58	-1.14

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
17JUL16	Today =	17 JUL 2016	541	MON	6639
17JUL16	-1 Day =	16 JUL 2016	405	SUN	2515
17JUL16	-2 Days =	15 JUL 2016	739	SAT	2026
17JUL16	-3 Days =	14 JUL 2016	1117	FRI	3390
17JUL16	-4 Days =	13 JUL 2016	1721	THU	853
17JUL16	-5 Days =	12 JUL 2016	2048	WED	-4626
17JUL16	-6 Days =	11 JUL 2016	2793	TUE	-3806
17JUL16	-7 Days =	10 JUL 2016	3650	MON	-3518
17JUL16	-8 Days =	09 JUL 2016	4025	SUN	-1023
17JUL16	-9 Days =	08 JUL 2016	4365	SAT	-174
17JUL16	-10 Days =	07 JUL 2016	4787	FRI	-1461
17JUL16	-11 Days =	06 JUL 2016	5284	THU	980
17JUL16	-12 Days =	05 JUL 2016	5805	WED	1527
17JUL16	-13 Days =	04 JUL 2016	6026	TUE	4256

S65E

		Average Flow over previous 14 days			Avg-Daily Flow
17JUL16	Today=	17 JUL 2016	1613	MON	1400
17JUL16	-1 Day =	16 JUL 2016	1700	SUN	1310
17JUL16	-2 Days =	15 JUL 2016	1810	SAT	1266
17JUL16	-3 Days =	14 JUL 2016	1943	FRI	1468
17JUL16	-4 Days =	13 JUL 2016	2079	THU	1269
17JUL16	-5 Days =	12 JUL 2016	2231	WED	1148
17JUL16	-6 Days =	11 JUL 2016	2393	TUE	1156
17JUL16	-7 Days =	10 JUL 2016	2586	MON	1298
17JUL16	-8 Days =	09 JUL 2016	2781	SUN	1544
17JUL16	-9 Days =	08 JUL 2016	2973	SAT	1643
17JUL16	-10 Days =	07 JUL 2016	3167	FRI	2053
17JUL16	-11 Days =	06 JUL 2016	3370	THU	2086
17JUL16	-12 Days =	05 JUL 2016	3576	WED	2513
17JUL16	-13 Days =	04 JUL 2016	3765	TUE	2429

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)
17 JUL 2016		3921	3750	8440
16 JUL 2016		3581	3915	7861
15 JUL 2016		3931	3875	7476
14 JUL 2016		4894	4442	8407
13 JUL 2016		4307	3496	6398
12 JUL 2016		4012	3460	6158
11 JUL 2016		4187	3490	6613
10 JUL 2016		4242	3467	6686
09 JUL 2016		4172	3421	7314
08 JUL 2016		4532	3731	7801

07 JUL 2016	4845	4020	8383
06 JUL 2016	4916	3275	9337
05 JUL 2016	4831	5698	11650
04 JUL 2016	4825	4901	11460

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)
17 JUL 2016	63	752	256	839	606
16 JUL 2016	93	363	339	1152	625
15 JUL 2016	165	516	137	1321	626
14 JUL 2016	207	224	91	736	629
13 JUL 2016	171	238	224	369	636
12 JUL 2016	168	611	79	101	641
11 JUL 2016	103	305	180	236	635
10 JUL 2016	78	0	569	367	629
09 JUL 2016	169	0	714	561	656
08 JUL 2016	176	0	178	559	659
07 JUL 2016	89	0	0	0	655
06 JUL 2016	86	0	0	0	650
05 JUL 2016	-29	0	0	0	649
04 JUL 2016	7	0	0	0	666

DATE	S-308 Discharge (ALL DAY) (AC-FT)	Below S-308 Discharge (ALL-DAY) (AC-FT)	S-80 Discharge (ALL-DAY) (AC-FT)
17 JUL 2016		2593	1255
16 JUL 2016		3126	1570
15 JUL 2016		1686	690
14 JUL 2016		147	23
13 JUL 2016		116	16
12 JUL 2016		2178	662
11 JUL 2016		3905	2079
10 JUL 2016		4413	2587
09 JUL 2016		4764	2864
08 JUL 2016		2226	1634
07 JUL 2016		-64	36
06 JUL 2016		576	335
05 JUL 2016		1747	1294
04 JUL 2016		2948	2115

*** 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

---

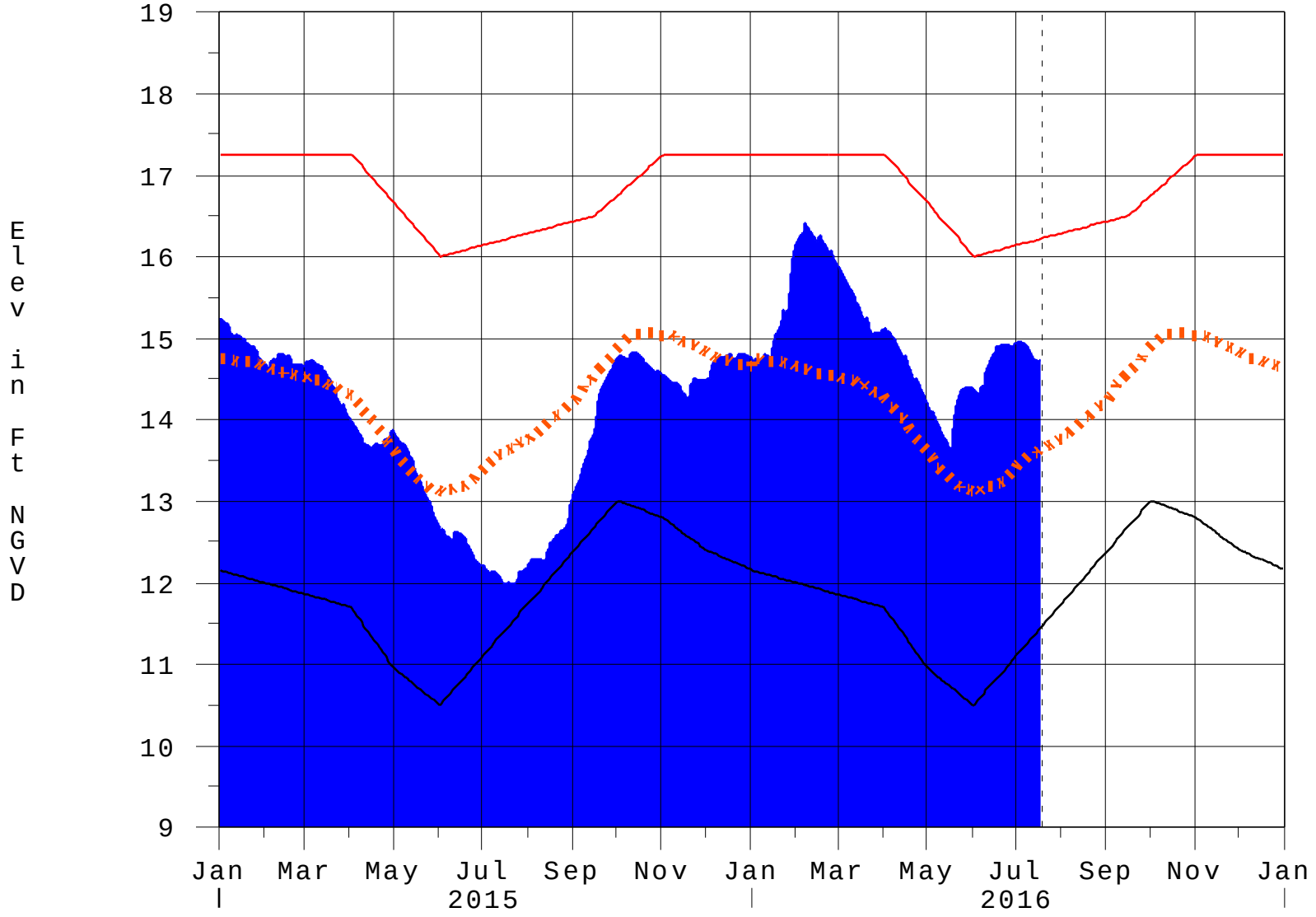
* On 11 May 1999, Lake Okeechobee Elevation was switched from
Instantaneous 2400 value to an average-daily lake average.
On 14 Mar 2001, due to the isolation of various gages within the
standard

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 18JUL2016 @ 12:15 ** Preliminary Data - Subject to Revision
**

Lake Okeechobee

18JUL16 11:45:32



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

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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