Application of the Lake Okeechobee Regulation Schedule (LORS2008) on 6/20/2016 (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 (Jun- Nov)	N/A	N/A	2.70	Very Wet	2.88	Very Wet	3.58	Very Wet
Multi Seasonal (Jun-Apr)	N/A	N/A	3.60	Wet	4.02	Wet	5.05	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:

14111 cfs 14-day running average for Lake Okeechobee Net Inflow through 6/19/2016. According to the classification in <u>Tributary Hydrologic Conditions</u> table, this condition is Very Wet.

1.92 for Palmer Index on 6/18/2016.

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

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

LORS2008 Classification Tables:

Lake Okeechobee Stage on 6/20/2016

Lake Okeechobee Stage: 14.89 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	16.09	
	High sub-band	15.61	
Operational Band	Intermediate sub-band	15.13	
	Low sub-band	13.18	← 14.89
Base Flow sub-ba	nd	12.60	
Beneficial Use sub	o-band	10.89	
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-77 up to 4000 cfs and S-80 up to 1800 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 6/20/2016 (ENSO Neutral Condition):

Status for week ending 6/20/2016:

District wide, Raindar rainfall was 1.45 inches for the week. Lake stage on 6/20/2016 was 14.89 ft, up 0.21 ft from last week.

The updated June 2016 SFWMM Dynamic Position Analysis <u>percentile graph</u> and <u>tracking chart</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 **Very Wet**. The PDSI indicates wet condition and the LONIN is Very Wet. The classification is based on the wetter of the two.

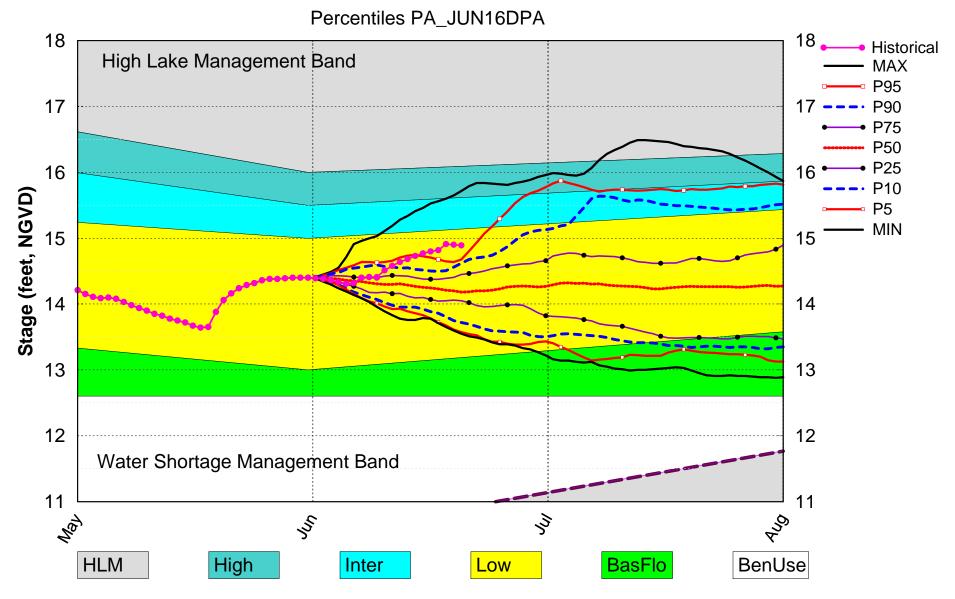
Water Supply Risk Evaluation

vvalei	ter 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	1.92 (Normal)	٦						
	CBC Procinitation Outlook	1 month: Above Normal	L						
LOK	CPC Precipitation Outlook	3 months: Above Normal	L						
	LOK Seasonal Net Inflow Forecast ENSO Neutral Years	2.88 ft (Normal to Extremely Wet)	L						
	LOK Multi-Seasonal Net Inflow Forecast	4.02 ft (Wet)	L						
	ENSO Neutral Years WCA 1: Site 1-7, Site 1-8T, & Site 1-9 Average	Above Line 1 (16.22 ft)	L						
WCAs	WCA 2A: Site 2-17 HW	Above Line1 (12.16 ft)	L						
	WCA-3A: 3 Station Average (Site 63, 64 and 65)	Above Line 1 (9.66 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.

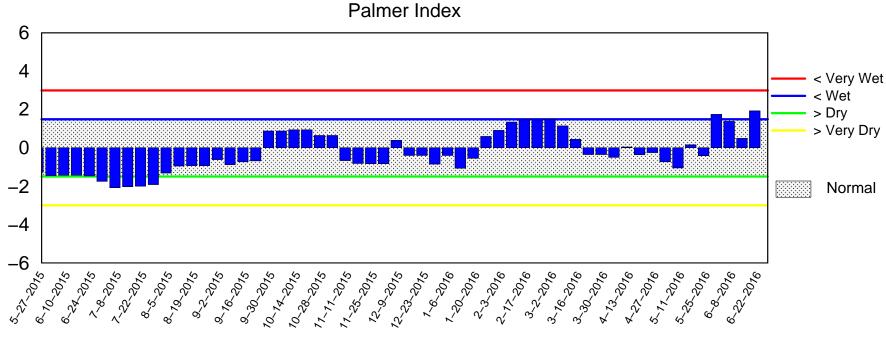
Back to Lake Okeechobee Operations Main Page
Back to U.S. Army Corps of Engineers LORSS Homepage

Lake Okeechobee SFWMM June 2016 Dynamic Position Analysis

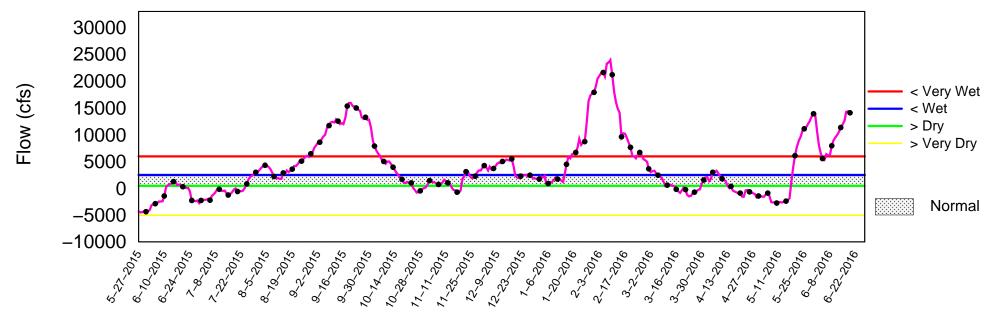


(See assumptions on the Position Analysis Results website)

Tributary Basin Condition Indicators as of June 20 2016



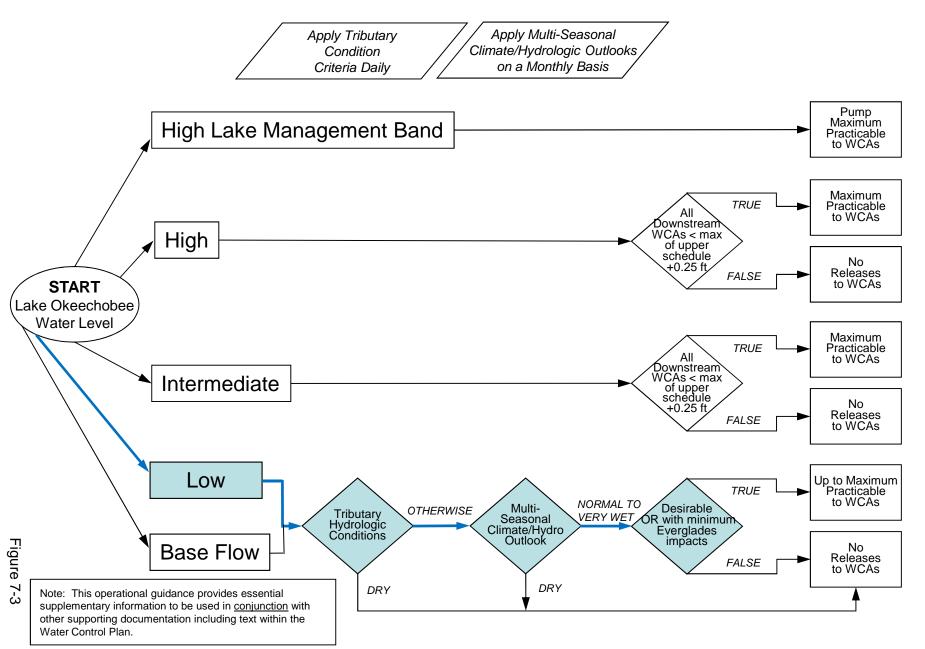
Lake Okeechobee Net Inflow (LONIN) 14-day Running Average



Mon Jun 20 13:39:55 EDT 2016

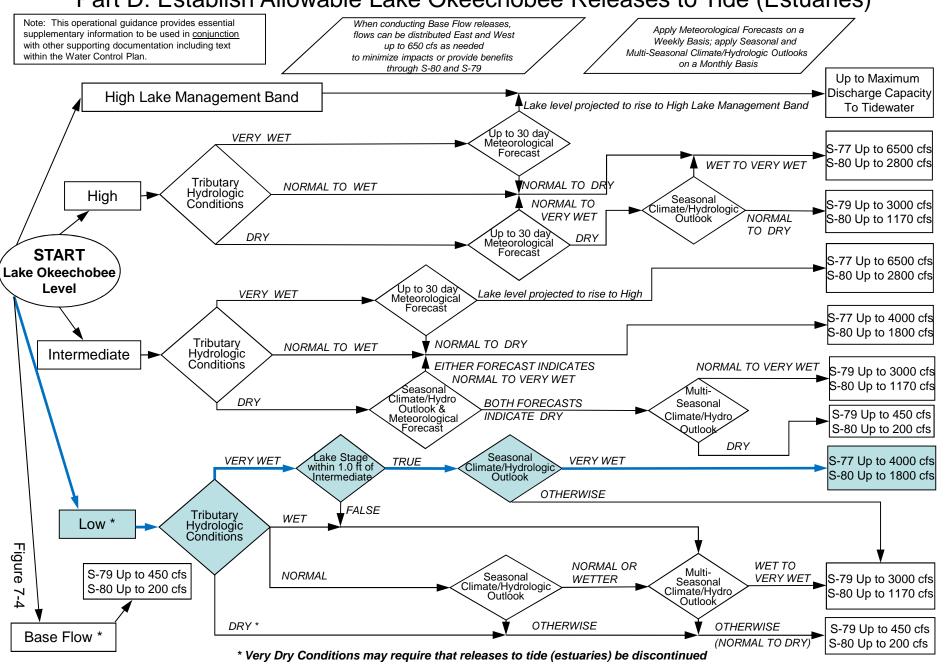
2008 LORS

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



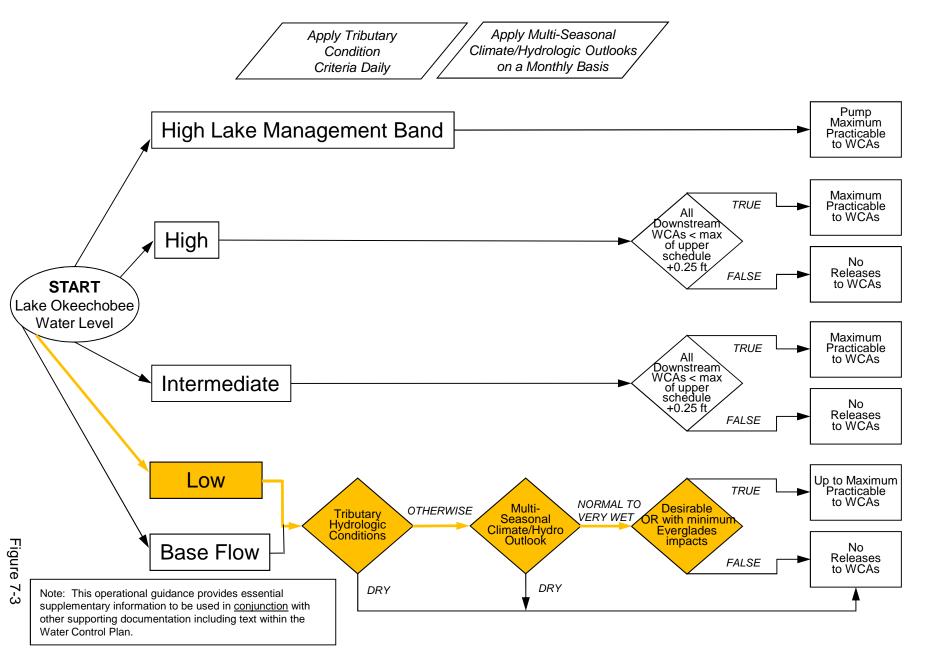
2008 LORS

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



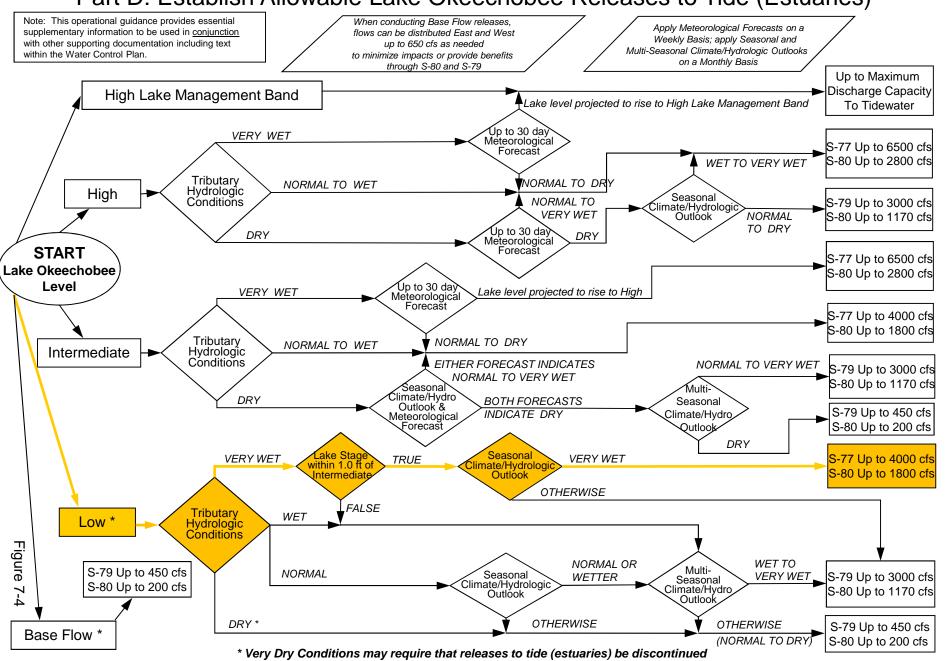
2008 LORS FORECAST

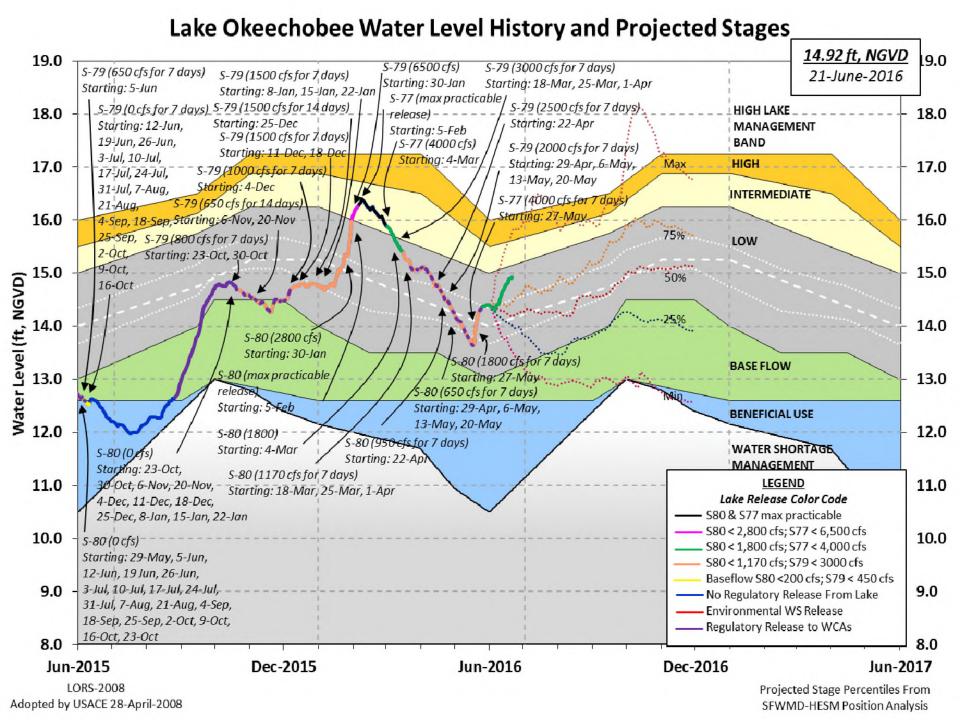
Part C: Establish Allowable Lake Okeechobee Releases to the Water Conservation Areas



2008 LORS FORECAST

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





Data Ending 2400 hours 19 JUN 2016

Okeechobee Lake 1	Regulation			Year 2YRS Ago GVD) (ft-NGVD)	
*Okeechobee Lai Bottom of High Currently in O	Lake Mngm	on 14.89 t= 16.08 Top	12 of Water S	.50 12.76 (O Short Mngmt= 10	
Simulated Avera Difference from			12.06 2.83		
19JUN (1965-20) Difference from				3.22 .67	
Today Lake Okeo stations	echobee el	evation is det	ermined fi	com the 4 Int &	4 Edge
_	epth (Base	d on 2007 Chan	nel Condit	cion Survey) Ro	ute 1 ÷
8.83'	anth (Daga	d 2000 Ch		des Comments De	
++Navigation D	eptn (Base	d on 2008 Chan	nei Condi	cion Survey) Ro	ute 2 ÷
Bridge Clearan	ce = 49.02	1			
_					
4 Tratanian and 4		alaalaaa Talaa Nee		- Dailelean	
4 Interior and 4	Eage Okee	chobee Lake Av	erage (Avg	j-Daily values)	•
L001 L005	L006 LZ4	0 S4 S35	2 S308	S133	
14.71 -NR-				14.74	
#G 1' - ' 01	1. 1			1.4.00	
*Combination Ok	eechobee	Avg-Daily Lake	Average =	= 14.89 (*See Note)	
				("See Note)	
					
Okeechobee Inflo					
S65E	5861	C5	-91	Fisheating C	
S154	101	S191	170	S135 Pumps	80
S84		S133 Pumps	116	S2 Pumps	
S84X S71	812 675	S127 Pumps	42	S3 Pumps S4 Pumps	0 0
S72	174	S129 Pumps S131 Pumps	43 48	54 Pullips	U
	10374	SISI Pumps	40		
Okeechobee Outflo					
S135 Culverts	0	S354	0	S77	(Not Used)
S127 Culverts	0	S351	0	S77Below	4496
(USED)	0	C2E2	0	G200	(No+ 11~~~1\
S129 Culverts	0	S352	0	S308	(Not Used)

S131 Culverts -NR- L8 Canal Pt 210 S308Below 1541

(USED)

Total Outflows: 6247

****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 0.00 S308 0.15

Average Pan Evap x 0.75 Pan Coefficient = 0.06" = 0.00'

Lake Average Precipitation using NEXRAD: = 0.50" = 0.04'

Evaporation - Precipitation: = -0.44" = -0.04"

Evaporation - Precipitation using Lake Area of 730 square miles

is equal to 8710 cfs into the lake.

Lake Okeechobee (Change in Storage) Flow is -2168 cfs or -4300 AC-FT

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

	Headwater	Tailwater				Gat	te Pos	sition	ns	
	Elevation	Elevation	Disch	#1	#2	#3	#4	#5	#6	#7
#8	(ft-msl)	(ft-msl)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
(ft)		(т) see n	ote at	bot.t	om				
North East Sl	nore	(-	, 500 11	occ ac	2 2000	20111				
S133 Pumps S193:	-	14.81	116	37	31	0	36	12	(cfs	s)
S191:	18.80	14.73	170	0.5	0.0	0.5				
S135 Pumps		-NR-	80	0			37		(cfs	3)
S135 Culve			0	-NR-	-NR-				•	,
North West Sl	nore									
S65E:	21.11	14.89	5861	2.6	2.6	2.6	2.2	2.2	2.2	
S127 Pumps	: 13.36	14.88	42	42	0	0	0	0	(cfs	3)
S127 Culve	rt:		0	0.0						
S129 Pumps	: 13.02	15.06	43	43	0	0			(cfs	s)
S129 Culve	rt:		0	0.0						
S131 Pumps S131 Culve		15.14	48 -NR-	43	0				(cfs	s)
Fisheating nr Palmda nr Lakepo	ale	33.07	1257							

C5: 15.04 14.90 -91 5.3 5.3 5.3

```
South Shore

      S4 Pumps:
      12.47
      15.12
      0
      0
      0
      0

      S169:
      15.18
      12.48
      0
      0.0
      0.0
      0.0

                                                                  (cfs)
 S169:
 S169: 15.10

S310: 15.18 -/-

S3 Pumps: 10.10 15.19 0 0 0 0 0

C354: 15.19 10.10 0 0.0 0.0

C354: 15.04 0 0 0 0 0

C354: 0 0.0 0.0 0.0
                                                                   (cfs)
                                                                  (cfs)
             15.00 9.96
-NR- 13.94
                                    0.0 0.0
 S352:
 C10A:
                                         0.0 0.0 8.0 0.0 0.0
 L8 Canal PT
                         13.75 210
                  S351 and S352 Temporary Pumps/S354 Spillway
                       15.04 0 -NR--NR--NR--NR--NR-
15.00 0 -NR--NR--NR-
15.19 0 -NR--NR--NR-
               9.99
  S351:
  S352:
               9.96
  S354:
               10.10
Caloosahatchee River (S77, S78, S79)
  S47B: 13.40 11.52
                                         1.9 2.4
  S47D:
              11.18
                        11.15
                                  142 6.0
  S77:
   Spillway and Sector Flow:
               14.69 11.30 4496 4.5 4.5 4.5 4.5
   Flow Due to Lockages+:
                                   5
  S77 Below USGS Flow Gage 4496
  S78:
   Spillway and Sector Flow:
              10.96 3.32 5642 5.5 0.0 6.0 6.0
   Flow Due to Lockages+:
                                 15
  S79:
   Spillway and Sector Flow:
       2.71 1.10 9798 4.0 5.0 5.0 5.0 5.0 5.0
4.0
   Flow Due to Lockages+:
                                    6
                                44%
                       om S77 44
(ppm) 51
    Percent of flow from S77
   Chloride
St. Lucie Canal (S308, S80)
  S308:
    Spillway and Sector Flow:
              14.76 14.48 1541 4.5 4.5 4.5 4.5
                                  1
   Flow Due to Lockages+:
                                1541
  S308 Below USGS Flow Gage
  S153: 18.93 14.28
                                 97 0.0 0.0
  S80:
   Spillway and Sector Flow:
              13.94 2.36 1849 1.1 1.1 1.2 0.0 1.2 1.1 0.0
   Flow Due to Lockages+: 26
Percent of flow from S308 84%
```

```
Steele Point Top Salinity (mg/ml) ****
Steele Point Bottom Salinity (mg/ml) ****

Speedy Point Top Salinity (mg/ml) 5638
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	1-Day	3-Day	7-Day	Directio	n
Speed					
	(inches	(inches)	(inches)	(Degø)	
mph)					
S133 Pump Station:		0.00			
S193:			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:	0.82	3.72	4.87	62	4
S78:	0.22	0.58	0.96	53	4
S79:	0.03	0.51	0.62	107	2
S4 Pump Station:	-NR-	0.00	0.00		
Clewiston Field Station:	-NR-	0.00	0.00		
		0.00			
S2 Pump Station:	-NR-	0.00	0.00		
		*****		54	6
S80:	-NR-	0.67	0.85	95	5
Okeechobee Average	*****	4924.82	6539.22		
(Sites S78, S79 and					
Oke Nexrad Basin Avg	0.50	0.97	1.38		

	10 7777 0016	14 00 D'55	_
Okeechobee Lake Elevations	19 JUN 2016	14.89 Difference	rom
19JUN16			
19JUN16 -1 Day =	18 JUN 2016	14.90	0.01
19JUN16 - 2 Days =	17 JUN 2016	14.91	0.02
19JUN16 -3 Days =	16 JUN 2016	14.82	-0.07
19JUN16 -4 Days =	15 JUN 2016	14.80	-0.09
19JUN16 -5 Days =	14 JUN 2016	14.77	-0.12
19JUN16 -6 Days =	13 JUN 2016	14.73	-0.16
19JUN16 -7 Days =	12 JUN 2016	14.68	-0.21
19JUN16 - 30 Days =	20 MAY 2016	14.16	-0.73
19JUN16 -1 Year =	19 JUN 2015	12.50	-2.39
19JUN16 - 2 Year =	19 JUN 2014	12.76	-2.13

_

							previous	ow (LONIN)	Avg-Daily Flo
1016	_		_				-	-	! -
19JUN16		Гoday				2016	14132	MON	4079
19JUN16	-1	Day	=	18	JUN	2016	14416	SUN	3813
19JUN16	-2	Days	=	17	JUN	2016	14281	SAT	25239
19JUN16	-3	Days	=	16	JUN	2016	12517	FRI	10351
19JUN16	-4	Days	=	15	JUN	2016	11958	THU	12480
19JUN16	-5	Days	=	14	JUN	2016	11375	WED	14276
19JUN16	-6	Days	=	13	JUN	2016	10664	TUE	15923
19JUN16	-7	Days	=	12	JUN	2016	10015	MON	13553
19JUN16	-8	Days	=	11	JUN	2016	9546	SUN	17657
19JUN16	-9	Days	=	10	JUN	2016	8903	SAT	19400
19JUN16	-10	Days	=	09	JUN	2016	7989	FRI	26247
19JUN16	-11	Days	=	08	JUN	2016	6196	THU	5128
19JUN16	-12	Days	=	07	JUN	2016	6227	WED	6924
19JUN16	-13	Days	=	06	JUN	2016	6397	TUE	22775

_			S65E			
		Average F	Flow over	previous	14 days	Avg-Daily Flow
19JUN16	Today=	19 5	JUN 2016	6480	MON	5861
19JUN16	-1 Day =	18 5	JUN 2016	6363	SUN	6483
19JUN16	-2 Days =	17 J	JUN 2016	6210	SAT	7030
19JUN16	-3 Days =	16 5	JUN 2016	6060	FRI	7732
19JUN16	-4 Days =	15 J	JUN 2016	5890	THU	7943
19JUN16	-5 Days =	14 5	JUN 2016	5727	WED	8256
19JUN16	-6 Days =	13 5	JUN 2016	5562	TUE	8768
19JUN16	-7 Days =	12 5	JUN 2016	5407	MON	8716
19JUN16	-8 Days =	11 3	JUN 2016	5278	SUN	7636

19JUN16 -8 Days = 11 JUN 2016 19JUN16 -9 Days = 10 JUN 2016 19JUN16 -10 Days = 09 JUN 2016 19JUN16 -11 Days = 08 JUN 2016 19JUN16 -12 Days = 07 JUN 2016 19JUN16 -13 Days = 06 JUN 2016 6184 TUE 3842

5229 SAT

5328 FRI

5544 THU 5861 WED

5969

4804

3812 3874

Lake Okeechobee Outlets Last 14 Days

		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)
	DATE	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)
19	JUN 20	16		8916	-NR-	11219	19442
18	JUN 20	16		8407	-NR-	11071	19821
17	JUN 20	16		7909	-NR-	10248	16682
16	JUN 20	16		7975	-NR-	9618	14084
15	JUN 20	16		8294	-NR-	11951	17868
14	JUN 20	16		8270	-NR-	12179	19765
13	JUN 20	16		7869	-NR-	12232	22866
12	JUN 20	16		7539	-NR-	12414	21945
11	JUN 20	16		7382	-NR-	-NR-	25384
10	JUN 20	16		6760	-NR-	9758	22187

80	JUN	2016 2016 2016			5757 5458 5581	-NR - -NR - -NR -	6691 6078 5615	15885 9126 -NR-
		2016			8012	-NR-	7364	8294
			S-310	S-351	S-352	S-354	L8 Canal Pt	
			Discharge			Discharge		
			(ALL DAY)	(ALL DAY)	(ALL DAY)	(ALL DAY)	(ALL DAY)	
	DATE		(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)	
		2016		0	0	0	416	
		2016		0	101	0	410	
		2016		0	0	0	500	
		2016		0	0	0	627	
		2016		0	0	0	604	
14	JUN	2016	-276	0	0	0	531	
13	JUN	2016	-331	0	0	0	509	
12	JUN	2016	-345	0	0	0	571	
11	JUN	2016	-364	0	0	0	505	
10	JUN	2016	-328	0	0	0	444	
09	JUN	2016	-258	0	468	0	426	
80	JUN	2016	-134	0	968	0	556	
		2016		0	793	0	497	
06	JUN	2016	6	0	0	0	379	
			S-308	Below S-308	S-80			
			Discharge	Discharge	Discharge	2		
			(ALL DAY)	(ALL-DAY)	(ALL-DAY)			
	DATE	C	(AC-FT)	(AC-FT)	(AC-FT)			
19	JUN	2016		3057	2454			
		2016		2841	2481			
		2016		3049	2448			
		2016		3326	2461			
		2016		3252	2452			
		2016		2711	2459			
		2016		2202	2452			
		2016		1970	2462			
		2016		1933	2433			
		2016		1872	2454			
		2016		2507	2427			
0.0		0016		2105	,			

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

2383

2415

2396

Gate Discharges from 0700 hrs to 2100 hrs.

2) Discharge (ALL DAY) is computed using Spillway, Sector Gate and ${\color{blue} \text{Lockages Discharges from 0015 hrs to 2400 hrs.}}$

(I) - Flows preceded by "I" signify an instantaneous flow computed from the single value reported for the day

3187

2560

3179

* On 11 May 1999, Lake Okeechobee Elevation was switched from

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08 JUN 2016

07 JUN 2016

06 JUN 2016

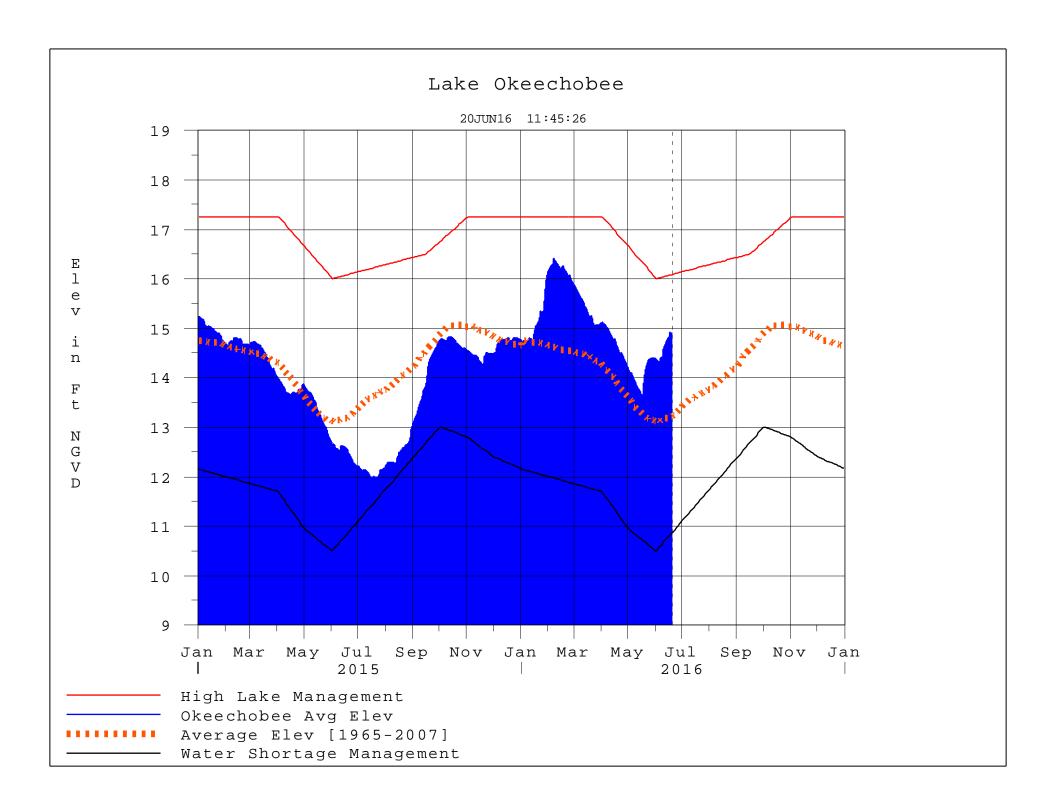
Instantaneous 2400 value to an average-daily lake average.

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 20JUN2016 @ 11:39 ** 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

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