

Application of the Lake Okeechobee Regulation Schedule (LORS2008) on 11/23/2015 (Developing El Nino Condition)

Lake Okeechobee Net Inflow Outlook:

The Lake Okeechobee Net Inflow Outlook has been computed using 4 methods: Croley's method¹, the SFWMD empirical method², a sub-sampling of El Nino years³ and a sub-sampling of cold years of the Atlantic Multi-decadal Oscillation (AMO) in combination with ENSO El Nino years⁴. 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 ENSO El Nino Years ³		Sub-sampling of AMO Warm + ENSO El Nino Years ⁴	
	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition
Current (Nov-Apr)	N/A	N/A	0.84	Normal	1.59	Wet	2.26	Very Wet
Multi Seasonal (Nov-Oct)	N/A	N/A	3.13	Wet	4.03	Wet	6.20	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:](#)

3090 cfs 14-day running average for Lake Okeechobee Net Inflow through 11/23/2015. According to the classification in [Tributary Hydrologic Conditions](#) table, this condition is Wet.

-0.82 for Palmer Index on 11/22/2015.

According to the classification in [Tributary Hydrologic Conditions](#) table, this condition is Normal.

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

[LORS2008 Classification Tables:](#)

Lake Okeechobee Stage on 11/23/2015

Lake Okeechobee Stage: **14.51 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	← 14.51
Base Flow sub-band		12.77	
Beneficial Use sub-band		12.51	
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 11/23/2015 (ENSO Neutral Condition):

Water Supply Department Technical Input

Water Supply Outlook:

District wide, Raindar rainfall 2.21 inches for the week ending 11/23/2015. Lake stage on 11/23/2015 is 14.50 ft, up 0.18 ft from last week.

The updated November 2015 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 **Wet**. The PDSI indicates normal condition and the LONIN is Wet. The classification is based on the wetter of the two.

Water Supply Risk Evaluation

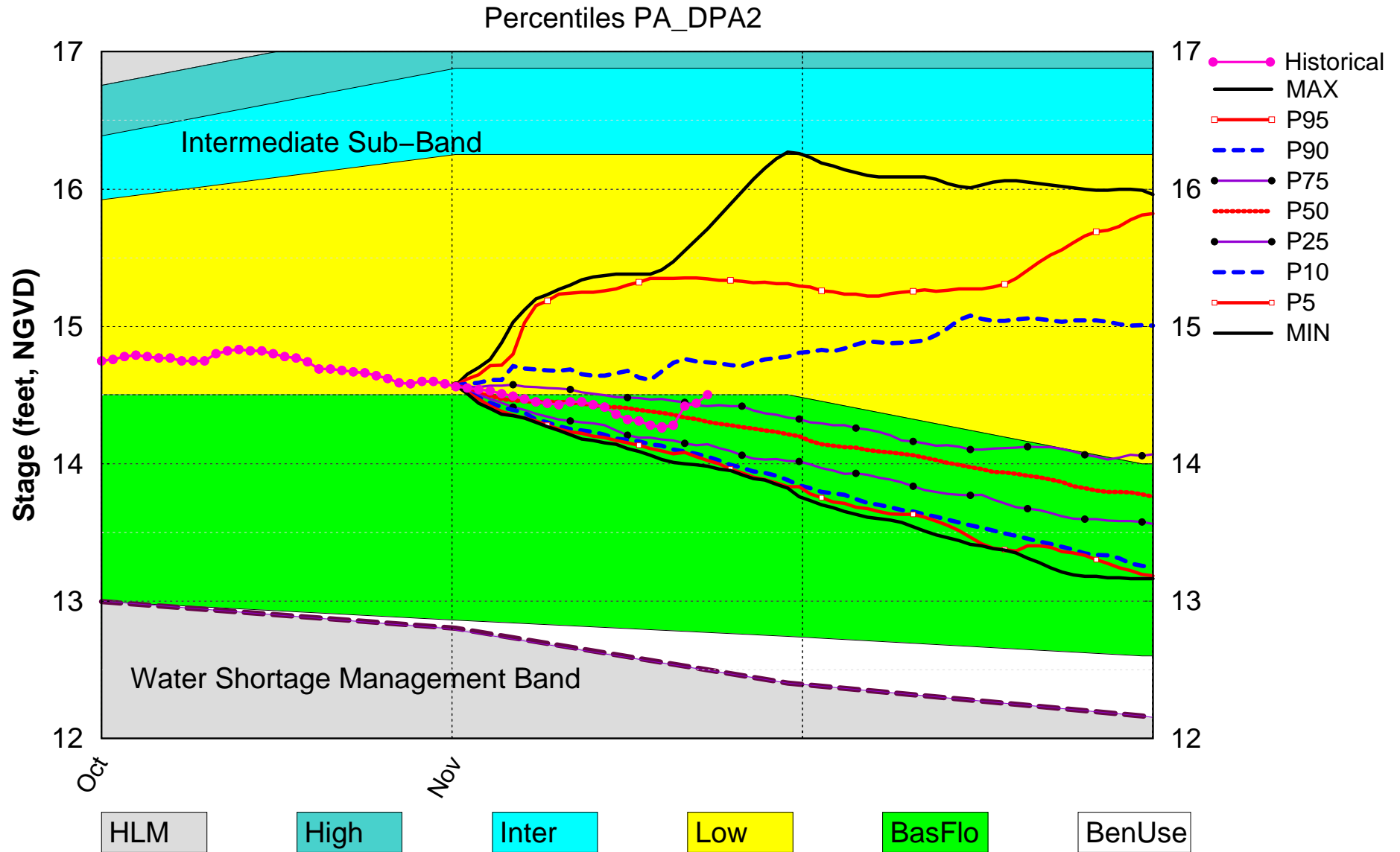
Area	Indicator	Value	Color Coded Scoring Scheme
LOK	Projected LOK Stage for the next two months	Base Flow Sub-Band	M
	Palmer Index for LOK Tributary Conditions	-0.82 (Normal)	L
	CPC Precipitation Outlook	1 month: Above Normal	L
		3 months: Above Normal	L
	LOK Seasonal Net Inflow Forecast	1.76 ft (Normal to Extremely Wet)	L
	AMO warm/EI Nino		
	LOK Multi-Seasonal Net Inflow Forecast	4.03 ft (Wet)	L
AMO warm/EI Nino			
WCAs	WCA 1: Site 1-7,1-8T, & 1-9	(16.97 ft)	L
	WCA 2A: Site 2-17 HW	(12.66 ft)	L
	WCA-3A: 3 Station Average (Site 63, 64 and 65)	(10.27 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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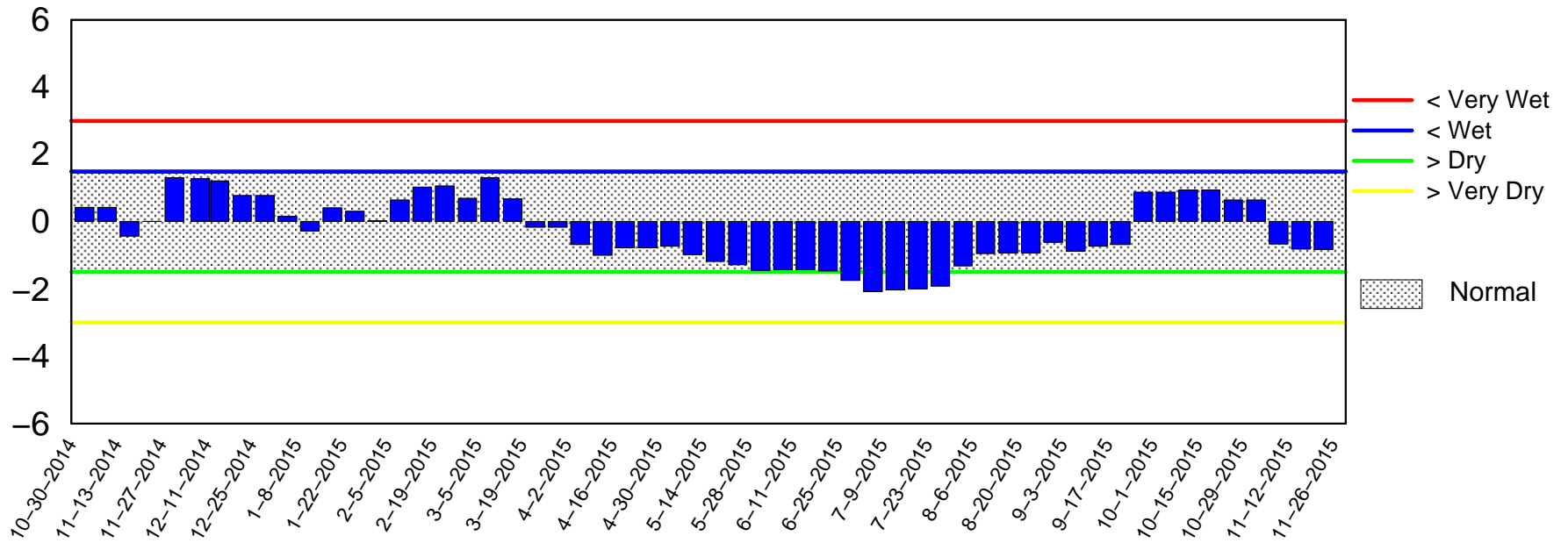
Lake Okeechobee SFWMM Nov 2015 Dynamic Position Analysis



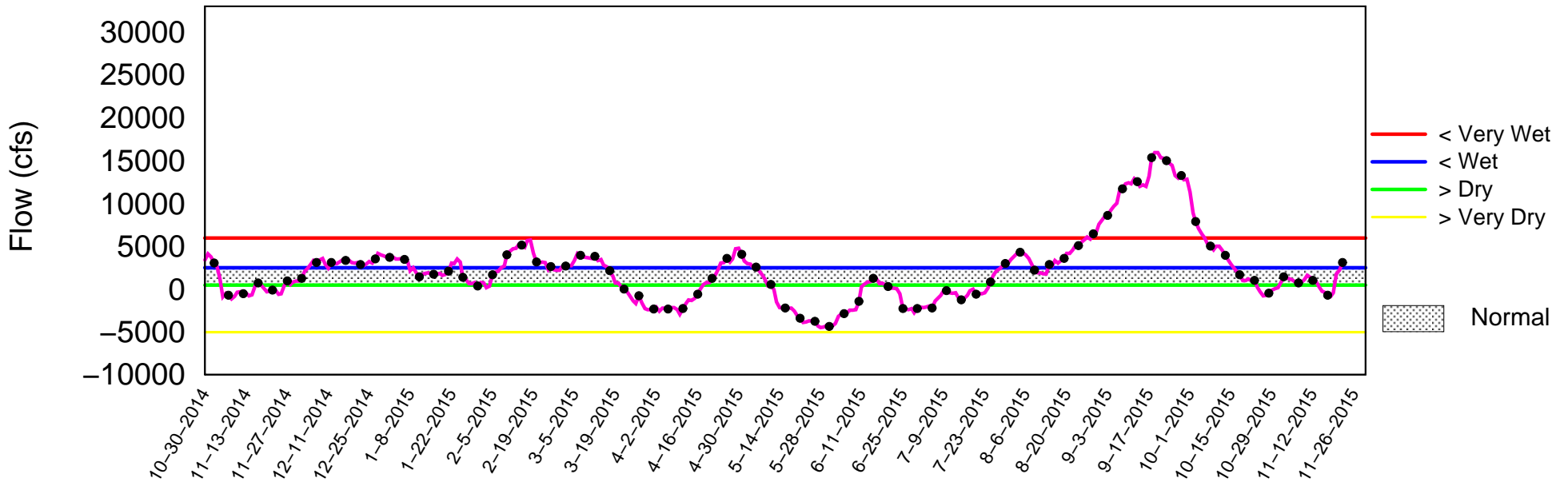
(See assumptions on the Position Analysis Results website)

Tributary Basin Condition Indicators as of November 23 2015

Palmer Index



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



Mon Nov 23 15:00:19 EST 2015

2008 LORS

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

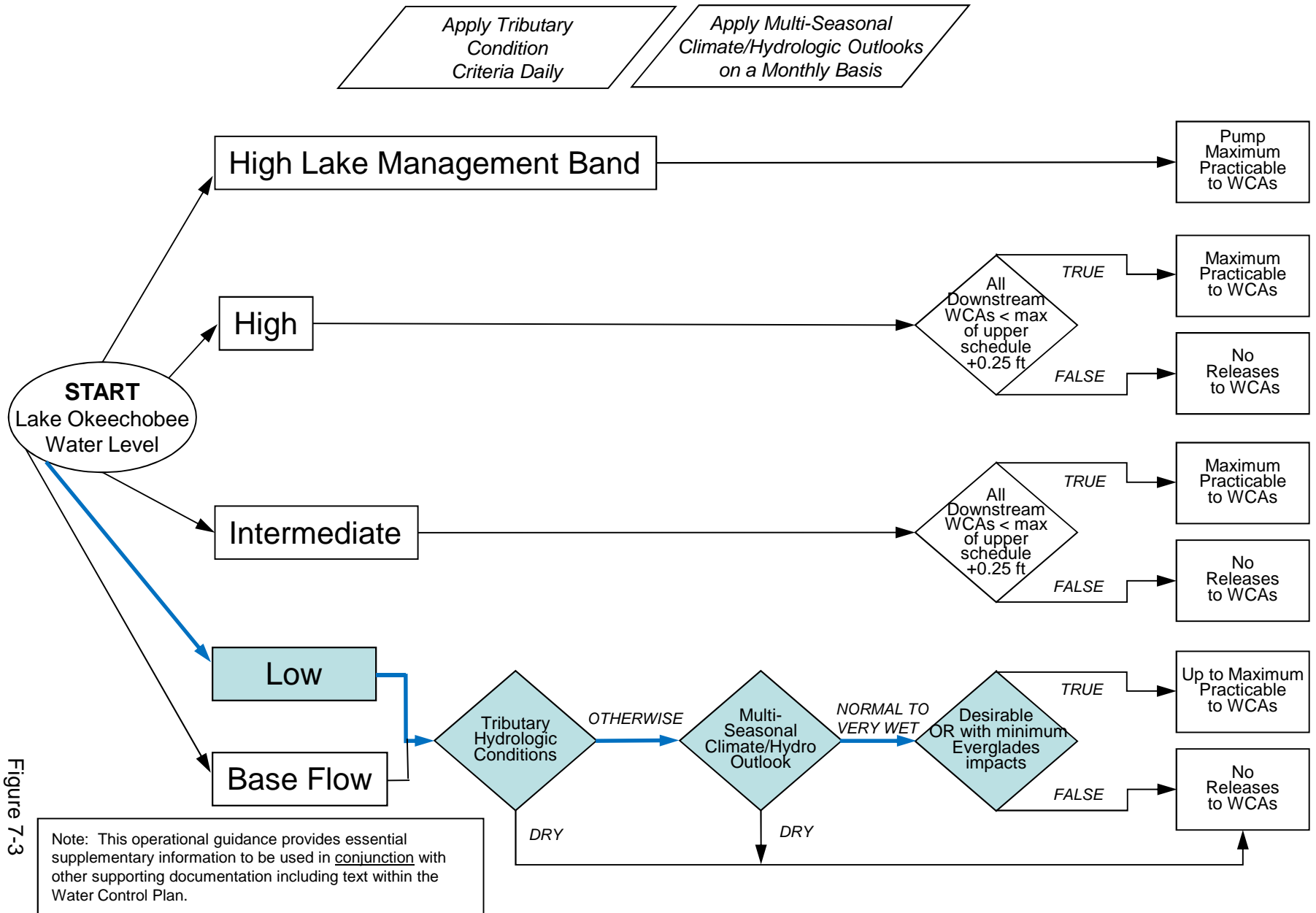


Figure 7-3

2008 LORS FORECAST

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

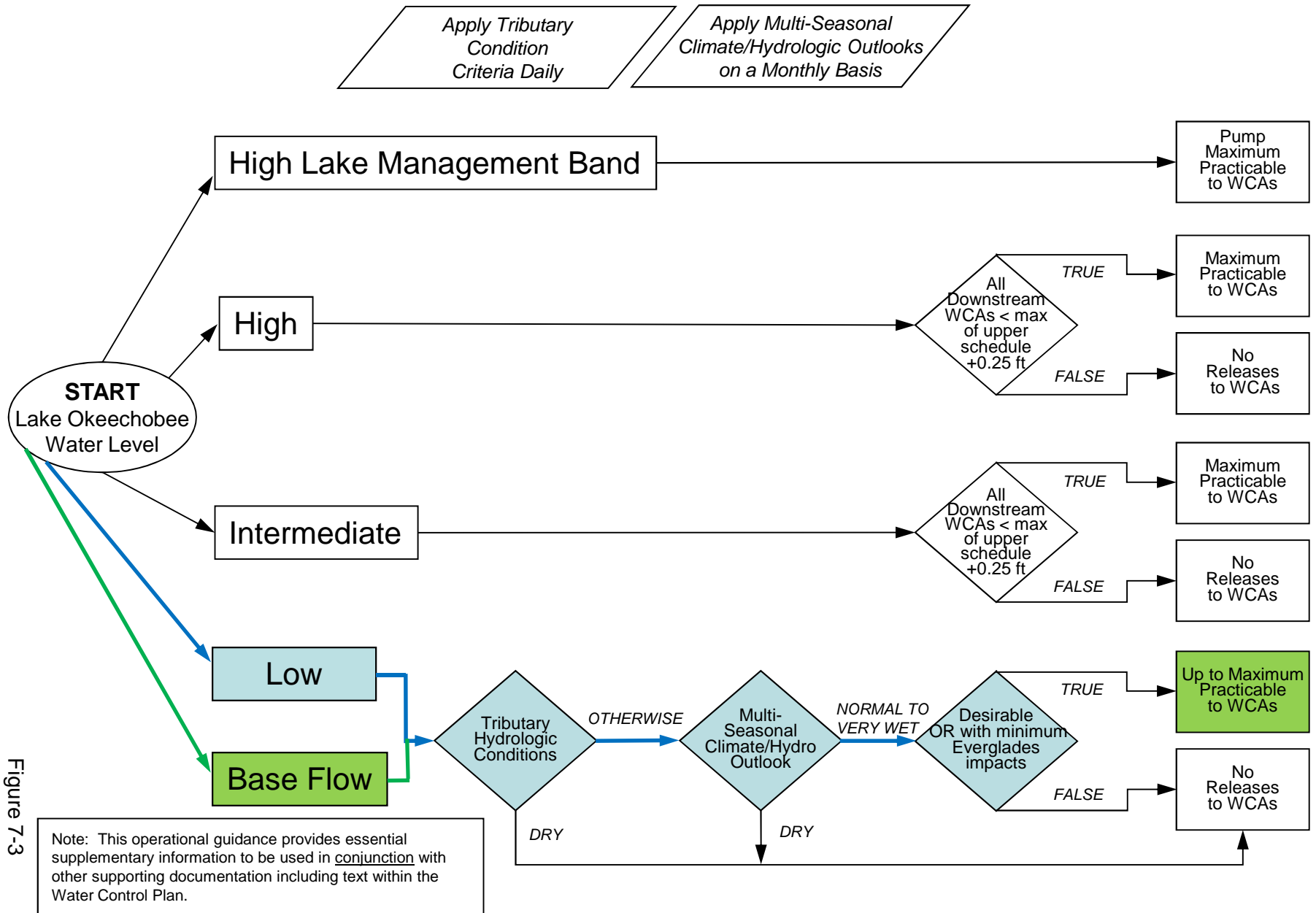


Figure 7-3

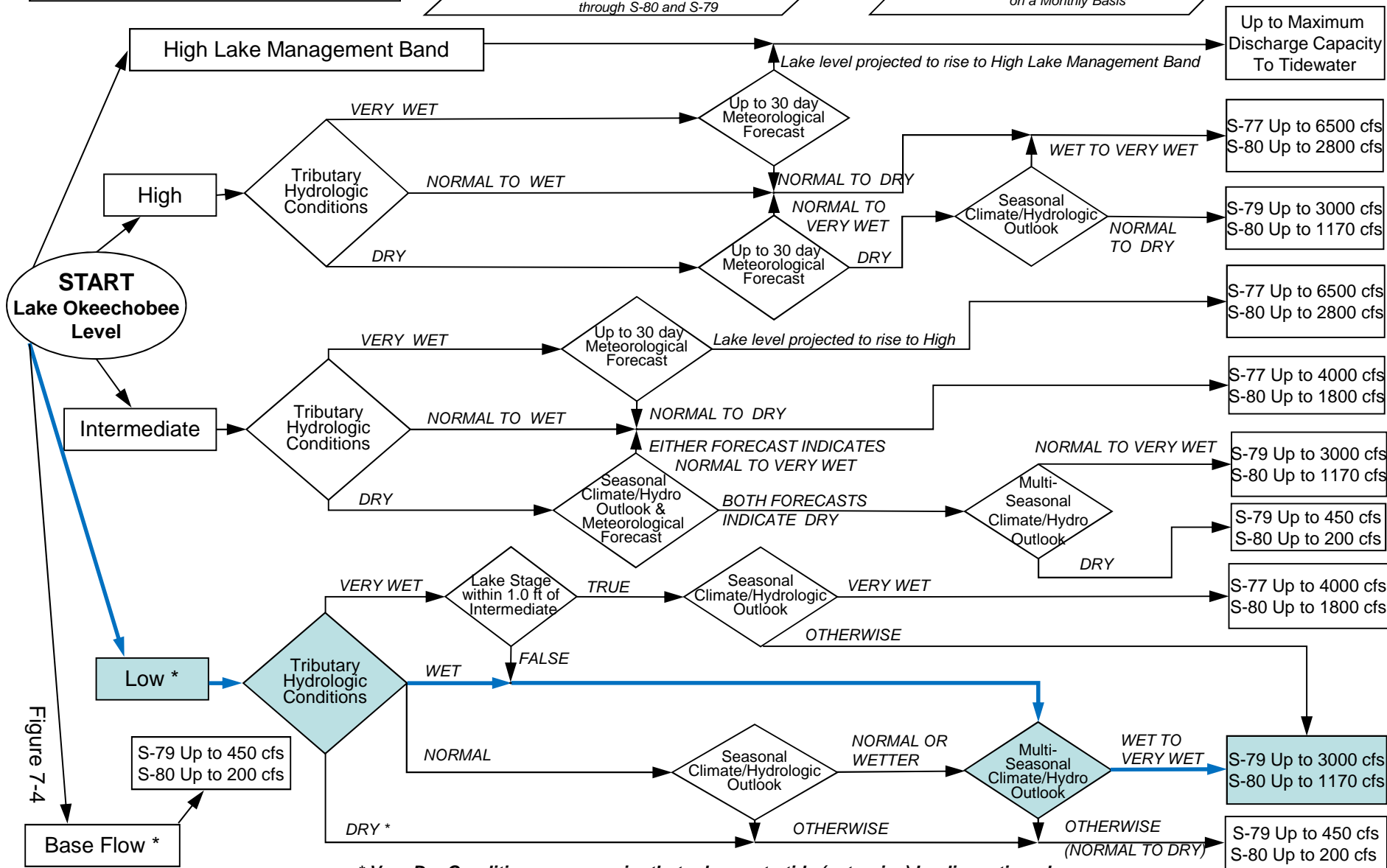
2008 LORS

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



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

Figure 7-4

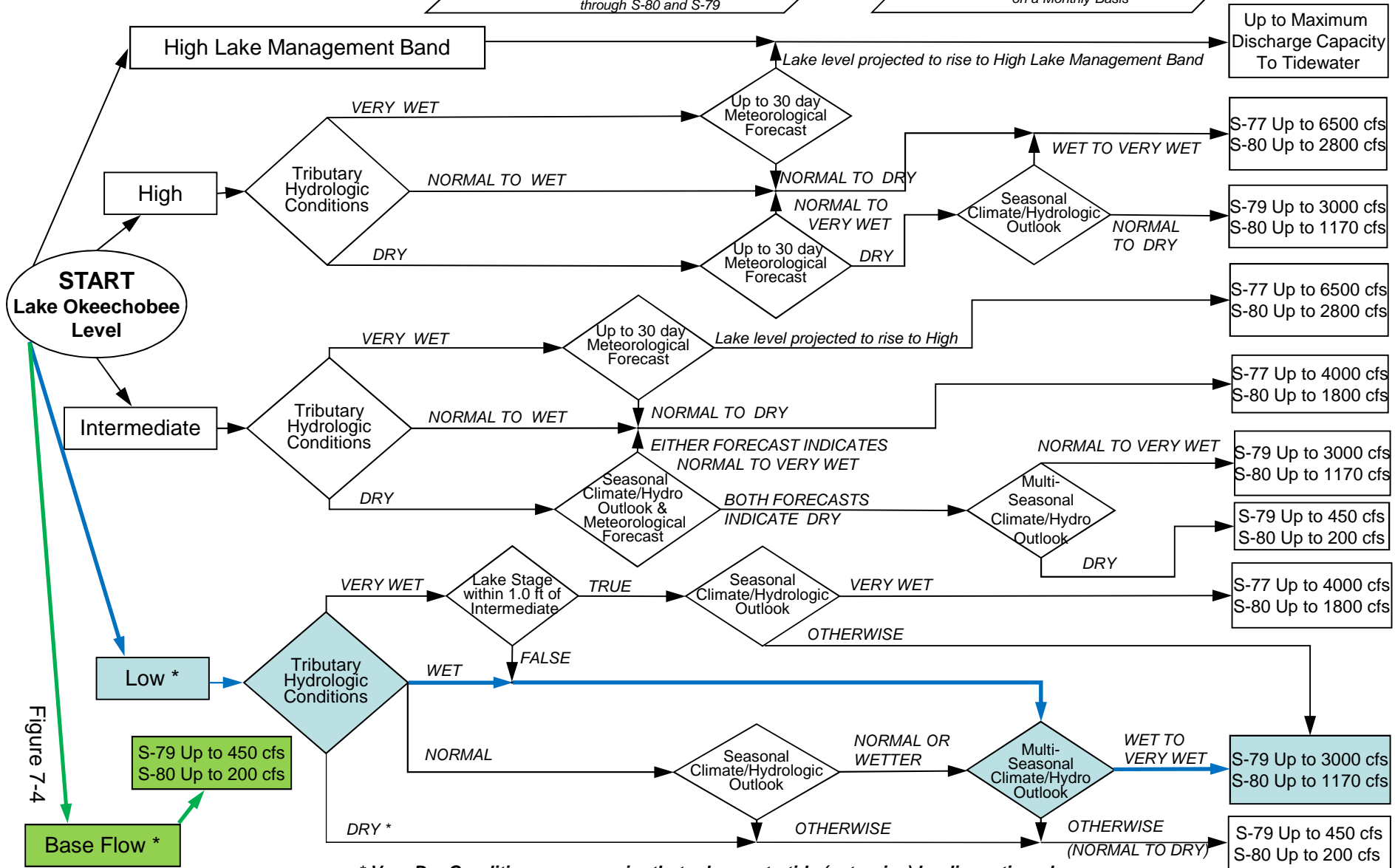
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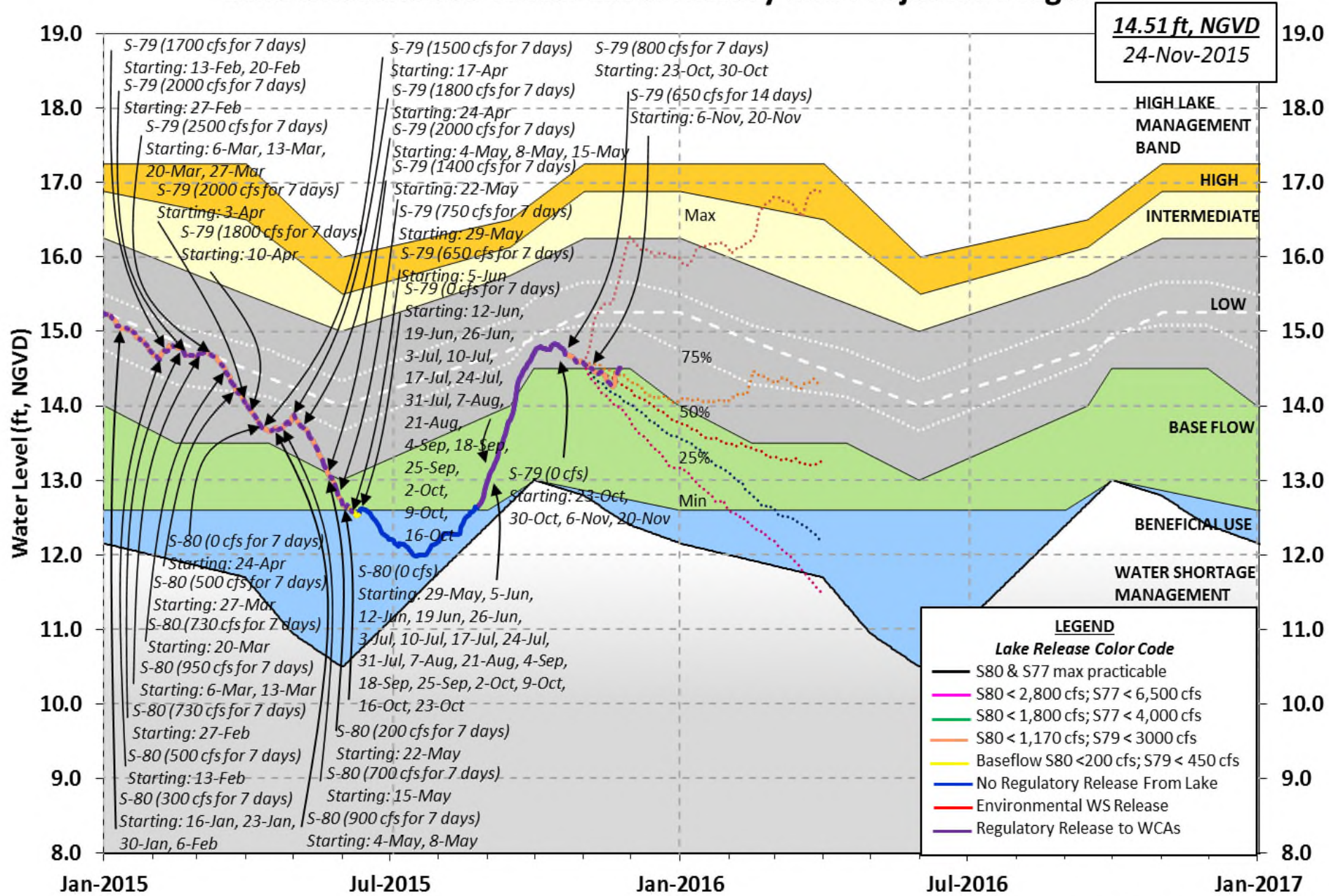
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* Very Dry Conditions may require that releases to tide (estuaries) be discontinued

Figure 7-4

Lake Okeechobee Water Level History and Projected Stages



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

Data Ending 2400 hours 22 NOV 2015

Okeechobee Lake Regulation	Elevation	Last Year	2YRS Ago
	(ft-NGVD)	(ft-NGVD)	(ft-NGVD)
*Okeechobee Lake Elevation	14.50	15.52	14.80 (Official Elv)
Bottom of High Lake Mngmt=	17.25	Top of Water Short Mngmt=	12.51
Currently in Operational Management Band			

Simulated Average LORS2008 [1965-2000]	13.84
Difference from Average LORS2008	0.66

22NOV (1965-2007) Period of Record Average	14.91
Difference from POR Average	-0.41

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

++Navigation Depth (Based on 2007 Channel Condition Survey) Route 1 ÷ 8.44'
 ++Navigation Depth (Based on 2008 Channel Condition Survey) Route 2 ÷ 6.64'
 Bridge Clearance = 49.02'

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

L001	L005	L006	LZ40	S4	S352	S308	S133
14.30	14.55	14.57	14.49	14.60	14.71	14.48	14.33

*Combination Okeechobee Avg-Daily Lake Average = 14.50
 (*See Note)

Okeechobee Inflows (cfs):

S65E	1797	C5	-NR-	Fisheating Cr	54
S154	85	S191	0	S135 Pumps	168
S84	1991	S133 Pumps	109	S2 Pumps	0
S84X	812	S127 Pumps	96	S3 Pumps	0
S71	1430	S129 Pumps	68	S4 Pumps	0
S72	558	S131 Pumps	45		
Total Inflows:	7212				

Okeechobee Outflows (cfs):

S135 Culverts	0	S354	0	S77	184
(Used)					
S127 Culverts	-NR-	S351	0	S77Below	167 (NOT USED)

C5:		14.56	-NR-	-NR-	-NR-	-NR-				
South Shore										
S4 Pumps:	12.26	14.79	0	0	0	0				(cfs)
S169:	14.87	12.24	0	0.0	0.0	0.0				
S310:	14.80		-103							
S3 Pumps:	10.68	14.97	0	0	0	0				(cfs)
S354:	14.97	10.68	0	0.0	0.0					
S2 Pumps:	11.12	14.88	0	0	0	0	0			(cfs)
S351:	14.88	11.12	0	0.0	0.0	0.0				
S352:	14.76	10.45	0	0.0	0.0					
C10A:	-NR-	14.00		0.0	8.5	8.5	8.5	8.5	8.5	
L8 Canal PT		13.77	181							
S351 and S352 Temporary Pumps/S354 Spillway										
S351:	11.12	14.88	0	-NR-	-NR-	-NR-	-NR-	-NR-	-NR-	
S352:	10.45	14.76	0	-NR-	-NR-	-NR-	-NR-			
S354:	10.68	14.97	0	-NR-	-NR-	-NR-	-NR-			
Caloosahatchee River (S77, S78, S79)										
S47B:	14.87	11.24		0.5	0.5					
S47D:	11.12	11.10	19	5.0						
S77:	Spillway and Sector Flow:									
	14.43	11.14	179	0.0	0.0	0.0	0.0			
	Flow Due to Lockages+:		5							
S77 Below USGS Flow Gage			167							
S78:	Spillway and Sector Flow:									
	10.98	3.05	543	0.5	0.5	0.5	0.5			
	Flow Due to Lockages+:		12							
S79:	Spillway and Sector Flow:									
	3.17	2.12	1983	1.0	1.0	1.0	2.0	2.0	1.0	1.0
1.0	Flow Due to Lockages+:		5							
	Percent of flow from S77		9%							
	Chloride (ppm)		55							
St. Lucie Canal (S308, S80)										
S308:	Spillway and Sector Flow:									
	14.44	14.48	0	0.0	0.0	0.0	0.0			
	Flow Due to Lockages+:		-0							
S308 Below USGS Flow Gage			-32							
S153:	18.88	14.31	22	0.5	0.0					
S80:	Spillway and Sector Flow:									
	14.54	1.44	670	0.5	0.3	0.0	0.0	0.0	0.0	0.0

Flow Due to Lockages+: 21
 Percent of flow from S308 0%

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.

	1-Day	3-Day	7-Day	----- Wind ---	
Daily Precipitation Totals				Direction	
Speed	(inches)	(inches)	(inches)	(Degø)	
(mph)					
S133 Pump Station:	-NR-	0.00	0.47		
S193:	-NR-	0.00	0.00	-NR-	-NR-
Okeechobee Field Station:	-NR-	0.00	0.00		
S135 Pump Station:	-NR-	0.00	0.38		
S127 Pump Station:	-NR-	0.00	1.85		
S129 Pump Station:	-NR-	0.00	1.68		
S131 Pump Station:	-NR-	0.00	1.21		
S77:	0.34	0.67	1.49	54	2
S78:	0.17	0.42	70.41	111	2
S79:	0.89	1.75	1.77	102	3
S4 Pump Station:	-NR-	0.00	0.00		
Clewiston Field Station:	-NR-	0.00	0.00		
S3 Pump Station:	-NR-	0.00	2.81		
S2 Pump Station:	-NR-	0.00	1.98		
S308:	*****	*****	*****	341	4
S80:	0.16	0.35	0.79	34	2
Okeechobee Average	*****	4402.97	4403.97		
(Sites S78, S79 and S80 not included)					

Oke Nexrad Basin Avg	-NR-	0.00	0.00		

Okeechobee Lake Elevations	22 NOV 2015	14.50	Difference from
22NOV15			22NOV15
22NOV15 -1 Day =	21 NOV 2015	14.44	-0.06
22NOV15 -2 Days =	20 NOV 2015	14.42	-0.08
22NOV15 -3 Days =	19 NOV 2015	14.28	-0.22
22NOV15 -4 Days =	18 NOV 2015	14.26	-0.24
22NOV15 -5 Days =	17 NOV 2015	14.28	-0.22
22NOV15 -6 Days =	16 NOV 2015	14.31	-0.19
22NOV15 -7 Days =	15 NOV 2015	14.32	-0.18
22NOV15 -30 Days =	23 OCT 2015	14.66	0.16
22NOV15 -1 Year =	22 NOV 2014	15.52	1.02
22NOV15 -2 Year =	22 NOV 2013	14.80	0.30

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
22NOV15	Today =	22 NOV 2015	2747	MON		13367
22NOV15	-1 Day =	21 NOV 2015	1836	SUN		4801
22NOV15	-2 Days =	20 NOV 2015	1396	SAT		29942
22NOV15	-3 Days =	19 NOV 2015	-826	FRI		4583
22NOV15	-4 Days =	18 NOV 2015	-1233	THU		-3068
22NOV15	-5 Days =	17 NOV 2015	-1096	WED		-4444
22NOV15	-6 Days =	16 NOV 2015	-732	TUE		427
22NOV15	-7 Days =	15 NOV 2015	-658	MON		-6190
22NOV15	-8 Days =	14 NOV 2015	-82	SUN		-8314
22NOV15	-9 Days =	13 NOV 2015	495	SAT		-1556
22NOV15	-10 Days =	12 NOV 2015	533	FRI		-2002
22NOV15	-11 Days =	11 NOV 2015	864	THU		2324
22NOV15	-12 Days =	10 NOV 2015	1146	WED		7669
22NOV15	-13 Days =	09 NOV 2015	687	TUE		921

S65E						
Average Flow over previous 14 days						Avg-Daily Flow
22NOV15	Today=	22 NOV 2015	948	MON		1797
22NOV15	-1 Day =	21 NOV 2015	882	SUN		1090
22NOV15	-2 Days =	20 NOV 2015	870	SAT		1023
22NOV15	-3 Days =	19 NOV 2015	875	FRI		737
22NOV15	-4 Days =	18 NOV 2015	917	THU		-NR-
22NOV15	-5 Days =	17 NOV 2015	959	WED		-NR-
22NOV15	-6 Days =	16 NOV 2015	1005	TUE		619
22NOV15	-7 Days =	15 NOV 2015	1086	MON		617
22NOV15	-8 Days =	14 NOV 2015	1171	SUN		714
22NOV15	-9 Days =	13 NOV 2015	1257	SAT		766
22NOV15	-10 Days =	12 NOV 2015	1342	FRI		710
22NOV15	-11 Days =	11 NOV 2015	1440	THU		974
22NOV15	-12 Days =	10 NOV 2015	1523	WED		1136
22NOV15	-13 Days =	09 NOV 2015	1573	TUE		1192

Lake Okeechobee Outlets Last 14 Days

DATE	S-77	S-77	Below S-77	S-78	S-78	S-79
	Discharge	Discharge	Discharge	Discharge	Discharge	Discharge
	(0700-2100)	(ALL DAY)	(ALL-DAY)	(0700-2100)	(ALL DAY)	(ALL DAY)
	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)
22 NOV 2015	62	365	332	661	1100	3942
21 NOV 2015	406	-NA-	444	536	755	2061
20 NOV 2015	0	6	-118	269	425	1327
19 NOV 2015	12	-NA-	239	208	387	386
18 NOV 2015	868	-NA-	1137	248	511	818
17 NOV 2015	818	-NA-	888	371	647	1339
16 NOV 2015	806	-NA-	1239	493	1039	1665
15 NOV 2015	1273	2146	2183	947	1628	2139

14 NOV 2015	1002	-NA-	1315	889	1201	2211
13 NOV 2015	490	-NA-	455	133	307	1229
12 NOV 2015	0	30	147	133	446	1099
11 NOV 2015	31	731	853	294	680	945
10 NOV 2015	872	-NA-	1498	288	880	1335
09 NOV 2015	1032	-NA-	1826	578	1384	1636

	S-310	S-351	S-352	S-354	L8 Canal Pt
	Discharge	Discharge	Discharge	Discharge	Discharge
	(ALL DAY)	(ALL DAY)	(ALL DAY)	(ALL DAY)	(ALL DAY)
DATE	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)
22 NOV 2015	-204	0	0	0	359
21 NOV 2015	-140	0	0	0	393
20 NOV 2015	-178	0	0	0	389
19 NOV 2015	41	0	0	0	346
18 NOV 2015	14	383	87	0	330
17 NOV 2015	54	892	956	224	347
16 NOV 2015	84	1489	1154	458	369
15 NOV 2015	69	1059	470	486	374
14 NOV 2015	121	1160	573	863	392
13 NOV 2015	116	1420	1430	1610	386
12 NOV 2015	55	1664	1170	1406	365
11 NOV 2015	42	1931	902	672	384
10 NOV 2015	54	1761	1184	1237	401
09 NOV 2015	71	1842	884	827	331

	S-308	Below S-308	S-80
	Discharge	Discharge	Discharge
	(ALL DAY)	(ALL-DAY)	(ALL-DAY)
DATE	(AC-FT)	(AC-FT)	(AC-FT)
22 NOV 2015	-0	-63	1370
21 NOV 2015	0	129	68
20 NOV 2015	0	98	46
19 NOV 2015	0	123	42
18 NOV 2015	1	628	41
17 NOV 2015	1	399	40
16 NOV 2015	1	739	51
15 NOV 2015	0	344	32
14 NOV 2015	0	27	51
13 NOV 2015	0	316	64
12 NOV 2015	1	442	63
11 NOV 2015	1	343	61
10 NOV 2015	1	-199	47
09 NOV 2015	1	-2	33

*** NOTE: 1) Discharge from (0700-2100) is computed using Spillway and Sector

Gate Discharges from 0700 hrs to 2100 hrs.

and 2) 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

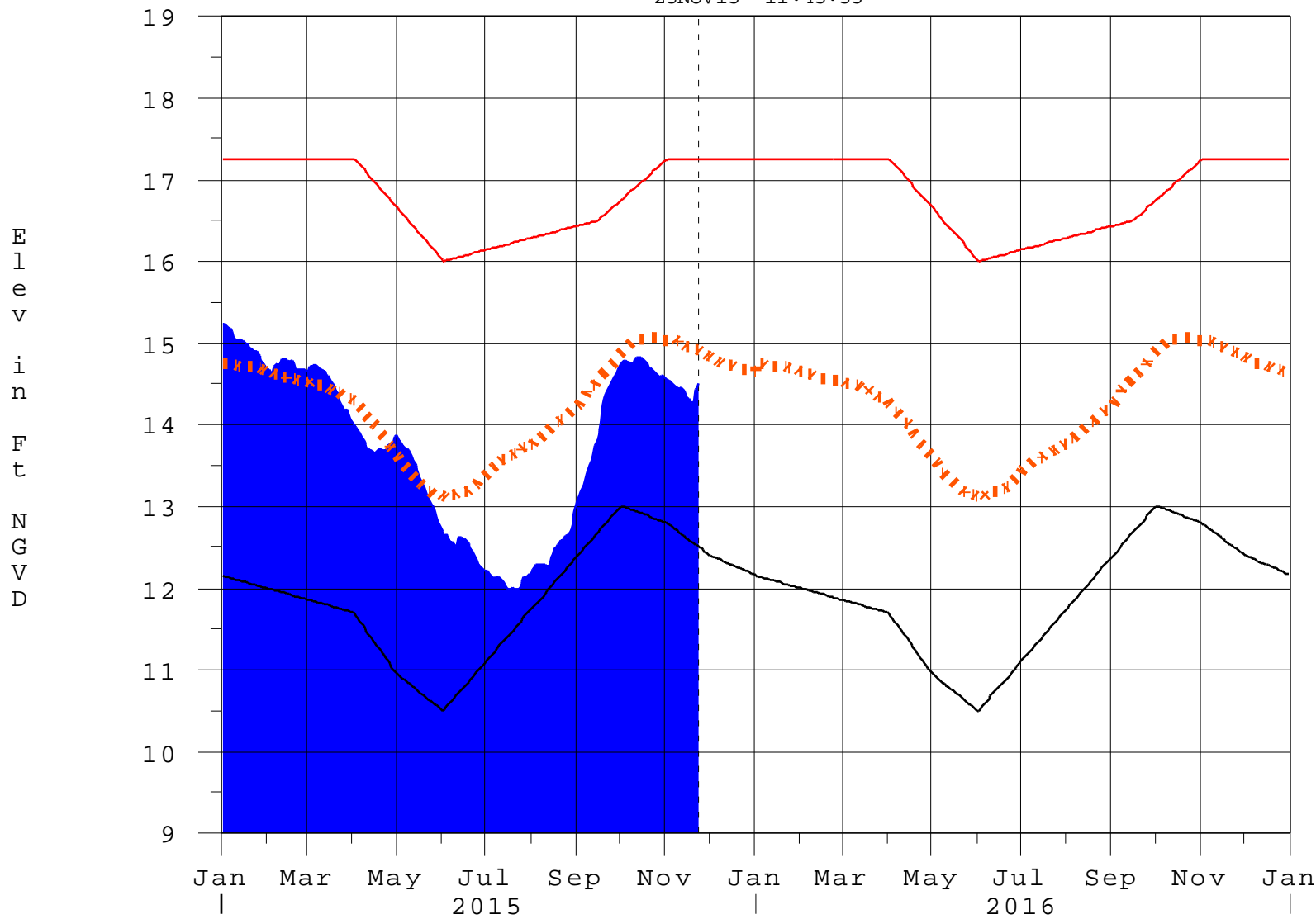
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* On 11 May 1999, Lake Okeechobee Elevation was switched from Instantaneous 2400 value to an average-daily lake average.
On 14 Mar 2001, due to the isolation of various gages within the standard
10 stations, the average of the interior 4 station gages 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

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Report Generated 23NOV2015 @ 12:39 ** Preliminary Data - Subject to Revision
**

Lake Okeechobee

23NOV15 11:45:35



- 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 \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*

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