Application of the Lake Okeechobee Regulation Schedule (LORS2008) on 7/25/2016 (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 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 (Aug- Jan)	N/A	N/A	1.61	Wet	2.77	Very Wet	3.50	Very Wet	
Multi Seasonal (Aug- Apr)	N/A	N/A	1.69	Normal	2.81	Wet	3.57	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:

1289 cfs 14-day running average for Lake Okeechobee Net Inflow through 7/24/2016. According to the classification in <u>Tributary Hydrologic Conditions</u> table, this condition is Normal.

-0.73 for Palmer Index on 7/23/2016.

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 7/25/2016

Lake Okeechobee Stage: 14.68 feet

USACE Report for Lake Okeechobee

Lake Okeechobee Stage Hydrograph

Lake Okeechob	ee Management	Bottom Elevation	Current
Zone	/Band	(feet, NGVD)	Lake Stage
Libert Late Manage	amant Dand	10.05	
High Lake Manage	ement Band	16.25	
	High sub-band	15.82	
Operational Band	Intermediate sub-band	15.38	
	Low sub-band	13.50	← 14.68
Base Flow sub-ba	nd	12.60	
Beneficial Use sub	o-band	11.61	
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 7/25/2016 (ENSO Neutral Condition):

Status for week ending 7/25/2016:

District wide, Raindar rainfall was 1.60 inches for the week. Lake stage on 7/25/2016 was 14.68 ft, down 0.04 ft from last week.

The updated July 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 **Normal**. The PDSI indicates normal condition and the LONIN is Normal. The classification is based on the wetter of the two.

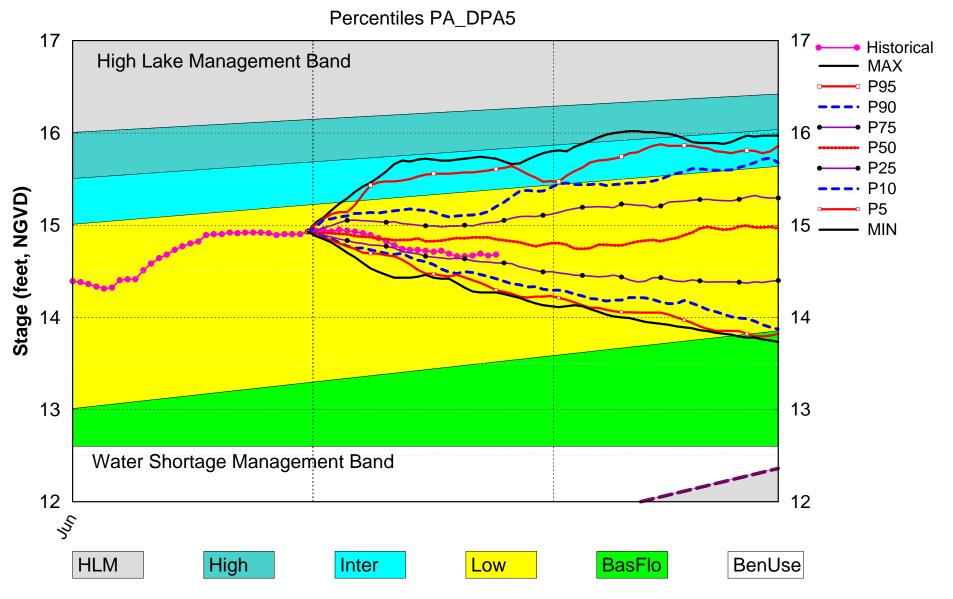
Water Supply Risk Evaluation

Trator	Supply Kisk 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	-0.73 (Normal)	L
	CPC Precipitation Outlook	1 month: Normal	L
LOK	CFC Frecipitation Outlook	3 months: Above Normal	L
	LOK Seasonal Net Inflow Forecast ENSO Neutral Years	2.77 ft (Normal to Extremely Wet)	L
	LOK Multi-Seasonal Net Inflow Forecast	2.81 ft (Normal)	M
	ENSO Neutral Years		
	WCA 1: Site 1-7, Site 1-8T, & Site 1-9 Average	Above Line 1 (15.78 ft)	L
WCAs	WCA 2A: Site 2-17 HW	Above Line1 (12.01 ft)	L
	WCA-3A: 3 Station Average (Site 63, 64 and 65)	Above Line 1 (9.84 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.

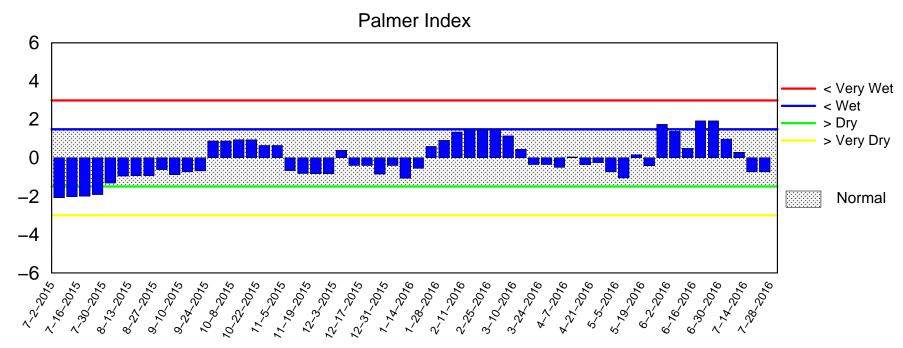
Back to Lake Okeechobee Operations Main Page
Back to U.S. Army Corps of Engineers LORSS Homepage

Lake Okeechobee SFWMM July 2016 Position Analysis

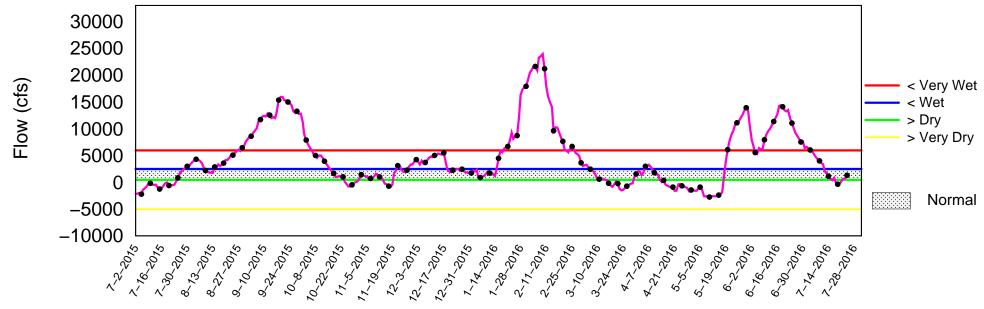


(See assumptions on the Position Analysis Results website)

Tributary Basin Condition Indicators as of July 25 2016



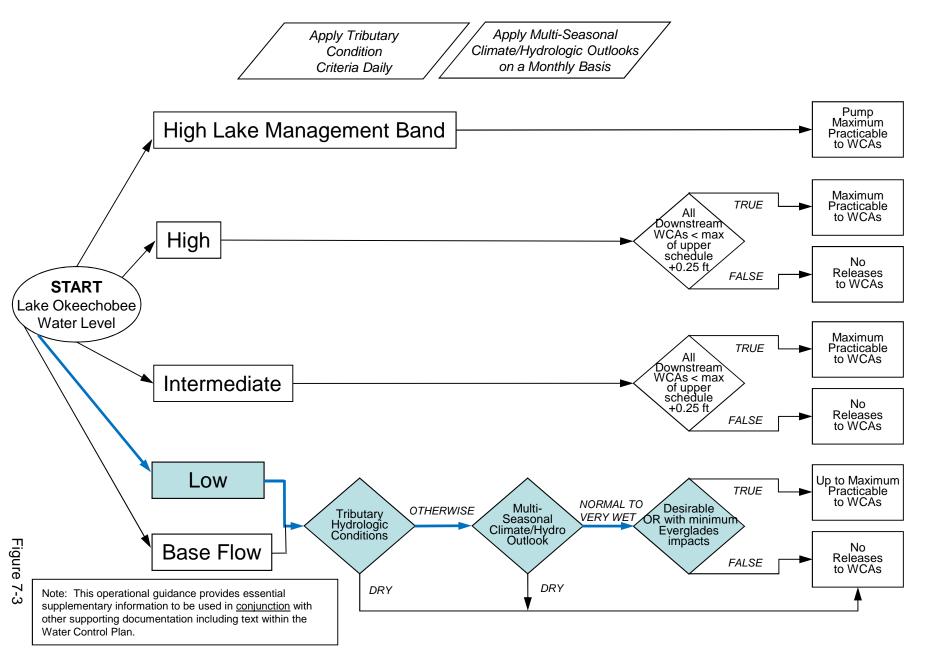
Lake Okeechobee Net Inflow (LONIN) 14-day Running Average



Mon Jul 25 11:35:21 EDT 2016

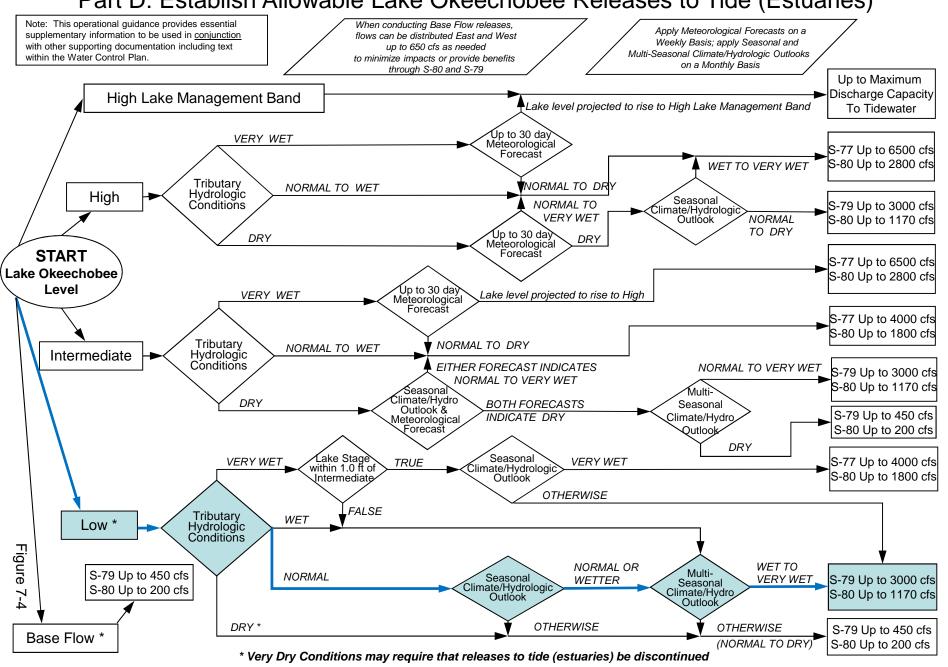
2008 LORS

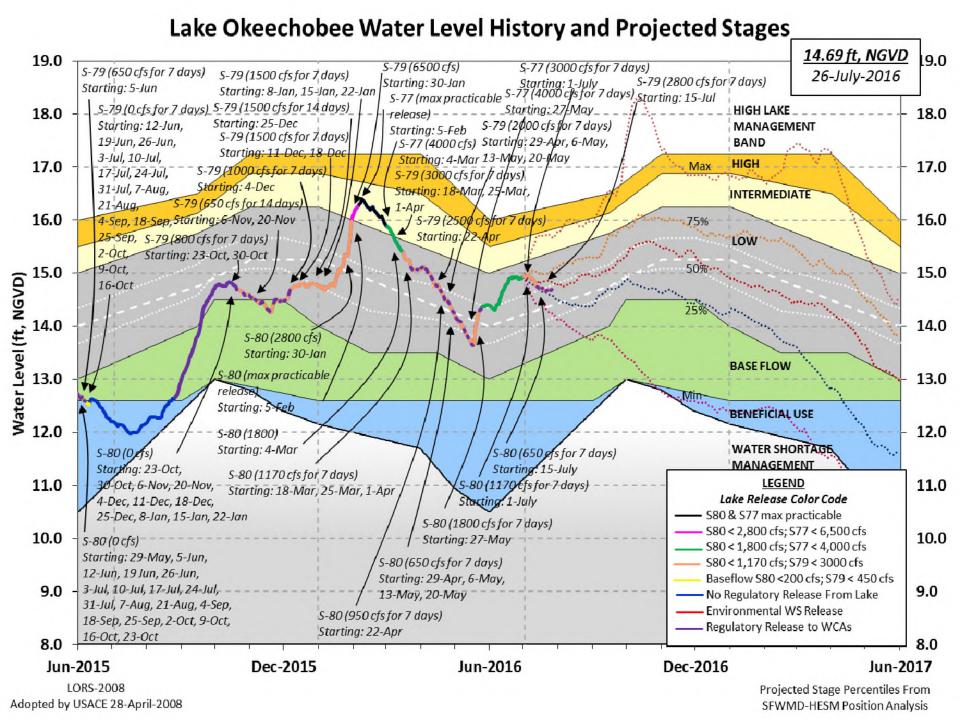
Part C: Establish Allowable Lake Okeechobee Releases to the Water Conservation Areas



2008 LORS

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





Data Ending 2400 hours 24 JUL 2016

Okeechobee Lake Regulation	(ft-NGVD)	(ft-NGVI) (ft-NGVD)	
*Okeechobee Lake Elevati Bottom of High Lake Mngm Currently in Operational	t= 16.25 Top of	Water Sho	1 13.78 (Of ort Mngmt= 11.	
Simulated Average LORS20 Difference from Average		12.61 2.07		
24JUL (1965-2007) Period Difference from POR Aver		age 13.7 0.97		
Today Lake Okeechobee el stations	evation is deter	rmined from	n the 4 Int &	4 Edge
++Navigation Depth (Base	d on 2007 Channe	el Conditio	on Survey) Rou	ıte 1 ÷
<pre>8.62' ++Navigation Depth (Base 6.82'</pre>	d on 2008 Channe	el Conditio	on Survey) Rou	ıte 2 ÷
Bridge Clearance = 49.31	•			
4 Interior and 4 Edge Okee	chobee Lake Aver	rage (Avg-I	Daily values):	:
L001 L005 L006 LZ4 14.60 14.72 14.68 14.			5133 L4.68	
			14.60	
*Combination Okeechobee	Avg-Dally Lake A		(*See Note)	
				
Okeechobee Inflows (cfs):				
S65E 1092	C5	-88	Fisheating Cr	
S154 0	S191	0	S135 Pumps	54
S84 963	S133 Pumps	0	S2 Pumps	
S84X 815	S127 Pumps	0	S3 Pumps	0
S71 127 S72 0	S129 Pumps S131 Pumps	65 0	S4 Pumps	0
Total Inflows: 3527	5131 Famps	O		
iocai illiows: 5527				
Okeechobee Outflows (cfs):	S354	1215	S77	(Not Used)
Okeechobee Outflows (cfs):		1215 154	S77 S77Below	(Not Used) 350

S131 Culverts 0 L8 Canal Pt 200 S308Below 866

(USED)

Total Outflows: 3033

****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 0.32 S308 0.34

Average Pan Evap x 0.75 Pan Coefficient = 0.25" = 0.02'

Lake Average Precipitation using NEXRAD: = 0.18" = 0.02'

Evaporation - Precipitation: = 0.07" = 0.01'

Evaporation - Precipitation using Lake Area of 730 square miles

is equal to 1325 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

 $(\mathsf{ft}\mathsf{-msl}) \quad (\mathsf{ft}\mathsf{-msl}) \quad (\mathsf{cfs}) \quad (\mathsf{ft}) \quad (\mathsf{ft}) \quad (\mathsf{ft}) \quad (\mathsf{ft}) \quad (\mathsf{ft}) \quad (\mathsf{ft})$

(ft)

(I) see note at bottom

		`	-,							
North East Sho	ore									
S133 Pumps:	13.43	14.67	0	0	0	0	0	0	(cfs)	
S193:										
S191:	19.04	14.64	0	0.0	0.0	0.0				
S135 Pumps:		-NR-	54	0	0	0	62		(cfs)	
S135 Culvert	s:		-NR-	-NR-	-NR-					
North West Sho	ore									
S65E:	20.93	14.68	1092	1.0	1.0	1.0	0.5	0.5	0.5	
S127 Pumps:	13.51	14.65	0	0	0	0	0	0	(cfs)	

S127 Pumps: 13.51 14.65 0 0 0 0 0 0 (cfs) S127 Culvert: 0 0.0

S129 Pumps: 12.78 14.69 65 49 18 0 (cfs) S129 Culvert: 0 0.0

S131 Pumps: 13.02 14.70 0 0 0 (cfs) S131 Culvert: 0

Fisheating Creek

nr Palmdale 32.15 500

nr Lakeport _____ C5: 14.74 14.72 -88 5.3 5.2 5.3

```
South Shore

      S4 Pumps:
      11.28
      14.65
      0
      0
      0
      0

      S169:
      14.65
      11.27
      0
      0.0
      0.0
      0.0

                                                                (cfs)
 S310: 14.59 7
S3 Pumps: 10.97 14.81 0 0 0 0
S354: 14.81 10.97 1215 1.7 1.9
S2 Pumps: 10.54 14.68 0 0 0
S351: 14.68 10.54 154 0.0 0.0 0
                                         0 0 0
                                                                 (cfs)
                                         0 0 0 0
                                                                (cfs)
                                154 0.0 0.0 0.0
             14.84 10.58
-NR- 14.73
                                248 0.4 0.4
 S352:
 C10A:
                                       0.0 0.0 8.0 0.0 0.0
 L8 Canal PT
                        14.54 200
                  S351 and S352 Temporary Pumps/S354 Spillway
                       14.68
                                 154 -NR--NR--NR--NR--NR-
 S351:
              10.54
                              248 -NR--NR--NR-
 S352:
              10.58
                      14.84
                       14.81 1215 -NR--NR--NR-
 S354:
              10.97
Caloosahatchee River (S77, S78, S79)
 S47B: 14.17 11.26
                                       0.5 0.5
 S47D:
                       11.23 79 6.0
             11.24
 S77:
   Spillway and Sector Flow:
              14.75 11.31 350 0.0 2.0 0.0 0.0
   Flow Due to Lockages+:
                                  3
 S77 Below USGS Flow Gage 350
 S78:
   Spillway and Sector Flow:
             11.34 3.13
                                880 0.0 0.0 2.5 0.0
   Flow Due to Lockages+:
                                 8
 S79:
   Spillway and Sector Flow:
      3.20 1.65 3765 1.0 1.0 2.0 2.0 2.0 2.0
2.0
   Flow Due to Lockages+:
                                  6
                               12%
   Percent of flow from S77
                      om S77 12
(ppm) 43
   Chloride
St. Lucie Canal (S308, S80)
 S308:
   Spillway and Sector Flow:
             14.65 14.19
                                  866 2.0 2.0 2.0 2.0
   Flow Due to Lockages+:
                                  0
 S308 Below USGS Flow Gage
                                  866
 S153: 18.57 14.01
                                117 0.0 0.0
 S80:
   Spillway and Sector Flow:
             14.27 0.60 1099 0.4 0.4 0.4 0.0 0.4 0.3 0.0
   Flow Due to Lockages+: 6
Percent of flow from S308 86%
```

```
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	s) (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	0.00	0.01	207	1
S78:	0.00	1.03	2.50	210	2
S79:	0.00	0.00	0.00	175	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:	*****	*****	*****	95	0
S80:	0.39	0.98	1.95	305	2
Okeechobee Average	*****	5013.77	6573.46		
(Sites S78, S79 and	S80 not	included)			
Oke Nexrad Basin Avg	0.18	0.33	1.01		

Okeechobee Lake Elevations	24 JUL 2016	14.68 Differ	ence from
24JUL16			
24JUL16 -1 Day =	23 JUL 2016	14.67	-0.01
24JUL16 - 2 Days =	22 JUL 2016	14.69	0.01
24JUL16 -3 Days =	21 JUL 2016	14.67	-0.01
24JUL16 - 4 Days =	20 JUL 2016	14.66	-0.02
24JUL16 -5 Days =	19 JUL 2016	14.66	-0.02
24JUL16 -6 Days =	18 JUL 2016	14.69	0.01
24JUL $16 - 7$ Days =	17 JUL 2016	14.72	0.04
24JUL16 -30 Days =	24 JUN 2016	14.92	0.24
24JUL16 -1 Year =	24 JUL 2015	12.04	-2.64
24JUL16 - 2 Year =	24 JUL 2014	13.78	-0.90

_

_			Lake Oke	echobee	Net Inflo	ow (LONIN)	
		Averag	ge Flow o	ver the	previous	14 days	Avg-Daily Flow
24JUL16	Toda	ay =	24 JU	L 2016	1290	MON	4802
24JUL16	-1 Day	<i>y</i> =	23 JU	L 2016	695	SUN	-853
24JUL16	-2 Day	/S =	22 JU	L 2016	683	SAT	6756
24JUL16	-3 Day	/s =	21 JU	L 2016	188	FRI	4227
24JUL16	-4 Day	/S =	20 JU	L 2016	-218	THU	2763
24JUL16	-5 Day	/S =	19 JU	L 2016	-346	WED	-3656
24JUL16	-6 Day	/S =	18 JU	L 2016	25	TUE	-2976
24JUL16	-7 Day	/S =	17 JU	L 2016	541	MON	6639
24JUL16	-8 Day	/S =	16 JU	L 2016	405	SUN	2515
24JUL16	-9 Day	/S =	15 JU	L 2016	739	SAT	2026
24JUL16	-10 Day	/S =	14 JU	L 2016	1117	FRI	3390
24JUL16	-11 Day	/S =	13 JU	L 2016	1721	THU	853
24JUL16	-12 Day	/S =	12 JU	L 2016	2048	WED	-4626
24JUL16	-13 Day	/S =	11 JU	L 2016	2793	TUE	-3806

-

 S65E	
Average Flow o	τ,

	Average	Flow over	previous	14 days	Avg-Daily Flow
24JUL16 Today=	24	JUL 2016	1306	MON	1226
24JUL $16 - 1$ Day =	23	JUL 2016	1311	SUN	1411
24JUL $16 - 2$ Days =	22	JUL 2016	1321	SAT	1427
24JUL $16 - 3$ Days =	21	JUL 2016	1336	FRI	1166
24JUL $16 - 4$ Days =	20	JUL 2016	1399	THU	1351
24JUL $16 - 5$ Days =	19	JUL 2016	1452	WED	1310
24JUL $16 - 6$ Days =	18	JUL 2016	1538	TUE	1383
24JUL $16 - 7$ Days =	17	JUL 2016	1612	MON	1395
24JUL $16 - 8$ Days =	16	JUL 2016	1700	SUN	1315
24JUL $16 - 9$ Days =	15	JUL 2016	1809	SAT	1262
24JUL $16 - 10$ Days =	14	JUL 2016	1942	FRI	1464
24JUL $16 - 11$ Days =	13	JUL 2016	2079	THU	1273
24JUL $16 - 12$ Days =	12	JUL 2016	2230	WED	1144
24JUL $16 - 13$ Days =	11	JUL 2016	2393	TUE	1156

__ Lake Okeechobee Outlets Last 14 Days

			S-77	Below S-77	S-78	S-79
			Discharge	Discharge	Discharge	Discharge
			(ALL DAY)	(ALL-DAY)	(ALL DAY)	(ALL DAY)
	DATE	3	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)
24	JUL	2016	5	694	1762	7477
23	JUL	2016	5	1020	1749	8440
22	JUL	2016	5	1223	1687	6310
21	JUL	2016	5	524	1745	4934
20	JUL	2016	5	563	1834	5884
19	JUL	2016	5	772	993	4901
18	JUL	2016	5	2737	3161	6633
17	JUL	2016	5	3921	3750	8440
16	JUL	2016	5	3581	3915	7861
15	JUL	2016)	3931	3875	7476

14 JUL 2016 13 JUL 2016 12 JUL 2016 11 JUL 2016	5	4894 4307 4012 4187	4442 3496 3460 3490	8407 6398 6158 6613	
DATE 24 JUL 2016 23 JUL 2016 22 JUL 2016 21 JUL 2016 19 JUL 2016 18 JUL 2016 17 JUL 2016 16 JUL 2016 15 JUL 2016 14 JUL 2016 13 JUL 2016 12 JUL 2016	0 -27 -80 7 103 145 63 93 165 207 171 168	S-351 Discharge (ALL DAY) (AC-FT) 305 545 623 1241 1225 1200 1005 752 363 516 224 238 611	S-352 Discharge (ALL DAY) (AC-FT) 492 531 549 754 765 307 190 256 339 137 91 224 79	S-354 Discharge (ALL DAY) (AC-FT) 1719 1727 1045 803 1360 946 200 839 1152 1321 736 369 101	L8 Canal Pt Discharge (ALL DAY) (AC-FT) 396 327 299 420 622 609 600 606 625 626 629 636 641
DATE 24 JUL 2016 23 JUL 2016 22 JUL 2016 21 JUL 2016 20 JUL 2016 19 JUL 2016 17 JUL 2016 16 JUL 2016 15 JUL 2016 14 JUL 2016 13 JUL 2016 11 JUL 2016 11 JUL 2016	S-308 Discharge (ALL DAY) (AC-FT)	305 Below S-308 Discharge (ALL-DAY) (AC-FT) 1717 2555 1259 441 942 1515 1962 2593 3126 1686 147 116 2178 3905	180 S-80 Discharge (ALL-DAY) (AC-FT) 1227 1586 723 20 170 648 865 1255 1570 690 23 16 662 2079		635

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

Lockages Discharges from 0015 hrs to 2400 hrs.

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(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.

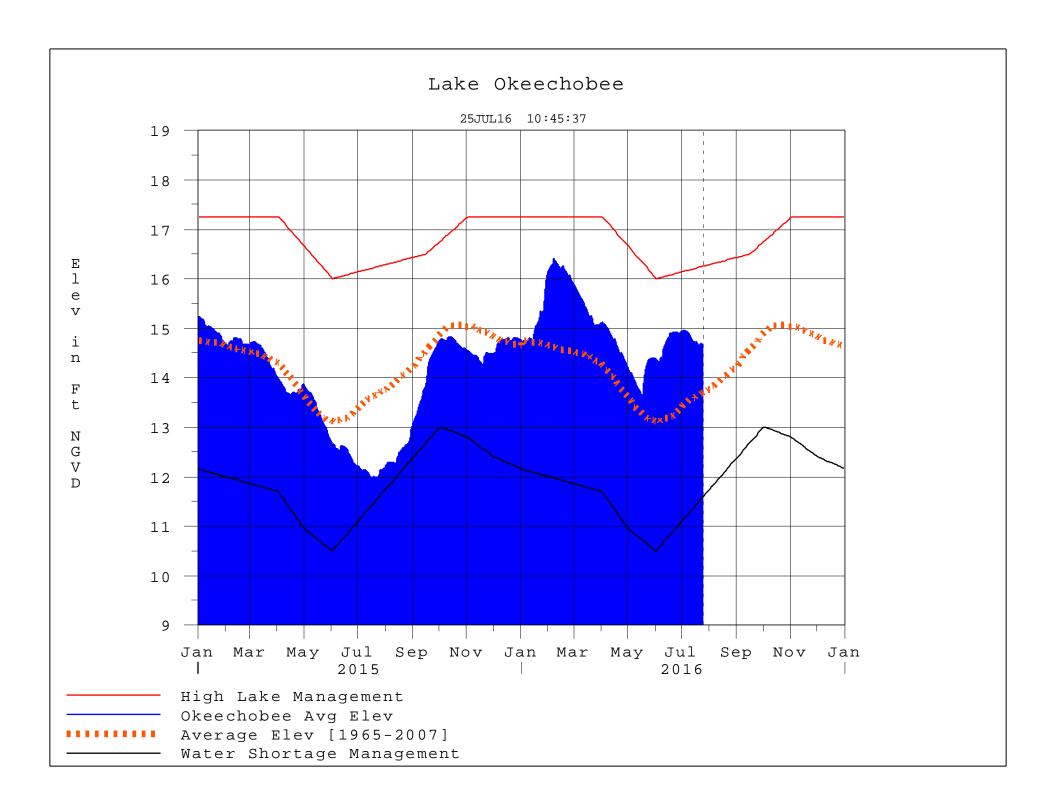
On 09 May 2011, Lake Okeechobee Elevation was switched to a 8 gage mix of interior and edge gages to obtain a more reliable representation of the lake level due to isolation of S135 from low lake levels.

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 25JUL2016 @ 10:39 ** 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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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