Application of the Lake Okeechobee Regulation Schedule (LORS2008) on 8/15/2016 (ENSO Neutral 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 Neutral years³ and a sub-sampling of warm years of the Atlantic Multi-decadal Oscillation (AMO) in combination with Neutral ENSO 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 Empiri		Empirical		Croley's Method ^{1*}		Empirical		ampling of al ENSO ears ³	AMO Neutr	ampling of Warm + al ENSO ears ⁴
	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition				
Current (Aug- Jan)	N/A	N/A	1.89	Wet	2.87	Very Wet	3.40	Very Wet				
Multi Seasonal (Aug- Apr)	N/A	N/A	1.97	Normal	2.90	Wet	3.48	Wet				

^{*}Croley's Method Not Produced For This Report

See <u>Seasonal</u> and <u>Multi-Seasonal</u> 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:

3539 cfs 14-day running average for Lake Okeechobee Net Inflow through 8/15/2016. According to the classification in <u>Tributary Hydrologic Conditions</u> table, this condition is Normal.

-1.38 for Palmer Index on 8/13/2016.

According to the classification in <u>Tributary Hydrologic Conditions</u> table, this condition is Normal.

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

LORS2008 Classification Tables:

Lake Okeechobee Stage on 8/15/2016

Lake Okeechobee Stage: 14.77 feet

USACE Report for Lake Okeechobee

Lake Okeechobee Stage Hydrograph

Lake Okeechob	ee Management	Bottom Elevation	Current
Zone	/Band	(feet, NGVD)	Lake Stage
High Lake Manag	amant Dand	10.05	
High Lake Manage	ement Band	16.35	
	High sub-band	15.94	
Operational Band	Intermediate sub-band	15.53	
	Low sub-band	13.70	← 14.77
Base Flow sub-ba	nd	12.60	
Beneficial Use sub	o-band	12.04	
Water Shortage M	lanagement 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

Back to U.S. Army Corps of Engineers LORSS Homepage

LORS2008 Implementation on 8/15/2016 (ENSO Neutral Condition):

Status for week ending 8/15/2016:

District wide, Raindar rainfall was 2.02 inches for the week. Lake stage on 8/15/2016 was 14.77 ft, up 0.16 ft from last week.

The updated August 2016 SFWMM Dynamic Position Analysis <u>percentile graph</u> for Lake Okeechobee show that the current lake stage is in the Low Operational Sub-Band.

The LORS2008 tributary <u>indices</u> are classified as **Wet**. The PDSI indicates normal condition and the LONIN is Wet. The classification is based on the wetter of the two.

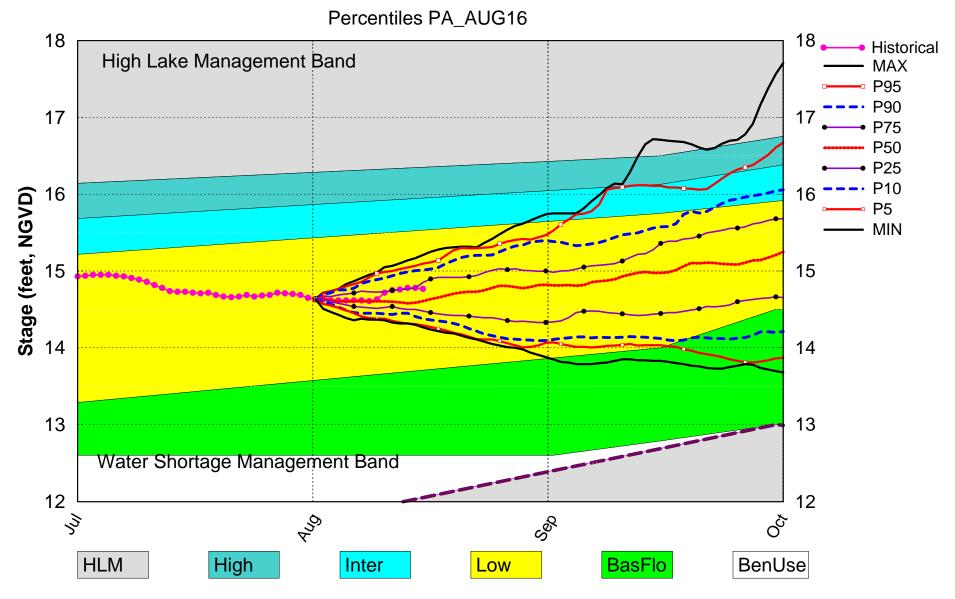
Water Supply Risk Evaluation

Truto.	Supply Nisk Evaluation		
Area	Indicator	Value	Color Coded Scoring Scheme
	Projected LOK Stage for the next two months	Low Sub-Band	L
	Palmer Index for LOK Tributary Conditions	-1.38 (Dry)	M
	CPC Precipitation Outlook	1 month: Normal	L
LOK	CFC Frecipitation Outlook	3 months: Above Normal	L
	LOK Seasonal Net Inflow Forecast ENSO Neutral Years	2.87 ft (Normal to Extremely Wet)	L
	LOK Multi-Seasonal Net Inflow Forecast	2.90 ft (Normal)	M
	ENSO Neutral Years		
	WCA 1: Site 1-7, Site 1-8T, & Site 1-9 Average	Above Line 1 (16.18 ft)	L
WCAs	WCA 2A: Site 2-17 HW	Above Line1 (12.63 ft)	L
	WCA-3A: 3 Station Average (Site 63, 64 and 65)	Above Line 1 (10.02 ft)	L
	Service Area 1	Year-Round Irrigation Rule in effect	L
LEC	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.

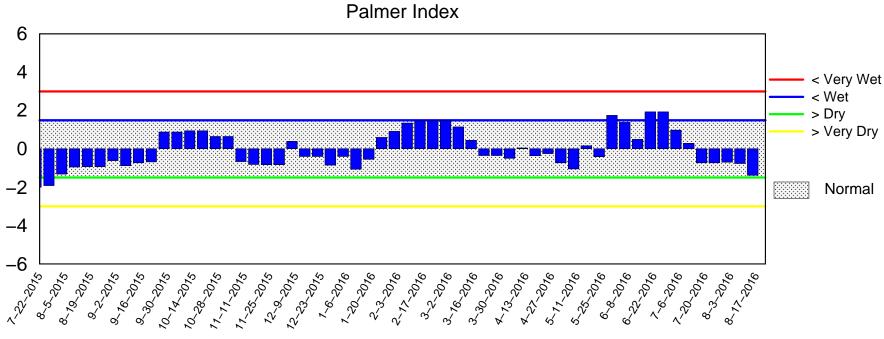
Back to Lake Okeechobee Operations Main Page
Back to U.S. Army Corps of Engineers LORSS Homepage

Lake Okeechobee SFWMM August 2016 Dynamic Position Analysis

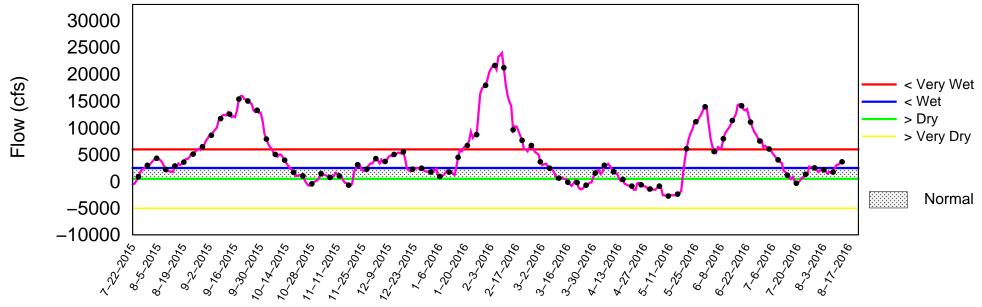


(See assumptions on the Position Analysis Results website)

Tributary Basin Condition Indicators as of August 15 2016



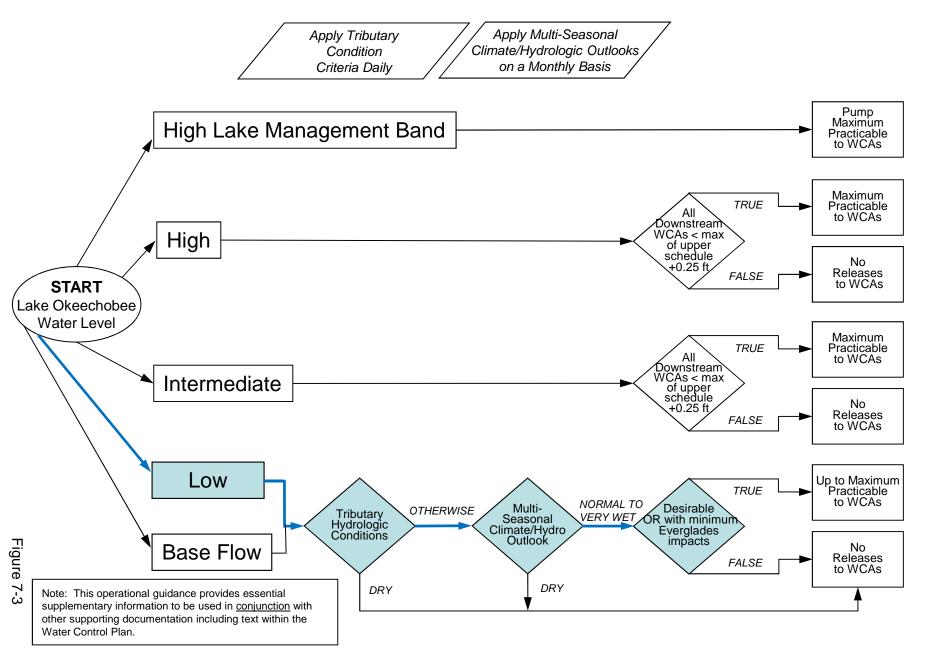
Lake Okeechobee Net Inflow (LONIN) 14-day Running Average



Mon Aug 15 12:20:11 EDT 2016

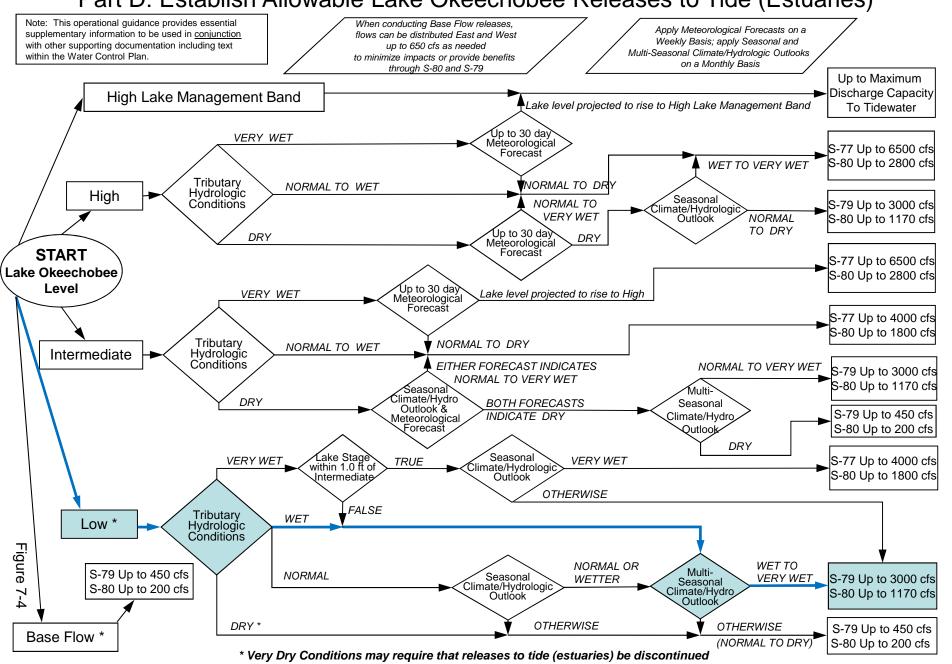
2008 LORS

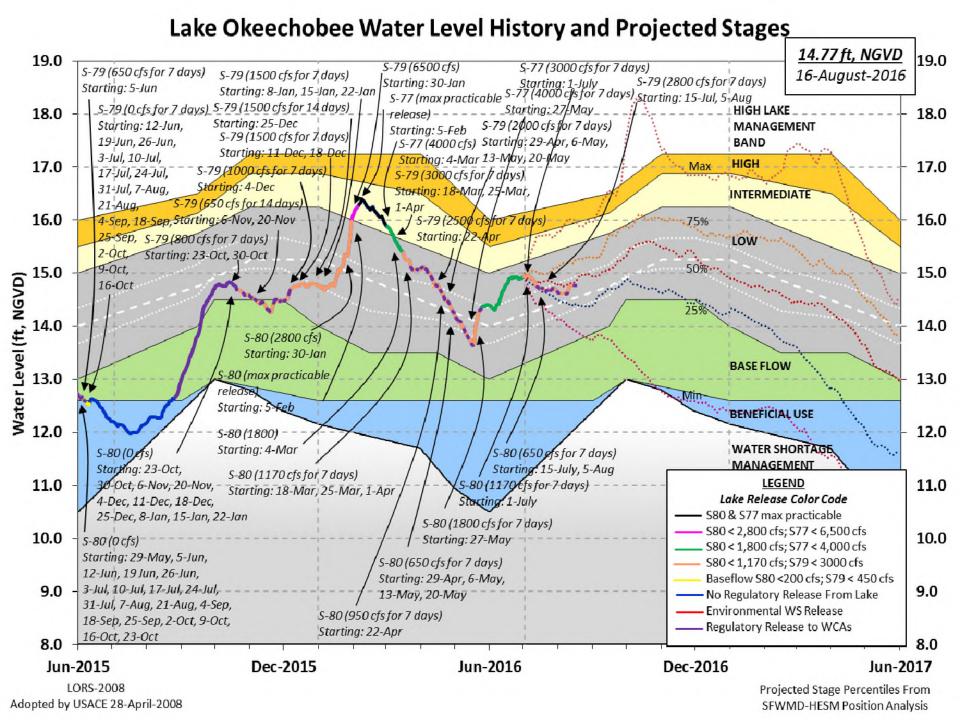
Part C: Establish Allowable Lake Okeechobee Releases to the Water Conservation Areas



2008 LORS

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





Data Ending 2400 hours 14 AUG 2016

Okeechobee Lake Regulation	(ft-NGVD)	(ft-NGV	D) (ft-NGVD)	
*Okeechobee Lake Elevation Bottom of High Lake Mngmt= Currently in Operational Ma	16.35 Top of		8 14.36 (Of ort Mngmt= 12.	
Simulated Average LORS2008 Difference from Average LOR		12.95 1.82		
14AUG (1965-2007) Period of Difference from POR Average		ge 13. 0.7		
Today Lake Okeechobee eleva stations	ation is determ	nined fro	m the 4 Int &	4 Edge
++Navigation Depth (Based	on 2007 Channel	Conditi	on Survey) Rou	te 1 ÷
8.71' ++Navigation Depth (Based of 6.91' Bridge Clearance = 48.93'	on 2008 Channel	Conditi	on Survey) Rou	te 2 ÷
_		, -		
4 Interior and 4 Edge Okeecho	obee Lake Avera	ige (Avg-	Daily values):	
L001 L005 L006 LZ40 14.65 14.87 14.77 14.74			S133 14.73	
*Combination Okeechobee Avg	g-Daily Lake Av		14.77 (*See Note)	
_				
Okeechobee Inflows (cfs):				
S65E 1096 C			Fisheating Cr	628
	191	65	S135 Pumps	0
	133 Pumps	0	S2 Pumps	0
	127 Pumps 129 Pumps	77 0	S3 Pumps S4 Pumps	0
	131 Pumps	0		Ω
5/2 145 5	- · <u>-</u> -~			0
				0
Total Inflows: 2800				0
Total Inflows: 2800 Okeechobee Outflows (cfs):	354	0	S77	
Total Inflows: 2800 Okeechobee Outflows (cfs): S135 Culverts -NR- Si	354 351	0	S77 S77Below	0 (Not Used) 263

S131 Culverts 0 L8 Canal Pt 100 S308Below 996

(USED)

Total Outflows: 1359

****S77 Structure outflow is being used to compute Total Outflow.

****S308 Structure outflow is being used to compute Total Outflow.

Okeechobee Pan Evaporation (inches):

0.30 S308 0.06

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 -2118 cfs or -4200 AC-FT

Note: Headwater, tailwater, and stage values below are instantaneous values

unless otherwise specified.

Headwater Tailwater ----- Gate Positions -----

Elevation Elevation Disch #1 #2 #3 #4 #5 #6 #7

#8 (ft-msl) (ft-msl) (cfs) (ft) (ft) (ft) (ft) (ft) (ft)

(ft)

(I) see note at bottom

North East Shore S133 Pumps: 13.74 14.66 0 -NR- -NR- -NR- -NR- (cfs)

0 0 0 0 (cfs)

North West Shore

S65E: 20.99 14.60 1096 0.4 0.4 0.4 0.7 0.6 0.5 S127 Pumps: 13.59 14.76 77 0 0 0 0 0 (cfs 0 0 0 0 (cfs) S127 Culvert: 0 0.0

0 0 0 0 (cfs)

S129 Pumps: 13.13 14.84 S129 Culvert: 0 0.0

0 0 0 S131 Pumps: 13.04 14.91 (cfs) 0

S131 Culvert:

Fisheating Creek nr Palmdale 32.40 628

nr Lakeport 14.92 14.96 -76 5.3 5.2 5.2 C5:

```
South Shore

      S4 Pumps:
      12.23
      14.85
      0
      0
      0
      0

      S169:
      14.86
      12.24
      0
      0.0
      0.0
      0.0

                                                                    (cfs)
 S4 1... _
S169:
 S310: 14.79 -95
S3 Pumps: 10.08 14.86 0 0 0 0 0
S354: 14.86 10.08 0 0.0 0.0
S2 Pumps: 10.06 14.79 0 0 0 0 0
S351: 14.79 10.06 0 0.0 0.0 0.0
                                                                     (cfs)
                                                                    (cfs)
              14.79 10.06
14.90 9.60
-NR- 14.62
                                    0.0 0.0
  S352:
 C10A:
                                          0.0 0.0 8.0 0.0 0.0
                         14.44 100
  L8 Canal PT
                   S351 and S352 Temporary Pumps/S354 Spillway
                        14.79 0 -NR--NR--NR--NR--NR-
14.90 0 -NR--NR--NR-
14.86 0 -NR--NR--NR-
  S351:
               10.06
  S352:
               9.60
  S354:
               10.08
Caloosahatchee River (S77, S78, S79)
  S47B: 14.42 11.13
                                         0.5 0.5
  S47D:
              11.04
                         11.02 25 6.0
  S77:
   Spillway and Sector Flow:
               14.90 11.06 263 0.0 0.0 0.0 0.0
    Flow Due to Lockages+:
                                     2
  S77 Below USGS Flow Gage 263
  S78:
   Spillway and Sector Flow:
              11.12 2.97 1006 0.0 0.0 3.5 0.0
   Flow Due to Lockages+:
  S79:
    Spillway and Sector Flow:
       3.08 0.96 3670 1.0 2.0 2.0 2.0 2.0 2.0 1.0
1.0
    Flow Due to Lockages+:
                                     6
                                  0%
    Percent of flow from S77
                       (ppm) 42
    Chloride
St. Lucie Canal (S308, S80)
  S308:
    Spillway and Sector Flow:
              14.68 14.57
                                  996 3.2 3.2 3.2 3.2
    Flow Due to Lockages+:
                                     0
                                  996
  S308 Below USGS Flow Gage
  S153: 18.85 14.36
                                   61 0.0 0.0
  S80:
    Spillway and Sector Flow:
                -NR- -NR-
                                -NR- 0.4 0.4 0.4 0.0 0.4 0.3 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) 4978
Speedy Point Bottom Salinity (mg/ml) 6800
```

+ 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.

-				Wi	nd
- Daily Precipitation Totals Speed	1-Day	3-Day	7-Day	Directio	n
-	(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	1.16	2.54	120	2
S78:	0.00	1.07	1.20	83	6
S79:	0.00	0.00	0.00	167	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:	0.00	0.08	*****	49	2
S80:	0.03	0.04	0.77	-NR-	-NR-
Okeechobee Average	0.00	0.10	3611.44		
(Sites S78, S79 and					
Oke Nexrad Basin Avg	0.00	0.50	2.40		

	44 0046	44 == -166
Okeechobee Lake Elevations	14 AUG 2016	14.77 Difference from
14AUG16		
14AUG16 - 1 Day =	13 AUG 2016	14.78 0.01
14AUG16 - 2 Days =	12 AUG 2016	14.78 0.01
14AUG16 - 3 Days =	11 AUG 2016	14.76 -0.01
14AUG16 - 4 Days =	10 AUG 2016	14.75 -0.02
14AUG16 - 5 Days =	09 AUG 2016	14.72 -0.05
14AUG16 -6 Days =	08 AUG 2016	14.63 -0.14
14AUG16 - 7 Days =	07 AUG 2016	14.61 -0.16
14AUG16 - 30 Days =	15 JUL 2016	14.72 -0.05
14AUG16 - 1 Year =	14 AUG 2015	12.38 -2.39
14AUG16 - 2 Year =	14 AUG 2014	14.36 -0.41

_

_		L	ake (Okeed	chobee	Net Inflo	ow (LONIN)	
	Ī	Average	Flov	v ove	er the	previous	14 days	Avg-Daily Flow
14AUG16	Today	=	14	AUG	2016	3565	MON	-758
14AUG16	-1 Day	=	13	AUG	2016	3673	SUN	1405
14AUG16	-2 Days	=	12	AUG	2016	3409	SAT	5342
14AUG16	-3 Days	=	11	AUG	2016	3189	FRI	2676
14AUG16	-4 Days	=	10	AUG	2016	2892	THU	6724
14AUG16	-5 Days	=	09	AUG	2016	2550	WED	19770
14AUG16	-6 Days	=	80	AUG	2016	1730	TUE	6537
14AUG16	-7 Days	=	07	AUG	2016	1555	MON	1057
14AUG16	-8 Days	=	06	AUG	2016	1822	SUN	3147
14AUG16	-9 Days	=	05	AUG	2016	1537	SAT	1459
14AUG16	-10 Days	=	04	AUG	2016	1915	FRI	523
14AUG16	-11 Days	=	03	AUG	2016	2180	THU	668
14AUG16	-12 Days	=	02	AUG	2016	2178	WED	-788
14AUG16	-13 Days	=	01	AUG	2016	2124	TUE	2152

_

_	•

					Se	55E			
				Average	Flov	v over	previous	14 days	Avg-Daily Flow
14AUG16		Today	<i>7</i> =	14	AUG	2016	1200	MON	1233
14AUG16	-1	Day	=	13	AUG	2016	1195	SUN	1214
14AUG16	-2	Days	=	12	AUG	2016	1194	SAT	1164
14AUG16	-3	Days	=	11	AUG	2016	1203	FRI	1267
14AUG16	-4	Days	=	10	AUG	2016	1210	THU	1413
14AUG16	-5	Days	=	09	AUG	2016	1209	WED	1306
14AUG16	-6	Days	=	80	AUG	2016	1210	TUE	1402
14AUG16	-7	Days	=	07	AUG	2016	1211	MON	1298
14AUG16	-8	Days	=	06	AUG	2016	1204	SUN	897
14AUG16	-9	Days	=	05	AUG	2016	1245	SAT	1227
14AUG16	-10	Days	=	04	AUG	2016	1261	FRI	1266
14AUG16	-11	Days	=	03	AUG	2016	1254	THU	1027
14AUG16	-12	Days	=	02	AUG	2016	1277	WED	1043
14AUG16	-13	Days	=	01	AUG	2016	1296	TUE	1048

			S-77	Below S-77	S-78	S-79
			Discharge	Discharge	Discharge	Discharge
			(ALL DAY)	(ALL-DAY)	(ALL DAY)	(ALL DAY)
	DATE	C	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)
14	AUG	2016	5	521	2010	7289
13	AUG	2016	5	606	1425	8039
12	AUG	2016	5	950	1418	6416
11	AUG	2016	5	878	1403	7182
10	AUG	2016	5	472	1416	6072
09	AUG	2016	5	866	1482	5715
80	AUG	2016	5	2603	2599	6338
07	AUG	2016	5	3293	3280	7459
06	AUG	2016	5	2302	3508	7076
05	AUG	2016	5	921	1291	5645

04 AUG 2016	5	421	774	5487		
03 AUG 2016	5	-63	665	6328		
02 AUG 2016	5	-201	627	4244		
01 AUG 2016	5	395	1261	5902		
	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)	
14 AUG 2016	-189	0	0	0	199	
13 AUG 2016	-163	0	0	0	191	
12 AUG 2016	-173	0	0	0	173	
11 AUG 2016	-191	0	0	0	230	
10 AUG 2016	-246	0	0	0	265	
09 AUG 2016	-111	0	0	0	359	
08 AUG 2016	37	4	13	0	537	
07 AUG 2016	5 25	0	155	0	610	
06 AUG 2016	-11	0	571	0	611	
05 AUG 2016	-109	0	93	14	580	
04 AUG 2016	20	2	0	0	581	
03 AUG 2016	5 53	0	256	234	588	
02 AUG 2016	68	0	744	399	595	
01 AUG 2016	5 4	297	678	666	577	
	S-308	Below S-308	S-80			
	Discharge	Discharge	Discharge	<u> </u>		
	(ALL DAY)	(ALL-DAY)	(ALL-DAY)			
DATE	(AC-FT)	(AC-FT)	(AC-FT)			
14 AUG 2016	5	1975	-NR-			
13 AUG 2016)	1990	1678			
12 AUG 2016)	1072	1152			
11 AUG 2016	·	-358	679			
	_					

*** NOTE: Discharge (ALL DAY) is computed using Spillway, Sector Gate and

181

-NR-

-NR-

-NR-

-NR-

-NR-

20

187

609 867

Lockages Discharges from 0015 hrs to 2400 hrs.

-82

188

1408

2238

2757

1285

33

247

899

1653

-

(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 AUG 2016

09 AUG 2016

08 AUG 2016

07 AUG 2016

06 AUG 2016

05 AUG 2016

04 AUG 2016

03 AUG 2016

02 AUG 2016

01 AUG 2016

10 stations, the average of the interior 4 station gages was used as the Lake Okeechobee Elevation.

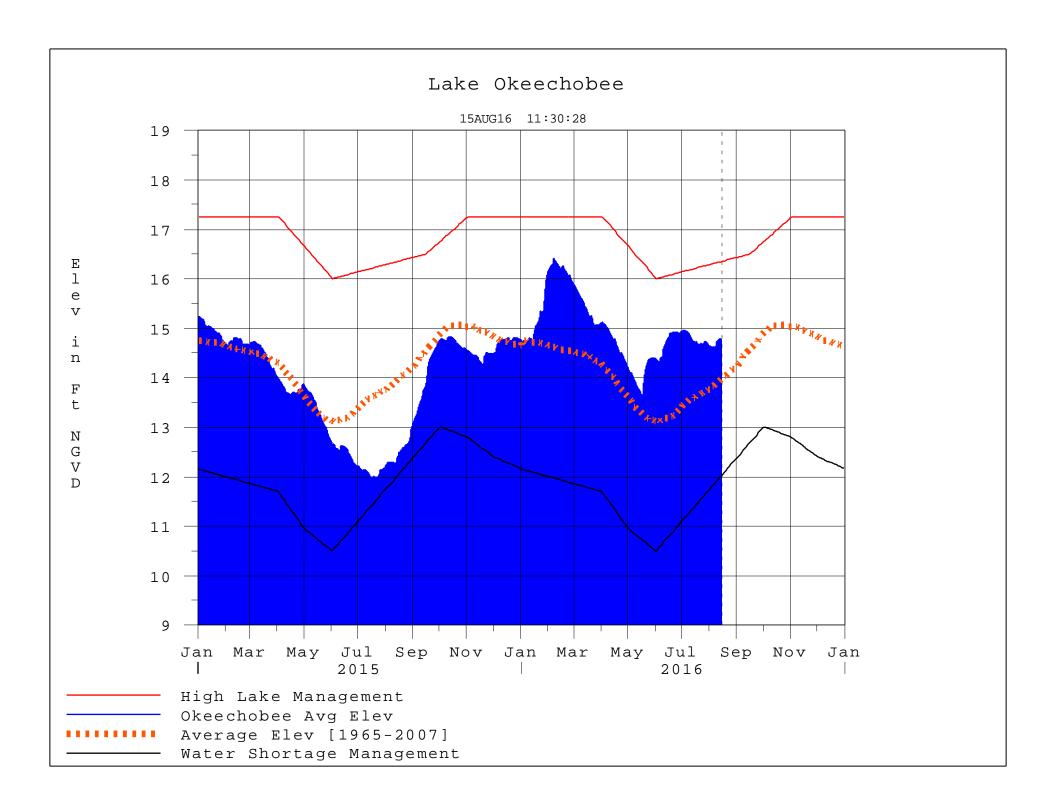
On 05 November 2010, Lake Okeechobee Elevation was switched to a 9 gage mix of interior and edge gages to obtain a more reliable representation of the lake level.

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 \$135\$ 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



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	Palmer Index	2-wk Mean L.O. Net
Classification*	Class Limits	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	Equivalent Depth**	Lake Okeechobee
[million acre-feet]	[feet]	Net Inflow
[[1000]	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	Equivalent Depth**	Lake Okeechobee
[million acre-feet]	[feet]	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