Application of the Lake Okeechobee Regulation Schedule (LORS2008) on 9/28/2015 (Developing El Nino 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 El Nino years³ and a sub-sampling of cold years of the Atlantic Multi-decadal Oscillation (AMO) in combination with ENSO El Nino 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*}		Em	FWMD npirical ethod ²	Sub-sampling of ENSO El Nino Years ³ Sub-sampli AMO War ENSO El N		Warm + D El Nino	
	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition
Current (Sep- Feb)	N/A	N/A	2.80	Very Wet	3.30	Very Wet	2.77	Very Wet
Multi Seasonal (Nov- Oct)	N/A	N/A	3.10	Wet	3.99	Wet	3.36	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:

12946 cfs 14-day running average for Lake Okeechobee Net Inflow through 9/28/2015. According to the classification in <u>Tributary Hydrologic Conditions</u> table, this condition is Very Wet.

0.87 for Palmer Index on 9/27/2015.

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

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

LORS2008 Classification Tables:

Lake Okeechobee Stage on 9/28/2015

Lake Okeechobee Stage: 14.62 feet

USACE Report for Lake Okeechobee

Lake Okeechobee Stage Hydrograph

Lake Okeechob	ee Management	Bottom Elevation	Current
Zone	/Band	(feet, NGVD)	Lake Stage
Libert Lake Manage	om out Dand	10.00	
High Lake Manage	ement Band	16.69	
	High sub-band	16.32	
Operational Band	Intermediate sub-band	15.88	
	Low sub-band	14.40	← 14.62
Base Flow sub-ba	nd	12.95	
Beneficial Use sub	o-band	12.94	
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

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LORS2008 Implementation on 9/28/2015 (ENSO Neutral Condition):

Water Supply Department Technical Input

Water Supply Outlook:

District wide, Raindar rainfall 1.57 inches for the week ending 9/29/2015. Lake stage on 9/28/2015 is 14.62 ft, up 0.25 ft from last week.

The updated September 2015 SFWMM Dynamic Position Analysis <u>percentile graph</u> and <u>tracking chart</u> for Lake Okeechobee show that the lake stage is in the low Operational Sub-Band.

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

Water Supply Risk Evaluation

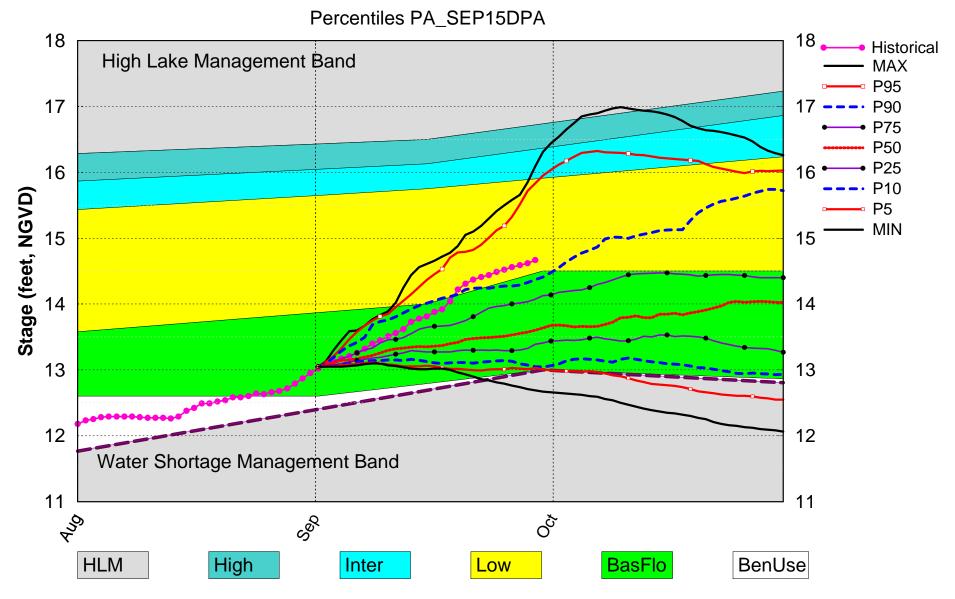
vvale	vater Supply Risk Evaluation								
Area	Indicator	Value	Color Coded Scoring Scheme						
	Projected LOK Stage for the next two months	Low Sub-Band	٦						
	Palmer Index for LOK Tributary Conditions	0.87 (Normal)	L						
LOK	CDC Draginitation Outland	1 month: Normal	L						
LOK	CPC Precipitation Outlook	3 months: Above Normal	Г						
	LOK Seasonal Net Inflow Forecast AMO warm/El Nino	3.30 ft (Normal to Extremely Wet)	L						
	LOK Multi-Seasonal Net Inflow Forecast AMO warm/El Nino	3.99 ft (Wet)	L						
	WCA 1: Site 1-8C	(16.82 ft)	L						
WCAs	WCA 2A: Site 2-17 HW	(13.26 ft)	L						
	WCA-3A: 3 Station Average (Site 63, 64 and 65)	(10.17 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 for classifying the tributary hydrologic condition (THC).

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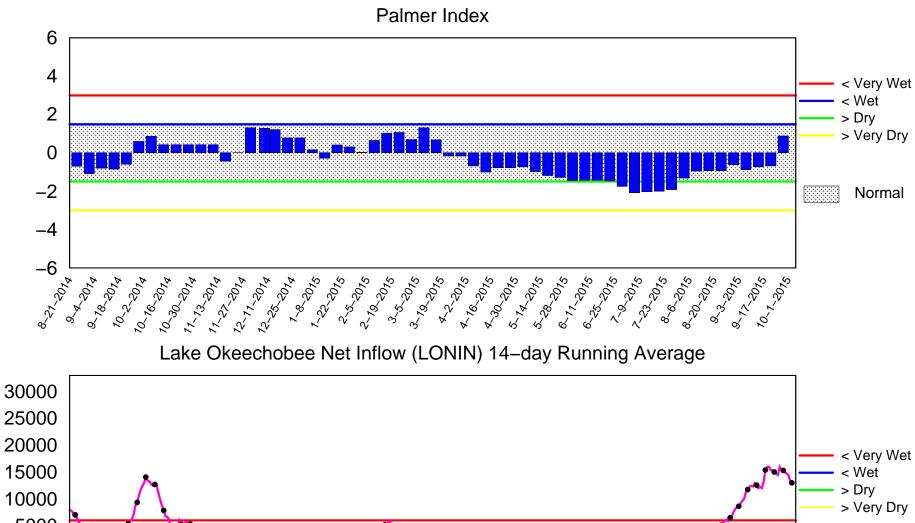
Back to U.S. Army Corps of Engineers LORSS Homepage

Lake Okeechobee SFWMM September 2015 Dynamic Position Analysis



(See assumptions on the Position Analysis Results website)

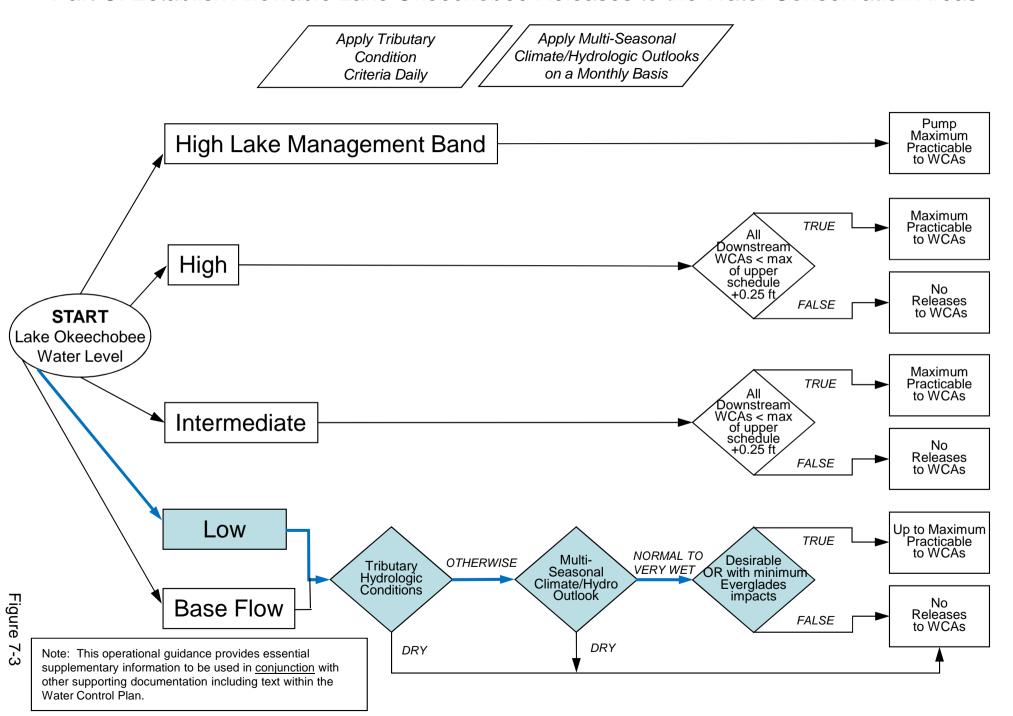
Tributary Basin Condition Indicators as of September 28 2015



25000 20000 Flow (cfs) 15000 10000 5000 0 Normal -5000-1000017.23-2074 12,1,2014 | 12,23,2074 1 1.5% 2,79,20,5 3,79,2075 1 4,16,2015 1 4.30,2075 1 5-28-2015 1 6-35-6075 1 1,23,2015.1 8-20-2015 1 1.8.2015 2,5,2015 3.5.2015 4.2.2015 19,5015 8-6-2015 Tue Sep 29 10:48:54 2015

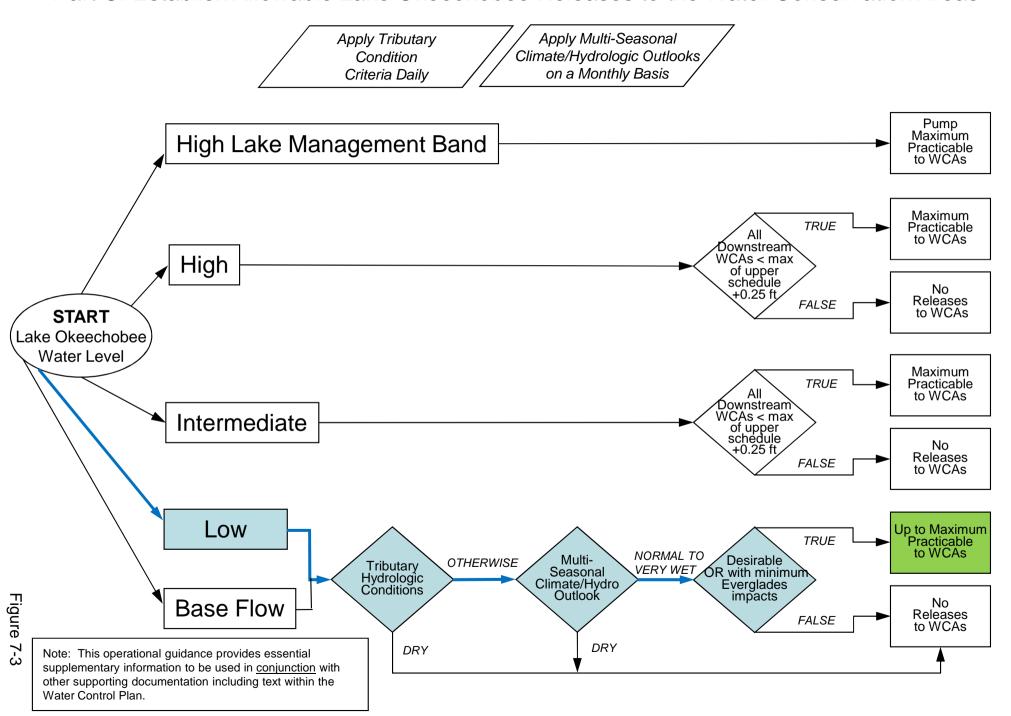
2008 LORS

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



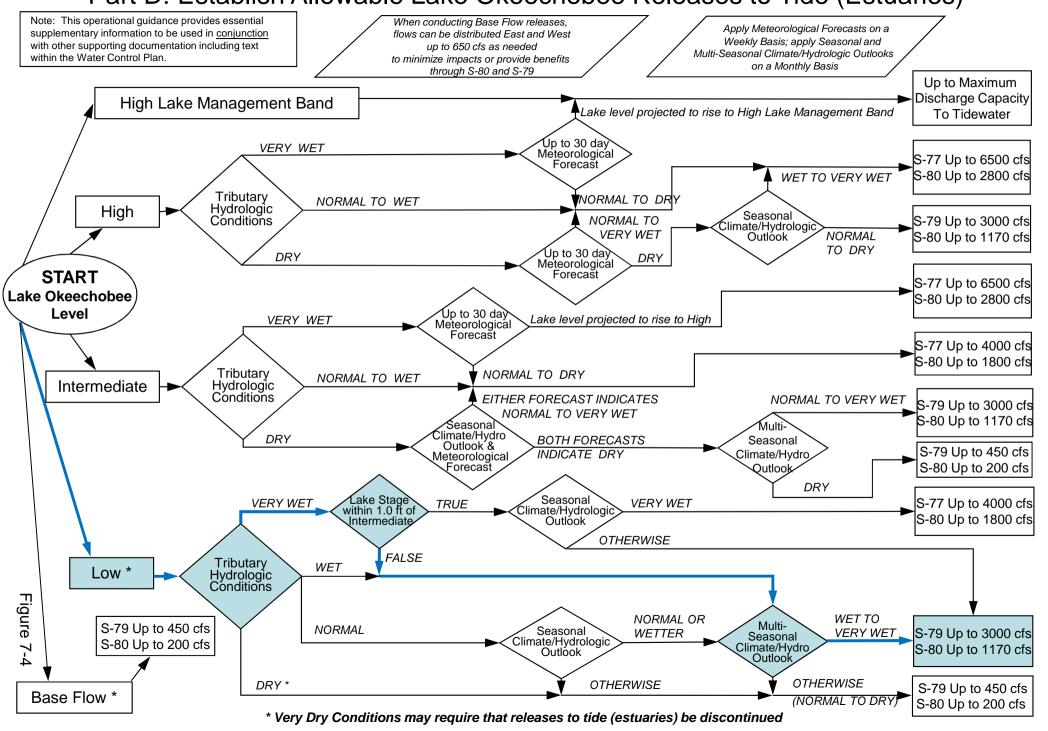
2008 LORS FORECAST

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



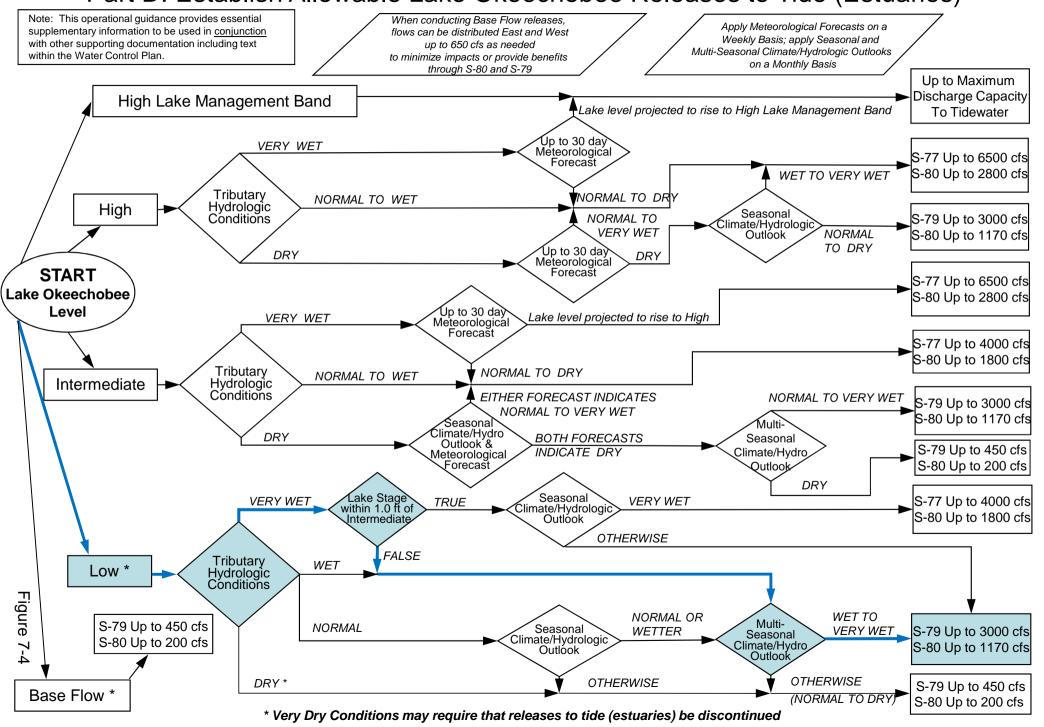
2008 LORS

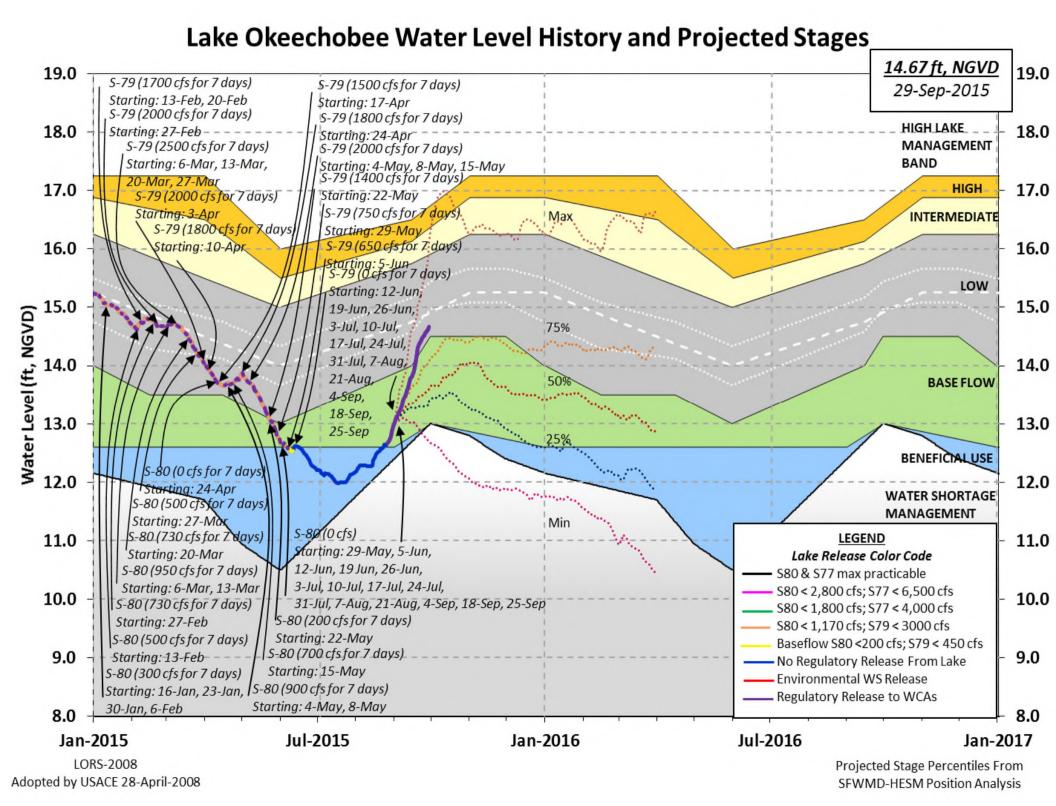
Part D: Establish Allowable Lake Okeechobee Releases to Tide (Estuaries)



2008 LORS FORECAST

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





Data Ending 2400 hours 27 SEP 2015

Okeechobee Lake	Regulation			Tear 2YRS Ago GVD) (ft-NGVD)	
*Okeechobee La Bottom of High Currently in C	n Lake Mngm	on 14.62 t= 16.69 Top	e 15. of Water S	.07 15.95 (Of Short Mngmt= 12.	
Simulated Aver Difference fro			13.71 0.91		
27SEP (1965-20 Difference fro				1.80 .18	
Today Lake Oke stations	eechobee el	evation is det	ermined fi	com the 4 Int &	4 Edge
	epth (Base	d on 2007 Chan	nel Condit	ion Survey) Rou	te 1 ÷
8.56'	enth (Bage	d on 2008 Char	nel Condit	cion Survey) Rou	te 2 ÷
6.76'	Depth (base	d on 2000 chai.	mer condit	cion barvey, koa	ce z .
Bridge Clearan	100 = 48.91	1			
_					
4 Interior and 4	ł Edge Okee	chobee Lake Av	rerage (Avo	y-Daily values):	
				•	
	L006 LZ4		52 S308		
14.49 14.70	14.69 14.	59 14.69 14.	78 14.50) 14.57	
*Combination Ok	reechobee	Avg-Daily Lake	a Average =	= 14.62	
				(*See Note)	
_					
Okeechobee Inflo	ows (cfs):				
S65E	4749	C5	0	Fisheating Cr	1568
S154	45	S191	274	S135 Pumps	0
S84	524	S133 Pumps	0	S2 Pumps	0
S84X	804	S127 Pumps	61	S3 Pumps	0
S71	414	S129 Pumps	43	S4 Pumps	0
S72	84	S131 Pumps	0		
Total Inflows:	8566				
Okeechobee Outfl	ows (cfs):				
S135 Culverts		S354	0	S77	1
(Used)			Č	~	_
S127 Culverts	0	S351	0	S77Below	139 (NOT
USED)					

S129 Culverts	0	S352		0	S308	0		
(Used) S131 Culverts USED)	0	L8 Canal	Pt	197	S308Below	-99 (NOT		
Total Outflows:	198							
	****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 0.18 S308								
Lake Average Precip	itation	using NEX	KRAD: =	-NR-" =	-NR-'			
Evaporation - Precipitation: = -NR-" = -NR-" Evaporation - Precipitation using Lake Area of 730 square miles is equal to -NR-								
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.

	Headwater	Tailwater				Gat	e Pos	sition	ns	
#8	Elevation	Elevation	Disch	#1	#2	#3	#4	#5	#6 #	7
#0 (ft)	(ft-msl)	(ft-msl)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft) (f	t)
(IC)		(т) see no	ote at	bott	.om				
North East Sh	nore	(-	, 200 11	300 0.0	2000					
S133 Pumps S193:	: 13.54	14.49	0	0	0	0	0	0	(cfs)	
S191:	18.50	14.52	274	0.5	0.0	0.5				
S135 Pumps	:	-NR-	0	0	0	0	0		(cfs)	
S135 Culve	rts:		-NR-	-NR-	-NR-					
North West Sh										
	21.04	14.26				1.9				
S127 Pumps S127 Culve		14.64	61 0	0.0	0	6	12	42	(cfs)	
S129 Pumps S129 Culve		14.65	43	6 0.1	0	37			(cfs)	
S131 Pumps S131 Culve		14.74	0	0	0				(cfs)	
Fisheating nr Palmda nr Lakepo	ale	33.27	1568							

```
C5: 14.18 14.71 0 0.0 0.0 0.0
South Shore

      S4 Pumps:
      12.04
      14.74
      0
      0
      0
      0

      S169:
      14.70
      12.03
      0
      0.0
      0.0
      0.0

                                                            (cfs)
 s169:
 S310:
S3 Pumps: 9.87
14.74
            14.64
                              -130
                               0
                     14.74
                                       0 0
                                                0
                                                             (cfs)
                               0 0.0 0.0 0
                      9.87
                                      0 0 0 0
 S2 Pumps: 10.97
S351: 14.66
                     14.66
                                                            (cfs)
            14.66 10.97
14.84 10.56
-NR- 14.74
                                0 0.0 0.0 0.0
0 0.0 0.0
 S352:
C10A:
                                     0.0 8.5 8.5 8.5 8.5
 L8 Canal PT
                      14.54 197
                 S351 and S352 Temporary Pumps/S354 Spillway
                     14.66 0 -NR--NR--NR--NR--NR-
14.84 0 -NR--NR--NR-
 S351:
            10.97
 S352:
             10.56
                                0 -NR--NR--NR--NR-
 S354:
             9.87
                      14.74
Caloosahatchee River (S77, S78, S79)
 S47B: 13.35 11.25
                                     0.0 0.0
                      11.12 -3 5.0
 S47D:
             11.12
 S77:
   Spillway and Sector Flow:
             14.48 11.15 0 0.0 0.0 0.0 0.0
                                1
   Flow Due to Lockages+:
 S77 Below USGS Flow Gage 139
 S78:
   Spillway and Sector Flow:
             10.96 2.88
                              850 0.5 1.0 1.0 0.5
                                6
   Flow Due to Lockages+:
 S79:
   Spillway and Sector Flow:
            3.06 1.41 2933 1.0 2.0 2.0 2.0 2.0 2.0 2.0
1.0
   Flow Due to Lockages+:
                                 3
                              0%
   Percent of flow from S77
                   (ppm) 50
   Chloride
St. Lucie Canal (S308, S80)
   Spillway and Sector Flow:
            14.52 14.59 0 0.0 0.0 0.0 0.0 co Lockages+: 0
   Flow Due to Lockages+:
                               -99
 S308 Below USGS Flow Gage
 S153: 18.77 14.44
                              130 0.5 0.1
 S80:
   Spillway and Sector Flow:
              -NR- -NR- -NR- 0.8 0.8 0.8 0.0 0.8 0.0 0.8
```

```
Flow Due to Lockages+: -NR-
Percent of flow from S308 -NR-%

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

Speedy Point Top Salinity (mg/ml) ****

Speedy Point Top 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
aily Precipitation Totals	1-Day	3-Day	7-Day	Directio	n
peed	(inches)	(inches)	(inghog)	(Dogg)	
mph)	(Inches)	(Inches)	(Inches)	(Degø)	
S133 Pump Station:	-NR-	0.00	0 00		
S193:	-NR-		0.00	-NR-	-NR-
Okeechobee Field Station:		0.00	0.00		
S135 Pump Station:	-NR-	0.00	0.76		
S127 Pump Station:	-NR-	0.00	0.35		
S129 Pump Station:	-NR-		2.43		
-	-NR-	0.00	0.00		
S77:	0.70	0.70	0.75	189	2
S78:	33.18	56.02	56.06	97	4
S79:	0.10	0.15	1.47	170	2
S4 Pump Station:	-NR-	0.00	0.00		
Clewiston Field Station:	-NR-	0.00	0.00		
S3 Pump Station:	-NR-	0.00	0.28		
S2 Pump Station:	-NR-	0.00	0.49		
S308:	0.04	1.28	1.29	79	4
S80:	0.00	0.00	0.01	-NR-	-NR-
Okeechobee Average	0.37	0.15	0.49		
(Sites S78, S79 and	S80 not in	cluded)			
Oke Nexrad Basin Avg	-NR-	0.18	0.50		

_ Okeechobee Lake Elevations 27SEP15	s 27 SEP 2015	14.62 Difference from
27SEP15 -1 Day =	26 SEP 2015	14.59 -0.03
27SEP15 - 2 Days =	25 SEP 2015	14.56 -0.06
27SEP15 - 3 Days =	24 SEP 2015	14.52 -0.10
27SEP15 - 4 Days =	23 SEP 2015	14.49 -0.13
27SEP15 -5 Days =	22 SEP 2015	14.45 -0.17
27SEP15 - 6 Days =	21 SEP 2015	14.41 -0.21
27SEP15 -7 Days =	20 SEP 2015	14.37 -0.25
27SEP15 - 30 Days =	28 AUG 2015	12.79 -1.83
27SEP15 -1 Year =	27 SEP 2014	15.07 0.45
27SEP15 - 2 Year =	27 SEP 2013	15.95 1.33

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

				Т.	oleo ()]r.o.o.	ahahaa	Not Infl	ow (LONIN)	
			7					previous		Avg-Daily Flow
27SEP15	-	Today		age			2015	13827	MON	Avg-Daily Flow 6549
27SEP15		Day					2015	14182	SUN	6619
27SEP15		Days					2015	15586	SAT	8924
27SEP15		Days					2015	16192	FRI	6924 -NR-
27SEP15		Days					2015	15725	THU	8946
27SEP15		Days					2015	16020	WED	-NR-
27SEP15		Days					2015	15588	TUE	8667
27SEP15		Days					2015	16228	MON	12837
27SEP15		Days					2015	16226	SUN	19130
27SEP15		Days					2015	15575	SAT	38619
27SEP15		_					2015	13264	FRI	25508
27SEP15		_					2015	11964	THU	8619
27SEP15		_					2015	12117	WED	14991
27SEP15							2015	11942	TUE	6516
2,01113		Days					2013	11712	102	1 0310
						S	65E			
				Aver	rage	Flo	w over	previous	14 days	Avg-Daily Flow
27SEP15		Toda	y=		27	SEP	2015	5900	MON	4749
27SEP15	-1	Day	=		26	SEP	2015	5989	SUN	4966
27SEP15	-2	Days	=		25	SEP	2015	6071	SAT	4894
27SEP15	-3	Days	=		24	SEP	2015	6154	FRI	5193
27SEP15	-4	Days	=		23	SEP	2015	6243	THU	5605
27SEP15	-5	Days	=		22	SEP	2015	6307	WED	6173
27SEP15	-6	Days	=		21	SEP	2015	6354	TUE	6392
27SEP15	-7	Days	=		20	SEP	2015	6379	MON	6716
27SEP15	-8	Days	=		19	SEP	2015	6344	SUN	6758
27SEP15	-9	Days	=		18	SEP	2015	6294	SAT	6508
270FD1E	-10	Days	=		17	SEP	2015	6272	FRI	6333
Z/SEPIS		Darra	_		16	SEP	2015	6240	THU	6255
27SEP15 27SEP15	-11	Days	_							
		-				SEP	2015	6179	WED	6255

_ 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	C	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)
27	SEP	2015	0	3	276	1092	1697	5822
26	SEP	2015	0	12	30	751	1115	4447
25	SEP	2015	0	1	-23	378	639	5639
24	SEP	2015	0	-NR-	-129	380	652	3584
23	SEP	2015	0	-NR-	-163	378	655	6187
22	SEP	2015	15	15	18	426	1068	5693
21	SEP	2015	0	7	-233	1127	2088	8159
20	SEP	2015	0	6	-170	1722	3035	10645

18 17 16 15	SEP SEP SEP	2015 2015 2015 2015 2015	0 0 0 0	7 2 2 3 2	-125 -92 -100 -104 -111	2348 2519 763 317 428	4180 4490 1435 655 920	11500 14283 9099 8249 7294
14	SEP	2015	0	2	-230	432	864	4993
			S-310	S-351	S-352	S-354	L8 Canal Pt	
		I	Discharge	Discharge	Discharge	Discharge	Discharge	
			(ALL DAY)	(ALL DAY)	(ALL DAY)	(ALL DAY)	(ALL DAY)	
	DATE	C	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)	
27	SEP	2015	-258	0	0	0	390	
26	SEP	2015	-275	50	0	0	479	
25	SEP	2015	-196	395	0	0	505	
24	SEP	2015	-45	260	0	0	436	
23	SEP	2015	-23	67	0	0	476	
22	SEP	2015	-69	0	0	-NR-	388	
21	SEP	2015	-118	0	0	0	290	
20	SEP	2015	-155	0	0	0	262	
19	SEP	2015	-331	0	0	0	143	
18	SEP	2015	-410	0	0	0	-59	
17	SEP	2015	-100	0	0	0	194	
16	SEP	2015	-8	0	0	0	295	
15	SEP	2015	-92	0	0	0	335	
14	SEP	2015	-100	0	0	0	324	
			S-308	Below S-308	S-80			
		Т	Discharge	Discharge	Discharge	7		
			(ALL DAY)	(ALL-DAY)	(ALL-DAY)			
	DATE		(AC-FT)	(AC-FT)	(AC-FT)			
27		2015	0	-197	-NR-			
26		2015	1	-170	749			
		2015	0	-6	2062			
		2015	1	28	925			
		2015	1	33	1384			
		2015	-0	63	1730			
		2015	1	52	1727			
		2015	0	71	3040			
		2015	-2	-161	4196			
18		2015	-1	69	6942			
		2015	-1	111	3158			
					100=			

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

1395

813

696

Gate Discharges from 0700 hrs to 2100 hrs.

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

119

135

216

_

16 SEP 2015

15 SEP 2015

14 SEP 2015

-1

-0

0

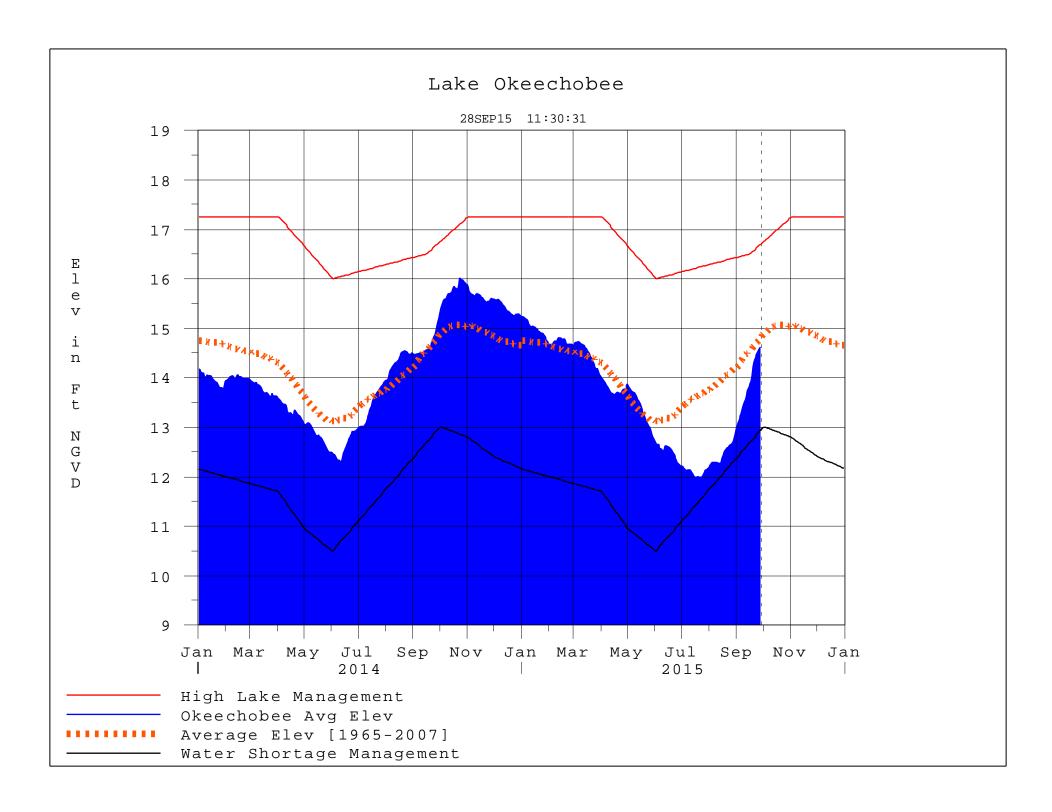
* On 11 May 1999, Lake Okeechobee Elevation was switched from Instantaneous 2400 value to an average-daily lake average.

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 28SEP2015 @ 11:15 ** 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
[[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