Application of the Lake Okeechobee Regulation Schedule (LORS2008) on 10/7/2019 (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 La Nina 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*}		Croley's Empirical		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 (Oct- Mar)	N/A	N/A	0.81	Normal	1.12	Normal	2.52	Very Wet
Multi Seasonal (Oct-Apr)	N/A	N/A	0.89	Dry	1.08	Dry	2.62	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.

**Sub-sampling is a weighted average of ENSO conditions based on the ENSO forecast used.

Tributary Hydrologic Conditions Graph:

- **-3456 cfs** 14-day running average for Lake Okeechobee Net Inflow through 10/6/2019. According to the classification in <u>Tributary Hydrologic Conditions</u> table, this condition is Dry.
- **-1.78** for Palmer Index on 10/5/2019. According to the classification in <u>Tributary Hydrologic Conditions</u> table, this condition is Dry.

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

LORS2008 Classification Tables:

Lake Okeechobee Stage on 10/7/2019

Lake Okeechobee Stage: 13.40 feet

USACE Report for Lake Okeechobee

Lake Okeechobee Stage Hydrograph

	ee Management 'Band	Bottom Elevation (feet, NGVD)	Current Lake Stage
High Lake Manage	ement Band	16.84	
	High sub-band	16.47	
Operational Band	Intermediate sub-band	15.97	
	Low sub-band	14.50	
Base Flow sub-ba	nd	12.98	← 13.40
Beneficial Use sub	o-band	12.97	
Water Shortage M	lanagement Band		

Part C of LORS2008: Discharge to WCA's

Release Guidance Flow Chart Outcome: No releases to WCAs.

Part D of LORS2008: Discharge to Tidewater

Release Guidance Flow Chart Outcome: S-79 Up to 450 cfs & S-80 Up to 200 cfs.

Adaptive Protocol's Release Guidance: Caloosahatchee Estuary

Release Guidance Flow Chart Outcome: S-79 Up to 450 cfs & S-77 baseflow release to supplement as needed.

Back to Lake Okeechobee Operations Main Page

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

LORS2008 Implementation on 10/07/2019 (ENSO Neutral Condition):

Status for week ending 10/07/2019:

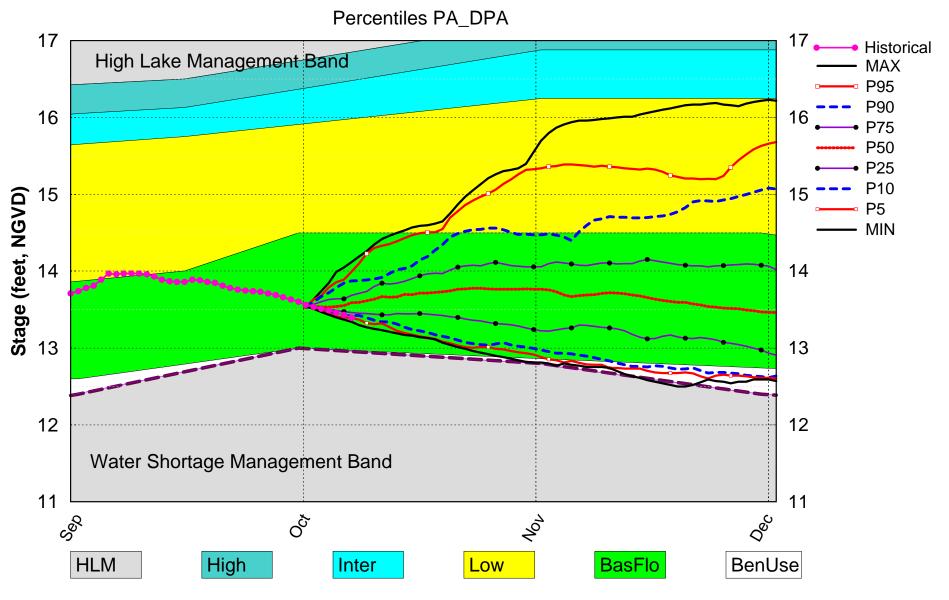
District wide, Raindar rainfall was 0.61 inches for the week. Lake stage on 10/7/2019 was 13.40 ft, NGVD, down 0.20 ft from last week .The updated October 2019 SFWMM Dynamic Position Analysis percentile graph for Lake Okeechobee show that the current lake stage is in the Base-Flow Sub-Band. The LORS2008 Tributary Hydrologic Conditions (THC) are classified as **Dry.** The PDI indicates dry conditions and the LONIN is dry. The THC classification is based on the wetter of the two indices.

Water Supply Risk Evaluation

Area	Indicator	Value	Color Coded Scoring Scheme
	Projected LOK Stage for the next two months	Base-Flow Sub-Band	M
	Palmer Index for LOK Tributary Conditions	-1.78 (Dry)	M
	CDC Presinitation Outlank	1 month: Above Normal	L
LOK	CPC Precipitation Outlook	3 months: Above Normal	П
	LOK Seasonal Net Inflow Outlook ENSO Forecast (positive)	1.12 ft (Normal to Extremely Wet)	П
	LOK Multi-Seasonal Net Inflow Outlook	1.08 ft (Dry)	Н
	ENSO Forecast (positive)		
	WCA 1: 3 Station Average (Site 1-7, Site 1-8T & Site 1-9)	Line 1- Line 2 (16.28 ft)	M
WCAs	WCA 2A: Site 2-17 HW	Above Line 1 (12.35 ft)	L
	WCA-3A: 3 Station Average (Site 63, 64, and 65)	Above Line 1 (10.04 ft)	L
	Service Area 1	Year-Round Irrigation Rule in effect	٦
LEC	Service Area 2	Year-Round Irrigation Rule in effect	L
	Service Area 3	Year-Round Irrigation Rule in effect	L

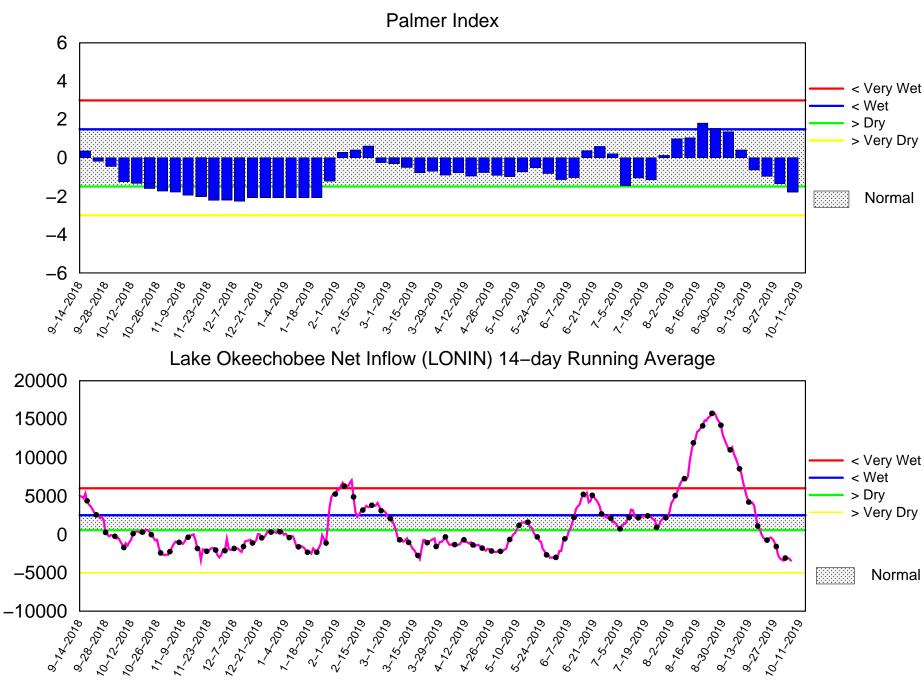
Note: The water supply risk classification based on the Palmer index, as well as the LOK seasonal and multi-seasonal net inflow outlooks use slightly different classification intervals than those used by the 2008-LORS.

Lake Okeechobee SFWMM Oct 2019 Position Analysis



(See assumptions on the Position Analysis Results website)

Tributary Basin Condition Indicators as of October 7 2019

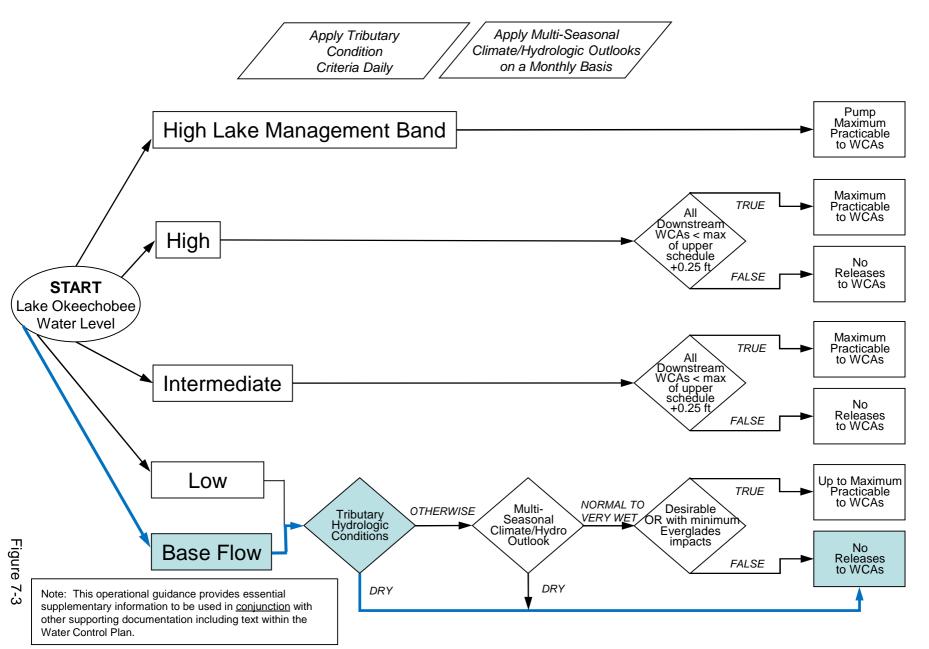


Mon Oct 07 17:30:37 EDT 2019

Flow (cfs)

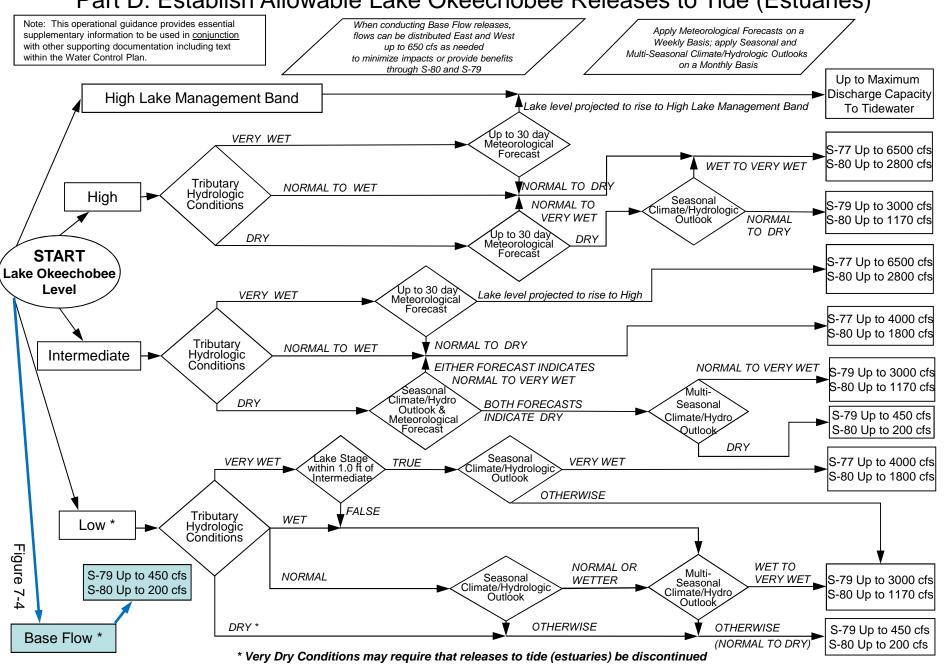
2008 LORS

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

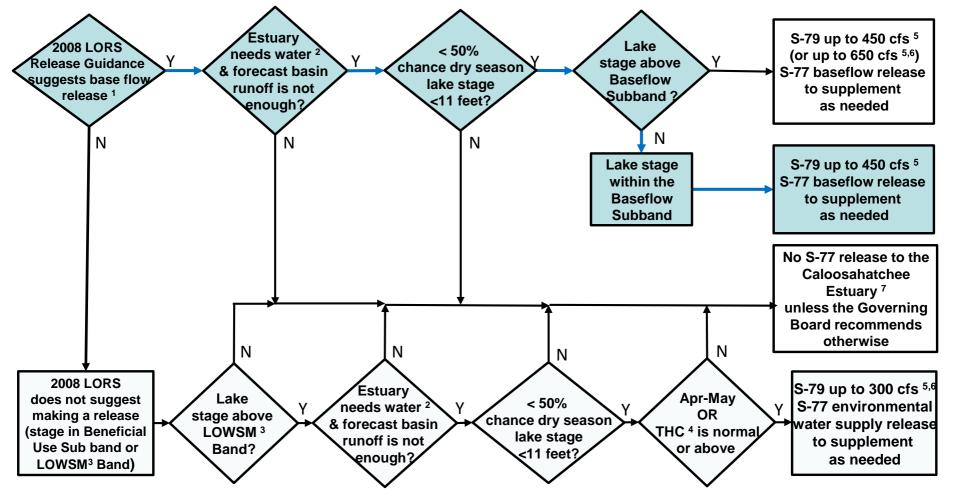


2008 LORS

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



Flowchart to Guide Recommendations for Lake Okeechobee Releases to the Caloosahatchee Estuary for 2008 LORS Baseflow & for Environmental Water Supply (revised 9-Aug-2012)



¹The 2008 LORS Release Guidance (Part D) can suggest baseflow releases in the Intermediate, Low, or Baseflow Subbands.

²Estuary "needs" water when the 30-day moving average salinity at I-75 bridge is projected to exceed 5 practical salinity units (psu) within 2 weeks.

³LOWSM = Lake Okeechobee Water Shortage Management.

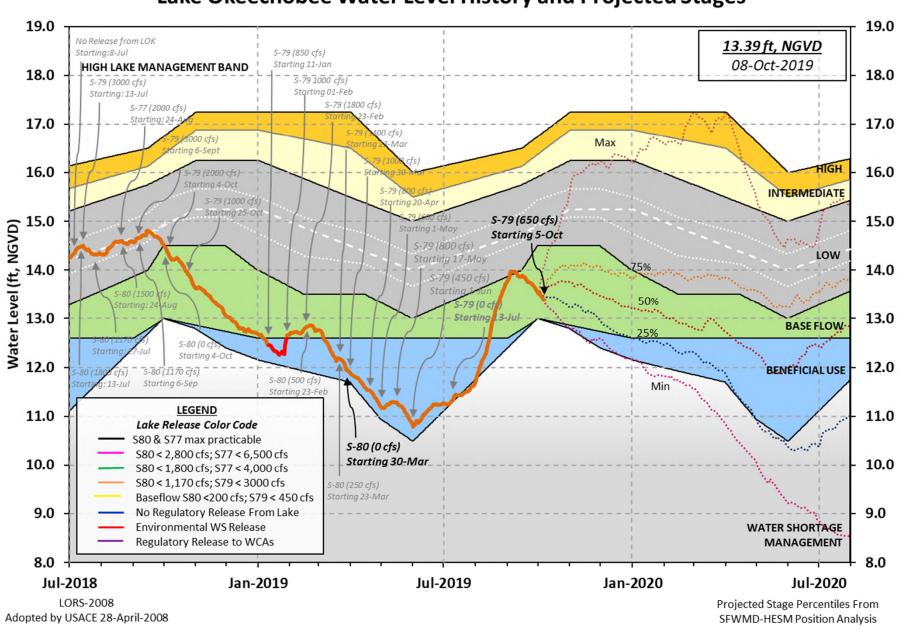
⁴Tributary Hydrologic Condition (THC) is based on classification of Lake Okeechobee Net Inflow and Palmer Index.

⁵Can release less than the "up to" limit if lower release is sufficient to reach or sustain desired estuary salinity; cfs = cubic feet per second.

⁶After reviewing conditions in Water Conservation Areas (WCAs), Stormwater Treatment Areas (STAs), ENP, St. Lucie Estuary and Lake Okeechobee.

⁷Should this condition be reached, the Governing Board will be briefed at their next regularly scheduled meeting as part of the State of the Water Resources agenda item.

Lake Okeechobee Water Level History and Projected Stages



Data Ending 2400 hours 06 OCT 2019

					
Okeechobee Lake		(ft-NGVI)) (ft-NG	VD) (ft-NGVD)	
*Okeechobee La Bottom of High Currently in O	Lake Mngmt	t= 16.84 Top	of Water S	29 -NR- (Of hort Mngmt= 12.	ficial Elv) 97
Simulated Aver Difference fro	_				
060CT (1965-20 Difference fro			erage 14 -1.		
Today Lake Oke stations	echobee ele	evation is det	ermined fr	om the 4 Int &	4 Edge
	epth (Based	d on 2007 Char	nnel Condit	ion Survey) Rou	te 1 ÷
7.34'	onth (Pago	d on 2008 Char	nol Condit	ion Survey) Rou	+o 2 ÷
5.54'	eptii (baset	d OII 2006 CIIdi	mer condic	ion survey) kou	ite z -
Bridge Clearan	ce = 50.48	1			
_					
4 Interior and 4	Edge Okeed	chobee Lake Av	verage (Avg	-Daily values):	
L001 L005	L006 LZ40) S4 S35	52 S308	S133	
13.27 13.52					
*Combination Ok	eechobee <i>1</i>	Avg-Daily Lake	e Average =	13.40 (*See Note)	
				("See Note)	
_					
01 1 1 7 61	(5)				
Okeechobee Inflo S65E		S65EX1	130	Fisheating Cr	12
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	C5	0
Total Inflows:	482				
Okeechobee Outfl	ows (cfs):				
S135 Culverts	0	S354	663	S77	1192
S127 Culverts	0	S351	1174	S308	0
S129 Culverts	0	S352	610		
S131 Culverts	0	L8 Canal Pt	177		
Total Outflows:	3816				

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 13.27 0 0 0 0 0 (cfs) S133 Pumps: 13.30 S193: 0 0.0 0.0 0.0 17.01 S191: 13.24 S135 Pumps: 12.81 13.20 0 0 0 0 0 (cfs) 0.0 0.0 S135 Culverts: North West Shore 340 S65E: 21.02 13.35 0.0 0.0 0.5 0.5 0.0 0.0 21.02 S65EX1: 13.35 130 S127 Pumps: 13.34 0 0 0 0 0 (cfs) 13.30 0 S127 Culvert: 0 0.0 0 S129 Pumps: 12.64 0 0 0 13.47 (cfs) 0 S129 Culvert: 0.0 0 0 13.53 S131 Pumps: 12.54 0 (cfs) S131 Culvert: 0 Fisheating Creek nr Palmdale 12 28.60 nr Lakeport C5: -NR-0 -NR- -NR- -NR-South Shore S4 Pumps: 12.06 13.61 0 0 0 (cfs) S169: 13.65 12.04 36 0.0 0.0 0.0 13.37 S310: 57

```
S3 Pumps: 11.18 13.55 0 0 0 0 0 (cfs)
S354: 13.55 11.18 663 1.3 1.5
S2 Pumps: 10.90 -NR- 0 0 0 0 0 (cfs)
S351: -NR- 10.90 1174 1.7 1.8 1.7
S352: 13.41 10.62 610 1.2 1.2
C10A: -NR- 13.45 8.0 8.0 8.0 0.0 0.0
                        13.35 177
  L8 Canal PT
                   S351 and S352 Temporary Pumps/S354 Spillway
                                 1174 -NR--NR--NR--NR--NR-
               10.90
  S351:
                          -NR-
  S352:
               10.62
                        13.41
                                  610 -NR--NR--NR-
               11.18 13.55
  S354:
                                   663 -NR--NR--NR--NR-
Caloosahatchee River (S77, S78, S79)
12 40 12.63 0.0 0.0

      S47B:
      13.40
      12.63
      0.0

      S47D:
      12.59
      11.03
      0
      0.0

  S77:
    Spillway and Sector Preferred Flow:
               13.36 10.89 1188 0.5 3.0 3.0 0.5
                                   4
   Flow Due to Lockages+:
  S78:
    Spillway and Sector Flow:
              10.91 2.67 729 0.0 2.5 0.0 0.0
   Flow Due to Lockages+:
                                     6
  S79:
    Spillway and Sector Flow:
                2.82 1.94 1218 1.0 1.0 1.0 1.0 1.0 1.0 0.0
0.0
    Flow Due to Lockages+:
               flow from S77 98
(ppm) 76
                                   98%
    Percent of flow from S77
    Chloride
St. Lucie Canal (S308, S80)
  S308:
    Spillway and Sector Preferred Flow:
               13.29 13.02 0 0.0 0.0 0.0 0.0
    Flow Due to Lockages+:
                                     0
        18.61 12.87 53 0.0 0.0
  S153:
  S80:
    Spillway and Sector Flow:
    13.11 1.68 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Flow Due to Lockages+: 10
    Percent of flow from S308 NA %
  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.
- ++ Preferred flow is determined from either the spillway discharge or the below flow meter daily

---- Wind ---Daily Precipitation Totals 1-Day 3-Day 7-Day Direction Speed (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: 0.00 0.00 -NR--NR-S127 Pump Station: 0.00 0.00 S129 Pump Station: -NR-0.00 0.00 0.00 S131 Pump Station: -NR-0.00 S77: 0.00 0.01 0.04 28 S78: 0.00 0.00 0.00 65 2. S79: 0.00 0.00 9 5 0.00 0.00 S4 Pump Station: 0.00 -NR-Clewiston Field Station: -NR-0.00 0.00 0.00 0.00 S3 Pump Station: -NR-S2 Pump Station: -NR-0.00 0.00 25.55 S308: 25.55 25.62 144 2 S80: 1.96 1.96 2.41 116 5 Okeechobee Average 12.77 1.97 1.97 (Sites S78, S79 and S80 not included) Oke Nexrad Basin Avg 0.11 0.19 0.29 ______

 Okeechobee Lake Elevations	06 OCT 2010	13.40 Difference from
060CT19	00 001 2019	13.40 Difference from
0000119		
060CT19 - 1 Day =	05 OCT 2019	13.43 0.03
060CT19 - 2 Days =	04 OCT 2019	13.46 0.06
060CT19 - 3 Days =	03 OCT 2019	13.49 0.09
060CT19 - 4 Days =	02 OCT 2019	13.51 0.11
060CT19 -5 Days =	01 OCT 2019	13.53 0.13
060CT19 -6 Days =	30 SEP 2019	13.56 0.16
060CT19 - 7 Days =	29 SEP 2019	13.60 0.20
060CT19 -30 Days =	06 SEP 2019	13.97 0.57
060CT19 -1 Year =	06 OCT 2018	14.29 0.89
060CT19 - 2 Year =	06 OCT 2017	-NRNR-

Long Term Mean 30day Avearge ET for Lake Alfred (Inches) = 3.78

	060CT19	7	Today	=	06	OCT	2019	-2463	MON	-2390
	060CT19		Day				2019	-2336	SUN	-2554
	060CT19		Days				2019	-2362	SAT	-2886
	060CT19		Days				2019	-2322	FRI	-1130
	060CT19		Days				2019	-2422	THU	-1342
			-							1
	060CT19		Days				2019	-2375	WED	-3486
	060CT19		Days				2019	-2259	TUE	-5913
	060CT19		Days				2019	-1706	MON	-3915
	060CT19	-8	Days	=	28	SEP	2019	-550	SUN	-3649
	060CT19	-9	Days	=	27	SEP	2019	58	SAT	-3559
	060CT19	-10	Days	=	26	SEP	2019	442	FRI	-1258
	060CT19	-11	Days	=	25	SEP	2019	525	THU	-1736
	060CT19		-				2019	314	WED	-347
	060CT19		_				2019	100	TUE	-315
	0000113		Days		23	DLI	2017	100	101	1 313
_										
							55E			
								previous		Avg-Daily Flow
	060CT19		Today	y=			2019	545	MON	383
	060CT19	-1	Day	=	05	OCT	2019	609	SUN	231
	060CT19	-2	Days	=	04	OCT	2019	701	SAT	428
	060CT19	-3	Days	=	03	OCT	2019	805	FRI	334
	060CT19		Days				2019	918	THU	230
	060CT19		Days				2019	1053	WED	450
	060CT19		Days				2019	1069	TUE	446
			_					1058		1
	060CT19		Days				2019		MON	291
	060CT19		Days				2019	1054	SUN	331
	060CT19		Days				2019	1062	SAT	333
	060CT19		_				2019	1038	FRI	840
	060CT19	-11	Days	=	25	SEP	2019	978	THU	1124
	060CT19	-12	Days	=	24	SEP	2019	897	WED	1022
	060CT19	-13	Days	=	23	SEP	2019	824	TUE	1185
_										
_						S	65EX1			
					Average			previous	14 days	Avg-Daily Flow
	060CT19		Today	y=			2019	286	MON	130
	060CT19	-1	Day				2019	305	SUN	129
	060CT19		Days				2019	301	SAT	129
	060CT19		Days				2019	314	FRI	132
	060CT19		Days				2019	329	THU	131
			_							
	060CT19		Days				2019	318	WED	195
	060CT19		Days				2019	410	TUE	109
	060CT19		Days				2019	566	MON	285
	060CT19		Days				2019	707	SUN	502
	060CT19	-9	Days	=	27	SEP	2019	831	SAT	414
	060CT19	-10	Days	=	26	SEP	2019	1010	FRI	389
	060CT19						2019	1218	THU	552
	060CT19		_				2019	1439	WED	509
	060CT19		_				2019	1710	TUE	396

	S-77 Discharge (ALL DAY) (AC-FT) 2368 1660 529 494 435 524 133 213 369 474 558 290 132	Below S-77 Discharge (ALL-DAY) (AC-FT) 2240 1355 656 694 718 666 183 430 726 814 950 466 33 -40	S-78 Discharge (ALL DAY) (AC-FT) 1459 1179 14 14 14 9 11 9 21	S-79 Discharge (ALL DAY) (AC-FT) 2417 1167 6 5 8 3 6 12 8 3 5 64 198 398	
	g 210	G 251	g 250	g 254	T.O. Co 1 D.
	S-310 Discharge (ALL DAY)	S-351 Discharge (ALL DAY)	S-352 Discharge (ALL DAY)	S-354 Discharge (ALL DAY)	L8 Canal Pt Discharge (ALL DAY)
DATE	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)
06 OCT 2019	112	2329	1209	995	350
05 OCT 2019	225	2567	1107	1231	349
04 OCT 2019	357	2769	1299	1299	378
03 OCT 2019 02 OCT 2019	243	2953	933	1108	352
02 OCT 2019 01 OCT 2019	269 284	2685 2414	1227 1313	851 878	306 356
30 SEP 2019	355	2122	1341	900	353
29 SEP 2019	327	1866	1175	956	418
28 SEP 2019	342	1988	1485	896	445
27 SEP 2019	486	2106	1510	839	425
26 SEP 2019	284	2243	1553	940	455
25 SEP 2019	361	2198	824	978	475
24 SEP 2019	475	1572	566	696	416
23 SEP 2019	389	1387	1088	672	274
	S-308	Below S-308	S-80		
I	Discharge	Discharge	Discharge	<u> </u>	
	(ALL DAY)	(ALL-DAY)	(ALL-DAY)		
DATE	(AC-FT)	(AC-FT)	(AC-FT)		
06 OCT 2019	1	112	19		
05 OCT 2019 04 OCT 2019	0 1	258 91	27 33		
03 OCT 2019	0	99	10		
02 OCT 2019	0	56	16		
01 OCT 2019	0	58	22		
30 SEP 2019	0	59	19		
29 SEP 2019	0	-109	13		
28 SEP 2019	0	104	17		
27 SEP 2019	0	120	24		
26 SEP 2019	0	14 12	28		
25 SEP 2019 24 SEP 2019	-0 -1	13 115	24 21		
23 SEP 2019	-1	102	28		
	_				

*** 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/

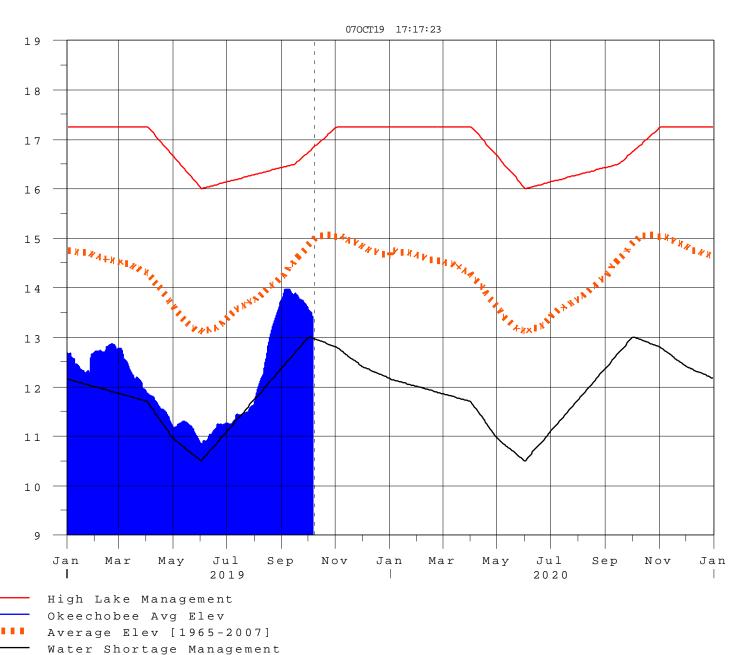
\$ For information regarding Lake Okeechobee Service Area water restrictions

please refer to www.sfwmd.gov

-- Report Generated 070CT2019 @ 17:15 ** Preliminary Data - Subject to Revision

Report Generated 070CT2019 @ 17:15 ** Preliminary Data - Subject to Revision **





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G V D

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
[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