Application of the Lake Okeechobee Regulation Schedule (LORS2008) on 1/2/2016 (ENSO La Nina 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 <u>CPC Outlook</u>.

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 La Nina ENSO Years ³		Sub-sampling of AMO Warm + La Nina ENSO Years ⁴	
	Value (ft)	<u>Condition</u>	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition
Current (Jan- Jun)	N/A	N/A	0.27	Dry	0.17	Dry	0.19	Dry
Multi Seasonal (Jan-Oct)	N/A	N/A	2.44	Normal	2.83	Wet	2.14	Normal

*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:

-1747 cfs 14-day running average for Lake Okeechobee Net Inflow through 1/1/2017. According to the classification in <u>Tributary Hydrologic Conditions</u> table, this condition is Dry.

-1.63 for Palmer Index on 12/31/2016.

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 1/1/2017

Lake Okeechobee Stage: 14.26 feet

USACE Report for Lake Okeechobee

Lake Okeechobee Stage Hydrograph

Lake Okeechob Zone/	ee Management /Band	Bottom Elevation (feet, NGVD)	Current Lake Stage
High Lake Manage	ement Band	17.25	
Operational Band	High sub-band	16.88	
	Intermediate sub-band	16.25	
	Low sub-band	14.00	← 14.25
Base Flow sub-ba	nd	12.60	
Beneficial Use sub	o-band	12.15	
Water Shortage M	lanagement Band		

Part C of LORS2008: Discharge to WCA's

Release Guidance Flow Chart Outcome: No releases to the WCAs.

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

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LORS2008 Implementation on 1/2/2017 (ENSO La Nina Condition):

Status for week ending 1/2/2016:

District wide, Raindar rainfall was 0.06 inches for the week. Lake stage on 1/2/2017 was 14.26 ft, down 0.15 ft from last week.

The updated December 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 **Dry**. The PDSI indicates dry condition and the LONIN is Dry. 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	-1.63 (Dry)	М
	CPC Procinitation Outlook	1 month: Below Normal	М
LOK	CFC Frecipitation Outlook	3 months: Below Normal	М
	LOK Seasonal Net Inflow Outlook ENSO La Nina Years	0.17 ft (Dry)	М
	LOK Multi-Seasonal Net Inflow Outlook ENSO La Nina Years	2.83 ft (Normal)	М
	WCA 1: Site 1-7, Site 1-8T, & Site 1-9 Average	Above Line 1 (16.51 ft)	L
WCAs	WCA 2A: Site 2-17 HW	Above Line1 (12.20 ft)	L
	WCA-3A: 3 Station Average (Site 63, 64 and 65)	Above Line 1 (9.86 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 outlooks use slightly different classification intervals than those used by the 2008-LORS.

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Lake Okeechobee SFWMM Dec 2016 Dynamic Position Analysis



Tue Jan 2 9:15:47 EST 2016

Tributary Basin Condition Indicators as of January 2 2017

Palmer Index



Tue Jan 03 09:02:46 EST 2017

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)



Lake Okeechobee Water Level History and Projected Stages



Adopted by USACE 28-April-2008

Projected Stage Percentiles From SFWMD-HESM Position Analysis

U. S. Army Corps of Engineers, Jacksonville District Lake Okeechobee and Vicinity Report ** Preliminary Data - Subject to Revision ** Data Ending 2400 hours 02 JAN 2017 Okeechobee Lake Regulation Elevation Last Year 2YRS Ago (ft-NGVD) (ft-NGVD) (ft-NGVD) *Okeechobee Lake Elevation 14.25 14.73 15.23 (Official Elv) Bottom of High Lake Mngmt= 17.25 Top of Water Short Mngmt= 12.14 Currently in Operational Management Band Simulated Average LORS2008 [1965-2000] 13.62 Difference from Average LORS2008 0.63 02JAN (1965-2007) Period of Record Average 14.74 Difference from POR Average -0.49 Today Lake Okeechobee elevation is determined from the 4 Int & 4 Edge stations ++Navigation Depth (Based on 2007 Channel Condition Survey) Route 1 ÷ 8.19' ++Navigation Depth (Based on 2008 Channel Condition Survey) Route 2 ÷ 6.39' Bridge Clearance = 49.31' 4 Interior and 4 Edge Okeechobee Lake Average (Avg-Daily values): L001 L005 L006 LZ40 S4 S352 S308 S133 14.16 14.24 14.22 14.25 14.30 14.39 14.21 14.24 *Combination Okeechobee Avg-Daily Lake Average = 14.25 (*See Note) Okeechobee Inflows (cfs): Fisheating Cr S65E 501 C5 -100 2 S191 S135 Pumps S154 0 0 0 0 S84 0 S133 Pumps S2 Pumps 0 0 0 0 S84X S127 Pumps S3 Pumps 0 0 S71 0 S129 Pumps S4 Pumps S72 0 0 S131 Pumps Total Inflows: 403 Okeechobee Outflows (cfs): S135 Culverts 0 S354 392 S77 981 S127 Culverts 0 S351 262 S77Below 933 S129 Culverts 0 S352 138 S308 -NR-S131 Culverts 0 L8 Canal Pt 277 S308Below 29 Total Outflows: No Report Due To Missing S77 or S308 Discharge Data

****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 0.20 S308 0.13 Average Pan Evap x 0.75 Pan Coefficient = 0.12" = 0.01' Lake Average Precipitation using NEXRAD: = 0.00" = 0.00' Evaporation - Precipitation: = 0.12" = 0.01'Evaporation - Precipitation using Lake Area of 730 square miles is equal to 2429 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 #8 (ft-msl) (ft-msl) (cfs) (ft) (ft) (ft) (ft) (ft) (ft) (ft) (I) see note at bottom North East Shore 14.21 0 0 0 0 0 0 (cfs) S133 Pumps: 13.32 S193: 0 0.0 0.0 0.0 S191: 18.27 14.20 S135 Pumps: 13.08 0 0 0 0 0 14.18 (cfs) 0.0 0.0 0 S135 Culverts: North West Shore S65E: 21.00 14.03 501 0.3 0.2 0.3 0.2 0.3 0.2 S127 Pumps: 12.91 14.27 0 0 0 0 0 0 (cfs) S127 Culvert: 0 0.0 0 S129 Pumps: 12.86 14.32 0 0 0 (cfs) S129 Culvert: 0 -NR-S131 Pumps: 12.78 14.30 0 0 0 (cfs) S131 Culvert: 0 Fisheating Creek nr Palmdale 28.17 2 nr Lakeport C5: 14.28 14.36 -100 5.3 5.3 5.3 South Shore S4 Pumps:11.1914.320000S169:14.3011.1800.00.00.0 0 0 0 (cfs)

S310:	14.18		15							
S3 Pumps:	10.91	14.30	0	0	0	0			(cfs)
S354:	14.30	10.91	392	0.7	0.9					
S2 Pumps:	10.86	14.29	0	0	0	0	0		(cfs)
S351:	14.29	10.86	262	0.4	0.6	0.4				
S352:	14.41	10.83	138	0.1	0.2					
C10A:	-NR-	14.29		0.0	8.0) 8.0) 8	3.0	8.0	
L8 Canal PT	1	14.14	277							
	S351	and S35	52 Tempor	ary Pu	mps/S3	54 Sp:	llwa	ıy		
S351:	10.86	14.29	262	-NR1	NRNF	RNR	-NR	NR-		
S352:	10.83	14.41	138	-NR1	NRNF	RNR-				
S354:	10.91	14.30	392	-NR1	NRNF	RNR-				
aloosahatche	e River (S	77. 578	S79)							
S47B:	12.81	11.15	/	0.0	0.0					
S47D:	11.16	11.16	44	6.0						
s77:	±±•±0	±±•±0	11	0.0						
Spillway	and Sector	Flow:								
SE = 1 + 1 0 4 Y	14.25	11.29	976	0.0	4.0 0	0.0	. 0			
Flow Due	to Lockage	s+:	5							
S77 Below U	ISGS Flow G	age	933							
S78:										
Spillway	and Sector	Flow:								
	11.06	3.05	644	1.0	0.0	0.0	1.0			
Flow Due	to Lockage	s+:	9							
S79:	_	_								
Spillway	and Sector	Flow:								
_	2.99	0.98	722	0.0	0.0	0.0	0.8	1.0	1.0	0.0
.0			_							
Flow Due	to Lockage	s+:	8							
Percent c	of flow from	m S77	1358	5						
Chloride		(ppm)	56							
t. Lucie Can	al (S308,	S80)								
S308:										
Spillway	and Sector	Flow:								
	14.23	14.19	0	0.0	0.0 0	0.0 0.	. 0			
Flow Due	to Lockage	s+:	-NR-							
S308 Below	USGS Flow	Gage	29							
S153:	18.32	13.90	0	0.0	0.0					
S80:										
Spillway	and Sector	Flow:								
_ •	14.23	0.58	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flow Due	to Lockage	s+:	20							
Percent o	of flow from	m S308	NA %							
			0							
Steele Poin	it Top Sali:	nity	(mg/ml)	* * * *						
Steele Poin	t Bottom S	alinity	(mg/ml)	* * * *						

_				W	ind
_					IIIQ
Daily Precipitation Totals Speed	1-Day	3-Day	7-Day	Directi	on
	(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:	0.00	0.00	0.32	176	2
S78:	0.00	0.00	0.00	126	4
S79:	0.03	0.03	0.03	213	4
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	0.00	0.03	270	0
S80:	0.00	0.00	0.00	199	3
Okeechobee Average	0.00	0.00	0.03		
(Sites S78, S79 and	S80 not inc	luded)			

+ Flow Due to lockages is computed utilizing average daily headwater and

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

_								
Okeechobee	Lake Ele	vations	02	JAN	2017	14.2	25 Difference	from
02JAN17								
02JAN17	-1 Day	=	01	JAN	2017	14.2	26	0.01
02JAN17	-2 Days	s =	31	DEC	2016	14.2	27	0.02
02JAN17	-3 Days	s =	30	DEC	2016	14.2	29	0.04
02JAN17	-4 Days	s =	29	DEC	2016	14.3	37	0.12
02JAN17	-5 Days	s =	28	DEC	2016	14.3	88	0.13
02JAN17	-6 Days	5 =	27	DEC	2016	14.4	10	0.15
02JAN17	-7 Days	5 =	26	DEC	2016	14.4	10	0.15
02JAN17	-30 Days	5 =	03	DEC	2016	14.7	0	0.45
02JAN17	-1 Year	=	02	JAN	2016	14.7	3	0.48
02JAN17	-2 Year	=	02	JAN	2015	15.2	23	0.98

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

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	La	ake Oke	echobee	Net Inflo	ow (LONIN)		
	Average	Flow o	ver the	previous	14 days	Avg-Daily F	low
02JAN17 To	oday =	02 JA	N 2017	-1784	TUE	-139	
02JAN17 -1 E	Day =	01 JA	N 2017	-1728	MON	37	
02JAN17 -2 D	Days =	31 DE	C 2016	-1747	SUN	-2195	
02JAN17 -3 D	Days =	30 DE	C 2016	-1608	SAT	-14397	
02JAN17 -4 D	Days =	29 DE	C 2016	-920	FRI	867	
02JAN17 -5 D	Days =	28 DE	C 2016	-1058	THU	-1630	
02JAN17 -6 D	Days =	27 DE	C 2016	-1010	WED	2521	
02JAN17 -7 D	Days =	26 DE	C 2016	-1232	TUE	-2658	
02JAN17 -8 D	Days =	25 DE	C 2016	-972	MON	-2340	
02JAN17 -9 D	Days =	24 DE	C 2016	-208	SUN	1813	
02JAN17 -10 D	Days =	23 DE	C 2016	-507	SAT	-1858	
02JAN17 -11 D	Days =	22 DE	C 2016	-1029	FRI	-1805	
02JAN17 -12 D	Days =	21 DE	C 2016	-1191	THU	-1696	
02JAN17 -13 D	Days =	20 DE	C 2016	-675	WED	-1499	

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_											
						Se	55E				
					Average	Flov	v over	previous	14 days	Avg-Daily	Flow
	02JAN17		Today	7=	02	JAN	2017	769	TUE	593	
	02JAN17	-1	Day	=	01	JAN	2017	789	MON	598	
	02JAN17	-2	Days	=	31	DEC	2016	807	SUN	610	
	02JAN17	-3	Days	=	30	DEC	2016	824	SAT	656	
	02JAN17	-4	Days	=	29	DEC	2016	839	FRI	661	
	02JAN17	-5	Days	=	28	DEC	2016	858	THU	678	
	02JAN17	-6	Days	=	27	DEC	2016	875	WED	752	
	02JAN17	-7	Days	=	26	DEC	2016	888	TUE	830	
	02JAN17	-8	Days	=	25	DEC	2016	896	MON	866	
	02JAN17	-9	Days	=	24	DEC	2016	899	SUN	867	
	02JAN17	-10	Days	=	23	DEC	2016	903	SAT	873	
	02JAN17	-11	Days	=	22	DEC	2016	906	FRI	930	
	02JAN17	-12	Days	=	21	DEC	2016	904	THU	936	
	02JAN17	-13	Days	=	20	DEC	2016	897	WED	913	

_					
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	2	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)
02	JAN	2017	1945	1851	1296	1447
01	JAN	2017	2233	2187	1303	1610
31	DEC	2016	1796	1710	1066	1619
30	DEC	2016	1216	1144	602	1338
29	DEC	2016	1530	1522	606	538
28	DEC	2016	1990	1229	793	625
27	DEC	2016	1930	608	936	936
26	DEC	2016	1875	868	942	1518
25	DEC	2016	2142	1668	1310	1793
24	DEC	2016	2001	1542	1571	2011
23	DEC	2016	1426	1292	1175	1692
22	DEC	2016	1152	1027	305	518
21	DEC	2016	1164	1044	307	487

20	DEC	2016	1187	1102	494	1153			
			S-310	S-351	S-352	S-354	L8 Canal	. Pt	
]	Discharge	Discharge	Discharge	Discharge	Discharg	le	
			(ALL DAY)	(ALL DAY)	(ALL DAY)	(ALL DAY)	(ALL DAY	[)	
	DATE	2	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)	(AC-FT)		
02	JAN	2017	29	520	274	672	550		
01	JAN	2017	70	543	145	658	538		
31	DEC	2016	49	571	268	666	559		
30	DEC	2016	167	1154	787	1323	581		
29	DEC	2016	127	1237	966	1575	619		
28	DEC	2016	74	1194	892	1172	622		
27	DEC	2016	-10	1561	773	1093	617		
26	DEC	2016	55	875	355	403	571		
25	DEC	2016	12	740	387	414	571		
24	DEC	2016	20	656	258	438	584		
23	DEC	2016	-1	1083	855	946	597		
22	DEC	2016	22	1222	823	1108	618		
21	DEC	2016	72	1325	668	1309	650		
20	DEC	2016	39	1503	736	1344	629		
			S-308	Below S-308	S-80				
]	Discharge	Discharge	Discharge	2			
			(ALL DAY)	(ALL-DAY)	(ALL-DAY)	1			
	DATE	2	(AC-FT)	(AC-FT)	(AC-FT)				
02	JAN	2017	-NR-	57	39				
01	JAN	2017	0	200	31				
31	DEC	2016	0	273	30				
30	DEC	2016	-NR-	53	23				
29	DEC	2016	-NR-	-275	63				
28	DEC	2016	0	56	55				
27	DEC	2016	450	348	50				
26	DEC	2016	1	255	15				
25	DEC	2016	0	177	8				
24	DEC	2016	1	117	15				
23	DEC	2016	0	142	37				
22	DEC	2016	-0	221	38				
21	DEC	2016	0	238	-NR-				
20	DEC	2016	0	111	-NR-				
* * :	* N()TE:	Dischar	ge (ALL DAY) is comput	ed using	Spillway,	Sector	Gate
and	נ		Lockage	s Discharge	s from 0015	5 hrs to 2	2400 hrs.		
_									
(-	、 .			1					

(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 03JAN2017 @ 08:45 ** 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

<u>6-15 Day Precipitation Outlook Categories</u>

Table ?? in the Lake Okeechobee Water Control Plan

<u>Classification of Lake Okeechobee Net Inflow for Seasonal</u>

<u>Outlook</u>

 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
		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