Application of the Lake Okeechobee Regulation Schedule (LORS2008) on 8/22/2016 (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		oley's ethod ^{1*}	Em	FWMD npirical ethod ²	Neutr	ampling of ral ENSO ears ³	Sub-sampling of AMO Warm + Neutral ENSO Years ⁴		
	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition	
Current (Aug- Jan)	N/A	N/A	1.81	Wet	2.37	Very Wet	2.98	Very Wet	
Multi Seasonal (Aug- Apr)	N/A	N/A	1.82	Normal	2.40	Normal	3.05	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:

2850 cfs 14-day running average for Lake Okeechobee Net Inflow through 8/22/2016. According to the classification in <u>Tributary Hydrologic Conditions</u> table, this condition is Wet.

-0.99 for Palmer Index on 8/20/2016.

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

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

LORS2008 Classification Tables:

Lake Okeechobee Stage on 8/22/2016

Lake Okeechobee Stage: 14.72 feet

USACE Report for Lake Okeechobee

Lake Okeechobee Stage Hydrograph

Lake Okeechobe Zone/	ee Management /Band	Bottom Elevation (feet, NGVD)	Current Lake Stage
High Lake Manage	ement Band	16.38	
	High sub-band	15.98	
Operational Band	Intermediate sub-band	15.57	
	Low sub-band	13.77	← 14.72
Base Flow sub-ba	nd	12.60	
Beneficial Use sub	o-band	12.18	
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 450 cfs and S-80 up to 200 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 8/22/2016 (ENSO Neutral Condition):

Status for week ending 8/22/2016:

District wide, Raindar rainfall was 0.71 inches for the week. Lake stage on 8/22/2016 was 14.72 ft, down 0.05 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.

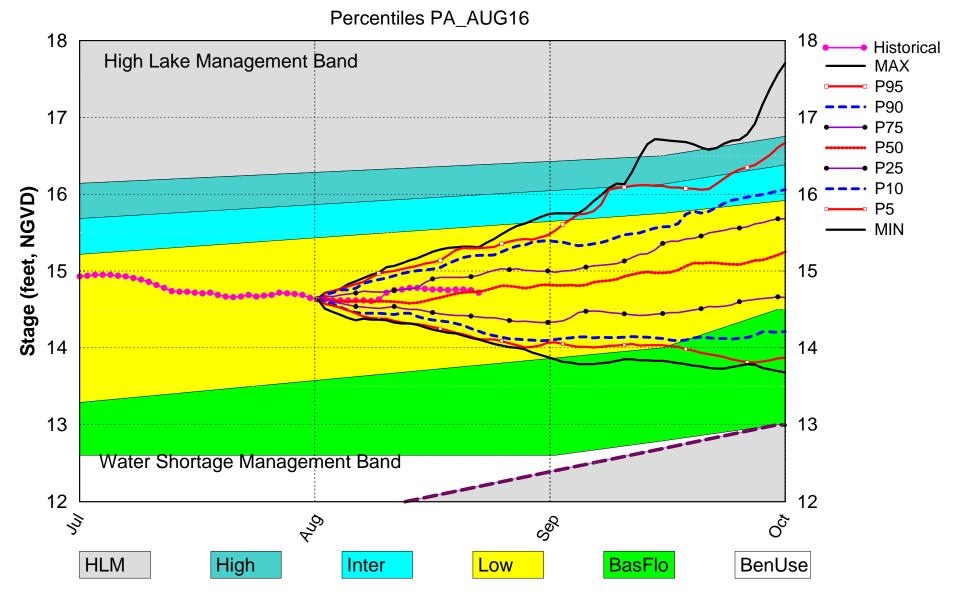
Water Supply Risk Evaluation

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	-0.99 (Normal)	L
	CPC Precipitation Outlook	1 month: Normal	L
LOK	CFC Frecipitation Outlook	3 months: Normal	L
	LOK Seasonal Net Inflow Forecast ENSO Neutral Years	2.37 ft (Normal to Extremely Wet)	L
	LOK Multi-Seasonal Net Inflow Forecast	2.40 ft (Normal)	M
	ENSO Neutral Years		
	WCA 1: Site 1-7, Site 1-8T, & Site 1-9 Average	Above Line 1 (16.17 ft)	L
WCAs	WCA 2A: Site 2-17 HW	Above Line1 (12.81 ft)	L
	WCA-3A: 3 Station Average (Site 63, 64 and 65)	Above Line 1 (10.03 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.

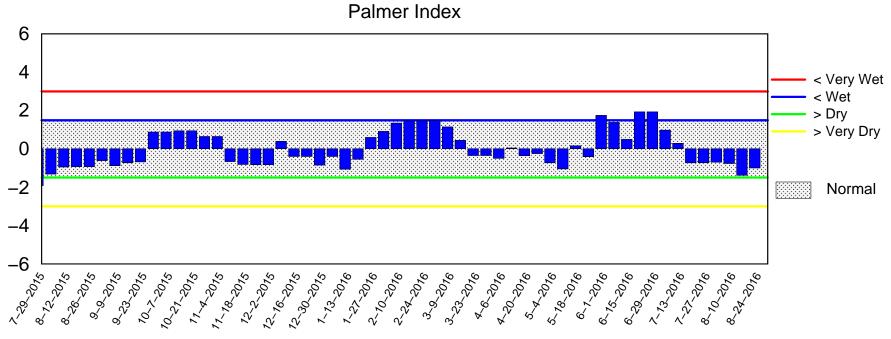
Back to Lake Okeechobee Operations Main Page
Back to U.S. Army Corps of Engineers LORSS Homepage

Lake Okeechobee SFWMM August 2016 Dynamic Position Analysis

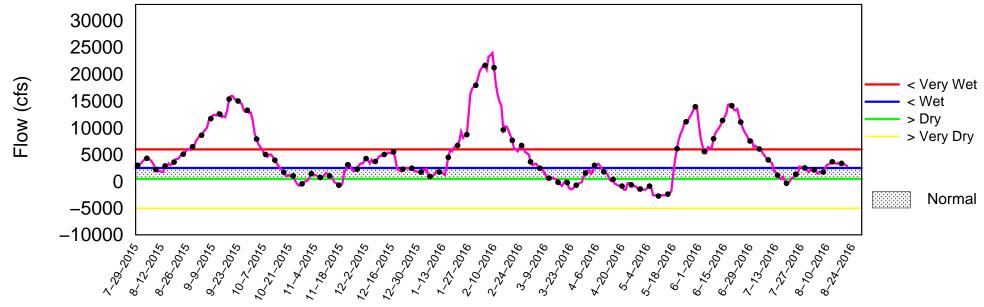


(See assumptions on the Position Analysis Results website)

Tributary Basin Condition Indicators as of August 22 2016



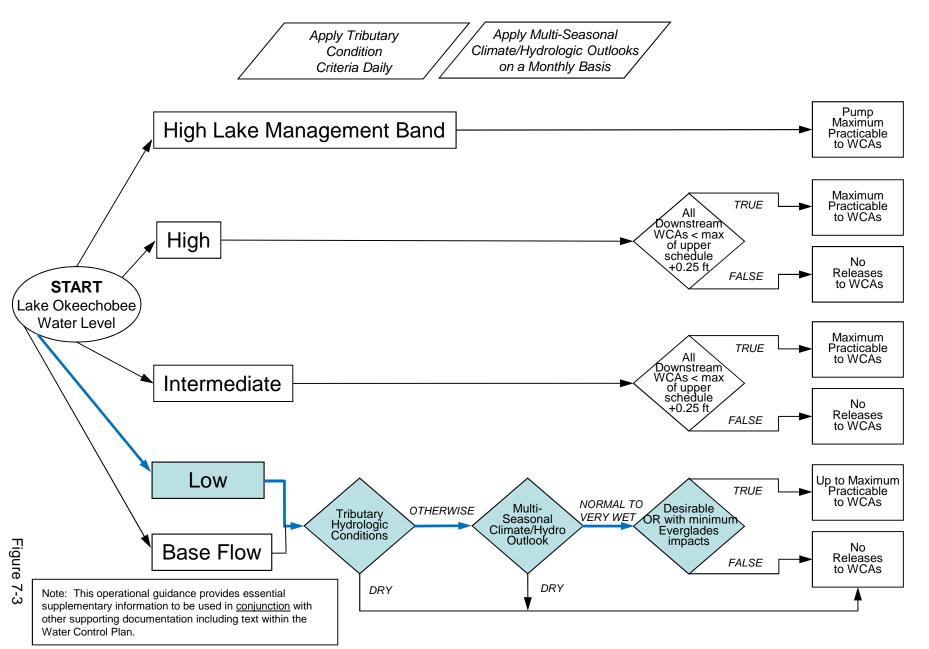
Lake Okeechobee Net Inflow (LONIN) 14-day Running Average



Mon Aug 22 16:47:12 EDT 2016

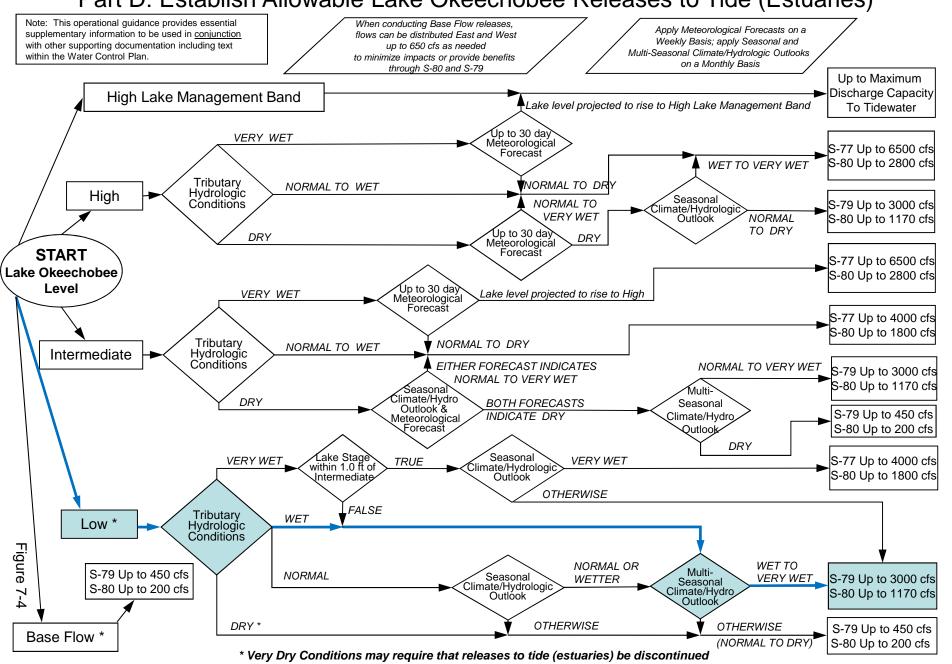
2008 LORS

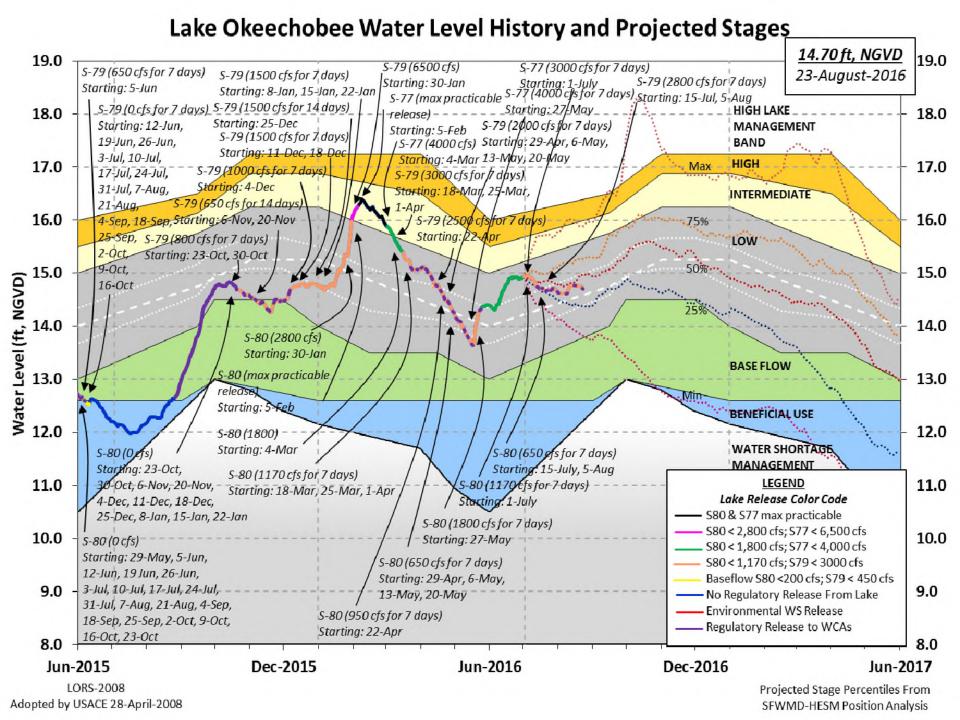
Part C: Establish Allowable Lake Okeechobee Releases to the Water Conservation Areas



2008 LORS

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





Data Ending 2400 hours 21 AUG 2016

Okeechobee Lake		(ft-NGVD)	(ft-NGV	ar 2YRS Ago D) (ft-NGVD)	
	Lake Mngmt	n 14.72 = 16.38 Top of Management Band	Water Sh	8 14.54 (Of ort Mngmt= 12.	
Simulated Aver Difference fro			13.07 1.65		
21AUG (1965-20 Difference fro		of Record Avera ge	nge 14. 0.6		
Today Lake Oke stations	echobee elev	ation is deter	rmined fro	m the 4 Int &	4 Edge
++Navigation D 3.66'	epth (Based	on 2007 Channe	el Conditi	on Survey) Rou	ıte 1 ÷
	epth (Based	on 2008 Channe	el Conditi	on Survey) Rou	ıte 2 ÷
5.86' Bridge Clearan	go = 40 121				
_					
4 Interior and 4	Edge Okeech	nobee Lake Aver	age (Avg-	Daily values)	1
L001 L005	L006 LZ40	S4 S352	S308	S133	
		3 14.73 14.91			
*Combination Ok	eechobee Av	<i>r</i> g-Daily Lake <i>P</i>	verage =		
				(*See Note)	
Okeechobee Inflo					
S65E		C5	-60	Fisheating Cr	
S154		3191	0	S135 Pumps	0
S84 S84X		S133 Pumps S127 Pumps	0 0	S2 Pumps S3 Pumps	0 0
S71		S127 Pumps	0	S4 Pumps	0
S72		S131 Pumps	0	21 1 ambo	Ü
Total Inflows:	1776	<u></u> -	-		
Okeechobee Outfl		32 F 4	0	077	/NT== 77 77
S135 Culverts S127 Culverts		5354 5351	0 0	S77 S77Below	(Not Used)
(USED)	0 .	JUL	U	D//DETOM	170 1
S129 Culverts	0 8	5352	0	S308	(Not Used)

S131 Culverts 0 L8 Canal Pt 203 S308Below 1313

(USED)

Total Outflows: 3480

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

****\$308 Structure outflow is being used to compute Total Outflow.

Okeechobee Pan Evaporation (inches):

S77 0.28 S308 0.23

Average Pan Evap x 0.75 Pan Coefficient = 0.19" = 0.02'

Lake Average Precipitation using NEXRAD: = 0.13" = 0.01'

Evaporation - Precipitation: = 0.06" = 0.01'

Evaporation - Precipitation using Lake Area of 730 square miles

is equal to 1202 cfs out of the lake.

Lake Okeechobee (Change in Storage) Flow is -6353 cfs or -12600 AC-FT

_

Note: Headwater, tailwater, and stage values below are instantaneous values unless otherwise specified

unless otherwise specified.

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

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

(ft-msl) (ft-msl) (cfs) (ft) (ft) (ft) (ft) (ft) (ft)

(ft)

(I) see note at bottom

North East Sho	ore								
S133 Pumps:	13.70	14.60	0	0	0	0	0	0	(cfs)
S193:									
S191:	18.88	14.48	0	0.0	0.0	0.0			

S135 Pumps: 13.36 14.54 0 0 0 0 0 (cfs)
S135 Culverts: -NR- 0.0 0.0

North West Shore

S65E: 20.96 14.20 904 0.2 0.2 0.6 0.6 0.6 0.2 S127 Pumps: 13.44 14.63 0 0 0 0 0 0 (cfs)

S127 Culvert: 0 0.0

S129 Pumps: 13.01 14.71 0 0 0 0 (cfs)

S129 Culvert: 0 0.0

S131 Pumps: 12.84 14.73 0 0 0 (cfs) S131 Culvert: 0

Fisheating Creek

nr Palmdale 31.64 333

nr Lakeport _____ C5: 14.68 14.71 -60 5.3 5.2 5.2

```
South Shore

      S4 Pumps:
      10.97
      14.79
      0
      0
      0
      0

      S169:
      14.81
      10.97
      0
      0.0
      0.0
      0.0

                                                                  (cfs)
 S4 1 ... _
S169:
 S310: 14.77 3
S3 Pumps: 9.26 14.90 0 0 0 0
S354: 14.90 9.26 0 0.0 0.0
S2 Pumps: 9.92 14.81 0 0 0 0 0
S351: 14.81 9.92 0 0.0 0.0 0.0
                                                                   (cfs)
                                                                  (cfs)
             14.81 9.92
15.00 9.03
-NR- 13.96
                                   0 0.0 0.0
 S352:
C10A:
                                         0.0 0.0 8.0 0.0 0.0
                         13.79 203
  L8 Canal PT
                 S351 and S352 Temporary Pumps/S354 Spillway
                       14.81 0 -NR--NR--NR--NR--NR-
15.00 0 -NR--NR--NR-
14.90 0 -NR--NR--NR-
  S351:
               9.92
               9.03
  S352:
  S354:
               9.26
Caloosahatchee River (S77, S78, S79)
  S47B: 14.46 10.92
                                        0.5 1.0
                        10.94 74 6.0
  S47D:
              10.95
  S77:
   Spillway and Sector Flow:
               14.68 10.99 1964 2.0 2.5 2.5 0.0
   Flow Due to Lockages+: 2
  S77 Below USGS Flow Gage 1964
  S78:
   Spillway and Sector Flow:
              10.96 3.05
                                  2214 2.5 0.0 1.0 3.0
   Flow Due to Lockages+:
                                 3
  S79:
    Spillway and Sector Flow:
      3.09 1.37 4004 2.0 2.0 2.0 2.0 2.0 2.0 2.0
2.0
   Flow Due to Lockages+:
                                    4
                       om S77 48%
(ppm) 42
    Percent of flow from S77
    Chloride
St. Lucie Canal (S308, S80)
  S308:
    Spillway and Sector Flow:
              14.67 14.37 1313 2.5 2.7 2.7 2.5
    Flow Due to Lockages+:
                                  0
                                1313
  S308 Below USGS Flow Gage
  S153: 18.92 14.15
                                 29 0.5 0.0
  S80:
   Spillway and Sector Flow:
              14.34 0.94 1098 0.0 0.3 0.8 0.0 0.8 0.3 0.0
                                  10
   Flow Due to Lockages+:
   Percent of flow from S308 116%
```

```
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.

_				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:	0.27	0.27	0.44	332	1
S78:	0.14	0.36	1.03	304	1
S79:	0.00	0.00	1.49	223	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:	0.00	0.02	0.37	49	0
S80:	0.31	0.31	0.71	326	2
Okeechobee Average	0.14	0.02	0.06		
(Sites S78, S79 and	S80 not inc	:luded)			
Oke Nexrad Basin Avg	0.13	0.17	0.44		

keechobee Lake Elevations	21 AUG 2016	14.72 Differ	ence from
:1AUG16			
21AUG16 - 1 Day =	20 AUG 2016	14.75	0.03
21AUG16 - 2 Days =	19 AUG 2016	14.76	0.04
21AUG16 -3 Days =	18 AUG 2016	14.76	0.04
21AUG16 - 4 Days =	17 AUG 2016	14.75	0.03
21AUG16 -5 Days =	16 AUG 2016	14.76	0.04
21AUG16 -6 Days =	15 AUG 2016	14.76	0.04
21AUG16 - 7 Days =	14 AUG 2016	14.77	0.05
21AUG16 -30 Days =	22 JUL 2016	14.69	-0.03
21AUG16 -1 Year =	21 AUG 2015	12.58	-2.14
21AUG16 - 2 Year =	21 AUG 2014	14.54	-0.18

_

_				Lal	ke (Okeed	chobee	Net Infl	ow (LONIN)
		1	Aver	age I	Flov	w ove	er the	previous	14 days	Avg-Daily Flow
21AUG16	-	Today	=		21	AUG	2016	3153	MON	-2873
21AUG16	-1	Day	=		20	AUG	2016	3455	SUN	1234
21AUG16	-2	Days	=		19	AUG	2016	3602	SAT	-NR-
21AUG16	-3	Days	=		18	AUG	2016	3449	FRI	2604
21AUG16	-4	Days	=		17	AUG	2016	3301	THU	-1623
21AUG16	-5	Days	=		16	AUG	2016	3464	WED	1064
21AUG16	-6	Days	=		15	AUG	2016	3332	TUE	-1114
21AUG16	-7	Days	=		14	AUG	2016	3565	MON	j –758
21AUG16	-8	Days	=		13	AUG	2016	3673	SUN	1405
21AUG16	-9	Days	=		12	AUG	2016	3409	SAT	5342
21AUG16	-10	Days	=		11	AUG	2016	3189	FRI	2676
21AUG16	-11	Days	=		10	AUG	2016	2892	THU	6724
21AUG16	-12	Days	=		09	AUG	2016	2550	WED	19770
21AUG16	-13	Days	=		80	AUG	2016	1730	TUE	6537

-

_		

					Se	55E			
				Average	Flov	v over	previous	14 days	Avg-Daily Flow
21AUG16		Today	<i>r</i> =	21	AUG	2016	1245	MON	1030
21AUG16	-1	Day	=	20	AUG	2016	1264	SUN	1156
21AUG16	-2	Days	=	19	AUG	2016	1245	SAT	1357
21AUG16	-3	Days	=	18	AUG	2016	1236	FRI	1197
21AUG16	-4	Days	=	17	AUG	2016	1241	THU	1176
21AUG16	-5	Days	=	16	AUG	2016	1230	WED	1265
21AUG16	-6	Days	=	15	AUG	2016	1214	TUE	1248
21AUG16	-7	Days	=	14	AUG	2016	1200	MON	1235
21AUG16	-8	Days	=	13	AUG	2016	1194	SUN	1214
21AUG16	-9	Days	=	12	AUG	2016	1194	SAT	1164
21AUG16	-10	Days	=	11	AUG	2016	1202	FRI	1265
21AUG16	-11	Days	=	10	AUG	2016	1210	THU	1412
21AUG16	-12	Days	=	09	AUG	2016	1208	WED	1303
21AUG16	-13	Days	=	80	AUG	2016	1210	TUE	1402

			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)
21	AUG	2016	,)	3895	4397	7948
20	AUG	2016	5	3331	4065	7281
19	AUG	2016	5	499	1846	5607
18	AUG	2016	5	-326	793	3730
17	AUG	2016	5	-2833	826	4023
16	AUG	2016	,)	803	1468	6142
15	AUG	2016	,)	557	1995	6198
14	AUG	2016	,)	521	2010	7289
13	AUG	2016	5	606	1425	8039
12	AUG	2016	-)	950	1418	6416

11 AUG 2016 10 AUG 2016 09 AUG 2016 08 AUG 2016		878 472 866 2603	1403 1416 1482 2599	7182 6072 5715 6338	
S Dis (AI	_	S-351 Discharge (ALL DAY)	S-352	S-354 Discharge (ALL DAY)	_
15 AUG 2016	-167	0	0	0	219
14 AUG 2016 13 AUG 2016	-189 -163	0 0	0 0	0 0	199 191
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
Dis (AI	charge	Below S-308 Discharge (ALL-DAY) (AC-FT)	Discharge		
21 AUG 2016	,	2603	1346		

			Discharge	Di	scharge	Disch	narg
			(ALL DAY)	(A)	LL-DAY)	(ALL-	-DAY
	DATI	Ξ	(AC-FT)	()	AC-FT)	(AC-	-FT)
2	1 AUG	2016			2603	13	346
2	0 AUG	2016			2911	1	746
1	9 AUG	2016			568	(596
1	8 AUG	2016			590		20
1	7 AUG	2016			663	-	191
1	6 AUG	2016			1079	(559
1	5 AUG	2016			1214	8	383
1	4 AUG	2016			1975	12	249
1	3 AUG	2016			1990	16	578
1	2 AUG	2016			1072	1.	152
1	1 AUG	2016			-358	(579
1	0 AUG	2016			-82	-	181
0	9 AUG	2016			188	-1	NR-
0	8 AUG	2016			1408	-1	NR-

*** NOTE: 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

* 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.

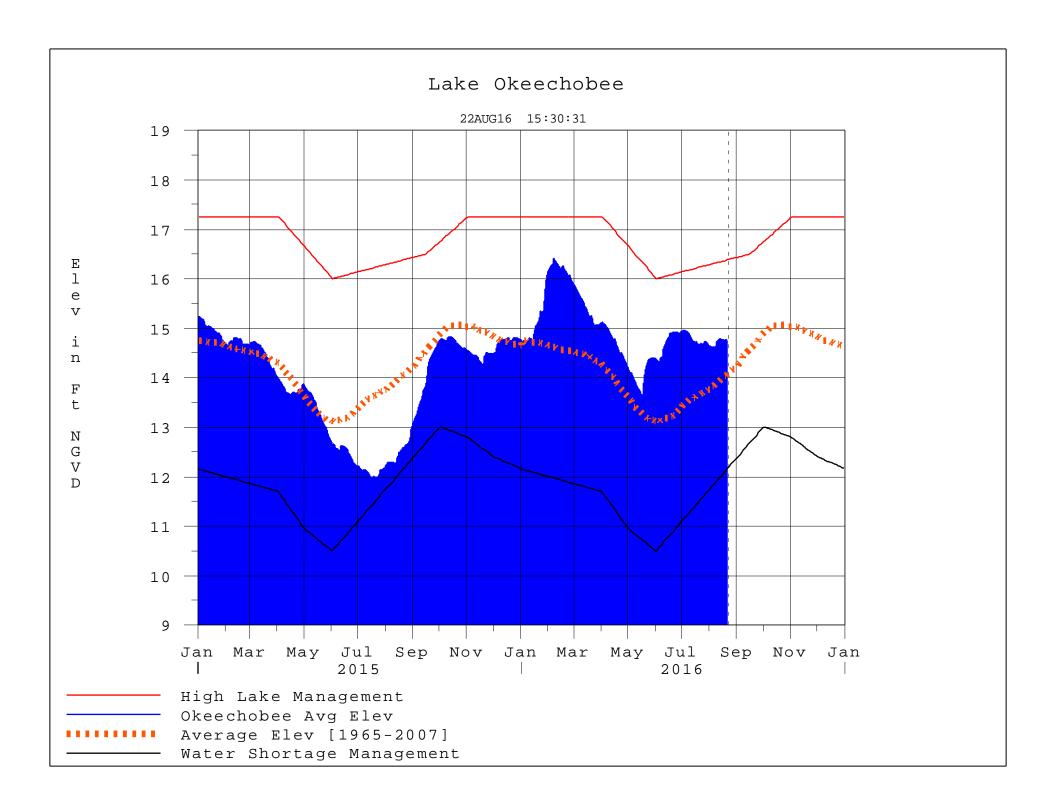
On 09 May 2011, Lake Okeechobee Elevation was switched to a 8 gage mix of interior and edge gages to obtain a more reliable representation of the lake level due to isolation of S135 from low lake levels.

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 22AUG2016 @ 15:39 ** Preliminary Data - Subject to Revision **



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	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
	2000	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 Net Inflow	
[million acre-feet]	[feet]		
		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