To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Tommy Strowd, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N.<sup>\*</sup>. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report REVISED

Reporting Period: December 31, 2013 – January 6, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system. **REVISED to correct Lake Okeechobee flows to S77.** 

**Caloosahatchee Condition Summary:** Flows over the past 7 days averaged 406 cfs at S79 due to three days of no flow. The 30-day moving average of surface salinity at the SCCF Fort Myers Yacht Basin sensor is **10.2 psu**. Despite projections indicating a low chance of water shortage this year, beneficial make up releases to the Caloosahatchee have been discontinued resulting in salinities trending too high for tape grass and oyster recovery.

**USACE Action:** On Tuesday, 1/7/14 a 10-day pulse was initiated, with average flows of 650 cfs including two days of no flow at the end of the pulse.

**Recommendation:** Rising salinity at Fort Myers, exceeding 10 psu on a 30 day moving average, reflects the fact that average flows above 650 cfs are needed to maintain salinity below 10 psu at Fort Myers to prevent harm. We request that make up releases be utilized to provide flows to support healthy conditions in the Caloosahatchee for tape grass and oyster health.

Lake Okeechobee Level:	14.09 ft. (Low Sub-Band)		Last wk: <b>14. 20 ft</b>		
Lake Okeechobee Inflow:	270 cfs	Lake C	Okeechobee Outflow:	2,077 cfs	
Weekly Rainfall:	WP Franklin 0.89"	Ortona 0.47"	Moore Haven 0.35"		
Salinity Fort Myers:	8.2 – 13 psu SCCF Ft. Mye	ers Yacht Basin	Previous wk: 7.1- 14 p	su	
MFL Status:	<b>10.2</b> psu 30 day moving av	verage Fort Myers (SC	CF sonde) MFL target	<u>&lt;</u> 10 psu	
	10 – 18 psu (SCCF RECON	Marker 52)	Previous wk 8.6 - 18 p	osu	
Salinity Beautiful Island:	3.5 - 6.2 psu (SCCF RECON	Marker 18)	Previous wk <b>3.2 - 5.8 p</b>	osu	
Salinity Shell Point:	<b>22 – 33</b> psu (SCCF RECON)		Previous wk: 20 – 33	psu	



Flow Dynamics: Flows at S79 over the last 7 days averaged 406 cfs and over the 10 day pulse averaged 749 cfs. Over the 10 day pulse 2 % of Lake Okeechobee outflows were delivered to the Caloosahatchee via S77.

Δ	COE E	ecembe	r 28, 2013 P	ulse Releas	e	SCCF Sonde Surface Salinity at Fort Myers Yacht Basin
Date	Day	Pulse	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	25 20 1 day harm threshold
12/28/13	1	1200	1020	678	688	
12/29/13	2	1600	1554	1123	1020	<b>S</b> 15
12/30/13	3	1200	2076	1272	1260	> 30 day harm threshold
12/31/13	4	800	1404	917	1040	E Maria Maria Maria Maria Maria
1/1/14	5	600	585	595	812	Bro Monauth Mar M. J
1/2/14	6	400	399	268	492	
1/3/14	7	400	460	51	112	salinity —
1/4/14	8	300	0	0	104	30D MA
1/5/14	9	0	0	0	194	
1/6/14	10	0	0	0	184	ane she ane she she have he he have
10 day Av		650	749	490	590	

Upstream of S79/Franklin Conditions: On 1/7/14, chlorides measured 65 mg/L and apparent color was 71 CU.

**Upper Estuary Conditions:** Near Old Bridge Park, where tape grass was present on 1/01/14, the salinities have been occasionally exceeding 10 psu. The oligohaline zone extends from S79 to I75 but the salinity gradient is truncated at S79 (3.1 psu). **Color levels (CDOM) are too high for submersed plants at depth in the oligohaline area.** 

**Lower Estuary Condition:** Seagrass shoots at two sites near the Sanibel Causeway were covered with epiphytic algae (dominantly *Polysiphonia*) 1/05/14. Drift macroalgae continued washing up on the shore of San Carlos Bay (*Acanthophora, Gracilaria, Dasya, Polysiphonia, Agardhiella, Ceramium, Hypnea, Laurencia, Tiffaniella, Sargassum, Rosenvigea, Feldmannia*, and *Enteromorpha, and Bryopsis,* were present 1/05/14.

# McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:

The SCCF Marine Laboratory installed a RECON station at the USGS platform on 12/18/13 and the raw data will be available on the RECON website soon.

*Red Tide:* The Florida Fish and Wildlife Conservation Commission (FWC) reported no *Karenia brevis*, the Florida red tide organism, in samples from 1/3/14.

**Manatees:** Lee County Manatee Park staff report over 100 manatees congregating in the warm water of the FPL canal since Saturday. With the cold temperatures adult to calf ratio was much higher than the past week. Nursing calves and newborns accounting for 8 - 9 %. Also spotted, a mating herd.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
31 Bridge	4.8	191	0.8	0.84
Fort Myers	4.0	139	1.1	1.03
Colonial Br.	4.7	102	2.8	1.13

Target light penetration: CE- Caloosahatchee Estuary =1 m

SCB-San Carlos Bay = 2.2 meters

Definition of 25% lz: **z where I is 25% of surface I.** I = irradiance, **z**= depth



Manatee at Lee County Manatee Park warm water refuge 1/7/14. Photo Wallace Campbell.

# Caloosahatchee Estuary

Fort Myers Surface Salinity 30 **salinity (30 dma psu)** 12 10 12 2 00-01 06-07 11-12 Harm level 13-14 12-13 5 04-05 0 15:101 26.1.124 18:5eR 3.set 6.49 1.10 21.De 15.Fet Annual Comparison of Dry Season Surface Salinity in the Caloosahatchee at the Fort Myers Yacht Basin (SFWMD 2006-2013 and SCCF 2013-2014)

2006-07 limited by missing SFWMD data



Macroalgae growing on hard substrate and seagrass blades 1/07/14 in shallows of San Carlos Bay. Photo SCCF

ACOE Daily Reports					
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
12/31/13	Tues	1404	917	1040	
1/1/14	Wed	585	595	812	
1/2/14	Thurs	399	268	492	
1/3/14	Fri	460	51	112	
1/4/14	Sat	0	0	104	
1/5/14	Sun	0	0	194	
1/6/14	Mon	0	0	184	
7 Day	Avg	406	261	419	



Decomposing macroalgae along San Carlos Bay shoreline 1/05/14. Photo SCCF

Page 3 of 3

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Tommy Strowd, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: January 7 - 13, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** The consequences of four months of massive nutrient loaded flows to the Caloosahatchee during the summer of 2013 are washing up on Sanibel Island and Fort Myers Beach in the form of drift algae. Legacy nutrients from the excessive summer releases are fueling substantial drift algal bloom wracks 12 -18 inches deep and several miles long on Sanibel Island and Fort Myers Beach. Heavy winds and wave conditions with associated cold fronts will likely continue to push macroalgae wracks onto the beaches. These drift algae strandings are causing odor and nuisance complaints from visitors and residents. At the same time, increasing salinities in the upper estuary are impacting recovery of freshwater tape grass.

**USACE Action:** On Tuesday, 1/7/14 a 10-day pulse was initiated, with average flows of 650 cfs including two days of no flow at the end of the pulse.

**Recommendation:** Despite projections indicating a low chance of water shortage this year, beneficial make-up releases to the Caloosahatchee Estuary have been discontinued resulting in salinities trending too high for tape grass and oyster recovery. We request that make-up releases be utilized to provide flows to support healthy conditions in the Caloosahatchee Estuary for tape grass and oyster survival and recovery.

Lake Okeechobee Level:	14.04 ft. (Low Sub-Band)		Last wk: <b>14.09 ft</b>	
Lake Okeechobee Inflow:	389 cfs	Lake	Okeechobee Outflow:	1,155 cfs
Weekly Rainfall:	WP Franklin 0.26"	Ortona 0.27"	Moore Haven 0.23"	
Salinity Fort Myers:	7.3 - 14 SCCF Ft. Myers Ya	acht Basin	Previous wk: <b>8.2 – 1</b> 3	psu
MFL Status:	<b>10.1</b> psu 30 day moving av	verage Fort Myers (SC	CCF sonde) MFL targe	et <u>&lt;</u> 10 psu
	ND (SCCF RECON Marker 52	2)	Previous wk 10 – 18	psu
Salinity Beautiful Island:	2.9 - 5.7 psu (SCCF RECON	l Marker 18)	Previous wk <b>3.5 - 6.2</b>	psu
Salinity Shell Point:	<b>20 – 32</b> psu (SCCF RECON)	1	Previous wk: 22 - 33	psu
			and alp	



Flow Dynamics: Flows at S79 over the last 7 days of the 10 day pulse averaged **855 cfs** representing **25%** of Lake Okeechobee outflows delivered to the Caloosahatchee via S77. However, this past week extremely high, unseasonable rainfall (**20+** inches) east of the lake reduced water demand south and east of Lake Okeechobee.

ACOE January 7, 2014 Pulse Release					
Date	Day	Pulse	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)
1/7/14	1	1200	812	492	716
1/8/14	2	1600	1511	1006	1004
1/9/14	3	1200	1355	860	790
1/10/14	4	800	868	535	516
1/11/14	5	600	574	285	278
1/12/14	6	400	487	176	121
1/13/14	7	400	382	216	94
1/14/14	8	300			
1/15/14	9	0			
1/16/14	10	0			
10 day Av		650			



# Flow and Nutrient Load Effects:

Flows from the two most recent high flow years of 2005 and 2013 are graphed at right. In the active hurricane season of 2005, a greater percentage of flows originated from Lake O than in the rain driven flooding event of 2013. (Flow data USACOE)

A comparison of total nitrogen and total phosphorus loading into the Caloosahatchee Estuary at S79, graphed below, shows the dramatic increase in nutrient loading in the two high flow years compared to the low flow/drought year of 2001 & historical averages from 20 years 1966-1984. (\* *2013 data to November 10, 2013*) (Data: Average 1966-1984 from Hammett 1988, other years from SFWMD DBHYDRO)

As predicted, nutrient loading has fueled a massive drift algae response that has

covered bay bottoms. The algae is now breaking off from nearshore and offshore hard bottom substrates and is washing up on coastal beaches producing odors, respiratory irritation and devastating economic impacts as Southwest Florida's tourism moves into high season.







Fort Myers Beach inundated with drift algae 12-18" deep over 4 miles of beach on 1/14/14. This is generating many visitor complaints. Photo Town of Fort Myers Beach



Upstream of S79/Franklin Conditions: On 1/14/14, chlorides measured 68 mg/L and apparent color was 64 CU.

**Upper Estuary Conditions:** Near Old Bridge Park, where tape grass was present on 1/1/14, salinities have been occasionally exceeding 10 psu. The oligohaline zone extends from S79 to west of Beautiful Island but the salinity gradient is truncated at S79. Color levels are too high for submerged plants at depth in the oligohaline zone.

**Lower Estuary Condition:** Drift algae strandings along Sanibel Island beaches have been increasing in intensity and biovolume. Estuarine macroalgae are washing up on shorelines within the estuary and nearshore macroalgae are washing up along the beaches. Drift algae washing up on Sanibel Island beaches and at the boat ramp on 1/13/14 include: *Acanthophora, Gracilaria, Dasya, Polysiphonia, Agardhiella, Hypnea, Laurencia, Halymenia, Sargassum, Rosenvigea*.

On Fort Myers Beach moderate to heavy wracks of drift algae have washed up on over four miles of beaches. Clean up crews have begun to remove drift algae from the beach. Staff has received multiple public complaints and media inquiries, including this Fort Myers New-Press article <u>http://www.news-press.com/apps/pbcs.dll/article?AID=2014301140015</u>

# McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:

The SCCF Marine Laboratory installed a RECON station at the USGS platform on 12/18/13 and the raw data will be available on the RECON website soon.

*Red Tide:* The Florida Fish and Wildlife Conservation Commission (FWC) reported no *Karenia brevis*, the Florida red tide organism, in samples from 1/3/14.

**Manatees:** An FPL survey on 1/8/14 counted 321 manatees in the warm water refuge of the canal off the Orange River which represented 61% of manatees counted at facilities across the state that day. Approximately 12 – 20% of manatees taking refuge at the FPL canal and Orange River are calves. Lee County Manatee Park staff observed two mating herds in the canal and river. On Monday, 1/13/14, a cold stressed manatee was successfully rescued from the Davis boat ramp and transported to Lowry Zoo in Tampa. On 1/814 FWC staff tagged and released two rehabilitated sub adult manatees previously rescued on the west coast, (Cheeno and Woodstock). They can be tracked at www.wildtracks.org.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
31 Bridge	4.7	183	1.8	0.86
Colonial Br.	3.8	112	1.1	1.18
San Carlos Bay	3.8	31	3.5	1.67

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters Definition of 25% *Iz*: **z where I is 25% of surface I**. **I** = irradiance, **z**= depth





Large volumes of drift algae washing ashore along Sanibel Beaches 1/1314. Pointe Santo Condo and Buttonwood Lane Beaches. Photos City of Sanibel

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: October 28 – November 3, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

Caloosahatchee Condition Summary: The oligonaline zone extends to Fort Myers. Flows to the estuary at S79 averaged 1,000 cfs. Flows are currently in the suitable range for tape grass in the upper estuary and oysters in the lower estuary, but light levels remain too low to sustain submerged aquatic vegetation at depth due to high CDOM.

**USACE Action:** On 10/31/14 the USACE initiated a 7-day pulse release targeting average flows of **1,000 cfs** to the Caloosahatchee estuary measured at S79.

**Recommendation:** With drier conditions we recommend maintaining flows between **800** - **1,000 cfs** to meet established ecological targets within the estuary.

Lake Okeechobee Level:	15.72 ft. (Low Sub-Band)		Last wk: <b>15.93 ft</b> .		
Lake Okeechobee Inflow:	736 cfs	Lake Oke	echobee Outflow: 2,560 cfs		
Weekly Rainfall:	WP Franklin 0.0"	Ortona 0.0"	Moore Haven 0.0"		
Salinity Fort Myers:	<b>4.8 – 13 psu</b> (SCCF RECC	N Marker 52)	Previous wk <b>4.3 - 9.4</b> psu		
Salinity Beautiful Island:	<b>0.7- 1.7 psu</b> (SCCF RECO	N Marker 18)	Previous wk 0.3-1.3 psu		
Salinity Shell Point:	<b>15 – 31 psu</b> (SCCF RECO	N)	Previous wk: <b>15 – 31</b> psu		



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 over the past 7 days averaged **1,000 cfs.** The past 14 days, approximately **35%** of total Lake Okeechobee outflows were delivered to the Caloosahatchee at S77.

ACOE October 31, 2014 Pulse Release						
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
10/31/2014	1	1400	1018	714	1282	
11/1/2014	2	1600	1562	992	1660	
11/2/2014	3	1300	1445	1090	1113	
11/3/2014	4	1000	1135	796	1040	
11/4/2014	5	800				
11/5/2014	6	600				
11/6/2014	7	300				
7 day avg		1000				



**Upstream of S79/Franklin Conditions:** On 11/4/14 at the Olga Water Treatment plant, chlorides measured **76 mg/L**, apparent color was **162 CU** and turbidity measured **0.58 NTU**.

**Upper Estuary Conditions:** A bloom of *Skeletonema sp.* near the Fort Myers RECON returned during the week (20 µg chl). Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass but **light levels are too low to sustain submerged aquatic vegetation at depth.** The oligohaline zone extends to Fort Myers.

Lower Estuary Condition: The salinity at Iona (11 psu) was below optimal for oyster health. The average salinity at Shell Point (22 psu) was in the optimal range for oysters. A bloom of *Skeletonema sp.* was present at the Colonial Bridge on 11/2/14. Light levels are too low to sustain submerged aquatic vegetation at depth from Iona to the Sanibel Causeway.

**Red Tide:** On 11/3/14 low and medium concentrations of *Karenia* were found in Pine Island Sound (reported by FWRI). On 10/30/14, SCCF reported high *Karenia* spp. concentrations of 1.1 million cells/L at the Sanibel Boat Ramp.

Other SCCF samples around Sanibel have had low or zero *Karenia* concentrations over the week. *Karenia* concentration at Tarpon Beach was 50,000/L (low) on 10/30/14.



On 10/31/14 FWC reported *Karenia brevis* concentrations ranged from background to medium in the offshore and along shore areas and from background to low in Pine Island Sound.





McIntyre Creek & Tarpon Bay in J.N. "*Ding*" Darling NWR: Over the last week, salinity at McIntyre Creek increased to 31.5 psu and CDOM decreased to 29.5 qse. Salinity at Tarpon Bay increased to 30.5 psu and CDOM increased to 32.5 qse. Salinity at both locations is below or in the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% dept (mete	lo th ers)	
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2		
Colonial Br.	14.6	231	7.3	0.5	8	
lona	7.9	198	5.9	0.69		
Causeway	Causeway 3.6 57 0.4		0.4	1.7	3	
Target light p	enetration: CE-	Caloosahat	chee Estuary	=1 m		
<b>SCB</b> -San Carlos Bay = 2.2 meters						
Definition of 25% Iz: <b>z where I is 25% of surface I.</b> I = irradiance, <b>z</b> = depth						

ACOE Daily Reports					
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
10/28/2014	Tues	824	491	631	
10/29/2014	Wed	614	488	638	
10/30/2014	Thur	399	294	667	
10/31/2014	Fri	1018	714	1282	
11/1/2014	Sat	1562	992	1660	
11/2/2014	Sun	1445	1090	1113	
11/3/2014	Mon	1135	796	1040	
7 Day	Avg	1000	695	1004	

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Tommy Strowd, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: January 14 - 20, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** For the past 5 weeks the salinities have exceeded the MFL "harm" threshold of 10 psu. Legacy nutrients from the summer's high flows continue to feed algal blooms within San Carlos Bay and Pine Island Sound and along the hard bottom surfaces within the Gulf of Mexico and are washing up on coastal beaches during cold fronts.

**USACE Action:** On Friday, 1/17/14 a 10-day pulse was initiated, with average flows of 650 cfs including two days of no flow at the end of the pulse.

**Recommendation:** The Caloosahatchee is the only user currently being cut back from water needed to protect the estuary's resources. We recommend supplemental flows be provided to keep salinity in the upper estuary below the 10 psu 30-day moving average harm threshold. Projections show only a 10% probability that Lake levels will fall into the Water Shortage Management Band by June 1. Current water management protocols are causing harm even though sufficient water supplies are available for all users.

Lake Okeechobee Level:	13.91 ft. (Low Sub-Band)		Last wk: 14.04 ft	
Lake Okeechobee Inflow:	336 cfs	Lake Okeecho	bee Outflow:	1,774 cfs
Weekly Rainfall:	WP Franklin 0.18"	Ortona 0.0"	Moore Haven	0.0"
Salinity Fort Myers:	8.7 - 13 SCCF Ft. Myers Ya	cht Basin	Previous wk: 7	.3 - <mark>14</mark> psu
MFL Status:	MFL Violation 7 <sup>th</sup> Consecu 30 day moving average > 10	<mark>itive Year</mark> 0 psu Fort Myers (SCC	CF sonde) 10.3	psu = 35 days
	ND (SCCF RECON Marker 52	2)	Previous wk N	D
Salinity Beautiful Island:	3.5 - 6 psu (SCCF RECON M	arker 18)	Previous wk 2.	9 - 5.7 psu
Salinity Shell Point:	23 - 32 psu (SCCF RECON)		Previous wk: 2	20 – 32 psu
			to an	



# Caloosahatchee Estuary

### Page 2 of 3

**Flow Dynamics:** Flows at S79 over the last 10 day pulse averaged 667 cfs representing 25% of Lake Okeechobee outflows delivered to the Caloosahatchee via S77. Flows the past 7 days at S79 were 778 cfs.

ACOE January 7, 2014 Pulse Release						
Date	Day	Pulse	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
1/7/14	1	1200	812	492	716	
1/8/14	2	1600	1511	1006	1004	
1/9/14	3	1200	1355	860	790	
1/10/14	4	800	868	535	516	
1/11/14	5	600	574	285	278	
1/12/14	6	400	487	176	121	
1/13/14	7	400	382	216	94	
1/14/14	8	300	502	320	505	
1/15/14	9	0	184	172	664	
1/16/14	10	0	0	0	382	
10 day Av		650	667	406	507	



Upstream of S79/Franklin Conditions: On 1/21/14, chlorides measured 65 mg/L and apparent color was 66 CU.

**Upper Estuary Conditions:** Near Old Bridge Park, where tape grass was present on 1/1/14, the salinities have been occasionally exceeding 10 psu. The oligohaline zone extends from S79 to west of Beautiful Island but the salinity gradient is truncated at S79. Water column chlorophyll was elevated at Colonial Bridge due to a diatom bloom (1.6 million filaments/L of *Chaetoceros* sp.).

**Lower Estuary Condition:** Macroalgae and epiphytic algae are at problematic levels in some areas. Estuarine macroalgae was still piling up at Punta Rassa on 1/19/14. Tall *Sargassum* was growing on rocks and dense epiphytes (*Polysiphonia* spp.) were growing on seagrasses along the causeway 1/19/14. Low levels of drift algae (*Gracilaria* spp., *Agardhiella*, and *Eucheuma*) were present along Sanibel beaches 1/20/14. Drift algae accumulations were present in some Pine Island Sound seagrass meadows. Macroalgae has also been present on Sanibel's beaches from Lighthouse Beach to Gulfside Park following cold fronts.

# McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:

Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. A filamentous green algae is prevalent in the refuge impoundments (particularly in the west impoundment) and water remains darkly colored with low light conditions. Similar conditions occurred within the refuge after high flows in 2005.

*Manatees:* Over 200 manatees were reported using the warm water refuge of the FPL discharge canal and Orange River the past week including three radio tagged manatees and 15 calves. A flyer about tagged manatees from Lee County Park staff is attached. Rehabilitated, released manatees can be tracked at: <u>www.wildtracks.org</u>.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)	
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m	
Colonial Br.	16.2	103	1.5	1.09	
San Carlos Bay	3.7	40	2.9	1.63	
Sanibel Ramp	1.63				
Target light penetr					

**SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: **z where I is 25% of surface I.** I = irradiance, **z**= depth

ACOE Daily Reports					
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
1/14/14	Tues	502	320	505	
1/15/14	Wed	184	172	664	
1/16/14	Thurs	0	0	382	
1/17/14	Fri	924	687	1316	
1/18/14	Sat	1596	842	1390	
1/19/14	Sun	1322	937	1412	
1/20/14	Mon	923	534	870	
7 Day	Avg	778	498	848	



Drift algae accumulation at Punta Rassa 1/19/14. Photo SCCF



To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Tommy Strowd, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: January 21 - 27, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

# **Caloosahatchee Condition Summary:**

**USACE Action:** On Friday, 1/17/14 a 10-day pulse was initiated, with average flows of 650 cfs including two days of no flow at the end of the pulse.

**Recommendation:** We appreciate the 650 cfs dry-season flows that are being provided to the Caloosahatchee to help maintain lower salinity conditions in the upper estuary. We recommend supplemental flows be provided to keep salinity in the upper estuary below the 10 psu 30-day moving average harm threshold. Projections show only a 10% probability that Lake levels will fall into the Water Shortage Management Band by June 1. Current water management protocols are causing harm to the estuary even though sufficient water supplies are available for all users.

Lake Okeechobee Level:	13. ft. (Low Sub-Band)	Last wk: <b>13</b>		ft.
Lake Okeechobee Inflow:	336 cfs	Lake Okeecho	bee Outflow:	1,774 cfs
Weekly Rainfall:	WP Franklin 0.18"	Ortona 0.0"	Moore Haven	0.0"
Salinity Fort Myers:	7.1 - 12 SCCF Ft. Myers Ya	acht Basin	Previous wk: 8	8.7 - <mark>13</mark> psu
MFL Status:	10.3 psu 30 day moving a	verage > 10 psu Fort	Myers (SCCF s	onde)
	ND (SCCF RECON Marker 5	2)	Previous wk	ND
Salinity Beautiful Island:	2.8 - 4.8 psu (SCCF RECON	Marker 18)	Previous wk 3	8.5 - 6 psu
Salinity Shell Point:	20 - 32 psu (SCCF RECON)		Previous wk:	23 - 32 psu



**Flow Dynamics:** Flows at S79 over the last 10 day pulse averaged **687 cfs**. Flows the past 7 days at S79 were **433 cfs**. Lake Okeechobee outflows delivered to S77 represented 30% of total Lake outflows.

ACOE January 17, 2014 Pulse Release						
Date	Day	Pulse	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
1/17/14	1	1200	924	687	1316	
1/18/14	2	1600	1596	842	1390	
1/19/14	3	1200	1322	937	1412	
1/20/14	4	800	923	534	870	
1/21/14	5	600	491	654	674	
1/22/14	6	400	711	611	988	
1/23/14	7	400	403	326	784	
1/24/14	8	300	283	228	464	
1/25/14	9	0	95	44	104	
1/26/14	10	0	198	0	0	
10 day Av		650	687	486	800	



Upstream of S79/Franklin Conditions: On 1/28/14, chlorides measured 65 mg/L and apparent color was 69 CU.

**Upper Estuary Conditions:** The oligonaline zone extends from S79 to west of Beautiful Island but the salinity gradient is truncated at S79 where the salinity was 3.0. Water column chlorophyll was elevated at Fort Myers and Colonial Bridge.

*Manatees:* Over 200 manatees were reported using the warm water refuge of the FPL discharge canal and Orange River the past week including three radio tagged manatees. Calves represent 12- 22% of individuals. Mating herds were also present.

# Lower Estuary Condition:

**Beaches:** Algae continues to wash up on Sanibel Island from Lighthouse Beach to Tarpon Bay Beach. Algae also continues to wash up on Fort Myers Beach forming moderate to heavy wracks. Town staff and hotels continue to receive odor and nuisance complaints. Stranding events are typically associated with cold fronts.

# McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:

Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Enteromorpha* and *Cladophora*) is prevalent in the refuge impoundments (particularly in the west impoundment) and water remains darkly colored with low light conditions. Red macroalgae (*Acanthophora*, *Dasya* and *Gracilaria*) were also abundant.



Drift algae at Sanibel Gulfside City Park. Photo Sanibel

**Oysters:** January sampling by FGCU revealed disease prevalence of *Perkinsus* was 60% at both upstream Caloosahatchee Estuary sites with no adult oysters found at the most upstream site. *Perkinsus* intensity was very low at 0.60 for both sites. Recruitment ranged from 0 - 0.64 spat/shell with an estuary average of 0.21.

*Wildlife:* Four pelicans were found dead along San Carlos Bay and 6 pelicans brought to CROW were septic. A pod of 25 pilot whales beached and died in the Lee and Collier counties.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
31 Br.	6.7	185	1.3	0.84
Ft. Myers	17.1	139	1.6	0.92
Colonial Br.	14.4	115	1.9	1.03
Definition of 25% I I = irradiance, <b>z</b> = c				

ACOE Daily Reports					
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
1/21/14	Tues	491	654	674	
1/22/14	Wed	711	611	988	
1/23/14	Thurs	403	326	784	
1/24/14	Fri	283	228	464	
1/25/14	Sat	95	44	104	
1/26/14	Sun	198	0	0	
1/27/14	Mon	854	461	401	
7 Day	Avg	433	332	487	

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Tommy Strowd, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: January 28 – February 3, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Flows averaging 1,400 cfs this past week lowered salinity throughout the estuary, reducing it below the 10 psu 30-day moving average in Ft. Myers. Rainfall was not evenly distributed over the SFWMD service area, with a majority of the rainfall occurring along the east coast.

**USACE Action:** On Friday, 1/27/14 a 10-day pulse was initiated, with average flows of 650 cfs including two days of no flow at the end of the pulse.

**Recommendation:** We recommend a 10-day pulse release with flows averaging 1,000 cfs to help maintain salinities below the 10 psu 30-day moving average. However, if additional capacity is needed to lower the Lake, up to 1,500 cfs would be acceptable without adversely affecting oysters in the lower estuary. Flows >1,500 will contribute unnecessary nutrient loads that may compound the impacts of the extremely high rainy season flows and slow recovery of the lower estuary.

Lake Okeechobee Level:	13.96 ft. (Low Sub-Band)		Last wk: 13.79 ft.		
Lake Okeechobee Inflow:	1,070 cfs	Lake C	keechobee Outflow:	180 cfs	
Weekly Rainfall:	WP Franklin 2.79"	Ortona 2.15"	Moore Haven 1.94"		
Salinity Fort Myers:	6.8 – 11 psu SCCF Ft. Mye	ers Yacht Basin	Previous wk: <b>7.1 – 12</b>	psu	
MFL Status:	9.7 psu 30 day moving ave	rage Fort Myers (SCC	F sonde) MFL target	<u>&lt;</u> 10 psu	
	10 - 15 psu (SCCF RECON M	/arker 52)	Previous wk ND		
Salinity Beautiful Island:	1.9 - 4.7 psu (SCCF RECON	Marker 18)	Previous wk 2.8 - 4.8	psu	
Salinity Shell Point:	21 - 33 psu (SCCF RECON)		Previous wk: 20 - 32	psu	



# Page **2** of **2**

Flow Dynamics: Flows at S79 over the last 8 days of the 10 day pulse averaged **1,374 cfs**. Flows the past 7 days at S79 were **1,449 cfs**.

	ACOE	E January	27, 2014 Pu	lse Release		
Date	Day	Pulse	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	SCCF Sonde Surface Salinity at Fort Myers Yacht Basin
1/27/14	1	1200	854	461	401	
1/28/14	2	1600	1512	841	1115	S 15
1/29/14	3	1200	1336	622	1170	2 30 day harm threshold
1/30/14	4	800	959	535	588	
1/31/14	5	600	1991	922	52	
2/1/14	6	400	2280	1092	0	5
2/2/14	7	400	1293	755	0	salinity —
2/3/14	8	300	769	245	0	
2/4/14	9	0				war war war war war war see
2/5/14	10	0				2. 12. 12. 12. 12. 10. N.
10 day Av		650				

Upstream of S79/Franklin Conditions: On 2/4/14, chlorides measured 64 mg/L and apparent color was 65 CU.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 to west of Beautiful Island. Water column chlorophyll was elevated at Fort Myers with a mixture of diatoms, ciliates, dinoflagellates and nanoflagellates. Surface salinities at Fort Myers are at the high end of tape grass tolerance and submarine light level is too low to support plant growth below 1 meter.

**Manatees:** Up to 50 manatees, including calves and one radio tagged manatee, were reported using the warm water refuge of the FPL discharge canal and Orange River the past week. On 2/1/14 a manatee was rescued in the Orange River. The manatee is an amputee, missing its right flipper from a previous entanglement. Its left flipper was also entangled in vines along the bank from being pushed to the bank by a mating herd. The manatee was transported to Lowry Zoo for rehab.

# Lower Estuary Condition:

**Beaches:** Algae continues to wash up on Sanibel Island from Lighthouse Beach to Tarpon Bay Beach. Algae also continues to wash up on Fort Myers Beach forming moderate to heavy wracks. Town staff and hotels continue to receive odor and nuisance complaints. Stranding events are typically associated with cold fronts.

# McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:

Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows

during the wet season. Filamentous green algae (*Enteromorpha* and *Cladophora*) is prevalent in the Refuge impoundments (particularly in the west impoundment) and water remains darkly colored with low light conditions. Red macroalgae (*Acanthophora*, *Dasya* and *Gracilaria*) were also abundant. The SCCF McIntryre Creek RECON sensor data is available at <a href="http://recon.sccf.org/">http://recon.sccf.org/</a>.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
31 Br.	5.1	185	1.4	0.88
Ft. Myers	10.3	139	2.3	0.95
Colonial Br.	8.4	115	1.9	1.12

Target light penetration: **CE**- Caloosahatchee Estuary = 1 m

SCB-San Carlos Bay = 2.2 meters

Definition of 25% Iz: **z where I is 25% of surface I**. **I** = irradiance, **z**= depth

ACOE Daily Reports					
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
1/28/14	Tues	1512	841	1115	
1/29/14	Wed	1336	622	1170	
1/30/14	Thurs	959	535	588	
1/31/14	Fri	1991	922	52	
2/1/14	Sat	2280	1092	0	
2/2/14	Sun	1293	755	0	
2/3/14	Mon	769	245	0	
7 Day	Avg	1449	716	417	



To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Tommy Strowd, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: February 4 - 10, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

Caloosahatchee Condition Summary: Increased flows in the last pulse helped lower salinity throughout the estuary.

**USACE Action:** On Wednesday 2/5/14 the 10 day pulse with average flows of 650 ended. On Saturday, 2/8/14 a 10-day pulse was initiated, with average flows of 1000 cfs including one day of no flow at the end of the pulse.

**Recommendation:** We recommend a 10-day pulse release with flows averaging 1,000 cfs to help maintain salinities below the 10 psu 30-day moving average. Flows >1,500 will contribute unnecessary nutrient loads that may compound the impacts of the extremely high wet season flows and slow recovery of the lower estuary.

Lake Okeechobee Level:	13.99 ft. (Low Sub-Band)		Last wk: <b>13.96 ft</b> .		
Lake Okeechobee Inflow:	1,414 cfs	Lake	Okeechobee Outflow:	2,841 cfs	
Weekly Rainfall:	WP Franklin 0"	Ortona 0.78"	Moore Haven 0.53"		
Salinity Fort Myers:	6.4 - 11 psu SCCF Ft. I	Myers Yacht Basin	Previous wk: <b>6.8 – 1</b> ′	1 psu	
MFL Status:	9.3 psu 30 day moving	average Fort Myers (SC	CF sonde) MFL targe	t <u>&lt;</u> 10 psu	
	10 - 15 psu (SCCF RECC	DN Marker 52)	Previous wk 10 – 15	psu	
Salinity Beautiful Island:	1.7 - 3.5 psu (SCCF REC	CON Marker 18)	Previous wk 1.9 - 4.	<b>7</b> psu	
Salinity Shell Point:	19 - 32 psu (SCCF REC	ON)	Previous wk: 21 - 33	psu	



**Flow Dynamics:** Flows at S79 over the last 10 day pulse averaged **1,202 cfs**. Flows the past 7 days at S79 were **1,370 cfs**. Lake Okeechobee outflow water to S77 represented 32% of total lake outflows.



Upstream of S79/Franklin Conditions: On 2/11/14, chlorides measured 65 mg/L and apparent color was 54 CU.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 to west of Beautiful Island. Water column chlorophyll was elevated at Fort Myers. Surface salinities at Fort Myers became more favorable for tape grass but submarine light levels dropped and are too low to support vascular plant growth below 1 meter.

*Manatees:* Up to 60 manatees with calves were recorded in the warm water refuge at the Orange River the past week. Lack of forage in the warm water region has caused FWC to step up warnings to boaters as more manatees are moving down river in search of food.

**Lower Estuary Condition:** Macroalgae accumulations were noted at Punta Rassa (*Gracilaria, Agardhiella, Polysiphonia*), Bunche Beach and the Sanibel boat ramp (*Sargassum, Rosenvigea*) 2/12/14. Some of the seagrasses along the causeway had dense epiphytic algae accumulations including (*Spyridia, Polysiphonia* and *Chondria*).

*McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:* Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Enteromorpha* and *Cladophora*) is prevalent in the Refuge impoundments (particularly in the west impoundment) and water remains darkly colored with low light conditions. Red macroalgae (*Acanthophora, Dasya* and *Gracilaria*) were also abundant.



Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	15.2	149	2.8	0.86
Colonial Br.	5.5	118	2.4	1.06
lona	2.2	95	2.4	1.22

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: **z where I is 25% of surface I.** I = irradiance, **z**= depth

ACOE Daily Reports						
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)		
2/4/14	Tues	481	108	0		
2/5/14	Wed	551	164	0		
2/6/14	Thurs	1020	536	0		
2/7/14	Fri	1601	853	0		
2/8/14	Sat	1712	865	388		
2/9/14	Sun	2284	1489	1440		
2/10/14	Mon	1947	1384	1044		
7 Day	Avg	1370	771	410		

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Tommy Strowd, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: February 11 - 17, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Flows of 885 – 1200 cfs held salinity at sustainable levels in the upper estuary.

**USACE Action:** On Saturday, 2/8/14 a 10-day pulse was initiated, with average flows of 1000 cfs including one day of no flow at the end of the pulse.

**Recommendation:** We recommend a 10-day pulse release with flows averaging 1,000 cfs to help maintain salinities below the 10 psu 30-day moving average. Flows >1,500 will contribute unnecessary nutrient loads that may compound the impacts of the extremely high wet season flows and slow recovery of the estuary.

Lake Okeechobee Level:	14.01 ft. (Low Sub-Band)		Last wk: 13.99 ft.	
Lake Okeechobee Inflow:	1,685 cfs	Lake C	0keechobee Outflow: 867 cfs	;
Weekly Rainfall:	WP Franklin 1.13"	Ortona 0.75"	Moore Haven 0.71"	
Salinity Fort Myers:	5.3 – 8.5 psu SCCF Fort My	vers Yacht Basin	Previous wk: <b>6.4 - 11</b> psu	
MFL Status:	8.3 psu 30 day moving aver	age Fort Myers (SCCF	<sup>–</sup> sonde) MFL target <u>&lt;</u> 10 psu	
	6.7 - 15 psu (SCCF RECON	Marker 52)	Previous wk 10 – 15 psu	
Salinity Beautiful Island:	1.6 - 3.0 psu (SCCF RECON	Marker 18)	Previous wk 1.7 - 3.5 psu	
Salinity Shell Point:	<b>19 - 32</b> psu (SCCF RECON)		Previous wk: 19 - 32 psu	



#### Page 2 of 3

ACOE February 8, 2014 Pulse Release				se Release		
Date	Day	Pulse	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	25 20 1 day harm threshold
2/08/2014	1	1600	1712	865	388	0
2/09/2014	2	2200	2284	1489	1440	р 8 15
2/10/2014	3	1800	1947	1384	1044	≥ 30 day harm threshold
2/11/2014	4	1400	1432	876	650	E 10 AMM ANA AMMANA
2/12/2014	5	1100	1153	786	566	8 mls . malalala har
2/13/2014	6	800	1459	563	415	5 salinity
2/14/2014	7	600	806	415	204	30D MA
2/15/2014	8	300	747	200	35	
2/16/2014	9	200	509	150	0	1181 1231 1281 2021 2021 2011 21212 21212
2/17/2014	10	0	90	44	0	or or or on on on on
10 day Av		1000	1213	677	474	

Flow Dynamics: Flows at S79 over the last 10 day pulse averaged 1,213 cfs. Flows the past 7 days at S79 were 885 cfs.

Upstream of S79/Franklin Conditions: On 2/18/14, chlorides measured 63 mg/L and apparent color was 67 CU.

**Upper Estuary Conditions:** The oligonaline zone extends from S79 to Fort Myers. Water column chlorophyll was elevated at Fort Myers from a dinoflagellate bloom  $(1.6 \times 10^6 \text{ cells } \text{I}^1)$ . Surface salinities at Fort Myers became more favorable for tape grass but submarine light levels dropped and are too low to support vascular plant growth below 1 meter. Tape grass was still present at Old Bridge Park on 2/16/14 but red drift algae (*Polysiphonia subtilissima*) was covering many of the shoots.

*Manatees:* Up to 100 manatees with as many as 20 calves were recorded in the warm water refuge at the Orange River the past week. All 3 tagged animals, Woodstock and Cheeno and Tippecanoe, were also spotted. <u>www.wildtacks.org</u>

**Lower Estuary Condition:** The salinity at Iona was 15.6 psu, within the optimal range for oysters. Macroalgae accumulations were noted at Bunche Beach and the Sanibel boat ramp on 2/16/14. Drift algae continues to wash up from Lighthouse Beach to Tarpon Bay Beach on Sanibel after each cold front. Moderate to heavy wracks of red drift algae continue to wash onto Fort Myers Beach with each tidal cycle. Town staff, hotels, and restaurants continue to receive complaints from the public about the aesthetics and odors caused by the algae.

**McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:** Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Enteromorpha* and *Cladophora*) is prevalent in the Refuge impoundments (particularly in the west impoundment) and water remains darkly colored with low light conditions. Red macroalgae (*Acanthophora*, *Dasya* and *Gracilaria*) were also abundant.

**Oysters:** February sampling by FGCU reports disease intensity of *Perkinsus* ranged from 0.57-0.80. Disease prevalence ranged from 57%-73%. Disease data this month includes data from Iona Cove (site 1), in the Caloosahatchee where 100% mortality was reported this past wet season due to excessive freshwater releases that dropped salinity to zero for months. Spat recruitment ranged from 0-0.08 spat/shell.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	20	159	5.5	0.73
Colonial Br.	6.2	129	17	1.04
lona	5.6	93	5.6	1.54
Target light penetr				
Definition of 25% I				

I = irradiance, z = depth

ACOE Daily Reports						
Date	Day	S79 Flow	S78 Flow	S77 Flow		
		(cfs)	(cfs)	(cfs)		
2/11/2014	Tues	1432	876	650		
2/12/2014	Wed	1153	786	566		
2/13/2014	Thurs	1459	563	415		
2/14/2014	Fri	806	415	204		
2/15/2014	Sat	747	200	35		
2/16/2014	Sun	509	150	0		
2/17/2014	Mon	90	44	0		
7 Day	Avg	885	433	267		



Drift algae at Bunche Beach on 2/16/14. Photo SCCF



Drift algae covering tape grass near Old Bridge Park on 2/16/14. Photo SCCF

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Tommy Strowd, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: February 18 - 24, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Increased flows above 1300 cfs have resulted in salinity trending downward within the upper estuary. Increased flows have expanded the low salinity zone within the upper estuary between S-79 and the Fort Myers Yacht Basin. This has increased habitat volume for larval fishes and invertebrates that depend on the low salinity zone for reproduction.

**USACE Action:** The last published 10 day pulse ended on 2/17/14, The USACE has continued these higher flows until further notice.

**Recommendation:** We recommend a 10-day pulse release with flows averaging 1,000 cfs to continue to maintain salinities below the 10 psu 30-day moving average. We request that flows not exceed 1,500 cfs due to concerns of excess nutrient loading that may compound the impacts of last year's high wet season flows and slow recovery of the estuary.

Lake Okeechobee Level: 13.98 ft. (Low Sub-Band) Last wk: 14.01 ft.

Lake Okeechobee Inflow:	1,333 cfs	Lake	Okeechobee Outflow: 837 cfs
Weekly Rainfall:	WP Franklin 0.0"	Ortona 0.01"	Moore Haven 0.41"
Salinity Fort Myers:	4.0 - 7.8 psu SCCF Fort M	lyers Yacht Basin	Previous wk: <b>5.3 – 8.5</b> psu
MFL Status:	7.1 psu 30 day moving av	erage Fort Myers (SCC	CF sonde) MFL target <u>&lt; 10</u> psu
	6.7 - 12 psu (SCCF RECC	DN Marker 52)	Previous wk 6.7 - 15 psu
Salinity Beautiful Island:	0.9 - 2.2 psu (SCCF REC	ON Marker 18)	Previous wk 1.6 - 3.0 psu
Salinity Shell Point:	18 - 32 psu (SCCF RECO	N)	Previous wk: <b>19 - 32</b> psu



**Flow Dynamics:** Flows at S79 over the last 7 days averaged 1,371 cfs and have resulted in a beneficial reduction in salinity in the upper estuary.

ACOE Daily Reports						
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)		
2/18/2014	Tues	1404	635	642		
2/19/2014	Wed	2106	1574	1556		
2/20/2014	Thur	1870	1386	1570		
2/21/2014	Fri	1340	1084	1212		
2/22/2014	Sat	1244	947	1102		
2/23/2014	Sun	959	689	778		
2/24/2014	Mon	675	621	663		
7 Day	Avg	1371	990	1074		



Upstream of S79/Franklin Conditions: On 2/25/14, chlorides measured 64 mg/L and apparent color was 60 CU.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 to Fort Myers. Water column chlorophyll was elevated at Fort Myers 2/23/14. Surface salinities at Fort Myers were favorable for tape grass but submarine light levels are too low to support vascular plant growth below 1 meter because of color, phytoplankton and turbidity.

*Manatees:* Manatees with calves continue to congregate at the FPL warm water discharge off the Orange River. Three rehabilitated, tagged manatees remain in the region since their release.

**Lower Estuary Condition:** The salinity at Iona was 16.9 psu, within the optimal range for oysters. Macroalgae accumulations were noted at Punta Rassa on 2/23/14.

**McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:** Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Enteromorpha* and *Cladophora*) is prevalent in the Refuge impoundments (particularly in the west impoundment) and water remains darkly colored with low light conditions. Red macroalgae (*Acanthophora*, *Dasya* and *Gracilaria*) were also abundant.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	11.8	140	5.8	0.81
Colonial Br.	3.9	114	2.5	1.09
lona	6.9	102	2.5	1.13

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: **z where l is 25% of surface l. I** = irradiance, **z**= depth

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Tommy Strowd, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: February 25 – March 3, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Average flows of 981 cfs the past week have maintained sustainable salinities below the MFL harm level in the upper estuary. Increased flows have expanded the low salinity zone within the upper estuary between S-79 and the Fort Myers Yacht Basin. This has increased habitat volume for larval fishes and invertebrates that depend on the low salinity zone for reproduction.

USACE Action: The USACE has continued providing average flows of 1000 cfs to the Caloosahatchee until further notice.

**Recommendation:** We recommend releases averaging 1,000 cfs be continued to maintain salinities below the 10 psu 30day moving average and to assist in Lake Okeechobee recession. We request that flows not exceed 1,500 cfs due to concerns of excess nutrient loading that may compound the impacts of last year's high wet season flows and slow recovery of the estuary.

Lake Okeechobee Level:	13.90 ft. (Low Sub-Band	d)	Last wk: <b>13.98 ft</b> .	
Lake Okeechobee Inflow:	1,325 cfs	Lake C	keechobee Outflow: 3	3,460 cfs
Weekly Rainfall:	WP Franklin 0.25"	Ortona 0.32"	Moore Haven 0.22"	
Salinity Fort Myers:	4.4 - 7.9 psu SCCF Fort My	ers Yacht Basin	Previous wk: <b>4.0 - 7.8</b> p	su
MFL Status:	6.6 psu 30 day moving aver	rage Fort Myers (SCCI	<sup>=</sup> sonde) MFL target <u>&lt;</u> '	<b>10</b> psu
	7.6 - 13 psu (SCCF RECOM	N Marker 52)	Previous wk 6.7 - 12 ps	SU
Salinity Beautiful Island:	0.8 - 2.6 psu (SCCF RECO	N Marker 18)	Previous wk 0.9 - 2.2 p	su
Salinity Shell Point:	18 - 32 psu (SCCF RECON	)	Previous wk: 18 - 32 ps	su



estuary.

#### Page 2 of 2

**ACOE Daily Reports** Date Day S79 Flow **S78** S77 Flow Flow (cfs) (cfs) (cfs) 545 428 536 Tues 2/25/2014 Wed 246 322 356 2/26/2014 47 Thur 109 116 2/27/2014 1191 551 688 Fri 2/28/2014 1631 Sat 1203 1334 3/1/2014 1819 1166 1460 Sun 3/2/2014 Mon 1389 1086 NR 3/3/2014 7 Day Avg 981 695



Upstream of S79/Franklin Conditions: On 3/4/14, chlorides measured 80 mg/L and apparent color was 64 CU.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 to Fort Myers. Water column chlorophyll was elevated at Fort Myers on 3/2/14 with the diatom *Skeletonema* being most abundant. Surface salinities at Fort Myers were favorable for tape grass but submarine light levels are too low to support vascular plant growth below 1 meter because of color and phytoplankton.

Flow Dynamics: Flows at S79 over the last 7 days averaged 981 cfs providing a beneficial reduction in salinity in the upper

*Manatees:* Manatee Park staff report manatees including cows with calves continue to congregate at the FPL warm water discharge off the Orange River although with warmer water they are more dispersed. Two of the rehabilitated, tagged manatees remain in the region since their release.

**Lower Estuary Condition:** The salinity at Iona was within the optimal range for oysters (18.1 psu) on 3/2/14. Macroalgae accumulations were observed at some locations in Pine Island Sound.

**McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:** Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Enteromorpha* and *Cladophora*) is prevalent in the Refuge impoundments (particularly in the west impoundment) and water remains darkly colored with low light conditions. Red macroalgae (*Acanthophora*, *Dasya* and *Gracilaria*) were also abundant.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)	Drift macroalgae at Punta Rassa 3/4/14. Photo SCCF
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m	
Ft. Myers	15.1	157	3.4	0.82	
Colonial Br.	3.9	143	1.3	1.00	
lona	6.9	96	3.2	1.13	
Definition of 25 I = irradiance, 2	<b>SCB</b> -San Ca % Iz: <b>z where</b> i <b>z</b> = depth	rlos Bay = 2.2	? meters urface I.		

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Tommy Strowd, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: March 4 - 10, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

# **Caloosahatchee Condition Summary:**

**USACE Action:** The USACE initiated a 10 day pulse release on 3/10/14 with average flows of 1,000 cfs to the Caloosahatchee estuary through the S79 structure.

**Recommendation:** We recommend releases averaging 1,000 cfs be continued to maintain salinities below the 10 psu 30day moving average and to assist in Lake Okeechobee recession. We request that flows not exceed 1,500 cfs due to concerns over high color and turbidity which are impacting tape grass in the upper estuary. Additional nutrient loading may compound the impacts of last year's high wet season flows and slow recovery of the estuary.

Lake Okeechobee Level:	13.85 ft. (Low Sub-Band)		Last wk: 13.90	wk: <b>13.90 ft</b> .	
Lake Okeechobee Inflow:	757 cfs	Lake Okeecho	bee Outflow:	1,680 cfs	
Weekly Rainfall:	WP Franklin 0.56"	Ortona 0.32"	Moore Haven	0.32"	
Salinity Fort Myers:	3.9 - 7.7 psu SCCF Fort My	ers Yacht Basin	Previous wk:	<b>4.4 - 7.9</b> psu	
MFL Status:	6.0 psu 30 day moving aver	age Fort Myers (SCCF	sonde) MFL	. target <u>&lt;</u> 10 psu	
	4.9 -12 psu (SCCF RECON	Marker 52)	Previous wk	<b>7.6 - 13</b> psu	
Salinity Beautiful Island:	0.6 -1.8 psu (SCCF RECON	I Marker 18)	Previous wk	<b>).8 - 2.6</b> psu	
Salinity Shell Point:	18 - 33 psu (SCCF RECON)	)	Previous wk:	<b>18 - 32</b> psu	



**ACOE Daily Reports** SCCF Sonde Surface Salinity at Fort Myers Yacht Basin Date Day S79 Flow **S78** S77 Flow 25 Flow (cfs) (cfs) 1 day harm threshold 20 (cfs) Tues 1184 782 1284 salinity (psu) 3/4/2014 15 Wed 944 622 846 3/5/2014 30 day harm threshold Thur 640 488 636 3/6/2014 10 368 258 104 Fri 3/7/2014 5 147 34 salinity Sat 208 3/8/2014 30D MA 49 57 0 Sun 0 3/9/2014 02106114 02/16/14 02121124 02/26/14 03/08/14 03103120 Mon 1043 575 640 3/10/2014 7 Day Avg 633 418 506

Flow Dynamics: Flows at S79 over the last 7 days were reduced from an average of **981** cfs to **633 cfs**.

Upstream of S79/Franklin Conditions: On 3/11/14, chlorides measured 83 mg/L and apparent color was 57 CU.

**Upper Estuary Conditions:** The oligonaline zone extends from S79 to Fort Myers. Surface salinities at Fort Myers were favorable for tape grass but **submarine light levels are too low to support vascular plant growth below 1 meter because of color and turbidity**. FWRI identified the dinoflagellate bloom at the Fort Myers Yacht Basin on 2/16/14 as *Alexandrium peruvianum*, a harmful algal bloom (HAB) species which has been found to produce saxitoxins and to cause paralytic shellfish poisoning (PSP).

*Manatees:* Manatee Park staff report manatees including cows with calves continue to congregate at the FPL warm water discharge off the Orange River although with warmer water they are more dispersed. One rehabilitated, tagged manatee was spotted in the region the past week.

**Lower Estuary Condition:** The salinity at Iona was at the lower end of the optimal range for oysters (14.5 psu) on 3/9/14. Heavy wracks of red algae have been impacting the central beaches of Fort Myers Beach due to recent high wind and wave conditions which have pushed the algae onshore.

**McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:** Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Enteromorpha* and *Cladophora*) is prevalent in the Refuge impoundments (particularly in the west impoundment) and water remains darkly colored with low light conditions. Red macroalgae (*Acanthophora*, *Dasya* and *Gracilaria*) were also abundant.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	8.6	171	8.0	0.70
Colonial Br.	5.8	143	6.0	1.00
lona	8	102	4.4	1.13

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: **z where I is 25% of surface I. I** = irradiance, **z**= depth



A dinoflagellate bloom on 2/16/14 was identified by FWRI as *Alexandrium peruvianum*. Photo SCCF.

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Tommy Strowd, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: March 11 – 17, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Freshwater flows of approximately 1000 cfs over the past six weeks have maintained salinities below the MFL in the upper Caloosahatchee Estuary; however, Colored Dissolved Organic Matter (CDOM) continues to limit light penetration to the submerged aquatic vegetation trying to recover in the upper estuary. Freshwater flows between 800–1,000 cfs have provided a continuous low salinity zone gradient from S-79 to Fort Myers, expanding the habitat volume available for larval fishes and invertebrates. This should result in greater foraging opportunities for zooplankton and may increase reproduction rates during spring spawning.

**USACE Action:** The USACE initiated a 10 day pulse release on 3/10/14 with average flows of 1,000 cfs to the Caloosahatchee estuary at S79.

**Recommendation:** We recommend releases averaging 1,000 cfs be continued to maintain salinities below the 10 psu 30day moving average and to assist in Lake Okeechobee recession. We request that flows not exceed 1,200 cfs due to concerns over high color and turbidity which are currently impacting tape grass in the upper estuary. Additional nutrient loading may compound the impacts of last year's high wet season flows and slow recovery of the estuary. The C43 reservoir site should be utilized to pump and store/process excess flow. Conditions at this time of year are optimal for ET so the capacity of the C43 Reservoir site, as well as other watershed storage sites should be optimized for groundwater recharge, storage, treatment and estuary health. The Corps and the District should investigate the potential for holding more water in the canals south of Lake Okeechobee and moving water south into the WCAs when capacity exists.

Lake Okeechobee Level:	13.68 ft. (Low Sub-Band)		Last wk: <b>13.85 ft</b> .
Lake Okeechobee Inflow:	1.279 cfs	Lake O	Reechobee Outflow: 1,090 cfs
Weekly Rainfall:	WP Franklin 0.36"	Ortona 0.42"	Moore Haven 0.76"
Salinity Fort Myers:	3.3 - 6.8 psu SCCF Fort My	ers Yacht Basin	Previous wk: <b>3.9 - 7.7</b> psu
	5.0 - 12 psu (SCCF RECON	l Marker 52)	Previous wk 4.9 - 12 psu
Salinity Beautiful Island:	0.6 - 1.4 psu (SCCF RECOM	N Marker 18)	Previous wk 0.6 - 1.8 psu

Salinity Shell Point:



Previous wk: 18 - 33 psu



	ACOE	March 10,	2014 Pulse	Release		
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	20 1 day harm threshold
3/10/2014	1	1600	1043	575	640	
3/11/2014	2	2200	1808	918	1236	S 15
3/12/2014	3	1800	1432	1001	1286	
3/13/2014	4	1400	1633	1073	1430	
3/14/2014	5	1100	1381	1098	1446	The Alasta A well at an
3/15/2014	6	800	950	1020	1402	5 selinity - May any any any
3/16/2014	7	600	634	561	989	30D MA
3/17/2014	8	300	324	200	281	
3/18/2014	9	200				wally well a stra solva wella wella
3/19/2014	10	0				021 021 021 021 031 031 031
10 day Av		1000				

Flow Dynamics: Flows at S79 over the last 7 days were increased from an average of 633 cfs to 1166 cfs.

Upstream of S79/Franklin Conditions: On 3/18/14, chlorides measured 69 mg/L and apparent color was 63 CU.

**Upper Estuary Conditions:** The oligonaline zone extends from S79 to Fort Myers. Surface salinities at Fort Myers were favorable for tape grass but **submarine light levels are too low to support vascular plant growth below 1 meter because of color, chlorophyll and turbidity**. Chlorophyll levels were spiking at the Fort Myers RECON during the week and *Skeletonema*, a diatom, was dominant at the Fort Myers Yacht Basin on 3/16/14.

Manatees: Manatee Park staff report few manatees in the FPL warm water discharge off the Orange River the past week.

Lower Estuary Condition: The salinity at Iona was in the optimal range for oysters (22.5 psu) on 3/16/14.

**McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:** Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Enteromorpha* and *Cladophora*) is prevalent in the Refuge impoundments (particularly in the west impoundment) and water remains darkly colored with low light conditions. Red macroalgae (*Acanthophora*, *Dasya* and *Gracilaria*) were also abundant.

**Oysters:** March sampling by FGCU revealed mean oyster recruitment in the Caloosahatchee was poor at 0.00-0.33 spat/shell. Disease prevalence of Perkinsus ranged from 20-33%. Disease intensity of *Perkinsus* ranged from 0.20-0.33. (scale 0 = no infection, 1 = low, 3 = medium, 5 = heavy). Recruitment and disease prevalence metrics are normal for this time of year. Spawning will peak in April and May, making it critical to maintain flows within the appropriate salinity targets during that time to ensure that larvae are not advected out of the system and away from suitable substrate.

Caloosahatchee	Caloosahatchee Chlorophyll CDOM Turbidity 25		25% lo	% lo ACOE Da			Daily Reports		
Stations	(µg/L)	(qse)	(NTU)	(meters)	Date	Day	S79 Flow	<b>S78</b>	S77 Flow
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m			(cfs)	Flow (cfs)	(cfs)
Ft. Myers	10.6	144	8.7	0.73	3/11/2014	Tues	1808	918	1236
Colonial Br.	9.2	111	5.7	0.92	5/11/2014				
lona	4.9	87	3.7	1.16	3/12/2014	Wed	1432	1001	1286
					3/13/2014	Thur	1633	1073	1430
Target light per	netration: <b>CE</b> - Ca	loosahatchee	e Estuary =1 m	1	3/14/2014	Fri	1381	1098	1446
	SCB-San Car	rlos Bay = 2.2	? meters		3/15/2014	Sat	950	1020	1402
Definition of 25% Iz: <b>z where I is 25% of surface I.</b>					3/16/2014	Sun	634	561	989
				3/17/2014	Mon	324	200	281	
					7 Day	Avg	1166	838	1152

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: March 18 – 24, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Freshwater flows of approximately 1000 cfs over the past seven weeks have maintained salinities below the MFL in the upper Caloosahatchee Estuary; however, Colored Dissolved Organic Matter (CDOM) continues to limit light penetration to the submerged aquatic vegetation trying to recover in the upper estuary.

**USACE Action:** The USACE initiated a 10 day pulse release on 3/20/14 with average flows of 1,000 cfs to the Caloosahatchee estuary at S79.

**Recommendation:** Due to concerns over high color, turbidity and nutrient loading which are currently impacting tape grass in the upper estuary and estuary recovery, we request flows not exceed an average of 1000 cfs over the ten day pulse. The Corps and the District should investigate the potential for holding more water in the canals south of Lake Okeechobee, moving water south into the WCAs when capacity exists, optimizing storage on the C43 reservoir and other watershed storage sites to store/process excess flow.

Lake Okeechobee Level:	13.59 ft. (Low Sub-Band)	)	Last wk: 13.68 ft.
Lake Okeechobee Inflow:	1,100 cfs	Lake C	0keechobee Outflow: 2,650 cfs
Weekly Rainfall:	WP Franklin 2.05"	Ortona 1.81"	Moore Haven 1.41"
Salinity Fort Myers:	3.2 - 7.3 psu SCCF Fort My	ers Yacht Basin Previ	ous wk: <b>3.3 - 6.8</b> psu
	5.7 -12 psu (SCCF RECON	Marker 52)	Previous wk 5.0 – 12 psu
Salinity Beautiful Island:	0.6- 2.0 psu (SCCF RECON	Marker 18)	Previous wk 0.6 - 1.4 psu
Salinity Shell Point:	19 - 33 psu (SCCF RECON	)	Previous wk: 18 - 32 psu



Flow Dynamics: Flows at S79 over the last 10 day pulse release averaged **963 cfs** and over the past 7 days averaged **1,258 cfs**.



Upstream of S79/Franklin Conditions: On 3/25/14, chlorides measured 63 mg/L and apparent color was 76 CU.

**Upper Estuary Conditions:** The oligonaline zone extends from S79 to Fort Myers. Surface salinities at Fort Myers were favorable for tape grass but **submarine light levels are too low to support vascular plant growth below 1 meter because of color and turbidity**.

**Lower Estuary Condition:** The salinity at Iona (15.9 psu on 3/23/14) and the average salinity at Shell Point were in the optimal range for oysters.

**McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:** Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Enteromorpha* and *Cladophora*) is prevalent in the Refuge impoundments (particularly in the west impoundment) and water remains darkly colored with low light conditions. Red macroalgae (*Acanthophora*, *Dasya* and *Gracilaria*) were also abundant.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	8.1	161	3.6	0.83
Colonial Br.	5.9	140	2.6	0.95
lona	4.7	98	2.1	1.19

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters Definition of 25% lz: **z where I is 25% of surface I. I** = irradiance, **z**= depth

ACOE Daily Reports					
Date	Day	Day S79 Flow		S77 Flow	
		(cfs)	(cfs)	(cfs)	
3/18/2014	Tues	334	148	52	
3/19/2014	Wed	94	149	0	
3/20/2014	Thur	1228	680	776	
3/21/2014	Fri	2385	1521	1412	
3/22/2014	Sat	2039	1168	1652	
3/23/2014	Sun	1444	940	1270	
3/24/2014	Mon	1282	952	157	
7 Day	Avg	1258	794	759	

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: March 25-31, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Freshwater flows between 800–1,000 cfs this spring have provided a continuous low salinity zone gradient from S-79 to Fort Myers, expanding the habitat volume available for larval fishes and invertebrates. However, Colored Dissolved Organic Matter (CDOM) continues to limit light penetration to the submerged aquatic vegetation trying to recover in the upper estuary.

**USACE Action:** The USACE initiated a 10 day pulse release on 3/20/14 with average flows of 1,000 cfs to the Caloosahatchee estuary at S79.

**Recommendation:** We request flows not exceed an average of 1000 cfs over the ten day pulse. We strongly urge the Corps and the District to increase storage in canals south of Lake Okeechobee, moving water south into the WCAs, optimizing storage on the C43 reservoir and other watershed storage sites to store and treat excess flow.

Lake Okeechobee Level:	13.59 ft. (Low Sub-Band)		Last wk: 13.59 ft.		
Lake Okeechobee Inflow:	1,000 cfs	Lake	Okeechobee Outflow: 2,944 cf	s	
Weekly Rainfall:	WP Franklin 0.70"	Ortona 0.40"	Moore Haven 0.20"		
Salinity Fort Myers:	2.6 - 6.7 psu SCCF Fort My	ers Yacht Basin	Previous wk: <b>3.2 - 7.3</b> psu		
	3.5 - 12 psu (SCCF RECON	I Marker 52)	Previous wk 5.7 -12 psu		
Salinity Beautiful Island:	0.4 - 1.2 psu (SCCF RECO	N Marker 18)	Previous wk 0.6 - 2.0 psu		
Salinity Shell Point:	17 - 32 psu (SCCF RECON	)	Previous wk: <b>19 - 33</b> psu		



Flow Dynamics: Flows at S79 over the last 10 day pulse release increased to an average of **1,329 cfs** and over the past 7 days averaged **1,198 cfs**.

ACOE March 20, 2014 Pulse Release						
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
3/20/2014	1	1600	1228	680	776	
3/21/2014	2	2200	2385	1521	1412	
3/22/2014	3	1800	2039	1168	1652	
3/23/2014	4	1400	1444	940	1270	
3/24/2014	5	1100	1282	952	157	
3/25/2014	6	800	1295	782	320	
3/26/2014	7	600	1224	816	0	
3/27/2014	8	300	1158	467	0	
3/28/2014	9	200	442	950	179	
3/29/2014	10	0	798	298	54	
10 day Av		1000	1329	827	582	

**Upstream of S79/Franklin Conditions:** On 4/1/14, chlorides measured 63 mg/L and apparent color was 56 CU.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 to Fort Myers. Water column chlorophyll was spiking at Fort Myers RECON due to a bloom of dinoflagellates *Alexandrium peruvianum*. and *Akashiwo sanguinea*. *A. peruvianum*, is the same species that was blooming in February. Surface salinities at Fort Myers were favorable for tape grass but **submarine light levels are too low to support vascular plant growth below 1 meter because of color, chlorophyll and turbidity**.

**Lower Estuary Condition:** The salinity at Iona (14 psu on 3/30/14) and the average salinity at Shell Point (25 psu) were in the optimal range for oysters.

# McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling





# Chlorophyll spikes showing a bloom of *Alexandrium peruvianum* at Fort Myers RECON. Grab sample on 3/30/14 at Fort Myers Yacht basin had 2.4 million cells 1<sup>-1</sup>.

**NWR:** Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Enteromorpha* and *Cladophora*) is prevalent in the Refuge impoundments (particularly in the west impoundment) and water remains darkly colored with low light conditions. Red macroalgae (*Acanthophora*, *Dasya* and *Gracilaria*) were also abundant.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	31.5	152	6	0.7
Colonial Br.	5.6	129	2.6	1.0
lona	9.1	104	2.4	1.1

Target light penetration: **CE**- Caloosahatchee Estuary =1 m

**SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: **z where I is 25% of surface I.** I = irradiance, **z**= depth

	ACOE Daily Reports					
Date	Day	S79 Flow	S78 Flow	S77 Flow		
		(cfs)	(cfs)	(cfs)		
3/25/2014	Tues	1295	782	320		
3/26/2014	Wed	1224	816	0		
3/27/2014	Thur	1158	467	0		
3/28/2014	Fri	442	950	179		
3/29/2014	Sat	798	298	54		
3/30/2014	Sun	1310	651	528		
3/31/2014	Mon	2159	1360	1350		
7 Day	Avg	1198	760	347		



Dinoflagellate bloom of *Alexandrium peruvianum* (Identified by FWRI) at Fort Myers between the Edison Bridge and Marker 52 on 4/1/14. *A. peruvianum* is potentially toxic and grows faster in saltier water. Photo SCCF.

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: April 1 - 7, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Freshwater flows between 800–1,000 cfs this spring have provided a continuous low salinity zone gradient from S-79 to Fort Myers, expanding the habitat volume available for larval fishes and invertebrates. However, Colored Dissolved Organic Matter (CDOM) continues to limit light penetration to the submerged aquatic vegetation trying to recover in the upper estuary.

**USACE Action:** The USACE initiated a 10 day pulse release on 3/30/14 with average flows of 1,000 cfs to the Caloosahatchee estuary at S79.

**Recommendation:** We request average flows of 650 to 800 cfs over the ten day pulse to maintain the low salinity zone gradient from S-79 to Fort Myers to support healthy conditions for tape grass, larval fishes and invertebrates.

Lake Okeechobee Level:	13.45 ft. (Base Flow Band)		Last wk: 13.59 ft.
Lake Okeechobee Inflow:	1,066 cfs	Lake (	Okeechobee Outflow: 2,710 cfs
Weekly Rainfall:	WP Franklin 0.01"	Ortona 0.05"	Moore Haven 0.06"
Salinity Fort Myers:	2.8 - 5.9 psu SCCF Fort Mye	ers Yacht Basin	Previous wk: 2.6 - 6.7 psu
	4.5 - 12 psu (SCCF RECON	Marker 52)	Previous wk 3.5 - 12 psu
Salinity Beautiful Island:	0.4 - 1.0 psu (SCCF RECON	N Marker 18)	Previous wk 0.4 - 1.2 psu
Salinity Shell Point:	18 - 32 psu (SCCF RECON)	)	Previous wk 17 - 32 psu



Flow Dynamics: Flows into the Caloosahatchee estuary at S79 over the last 10 day pulse averaged **1,165 cfs** and over the past 7 days averaged **1,085 cfs**.

ACOE March 30, 2014 Pulse Release						
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	SCCF Sonde Surface Salinity at Fort Myers Yacht Basin salinity 30D MA 1 day harm threshold
3/30/2014	1	1600	1310	651	528	r n
3/31/2014	2	2200	2159	1360	1350	<u>s</u> 15
4/1/2014	3	1800	2083	1549	1580	lity
4/2/2014	4	1400	1839	1022	1568	The second secon
4/3/2014	5	1100	1252	811	1200	
4/4/2014	6	800	892	794	1112	5 million million many and
4/5/2014	7	600	714	585	960	A A HAND AND AND AND
4/6/2014	8	300	455	486	730	0
4/7/2014	9	200	362	401	580	when when all a colla alla alla
4/8/2014	10	0	583	348	690	0312 0312 0312 0312 0313 0410
10 day Av		1000	1165	801	1029	

Upstream of S79/Franklin Conditions: On 4/8/14, chlorides measured 70 mg/L and apparent color was 46 CU.

**Upper Estuary Conditions:** The oligonaline zone extends from S79 to Fort Myers. Water column chlorophyll levels dropped from the previous week at Fort Myers RECON. *Alexandrium peruvianum* was still present in the surface layer of the Caloosahatchee at several locations in the channel and on the north and south shorelines near Fort Myers. On 4/3/14 the highest concentrations found in the channel were at the Edison Bridge (1.5 million/L) and Marker 36, 2 km upstream of the bridge (616,000/L). On 4/6/14 the highest concentrations were found at Centennial Park (34,600 cells/L, FWRI), and inside the Fort Myers Yacht Basin (7.2 million cells/L).

Surface salinities at Fort Myers were favorable for tape grass but **submarine light levels remain too low to support vascular plant growth below 1 meter because of color, and turbidity**.

**Lower Estuary Condition:** The salinity at Iona (18 psu on 4/6/14) and the average salinity at Shell Point (25 psu) were in the optimal range for oysters.

*McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:* Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Enteromorpha*) is prevalent in the Refuge impoundments (particularly in the west impoundment). Red and brown macroalgae (*Gracilaria* and *Hincksia*) were also abundant.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	7.2	143	2.5	0.94
Colonial Br.	4.8	125	3.4	1.0
lona	6.9	91	3.4	1.1

Target light penetration: **CE**- Caloosahatchee Estuary =1 m

**SCB**-San Carlos Bay = 2.2 meters

Definition of 25% Iz: z where I is 25% of surface I. I = irradiance, z = depth

ACOE Daily Reports									
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)					
4/1/2014	Tues	2083	1549	1580					
4/2/2014	Wed	1839	1022	1568					
4/3/2014	Thur <b>1252</b>		811	1200					
4/4/2014	Fri	892	794	1112					
4/5/2014	Sat	714	585	960					
4/6/2014	Sun	455	486	730					
4/7/2014	Mon	362	401	580					
7 Day	Avg	1085	807	1104					


Elevated upper estuary turbidity evident at Tarpon Street Pier on south side of the Caloosahatchee on 4/6/14. Photo SCCF

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: April 8 - 14, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Freshwater flows between 800–1,000 cfs have provided a low salinity zone gradient from S-79 to Fort Myers, expanding the habitat volume available for larval fishes and invertebrates. **However, colored dissolved organic matter (CDOM) continues to limit light penetration to the submerged aquatic vegetation in the upper estuary.** 

USACE Action: The USACE initiated a 10 day pulse release on 4/9/14 with average flows of 650 cfs to the estuary at S79.

**Recommendation:** We request average flows of 650 to 800 cfs over the ten day pulse to maintain the low salinity zone gradient from S-79 to Fort Myers. Sources and causes of color levels and turbidity in the upper estuary, which are impeding restoration of healthy conditions for submerged aquatic vegetation, need to be identified so that the levels can be reduced.

Lake Okeechobee Level:	13.29 ft. (Base Flow Bar	nd)	Last wk: <b>13.45 ft</b> .		
Lake Okeechobee Inflow:	1,310 cfs	Lake	Okeechobee Outflow: 1	,740 cfs	
Weekly Rainfall:	WP Franklin 0.80"	Ortona 0.96"	Moore Haven 1.13"		
Salinity Fort Myers:	2.2 - 6.4 psu SCCF Fort M	yers Yacht Basin	Previous wk: <b>2.8 – 5.9</b> psu		
	3.3 - 12 psu (SCCF RECO	N Marker 52)	Previous wk 4.5 - 12 ps	SU	
Salinity Beautiful Island:	0.3 - 1.7 psu (SCCF RECC	Previous wk 0.4 - 1.0 psu			
Salinity Shell Point:	16 - 33 psu (SCCF RECON	۷)	Previous wk: <b>18 - 32</b> ps	su	



## Caloosahatchee Estuary

### Page 2 of 2

**Flow & Water Quality:** Flows into the Caloosahatchee estuary at S79 over the past 7 days averaged **958 cfs**. This year adequate water flows have provided a low salinity zone from S79 to Fort Myers, however light limitation due to high levels of CDOM are preventing restoration of tape grass in the upper estuary. Reduction of CDOM levels are needed to provide adequate light penetration through the water column for tape grass habitat recovery.

	ACOE	E April 9, 2	2014 Pulse I	Release		
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	SCCF Sonde Surface Salinity at Fort Myers Yacht Basin salinity 30D MA 1 day harm threshold
4/9/2014	1	1100	1045	533	675	Ω.
4/10/2014	2	1700	1598	698	680	<b>Š</b> 15
4/11/2014	3	1100	1352	700	890	ity
4/12/2014	4	900	1008	649	701	10 - 30 day harm threshold
4/13/2014	5	700	713	651	892	
4/14/2014	6	400	410	329	340	5 m mall man Martin was
4/15/2014	7	300				A THE MAN
4/16/2014	8	300				0
4/17/2014	9	0				with white with with white with
4/18/2014	10	0				031 031 031 0AL 0AL 0AL
10 day Av		650				] [

Upstream of S79/Franklin Conditions: On 4/15/14, chlorides measured 68 mg/L and apparent color was 49 CU.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 to Fort Myers. Surface salinities at Fort Myers were favorable for tape grass but **submarine light levels are too low to support vascular plant growth below 1 meter because of color**. No phytoplankton blooms or *Alexandrium peruvianum* cells were seen in samples from 4/13/14.

**Lower Estuary Condition:** The salinity at Iona (17 psu on 4/14/14) was in the optimal range for oysters and the average salinity at Shell Point rose to 28 psu, **the upper end of the optimal range for oysters.** 

*McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:* Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Ulva*) is prevalent in the Refuge impoundments (particularly in the west impoundment). Red and brown macroalgae (*Gracilaria* and *Hincksia*) were also abundant.

**Oysters:** April sampling by FGCU reported spat recruitment ranging from 0-3.47 spat/shell. Disease prevalence of Perkinsus ranged from 46.66-60%. Disease intensity ranged from 0.47-0.6 from upstream to downstream. (scale 0 = no infection, 1 = low, 3 = medium, 5 = heavy).

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	9.6	134	4.8	0.87
Colonial Br.	5.6	113	2.9	1.06
lona	9.1	96	2.7	1.15

Target light penetration: **CE**- Caloosahatchee Estuary =1 m

**SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: **z where I is 25% of surface I.** I = irradiance, **z**= depth

ACOE Daily Reports							
Date	Day	S79 Flow	S78 Flow	S77 Flow			
		(CfS)	(CfS)	(CTS)			
4/8/2014	Tues	583	348	690			
4/9/2014	Wed	1045	533	675			
4/10/2014	Thur	1598	698	680			
4/11/2014	Fri	1352	700	890			
4/12/2014	Sat	1008	649	701			
4/13/2014	Sun	713	651	892			
4/14/2014	Mon	410	329	340			
7 Day	Avg	958	558	695			

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: April 15 - 21, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Freshwater flows between 800–1,000 cfs have provided a low salinity zone gradient from S-79 to Fort Myers, expanding the habitat volume available for larval fishes and invertebrates. **However, colored dissolved organic matter (CDOM) continues to limit light penetration to the submerged aquatic vegetation in the upper estuary.** 

**USACE Action:** The USACE initiated a 10 day pulse release on 4/9/14 with average flows of 650 cfs to the estuary at S79.

**Recommendation:** We request average flows of 650 to 800 cfs over the ten day pulse to maintain the low salinity zone gradient from S-79 to Fort Myers. Sources and causes of color and turbidity levels in the upper estuary, which are impeding restoration of healthy conditions for submerged aquatic vegetation, need to be identified and reduced.

Lake Okeechobee Level:	13.29 ft. (Base Flow Ban	nd)	Last wk: 13.29 ft.	
Lake Okeechobee Inflow:	1,260 cfs	Lake	Okeechobee Outflow: 1,080 cfs	
Weekly Rainfall:	WP Franklin 0.38"	Ortona 0.35"	Moore Haven 0.45"	
Salinity Fort Myers:	5.0 - 8.9 psu SCCF Fort My	yers Yacht Basin	Previous wk: 2.2 - 6.4 psu	
	6.0 - 14 psu (SCCF RECO	N Marker 52)	Previous wk 3.3 - 12 psu	
Salinity Beautiful Island:	0.7 - 3.7 psu (SCCF RECO	N Marker 18)	Previous wk 0.3 - 1.7 psu	
Salinity Shell Point:	19 - 33 psu (SCCF RECON	1)	Previous wk: 16 - 33 psu	



#### Page 2 of 3

### Caloosahatchee Estuary

**Flow & Water Quality:** Flows into the Caloosahatchee estuary at S79 over the past 10 day pulse averaged **648 cfs**. Over the past 7 days flows averaged **625 cfs**. With relatively dry conditions, and a decrease in S79 flows from over 1000 to less than 650 cfs, salinities at Fort Myers have begun to rise. Light limitation from high levels of CDOM continue to prevent restoration of tape grass in the upper estuary. Reduction of CDOM levels are needed to provide adequate light penetration through the water column for tape grass habitat recovery.



**Upstream of S79/Franklin Conditions:** On 4/22/14, chlorides measured 68 mg/L and apparent color was 54 CU. Turbidity measured 0.64 NTU at the Olga Water Treatment plant, twice the level measured last week.

**Upper Estuary Conditions:** The oligonaline zone extends from S79 to Fort Myers. Surface salinities at Fort Myers were favorable for tape grass but **submarine light levels are too low to support vascular plant growth below 1 meter because of color**. No phytoplankton blooms or *Alexandrium peruvianum* cells were seen in samples from 4/13/14.

Lower Estuary Condition: The salinity at Iona (17 psu on 4/20/14) and at Shell Point (27 psu), were in the optimal range for oysters.

**McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:** Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Ulva* and *Chaetomorpha*) is prevalent in the Refuge impoundments (particularly in the west impoundment). Red macroalgae (*Acanthophora, Dasya*) were also abundant (4/17/14).

Caloosahatchee	Chlorophyll	CDOM	Turbidity	25% lo dopth	ACOE Daily Reports				
Stations	(µg/L)	(qse)	(NTU)	(meters)	Date	Day	S79 Flow	S78 Flow	S77 Flow
Target Values	< 11	CE <70	CE < 18	CE = 1 m			(cfs)	(cfs)	(cfs)
Target Values		SCB <11	SCB < 5	SCB = 2.2m	4/15/2014	Tues	91	0	0
Ft. Myers	8.0	134	4.3	0.9	4/16/2014	Wed	170	104	90
Colonial Br.	7.5	121	5.2	0.92	4/10/2014	Thur	00	140	170
lona	4.8	93	2.8	1.18	4/17/2014	Thur	90	149	170
			-	-	4/18/2014	Fri	0	149	164
Target light per	netration: <b>CE</b> - Ca	loosahatchee	e Estuary =1 m	1	4/19/2014	Sat	942	581	296
	SCB-San Ca	rlos Bay = 2.2	meters		4/20/2014	Sun	1734	978	826
Definition of 25% Iz: <b>z where I is 25% of surface I</b> .					4/21/2014	Mon	1340	985	852
				7 Day	Avg	625	421	343	
						I		4	



Floating mats of *Chaetomorpha* and other macroalgae in the west impoundment of the J.N. "Ding" Darling National Wildlife Refuge on 4/17/14. Photo SCCF

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: April 22 - 28, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** No rainfall was recorded within the basin during the past week. Freshwater flows averaging 457 cfs have resulted in salinities trending upward, although a low salinity zone gradient was maintained from S-79 to Fort Myers supporting tape grass and habitat for larval fishes and invertebrates.

USACE Action: The USACE initiated a 10 day pulse release on 4/19/14 with average flows of 650 cfs to the estuary at S79.

**Recommendation:** We request flows averaging 650 - 800 cfs to maintain salinity below the MFL and provide a low salinity zone gradient from S-79 to Fort Myers and to maintain salinities in the preferred range for oysters (12-25 psu) in the lower estuary. Sources and causes of color and turbidity levels in the upper estuary, which are impeding restoration of healthy conditions for submerged aquatic vegetation, need to be identified and reduced.

Lake Okeechobee Level:	13.13 ft. (Base Flow Bane	d)	Last wk: <b>13.29 ft</b> .
Lake Okeechobee Inflow:	350 cfs	Lake Okeecho	bbee Outflow: 2,020 cfs
Weekly Rainfall:	WP Franklin 0.0"	Ortona 0.0"	Moore Haven 0.0"
Salinity Fort Myers:	3.8 - 8.3 psu SCCF Fort My	ers Yacht Basin	Previous wk: <b>5.0 - 8.9</b> psu
	9.8 - 12 psu (SCCF RECON	I Marker 52)	Previous wk 6.0 - 14 psu
Salinity Beautiful Island:	1.8 - 3.1 psu (SCCF RECO	N Marker 18)	Previous wk 0.7 - 3.7 psu
Salinity Shell Point:	27 - 33 psu (SCCF RECON	)	Previous wk: 19 - 33 psu



Flow & Water Quality: Flows into the Caloosahatchee estuary at S79 over the past 10 day pulse averaged 721 cfs. Over the past 7 days flows averaged 457 cfs.



**Upstream of S79/Franklin Conditions:** On 4/29/14, chlorides measured 70 mg/L and apparent color was 50 CU. Turbidity measured 0.51 NTU at the Olga Water Treatment plant.

**Upper Estuary Conditions:** The oligonaline zone extends from S79 to Fort Myers. Surface salinities at Fort Myers were favorable for tape grass.

**Lower Estuary Condition:** The salinity at Iona (22 psu on 4/27/14) was in the optimal range for oysters. The average salinity at Shell Point (30 psu) was slightly above the optimal range for oysters.

**McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:** Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Ulva* and *Chaetomorpha*) is prevalent in the Refuge impoundments (particularly in the west impoundment). Red macroalgae (*Acanthophora, Dasya*) were also abundant (4/17/14).

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	4.1	124	2.5	1.04
Colonial Br.	4.3	108	3.1	1.09
lona	4.2	75	2.5	1.33

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters Definition of 25% lz: **z where I is 25% of surface I. I** = irradiance, **z**= depth

ACOE Daily Reports							
Date	Day	S79 Flow	S78 Flow	S77 Flow			
		(cfs)	(cfs)	(cfs)			
4/22/2014	Tues	865	808	890			
4/23/2014	Wed	848	509	860			
4/24/2014	Thur	584	365	543			
4/25/2014	Fri	463	NR	NR			
4/26/2014	Sat	343	NR	912			
4/27/2014	Sun	94	300	570			
4/28/2014	Mon	0	0	100			
7 Day	Avg	457					

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: April 29 - May 5, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Freshwater flows have maintained a low salinity zone gradient from S-79 to Fort Myers supporting tape grass and habitat for larval fishes and invertebrates.

**USACE Action:** The USACE initiated a 10 day pulse release on 4/29/14 with average flows of 650 cfs to the estuary at S79.

**Recommendation:** We request flows averaging 650 - 800 cfs to maintain salinity below the MFL and provide a low salinity zone gradient from S-79 to Fort Myers and to maintain salinities in the preferred range for oysters (12-25 psu) in the lower estuary. Sources and causes of color and turbidity levels in the upper estuary, which are impeding restoration of healthy conditions for submerged aquatic vegetation, need to be identified and reduced.

Lake Okeechobee Level:	13.08 ft. (Base Flow Bar	nd)	Last wk: 13.13 ft.		
Lake Okeechobee Inflow:	1,370 cfs	Lake	Okeechobee Outflow: 1,000 cfs		
Weekly Rainfall:	WP Franklin 0.95"	Ortona 1.85"	Moore Haven 2.67"		
Salinity Fort Myers:	4.8 - 9.6 psu SCCF Fort N	lyers Yacht Basin	Previous wk: <b>3.8 - 8.3</b> psu		
	10 -13 psu (SCCF RECON	I Marker 52)	Previous wk 9.8 - 12 psu		
Salinity Beautiful Island:	1.2 - 1.5 psu (SCCF RECC	Previous wk 1.8 - 3.1 psu			
Salinity Shell Point:	20 - 32 psu (SCCF RECOM	N)	Previous wk: 27 - 33 psu		



**Flow & Water Quality:** Flows into the Caloosahatchee estuary at S79 over the past 7 day pulse averaged **1,117 cfs**. Over the past 14 days 23% of Lake Okeechobee outflows were delivered to S77.

A	ACOE A	April 29, 2	014 Pulse	Release		
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	25 salinity
4/29/2014	1	1100	752	434	760	(ns
4/30/2014	2	1700	1748	857	1300	<u>ä</u> 15
5/1/2014	3	1100	1543	970	1400	30 day barm threshold
5/2/2014	4	900	1117	616	804	
5/3/2014	5	700	1265	476	412	and he wanted
5/4/2014	6	400	977	408	0	5 Martin
5/5/2014	7	300	421	277	0	
5/6/2014	8	300	310	174	0	a de de de
5/7/2014	9	0				allogit alt312 alt812 alt312 alt312 alt912
5/8/2014	10	0				0
10 day Av		650				

**Upstream of S79/Franklin Conditions:** On 5/6/14, chlorides measured 68 mg/L and apparent color was 43CU. Turbidity measured 0.72 NTU at the Olga Water Treatment plant.

**Upper Estuary Conditions:** The oligonaline zone extends from S79 to East Fort Myers. Surface salinities at Fort Myers were favorable for tape grass but the salinity has risen this week.

**Lower Estuary Condition:** The salinity at Iona (17 psu on 5/04/14) and the average salinity at Shell Point (28 psu) were within the optimal range for oysters.

*McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:* Although salinity and CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Ulva* and *Chaetomorpha*) is prevalent in the Refuge impoundments (particularly in the west impoundment). Red macroalgae (*Acanthophora, Dasya*) were also abundant (4/17/14).

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	8.1	137	3.2	0.93
Colonial Br.	6.2	115	2.5	1.06
lona	4.2	91	1.9	1.25

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters Definition of 25% lz: **z where I is 25% of surface I. I** = irradiance, **z**= depth

ACOE Daily Reports					
Date	Day	S79 Flow	S78 Flow	S77 Flow	
	Ture				
4/29/2014	Tues	752	434	760	
4/30/2014	Wed	1748	857	1300	
5/1/2014	Thur	1543	970	1400	
5/2/2014	Fri	1117	616	804	
5/3/2014	Sat	1265	476	412	
5/4/2014	Sun	977	408	0	
5/5/2014	Mon	421	277	0	
7 Day	Avg	1117	576	668	

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: May 6 -12, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Dry conditions and lower freshwater flows averaging 650 cfs, are resulting in salinities trending upward approaching 10 psu.

USACE Action: The USACE initiated a 10 day pulse release on 4/29/14 with average flows of 650 cfs to the estuary at S79.

**Recommendation:** We request flows averaging 650 - 800 cfs to maintain salinity below the MFL and provide a low salinity zone gradient from S-79 to Fort Myers and to maintain salinities in the preferred range for oysters (14-28 psu) in the lower estuary.

Lake Okeechobee Level:	12.86 ft. (Base Flow Bar	nd)	Last wk: <b>13. 08 ft</b> .		
Lake Okeechobee Inflow:	1,336 cfs	Lake	e Okeechobee Outflow: 1,470 cfs		
Weekly Rainfall:	WP Franklin 0.15"	Ortona 0.0"	Moore Haven 0.0"		
Salinity Fort Myers:	4.8 - 9.6 psu SCCF Fort M	yers Yacht Basin	Previous wk: <b>4.8 - 9.6</b> psu		
	9.5 - 16 psu (SCCF RECO	N Marker 52)	Previous wk 10 -13 psu		
Salinity Beautiful Island:	1.9 - 4.9 psu (SCCF RECC	DN Marker 18)	Previous wk 1.2 - 1.5 psu		
Salinity Shell Point:	20 - 34 psu (SCCF RECO	N)	Previous wk: 20 - 32 psu		



Flow & Water Quality: Flows into the Caloosahatchee estuary at S79 over the past 7 days averaged **731 cfs**. The 10 day pulse averaged flows of **823 cfs**. Over the past 14 days approximately **21%** of Lake Okeechobee outflows were delivered to S77.



**Upstream of S79/Franklin Conditions:** On 5/13/14, chlorides measured 71 mg/L and apparent color was 44 CU. Turbidity measured 0.71 NTU at the Olga Water Treatment plant.

**Upper Estuary Conditions:** The oligonaline zone extends from S79 to west of Beautiful Island. Surface salinities at Fort Myers were favorable for tape grass but the salinity has risen this week.

**Lower Estuary Condition:** The salinity at Iona (21 psu on 5/11/14) was within the optimal range for oysters. The average salinity at Shell Point (31 psu) was slightly above the optimal range for oysters.

*McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:* Although CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Ulva* and *Chaetomorpha*) is prevalent in the Refuge impoundments (particularly in the west impoundment). Red macroalgae (*Acanthophora, Dasya*) were also abundant (4/17/14). Salinity at McIntyre Creek has been greater than 34 psu since 4/30/14, peaking at 35.2 psu on 5/12/14.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	8.3	127	1.8	1.02
Colonial Br.	4.5	122	1.4	1.1
lona	6.1	74	1.6	1.38

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters Definition of 25% lz: **z where I is 25% of surface I. I** = irradiance, **z**= depth

ACOE Daily Reports					
Date	Day	S79 Flow	S78 Flow	S77 Flow	
		(cfs)	(cfs)	(cfs)	
5/6/2014	Tues	310	174	0	
5/7/2014	Wed	97	59	0	
5/8/2014	Thur	0	0	0	
5/9/2014	Fri	860	567	638	
5/10/2014	Sat	1548	813	1544	
5/11/2014	Sun	1302	833	NR	
5/12/2014	Mon	1000	614	0	
7 Day	Avg	731	437		

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: May 13 -19, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Dry conditions and lower freshwater flows averaging 479 cfs during the past week have resulted in salinities trending upward approaching 10 psu.

USACE Action: The USACE initiated a 10 day pulse release on 5/9/14 with average flows of 650 cfs to the estuary at S79.

**Recommendation:** We request flows averaging 650–800 cfs to maintain salinity in the upper estuary below the MFL harm threshold, to provide a low salinity zone gradient from S-79 to Fort Myers, and to maintain salinities in the preferred range for oysters (14-28 psu) in the lower estuary.

Lake Okeechobee Level:	12.79 ft. (Base Flow Ba	and)	Last wk: <b>12.86 ft</b> .		
Lake Okeechobee Inflow:	1,504 cfs	L	Lake Okeechobee Outflow: 979 cf	S	
Weekly Rainfall:	WP Franklin 0.07"	Ortona 0.64"	Moore Haven 0.62"		
Salinity Fort Myers:	7.8 - 11 psu SCCF Fort N	lyers Yacht Basin	Previous wk: <b>4.8 - 9.6</b> psu		
	9.0 - 15 psu (SCCF RECO	ON Marker 52)	Previous wk 9.5 - 16 psu		
Salinity Beautiful Island:	3.8-7.0 psu (SCCF RECC	N Marker 18)	Previous wk 1.9 - 4.9 psu		
Salinity Shell Point:	20 -35 psu (SCCF RECO	N)	Previous wk: <b>20 - 34</b> psu		



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 over the past 7 days averaged **479 cfs**. The 10 day pulse averaged flows of **713 cfs**. Over the past 14 days, approximately **17%** of Lake Okeechobee outflows were delivered to S77.



**Upstream of S79/Franklin Conditions:** On 5/20/14, chlorides measured 68 mg/L and apparent color was 54 CU. Turbidity measured 0.75 NTU at the Olga Water Treatment plant.

**Upper Estuary Conditions:** The oligonaline zone extends from S79 to west of Beautiful Island. Surface salinities at Fort Myers rose above 10 psu into the harmful range for tapegrass this week.

**Lower Estuary Condition:** The salinity at Iona (22 psu on 5/18/14) was within the optimal range for oysters. The average salinity at Shell Point (30 psu) was slightly above the optimal range for oysters. *Perkinsus marinus* prevalence ranged from 46.66–60%, with an estuary average of 53.33%. The *Perkinsus* intensity ranged from 0.47 – 0.60, with an estuary average of 0.53. Spat recruitment ranged from 0.22-6.28 with an average of 2.55 spat/shell for the estuary.

*McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:* Although CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Ulva* and *Chaetomorpha*) is prevalent in the Refuge impoundments (particularly in the west impoundment). Red macroalgae (*Acanthophora, Dasya*) were also abundant (4/17/14). Salinity at McIntyre Creek has been greater than 34 psu since 4/30/14, peaking at almost 36 psu on 5/17/14.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	4.2	125	4.1	0.96
Colonial Br.	2.6	93	3.0	1.19
lona	3.5	75	3.0	1.30

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters Definition of 25% lz: **z where I is 25% of surface I. I** = irradiance, **z**= depth

ACOE Daily Reports					
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
5/13/2014	Tues	821	652	0	
5/14/2014	Wed	504	490	803	
5/15/2014	Thur	321	174	200	
5/16/2014	Fri	426	176	138	
5/17/2014	Sat	230	176	44	
5/18/2014	Sun	118	52	0	
5/19/2014	Mon	936	414	520	
7 Day	Avg	479	304	243	

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: May 20-26, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Dry conditions and freshwater flows averaging 877 cfs during the past week have resulted in salinities continuing to trend upward throughout the estuary.

**USACE Action:** The USACE initiated a 10 day pulse release on 5/19/14 with average flows of 650 cfs to the estuary measured at S79.

**Recommendation:** We request flows averaging 650–800 cfs to maintain salinity within the upper estuary below the MFL harm threshold, to provide a low salinity zone gradient from S-79 to Fort Myers, and to keep salinities within the preferred range for oysters (14-28 psu) in the lower estuary.

Lake Okeechobee Level:	12.54 ft. (Beneficial Use	Sub-Band)	Last wk: 12.79 ft.
Lake Okeechobee Inflow:	579 cfs	Lake Okeec	hobee Outflow: 3,278 cfs
Weekly Rainfall:	WP Franklin 0.00"	Ortona 0.00"	Moore Haven 0.00"
Salinity Fort Myers:	8.0 -12 psu SCCF Fort My	ers Yacht Basin	Previous wk: <b>7.8 - 11</b> psu
	11 -18 psu (SCCF RECOM	N Marker 52)	Previous wk 9.0 - 15 psu
Salinity Beautiful Island:	<b>2.8 – 4.7</b> psu (SCCF REC	ON Marker 18)	Previous wk 3.8-7.0 psu
Salinity Shell Point:	25 -34 psu (SCCF RECOM	۷)	Previous wk: 20 -35 psu



Fort Myers Yacht Basin

salinity 30D MA

Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 over the past 7 days averaged 877 cfs. The 10 day pulse averaged flows of 729 cfs. Over the past 14 days, approximately 27% of Lake Okeechobee outflows were delivered to S77.

	ACOE	May 19, 20	014 Pulse	Release		]
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	25 SCCF Sonde Surface Salinity at Fo
5/19/2014	1	1100	936	414	520	2
5/20/2014	2	1700	1594	1055	1676	a 15
5/21/2014	3	1100	1422	1357	1936	ity (
5/22/2014	4	900	1016	1177	1666	10 30 day harm threshold
5/23/2014	5	700	799	992	1410	" mount of manuscrime
5/24/2014	6	400	535	<b>568</b>	856	5
5/25/2014	7	300	400	453	1172	
5/26/2014	8	300	370	350	804	0
5/27/2014	9	0	216	118	332	relia when when when alla
5/28/2014	10	0	0	101	530	0 <sup>&amp;1,</sup> 0 <sup>51,</sup> 0 <sup>51,</sup> 0 <sup>51,</sup>
10 day Av		650	729	659	1090	

**Upstream of S79/Franklin Conditions:** On 5/27/14, chlorides measured 68 mg/L and apparent color was 38 CU. Turbidity measured 0.50 NTU at the Olga Water Treatment plant.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 to west of Beautiful Island. Surface salinities are hovering around 10 psu. If there is no rainfall within the Caloosahatchee basin over the next three weeks and freshwater releases from Lake Okeechobee are discontinued, it is predicted that salinity within the upper estuary will exceed the 10 psu 30-day moving average MFL "harm" threshold for tape grass.

**Lower Estuary Condition:** The salinity at Iona (22 psu on 5/27/14) was within the optimal range for oysters. The average salinity at Shell Point (30 psu) was slightly above the optimal range for oysters.

*McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:* Although CDOM conditions are currently within normal ranges at McIntyre Creek, conditions within the refuge have not fully recovered from the extreme high flows during the wet season. Filamentous green algae (*Ulva* and *Chaetomorpha*) is prevalent in the Refuge impoundments (particularly in the west impoundment). Red macroalgae (*Acanthophora, Dasya*) were also abundant (4/17/14). Salinity at McIntyre Creek has been greater than 34 psu since 4/30/14, peaking at almost 36 psu on 5/17/14.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	3.5	117	1.8	1.11
Colonial Br.	1.7	98	1.2	1.29
lona	9.0	77	1.8	1.31

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: **z where I is 25% of surface I. I** = irradiance, **z**= depth



*Lyngbya majuscula* covering seagrass blades near shore at Dixie Beach on Sanibel (5/27/14) at similar densities as in 2006. Floating mats of *Lyngbya* was noted from Cabbage Key to the Causeway this week. (Photo: SCCF)

ACOE Daily Reports					
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
5/20/2014	Tues	1594	1055	1676	
5/21/2014	Wed	1422	1357	1936	
5/22/2014	Thur	1016	1177	1666	
5/23/2014	Fri	799	992	1410	
5/24/2014	Sat	535	568	856	
5/25/2014	Sun	400	453	1172	
5/26/2014	Mon	370	350	804	
7 Day	Avg	877	850	1360	

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: May 27- June 2, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Reduced freshwater flows averaging **476 cfs** during the past week have resulted in increasing salinities in the upper estuary.

**USACE Action:** The USACE initiated a 7 day pulse release on 5/29/14 with average flows of **300 cfs** to the estuary measured at S79. The schedule includes 3 days of zero flow.

**Recommendation:** Estuary responses indicate flows averaging **650–800 cfs** are needed to maintain salinity within the upper estuary below the MFL harm threshold, to provide a low salinity zone gradient from S-79 to Fort Myers, and to keep salinities within the preferred range for oysters (14-28 psu) in the lower estuary. We urge increasing releases to gradually acclimate the estuary for higher volume summer flows and to create additional freeboard in Lake O in preparation for the wet season.

Lake Okeechobee Level:	12.45 ft. (Beneficial Use	Last wk: 12.54 ft.	
Lake Okeechobee Inflow:	471 cfs	Lake Okeech	obee Outflow: 886 cfs
Weekly Rainfall:	WP Franklin 1.33"	Ortona 4.08"	Moore Haven 0.35"
Salinity Fort Myers:	8.6 - 12 psu SCCF Fort Myers Yacht Basin		Previous wk: <b>8.0 - 12</b> psu
	12 – 17 psu (SCCF RECO	N Marker 52)	Previous wk 11 - 18 psu
Salinity Beautiful Island:	<b>3.8 – 6.1</b> psu (SCCF RECC	ON Marker 18)	Previous wk 2.8 – 4.7 psu
Salinity Shell Point:	25 – 34 psu (SCCF RECO	N)	Previous wk: 25 - 34 psu



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 over the past 7 days averaged 476 cfs. Over the past 14 days, approximately 26% of Lake Okeechobee outflows were delivered to S77.

	ACOE I	May 29, 20	14 Pulse	Release		SCCF Sonde Surface Salinity at Fort Myers Yacht Basin
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	20 1 day harm threshold
5/29/2014	1	600	410	148	660	<u>s</u> 15
5/30/2014	2	900	810	272	424	20 day harm threshold
5/31/2014	3	500	603	217	0	
6/1/2014	4	100	230	269	0	ALW UNVERT
6/2/2014	5	0	1064	319	0	5 salinity —
6/3/2014	6	0				30D MA
6/4/2014	7	0				
7 day Avg		300				slowit slowit strait strait shalt shalt

Upstream of S79/Franklin Conditions: On 6/3/14 at the Olga Water Treatment plant, chlorides measured 70 mg/L, apparent color was 48 CU and turbidity measured 0.53 NTU.

**Upper Estuary Conditions:** The oligohaline zone has contracted slightly and now extends from S79 to west of Beautiful Island. Surface salinities at the Fort Myers Yacht Basin are averaging **10 psu**.

Lower Estuary Condition: The salinity at Iona on 6/2/14 was 23 psu, within the optimal range for oysters. The average salinity at Shell Point was 30 psu, slightly above the optimal range for oysters.

*McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:* Floating algal mats have disappeared although a few small mats of *Cladophora* sp. remain in the refuge impoundments.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	6.8	107	1.8	1.14
Colonial Br.	4.7	103	1.4	1.21
Tarpon Bay	3.8	112	5.0	0.98

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: **z where I is 25% of surface I.** I = irradiance, **z**= depth

ACOE Daily Reports							
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)			
5/27/2014	Tues	216	118	332			
5/28/2014	Wed	0	101	530			
5/29/2014	Thur	410	148	660			
5/30/2014	Fri	810	272	424			
5/31/2014	Sat	603	217	0			
6/1/2014	Sun	230	269	0			
6/2/2014	Mon	1064	319	0			
7 Day	Avg	476	206	278			

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: June 3 - 9, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Freshwater flows averaging **515 cfs** during the past week have resulted in increasing salinities in the upper estuary nearing the MFL 10 psu 30 day moving average at Fort Myers.

**USACE Action:** The USACE initiated a 7 day pulse release on 5/29/14 with average flows of **300 cfs** to the estuary measured at S79. The schedule includes 3 days of zero flow.

**Recommendation:** Estuary responses indicate flows averaging **650–800 cfs** are needed to maintain salinity within the upper estuary below the MFL harm threshold, to provide a low salinity zone gradient from S-79 to Fort Myers, and to keep salinities within the preferred range for oysters (14-28 psu) in the lower estuary. We request increasing releases to gradually acclimate the estuary for higher volume summer flows and to create additional freeboard in the Lake in preparation for the wet season.

Lake Okeechobee Level:	12.33 ft. (Beneficial Use	Last wk: 12.45 ft.	
Lake Okeechobee Inflow:	990 cfs	Lake Okeechobee Ou	tflow: 2,120 cfs
Weekly Rainfall:	WP Franklin 0.13"	Ortona 2.55"	Moore Haven 0.19"
MFL Status:	9.8 psu 30 day moving av	verage Fort Myers (SCCF sonde	) MFL target <b>≤10</b> psu
Salinity Fort Myers:	9.4 - 13 psu SCCF Fort M	lyers Yacht Basin	Previous wk: <b>8.6 - 12</b> psu
	14 - 18 psu (SCCF RECC	N Marker 52)	Previous wk 12 – 17 psu
Salinity Beautiful Island:	4.2 - 7.0 psu (SCCF REC	ON Marker 18)	Previous wk 3.8 – 6.1 psu
Salinity Shell Point:	24 – 34 psu (SCCF RECO	DN)	Previous wk: 25 – 34 psu



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 over the past 7 days averaged **515 cfs**. Over the past 14 days, approximately **9%** of Lake Okeechobee outflows were delivered to S77.

ACOE May 29, 2014 Pulse Release						
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
5/29/2014	1	600	410	148	660	
5/30/2014	2	900	810	272	424	
5/31/2014	3	500	603	217	0	
6/1/2014	4	100	230	269	0	
6/2/2014	5	0	1064	319	0	
6/3/2014	6	0	1104	225	0	
6/4/2014	7	0	282	101	0	
7 day Avg		300	643	221	154	

**Upstream of S79/Franklin Conditions:** On 6/10/14 at the Olga Water Treatment plant, chlorides measured **72 mg/L**, apparent color was **48 CU** and turbidity measured **0.38 NTU**.

**Upper Estuary Conditions:** The oligohaline zone has contracted and now extends from S79 to the I75 Bridge. Surface salinities at the Fort Myers Yacht Basin are averaging **10 psu**. A phytoplankton bloom (>10ug chl a  $I^{-1}$ ) of *Akashiwo sanguinea* was detected by the Beautiful Island RECON.

Tape grass was present near Old Bridge Park on 6/7/14.

**Lower Estuary Condition:** The salinity at Iona on 6/8/14 was **21 psu**, within the optimal range for oysters. The average salinity at Shell Point was **29 psu**, slightly above the optimal range for oysters. *Lyngbya* (mat forming cyanobacteria) was still covering seagrass blades in some shallow areas and may be widespread in Pine Island Sound.

*McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:* Floating algal mats have disappeared although a few small mats of *Cladophora* sp. remain in the refuge impoundments.

There is an abundance of fiddler crabs (*Uca* sp.) feeding along Wildlife Drive and the Indigo Trail boardwalk.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	3.9	104	1.2	1.22
Colonial Br.	1.6	95	1.2	1.31
lona	7.8	73	4.3	1.18

Target light penetration: CE- Caloosahatchee Estuary =1 m

SCB-San Carlos Bay = 2.2 meters

Definition of 25% lz: z where I is 25% of surface I. I = irradiance, z= depth







Smalltooth sawfish near Edison Bridge 6/7/14. Photo SCCF

ACOE Daily Reports							
Date	Date Day		S78 Flow (cfs)	S77 Flow (cfs)			
6/3/2014	Tues	1104	225	0			
6/4/2014	Wed	282	101	0			
6/5/2014	Thur	277	38	32			
6/6/2014	Fri	821	362	330			
6/7/2014	Sat	571	403	668			
6/8/2014	Sun	191	98	230			
6/9/2014	Mon	361	0	80			
7 Day	Avg	515	175	191			

## Caloosahatchee Estuary



Lyngbya decomposing in wrack line along Sanibel Causeway 6/10/14. Photo SCCF

Lyngbya near shore in San Carlos Bay on 6/9/14. Photo SCCF



Lyngbya washing ashore on Useppa Island in Pine Island Sound on 6/4/14. Photo Richard Finkel



Red drift algae accumulating along Fort Myers Beach on 6/7/14. Photo James Evans



Macro algae along four miles of Fort Myers Beach 6/11/14. Photo Keith Laakkonen Town FMB



To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: June 10 - 16, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Freshwater flows averaged **1,258 cfs** during the past week. Lower flows the past few weeks caused the 30 day moving average salinity to exceeded 10 psu at the SCCF Fort Myers Yacht Basin sonde.

**USACE Action:** The USACE initiated a 7 day pulse release on 6/5/14 with average flows of **300 cfs** to the estuary measured at S79. The schedule includes 3 days of zero flow.

**Recommendation:** Estuary responses indicate flows averaging **650–800 cfs** are needed to maintain salinity within the upper estuary below the MFL harm threshold, to provide a low salinity zone gradient from S-79 to Fort Myers, and to keep salinities within the preferred range for oysters (14-28 psu) in the lower estuary. We request gradually increasing releases to acclimate the estuary for higher volume summer flows.

Lake Okeechobee Level:	12.61 ft. (Base Flow Sub	-Band)	Last wk: 12.33 ft.		
Lake Okeechobee Inflow:	3,098 cfs	Lake Okeech	obee Outflow: 0 cfs		
Weekly Rainfall:	WP Franklin 2.03"	Ortona 5.21"	Moore Haven 2.91"		
Salinity Fort Myers:	<b>10.4 psu</b> 30 day moving average Fort Myers (SCCF sonde) MFL target <b>≤10</b> psu @ SFWMD Fort Myers Yacht Basin sonde location				
	9.3 - 13 psu SCCF Fort My	vers Yacht Basin	Previous wk: <b>9.4 - 13</b> psu		
	11 - 18 psu (SCCF RECO	N Marker 52)	Previous wk 14 - 18 psu		
Salinity Beautiful Island:	ND psu (SCCF RECON M	arker 18)	Previous wk 4.2 - 7.0 psu		

Salinity Shell Point:

25 - 35 psu (SCCF RECON)

Previous wk: 24 – 34 psu



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 over the past 7 days averaged 1,258 cfs. Over the past 14 days, approximately 8% of Lake Okeechobee outflows were delivered to S77.

ACOE Daily Reports						
Date	Day	S79 Flow	S78 Flow	S77 Flow		
		(cfs)	(cfs)	(cfs)		
6/10/2014	Tues	841	0	130		
6/11/2014	Wed	52	0	56		
6/12/2014	Thur	420	226	152		
6/13/2014	Fri	1483	740	68		
6/14/2014	Sat	2380	986	0		
6/15/2014	Sun	1474	NR	0		
6/16/2014	Mon	2159	536	0		
7 Day	Avg	1258		58		



Upstream of S79/Franklin Conditions: On 6/17/14 at the Olga Water Treatment plant, chlorides measured 72 mg/L, apparent color was 40 CU and turbidity measured 1.04 NTU.

**Upper Estuary Conditions:** The oligonaline zone extends from S79 to the I75 Bridge. Surface salinities at the Fort Myers Yacht Basin are averaging **10 psu**. Chlorophyll spikes were detected by the RECONs at Beautiful Island and Fort Myers. Dinoflagellates (*Ceratium hircus, Akashiwo sanguinea, Gymnodinium* sp.) were dominant at Fort Myers while *Skeletonema* sp. was dominant at Beautiful Island on 6/15/14.

**Lower Estuary Condition:** The salinity at Iona on 6/16/14 was **21 psu**, within the optimal range for oysters. The average salinity at Shell Point was **30 psu**, slightly above the optimal range for oysters. Lyngbya was found in thick mats along the southern end of Fort Myers Beach. A brown macro algae bloom was observed in the surf zone along more than 5 miles of Fort Myers Beach.

*Wildlife impacts:* Three Atlantic spotted dolphins (*Stenella frontalis*) stranded on Fort Myers Beach on 6/12/14. Two of the animals died and a third was transported to Mote Marine Lab in Sarasota.

*McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:* Floating algal mats have disappeared although a few small mats of *Cladophora* sp. remain in the refuge impoundments. There is an abundance of fiddler crabs (*Uca* sp.) feeding along Wildlife Drive and the Indigo Trail boardwalk.

**Oysters:** June sampling by FGCU reported disease prevalence of *Perkinsus marinus* ranged from 40 - 60%. Disease intensity of *P. marinus* ranged from 0.40 - 0.60. (scale 0 = no infection, 1 = low, 3 = medium, 5 = heavy) Larval recruitment for June ranged from 0.14 - 2.00 spat/shell.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	6.8	116	3.4	1.01
Colonial Br.	5.5	92	3.0	1.17
lona	6.9	74	3.2	1.25

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters Definition of 25% Iz: **z where I is 25% of surface I. I** = irradiance, **z**= depth

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: June 17 - 23, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Increased freshwater flows averaging **1,654 cfs** during the past week reduced salinity within the upper estuary. The 30 day moving average salinity was 10 psu at the SCCF Fort Myers Yacht Basin sonde location and is trending downward.

**USACE Action:** The USACE initiated a 10 day pulse release on 6/19/14 with average flows of **650 cfs** to the estuary measured at S79. The schedule includes two days of zero flow.

**Recommendation:** In preparation for the wet season we request flows to meet the ecological targets within the estuary for tape grass, oysters and seagrasss.

Lake Okeechobee Level:	12.89 ft. (Base Flow Sub	-Band)	Last wk: 12.61 ft.		
Lake Okeechobee Inflow:	5,807 cfs	Lake Okeech	obee Outflow: 683 cfs		
Weekly Rainfall:	WP Franklin 0.20"	Ortona 0.44"	Moore Haven 0.60"		
Salinity Fort Myers:	10.0 psu 30 day moving average Fort Myers (SCCF sonde) MFL target <10 psu @ SFWMD Fort Myers Yacht Basin sonde location				
	<b>6.2 – 10</b> psu SCCF Fort My	ers Yacht Basin	Previous wk: <b>9.3 - 13</b> psu		
	8.0 – 16 psu (SCCF RECO	N Marker 52)	Previous wk 11 - 18 psu		
Salinity Beautiful Island:	1.7 - 3.5 psu (SCCF RECC	N Marker 18)	Previous wk ND psu		
Salinity Shell Point:	22 – 34 psu (SCCF RECOM	۱)	Previous wk: 25 - 35 psu		



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 over the past 7 days averaged **1,654 cfs**. Over the past 14 days, approximately **12%** of Lake Okeechobee outflows were delivered to S77.

ACOE June 19, 2014 Pulse Release						
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
6/19/2014	1	1100	1652	593	56	
6/20/2014	2	1700	2592	1129	332	
6/21/2014	3	1100	1578	739	180	
6/22/2014	4	900	1003	371	0	
6/23/2014	5	700	1098	320	0	
6/24/2014	6	400				
6/25/2014	7	300				
6/26/2014	8	300				
6/27/2014	9	0				
6/28/2014	10	0				
10 day Avg		650				



Upstream of S79/Franklin Conditions: On 6/24/14 at the Olga Water Treatment plant, chlorides measured 70 mg/L, apparent color was 68 CU and turbidity measured 1.34 NTU.

Upper Estuary Conditions: The oligonaline zone extends from S79 to the I75 Bridge. Surface salinities at the Fort Myers

Yacht Basin are averaging **10 psu**. Chlorophyll spikes were detected by the RECONs at Beautiful Island and Fort Myers. *Skeletonema* sp. was dominant and dinoflagellates (*Akashiwo sanguinea*, *Gymnodinium* sp.) were present at Fort Myers on 6/22/14.

**Lower Estuary Condition:** The salinity at Iona on 6/16/14 was **19 psu**, within the optimal range for oysters. The average salinity at Shell Point was **28 psu**, within the optimal range for oysters. Lyngbya was still dense near shore in Pine Island Sound and along the Sanibel Causeway.

*Wildlife impacts:* CROW reported treating one pelican and one sea turtle that showed symptoms suggesting exposure to HABs.

# McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:

Over the past week, salinity at McIntyre Creek ranged from **33.7 to 35.6 psu** and CDOM has ranged from **15 to 25 qsde**.

and a state of the second	NEED STREET BUILDING AND STREET			
Denser -				A MARK
		-		
- A-1- 7	and the second second	Creating and	THE COM	
the second second	Post of the			
	and the second	A COLOR		
and that	2. 0.			and a
17.52	Carried ge	Se an	and the second	
	Contraction of the second	and the second		
2 2 2	Selfer			100
Sale Sale				
and a grade start	The second			
	J.	See See		
-18mil		A CALL		
10510	and and	•		
			State and	A COMPLET

Large clumps of *Lyngbya* peeling off the bottom along the Sanibel Causeway 6/19/14. Photo SCCF

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	6.8	116	10.9	0.73
Colonial Br.	5.5	92	1.6	1.13
lona	6.9	74	1.9	1.28

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters Definition of 25% Iz: **z where I is 25% of surface I.** I = irradiance, z = depth

ACOE Daily Reports					
Date	Day	S79 Flow	S78 Flow	S77 Flow	
		(cfs)	(cfs)	(cfs)	
6/17/2014	Tues	1912	772	0	
6/18/2014	Wed	1748	551	0	
6/19/2014	Thur	1652	593	56	
6/20/2014	Fri	2592	1129	332	
6/21/2014	Sat	1578	739	180	
6/22/2014	Sun	1003	371	0	
6/23/2014	Mon	1098	320	0	
7 Day	Avg	1654	639	81	

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: June 24 - 30, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Freshwater flows have reduced salinity below the MFL threshold. Flows are currently in the suitable range for tape grass in the upper estuary and oysters and seagrass in the lower estuary. The majority of flow through S79 the past four weeks has originated in the Caloosahatchee watershed.

**USACE Action:** The USACE initiated a 10 day pulse release on 6/19/14 with average flows of **650 cfs** to the estuary measured at S79. The schedule includes two days of zero flow.

**Recommendation:** Maintain flows to meet the established ecological targets within the estuary for tape grass, oysters and seagrasss.

Lake Okeechobee Level:	12.98 ft. (Base Flow Sub	o-Band)	Last wk: <b>12. 89 ft</b> .		
Lake Okeechobee Inflow:	3,779 cfs	Lake Okeech	obee Outflow: 427 cfs		
Weekly Rainfall:	WP Franklin 2.24"	Ortona 1.11"	Moore Haven 0.57"		
Salinity Fort Myers:	9.2 psu 30 day moving average Fort Myers (SCCF sonde) MFL target <10 psu @ SFWMD Fort Myers Yacht Basin sonde location				
	5.3 – 8.2 psu SCCF Fort N	lyers Yacht Basin	Previous wk: <b>6.2 – 10</b> psu		
	<b>8.0 – 14.0</b> psu (SCCF REC	CON Marker 52)	Previous wk 8.0 – 16 psu		
Salinity Beautiful Island:	1.8 - 3.6 psu (SCCF REC	ON Marker 18)	Previous wk 1.7 - 3.5 psu		
Salinity Shell Point:	22 – 34 psu (SCCF RECO	N)	Previous wk: 22 – 34 psu		



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 for the 10 day pulse release averaged **1,037 cfs** and over the past 7 days averaged **765 cfs**. Over the past 14 days, approximately **28%** of Lake Okeechobee outflows were delivered to S77.



**Upstream of S79/Franklin Conditions:** On 7/1/14 at the Olga Water Treatment plant, chlorides measured **68 mg/L**, apparent color was **94 CU** and turbidity measured **1.24 NTU**. A slight amount of algae was visible in the river at the plant.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 to the I75 Bridge. Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass. Dissolved oxygen dipped below **2 mg/L** at Ft Myers RECON on 6/23/14 and to **3 mg/L** at Beautiful Island on 6/30/14.

**Lower Estuary Condition:** The salinity at Iona on 6/30/14 was **17 psu**, within the optimal range for oysters. The average salinity at Shell Point was **28 psu**, within the optimal range for oysters. Lyngbya was still dense near shore in Pine Island Sound and along the Sanibel Causeway. Small clumps of red drift algae were washing up at Sanibel's Tarpon Beach on 6/30/14.

Red, green and brown drift algae are accumulating in light to moderate clumps along Fort Myers Beach and in the surf zone. Dead *Halodule* and *Thalassia* were also found along the north end of the island. A fine silt was also observed in areas of the wet sand.



*McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:* Salinities and CDOM at McIntyre Creek have fluctuated with rainfall over the past week. Salinity ranged from 30.5 to 35.5 psu and CDOM ranged from 16.5 to 30.2 qse.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	7.8	127	12.1	0.71
Colonial Br.	6.2	102	3.3	1.09
lona	6.6	93	3.5	1.12

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters Definition of 25% lz: **z where l is 25% of surface l. I** = irradiance, **z**= depth

ACOE Daily Reports					
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
6/24/2014	Tues	567	323	0	
6/25/2014	Wed	359	94	48	
6/26/2014	Thur	302	0	158	
6/27/2014	Fri	94	118	152	
6/28/2014	Sat	1125	201	156	
6/29/2014	Sun	936	492	488	
6/30/2014	Mon	1972	632	664	
7 Day	Avg	765	265	238	

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: July 1 - 7, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Freshwater flows have reduced salinity below the MFL threshold. Flows are currently in the suitable range for tape grass in the upper estuary and oysters and seagrass in the lower estuary.

**USACE Action:** The USACE initiated a 10 day pulse release on 6/29/14 with average flows of **650 cfs** to the estuary measured at S79. The schedule includes two days of zero flow.

**Recommendation:** Maintain flows necessary to meet the established ecological targets within the estuary for tape grass, oysters and seagrass. Flows should remain between 650 and 1,000 cfs to help acclimate the system for wet-season flows and maintain the Lake lower to prevent harmful discharges later in the season.

Lake Okeechobee Level:	13.07 ft. (Base Flow S	ub-Band)	Last wk: <b>12.98 ft</b> .		
Lake Okeechobee Inflow:	3,779 cfs	Lake Ol	keechobee Outflow: 427 cfs		
Weekly Rainfall:	WP Franklin 2.24"	Ortona 1.11"	Moore Haven 0.57"		
Salinity Fort Myers:	5.0 – 8.2 psu SCCF For	t Myers Yacht Basin	Previous wk: <b>5.3 – 8.2</b> psu		
	7.9 – 13 psu (SCCF RE	CON Marker 52)	Previous wk <b>8.0 – 14.0</b> psu		
Salinity Beautiful Island:	1.6 – 2.6 psu (SCCF RE	CON Marker 18)	Previous wk 1.8 - 3.6 psu		
Salinity Shell Point:	<b>21 – 34</b> psu (SCCF REC	Previous wk: <b>22 – 34</b> psu			



**Flow & Water Quality:** Flows into the Caloosahatchee Estuary at S79 over the past 7 days averaged **648 cfs**. The past 14 days, approximately **28%** of Lake Okeechobee outflows were delivered to S77.

A	ACOE J	lune 29, 2	014 Pulse	Release		
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	25 SCCF Sonde Surface Salinity at Fort Myers Yacht Basin 20 1 day harm threshold
6/29/2014	1	1100	936	492	488	(ns.
6/30/2014	2	1700	1972	632	664	
7/1/2014	3	1100	1400	634	668	30 day harm threshold
7/2/2014	4	900	980	192	326	manufacture and a property with
7/3/2014	5	700	618	132	467	5
7/4/2014	6	400	500	96	511	30D MA
7/5/2014	7	300	350	0	168	da da da da
7/6/2014	8	300	302	0	170	solonis solizit solizit solizit solizit
7/7/2014	9	0	385	0	108	
7/8/2014	10	0	1315	226	0	
10 day Avg		650	876	240	357	

**Upstream of S79/Franklin Conditions:** On 7/8/14 at the Olga Water Treatment plant, chlorides measured **68 mg/L**, apparent color was **126 CU** and turbidity measured **1.05 NTU**. No algae were visible in the river at the plant over the last week.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 to Fort Myers. Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass. Chlorophyll levels were elevated at Fort Myers 7/06/14 with a mixture of small flagellates, diatoms and dinoflagellates.

**Lower Estuary Condition:** On 7/06/14 the salinities at Iona (19) and Shell Point (28) were within the optimal range for oysters. Dissolved oxygen at Shell Point dipped below 3 mg/L twice during the week. Minor amounts of drift algae and dead *Thalassia* were found on Fort Myers Beach on 7/7/14.

No *Karenia brevis* was found in SCCF samples from Pine Island Sound, Ft. Myers Beach, the Gulf RECON station and Sanibel beaches during the last week.

*Lyngbya* spp. was still covering seagrass shoots at Dixie Beach on the bay side of Sanibel 7/08/14 (attached photo). There are numerous benthic diatoms and dinoflagellates associated with the floating *Lyngbya* spp. mats. The dinoflagellates included *Prorocentrum* spp.

McIntyre Creek and Tarpon Bay in J.N. "*Ding*" Darling NWR: Salinities and CDOM at McIntyre Creek have fluctuated with rainfall over the past week. Salinity ranged from 32.5 to 34.5 psu and CDOM ranged from 17 to 27 qse. *Halodule* and *Syringodium* have been washing ashore along Wildlife Drive and Tarpon Bay, respectively.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	13.1	154	3.6	0.83
Colonial Br.	6.5	113	2.6	1.07
lona	9.7	76	2.8	1.24

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: **z where I is 25% of surface I.** I = irradiance, **z**= depth

ACOE Daily Reports					
Date	Day	S79 Flow	S78 Flow	S77 Flow	
		(cfs)	(cfs)	(cfs)	
7/1/2014	Tues	1400	634	668	
7/2/2014	Wed	980	192	326	
7/3/2014	Thur	618	132	467	
7/4/2014	Fri	500	96	511	
7/5/2014	Sat	350	0	168	
7/6/2014	Sun	302	0	170	
7/7/2014	Mon	385	0	108	
7 Day	Avg	648	151	345	



Red drift algae and seagrass washing up on Fort Myers Beach 7/8/14.



*Lyngbya* spp. covering seagrass shoots at Dixie Beach on bay side of Sanibel 7/8/14.

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: July 8 - 15, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Freshwater flows have reduced salinity below the MFL threshold. Flows are currently in the suitable range for tape grass in the upper estuary and oysters and seagrass in the lower estuary. Heavy rainfall within the basin is resulting in average flows of 2,220 cfs, with no releases from S77.

**USACE Action:** The USACE initiated a 10 day pulse release on 7/9/14 with average flows of **650 cfs** to the estuary measured at S79. The schedule includes two days of zero flow.

**Recommendation:** Maintain flows necessary to meet established ecological targets within the estuary for tape grass, oysters and seagrass. Flows should remain below the high-flow harm threshold of 2,800 cfs at S79. All efforts should be made to send water south and utilize all public and private disbursed water storage, as well as all emergency storage options, prior to exceeding the Caloosahatchee's high-flow harm threshold.

Lake Okeechobee Level:	13.38 ft. (Base Flow Su	b-Band)	Last wk: <b>13.07 ft</b> .		
Lake Okeechobee Inflow:	4,307 cfs	Lake C	Dkeechobee Outflow: -69 cfs		
Weekly Rainfall:	WP Franklin 1.16"	Ortona 1.02"	Moore Haven 2.21"		
Salinity Fort Myers:	4.3 – 9.0 psu SCCF Fort Myers Yacht Basin		Previous wk: <b>5.0 – 8.2</b> psu		
	7.1 – 13 psu (SCCF REC	ON Marker 52)	Previous wk <b>7.9 – 13.0</b> psu		
Salinity Beautiful Island:	<b>0.6 – 2.4</b> psu (SCCF REC	CON Marker 18)	Previous wk 1.6 - 2.6 psu		
Salinity Shell Point:	<b>19 – 34</b> psu (SCCF RECO	Previous wk: 21 – 34 psu			



**Flow & Water Quality:** Flows into the Caloosahatchee Estuary at S79 over the past 7 days averaged **2,220 cfs**. Flows at S79 were the result of rainfall within the watershed, with no discharges from S77 during the past week. During the past 14 days approximately **24%** of Lake Okeechobee outflows were delivered to S77.

	ACOE	July 9, 20	14 Pulse I	Release		
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	25 SCCF Sonde Surface Salinity at Fort Myers Yacht Basin 20 1 day harm threshold
7/9/2014	1	1100	2463	873	0	(ns.
7/10/2014	2	1700	2787	1300	0	<u>a</u> 15
7/11/2014	3	1100	2592	1379	0	30 day harm threshold
7/12/2014	4	900	2023	1024	0	When and a la the man demand when
7/13/2014	5	700	2874	901	0	5
7/14/2014	6	400	1486	764	0	30D MA
7/15/2014	7	300	2308	703	0	a a a a a a a a a a a a a a a a a a a
7/16/2014	8	300				solution of the solution of th
7/17/2014	9	0				
7/18/2014	10	0				
10 day Avg		650				

**Upstream of S79/Franklin Conditions:** On 7/15/14 at the Olga Water Treatment plant, chlorides measured **65 mg/L**, apparent color was **128 CU** and turbidity measured **0.38 NTU**. No algae were visible in the river at the plant over the last week.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 to Fort Myers. Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass. Chlorophyll levels were elevated at Fort Myers 7/13/14 with a mixture of small flagellates and dinoflagellates along with a bloom of a heterotrophic flagellate *Peranema trichophorum*  $5.8 \times 10^6$  cells l<sup>-1</sup>). Dissolved oxygen at the Ft. Myers and Beautiful Island RECONs dipped into the hypoxic range (<3 mg l<sup>-1</sup>) during the week. Light levels at depth were too low for submersed widgeon grass and tape grass east of Fort Myers because of surface runoff.

**Lower Estuary Condition:** On 7/13/14 the salinities at Iona (16 psu) and Shell Point (25 psu) were within the optimal range for oysters. *Lyngbya* was still present along the Causeway and in near shore seagrass beds along the eastern shoreline of Sanibel. Dissolved oxygen at the Shell Point RECON dipped into the hypoxic range (<3 mg  $l^{-1}$ ) during the week.

**Caloosahatchee Oysters:** In July, *Perkinsus* intensity ranged from 0.40-0.60 with an estuary average of 0.48. *Perkinsus* prevalence ranged from 35-60% with an estuary average of 45%. Spat recruitment ranged from 0.36-0.56 spat per shell, estuary average was 0.47 spat/shell.

**McIntyre Creek and Tarpon Bay in J.N.** *"Ding"* Darling NWR: Over the past week salinity at McIntyre Creek ranged from 30.0 to 33.0 psu and CDOM ranged from 16 to 33 qse. *Halodule* and *Syringodium* have been washing ashore along Wildlife Drive and Tarpon Bay, respectively, possibly due to low dissolved oxygen. Mats of *Cladophora* are still present in the west impoundment but appear to be decaying.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	14.9	154	3.1	0.84
Colonial Br.	9.6	95	3.7	1.07
lona	3.9	32	2.5	1.78

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters

Definition of 25% Iz: z where I is 25% of surface I. I = irradiance, z= depth

ACOE Daily Reports				
Date	Day	S79 Flow	S78 Flow	S77 Flow
		(CIS)	(CIS)	(CIS)
7/8/2014	Tues	1,315	226	0
7/9/2014	Wed	2,463	873	0
7/10/2014	Thur	2,787	1,300	0
7/11/2014	Fri	2,592	1,379	0
7/12/2014	Sat	2,023	1,024	0
7/13/2014	Sun	2,874	901	0
7/14/2014	Mon	1,486	764	0
7 Day	Avg	2,220	924	0



Photo of *Lyngbya majuscula* on seagrass shoots along the Sanibel Causeway 7/14/14.



Cladophora spp. in the J.N. "Ding" Darling NWR 7/8/14



Photos of *Lyngbya* spp. and seagrass along shoreline of Lighthouse Beach on Sanibel 7/15/14.

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: July 15 - 21, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Freshwater flows averaging **2,238 cfs** at S79, predominantly from the watershed, further reduced estuary salinities the past week. Flows are currently in the suitable range for tape grass in the upper estuary and oysters and seagrass in the lower estuary.

**USACE Action:** The USACE initiated a 10 day pulse release on 7/19/14 with average flows of **1,500 cfs** to the estuary measured at S79.

**Recommendation:** With the return of excess flows we request an update on the weekly calls regarding storage options and volumes being stored and a comprehensive discussion of flows and impacts on all parts of the system. We request flows to the Caloosahatchee remain below the high-flow harm threshold of 2,800 cfs at S79. All efforts should be made to send water south and utilize all public and private disbursed water storage, as well as all emergency storage options.

Lake Okeechobee Level:	13.70 ft. (Base Flow Sub-Band)		Last wk: <b>13.38 ft</b> .
Lake Okeechobee Inflow:	8,405 cfs	Lake	Okeechobee Outflow: 1,481 cfs
Weekly Rainfall:	WP Franklin 0.90"	Ortona 1.22"	Moore Haven 2.45"
Salinity Fort Myers:	1.7 -5.2 psu SCCF Fort M	lyers Yacht Basin	Previous wk: 4.3 – 9 psu
	<b>3.3 – 9.8</b> psu (SCCF REC	CON Marker 52)	Previous wk 7.1 – 13 psu
Salinity Beautiful Island:	0.3 -1.1 psu (SCCF REC	Previous wk 0.6 – 2.4 psu	
Salinity Shell Point:	16 -32 psu (SCCF RECO	N)	Previous wk: 19 – 34 psu



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 over the past 10 day pulse averaged 2,404 cfs and over the past 7 days averaged 2,238 cfs. Flows at S79 were predominately from rainfall within the watershed. During the past 14 days, approximately 80% of Lake Okeechobee outflows were delivered to S77.



Upstream of S79/Franklin Conditions: On 7/22/14 at the Olga Water Treatment plant, chlorides measured 68 mg/L, apparent color was 112 CU and turbidity measured 1.09 NTU. No algae were visible in the river at the plant over the last week.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 to Fort Myers. Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass. Chlorophyll levels were spiking at Fort Myers RECON with a bloom of a heterotrophic flagellate *Peranema trichophorum*. **Dissolved oxygen at the Ft. Myers RECON dipped below 2 mg I<sup>-1</sup>** during the week, and the **Beautiful Island level dropped below 3 mg I<sup>-1</sup>**. Light levels at depth were too low for submersed widgeon grass and tape grass east of Fort Myers because of surface runoff.

**Lower Estuary Condition:** The salinities at Iona (**15 psu**) and Shell Point (**24 psu**) were in the optimal range for oysters. Lyngbya was still present in lower densities along the Causeway and the near shore seagrass beds along the eastern shoreline of Sanibel. **Dissolved oxygen at the Shell Point RECON dipped into the hypoxic range (<3 mg I<sup>-1</sup>)** during the week.

**McIntyre Creek and Tarpon Bay in J.N.** *"Ding"* Darling NWR: Salinity at McIntyre Creek ranged from **28 psu** on 7/17/14 to **31.5 psu** on 7/21/14 and CDOM ranged from **17** to **28 qse** over the same time period. *Halodule* and *Syringodium* have been washing ashore along Wildlife Drive and Tarpon Bay, respectively, possibly due to low dissolved oxygen. Mats of *Cladophora* are still present in the west impoundment but appear to be decaying.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	16	228	3.3	0.65
lona	11.3	115	3.0	1.0
Causeway	9.8	32	4.6	1.54

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: **z where l is 25% of surface l.** l = irradiance, z = depth

ACOE Daily Reports				
Date	Day S79 Flow S78 Flow		S77 Flow	
		(cfs)	(cfs)	(cfs)
7/15/2014	Tues	2308	703	0
7/16/2014	Wed	1942	910	0
7/17/2014	Thur	1916	815	0
7/18/2014	Fri	2010	815	0
7/19/2014	Sat	2174	1091	577
7/20/2014	Sun	2778	1710	1266
7/21/2014	Mon	2544	1710	1386
7 Day	Avg	2238	1107	461

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: July 22 - 28, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Freshwater flows over the past week averaged **1,660 cfs** at S79, predominantly from watershed runoff. Flows are currently in the suitable range for tape grass in the upper estuary and oysters and seagrass in the lower estuary. Hypoxia occurred in the upper estuary over the past week.

**USACE Action:** The USACE initiated a 10 day pulse release on 7/19/14 with average flows of **1,500 cfs** to the estuary measured at S79.

**Recommendation:** We request flows to the Caloosahatchee remain below the high-flow harm threshold of 2,800 cfs at S79. All efforts should be made to send water south and utilize all public and private disbursed water storage, as well as all emergency storage options.

Lake Okeechobee Level: 13.91 ft. (Low Sub-Band)		Last w	Last wk: <b>13.70 ft</b> .		
Lake Okeechobee Inflow:	5,850 cfs	Lake Okeecho	bee Outflow: 440 cfs		
Weekly Rainfall:	WP Franklin 0.46"	Ortona 3.06"	Moore Haven 2.06"		
Salinity Fort Myers:	1.5 - 3.4 psu SCCF Fort Myers Yacht Basin		Previous wk: 1.7 - 5.2 psu		
	2.0 – 7.0 psu (SCCF RECO	N Marker 52)	Previous wk 3.3 – 9.8 psu		
Salinity Beautiful Island:	0.3 -1.1 psu (SCCF RECON	Narker 18)	Previous wk 0.3 - 1.1 psu		
Salinity Shell Point:	16 - 33 psu (SCCF RECON	)	Previous wk: 16 - 32 psu		


**Flow & Water Quality:** Flows into the Caloosahatchee Estuary at S79 over the past 10 day pulse averaged **1,911 cfs** and over the past 7 days averaged **1,660 cfs.** Flows at S79 were predominantly from rainfall within the watershed. During the past 14 days, approximately **70%** of Lake Okeechobee outflows were delivered to S77.



Upstream of S79/Franklin Conditions: On 7/30/14 at the Olga Water Treatment plant, chlorides measured 60 mg/L, apparent color was 112 CU and turbidity measured 0.84 NTU.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 to Fort Myers. Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass. **Dissolved oxygen at the Ft. Myers RECON dipped into the hypoxic range** ( $\leq 3 \text{ mg I}^{-1}$ ) during the week. Light levels at depth were too low for submersed widgeon grass and tape grass east of Fort Myers because of surface runoff.

**Lower Estuary Condition:** The salinities at Iona (15 psu) and Shell Point (24 psu) were in the optimal range for oysters. Lyngbya was still present in lower densities along the Causeway and the near shore seagrass beds along the eastern shoreline of Sanibel.

McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR: Over the last week, salinity at McIntyre Creek ranged from approximately 30 to 31.6 psu and CDOM ranged from 17 to 25.5 qse. Salinity at Tarpon Bay ranged from approximately 30 to 33.4 psu and CDOM ranged from approximately 13.5 to 22.5 qse. Halodule and Syringodium have been washing ashore along Wildlife Drive and Tarpon Bay, respectively, possibly due to low dissolved oxygen. Mats of Cladophora are still present in the west impoundment but appear to be decaying.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	4.5	215	3.6	0.65
lona	7.1	124	3.0	1.0
Causeway	3.3	33	4.6	1.54

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters Definition of 25% Iz: **z where I is 25% of surface I**.

I = irradiance, z = depth

ACOE Daily Reports					
Date	Day	S79 Flow	S78 Flow	S77 Flow	
		(cfs)	(cfs)	(cfs)	
7/22/2014	Tues	2291	1233	835	
7/23/2014	Wed	2171	1322	340	
7/24/2014	Thur	2197	1194	104	
7/25/2014	Fri	1403	767	0	
7/26/2014	Sat	1364	507	0	
7/27/2014	Sun	1062	324	0	
7/28/2014	Mon	1134	152	0	
7 Day	Avg	1660	785	182	

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: July 29 - August 4, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Freshwater flows to the estuary over the past week averaged **2,337 cfs** at S79, predominantly from watershed runoff. Flows are currently in the suitable range for tape grass in the upper estuary and oysters and seagrass in the lower estuary. However light levels are too low to sustain SAV in the upper estuary. Hypoxia occurred in the upper estuary over the past week.

**USACE Action:** The USACE initiated a 10 day pulse release on 7/29/14 with average flows of **1,500 cfs** to the estuary measured at S79.

**Recommendation:** We request flows to the Caloosahatchee remain below the high-flow harm threshold of 2,800 cfs at S79. Storage within the Caloosahatchee watershed should be prioritized and maximized to attenuate harmful flows. All efforts should be made to send water south and utilize all public and private disbursed water storage and emergency storage options, before exceeding 2,800 CFS at S79.

Lake Okeechobee Level: 14.07 ft. (Low Sub-Band)		Last wk: <b>13.91 ft</b> .		
Lake Okeechobee Inflow:	5,981 cfs	Lake Okee	chobee Outflow: 1,220 cfs	
Weekly Rainfall:	WP Franklin 2.06"	Ortona 5.08"	Moore Haven 2.17"	
Salinity Fort Myers:	1.0 -7.0 psu (SCCF RECON Mark	er 52)	Previous wk 2.0 – 7.0 psu	
Salinity Beautiful Island:	<b>0.2 – 0.3</b> psu (SCCF RECON Mar	ker 18)	Previous wk 0.3 -1.1 psu	
Salinity Shell Point:	14 – 32 psu (SCCF RECON)		Previous wk: 16 - 33 psu	



**Flow & Water Quality:** Flows into the Caloosahatchee Estuary at S79 over the past 7 days averaged **2,337 cfs.** The majority of flows at S79 were from the Caloosahatchee watershed. The past 14 days, approximately **22%** of Lake Okeechobee outflows were delivered to the Caloosahatchee via S77.

ACOE July 29, 2014 Pulse Release					
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)
7/29/2014	1	2100	1892	5190	0
7/30/2014	2	2700	2753	1133	912
7/31/2014	3	2300	2722	1336	714
8/1/2014	4	2000	2306	1061	390
8/2/2014	5	1700	2089	720	180
8/3/2014	6	1400	2431	669	50
8/4/2014	7	1100	2168	782	0
8/5/2014	8	800			
8/6/2014	9	600			
8/7/2014	10	300			
10 day Avg		1500			



Upstream of S79/Franklin Conditions: On 8/4/14 at the Olga Water Treatment plant, chlorides measured 64 mg/L, apparent color was 188 CU and turbidity measured 1.24 NTU.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 to the Colonial Bridge. Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass.

**Dissolved oxygen at the Ft. Myers RECON dipped below 2 mg I<sup>-1</sup> during the week.** Light levels at depth were too low for submersed widgeon grass and tape grass east of Fort Myers because of surface runoff.

**Lower Estuary Condition:** The salinity at Iona (12 psu) dropped below the optimum level for oysters, while salinity at Shell Point (23 psu) was in the optimal range for oysters.

*Lyngbya* was still present in lower densities along the Causeway and the near shore seagrass beds along the eastern shoreline of Sanibel. Dead *Thalassia* was observed washing up along central Fort Myers Beach and heavy



accumulations of red drift algae were present along the south end of Fort Myers Beach. Town officials have received numerous complaints.

McIntyre Creek and Tarpon Bay in J.N. "*Ding*" Darling NWR: Over the last week, salinity at McIntyre Creek ranged from approximately 28 to 32 psu and CDOM ranged from 18 to 26.5 qse. Salinity at Tarpon Bay ranged from approximately 27 to 32.5 psu and CDOM ranged from approximately 18 to 27 qse.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	7.4	251	2.5	0.65
lona	8.5	157	2.7	0.87
Causeway	4.0	44	3.3	1.53

Target light penetration: **CE**- Caloosahatchee Estuary =1 m

SCB-San Carlos Bay = 2.2 meters

Definition of 25% lz: z where I is 25% of surface I. I = irradiance, z= depth

ACOE Daily Reports					
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
7/29/2014	Tues	1892	5190	0	
7/30/2014	Wed	2753	1133	912	
7/31/2014	Thur	2722	1336	714	
8/1/2014	Fri	2306	1061	390	
8/2/2014	Sat	2089	720	180	
8/3/2014	Sun	2431	669	50	
8/4/2014	Mon	2168	782	0	
7 Day	Avg	2337	1556	321	



Red drift algae washing up in the surf and shoreline on Fort Myers Beach, 8/6/14. Photos: Town of Fort Myers Beach. Red drift algae washing up in the surf and deposited along miles of shoreline on Fort Myers Beach, 8/1/14.



To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: August 5 - 11, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Five of the past seven days freshwater flows to the estuary exceeded 2,800 cfs at S79. All flow the past week originated from watershed basin runoff. Flows are currently in the suitable range for tape grass in the upper estuary but light levels are too low to sustain SAV in the upper estuary where dissolved oxygen continues to **dip below 2 mg**  $\Gamma^{1}$ . Salinities in the lower estuary are dropping below the optimal range for oysters in Iona.

**USACE Action:** The USACE initiated a 10 day pulse release on 7/29/14 with average flows of **1,500 cfs** to the estuary measured at S79.

**Recommendation:** We request flows to the Caloosahatchee remain below the high-flow harm threshold of 2,800 cfs at S79. Storage within the Caloosahatchee watershed should be prioritized and maximized to attenuate harmful flows. All efforts should be made to send water south and utilize all public and private disbursed water storage and emergency storage options.

Lake Okeechobee Level:	14.30 ft. (Low Sub-Band)		Last wk: 14.07 ft.
Lake Okeechobee Inflow:	7,979 cfs	Lake Okeech	nobee Outflow: 2,900 cfs
Weekly Rainfall:	WP Franklin 0.97"	Ortona 0.28"	Moore Haven 1.03"
Salinity Fort Myers:	0.3 - 6.0 psu (SCCF RECON Mark	ker 52)	Previous wk <b>1.0 - 7.0</b> psu
Salinity Beautiful Island:	<b>0.2 – 0.3</b> psu (SCCF RECON Mar	ker 18)	Previous wk 0.2 – 0.3 psu
Salinity Shell Point:	12 – 31 psu (SCCF RECON)		Previous wk: <b>14 – 32</b> psu



**Flow & Water Quality:** Flows into the Caloosahatchee Estuary at S79 over the past 10 day pulse averaged **2,458** cfs and over the past 7 days averaged **3,097 cfs.** All flow to the estuary at S79 was from the Caloosahatchee watershed. The past 14 days, approximately **9 %** of Lake Okeechobee outflows were delivered to the Caloosahatchee via S77.



Upstream of S79/Franklin Conditions: On 8/12/14 at the Olga Water Treatment plant, chlorides measured 54 mg/L, apparent color was 168 CU and turbidity measured 1.24 NTU.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 downstream to the Cape Coral Bridge. Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass. Dissolved oxygen at the Ft. Myers RECON dipped below 2 mg  $\Gamma^1$  during the week but has been rising as the flow increased. **Light levels at depth were too low for submersed widgeon grass and tape grass east of Fort Myers because of surface runoff.** 

Lower Estuary Condition: The salinity at Iona (9 psu) remains below the optimum level for oysters, while average salinity at Shell Point (22 psu) was in the optimal range for oysters. *Lyngbya* was still present in the near shore seagrass beds along the Causeway and along the eastern shoreline of Sanibel. Water column chlorophyll levels were elevated at Iona Cove with diatoms (*Skeletonema* sp.) dominant. A harmful algal bloom of *Pyrodinium bahamense* was present in parts of Pine Island Sound on 8/4/14 (FDACS/FWRI) and was present at 33,000 cells/L on 8/11/14 (SCCF) in Roosevelt Channel, Captiva where the bioluminescence has recently been notable.

**McIntyre Creek and Tarpon Bay in J.N.** *"Ding"* Darling NWR: Since late May/early June, the average salinity at McIntye Creek has dropped from 35 to 28 psu and the average CDOM has risen from 20 to 25 qse. The average salinity at Tarpon Bay dropped from 35 to 30 psu and CDOM has risen from 15 to 23 over the same time period.



Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)	
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m	
Ft. Myers	4.4	270	2.5	0.62	i  -
lona	15.6	134	2.7	0.86	i –
Causeway	4.0	44	3.3	1.44	

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: **z where I is 25% of surface I.** I = irradiance, **z**= depth

ACOE Daily Reports					
Date	Day	S79 Flow	S78 Flow	S77 Flow	
		(cfs)	(cfs)	(cfs)	
8/5/2014	Tues	3003	790	0	
8/6/2014	Wed	2389	787	0	
8/7/2014	Thur	2826	664	0	
8/8/2014	Fri	2547	638	0	
8/9/2014	Sat	4320	626	0	
8/10/2014	Sun	3344	596	0	
8/11/2014	Mon	3253	482	0	
7 Day	Avg	3097	654	0	



Lyngbya clumps on shoalgrass blades near shore Sanibel, 8/10/14. Photo SCCF

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: August 12 - 18, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Flows to the estuary averaged **2,893 cfs** over the past week, exceeding the 2,800 **cfs** high flow ecological threshold at S79. The majority of the flows are from excess watershed runoff. Flows are currently in the suitable range for tape grass in the upper estuary, but light levels are too low to sustain SAV in the upper estuary and **dissolved oxygen continues to dip below 3 mg**  $\Gamma^{1}$ . **Salinities in the lower estuary are below the optimal range for oysters in Iona.** 

**USACE Action:** The USACE initiated a 10 day pulse release on 8/8/14 with average flows of **1,500 cfs** to the estuary measured at S79.

**Recommendation:** We request flows to the Caloosahatchee remain below the high-flow harm threshold of 2,800 cfs at S79. **Storage within the Caloosahatchee watershed should be prioritized and maximized to attenuate harmful flows from the watershed**. All efforts should be made to send water south and utilize all public and private disbursed water storage and emergency storage options.

Lake Okeechobee Level: 14.51 ft. (Low Sub-Band)			Last wk: 14.30 ft.
Lake Okeechobee Inflow:	8,558 cfs	Lake Okeech	nobee Outflow: 2,254 cfs
Weekly Rainfall:	WP Franklin 3.36"	Ortona 0.88"	Moore Haven 1.96"
Salinity Fort Myers:	<b>0.3 – 1.0</b> psu (SCCF RECON Mar	ker 52)	Previous wk <b>0.3 - 6.0</b> psu
Salinity Beautiful Island:	0.2 – 0.3 psu (SCCF RECON Mar	ker 18)	Previous wk 0.2 – 0.3 psu
Salinity Shell Point:	10 – 30 psu (SCCF RECON)		Previous wk: <b>12 – 31</b> psu



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 over the past 10 day pulse averaged **3,080 cfs** and over the past 7 days averaged **2,893 cfs.** Nearly all flow to the estuary at S79 was from the Caloosahatchee watershed. The past 14 days, approximately < **1** % of Lake Okeechobee outflows were delivered to the Caloosahatchee via S77.



Upstream of S79/Franklin Conditions: On 8/19/14 at the Olga Water Treatment plant, chlorides measured 52 mg/L, apparent color was 209 CU and turbidity measured 1.92 NTU.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 downstream to the Cape Coral Bridge. Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass but light levels are too low to sustain SAV. Dissolved oxygen at the Beautiful Island RECON dipped below 3 mg l<sup>-1</sup> during the week.

Lower Estuary Condition: The salinity at Iona (8 psu) remains below the optimum level for oysters, while average salinity at Shell Point (20 psu) was in the optimal range for oysters. *Lyngbya* was still present in the near shore seagrass beds along the Causeway and along the eastern shoreline of Sanibel. Water column chlorophyll levels were elevated at Iona Cove with diatoms (*Skeletonema* sp.) dominant. SCCF found no *Karenia* in samples from around Sanibel. The freshwater plume from the Caloosahatchee is now extending to Point Ybel on Sanibel.

McIntyre Creek and Tarpon Bay in J.N. "*Ding*" Darling NWR: Over the last week salinity at McIntyre Creek ranged from 26 to 31 psu and CDOM ranged from 19 to 31 qse. Salinity at Tarpon Bay ranged from 26 to 32 psu over the same time period. CDOM data for Tarpon Bay is unavailable due to a malfunctioning sensor.

*Red Tide:* A large offshore bloom of *Karenia brevis*, the Florida red tide organism, has been detected this month in the northeast Gulf of Mexico. Satellite images show a patchy bloom up to 60 miles wide and 90 miles long, at least 20 miles offshore between Dixie and northern Pinellas counties No bloom concentrations of red tide have been detected alongshore or inshore southwest Florida

*Wildlife Impacts:* 1 goliath grouper washed up on Captiva while Sanibel had six dead sea turtles wash up and fish kills of menhaden and anchovies. Red tide was not found in samples, the cause of these die offs unknown at this time.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)	
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m	
lona	10.0	196	3.8	0.73	-
Causeway	4.8	56	2.7	1.47	_
Sanibel Bch.	1.3	26	3.3	1.81	
	•				

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters Definition of 25% lz: **z where I is 25% of surface I. I** = irradiance, **z**= depth

ACOE Daily Reports				
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)
8/12/2014	Tues	2060	269	37
8/13/2014	Wed	1560	170	123
8/14/2014	Thur	2363	172	122
8/15/2014	Fri	2993	370	0
8/16/2014	Sat	4278	488	0
8/17/2014	Sun	4088	595	0
8/18/2014	Mon	2910	475	0
7 Day	Avg	2893	362	40



A mile long fish kill on Sanibel beach at Tradewinds towards Bowman's included anchovies, minnow species and one baby lookdown. 8/18/14. Photo SCCF



Goliath grouper washed up on Captiva Island 8/19/14. Photo SCCF

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: August 19 - 25, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Flows to the estuary at S79 averaged **1,757 cfs** over the past week. The majority of the flows are from watershed runoff. Flows are currently in the suitable range for tape grass in the upper estuary, but **light** levels are too low to sustain SAV in the upper estuary and dissolved oxygen continues to dip below 3 mg I<sup>-1.</sup> Salinities in the lower estuary are below the optimal range for oysters in Iona.

**USACE Action:** The USACE initiated a 10 day pulse release on 8/18/14 with average flows of **1,500 cfs** to the estuary measured at S79.

**Recommendation:** We request flows to the Caloosahatchee remain below the high-flow harm threshold of 2,800 cfs at S79. **Storage within the Caloosahatchee watershed should be prioritized and maximized to attenuate harmful flows from the watershed**. All efforts should be made to send water south and utilize all public and private disbursed and emergency water storage options.

Lake Okeechobee Level:	ce Okeechobee Level: 14.49 ft. (Low Sub-Band)		Last wk: <b>14.51 ft</b> .		
Lake Okeechobee Inflow:	4,930 cfs	Lake Okeecho	obee Outflow: 4,670 cfs		
Weekly Rainfall:	WP Franklin 0.17"	Ortona 0.11"	Moore Haven 0.25"		
Salinity Fort Myers:	0.3 – 4.0 psu (SCCF RECON Mar	<er 52)<="" th=""><th>Previous wk <b>0.3 – 1.0</b> psu</th></er>	Previous wk <b>0.3 – 1.0</b> psu		
Salinity Beautiful Island:	0.2 - 0.2 psu (SCCF RECON Mar	ker 18)	Previous wk 0.2 – 0.3 psu		
Salinity Shell Point:	10 – 31 psu (SCCF RECON)		Previous wk: <b>10 – 30</b> psu		



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 over the past 7 days averaged **1,757 cfs.** Nearly all flow to the estuary was from the Caloosahatchee watershed. The past 14 days, approximately **2** % of Lake Okeechobee outflows were delivered to the Caloosahatchee via S77.

ACOE August 18, 2014 Pulse Release						
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
8/18/2014	1	2100	2910	475	0	
8/19/2014	2	2700	2522	320	0	
8/20/2014	3	2300	2096	319	0	
8/212014	4	2000	2056	317	64	
8/22/2014	5	1700	1796	318	106	
8/23/2014	6	1400	1460	320	105	
8/24/2014	7	1100	1157	319	107	
8/25/2014	8	800	1216	212	220	
8/26/2014	9	600				
8/27/2014	10	300				
10 day Avg		1500				



**Upstream of S79/Franklin Conditions:** On 8/26/14 at the Olga Water Treatment plant, chlorides measured **48 mg/L**, apparent color was **223 CU** and turbidity measured **0.69 NTU**.

**Upper Estuary Conditions:** The oligonaline zone extends from S79 downstream to the Cape Coral Bridge. Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass but light levels are too low to sustain SAV at depth. **Dissolved oxygen at the Beautiful Island and Ft. Myers RECONs dipped below 3 mg**  $\Gamma^1$  **during the week.** 

Lower Estuary Condition: The salinity at Iona (8 psu) remains below the optimum level for oysters, while average salinity at Shell Point (20 psu) was in the optimal range for oysters. Water column chlorophyll levels were elevated at Iona Cove with diatoms (*Skeletonema* sp.) dominant. Light levels are too low to sustain SAV at depth at the Sanibel Causeway. Dissolved oxygen at the Shell Point RECON dipped below 3 mg l<sup>-1</sup> during the week.

McIntyre Creek and Tarpon Bay in J.N. "*Ding*" Darling NWR: Over the last week salinity at McIntyre Creek ranged from 26 to 29 psu and CDOM ranged from 24 to 33 qse. Salinity at Tarpon Bay ranged from 26.5 to 30 psu and CDOM ranged from 24 to 32.5 qse over the same time period.

*Red Tide:* A large offshore bloom of *Karenia brevis*, the Florida red tide organism, has been detected this month in the northeast Gulf of Mexico. Satellite images show a patchy bloom up to 60 miles wide and 90 miles long, at least 20 miles offshore between Dixie and northern Pinellas counties **SCCF found background levels of** *Karenia* in samples from around Sanibel.

**Oysters:** August sampling by FGCU reported disease prevalence of *Pekinsus marinus* ranged from 46%-53%. Disease intensity of *P. marinus* ranged from 0.47-0.53. (scale 0 = no infection, 1 = low, 3 = medium, 5 = heavy) Larval recruitment ranged from 1.19 -17.61 spat/shell.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Colonial Br.	8.9	251	3.8	0.61
lona	15.0	220	2.7	0.64
Causeway	5.9	82	5.1	1.1

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: **z where I is 25% of surface I.** I = irradiance, **z**= depth

ACOE Daily Reports					
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
8/19/2014	Tues	2522	320	0	
8/20/2014	Wed	2096	319	0	
8/212014	Thur	2056	317	64	
8/22/2014	Fri	1796	318	106	
8/23/2014	Sat	1460	320	105	
8/24/2014	Sun	1157	319	107	
8/25/2014	Mon	1216	212	220	
7 Day	Avg	1757	303	86	

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: August 26 – September 1, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

Caloosahatchee Condition Summary: Flows to the estuary at S79 averaged 1,478 cfs over the past week. Flows are currently in the suitable range for tape grass in the upper estuary, but light levels are too low to sustain SAV at depth in the estuary due to high CDOM. Salinity in the lower estuary has improved for oysters over the past week.

**USACE Action:** The USACE initiated two back-to-back 7-day day pulse releases on 8/28/14 with average flows of **1,500 cfs** to the estuary measured at S79.

**Recommendation:** We request that flows to the Caloosahatchee estuary at S79 remain between **1000** and **1500 cfs**. Since watershed runoff has been a major source of flow, **storage within the Caloosahatchee watershed needs to be prioritized and maximized to attenuate harmful flows from the watershed**. All efforts should be made to send water south and utilize all public and private dispersed and emergency water storage options.

Lake Okeechobee Level:	14.46 ft. (Low Sub-Band)		Last wk: <b>14.49 ft</b> .		
Lake Okeechobee Inflow:	1,593 cfs	Lake Okee	chobee Outflow: 1,920 cfs		
Weekly Rainfall:	WP Franklin 0.24"	Ortona 2.03"	Moore Haven 0.27"		
Salinity Fort Myers:	<b>0.9 – 8.3</b> psu (SCCF RECON Ma	arker 52)	Previous wk <b>0.3 – 4.0</b> psu		
Salinity Beautiful Island:	<b>0.2 – 0.7</b> psu (SCCF RECON Ma	Previous wk 0.2 - 0.2 psu			
Salinity Shell Point:	13 - 32 psu (SCCF RECON)		Previous wk: <b>10 – 31</b> psu		



**Flow & Water Quality:** Flows into the Caloosahatchee Estuary at S79 over the past 10 day pulse averaged **1,663 cfs** and over the past 7 days averaged **1,478 cfs**. The past 14 days, approximately **11%** of Lake Okeechobee outflows were delivered to the Caloosahatchee via S77.

ACOE August 18, 2014 Pulse Release						
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
8/18/2014	1	2100	2910	475	0	
8/19/2014	2	2700	2522	320	0	
8/20/2014	3	2300	2096	319	0	
8/212014	4	2000	2056	317	64	
8/22/2014	5	1700	1796	318	106	
8/23/2014	6	1400	1460	320	105	
8/24/2014	7	1100	1157	319	106	
8/25/2014	8	800	1216	212	381	
8/26/2014	9	600	951	147	212	
8/27/2014	10	300	470	52	NR	
10 day Avg		1500	1663	279		



**Upstream of S79/Franklin Conditions:** On 9/2/14 at the Olga Water Treatment plant, chlorides measured **58 mg/L**, apparent color was **180 CU** and turbidity measured **0.66 NTU**.

**Upper Estuary Conditions:** The oligohaline zone extends from S79 downstream to Fort Myers. Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass but **light levels are too low to sustain SAV at depth.** 

Lower Estuary Condition: The salinity at Iona (16 psu) and the average salinity at Shell Point (23 psu) were in the optimal range for oysters. Light levels are too low to sustain SAV at depth at the Sanibel Causeway. Dissolved oxygen at the Shell Point RECON dipped below 3 mg  $I^{-1}$  during the week.

Fort Myers Beach 9/2/14 Photo K.Laakkonen

McIntyre Creek and Tarpon Bay in J.N. "*Ding*" Darling NWR: Over the last week salinity at McIntyre Creek ranged from 27 to 30 psu and CDOM ranged from 22 to 32 qse. Salinity at Tarpon Bay ranged from 27 to 31.5 psu and CDOM ranged from 20 to 36 qse over the same time period. Salinity at both locations is below or in the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

**Red Tide:** No Karenia brevis, the Florida red tide organism, was found in SCCF or FWRI samples from around Sanibel. A patchy bloom of *Karenia* persists in the northeast Gulf of Mexico offshore between Dixie and northern Pinellas counties. Fish kills and low oxygen in bottom waters in the offshore bloom area have been observed.

Caloosahatchee	Chlorophyll	CDOM	Turbidity 25% lo			Α	COE Daily R	eports	
Stations	(µg/L)	(qse)	(NTU)	(meters)	Date	Day	S79 Flow	S78 Flow	S77 Flow
Target Values	< 11	CE <70	CE < 18	CE = 1 m			(cfs)	(cfs)	(cfs)
Talget Values		SCB <11	SCB < 5	SCB = 2.2m	8/26/2014	Tues	951	147	212
Colonial Br.	5.0	220	4.8	0.67	8/27/2014	Wed	470	52	NR
lona	6.2	167	9.3	0.68	0/21/2014	Thur	4500	002	4004
Causeway	6.7	77	7.0	1.03	8/28/2014	Thur	1583	983	1064
					8/29/2014	Fri	2461	1435	1726
Target light µ	Target light penetration: <b>CE</b> - Caloosahatchee Estuary =1 m			y =1 m	8/30/2014	Sat	2550	948	1090
	<b>SCB</b> -San Carlos Bay = 2.2 meters				8/31/2014	Sun	1382	270	195
Definition of	25% lz <b>: z whe</b> z <b>z</b> - denth	ere I is 25%	of surface I.		9/1/2014	Mon	955	176	55

7 Day

Avg

1478

573

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: September 2 - 8, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

Caloosahatchee Condition Summary: Flows to the estuary at S79 averaged 2,074 cfs over the past week. Flows are currently in the suitable range for tape grass in the upper estuary, but light levels are too low to sustain SAV at depth in the estuary due to high CDOM. The salinity at lona this week fell below the optimal range for oysters.

**USACE Action:** The USACE initiated two back-to-back 7-day day pulse releases on 8/28/14 with average flows of **1,500 cfs** to the estuary measured at S79.

**Recommendation:** We request that flows to the Caloosahatchee estuary at S79 be managed between **800 and 1,000 cfs**. This will improve ecological conditions in the estuary and preserve water within the Lake for future water supply purposes. Watershed runoff will likely provide adequate flows to meet or exceed this target, resulting in little to no water being needed from the Lake at S-77.

Lake Okeechobee Level:	14.50 ft. (Low Sub-Band)		Last wk: 14.46 ft.		
Lake Okeechobee Inflow:	2,106 cfs	Lake Okee	chobee Outflow: 971 cfs		
Weekly Rainfall:	WP Franklin 1.95"	Ortona 2.70"	Moore Haven 1.01"		
Salinity Fort Myers:	<b>2.6 – 8.5</b> psu (SCCF RECON M	arker 52)	Previous wk <b>0.9 – 8.3</b> psu		
Salinity Beautiful Island:	<b>0.3 – 0.9</b> psu (SCCF RECON M	arker 18)	Previous wk 0.2 – 0.7 psu		
Salinity Shell Point:	15 – 32 psu (SCCF RECON)		Previous wk: 13 – 32 psu		



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 over the past 7 days averaged 2,074 cfs with 86% of estuary flows originating from the watershed. The past 14 days, approximately 21% of Lake Okeechobee outflows were delivered to the Caloosahatchee via S77.

ACOE August 28, 2014 Pulse Release						
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
8/28/2014	1	2000	1583	983	1064	
8/29/2014	2	2400	2461	1435	1726	
8/30/2014	3	2100	2550	948	1090	
8/312014	4	1400	1382	270	195	
9/1/2014	5	1200	955	176	55	
9/2/2014	6	900	940	176	98	
9/3/2014	7	500	628	178	29	
9/4/2014	1	2000	1624	448	92	
9/5/2014	2	2400	2303	1208	728	
9/6/2014	3	2100	2960	1502	956	
9/7/2014	4	1400	2788	1304	201	
9/8/2014	5	1200	3275	1418	0	
9/9/2014	6	900				
9/10/2014	7	500				
14 day Avg		1500				



Upstream of S79/Franklin Conditions: On 9/9/14 at the Olga Water Treatment plant, chlorides measured 62 mg/L, apparent color was 158 CU and turbidity measured 1.02 NTU.

**Upper Estuary Conditions:** The oligonaline zone extends from S79 downstream to Fort Myers. Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass but **light levels are too low to sustain SAV at depth.** 

Lower Estuary Condition: The salinity at Iona (12 psu) is not in the optimal range for oysters but the average salinity at Shell Point (24 psu) is in the optimal range for oysters. Light levels are too low to sustain SAV at depth at the Sanibel Causeway. Elevated chlorophyll at the Causeway is due to diatom bloom dominated by *Chaetoceros sp.* 

McIntyre Creek and Tarpon Bay in J.N. *"Ding"* Darling NWR: Over the last week salinity at McIntyre Creek ranged from 27.8 to 29.4 psu and CDOM ranged from 22.5 to 28.5 qse. Salinity at Tarpon Bay ranged from 26 to 33.5 psu and CDOM ranged from 16 to 35 qse over the same time period. Salinity at both locations is below or in the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).



**Red Tide:** No Karenia brevis, the Florida red tide organism, was found in SCCF or FWRI samples from around Sanibel. A patchy bloom persists in the northeast Gulf of Mexico offshore Dixie, Pasco, Citrus and northern Pinellas Counties.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)	Date
Target Values	< 11	CE <70	CE < 18	CE = 1 m	
Tangot Tanaoo		SCB <11	SCB < 5	SCB = 2.2m	9/2/2014
Colonial Br.	4.8	239	5	0.63	0/2/2014
lona	9.4	165	5	0.78	9/3/2014
Causeway	13.1	19	10.1	1.11	9/4/2014
Cuaconay	9/5/2014				
Target light	9/6/2014				

SCB-San Carlos Bay = 2.2 meters

Definition of 25% lz: z where I is 25% of surface I. I = irradiance, z= depth

ACOE Daily Reports					
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
9/2/2014	Tues	940	176	98	
9/3/2014	Wed	628	178	29	
9/4/2014	Thur	1624	448	92	
9/5/2014	Fri	2303	1208	728	
9/6/2014	Sat	2960	1502	956	
9/7/2014	Sun	2788	1304	201	
9/8/2014	Mon	3275	1418	0	
7 Day	Avg	2074	890	300	

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: September 9 - 15, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** The oligohaline zone extends from S79 downstream to Cape Coral. Flows to the estuary at S79 averaged **2,729 cfs** over the past week with **100%** of flow originating from the watershed. Flows are currently in the suitable range for tape grass in the upper estuary, but **light levels are too low to sustain submerged aquatic vegetation at depth due to high CDOM. The salinity at lona this week continues to be below the optimal range for oysters.** 

**USACE Action:** On 9/12/14 The USACE initiated a 7-day pulse release with average flows of **650 cfs** to the estuary measured at S79.

**Recommendation:** To meet ecological targets in the estuary at S79, flows should be maintained between **650 –1000 cfs**. Watershed runoff will likely provide adequate flows to meet or exceed this target, resulting in little to no water being needed from the Lake at S-77.

Lake Okeechobee Level: 14.56 ft. (Low Sub-Band)			Last wk: <b>14.50 ft</b> .		
Lake Okeechobee Inflow:	3,024 cfs	Lake Okeec	hobee Outflow: 172 cfs		
Weekly Rainfall:	WP Franklin 0.29"	Ortona 2.22"	Moore Haven 0.44"		
Salinity Fort Myers:	0.9 - 5.5 psu (SCCF RECON Mar	ker 52)	Previous wk <b>2.6 – 8.5</b> psu		
Salinity Beautiful Island:	<b>0.2 – 0.4</b> psu (SCCF RECON Ma	rker 18)	Previous wk 0.3 – 0.9 psu		
Salinity Shell Point:	13 – 32 psu (SCCF RECON)		Previous wk: <b>15 – 32</b> psu		



**Flow & Water Quality:** Flows into the Caloosahatchee Estuary at S79 over the pulse release initiated on 8/28/14 averaged **2,077 cfs.** Flows over the past 7 days averaged **2,729 cfs** with **100%** of estuary flows originating from the watershed. The past 14 days, approximately **11%** of Lake Okeechobee outflows were delivered to the Caloosahatchee via S77.

ACOE August 28, 2014 Pulse Release						
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
8/28/2014	1	2000	1583	983	1064	
8/29/2014	2	2400	2461	1435	1726	
8/30/2014	3	2100	2550	948	1090	
8/312014	4	1400	1382	270	195	
9/1/2014	5	1200	955	176	55	
9/2/2014	6	900	940	176	98	
9/3/2014	7	500	<b>628</b>	178	29	
9/4/2014	1	2000	1624	448	92	
9/5/2014	2	2400	2303	1208	728	
9/6/2014	3	2100	2960	1502	956	
9/7/2014	4	1400	2788	1304	201	
9/8/2014	5	1200	3275	1418	0	
9/9/2014	6	900	2904	1270	0	
9/10/2014	7	500	2720	1383	0	
14 day			2077	907	445	
Avg		1500				



Upstream of S79/Franklin Conditions: On 9/16/14 at the Olga Water Treatment plant, chlorides measured 52 mg/L, apparent color was 198 CU and turbidity measured 0.97 NTU.

weekend.

Sandy skinned tunicates- *Mogul occidentalis* washed up at Blind Pass, Sanibel after a windy

Photo SCCF 9/15/14.

**Upper Estuary Conditions:** Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass but **light levels are too low to submerged aquatic vegetation at depth.** 

Lower Estuary Condition: The salinity at Iona (12 psu) is below the optimal range for oysters but the average salinity at Shell Point (23 psu) is in the optimal range for oysters. Light levels are too low to sustain submerged aquatic vegetation at depth at the Sanibel Causeway.

McIntyre Creek and Tarpon Bay in J.N. *"Ding"* Darling NWR: Over the last week salinity at McIntyre Creek ranged from 29.0 to 32.5 psu and CDOM ranged from 14.5 to 27.5 qse. Salinity at Tarpon Bay ranged from 29 to 34 psu and CDOM ranged from 13 to 33 qse. Salinity at both locations is below or in the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Colonial Br.	5.4	291	2	0.60
lona	5.3	202	2.4	0.77
Causeway	7.3	54	6.2	1.19

Target light penetration: **CE**- Caloosahatchee Estuary =1 m

**SCB**-San Carlos Bay = 2.2 meters

Definition of 25% *Iz*: **z** where *I* is 25% of surface *I*. *I* = irradiance, **z**= depth

ACOE Daily Reports						
Date	Day	S79 Flow	S78 Flow	S77 Flow		
		(cfs)	(cfs)	(cfs)		
9/9/2014	Tues	2904	1270	0		
9/10/2014	Wed	2720	1383	0		
9/11/2014	Thur	2578	1067	0		
9/12/2014	Fri	3054	1377	0		
9/13/2014	Sat	2899	1593	0		
9/14/2014	Sun	2804	1363	0		
9/15/2014	Mon	2143	1054	0		
7 Day	Avg	2729	1301	0		

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: September 16 - 22, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** The oligohaline zone extends from S79 downstream to the Cape Coral Bridge. Flows to the estuary at S79 averaged **2,221 cfs** over the past week with **98%** of flow originating from the watershed. Flows are currently in the suitable range for tape grass in the upper estuary, but **light levels are too low to sustain submerged aquatic vegetation at depth due to high CDOM. The salinity at Iona this week continues to be below the optimal range for oysters.** 

**USACE Action:** On 9/12/14 and 9/19/14 the USACE initiated a 7-day pulse release with average flows of **650 cfs** to the estuary measured at S79.

**Recommendation:** To meet ecological targets in the estuary at S79, flows should be maintained between **650 –1000 cfs**. Watershed runoff will likely provide adequate flows to meet or exceed this target, resulting in little to no water being needed from the Lake at S-77.

Lake Okeechobee Level:	14.75 ft. (Low Sub-Band)		Last wk: <b>14.56 ft</b> .		
Lake Okeechobee Inflow:	6,234 cfs	Lake Okee	chobee Outflow: 0 cfs		
Weekly Rainfall:	WP Franklin 1.98"	Ortona 1.32"	Moore Haven 3.38"		
Salinity Fort Myers:	1.0 -7.3 psu (SCCF RECON Mar	ker 52)	Previous wk <b>0.9 - 5.5</b> psu		
Salinity Beautiful Island:	0.2 -0.3 psu (SCCF RECON Mar	ker 18)	Previous wk 0.2 – 0.4 psu		
Salinity Shell Point:	12 – 31 psu (SCCF RECON)		Previous wk: <b>13 – 32</b> psu		



# Caloosahatchee Estuary

#### Page 2 of 2

**Flow & Water Quality:** Flows into the Caloosahatchee Estuary at S79 over the 7 day pulse release initiated on 9/12/14 averaged **2,281 cfs.** Flows over the past 7 days averaged **2,221 cfs** with **98%** of estuary flows originating from the watershed. The past 14 days, approximately **2%** of Lake Okeechobee outflows were delivered to the Caloosahatchee via S77.

ACC	DE Sep	tember 12	2, 2014 Pu	lse Releas	e	Suface Salinity at Iona Oyster Reef
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	30 Oyster Optimal Range 25
9/12/2014	1	900	3054	1377	0	>20
9/13/2014	2	1000	2899	1593	0	
9/14/2014	3	900	2804	1363	0	
9/15/2014	4	750	2143	1054	0	0 10 M M M M M M M M M M M M M M M M M M
9/16/2014	5	400	1351	517	0	5 Shoalaraes Harmful Panga
9/17/2014	6	300	1966	676	0	Oyster Mortality Range
9/18/2014	7	300	1750	1137	92	
7 day Avg		650	2281	1102	13	ੇ ਹੈ ਹੈ ਹੈ ਹੈ ਹੈ ਹੈ

**Upstream of S79/Franklin Conditions:** On 9/23/14 at the Olga Water Treatment plant, chlorides measured **54 mg/L**, apparent color was **148 CU** and turbidity measured **1.01 NTU**.

**Upper Estuary Conditions:** Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass but **light levels are too low to submerged aquatic vegetation at depth.** The oligohaline zone extends to Cape Coral Bridge.

Lower Estuary Condition: The salinity at Iona (10 psu) is below the optimal range for oysters but the average salinity at Shell Point (22 psu) is in the optimal range for oysters. Light levels are too low to sustain submerged aquatic vegetation at depth at the Sanibel Causeway.

McIntyre Creek and Tarpon Bay in J.N. "*Ding*" Darling NWR: McIntyre Creek salinity decreased from 32 - 28.5 psu over the last week and CDOM increased from 17 - 27 qse. Tarpon Bay salinity dropped from 32 - 27.5 psu and CDOM increased from 23 - 39 qse. Salinity at both locations is below or in the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

**Oysters:** September sampling by FGCU reported disease prevalence of *Perkinsus marinus* of 26.6%-73.3. Disease intensity of *P. marinus* ranged from 0.40-0.73. (scale 0 = no infection, 1 = low, 3 = medium, 5 = heavy) Mean larval recruitment for the estuary was 7.10 spat/shell.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Colonial Br.	7.5	332	1.2	0.55
lona	5.7	222	2.6	0.71
Causeway	4.3	103	5.2	1.03

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters Definition of 25% (Jay – purpose Lie 25% of our free L

Definition of 25% Iz: **z** where I is 25% of surface I. I = irradiance, z= depth

ACOE Daily Reports						
Date	Date Day S79 Flow S78 Flow					
		(cfs)	(cfs)	(cfs)		
9/16/2014	Tues	1351	517	0		
9/17/2014	Wed	1966	676	0		
9/18/2014	Thur	1750	1137	92		
9/19/2014	Fri	1937	794	172		
9/20/2014	Sat	2496	864	0		
9/21/2014	Sun	3032	1298	0		
9/22/2014	Mon	3015	1450	0		
7 Day	Avg	2221	962	37		

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: September 23 - 29, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

Caloosahatchee Condition Summary: Significantly higher freshwater flows have moved the oligohaline zone downstream to lona. Flows to the estuary at S79 averaged 4,505 cfs over the past week with 100% of flow originating from the watershed. Flows are currently in the suitable range for tape grass in the upper estuary, but light levels are too low to sustain submerged aquatic vegetation at depth due to high CDOM. The salinity at lona this week continues to be below the optimal range for oysters.

**USACE Action:** On 9/19/14 the USACE initiated a 7-day pulse release with average flows of **650 cfs** to the estuary measured at S79.

**Recommendation:** With the wet season ending soon, lake levels below last year's level and within the operational range, no tropical activity anticipated and major flows coming from the watershed we recommend continuing with no discharges from Lake Okeechobee to the Caloosahatchee.

Lake Okeechobee Level:	15.22 ft. (Low Sub-Band)		Last wk: 14.75 ft.		
Lake Okeechobee Inflow:	16,662 cfs	Lake Okee	chobee Outflow: 175 cfs		
Weekly Rainfall:	WP Franklin 5.06"	Ortona 2.03"	Moore Haven 1.10"		
Salinity Fort Myers:	<b>0.3 - 4.2</b> psu (SCCF RECON Ma	rker 52)	Previous wk <b>1.0 - 7.3</b> psu		
Salinity Beautiful Island:	<b>0.2 – 0.3</b> psu (SCCF RECON Ma	irker 18)	Previous wk <b>0.2 – 0.3</b> psu		
Salinity Shell Point:	8.3 – 30 psu (SCCF RECON)		Previous wk: <b>12 – 31</b> psu		



## Caloosahatchee Estuary

#### Page 2 of 2

**Flow & Water Quality:** Flows into the Caloosahatchee Estuary at S79 over the 7 day pulse release initiated on 9/19/14 averaged **2,685 cfs.** Flows over the past 7 days averaged **4,505 cfs** with **100%** of estuary flows originating from the watershed. The past 14 days, approximately **4%** of Lake Okeechobee outflows were delivered to the Caloosahatchee via S77.



**Upstream of S79/Franklin Conditions:** On 9/30/14 at the Olga Water Treatment plant, chlorides measured **54 mg/L**, apparent color was **198 CU** and turbidity measured **1.74 NTU**.

**Upper Estuary Conditions:** Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass but **light levels are too low to submerged aquatic vegetation at depth.** The oligohaline zone extends to lona.

Lower Estuary Condition: The salinity at Iona (5.9 psu) is below the optimal range for oysters but the average salinity at Shell Point (19 psu) is in the optimal range for oysters. Light levels are too low to sustain submerged aquatic vegetation at depth at the Sanibel Causeway.

McIntyre Creek and Tarpon Bay in J.N. "*Ding*" Darling NWR: Over the last week, salinity at McIntyre Creek has declined from approximately 29 psu on 9/23/14 to approximately 25 psu on 9/30/14 and CDOM increased from 26 to a peak of 37 qse. Over the same time period salinity at Tarpon Bay also declined from 29 psu to 25 psu and CDOM ranged from 33 to 50 qse. Salinity at both locations is below or in the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Colonial Br.	4.5	271	1.9	0.63
lona	9.0	239	1.9	0.68
Causeway	9.1	97	2.2	1.15

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters Definition of 25% Iz: **z** where I is 25% of surface I. I = irradiance, z= depth

ACOE Daily Reports						
Date	Day	S79 Flow	S78 Flow	S77 Flow		
		(cfs)	(cfs)	(cfs)		
9/23/2014	Tues	2958	1384	0		
9/24/2014	Wed	3215	1545	0		
9/25/2014	Thur	2143	936	0		
9/26/2014	Fri	4452	1582	0		
9/27/2014	Sat	6291	2563	0		
9/28/2014	Sun	6320	2495	0		
9/29/2014	Mon	6159	1952	0		
7 Day	Avg	4505	1779	0		

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: September 30 – October 6, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

Caloosahatchee Condition Summary: High freshwater flows have pushed the oligohaline zone further downstream to lona Cove. Flows to the estuary at S79 averaged 5,438 cfs over the past pulse and 3,612 cfs over the past week with 100% of flow originating from the watershed. Salinities are currently in the suitable range for tape grass in the upper estuary, but light levels are too low to sustain submerged aquatic vegetation at depth due to high CDOM. The salinity at lona has dropped into the harmful range for oysters.

**USACE Action:** On 9/26/14 and 10/3/14 the USACE initiated a 7-day pulse release targeting average flows of **650 cfs** to the estuary measured at S79.

**Recommendation:** With the wet season ending soon, Lake Okeechobee water levels below where they were at this time last year and within the operational range, no tropical activity anticipated and undesirable flows coming from the watershed, we recommend continuing with no discharges from Lake Okeechobee to the Caloosahatchee. **All efforts need to be made to capture excess flows on lands within the Kissimmee and Caloosahatchee watersheds**.

Lake Okeechobee Level:	15.58 ft. (Low Sub-Band)		Last wk: <b>15.22 ft</b> .		
Lake Okeechobee Inflow:	9,858 cfs	Lake Okeech	obee Outflow: 49 cfs		
Weekly Rainfall:	WP Franklin 0.24"	Ortona 0.08"	Moore Haven 0.94"		
Salinity Fort Myers:	<b>0.2 – 0.3</b> psu (SCCF RECON Mar	ker 52)	Previous wk <b>0.3 - 4.2</b> psu		
Salinity Beautiful Island:	<b>0.2 – 0.3</b> psu (SCCF RECON Mar	ker 18)	Previous wk 0.2 – 0.3 psu		
Salinity Shell Point:	4.1 – 30 psu (SCCF RECON)		Previous wk: <b>8.3 – 30</b> psu		



# Caloosahatchee Estuary

#### Page 2 of 2

**Flow & Water Quality:** Flows into the Caloosahatchee Estuary at S79 over the 7 day pulse release initiated on 9/26/14 averaged **5,438 cfs.** Flows over the past 7 days averaged **3,612 cfs** with **100%** of estuary flows originating from the watershed. The past 14 days **0%** of Lake Okeechobee outflows were delivered to the Caloosahatchee at S77.

ACOE September 26, 2014 Pulse Release						
		Pulse	<b>S79</b>	<b>S78</b>	S77	
Date	Day	Target	Flow	Flow	Flow	
			(cfs)	(cfs)	(cfs)	
9/26/2014	1	900	4452	1582	0	
9/27/2014	2	1000	<b>6291</b>	2563	0	
9/28/2014	3	900	6320	2495	0	
9/29/2014	4	750	6159	1952	0	
9/30/2014	5	400	5362	1669	0	
10/1/2014	6	300	5114	1740	0	
10/2/2014	7	300	4374	1320	0	
7 day avg		650	5438	1903	0	



Upstream of S79/Franklin Conditions: On 10/7/14 at the

Olga Water Treatment plant, chlorides measured 45 mg/L, apparent color was 235 CU and turbidity measured 0.89 NTU.

**Upper Estuary Conditions:** Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass but **light levels are too low to submerged aquatic vegetation at depth.** The oligohaline zone extends to lona Cove.

Lower Estuary Condition: The salinity at Iona (1.3 psu) is in the harmful range for oysters and the average salinity at Shell Point (17 psu) is in the optimal range for oysters. Light levels are too low to sustain submerged aquatic vegetation at depth from Iona to the Sanibel Causeway. Poor water conditions along the northern 1.5 miles of Fort Myers Beach, caused by dark water from Caloosahatchee discharges, impacted beach conditions this week.

McIntyre Creek & Tarpon Bay in J.N. *"Ding"* Darling NWR: Salinity at McIntyre Creek declined from a peak of 32.5 psu in mid-September to approximately 25 psu on 10/5/14. CDOM increased from a low of 15 to approximately 33 qse. Salinity at Tarpon Bay declined from 34 psu in mid-September to 24 psu on 10/6/14 and CDOM increased from a low of 13 to approximately 52 qse.

Salinity at both locations is below the preferred range for shoal grass and turtle grass (30-40 psu).



Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Colonial Br.	10.7	338	1.8	0.52
lona	20.6	315	3.8	0.51
Causeway	5.7	156	4.2	0.84

Target light penetration: CE- Caloosahatchee Estuary =1 m

**SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: z where l is 25% of surface l. l = irradiance, z= depth

ACOE Daily Reports							
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)			
9/30/2014	Tues	5362	1669	0			
10/1/2014	Wed	5114	1740	0			
10/2/2014	Thur	4374	1320	0			
10/3/2014	Fri	3205	1082	0			
10/4/2014	Sat	3172	1030	0			
10/5/2014	Sun	1859	552	0			
10/6/2014	Mon	2200	491	0			
7 Day	Avg	3612	1126	0			

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: October 7 - 13, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Lower freshwater flows have allowed the oligohaline zone to retreat upstream to the Colonial Bridge. Flows to the estuary at S79 averaged **1,228 cfs** over the past week with **90%** of flow originating from the watershed. Flows are currently in the suitable range for tape grass in the upper estuary and oysters in the lower estuary, but **light levels are too low to sustain submerged aquatic vegetation at depth due to high CDOM.** 

**USACE Action:** On 10/3/14 the USACE initiated a 7-day pulse release targeting average flows of **650 cfs** to the estuary measured at S79.

**Recommendation:** With drier conditions emerging we recommend maintaining flows between **800 – 1000 cfs** to meet established ecological targets within the estuary.

Lake Okeechobee Level:	15.72 ft. (Low Sub-Band)		Last wk: <b>15.58 ft</b> .		
Lake Okeechobee Inflow:	3,976 cfs	Lake Okee	chobee Outflow: 280 cfs		
Weekly Rainfall:	WP Franklin 0.0"	Ortona 0.66"	Moore Haven 0.15"		
Salinity Fort Myers:	0.2 – 8.0 psu (SCCF RECON	l Marker 52)	Previous wk <b>0.2 – 0.3</b> psu		
Salinity Beautiful Island:	0.2 – 0.3 psu (SCCF RECON	I Marker 18)	Previous wk <b>0.2 – 0.3</b> psu		
Salinity Shell Point:	7.6 – 31 psu (SCCF RECON	)	Previous wk: <b>4.1 – 30</b> psu		



# Caloosahatchee Estuary

# Page 2 of 2

**Flow & Water Quality:** Flows into the Caloosahatchee Estuary at S79 over the 7 day pulse release initiated on 10/3/14 averaged **2,238 cfs.** Flows over the past 7 days averaged **1,228 cfs** with **90%** of estuary flows originating from the watershed. The past 14 days, approximately **48%** of Lake Okeechobee outflows were delivered to the Caloosahatchee via S77.

ACOE October 3, 2014 Pulse Release							
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)		
10/3/2014	1	900	3205	1082	0		
10/4/2014	2	1000	3172	1030	0		
10/5/2014	3	900	1859	552	0		
10/6/2014	4	750	2201	491	0		
10/7/2014	5	400	2025	496	0		
10/8/2014	6	300	1919	496	0		
10/9/2014	7	300	1287	280	0		
7 day avg		650	2238	632	0		



Upstream of S79/Franklin Conditions: On 10/14/14 at the

Olga Water Treatment plant, chlorides measured 46 mg/L, apparent color was 201 CU and turbidity measured 0.51 NTU.

**Upper Estuary Conditions:** Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass but **light levels are too low to sustain submerged aquatic vegetation at depth.** The oligohaline zone extends to the Colonial Bridge.

Lower Estuary Condition: The salinity at Iona (14 psu) and the average salinity at Shell Point (23 psu) are in the optimal range for oysters. Light levels are too low to sustain submerged aquatic vegetation at depth from Iona to the Sanibel Causeway.

A plume of dark water from the Caloosahatchee extended along the northern 2 miles of Fort Myers Beach.

McIntyre Creek and Tarpon Bay in J.N. "*Ding*" Darling NWR: Over the last week, salinity at McIntyre Creek increased from approximately 26 psu to approximately 29 psu and CDOM decreased from 34 to of 29 qse. Over the same time period, salinity at Tarpon Bay increased from 26 psu to 33 psu and CDOM ranged from 47 to 20 qse. Salinity at both locations is below or in the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Colonial Br.	6.3	291	1.3	0.61
lona	5.1	202	2.6	0.76
Causeway	3.2	67.4	2.3	1.42

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: **z** where *l* is 25% of surface *l*. *l* = irradiance, **z** = depth



ACOE Daily Reports							
Date	Day	S79 Flow	S78 Flow	S77 Flow			
		(cfs)	(cfs)	(cfs)			
10/7/2014	Tues	2025	496	0			
10/8/2014	Wed	1919	496	0			
10/9/2014	Thur	1287	280	0			
10/10/2014	Fri	983	472	296			
10/11/2014	Sat	882	<b>406</b>	308			
10/12/2014	Sun	812	174	236			
10/13/2014	Mon	691	176	54			
7 Day	Avg	1228	277	127			

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: October 14 - 20, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** Reduced freshwater flows have allowed the oligohaline zone to retreat upstream to the Colonial Bridge. Flows to the estuary at S79 averaged **1,098 cfs** over the past week with **76%** of flow originating from the watershed. Flows are currently in the suitable range for tape grass in the upper estuary and oysters in the lower estuary, but **light levels are too low to sustain submerged aquatic vegetation at depth due to high CDOM.** 

**USACE Action:** On 10/17/14 the USACE initiated a 7-day pulse release targeting average flows of **1000 cfs** to the estuary measured at S79.

**Recommendation:** With drier conditions we recommend maintaining flows between **800 – 1000 cfs** to meet established ecological targets within the estuary.

Lake Okeechobee Level:	15.78 ft. (Low Sub-Band)		Last wk: <b>15.72 ft</b> .			
Lake Okeechobee Inflow:	1,483 cfs	Lake Okeech	nobee Outflow: 740 cfs			
Weekly Rainfall:	WP Franklin 0.22"	Ortona 1.02"	Moore Haven 0.52"			
Salinity Fort Myers:	2.5 – 11 psu (SCCF RECON	Marker 52)	Previous wk <b>0.2 – 8.0</b> psu			
Salinity Beautiful Island:	<b>0.2 – 1.1</b> psu (SCCF RECON	I Marker 18)	Previous wk <b>0.2 – 0.3</b> psu			
Salinity Shell Point:	14 – 31 psu (SCCF RECON)		Previous wk: <b>7.6 – 31</b> psu			



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 over the past 7 days averaged 1,098 cfs with 76% of estuary flows originating from the watershed. The past 14 days, approximately 46% of total Lake Okeechobee outflows were delivered to the Caloosahatchee at S77.

AC	COE Oc	tober 17,	2014 Puls	se Release	!	30	Suface Salinity at Iona Oyster Reef
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	25	Oyster Optimal Range
10/17/2014	1	1400	1300	545	324		
10/18/2014	2	1600	1599	767	468	<b>C</b> 15	A
10/19/2014	3	1300	1495	813	480	sal sal	·
10/20/2014	4	1000	1050	800	488	10	Manahar
10/21/2014	5	800				5	
10/22/2014	6	600					Ovster Mortality Range
10/23/2014	7	300				0	
7 day avg		1000					

**Upstream of S79/Franklin Conditions:** On 10/21/14 at the Olga Water Treatment plant, chlorides measured **52 mg/L**, apparent color was **186 CU** and turbidity measured **0.78 NTU**.

**Upper Estuary Conditions:** A bloom of *Skeletonema sp.* was near the Fort Myers RECON sensor. Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass but **light levels are too low to submerged aquatic vegetation at depth.** The oligonaline zone extends to the Colonial Bridge.

**Lower Estuary Condition:** The salinity at lona was suboptimal for oysters while the average salinity at Shell Point (**22 psu**) was in the optimal range for oysters.

A bloom of *Skeletonema sp.* at Iona and the Colonial Bridge caused elevated chlorophyll levels This brackish diatom bloom is in the fresher, surface layer, flowing out at Shell Point on outgoing tides, not on the incoming. Lower chlorophyll levels were recorded at the Sanibel causeway and Tarpon Beach.

# Light levels are too low to sustain submerged aquatic vegetation at depth from lona to the Sanibel Causeway.

McIntyre Creek & Tarpon Bay in J.N. "Ding" Darling NWR: Over the last week, salinity at McIntyre Creek fluctuated around 29 psu and CDOM increased to 31 qse. Salinity at Tarpon Bay decreased to 30 psu and CDOM increased to 27 qse. Salinity at both locations is below or in the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).



**Oysters:** October sampling by FGCU reported increased disease prevalence and intensity since September. *Perkinsus marinus* prevalence ranged from 53%-80%. *P. marinus* intensity ranged from 0.62 - 0.80. (scale 0 = no infection, 1 = low, 3 = medium, 5 = heavy). Larval recruitment ranged from 1.53-17.31 spat/shell.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% dep (mete	lo th ers)			
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = SCB =	1 m 2.2m			
Colonial Br.	18.5	225	1.5	0.68				
lona	29.1	189	2.3	0.71				
Causeway	4.3	90.8	1.5	1.2	9			
Target light p	Target light penetration: <b>CE</b> - Caloosahatchee Estuary =1 m							
<b>SCB</b> -San Carlos Bay = 2.2 meters								
Definition of 25% Iz: <b>z where I is 25% of surface I</b> . <b>I</b> = irradiance, <b>z</b> = depth								

ACOE Daily Reports							
Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)			
10/14/2014	Tues	467	175	120			
10/15/2014	Wed	971	175	0			
10/16/2014	Thur	808	351	0			
10/17/2014	Fri	1300	545	324			
10/18/2014	Sat	1599	767	468			
10/19/2014	Sun	1495	813	480			
10/20/2014	Mon	1050	800	488			
7 Day	Avg	1098	518	268			

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: October 21 - 27, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** The oligohaline zone this week retreated further upstream to Fort Myers. Flows to the estuary at S79 averaged **1,047 cfs** over the past week with **47%** of flow originating from the watershed. Flows are currently in the suitable range for tape grass in the upper estuary and oysters in the lower estuary, but **light levels are too low to sustain submerged aquatic vegetation at depth due to high CDOM.** 

**USACE Action:** On 10/24/14 the USACE initiated a 7-day pulse release targeting average flows of **1000 cfs** to the Caloosahatchee estuary measured at S79.

**Recommendation:** With drier conditions we recommend continuing with a 7-day pulse release maintaining average flows of **1000 cfs** to meet established ecological targets within the estuary.

Lake Okeechobee Level:	15.93 ft. (Low Sub-Band)	Last wk: <b>15.78 ft</b> .			
Lake Okeechobee Inflow:	1,504 cfs	Lake Oke	eechobee Outflow: 5,030 cfs		
Weekly Rainfall:	WP Franklin 0.20"	Ortona 0.36"	Moore Haven 4.20"		
Salinity Fort Myers:	4.3 - 9.4 psu (SCCF RECC	N Marker 52)	Previous wk <b>2.5 – 11</b> psu		
Salinity Beautiful Island:	<b>0.3- 1.3 psu</b> (SCCF RECO	N Marker 18)	Previous wk <b>0.2 – 1.1</b> psu		
Salinity Shell Point:	15 – 31 psu (SCCF RECO	N)	Previous wk: <b>14 – 31</b> psu		



**Flow & Water Quality:** Flows into the Caloosahatchee Estuary at S79 over the 7 day pulse release initiated on 10/17 averaged **1,078 cfs** and the past 7 days averaged **1,047 cfs** with **53%** of estuary flows **originating from Lake Okeechobee.** The past 14 days, approximately **23%** of total Lake Okeechobee outflows were delivered to the Caloosahatchee at S77.



**Upstream of S79/Franklin Conditions:** On 10/28/14 at the Olga Water Treatment plant, chlorides measured **60 mg/L**, apparent color was **162 CU** and turbidity measured **0.63 NTU**.

**Upper Estuary Conditions:** A bloom of *Skeletonema sp.* near the Fort Myers RECON declined during the week. Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass but **light levels are too low to sustain submerged aquatic vegetation at depth.** The oligonaline zone extends to Fort Myers.

Lower Estuary Condition: The salinities at Iona (18 psu) and the average salinity at Shell Point (24 psu) were in the optimal range for oysters. A bloom of *Skeletonema sp.* at Iona and the Colonial Bridge caused elevated chlorophyll levels during the week but has subsided.

# Light levels are too low to sustain submerged aquatic vegetation at depth from lona to the Sanibel Causeway.

**Red Tide:** *Karenia brevis* was detected in low concentrations along Sanibel beaches from Blind Pass to Donax (10/23-10/27/14, SCCF samples). FWC reported medium concentrations southwest of Sanibel (Sanibel Sea School samples 10/23/14).



FWCC map of *Karenia brevis* sample sites and concentrations in southwest Florida waters in past week



NOAA satellite chlorophyll image of possible *K. brevis* HAB areas (red polygons from 10/17-24/2014.



McIntyre Creek & Tarpon Bay in J.N. "*Ding*" Darling NWR: Over the last week, salinity at McIntyre Creek fluctuated around 29.5 psu and CDOM fluctuated around 27 qse. Salinity at Tarpon Bay decreased to 29.5 psu and CDOM increased to 34 qse. Salinity at both locations is below or in the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

		00.014		25% lo	ACOE Daily Reports			eports	
Caloosahatchee Stations	Chlorophyll (µg/L)	(qse)	(NTU)	depth (meters)	Date	Day	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m	10/21/2014	Tues	749	333	352
Colonial Br	69	204	17	0.77	10/22/2014	Wed	688	197	0
lona	5.0	146	2.3	0.95	10/23/2014	Thur	668	298	0
Causeway	4.5	68.1	2.1	1.47	10/24/2014	Fri	1230	632	340
Target light p	enetration: CE-	Caloosahat	chee Estuary	=1 <i>m</i>	10/25/2014	Sat	1544	1014	1206
	SCB-San	Carlos Bay =	= 2.2 meters		10/26/2014	Sun	1390	967	1245
Definition of 2	Definition of 25% Iz: <b>z where I is 25% of surface I.</b>				10/27/2014	Mon	1064	598	748
I = irradiance, z = depth				7 Day	Avg	1047	577	555	
					L			8	

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: November 4 - 10, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** The oligohaline zone extends to Fort Myers. Flows to the estuary at S79 averaged **899 cfs**. Flows are currently in the suitable range for tape grass in the upper estuary and oysters in the lower estuary, but **light levels remain too low to sustain submerged aquatic vegetation at depth due to high CDOM.** 

**USACE Action:** On 11/7/14 the USACE initiated two back to back 7-day pulse releases targeting average flows to the Caloosahatchee at S79 of **800 cfs** for the first 7 days and **1,200 cfs** the second 7 days. The variability is intended to prevent salinity stratification that might result from repeated 1000 cfs pulses.

**Recommendation:** With drier conditions we recommend maintaining flows between **800** - **1,000 cfs** to meet established ecological targets within the estuary.

Lake Okeechobee Level:	15.66 ft. (Low Sub-Band)		Last wk: <b>15.72 ft</b> .		
Lake Okeechobee Inflow:	700 cfs	Lake Oke	eechobee Outflow: 1,580 cfs		
Weekly Rainfall:	WP Franklin 0.77"	Ortona 0.75"	Moore Haven 2.02"		
Salinity Fort Myers:	<b>4.8 – 15 psu</b> (SCCF RECO	N Marker 52)	Previous wk 4.8 – 13 psu		
Salinity Beautiful Island:	1.0- 2.8 psu (SCCF RECO	N Marker 18)	Previous wk 0.7-1.7 psu		
Salinity Shell Point:	15 -32 psu (SCCF RECON	)	Previous wk: <b>15 – 31</b> psu		



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 over the pulse release ending on 11/6 averaged 975 cfs and over the past 7 days flows averaged 899 cfs. The past 14 days, approximately 43% of total Lake Okeechobee outflows were delivered to the Caloosahatchee at S77.

ACOE October 31, 2014 Pulse Release					
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)
10/31/2014	1	1400	1018	714	1282
11/1/2014	2	1600	1562	992	1660
11/2/2014	3	1300	1445	1090	1113
11/3/2014	4	1000	1135	<b>796</b>	1040
11/4/2014	5	800	804	564	1030
11/5/2014	6	600	558	396	696
11/6/2014	7	300	300	322	477
7 day avg		1000	975	696	1043



**Upstream of S79/Franklin Conditions:** On 11/11/14 at the Olga Water Treatment plant, chlorides measured **66 mg/L**, apparent color was **187 CU** and turbidity measured **0.86 NTU**.

**Upper Estuary Conditions:** A bloom of *Skeletonema* sp. occurred at the Beautiful Island RECON during the week (30 µg chl) and chlorophyll levels were also elevated at Fort Myers. Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass but **light levels are too low to submerged aquatic vegetation at depth.** The oligohaline zone extends to Fort Myers.

Lower Estuary Condition: The salinity at Iona (17 psu) and the average salinity at Shell Point (24 psu) were in the optimal range for oysters. Light levels are too low to sustain submerged aquatic vegetation at depth from Iona to the Sanibel Causeway.



Tape grass near Old Bridge Park 11/08/14.Leaves are 4-5 cm long.Photo SCCF

McIntyre Creek & Tarpon Bay in J.N. "*Ding*" Darling NWR: Over the last week, salinity at McIntyre Creek increased from 30.8 to 31.4 psu and CDOM decreased from 31 to 30.4 qse. Salinity at Tarpon Bay remained 30.5 psu and CDOM decreased to 31.6 qse. Salinity at both locations is below or in the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

# **Coastal Conditions:**

*Red Tide:* On 11/7/14 FWRI reported a patchy bloom of the Florida red tide organism, *Karenia brevis* in concentrations from background to medium in the Pine Island Sound system and offshore of Charlotte Harbor and Sanibel Island (Lee County). SCCF samples from Pine Island Sound near Captiva showed low concentrations (<100,000 cells/L) while samples from around Sanibel contained no *Karenia*. Bloom patches extend approximately 60 miles alongshore, up to 15 miles offshore, depending on location, between Lee and Collier counties.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% dep (mete	lo th ers)	
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	18 CE = 1 r < 5 SCB = 2.2		
Ft. Myers	9.2	243	1.7	1.7 <b>0.67</b>		
lona	4.9	152	2.9 0.90		0	
Causeway	Causeway 3.0 90 3.1 1.2					
Target light penetration: <b>CE</b> - Caloosahatchee Estuary =1 m						
<b>SCB</b> -San Carlos Bay = 2.2 meters						
Definition of 25% Iz: <b>z where I is 25% of surface I.</b> I = irradiance, <b>z</b> = depth						

ACOE Daily Reports						
Date	Day	S79 Flow	S78 Flow	S77 Flow		
		(cfs)	(cfs)	(cfs)		
11/4/2014	Tues	804	564	1030		
11/5/2014	Wed	558	396	696		
11/6/2014	Thur	300	322	477		
11/7/2014	Fri	998	714	1124		
11/8/2014	Sat	1526	1065	1166		
11/9/2014	Sun	1256	848	592		
11/10/2014	Mon	851	636	111		
7 Day	Avg	899	649	742		

*Wildlife Impacts:* In the past three days CROW the wildlife rehabilitation clinic on Sanibel received three birds, a sanderling and two double crested cormorants, with suspected brevetoxicosis.

**Beach Conditions:** Fort Myers Beach on 11/11/14 Beach Patrol reported small dead fish washing up and complaints of respiratory irritation.



# Chlorophyll and oxygen at Beautiful Island RECON.

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: November 11 - 17, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

Caloosahatchee Condition Summary: The oligonaline zone extends to Fort Myers. Flows to the estuary at S79 averaged 1,055 cfs. Flows are currently in the suitable range for tape grass in the upper estuary and oysters in the lower estuary, but light levels remain too low to sustain submerged aquatic vegetation at depth due to high CDOM.

**USACE Action:** On 11/7/14 the USACE initiated two back to back 7-day pulse releases targeting average flows to the Caloosahatchee at S79 of **800 cfs** for the first 7 days and **1,200 cfs** the second 7 days. The variability is intended to prevent salinity stratification that might result from repeated 1000 cfs pulses.

**Recommendation:** We recommend maintaining flows between **800** to **1,000 cfs** to meet the established ecological targets for the estuary. To address recent dry-season rainfall, we recommend that storage in the Kissimmee Chain of Lakes and floodplain be maximized to moderate inflows to Lake Okeechobee. If lake levels need to be further reduced to improve the ecology of the lake ecosystem, flows up to **1,200 cfs** could be accommodated for a short period of time. This would help reduce salinity within the upper estuary that is trending upward, but would increase the nutrient loading to the river and estuary.

Lake Okeechobee Level: 15.62 ft. (Low Sub-Band)		Last wk: <b>15.66 ft</b> .		
Lake Okeechobee Inflow:	518 cfs	Lake	Okeechobee Outflow: 1,569 cfs	
Weekly Rainfall:	WP Franklin 0.44"	Ortona 0.19"	Moore Haven 0.10"	
Salinity Fort Myers:	9.2- 13.7 psu (SCCF RECC	ON Marker 52)	Previous wk 4.8 – 15 psu	
Salinity Beautiful Island:	<b>1.3 – 4.3 psu</b> (SCCF RECC	ON Marker 18)	Previous wk 1.0-2.8 psu	
Salinity Shell Point:	ND (SCCF RECON)		Previous wk: <b>15 – 32</b> psu	



# Page 2 of 2

Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 over the pulse release ending on 11/13/14 averaged **788 cfs** and over the past 7 days flows averaged **1,055 cfs**. The past 14 days, approximately **49%** of total Lake Okeechobee outflows were delivered to the Caloosahatchee at S77.

ACOE November 7, 2014 Pulse Release					
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)
11/7/2014	1	1400	998	714	1124
11/8/2014	2	1600	1526	1065	1166
11/9/2014	3	1200	1256	848	592
11/10/2014	4	800	851	636	678
11/11/2014	5	400	522	254	847
11/12/2014	6	200	293	149	848
11/13/2014	7	0	76	64	859
7 day avg		800	788	532	873



**Upstream of S79/Franklin Conditions:** On 11/18/14 at the Olga Water Treatment plant, chlorides measured **56 mg/L**, apparent color was **202 CU** and turbidity measured **0.74 NTU**.

**Upper Estuary Conditions:** A bloom of *Skeletonema* sp. was present at Fort Myers 11/16/14. Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass but **light levels are too low to submerged aquatic vegetation at depth.** The oligohaline zone extends to Fort Myers.

**Lower Estuary Condition:** The salinity at Iona (**18 psu**) was in the optimal range for oysters on 11/17/14.

McIntyre Creek & Tarpon Bay in J.N. "*Ding*" Darling NWR: Salinity at McIntyre Creek ranged from 30.5 to 33 psu over the last week and CDOM ranged from 14 to 27 qse. Salinity at Tarpon Bay ranged from 30 to 33.5 psu and CDOM ranged from to 18 to 32 qse. Salinity at both locations is in the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

# **Coastal Conditions:**

**Red Tide:** On 11/14/14 FWRI reported a bloom of *Karenia brevis*, the Florida red tide organism, in background to high concentrations along and offshore southern Lee and Collier County and background to very low in Pine Island Sound. Bloom patches extend approximately 60 miles alongshore, up to 35 miles offshore, depending on location, between southern Lee and northern Monroe counties. SCCF samples from Pine Island Sound and around Sanibel contained no *Karenia.* 



Smalltooth Sawfish in Tarpon Bay Sanibel on 11/15/14. Photo above by Nancy Riley Photo below by John Mac MacLennan



*Wildlife Impacts:* CROW the wildlife rehabilitation clinic on Sanibel has received and is treating 11 birds suffering from brevetoxicosis; 7 double-crested cormorants, 1 great blue heron, 1 brown pelican, 1 common tern and 1 sanderling.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
Ft. Myers	13.2	237	1.6	0.68
Colonial	5.4	206	1.7	0.77
lona	4.2	128	1.8	1.05

Target light penetration: **CE**- Caloosahatchee Estuary =1 m

SCB-San Carlos Bay = 2.2 meters

Definition of 25% lz: z where l is 25% of surface l. I = irradiance, z = depth

ACOE Daily Reports						
Date	Day	S79 Flow	S78 Flow	S77 Flow		
		(cfs)	(cfs)	(cfs)		
11/11/2014	Tues	522	254	847		
11/12/2014	Wed	293	149	848		
11/13/2014	Thur	76	64	859		
11/14/2014	Fri	1236	472	855		
11/15/2014	Sat	1890	1258	1309		
11/16/2014	Sun	1727	1426	1370		
11/17/2014	Mon	1647	1037	872		
7 Day	Avg	1055	665	994		
To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: November 18 - 24, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** The oligohaline zone extends to Fort Myers. Over the past week flows to the estuary at S79 averaged **1,247 cfs**. Flows are currently in the suitable range for tape grass in the upper estuary and oysters in the lower estuary.

**USACE Action:** On 11/14/14 the USACE initiated a 7-day pulse releases targeting average flows to the Caloosahatchee at S79 of **1,200 cfs**.

**Recommendation:** We recommend maintaining flows between **800** to **1,000 cfs** to meet the established ecological targets for the estuary. To address recent dry-season rainfall, we recommend that storage in the Kissimmee Chain of Lakes and floodplain be maximized to moderate inflows to Lake Okeechobee.

Lake Okeechobee Level: 15.53 ft. (Low Sub-Band)		Last wk: <b>15.62 ft</b> .		
Lake Okeechobee Inflow:	923 cfs	Lake Oke	echobee Outflow: 1,474 cfs	
Weekly Rainfall:	WP Franklin 0.33"	Ortona 0.14"	Moore Haven 0.28"	
Salinity Fort Myers:	<b>4.9 - 12 psu</b> (SCCF RECO	N Marker 52)	Previous wk 9.2 - 13.7 psu	
Salinity Beautiful Island:	1.9 - 3.3 psu (SCCF REC	ON Marker 18)	Previous wk 1.3 – 4.3 psu	
Salinity Shell Point:	ND (SCCF RECON)		Previous wk: ND	



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 during the pulse release ending on 11/20/14 averaged 1,288 cfs and over the past 7 days flows averaged 1,247 cfs. Over the past 14 days, approximately 57% of total Lake Okeechobee outflows were delivered to the Caloosahatchee at S77.

ACO	E Nove	ember 14,	2014 Pul	se Releas	е	SCCF Sonde Surface Salinity at Fort Myers Yacht Basin
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	20 1 day harm threshold 30D MA
11/14/2014	1	1700	1236	472	855	Tit 20 days have the sharehold
11/15/2014	2	2100	1890	1258	1309	10 - 30 day harm threshold
11/16/2014	3	1800	1727	1426	1370	have another and and
11/17/2014	4	1100	1647	1037	872	5 min man with the first
11/18/2014	5	900	1392	660	723	0
11/19/2014	6	600	826	631	711	stra otra otra otra otra otra
11/20/2014	7	200	295	353	410	1012 1013 1210 1210 12112 1212 1212
7 day avg		1200	1288	834	855	

**Upstream of S79/Franklin Conditions:** On 11/25/14 at the Olga Water Treatment plant, chlorides measured **56 mg/L**, apparent color was **178 CU** and turbidity measured **1.15 NTU**.

**Upper Estuary Conditions:** Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass. The oligohaline zone extends to Fort Myers.

Lower Estuary Condition: The salinity at Iona (20 psu) was in the optimal range for oysters on 11/22/14.

McIntyre Creek & Tarpon Bay in J.N. "*Ding*" Darling NWR: Salinity at McIntyre Creek ranged from 30.5 to 32.5 psu over the last week and CDOM ranged from 16 to 28 qse. Salinity at Tarpon Bay ranged from 30 to 33 psu and CDOM ranged from to 16 to 35 qse. Salinity at both locations is in the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

#### **Coastal Conditions:**

**Red Tide:** On 11/21/14 FWRI reported *Karenia brevis* concentrations range from background to medium alongshore and offshore of Lee and Collier counties. Background concentrations were detected in samples collected in the Pine Island Sound system from Lee and Charlotte counties.

*Wildlife Impacts:* CROW the wildlife rehabilitation clinic on Sanibel has received and is treating 14 new cases of birds suffering from brevetoxicosis; 10 double-crested cormorants, 1 white pelican, 1 osprey, 1 laughing gull, and 1 royal tern.

*Manatees:* Over the past week Lee County Manatee Park staff report 60 - 70 manatees congregating in the warm water of the Orange River by the FPL power plant. On 11/21/14, three mating herds were spotted. Manatee season boat speed limits began on 11/15.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% dep (mete	lo th ers)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = SCB =	1 m 2.2m
Ft. Myers	6.2	206	2.2	0.7	6
Colonial	3.3	155	2.0	0.9	4
Causeway	seway 3.1 <u>55</u> 1.5 1.6				3
Target light penetration: <b>CE</b> - Caloosahatchee Estuary =1 m					
<b>SCB</b> -San Carlos Bay = 2.2 meters					
Definition of 25% Iz: <b>z where I is 25% of surface I.</b> <b>I</b> = irradiance, <b>z</b> = depth					

ACOE Daily Reports					
Date	Day	S79 Flow	S78 Flow	S77 Flow	
		(cfs)	(cfs)	(cfs)	
11/18/2014	Tues	1392	660	723	
11/19/2014	Wed	826	631	711	
11/20/2014	Thur	295	353	410	
11/21/2014	Fri	1159	530	695	
11/22/2014	Sat	1865	1296	1302	
11/23/2014	Sun	1663	1615	1491	
11/24/2014	Mon	1531	935	869	
7 Day	Avg	1247	860	886	

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: November 25 – December 1, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** The oligohaline zone extends to Fort Myers. Over the past week flows to the estuary at S79 averaged **1,486 cfs**. Flows are currently in the suitable range for tape grass in the upper estuary and oysters in the lower estuary.

**USACE Action:** On 11/21/14 the USACE initiated two back to back 7-day pulse releases targeting average flows to the Caloosahatchee at S79 of **1,200 cfs**.

**Recommendation:** We recommend maintaining flows between **800** to **1,000 cfs** to meet the established ecological targets for the estuary. To address above average dry-season rainfall, we recommend that storage in the Kissimmee Chain of Lakes and floodplain be maximized to moderate inflows to Lake Okeechobee and all public and private lands currently under contract with the State be utilized to reduce the timing and volume of flows to the Caloosahatchee.

Lake Okeechobee Level:	15.57 ft. (Low Sub-Band)	Last wk: <b>15.53 ft</b> .		
Lake Okeechobee Inflow:	2,779 cfs	Lake Okeech	obee Outflow: 1,376 cfs	
Weekly Rainfall:	WP Franklin 2.33"	Ortona 1.08"	Moore Haven 0.81"	
Salinity Fort Myers:	<b>3.0 – 13 psu</b> (SCCF RECO	N Marker 52)	Previous wk 4.9 - 12 psu	
Salinity Beautiful Island:	0.5- 2.7 psu (SCCF RECO	N Marker 18)	Previous wk 1.9 - 3.3 psu	
Salinity Shell Point:	ND (SCCF RECON)		Previous wk: ND	



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 during the pulse release ending on 11/27/14 averaged 1,384 cfs and over the past 7 days flows averaged 1,486 cfs. Over the past 14 days, approximately 54% of total Lake Okeechobee outflows were delivered to the Caloosahatchee at S77.

ACOE November 21, 2014 Pulse Release					
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)
11/21/2014	1	1700	1159	530	695
11/22/2014	2	2100	1865	1296	1302
11/23/2014	3	1800	1663	1615	1491
11/24/2014	4	1100	1531	935	869
11/25/2014	5	900	1064	<b>520</b>	452
11/26/2014	6	600	1428	397	318
11/27/2014	7	200	984	328	74
7 day avg		1200	1384	803	743



Page 2 of 3

Upstream of S79/Franklin Conditions: On 12/2/14 at the Olga Water Treatment plant, chlorides measured 66 mg/L, apparent color was 113 CU and turbidity measured 1.15 NTU.

Upper Estuary Conditions: Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass. The oligohaline zone extends to Fort Myers.

Water column chlorophyll levels were elevated above 11 µg/L during the week and phytoplankton sample 11/30 was dominated by Skeletonema sp. which has been blooming for the past month.

**Lower Estuary Condition:** On 11/30/14 the salinity at Iona was **15 psu**, in the optimal range for oysters.

McIntyre Creek & Tarpon Bay in J.N. "Ding" Darling NWR: Salinity at McIntyre Creek ranged from 26 to 32.5 psu over the last week and CDOM ranged from 12 to 26 gse. Salinity at Tarpon Bay ranged from **27 to 34 psu** and CDOM ranged from to 12 to 37 gse. Salinity at both locations is just below or in



Water column chlorophyll at Ft. Myers RECON for the past month reflecting a diatom bloom.

the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

Oysters: November sampling by FGCU reported disease prevalence of *Perkinsus marinus* ranged from 73 - 93%. Disease intensity ranged from **0.86 - 0.87.** (scale 0 = no infection, 1 = low, 3 = medium, 5 = high) Spat recruitment in the Caloosahatchee ranged from 1.19 - 7.89 spat/shell.

### **Coastal Conditions:**

**Red Tide:** On 11/26/14 FWRI reported a bloom of Karenia brevis persists with patches alongshore and up to 50 miles offshore between Collier and Monroe Counties.

Wildlife Impacts: CROW the wildlife rehabilitation clinic on Sanibel has received and is treating 21 new cases of birds suffering from brevetoxicosis; 17 double-crested cormorants, 2 royal terns, 1 white pelican, 1 brown pelican with most cases coming from Fort Myers Beach.

Manatees: Over the past week Lee County Manatee Park staff report 44 - 50 manatees congregating in the warm water of the Orange River by the FPL power plant.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)	
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m	
Ft. Myers	10.4	205	1.5	0.76	
Colonial Br.	4.6	168	1.3	0.91	
Causeway	3.2	51	1.5	1.68	
Target light penetration: $CE_{-}$ Caloosabatchee Estuany -1 m					

get light penetration: **CE**- Caloosahatchee Estuary =1 m

**SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: z where I is 25% of surface I.

I = irradiance, z = depth

ACOE Daily Reports				
Date	Day	S79 Flow	S78 Flow	S77 Flow
		(cfs)	(cfs)	(cfs)
11/25/2014	Tues	1064	520	452
11/26/2014	Wed	1428	397	318
11/27/2014	Thur	984	328	74
11/28/2014	Fri	1513	695	422
11/29/2014	Sat	1998	1230	1093
11/30/2014	Sun	1958	1088	1004
12/1/2014	Mon	1458	609	566
7 Day	Avg	1486	695	561



To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: December 2 - 8, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** The oligohaline zone extends to Fort Myers. Over the past week flows to the estuary at S79 averaged **1,448 cfs**. Flows are currently in the suitable range for tape grass in the upper estuary and oysters in the lower estuary.

**USACE Action:** On 11/28/14 the USACE initiated a 7-day pulse release targeting average flows of **1,200 cfs** to the Caloosahatchee at S79. On 12/5/14 the pulse was increased to average **1,500 cfs**.

**Recommendation:** We recommend maintaining flows between **1,000 -1,200 cfs** to meet the established ecological targets for the estuary, reduce nutrient inflow and help manage Lake Okeechobee water levels. We appreciate maximized storage being achieved in the Kissimmee Chain of Lakes and floodplain to manage high dry season rainfall and urge all additional storage be utilized in the Caloosahatchee watershed to moderate inflows to the estuary.

Lake Okeechobee Level:	15.53 ft. (Low Sub-Band)		Last wk: 15.57 ft.		
Lake Okeechobee Inflow:	2,743 cfs	La	ake Okeechobee Outflow: 4,665 cfs		
Weekly Rainfall:	WP Franklin 0"	Ortona 0.03"	Moore Haven 0.15"		
Salinity Fort Myers:	<b>7.3 – 13 psu</b> (SCCF	RECON Marker 52)	Previous wk 3.0 – 13 psu		
Salinity Beautiful Island:	<b>0.5 – 3.2 psu</b> (SCC	F RECON Marker 18)	Previous wk 0.5 - 2.7 psu		
Salinity Shell Point:	17 - 32 (SCCF REC	ON)	Previous wk: ND		



Flow & Water Quality: Flows into the Caloosahatchee Estuary at S79 during the pulse release ending on 12/4/14 averaged 1,408 cfs and over the past 7 days flows averaged 1,448 cfs. Over the past 14 days, approximately 34% of total Lake Okeechobee outflows were delivered to the Caloosahatchee at S77.



**Upstream of S79/Franklin Conditions:** On 12/9/14 at the Olga Water Treatment plant, chlorides measured **64 mg/L**, apparent color was **118 CU** and turbidity measured **1.74 NTU**.

**Upper Estuary Conditions:** Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass. The oligohaline zone extends to Fort Myers. Water column chlorophyll level was elevated at Fort Myers Yacht Basin on 12/7/14, but levels were dropping at the Fort Myers RECON.

Lower Estuary Condition: The salinity at Iona (14 psu on 12/7/14) and Shell Point (24 psu weekly average), were in the optimal range for oysters.

McIntyre Creek & Tarpon Bay in J.N. "*Ding*" Darling NWR: Salinity at McIntyre Creek ranged from 28.5 to 29.3 psu over the last week and CDOM ranged from 21.5 to 27 qse. Salinity at Tarpon Bay ranged from 28.5 to 30 psu and CDOM ranged from to 18 to 32 qse. Salinity at both locations is just below or in the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

#### **Coastal Conditions:**

*Red Tide:* On 12/5/14 FWRI reported no *Karenia brevis*, the Florida red tide organism, in samples collected the past week throughout southwest Florida.

*Wildlife Impacts:* CROW the Sanibel wildlife rehabilitation clinic has received and is treating 20 new cases of birds suffering from brevetoxicosis; 15 double-crested cormorants, 2 brown pelican, 1 laughing gull, 1 herring gull, and 1 sandwich tern.

*Manatees:* Over the past week Lee County Manatee Park staff report 20-30 manatees congregating in the warm water of the Orange River by the FPL power plant. A manatee rescued for red tide poisoning was rehabilitated and released at the Orange River on 12/3/14. Video of the release: <u>http://www.nbc-2.com/story/27538246/t-pine-the-manatee-recovers-after-red-tide-poisoning#.VIBdOosydZ8</u>

Ca	loosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% dep (mete	lo th ers)
Та	arget Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = SCB =	1 m 2.2m
	Ft. Myers	15.8	207	2.5	0.7	1
С	olonial Br.	6.6	189	3.9	0.7	6
(	Causeway 3.9 69 2.4 1.				1.3	9
	Target light penetration: <b>CE</b> - Caloosahatchee Estuary =1 m					

**SCB**-San Carlos Bay = 2.2 meters

Definition of 25% lz: **z where I is 25% of surface I.** I = irradiance, **z**= depth

ACOE Daily Reports					
Date	Day	S79 Flow	S78 Flow	S77 Flow	
		(cfs)	(cfs)	(cfs)	
12/2/2014	Tues	796	626	502	
12/3/2014	Wed	1052	728	701	
12/4/2014	Thur	1084	610	597	
12/5/2014	Fri	1380	1238	1104	
12/6/2014	Sat	2218	1500	1452	
12/7/2014	Sun	2087	1512	1369	
12/8/2014	Mon	1524	1030	1033	
7 Day	Avg	1448	1034	965	

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, Richard McMillen, SFWMD Blake Guillory, Dan Delisi, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants

Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Connie Jarvis – City of Cape Coral Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: December 9 - 15, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** The oligohaline zone extends to Fort Myers. Over the past week flows to the estuary at S79 averaged **1,483 cfs**. Flows are currently in the suitable range for tape grass in the upper estuary and oysters in the lower estuary.

**USACE Action:** On 12/5/14 the USACE initiated a 7-day pulse release that increased targeted average flows to the Caloosahatchee at S79 to **1,500 cfs.** On 12/12/14 the pulse was continued through 12/18/14.

**Recommendation:** We recommend maintaining flows between **800 - 1,200 cfs** to meet the established ecological targets for the estuary. Maximized storage currently being achieved in the Kissimmee Chain of Lakes and floodplain helps manage high dry season rainfall and retain water in the headwaters of the system. We urge all additional storage in the Caloosahatchee watershed be utilized to moderate inflows to the estuary.

Lake Okeechobee Level:	15.35 ft. (Low Sub-Band)		Last wk: 15.53 ft.	
Lake Okeechobee Inflow:	2, 485 cfs	Lake Okeeche	obee Outflow: 5,161 cfs	
Weekly Rainfall:	WP Franklin 0.0"	Ortona 0.04"	Moore Haven 0.0"	
Salinity Fort Myers:	6.5 – 12.8 psu (SCCF RECON	I Marker 52)	Previous wk 7.3 – 13 psu	
Salinity Beautiful Island:	1.0 - 2.8 (SCCF RECON Mark	er 18)	Previous wk 0.5 – 3.2 psu	
Salinity Shell Point:	15 - 31 (SCCF RECON)		Previous wk: 17 - 32	



#### Caloosahatchee Estuary

#### Page 2 of 2

**Flow & Water Quality:** Flows into the Caloosahatchee Estuary at S79 during the pulse release ending on 12/11/14 averaged **1,462 cfs** and over the past 7 days flows averaged **1,483 cfs** with **53%** of estuary flows originating from Lake Okeechobee releases. Over the past 14 days, approximately **26%** of total Lake Okeechobee outflows were delivered to the Caloosahatchee at S77.

ACOE December 5, 2014 Pulse Release					25 SCCF Sonde Surface Salinity at Fort Myers Yacht Basin	
Date	Day	Pulse Target	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	20 <u>1 day harm threshold</u>
12/5/2014	1	2000	1380	1238	<b>1104</b>	<u>a</u> 15
12/6/2014	2	2400	2218	1500	1452	<u>Sec</u> 10 30 day harm threshold
12/7/2014	3	2100	2087	1512	1369	
12/8/2014	4	1400	1524	1030	1033	5 North Martin Martin Martin
12/9/2014	5	1200	1315	1040	1264	har however
12/10/2014	6	900	1095	889	1194	0
12/11/2014	7	500	615	562	591	white with some with white with
7 day avg		1500	1462	1110	1143	with the the type the type

**Upstream of S79/Franklin Conditions:** On 12/16/14 at the Olga Water Treatment plant, chlorides measured **66 mg/L**, apparent color was **100 CU** and turbidity measured **1.05 NTU**.

**Upper Estuary Conditions:** Surface salinities at the Fort Myers Yacht Basin are in the suitable range for tape grass. The oligohaline zone extends to Fort Myers.

**Lower Estuary Condition:** The salinity at Iona (**14 psu** on 12/15/14) and Shell Point (**24 psu** weekly average), were in the optimal range for oysters. Chlorophyll spikes above 10µg/L were recorded at Shell Point and the Gulf of Mexico RECONs.

McIntyre Creek & Tarpon Bay in J.N. "*Ding*" Darling NWR: Salinity at McIntyre Creek ranged from 29 to 33 psu over the last week and CDOM ranged from 12 to 28 qse. Salinity at Tarpon Bay ranged from 27 to 33 psu and CDOM ranged from to 18 to 33 qse. Salinity at both locations is just below or in the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

#### **Coastal Conditions:**

*Red Tide:* On 12/12/14 FWRI reported no *Karenia brevis*, the Florida red tide organism, in samples collected the past week throughout Florida.

*Wildlife Impacts:* CROW, the wildlife rehabilitation clinic on Sanibel, has received and is treating **8** new double-crested cormorants suffering from brevetoxicosis.

*Manatees:* Over the past week Lee County Manatee Park staff report over 100 manatees congregating in the warm water of the Orange River by the FPL power plant. With the cold front numbers increased as water temperatures decreased.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)		
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m		
Ft. Myers	2.4	180.6	1.8	0.86		
Colonial Br.	6.5	164	1.5	0.90		
Iona	5.3	137	1.7	1.01		
Towned light negative of October States Fature 1						

Target light penetration: **CE**- Caloosahatchee Estuary =1 m

SCB-San Carlos Bay = 2.2 meters

Definition of 25% Iz: z where I is 25% of surface I. I = irradiance, z= depth

ACOE Daily Reports						
Date	Day	S79 Flow	S78 Flow	S77 Flow		
		(cfs)	(cfs)	(cfs)		
12/9/2014	Tues	1315	1040	1264		
12/10/2014	Wed	1095	889	1194		
12/11/2014	Thur	615	562	591		
12/12/2014	Fri	1516	862	775		
12/13/2014	Sat	2211	1391	1364		
12/14/2014	Sun	2143	1491	1586		
12/15/2014	Mon	1490	1082	1388		
7 Day	Avg	1483	1045	1166		

## Sanibel Vet Treats Second Dog For Toad Toxin

by Anne Mitchell

Sanibel veterinarian Dr. Mark Mathusa last week saw his second case in a year of marine toad poisoning in a dog.

The dog, a Jack Russell terrier, had bitten the toad in its owner's yard and immediately begun salivating, vomiting and acting unsteady.

The owner

Dr. Mark Mathusa, veterinarian

flushed out the dog's mouth – an important first step, says Mathusa – then took the dog to him for treatment. He stabilized it with atropine, then gave a dose of valium for the seizures plus cortisone to treat stress, along with fluids.

Untreated, dogs and cats can die from the toxin that's secreted as a milky fluid from the toad's large parotoid glands at the back of its head, behind the ears. "They can go into cardiac arrest," Mathusa noted.

According to the University of Florida Wildlife Extension's website, when this non-native species is threatened or handled, it secretes a substance that in humans can burn the eyes and irritate skin.

Symptoms of marine toad poisoning in pets include drooling, head-shaking, crying, loss of coordination, and, in more



*Bufus marinus*, or marine toad, whose secretions can be fatal to dogs and cats and highly irritating to humans

serious cases, convulsions. The dog's (or cat's) gums often turn red, an indicator used by veterinarians to distinguish toad poisoning from epilepsy, the University of Florida website states.

"For this reason, pet owners should be familiar with their pet's normal gum color. If you suspect toad poisoning, get a hose and run water in the side of the dog's/cat's mouth, pointing the animal's head downward so water isn't swallowed. Rub the gums and mouth to remove the toxin. This treatment is usually successful, but call your veterinarian immediately," according to UF.

Mathusa said when he worked in Key West, toad poisoning in pets was quite common and the toads could reach the size of a dinner plate. That was about 20 years ago. The offending creature in his case – preserved and kept in a freezer for now – is about six inches long.

After he read an article in the *Island Sun* last year about these toads showing up on Sanibel, he brushed up on toad toxin treatment.

Another indication of toad poisoning in dogs he has seen is that they turn their heads to the left.  $\overset{}{\approx}$ 

## Reduced Adoption Fees At Animal Services

t Lee County Domestic Animal Services shelter, kitten season is in full swing. During kitten

#### ISLAND SUN - JUNE 20, 2014 55

season, the monthly intake of cats and kittens entering the shelter doubles from 250 to nearly 500. To help alleviate the overcrowding, all felines six months and over are just \$25 as well as two-for-one during Animal Services' Kitten Smitten adoption promotion. In addition to the discounted fees for cats, the shelter is also reducing the adoption fee to \$35 for all dogs 35 pounds and over.

Kitten season, which runs from May through October, signals the beginning of crisis season for shelters. For Animal Services, the spike in cat intake combined with an average monthly intake of 400 dogs and lull in adoptions during the summer months leads to overcrowding at the shelter.

The discounted fees still include all the same veterinary and other services valued at over \$500. Every pet adopted will receive spay or neuter surgery, ageappropriate vaccinations, flea treatment, de-worming, heartworm test for dogs six months and older, feline AIDS and leukemia test for cats, Lee County pet license for pets three months and older, microchip ID, 10-day health guarantee, and Pet Behavior Helpline.

Pets available for adoption may be viewed online and adopters can submit their application online. The website updates hourly. Volunteers and staff will be available to help individuals and families select the pet that best suits their lifestyle.

The shelter is located at 5600 Banner Drive, Fort Myers, next to the Lee County Sheriff's Office off Six Mile Cypress Parkway. Adoption hours are Monday through Saturday, 11:30 a.m. to 3:30 p.m.\*

# Foundation Recognizes PTSD Awareness Day

Miles of Smiles Foundation President Keith Doxie and his wife Gail of North Fort Myers applaud the United States Senate initiative to raise awareness to the issues of post-traumatic stress disorder (PTSD) whereby June 27 is designated as National PTSD Awareness Day. In addition, June has been designated as PTSD Awareness Month by the National Center for PTSD (NCPTSD).

According to the NCPTSD, PTSD is an anxiety disorder resulting from exposure to a single traumatic event or multiple traumatic events, such as sexual or physical assault, natural or man-made disaster, and war-related combat stress. Symptoms of PTSD include persistent intrusive thoughts and distressing dreams about the traumatic event, triggered emotional responses to reminders of the trauma, efforts to avoid thinking or talking about the trauma, and persistent hyper vigilance for cues that indicate additional danger or trauma re-occurring.

Miles of Smiles Foundation operates Miles Ranch, a not-for-profit 20-acre horse ranch located in North Fort Myers, dedicated to equine-assisted psychotherapy for military veterans. Founded in 2007, the foundation is named in honor of Miles Doxie, son of Gail and Keith, who passed away May 25, 2006, at the age of 17 (two weeks before he was to leave for a career in the U.S. Air Force). They have since dedicated a good portion of their lives assisting veterans who suffer with post-traumatic stress disorder (PTSD) via equine assisted psychotherapy and equine assisted learning programs.

One such benefactor is retired U.S. Army Staff Sergeant Robert Miniaci, a veteran of Operation Iraqi Freedom, Purple Heart recipient and single-dad of a six-year-old daughter, who was diagnosed with post-traumatic stress disorder (PTSD) in 2007, ending his military career. Sergeant Miniaci was paired with a horse named Marshall that once belonged to Miles Doxie. Today, Miniaci is a team member at Miles Ranch, interacting with other veterans and horses.

The Miles Ranch relies on donations received through various fundraising events throughout the year, but to provide a tangible return for a donation, the Doxies have created a fence post program. By donating \$75, a donor's name is affixed on a brass plaque to a fence post at The Miles Ranch. A \$75 donation covers the cost of an eight-foot section of horse fence. By visiting online at www.milesranch.org, you can



From left, Purple Heart recipient and U.S. Army Staff Sergeant (Ret.) Robert Miniaci with Marshall and Keith Doxie at the Miles Ranch in North Fort Myers

donate to the fence post program and participate in other ways to help out at the Miles Ranch.

Founded in 2007, the Miles of Smiles Foundation is a HIPPA-compliant, registered 501(c)3 corporation.  $\updownarrow$ 

To: USACE Colonel Alan M. Dodd, Lt. Colonel Thomas Greco, John Kilpatrick, SFWMD Blake Guillory, Dan Delisi, Tommy Strowd, Terrie Bates, Susan Gray, Peter Doering, DEP Herschel Vinyard

From: Periodic Scientists Conference Call Participants Paul Tritaik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex James Evans & Holly Milbrandt - City of Sanibel Keith Kibbey - Lee County Environmental Lab Keith Laakkonen - Town of Fort Myers Beach Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: January 7 - 13, 2014

This report provides a scientific assessment of Caloosahatchee River and Estuary conditions and how these conditions affect the health, productivity and function of the system.

**Caloosahatchee Condition Summary:** The consequences of four months of massive nutrient loaded flows to the Caloosahatchee during the summer of 2013 are washing up on Sanibel Island and Fort Myers Beach in the form of drift algae. Legacy nutrients from the excessive summer releases are fueling substantial drift algal bloom wracks 12 -18 inches deep and several miles long on Sanibel Island and Fort Myers Beach. Heavy winds and wave conditions with associated cold fronts will likely continue to push macroalgae wracks onto the beaches. These drift algae strandings are causing odor and nuisance complaints from visitors and residents. At the same time, increasing salinities in the upper estuary are impacting recovery of freshwater tape grass.

**USACE Action:** On Tuesday, 1/7/14 a 10-day pulse was initiated, with average flows of 650 cfs including two days of no flow at the end of the pulse.

**Recommendation:** Despite projections indicating a low chance of water shortage this year, beneficial make-up releases to the Caloosahatchee Estuary have been discontinued resulting in salinities trending too high for tape grass and oyster recovery. We request that make-up releases be utilized to provide flows to support healthy conditions in the Caloosahatchee Estuary for tape grass and oyster survival and recovery.

Lake Okeechobee Level:	14.04 ft. (Low Sub-Band)		Last wk: <b>14.09 ft</b>		
Lake Okeechobee Inflow:	389 cfs	Lake	Okeechobee Outflow:	1,155 cfs	
Weekly Rainfall:	WP Franklin 0.26"	Ortona 0.27"	Moore Haven 0.23"		
Salinity Fort Myers:	7.3 - 14 SCCF Ft. Myers Ya	acht Basin	Previous wk: <b>8.2 – 13 psu</b>		
MFL Status:	<b>10.1</b> psu 30 day moving av	verage Fort Myers (SC	CCF sonde) MFL targe	et <u>&lt;</u> 10 psu	
	ND (SCCF RECON Marker 52	2)	Previous wk 10 – 18	psu	
Salinity Beautiful Island:	2.9 - 5.7 psu (SCCF RECON	Marker 18)	Previous wk <b>3.5 - 6.2</b>	psu	
Salinity Shell Point:	<b>20 – 32</b> psu (SCCF RECON)	I	Previous wk: 22 - 33	8 psu	
		A	and alp		



Flow Dynamics: Flows at S79 over the last 7 days of the 10 day pulse averaged **855 cfs** representing **25%** of Lake Okeechobee outflows delivered to the Caloosahatchee via S77. However, this past week extremely high, unseasonable rainfall (**20+** inches) east of the lake reduced water demand south and east of Lake Okeechobee.

ACOE January 7, 2014 Pulse Release						
Date	Day	Pulse	S79 Flow (cfs)	S78 Flow (cfs)	S77 Flow (cfs)	
1/7/14	1	1200	812	492	716	
1/8/14	2	1600	1511	1006	1004	
1/9/14	3	1200	1355	860	790	
1/10/14	4	800	868	535	516	
1/11/14	5	600	574	285	278	
1/12/14	6	400	487	176	121	
1/13/14	7	400	382	216	94	
1/14/14	8	300				
1/15/14	9	0				
1/16/14	10	0				
10 day Av		650				



### Flow and Nutrient Load Effects:

Flows from the two most recent high flow years of 2005 and 2013 are graphed at right. In the active hurricane season of 2005, a greater percentage of flows originated from Lake O than in the rain driven flooding event of 2013. (Flow data USACOE)

A comparison of total nitrogen and total phosphorus loading into the Caloosahatchee Estuary at S79, graphed below, shows the dramatic increase in nutrient loading in the two high flow years compared to the low flow/drought year of 2001 & historical averages from 20 years 1966-1984. (\* *2013 data to November 10, 2013*) (Data: Average 1966-1984 from Hammett 1988, other years from SFWMD DBHYDRO)

As predicted, nutrient loading has fueled a massive drift algae response that has

covered bay bottoms. The algae is now breaking off from nearshore and offshore hard bottom substrates and is washing up on coastal beaches producing odors, respiratory irritation and devastating economic impacts as Southwest Florida's tourism moves into high season.







Fort Myers Beach inundated with drift algae 12-18" deep over 4 miles of beach on 1/14/14. This is generating many visitor complaints. Photo Town of Fort Myers Beach



Upstream of S79/Franklin Conditions: On 1/14/14, chlorides measured 68 mg/L and apparent color was 64 CU.

**Upper Estuary Conditions:** Near Old Bridge Park, where tape grass was present on 1/1/14, salinities have been occasionally exceeding 10 psu. The oligohaline zone extends from S79 to west of Beautiful Island but the salinity gradient is truncated at S79. Color levels are too high for submerged plants at depth in the oligohaline zone.

**Lower Estuary Condition:** Drift algae strandings along Sanibel Island beaches have been increasing in intensity and biovolume. Estuarine macroalgae are washing up on shorelines within the estuary and nearshore macroalgae are washing up along the beaches. Drift algae washing up on Sanibel Island beaches and at the boat ramp on 1/13/14 include: *Acanthophora, Gracilaria, Dasya, Polysiphonia, Agardhiella, Hypnea, Laurencia, Halymenia, Sargassum, Rosenvigea*.

On Fort Myers Beach moderate to heavy wracks of drift algae have washed up on over four miles of beaches. Clean up crews have begun to remove drift algae from the beach. Staff has received multiple public complaints and media inquiries, including this Fort Myers New-Press article <u>http://www.news-press.com/apps/pbcs.dll/article?AID=2014301140015</u>

#### McIntyre Creek and Tarpon Bay in J.N. "Ding" Darling NWR:

The SCCF Marine Laboratory installed a RECON station at the USGS platform on 12/18/13 and the raw data will be available on the RECON website soon.

*Red Tide:* The Florida Fish and Wildlife Conservation Commission (FWC) reported no *Karenia brevis*, the Florida red tide organism, in samples from 1/3/14.

**Manatees:** An FPL survey on 1/8/14 counted 321 manatees in the warm water refuge of the canal off the Orange River which represented 61% of manatees counted at facilities across the state that day. Approximately 12 – 20% of manatees taking refuge at the FPL canal and Orange River are calves. Lee County Manatee Park staff observed two mating herds in the canal and river. On Monday, 1/13/14, a cold stressed manatee was successfully rescued from the Davis boat ramp and transported to Lowry Zoo in Tampa. On 1/814 FWC staff tagged and released two rehabilitated sub adult manatees previously rescued on the west coast, (Cheeno and Woodstock). They can be tracked at www.wildtracks.org.

Caloosahatchee Stations	Chlorophyll (µg/L)	CDOM (qse)	Turbidity (NTU)	25% lo depth (meters)
Target Values	< 11	CE <70 SCB <11	CE < 18 SCB < 5	CE = 1 m SCB = 2.2m
31 Bridge	4.7	183	1.8	0.86
Colonial Br.	3.8	112	1.1	1.18
San Carlos Bay	3.8	31	3.5	1.67

Target light penetration: **CE**- Caloosahatchee Estuary =1 m **SCB**-San Carlos Bay = 2.2 meters Definition of 25% *Iz*: **z** where *I* is 25% of surface *I*. *I* = irradiance, **z**= depth





Large volumes of drift algae washing ashore along Sanibel Beaches 1/1314. Pointe Santo Condo and Buttonwood Lane Beaches. Photos City of Sanibel