Application of the Lake Okeechobee Regulation Schedule (LORS2008) on 4/11/2016 (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	1.85	Wet	1.79	Wet	2.86	Very Wet
Multi Seasonal (May-Apr)	N/A	N/A	2.53	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:

1803 cfs 14-day running average for Lake Okeechobee Net Inflow through 4/11/2016.
According to the classification in Tributary Hydrologic Conditions table, this condition is Normal.

0.05 for Palmer Index on 4/10/2016.
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 4/11/2016

Lake Okeechobee Stage: **14.89 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		17.05	
Operational Band	High sub-band	16.34	
	Intermediate sub-band	15.42	
	Low sub-band	13.50	← 14.89
Base Flow sub-band		12.60	
Beneficial Use sub-band		11.45	
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

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LORS2008 Implementation on 4/11/2016 (ENSO El Nino Condition):

Water Supply Department Technical Input

Water Supply Outlook:

District wide, Raindar rainfall 0.02 inches for the week ending 4/11/2016. Lake stage on 4/11/2016 is 14.89 ft, down 0.20 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 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 Flow Sub-Band	M
	Palmer Index for LOK Tributary Conditions	0.05 (Normal)	L
	CPC Precipitation Outlook	1 month: Normal	L
		3 months: Above Normal	L
	LOK Seasonal Net Inflow Forecast	1.79 ft (Normal to Extremely Wet)	L
	AMO warm/El Nino		
	LOK Multi-Seasonal Net Inflow Forecast	3.99 ft (Normal)	L
	AMO warm/El Nino		
WCAs	WCA 1: Site 1-7, Site 1-8T, & Site 1-9 Average	Above Line 1 (16.20 ft)	L
	WCA 2A: Site 2-17 HW	Above Line1 (11.90 ft)	L
	WCA-3A: 3 Station Average (Site 63, 64 and 65)	Above Line 1 (10.35 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 for classifying the tributary hydrologic condition (THC).

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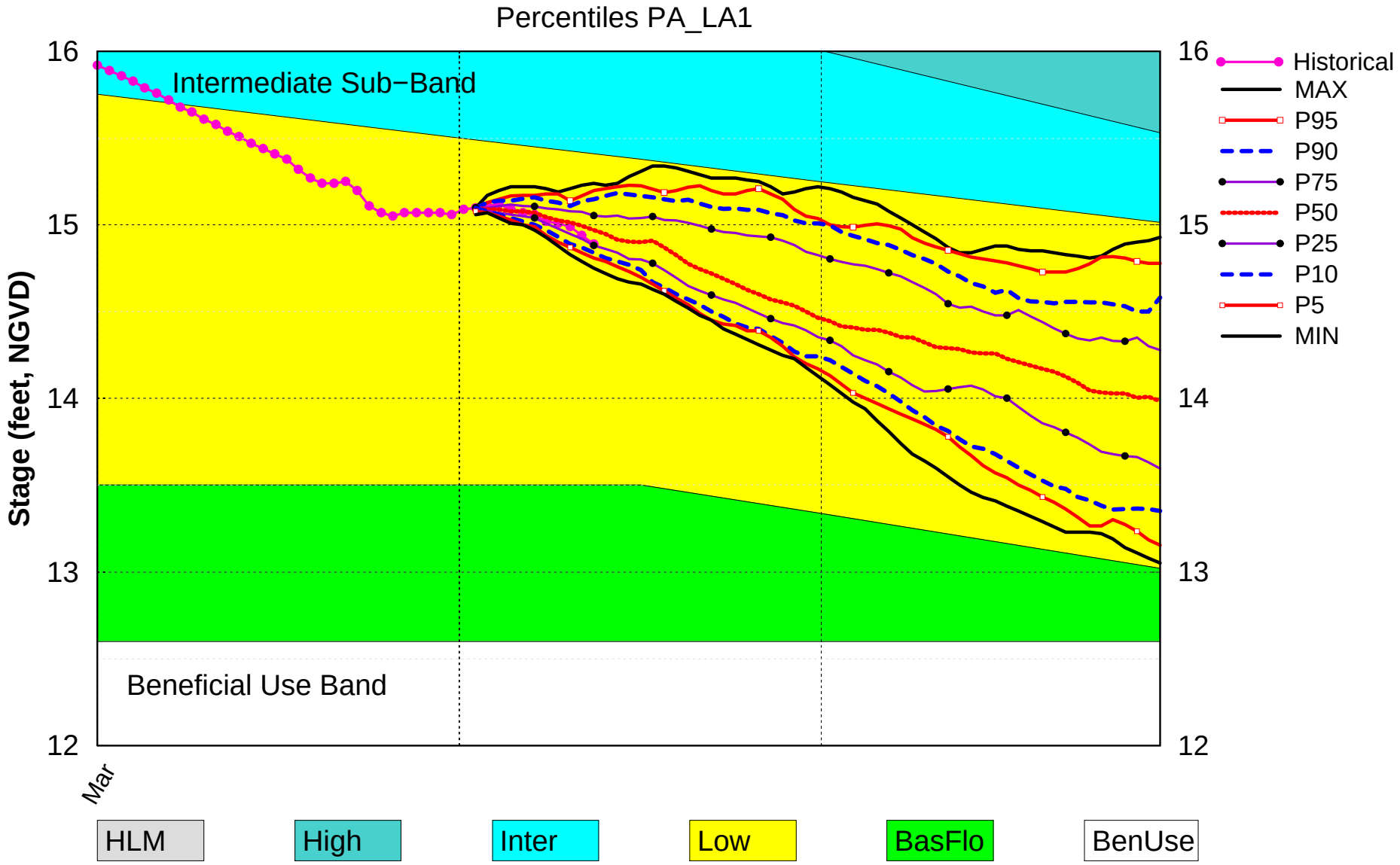
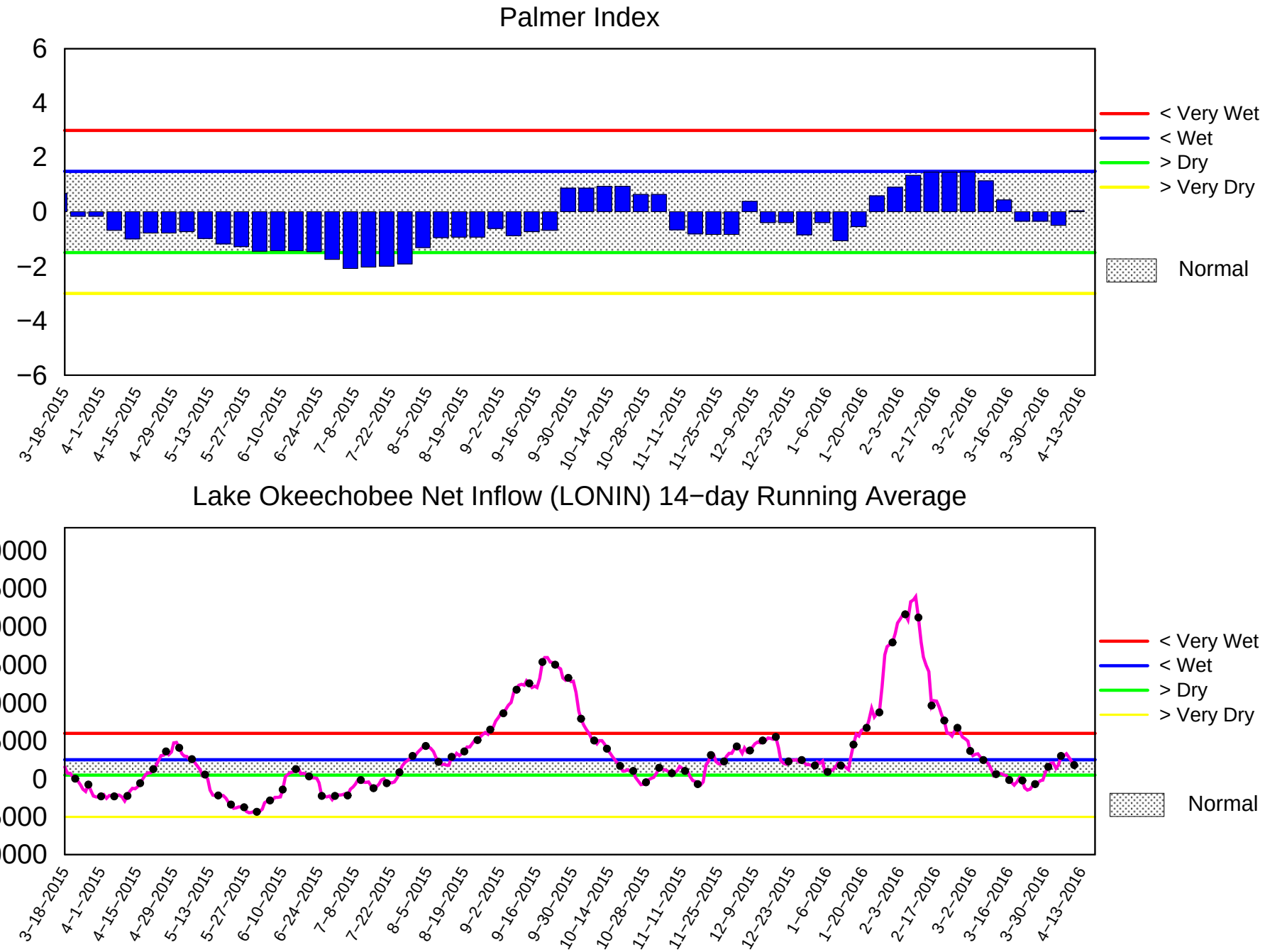
Lake Okeechobee SFWMM April 2016 Position Analysis



(See assumptions on the Position Analysis Results website)

Mon Apr 11 15:25:07 2016

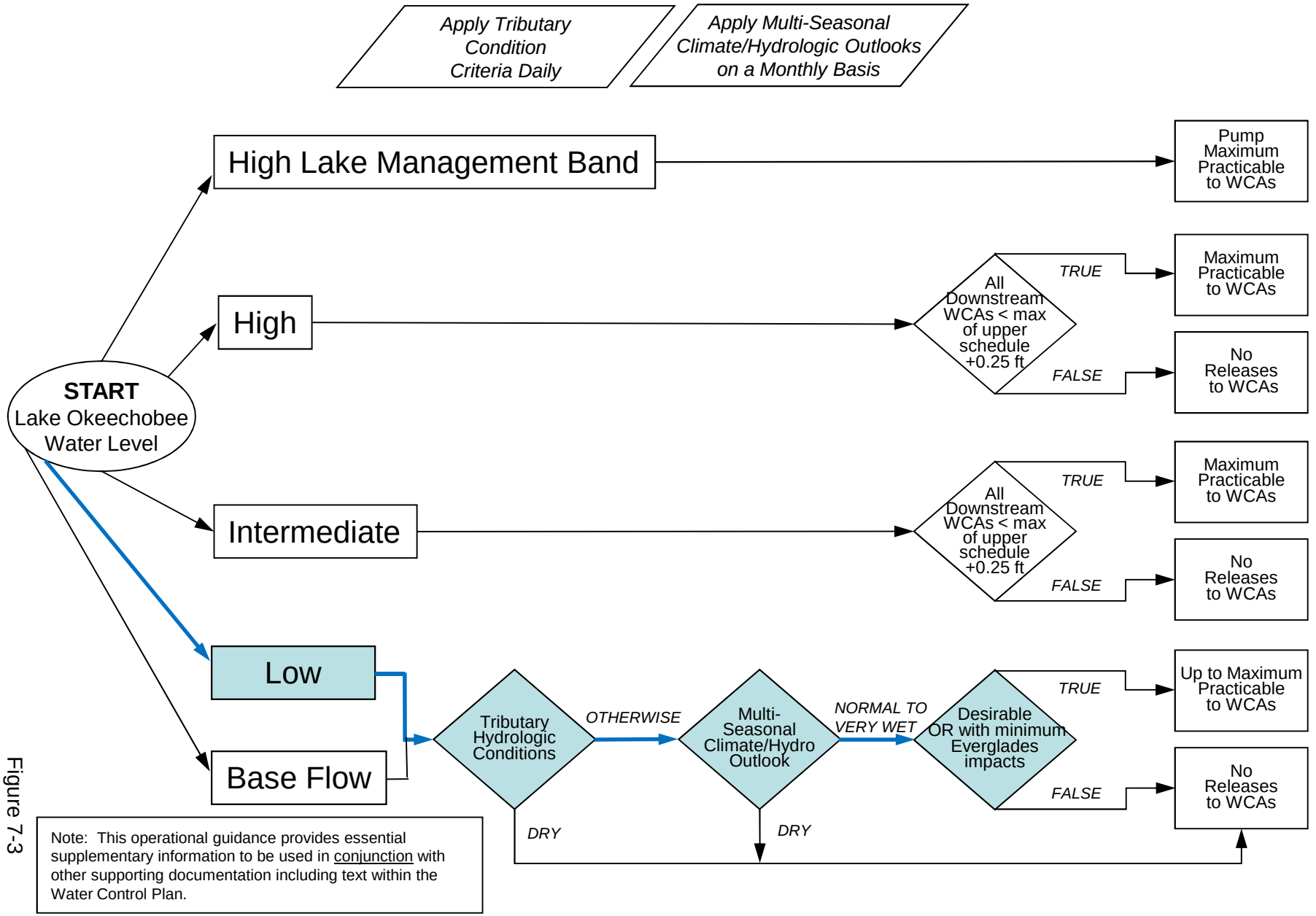
Tributary Basin Condition Indicators as of April 11 2016



Mon Apr 11 15:17:31 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)

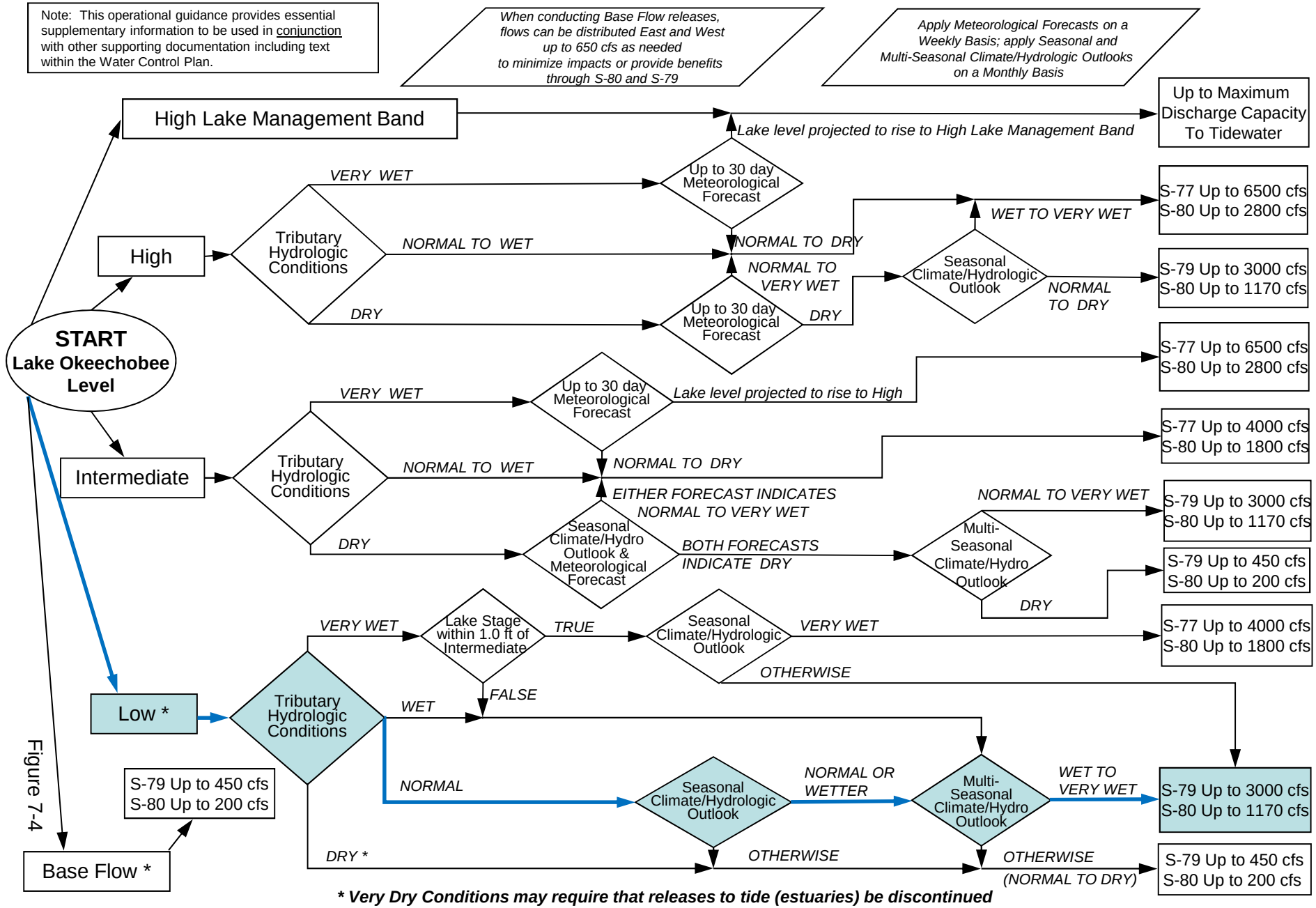


Figure 7-4

2008 LORS FORECAST

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

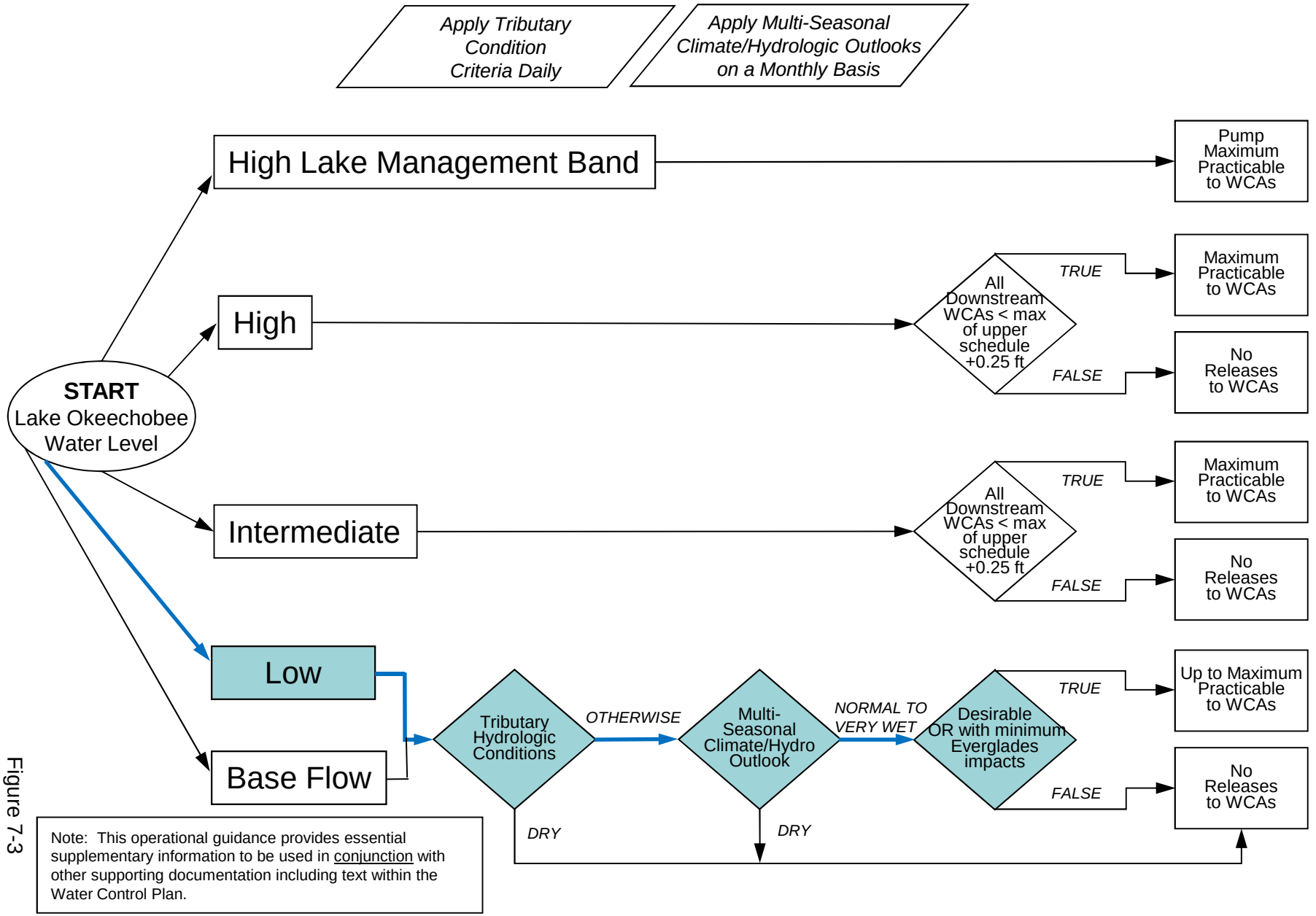


Figure 7-3

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

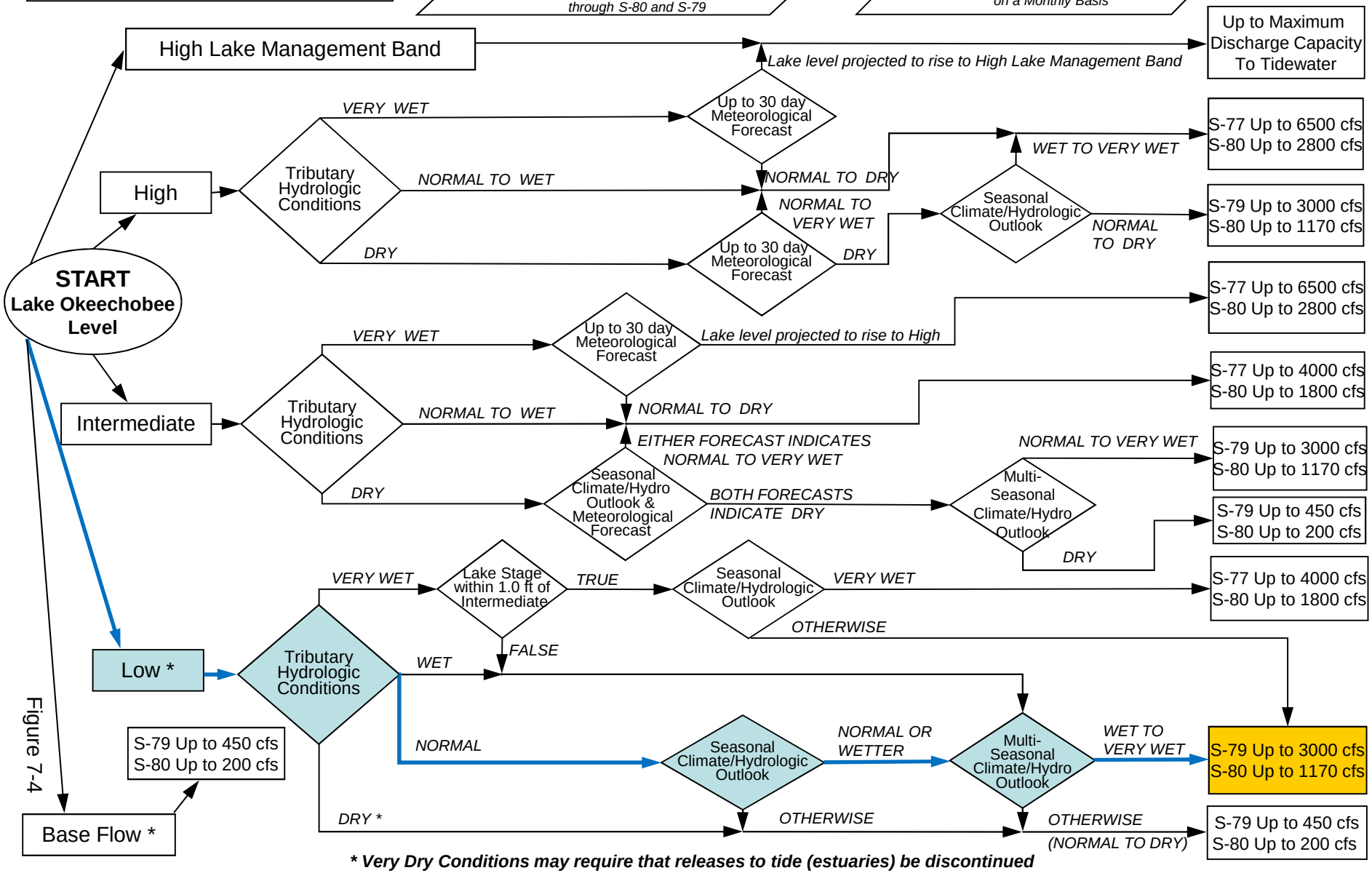
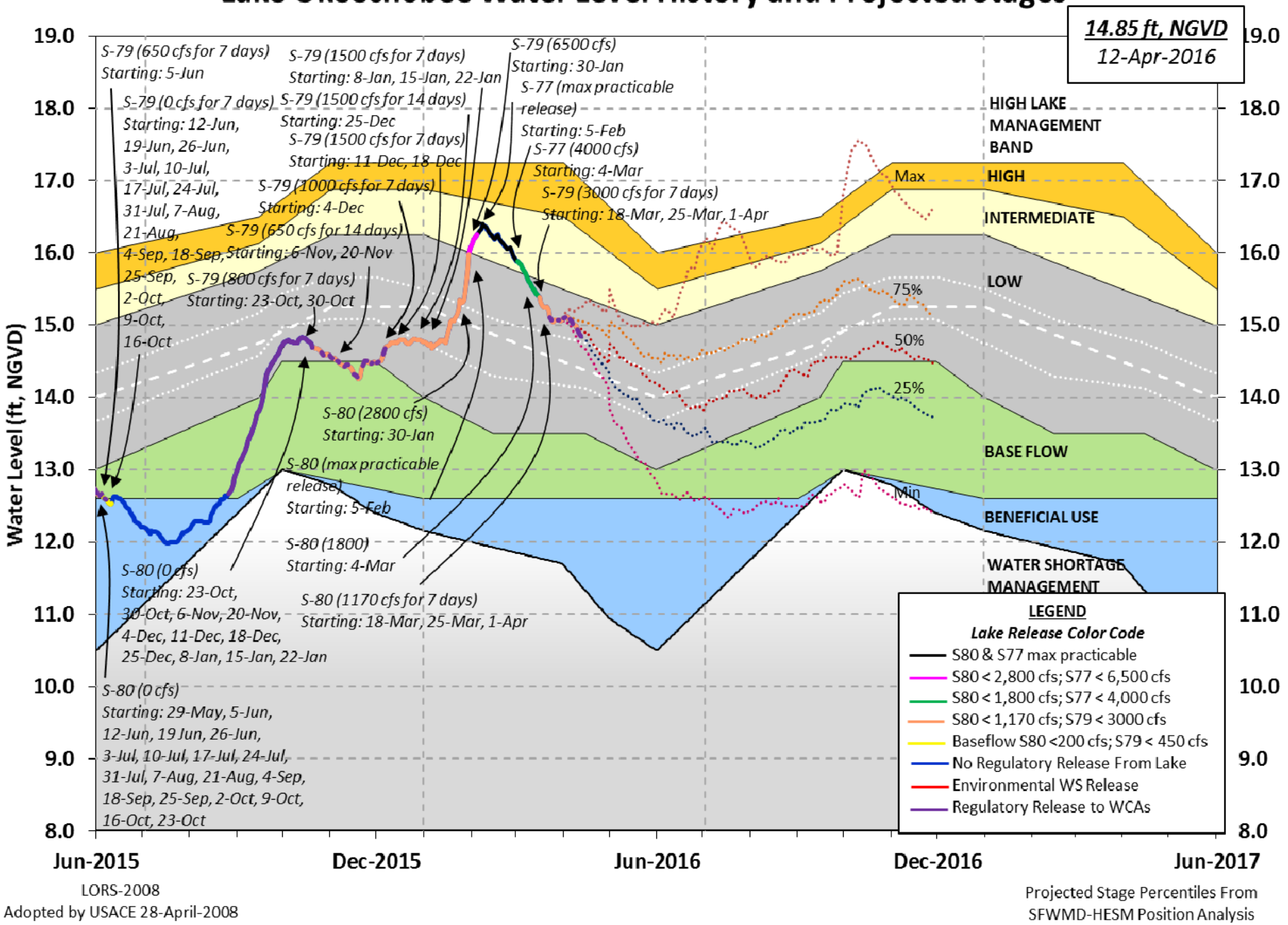


Figure 7-4

**** 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 10 APR 2016

Okeechobee Lake Regulation	Elevation (ft-NGVD)	Last Year (ft-NGVD)	2YRS Ago (ft-NGVD)
*Okeechobee Lake Elevation	14.89	13.71	13.37 (Official Elv)

Bottom of High Lake Mngmt= 17.07 Top of Water Short Mngmt= 11.45
Currently in Operational Management Band

Simulated Average LORS2008 [1965-2000] 12.83
Difference from Average LORS2008 2.06

10APR (1965-2007) Period of Record Average 14.07
Difference from POR Average 0.82

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

++Navigation Depth (Based on 2007 Channel Condition Survey) Route 1 ÷ 8.83'
++Navigation Depth (Based on 2008 Channel Condition Survey) Route 2 ÷ 7.03'
Bridge Clearance = 49.15'

---

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

L001	L005	L006	LZ40	S4	S352	S308	S133
14.74	15.00	14.94	14.86	15.02	15.01	14.80	14.78

*Combination Okeechobee Avg-Daily Lake Average = 14.89 (*See Note)

Okeechobee Inflows (cfs):

S65E	4113	C5	0	Fisheating Cr	24
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: 4137

Okeechobee Outflows (cfs):

S135 Culverts	0	S354	411	S77	(Not Used)
S127 Culverts	0	S351	1168	S77Below	3104 (USED)
S129 Culverts	-NR-	S352	364	S308	(Not Used)

```
  S131 Culverts  -NR-      L8 Canal Pt     170      S308Below       866
(USED)
Total Outflows:   6082

****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           0.15
  Average Pan Evap x 0.75 Pan Coefficient =  0.14" =  0.01'

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

Evaporation - Precipitation:             =  0.14" =  0.01'
Evaporation - Precipitation using Lake Area of 730 square miles
  is equal to   2650 cfs out of the lake.
Lake Okeechobee (Change in Storage) Flow is -10638 cfs or -21100 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:	13.66	14.80	0	0	0	0	0	0	(cfs)		
S193:	_____										
S191:	18.28	14.79	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	14.66	4113	1.4	1.4	1.4	1.4	0.9	0.9		
S127 Pumps:	13.39	14.86	0	0	0	0	0	0	(cfs)		
S127 Culvert:			0	0.0							
S129 Pumps:	13.22	14.98	0	0	0	0	(cfs)				
S129 Culvert:			-NR-	-NR-							
S131 Pumps:	12.99	15.09	0	0	0	(cfs)					
S131 Culvert:			-NR-								
Fisheating Creek nr Palmdale		29.06	24								
nr Lakeport		_____									
C5:	14.44	14.97	0	0.0	0.0	0.0					

South Shore

S4 Pumps:	10.79	14.95	0	0	0	0				(cfs)
S169:	14.98	10.78	35	0.0	0.0	0.0				
S310:	14.90		88							
S3 Pumps:	10.47	14.96	0	0	0	0				(cfs)
S354:	14.96	10.47	411	7.5	7.5					
S2 Pumps:	10.59	14.90	0	0	0	0	0			(cfs)
S351:	14.90	10.59	1168	2.0	2.0	2.0				
S352:	14.92	11.00	364	0.9	0.9					
C10A:	-NR-	13.71		0.0	0.0	4.0	0.0	0.0		
L8 Canal PT		13.51	170							

S351 and S352 Temporary Pumps/S354 Spillway

S351:	10.59	14.90	1168	-NR--NR--NR--NR--NR--NR-
S352:	11.00	14.92	364	-NR--NR--NR--NR-
S354:	10.47	14.96	411	-NR--NR--NR--NR-

Caloosahatchee River (S77, S78, S79)

S47B:	12.83	10.97		0.0	0.0						
S47D:	11.01	11.01	13	5.0							
S77:											
Spillway and Sector Flow:											
	14.50	11.13	3104	3.5	4.0	4.0	3.5				
Flow Due to Lockages+:			5								
S77 Below USGS Flow Gage			3104								
S78:											
Spillway and Sector Flow:											
	11.01	3.12	2527	1.5	2.5	2.5	2.5				
Flow Due to Lockages+:			17								
S79:											
Spillway and Sector Flow:											
	3.18	0.76	2911	1.0	1.0	1.0	2.0	2.0	1.0	1.0	1.0
Flow Due to Lockages+:			12								
Percent of flow from S77			103%								
Chloride		(ppm)	50								

St. Lucie Canal (S308, S80)

S308:											
Spillway and Sector Flow:											
	14.75	14.35	866	3.0	3.0	3.0	3.5				
Flow Due to Lockages+:			1								
S308 Below USGS Flow Gage			866								
S153:	18.95	14.18	0	0.0	0.0						
S80:											
Spillway and Sector Flow:											
	14.21	1.02	953	0.0	0.6	0.6	0.0	0.6	0.6	0.0	
Flow Due to Lockages+:			33								
Percent of flow from S308			129%								

Steele Point Top Salinity (mg/ml) 260
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	0.00	0.00	117	2
S78:	0.00	0.00	0.63	33	2
S79:	0.00	0.00	0.00	137	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:	*******	*******	*******	36	0
S80:	0.00	0.00	0.00	97	3
Okeechobee Average (Sites S78, S79 and S80 not included)	*******	5453.85	*******		
Oke Nexrad Basin Avg	0.00	0.00	0.00		

Okeechobee Lake Elevations	10 APR 2016	14.89	Difference from 10APR16
10APR16 -1 Day =	09 APR 2016	14.94	0.05
10APR16 -2 Days =	08 APR 2016	14.99	0.10
10APR16 -3 Days =	07 APR 2016	15.01	0.12
10APR16 -4 Days =	06 APR 2016	15.02	0.13
10APR16 -5 Days =	05 APR 2016	15.06	0.17
10APR16 -6 Days =	04 APR 2016	15.08	0.19
10APR16 -7 Days =	03 APR 2016	15.09	0.20
10APR16 -30 Days =	11 MAR 2016	15.51	0.62
10APR16 -1 Year =	10 APR 2015	13.71	-1.18
10APR16 -2 Year =	10 APR 2014	13.37	-1.52

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
10APR16	Today =	10 APR 2016	1804	MON	-4556
10APR16	-1 Day =	09 APR 2016	2338	SUN	-5424
10APR16	-2 Days =	08 APR 2016	2889	SAT	804
10APR16	-3 Days =	07 APR 2016	3313	FRI	4876
10APR16	-4 Days =	06 APR 2016	3012	THU	-1989
10APR16	-5 Days =	05 APR 2016	2969	WED	926
10APR16	-6 Days =	04 APR 2016	1879	TUE	1837
10APR16	-7 Days =	03 APR 2016	1402	MON	-3406
10APR16	-8 Days =	02 APR 2016	2115	SUN	5073
10APR16	-9 Days =	01 APR 2016	2010	SAT	4409
10APR16	-10 Days =	31 MAR 2016	1548	FRI	5641
10APR16	-11 Days =	30 MAR 2016	900	THU	10576
10APR16	-12 Days =	29 MAR 2016	-195	WED	2263
10APR16	-13 Days =	28 MAR 2016	-253	TUE	4225

S65E

			Average Flow over previous 14 days		Avg-Daily Flow
10APR16	Today=	10 APR 2016	3833	MON	4113
10APR16	-1 Day =	09 APR 2016	3655	SUN	4390
10APR16	-2 Days =	08 APR 2016	3428	SAT	4486
10APR16	-3 Days =	07 APR 2016	3163	FRI	4785
10APR16	-4 Days =	06 APR 2016	2866	THU	5140
10APR16	-5 Days =	05 APR 2016	2528	WED	5211
10APR16	-6 Days =	04 APR 2016	2184	TUE	5276
10APR16	-7 Days =	03 APR 2016	1852	MON	4853
10APR16	-8 Days =	02 APR 2016	1550	SUN	3970
10APR16	-9 Days =	01 APR 2016	1299	SAT	3156
10APR16	-10 Days =	31 MAR 2016	1098	FRI	2462
10APR16	-11 Days =	30 MAR 2016	971	THU	2058
10APR16	-12 Days =	29 MAR 2016	866	WED	1970
10APR16	-13 Days =	28 MAR 2016	761	TUE	1790

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)
10 APR 2016			6155	-NR-	5044	5797
09 APR 2016			4101	-NR-	3514	4433
08 APR 2016			4498	-NR-	3508	4302
07 APR 2016			7743	-NR-	6347	6968
06 APR 2016			8092	-NR-	6501	8321
05 APR 2016			6096	-NR-	5475	7281
04 APR 2016			4425	-NR-	4279	5694
03 APR 2016			3900	-NR-	3673	5504
02 APR 2016			2325	-NR-	2950	4086
01 APR 2016			2906	-NR-	2663	3864

31 MAR 2016	5308	-NR-	4184	6319
30 MAR 2016	5389	-NR-	6289	8528
29 MAR 2016	5479	-NR-	5767	7677
28 MAR 2016	4044	-NR-	4163	6122

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)
10 APR 2016	175	2316	722	815	336
09 APR 2016	228	2437	886	982	354
08 APR 2016	335	2116	777	984	340
07 APR 2016	278	1495	432	990	332
06 APR 2016	20	482	331	803	310
05 APR 2016	65	204	254	920	344
04 APR 2016	9	0	369	869	245
03 APR 2016	43	0	101	775	16
02 APR 2016	23	403	1162	1005	-1
01 APR 2016	13	0	180	387	25
31 MAR 2016	1	0	0	0	121
30 MAR 2016	-56	0	0	167	244
29 MAR 2016	78	303	131	408	344
28 MAR 2016	25	474	375	811	347

DATE	S-308 Discharge (ALL DAY) (AC-FT)	Below S-308 Discharge (ALL-DAY) (AC-FT)	S-80 Discharge (ALL-DAY) (AC-FT)
10 APR 2016		1717	1138
09 APR 2016		1480	894
08 APR 2016		1377	893
07 APR 2016		2977	1779
06 APR 2016		3233	2239
05 APR 2016		2616	1775
04 APR 2016		2035	1446
03 APR 2016		1350	1130
02 APR 2016		866	873
01 APR 2016		946	996
31 MAR 2016		1458	1768
30 MAR 2016		2275	2215
29 MAR 2016		2121	1771
28 MAR 2016		2327	1462

*** 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

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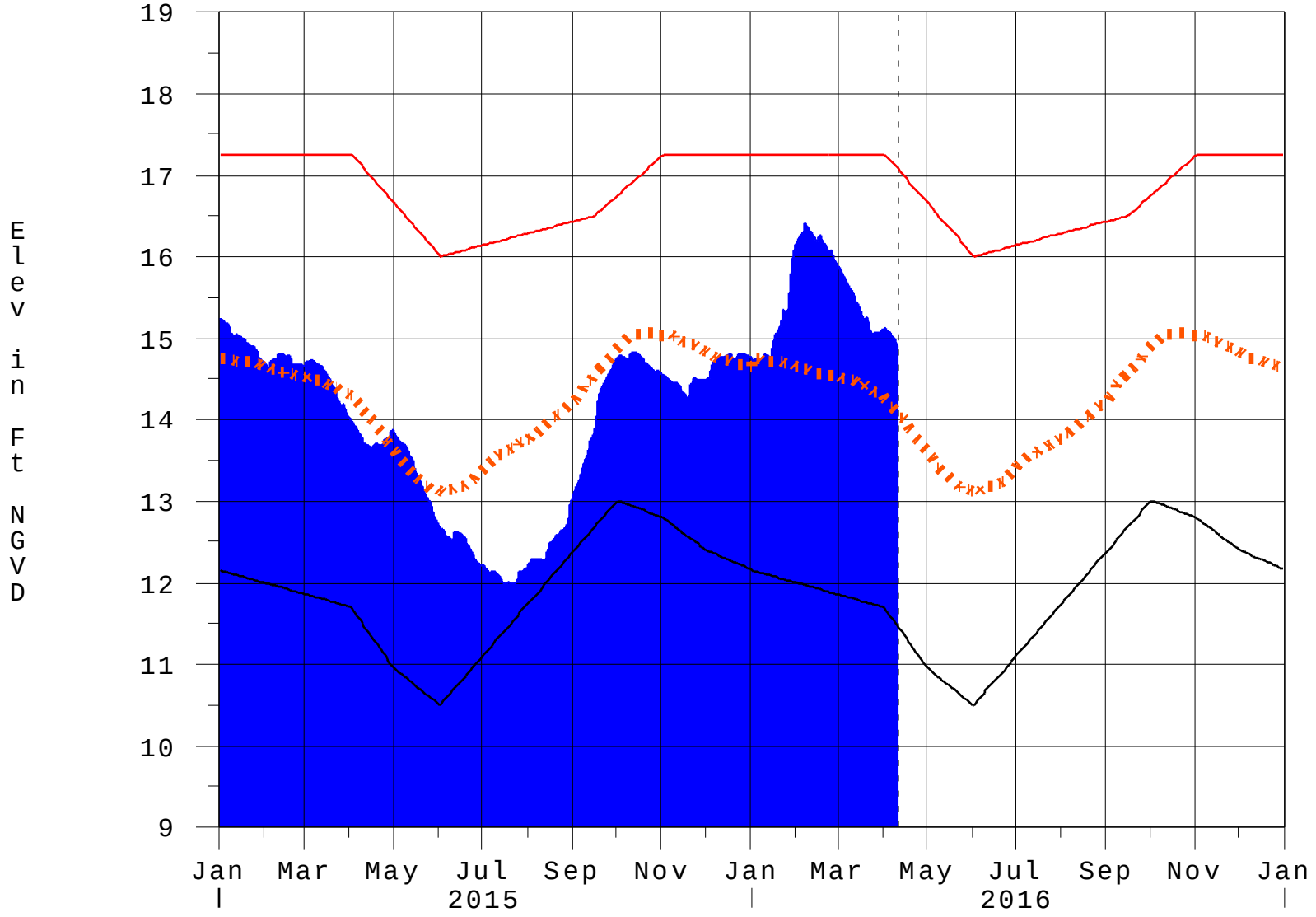
* On 11 May 1999, Lake Okeechobee Elevation was switched from

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 11APR2016 @ 14:07 ** Preliminary Data - Subject to Revision **

Lake Okeechobee

11APR16 13:45:24



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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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