MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: January 5 - 11, 2016

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:** Lake Okeechobee and watershed flows during the past week averaged 1,422 cfs to the estuary at S79. Current flows are maintaining average salinity at Fort Myers in the 5 psu range.

**USACE Action:** On 1/8/16 the USACE continued a 7 day pulse releases from Lake Okeechobee to provide average flows of 1,500 cfs to the Caloosahatchee estuary at S79 and no flow to the St. Lucie at S80.

**Recommendation:** With the current El Niño forecast of very wet conditions in the coming months, we urge water managers to utilize all available interim and emergency storage to accommodate excess water. We request the SFWMD provide weekly updates on the Periodic Scientists calls on the status of all available dispersed and emergency water storage that can be used to minimize high-flow impacts to the estuaries. We appreciate the conservative decisions to manage lake releases to date. Ecologically, the system can accommodate higher discharges now compared to later in the spring during peak estuarine spawning periods. We request that flows to the Caloosahatchee not exceed 2,000 cfs until flows to other portions of the C&SF system are also proportionally increased.

**Lake Okeechobee Level:** 14.78 ft. (Low Sub-Band)  
Last week: 14.74 ft.

**Lake Okeechobee Inflow:** 3,840 cfs

**Lake Okeechobee Outflow:** 268 cfs

**Weekly Rainfall:**  
WP Franklin 1.47”  
Ortona 1.35”  
Moore Haven 0.82”

**Salinity Beautiful Island:** 0.6 – 2.6 psu (SCCF RECON Marker 18)  
Previous wk 0.7 – 2.0 psu

**Salinity Fort Myers:** 2.8 – 8.6 psu (SCCF RECON Marker 52)  
Previous wk 3.4 – 7.5 psu

**Salinity Shell Point:** 15 – 32 psu (SCCF RECON)  
Previous wk 17 – 33 psu

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**Salinity (psu)**

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<th>Sustainable Range</th>
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**Light (25% Iz depth meters)**

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<td>San Carlos Bay</td>
<td>1.68</td>
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<td>Low</td>
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Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 1,422 cfs. Over the past 14 days 67.5% of Lake Okeechobee outflows were directed west to the Caloosahatchee, 15.6% was sent south to the EAA for water supply, 16.8% was delivered to the L8 basin, and no water went to the St Lucie at S308.

| ACOE January 1, 2016 Pulse Release |  |
|---|---|---|---|---|
| Date | Day | Pulse Target | S79 Flow (cfs) | S78 Flow (cfs) | S77 Flow (cfs) |
| 1/1/2016 | 1 | 2100 | 1622 | 1026 | 1288 |
| 1/2/2016 | 2 | 2650 | 2512 | 1312 | 2089 |
| 1/3/2016 | 3 | 2300 | 2230 | 1254 | 1306 |
| 1/4/2016 | 4 | 1200 | 1378 | 884 | 731 |
| 1/5/2016 | 5 | 1000 | 1066 | 421 | 217 |
| 1/6/2016 | 6 | 800 | 806 | 328 | 0 |
| 1/7/2016 | 7 | 450 | 445 | 323 | 0 |
| 7 day avg | | 1500 | 1437 | 793 | 804 |

Upstream of S79/Franklin Conditions: On 1/12/16 the Olga Water Treatment plant chlorides measured 55 mg/L, apparent color was 186 CU and turbidity measured 1.13 NTU. No algae was visible at the plant intake over the past week. The plant is online operating at 2000 GPM.

Upper Estuary Conditions: Salinities in the upper estuary are in the suitable range for tape grass.

Lower Estuary Condition: Salinity was in the optimal range for oysters at Iona (15 psu on 1/10/16) and at Shell Point (24 psu weekly average).

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: RECON values over the past week:
McIntyre Creek Salinity: 25 - 32 psu; CDOM: 0.7 - 4.1 qse; Dissolved oxygen: 4.8 - 10.5 mg/L; Chlorophyll 2 - 6.1 µg/L. Salinities are below and in the lower end of the preferred range for shoal and turtle grass (30-40 psu). Algal mats in the west impoundment are dissipating.

Red Tide: The past week FWC reported patchy blooms of the Florida red tide organism Karenia brevis persisting in northwest Florida. SCCF sampling found no Karenia in recent samples around the east side of Sanibel or San Carlos Bay.

Manatees: Lee County Manatee park staff report continued warm water temperatures resulting in small numbers of manatees congregating at Manatee Park on the Orange River and FPL discharge canal over the past week.
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: January 12 - 18, 2016

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 water was released from Lake Okeechobee to the Caloosahatchee this past week to accommodate heavy rainfall within the basin. Rainfall within the watershed provided average flows of 2,728 cfs to the estuary at S79. Three days flows exceeded 3,800 cfs. High flows dropped salinity at Fort Myers close to 0 psu. Salinity was below the optimal range for oysters at Iona.

**USACE Action:** On 1/15/16 the USACE continued a 7 day pulse releases from Lake Okeechobee to provide average flows of 1,500 cfs to the Caloosahatchee estuary at S79 and no flow to the St. Lucie at S80.

**Recommendation:** With very wet El Niño conditions forecast for the coming months, we urge water managers to utilize all interim and emergency storage to accommodate excess water. We request weekly updates continue to be provided by the SFWMD on all available dispersed and emergency water storage to minimize high-flow impacts to the estuaries. Preemptive water releases throughout the greater Everglades system should be implemented now to prevent higher discharges later in the spring during peak estuarine spawning periods. We request that when flows to the Caloosahatchee are increased, flows to other outlets of the C&SF system are proportionally increased. In accordance with the ecological indicators established for the Caloosahatchee estuary, we request flows be maintained below the 2,800 cfs 30-day moving average harm threshold at S79.

**Lake Okeechobee Level:** 15.07 ft. (Low Sub-Band)  
**Last week:** 14.78 ft.

**Lake Okeechobee Inflow:** 10,276 cfs  
**Lake Okeechobee Outflow:** 173 cfs

**Weekly Rainfall:** WP Franklin 3.97”  
Ortona 3.58”  
Moore Haven 2.46”

**Salinity Beautiful Island:** 0.2 – 2.0 psu (SCCF RECON Marker 18)  
**Previous wk:** 0.6 – 2.6 psu

**Salinity Fort Myers:** 0.6 – 6.6 psu (SCCF RECON Marker 52)  
**Previous wk:** 2.8 – 8.6 psu

**Salinity Shell Point:** 9.8 – 30 psu (SCCF RECON)  
**Previous wk:** 15 – 32 psu
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 2,728 cfs. Over the past 14 days 53% of Lake Okeechobee outflows were directed west to the Caloosahatchee, 47% was delivered to the L8 basin, and no water went to the EAA or St Lucie at S308.

### ACOE January 8, 2016 Pulse Release

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<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<td>1482</td>
<td>767</td>
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Upstream of S79/Franklin Conditions: On 1/19/16 the Olga Water Treatment plant chlorides measured 51 mg/L, apparent color was 142 CU and turbidity measured 1.76 NTU. No algae was visible at the plant intake over the past week. The plant is online operating at 2000 GPM.

Upper Estuary Conditions: Salinities in the upper estuary are in the suitable range for tape grass.

Lower Estuary Condition: Salinity was below the optimal range for oysters at Iona (8 psu on 1/18/16) and within the optimal range at Shell Point (21 psu weekly average).

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: RECON Values:
- McIntyre Creek Salinity: 22.4 – 29 psu; CDOM: 0.1 - 0.94 qse; Dissolved oxygen: 5.7 – 11.9 mg/L
- Tarpon Bay: data not available

Salinities are below the lower end of the preferred range for shoal and turtle grass (30-40 psu).

Red Tide: The past week FWC reported the Florida red tide organism Karenia brevis persisting along Pinellas, Manatee, Sarasota, Charlotte, and Lee counties in Southwest Florida. SCCF sampling found no Karenia in recent samples around the east side of Sanibel or San Carlos Bay.

Manatees: Lee County Manatee park staff report as river temperatures fell into the low 60s over the past week as many as 122 manatees were recorded congregating at Manatee Park on the Orange River and FPL discharge canal.
Aerial photo of turbid discharge in San Carlos Bay from the Caloosahatchee watershed and coastal runoff following very high rainfall over the past week. None of this water was discharged from Lake Okeechobee. Photo looking southeast toward Fort Myers Beach.

Photo: Bob Hardy  January 16, 2016
MEMORANDUM

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Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: January 19 - 25, 2016

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 watershed discharges from the Franklin pool during the past week increased average flows to the estuary at S79 to 3,618 cfs. Lake discharges accounted for only 3% of the flow at S79. The lake increased one quarter of a foot over the past week.

USACE Action: On 1/22/16 the USACE continued a 7 day pulse releases from Lake Okeechobee to provide average flows of 1,500 cfs to the Caloosahatchee estuary at S79 and no flow to the St. Lucie at S80.

Recommendation: We request the COE initiate discharges from the lake to other outlets of the C&SF system proportionally to the higher flows directed to the Caloosahatchee. We also request that flows to the Caloosahatchee continue to be measured at S79 when conducting regulatory releases from the Lake to account for local watershed runoff. Preemptive water releases throughout the greater Everglades system should be implemented now to prevent higher discharges later in the spring during peak estuarine spawning periods. The very wet El Niño conditions forecast for the coming months will require all available interim and emergency storage be used to accommodate excess water. Updates should continue to be provided by the SFWMD on the Periodic Scientists call on all available dispersed and emergency water storage to minimize high-flow impacts to the estuaries.

Lake Okeechobee Level: 15.32 ft. (Low Sub-Band) Last week: 15.07 ft.

Lake Okeechobee Inflow: 6,486 cfs
Weekly Rainfall:
WP Franklin 1.02” Ortona 1.19” Moore Haven 1.60”

Salinity Beautiful Island: 0.2 – 0.3 psu (SCCF RECON Marker 18) Previous wk 0.2 – 2.0 psu
Salinity Fort Myers: 0.2 – 0.6 psu (SCCF RECON Marker 52) Previous wk 0.6 – 6.6 psu
Salinity Shell Point: 5.4 – 29 psu (SCCF RECON) Previous wk 9.8 – 30 psu

Salinity (psu)

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<tr>
<th></th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
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<td>Beautiful Island</td>
<td>0.2-0.3</td>
<td>&lt; 5 psu</td>
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<td>Fort Myers</td>
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<td>Shell Point</td>
<td>5.4-29</td>
<td>25-31 psu</td>
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Light (25% Iz depth meters)

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<tr>
<td>Iona</td>
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<td>Causeway</td>
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<tr>
<td>San Carlos Bay</td>
<td>1.06</td>
<td>2.2 meters</td>
<td>Low</td>
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**Flow & Water Quality:** Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 3,618 cfs. Over the past 14 days 24% of Lake Okeechobee outflows were directed west to the Caloosahatchee, 76% were delivered to the L8 basin, and no water went to the EAA or St Lucie at S308. Approximately 1,133 ac-ft entered the Lake through the S-310 structure as drainage from Clewiston and a net of approximately 858 ac-ft entered the Lake from the S-308 structure during the past 14 days.

**Upstream of S79/Franklin Conditions:** On 1/26/16 the Olga Water Treatment plant chlorides measured 53 mg/L, apparent color was 162 CU and turbidity measured 0.86 NTU. No algae was visible at the plant intake over the past week. The plant is online operating at 2000 GPM.

**Upper Estuary Conditions:** Salinities in the upper estuary are in the suitable range for tape grass.

**Lower Estuary Condition:** Salinity was in the harmful range for oysters at Iona (4 psu on 1/24/16) and within the optimal range at Shell Point (19 psu weekly average).

**McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR:** RECON Values:
- McIntyre Creek Salinity: 23 – 31 psu; CDOM: 1.6 to 7.3 qse;
- Dissolved oxygen: 6.6 – 11.5 mg/L
- Tarpon Bay: data not available

**Red Tide:** The past week FWC reported the Florida red tide organism *Karenia brevis* persisting along Pinellas, Manatee, Sarasota, Charlotte, and Lee counties in Southwest Florida. Samples collected by the SCCF Marine Lab found *Karenia* spp. concentrations ranging from the "medium" to "high" range from eastern Pine Island to Redfish Pass in Pine Island Sound as well as within and adjacent to the J.N. "Ding" Darling NWR.

**Manatees:** Lee County Manatee park staff report approximately 200 manatees congregating at Manatee Park on the Orange River and FPL discharge canal. Over the past week a rehabilitated manatee named "Chilee" was released into the Orange River and a manatee was rescued that was struck by a boat and suffered a pneumothorax from a punctured lung. The rescued manatee died in route to Lowry Zoo rehab facility.

**ACOE Daily Reports**

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**ACOE January 15, 2016 Pulse Release**

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Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: January 26 – February 1, 2016

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 rainfall produced very high watershed discharges from the Franklin pool during the past week. Backpumping from the S2 and S3 structures contributed to raising Lake Okeechobee water levels undermining attempts to lower the lake and causing the COE to triple the discharges to the estuary at S79 to an average of 10,394 cfs.

**USACE Action:** On 1/30/16 the USACE increased releases from Lake Okeechobee to 6,500 cfs to the Caloosahatchee estuary measured at the Lake through S77 and 2,800 cfs to the St. Lucie at S80.

**SFWMD Action:** On 1/27/16 SFWMD initiated four days of back pumping from the S2 and S3 structures into Lake Okeechobee totaling 47,000 ac ft of inflow compounding efforts to lower lake water levels with higher estuary discharges.

**Recommendation:** With widespread rainfall and flooding from El Nino saturating all regions of the system we request the SFWMD not exacerbate the problem of high water levels in Lake Okeechobee by allowing backpumping. Initiate discharges from the lake to all other public and private lands in the C&SF system including the 700,000 acres of EAA land proportionally to the higher flows directed to the Caloosahatchee. The SFWMD needs to provide timely updates on emergency water operations and storage to limit harm to Lake Okeechobee and shorten high-flow impacts to the estuaries.

**Lake Okeechobee Level:** 16.19 ft. (Intermediate Sub-Band)  
Last week: 15.32 ft.

**Lake Okeechobee Inflow:** 13,464 cfs

**Weekly Rainfall:**  
WP Franklin 4.41”  
Ortona 4.52”  
Moore Haven 4.40”

**Salinity Beautiful Island:** 0.2 – 0.2 psu (SCCF RECON Marker 18)  
Previous wk 0.2 – 0.3 psu

**Salinity Fort Myers:** 0.2 – 0.2 psu (SCCF RECON Marker 52)  
Previous wk 0.2 – 0.6 psu

**Salinity Shell Point:** 0.6 – 29 psu (SCCF RECON)  
Previous wk 5.4 – 29 psu

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**Salinity (psu)**

<table>
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<tr>
<th>Location</th>
<th>Current Value</th>
<th>Sustainable Range</th>
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</tr>
<tr>
<td>Shell Point</td>
<td>0.6 – 29</td>
<td>25 -31 psu</td>
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**Light (25% Iz depth meters)**

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<th>Location</th>
<th>Value</th>
<th>Depth</th>
<th>Condition</th>
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</tr>
<tr>
<td>Causeway</td>
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<td>2.2 meters</td>
<td>Low</td>
</tr>
<tr>
<td>San Carlos Bay</td>
<td>0.78</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 10,394 cfs. Over the past 14 days 81% of Lake Okeechobee outflows were directed to the Caloosahatchee and 19% were delivered to the St Lucie at S308. No water was discharged to the EAA. Instead, 4 days of backpumping/flowing sent approximately 47,000 ac-ft of water back into Lake O through the S2 and S3 structures. Additional water was pumped into the lake from Clewiston through S-310 and the S4 structure.

Upstream of S79/Franklin Conditions: On 2/2/16 the Olga Water Treatment plant chlorides measured 47 mg/L, apparent color was 211 CU and turbidity measured 3.40 NTU. No algae was visible at the plant intake over the past week. The plant is online operating at 2000 GPM.

Upper Estuary Conditions: Salinities in the upper estuary are in the suitable range for tape grass.

Lower Estuary Condition: Salinity was in the lethal range for oysters at Iona (1 psu on 2/01/16) and within the optimal range at Shell Point (16 psu weekly average).

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: McIntyre Creek Salinity: 14 – 28 psu; CDOM: 0.6 – 2.5 qse; Dissolved oxygen: 5.5 – 10.5 mg/L Chlorophyll spiked over 11 µg/L 1 time ranging from 2.5 - 11.5 µg/L Salinities are below the lower end of the preferred range for seagrass.

Red Tide: The past week FWC reported the Florida red tide organism Karenia brevis persisting along Pinellas, Manatee, Sarasota, Charlotte, and Lee Counties in Southwest Florida. SCCF sampling found 16 million cells/liter at Tarpon Bay Beach on 1/27/16 and medium densities at beaches to the east, including Lighthouse Beach.

Manatees: Lee County Manatee park staff report that with cooler water temperatures approximately 235 manatees including a number of mothers with calves were observed the past week congregating at Manatee Park on the Orange River and FPL discharge canal.

### ACOE January 22, 2016 Pulse Release

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### ACOE Daily Reports

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<th>Day</th>
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<tr>
<td>1/27/2016</td>
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<tr>
<td>1/28/2016</td>
<td>Thur</td>
<td>12270</td>
<td>3665</td>
<td>0</td>
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<tr>
<td>1/29/2016</td>
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<td>4705</td>
<td>0</td>
</tr>
<tr>
<td>1/30/2016</td>
<td>Sat</td>
<td>12647</td>
<td>5416</td>
<td>1826</td>
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<tr>
<td>1/31/2016</td>
<td>Sun</td>
<td>11914</td>
<td>6398</td>
<td>3637</td>
</tr>
<tr>
<td>2/1/2016</td>
<td>Mon</td>
<td>12860</td>
<td>7541</td>
<td>4917</td>
</tr>
<tr>
<td>7 Day Avg</td>
<td></td>
<td>10394</td>
<td>4359</td>
<td>1483</td>
</tr>
</tbody>
</table>

Caloosahatchee Estuary

Target Values:
- Iona: 9.8 µg/L
- Causeway: 6.0 µg/L
- Sanibel: 4.6 µg/L

### ACOE Daily Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
</tr>
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<tbody>
<tr>
<td>1/26/2016</td>
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<td>0</td>
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<td>1/30/2016</td>
<td>Sat</td>
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<td>5416</td>
<td>1826</td>
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<tr>
<td>1/31/2016</td>
<td>Sun</td>
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<tr>
<td>7 Day Avg</td>
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</table>

### ACOE Daily Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<tr>
<td>1/26/2016</td>
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<tr>
<td>7 Day Avg</td>
<td></td>
<td>10394</td>
<td>4359</td>
<td>1483</td>
</tr>
</tbody>
</table>

**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
Flow at S79 from 1996 to present. Average flow is red, lowest percentage flow is blue and this January is the black line. Color bar shows the percentages indicated by each color.
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: February 2 - 8, 2016

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:** Moderate rainfall combined with a significant increase in lake discharges to reduce rising water levels in the lake. With higher lake water levels the COE moved the discharge measurement point to S77 at Lake O. This change does not limit lake discharges based on watershed inflows to the Caloosahatchee estuary, resulting in even higher flows. Over the past week, discharges into the estuary at S79 (representing watershed inflow on top of lake discharges) averaged 10,066 cfs. Discharges to the estuary from Lake O averaged 5,556 cfs, accounting for 55% of the flow at S79.

**USACE Action:** On 2/5/16 the USACE increased lake discharges and removed specific target flows to release as much water as practical through S-77 on the west side of the lake and S-308 on the east side of the lake. Flows to the Caloosahatchee from the lake could be as high as 9,300 cfs and as high as 7,600 cfs to the St Lucie.

**Recommendation:** We understand the severity of the situation and ask that all agencies look to pursue any and all actions that will limit the impact to the estuary. All options to move water south into Everglades National Park should be evaluated and implemented where feasible.

| Lake Okeechobee Inflow: | 9,801 cfs |
| Lake Okeechobee Outflow: | 9,469 cfs |
| Weekly Rainfall: | WP Franklin 1.07” Ortona 1.55” Moore Haven 1.76” |
| Salinity Beautiful Island: | 0.2 – 0.2 psu (SCCF RECON Marker 18 Previous wk 0.2 – 0.2 psu) |
| Salinity Fort Myers: | 0.2 – 0.2 psu (SCCF RECON Marker 52 Previous wk 0.2 – 0.2 psu) |
| Salinity Shell Point: | ND (SCCF RECON Previous wk 0.6 – 29 psu) |

---

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Island</td>
</tr>
<tr>
<td>Fort Myers</td>
</tr>
<tr>
<td>Shell Point</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iona</td>
</tr>
<tr>
<td>Causeway</td>
</tr>
<tr>
<td>San Carlos Bay</td>
</tr>
</tbody>
</table>
**Flow & Water Quality:** Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 10,066 cfs. Over the past 14 days 72% of Lake Okeechobee outflows were directed to the Caloosahatchee and 28% were delivered to the St Lucie at S308. No water was discharged to the EAA.

<table>
<thead>
<tr>
<th>ACOE January 30, 2016 Pulse Release at S77</th>
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<tbody>
<tr>
<td>Date</td>
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<tr>
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<td>2/4/2016</td>
</tr>
<tr>
<td>2/5/2016</td>
</tr>
<tr>
<td>7 day avg</td>
</tr>
</tbody>
</table>

**Upstream of S79/Franklin Conditions:** On 2/9/16 the Olga Water Treatment plant chlorides measured 45 mg/L, apparent color was 216 CU and turbidity measured 2.64 NTU. No algae was visible at the plant intake over the past week. The plant is online operating at 2000 GPM.

**Upper Estuary Conditions:** Salinities in the upper estuary are in the suitable range for tape grass.

**Lower Estuary Condition:** Salinity was in the lethal range for oysters at Iona (0.6 psu) on 2/7/16. Salinities at the Sanibel Causeway are swinging too low for many salt water benthic invertebrates.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: McIntyre Creek Salinity: 16 – 30 psu; CDOM: 0.97 – 0.07 qse; Dissolved oxygen: 5 – 10 mg/L Chlorophyll spiked over 11 µg/L multiple times since February 6, ranging from 3 - 15 µg/L. Salinities are below the preferred range for seagrasses and have never been this low during January and February since monitoring began during 2010.

**Oysters:** January oyster sampling in the Calosahatchee by FGCU reported disease prevalence of Perkinsus marinus for all oysters sampled ranged from 86.6% - 100%. Disease intensity of P. marinus ranged from 0.86 - 1.21. Scale 0 = no infection, 1 = low, 3 = medium, 5 = high. Larval recruitment ranged from 0.19 - 0.78 spat per shell.

**Red Tide:** The past week FWC reported a bloom of Karenia brevis, the Florida red tide organism, persists along Pinellas, Manatee, Sarasota, Charlotte, Lee, and northern Collier counties in Southwest Florida. During the week, SCCF recorded medium densities at Sanibel beaches and high concentrations Lighthouse Beach on 2/4/15.

**Manatees:** Lee County Manatee park staff report that with cool water temperatures approximately 160 manatees were observed the past week congregate at Manatee Park on the Orange River and FPL discharge canal.
Top: Salinity at MacIntyre Creek (2010-2015) and Gulf of Mexico (2008-2015). Average salinity is red, lowest percentage salinity is blue and this year is the black line. Color bar shows the percentages indicated by each color.

Bottom: Flow at S77 and S79 from 1996 to present. Average flow is red, lowest percentage flow is blue and this year is the black line. Color bar shows the percentages indicated by each color.
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
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Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report


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:** Watershed discharges were lower over the past week due to minimal rainfall within the Caloosahatchee basin. High discharges continue from the Lake, accounting for 94% of the flow to the Caloosahatchee. Lake water levels have begun to recede. High flows have lowered salinities at the mouth of the river to as low as 0.6 psu, too low for many salt water invertebrates. Salinities at Iona have been in the lethal range for oysters since 1/24/16. Over the past week, discharges into the estuary at S79 averaged 8,254 cfs. Discharges to the river from Lake O at S77 increased to an average of 7,797 cfs.

**USACE Action:** On 2/12/16 the USACE increased lake discharges and removed specific target flows to release as much water as practical through S-77 on the west side of the lake and S-308 on the east side of the lake. Flows to the Caloosahatchee from the lake could be as high as 9,300 cfs and as high as 7,600 cfs to the St Lucie. On 2/15/16, the USACE announced that it had granted a deviation to raise water levels in the L-29 canal to allow more water to flow from WCA-3 to Everglades National Park.

**Recommendation:** We appreciate the state and Federal actions to implement emergency deviations to move water south. We request the SFWMD provide weekly updates on the Periodic Scientists calls on the status of all available dispersed and emergency water storage on all public and private lands in the C&SF system and ask that all agencies look to pursue any and all actions that will limit the impact to the estuaries.

**Lake Okeechobee Level:** 16.19 ft. (Intermediate Sub-Band)  
**Last week:** 16.37 ft.

**Lake Okeechobee Inflow:** 6,452 cfs
**Lake Okeechobee Outflow:** 9,740 cfs

**Weekly Rainfall:**
- WP Franklin 0.80”
- Ortona 0.83”
- Moore Haven 1.05”

**Salinity Beautiful Island:** 0.2 – 0.2 psu (SCCF RECON Marker 18)  
**Previous wk:** 0.2 – 0.2 psu

**Salinity Fort Myers:** 0.2 – 0.2 psu (SCCF RECON Marker 52)  
**Previous wk:** 0.2 – 0.2 psu

**Salinity Shell Point:** 0.6 - 25 psu (SCCF RECON)  
**Previous wk:** ND

**Lake Okeechobee Level:** 16.19 ft. (Intermediate Sub-Band)  
**Last week:** 16.37 ft.

**Lake Okeechobee Inflow:** 6,452 cfs
**Lake Okeechobee Outflow:** 9,740 cfs

**Weekly Rainfall:**
- WP Franklin 0.80”
- Ortona 0.83”
- Moore Haven 1.05”

**Salinity Beautiful Island:** 0.2 – 0.2 psu (SCCF RECON Marker 18)  
**Previous wk:** 0.2 – 0.2 psu

**Salinity Fort Myers:** 0.2 – 0.2 psu (SCCF RECON Marker 52)  
**Previous wk:** 0.2 – 0.2 psu

**Salinity Shell Point:** 0.6 - 25 psu (SCCF RECON)  
**Previous wk:** ND

**Salinity (psu)**

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<tr>
<th></th>
<th>Current Value</th>
<th>Sustainable Range</th>
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<td>In Range</td>
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<td>Fort Myers</td>
<td>0.2 – 0.2</td>
<td>&lt;10 psu</td>
<td>Low</td>
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<tr>
<td>Shell Point</td>
<td>0.6 - 25</td>
<td>25 -31 psu</td>
<td>Low</td>
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**Light (25% Iz depth meters)**

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<th></th>
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<tbody>
<tr>
<td>Iona</td>
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<tr>
<td>Causeway</td>
<td>0.82</td>
<td>2.2 meters</td>
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</tr>
<tr>
<td>San Carlos Bay</td>
<td>0.84</td>
<td>2.2 meters</td>
<td>Low</td>
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</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 8,254 cfs. Over the past 14 days 64% of Lake Okeechobee outflows were directed to the Caloosahatchee and 35% were delivered to the St Lucie at S308. No water was discharged to the EAA. Discharges of 453 AF were made thru S310 & 516 AF to L8.

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<td>7 day avg</td>
<td></td>
<td>Max</td>
<td>9199</td>
<td>6791</td>
<td>6498</td>
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Upstream of S79/Franklin Conditions: On 2/16/16 the Olga Water Treatment plant chlorides measured 45 mg/L, apparent color was 245 CU and turbidity measured 4.69 NTU. No algae was visible at the plant intake over the past week. The plant is online operating at 2000 GPM.

Upper Estuary Conditions: Salinities in the upper estuary are in the suitable range for tape grass.

Lower Estuary Condition: Salinity was in the lethal range for oysters at Iona (0.8 psu) on 2/15/16. The weekly average was within the optimal range at Shell Point, however, salinities at Shell Point at the low end of the range are too low for many salt water benthic invertebrates.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR:
McIntyre Creek Salinity: 17 – 29.5 psu; CDOM: data not available; Dissolved oxygen: 7 – 12.5 mg/L Chlorophyll has been greater than 11 µg/L multiple times since February 12, ranging from 6 – 19.8 µg/L. Salinities are below the preferred range for seagrasses and have not been this low during January and February since monitoring began in 2010.

Beach Conditions: Lee County Environmental Lab samples on Fort Myers Beach, on February 12, 2016, reported an increase in red tide from low to medium levels (range:>100,000 to 1,000,000). Coral is washing up on the beach.

Red Tide: The past week FWC reported a bloom of Karenia brevis, the Florida red tide organism, persists along Pinellas, Manatee, Sarasota, Charlotte, Lee, and Collier counties in Southwest Florida. During the week, SCCF recorded decreasing densities of Karenia spp. at Sanibel beaches.

Wildlife Impacts: The past week CROW, the Wildlife rehabilitation clinic on Sanibel, treated 6 new cases of red tide poisoning: 2 common loons, 2 brown pelicans, 1 royal tern and 1 laughing gull.

Manatees: Lee County Manatee park staff report that with cool water temperatures approximately 300 manatees were observed the past week congregating at Manatee Park on the Orange River and FPL discharge canal.

<table>
<thead>
<tr>
<th>Caloosahatchee Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>CDOM (qse)</th>
<th>Turbidity (NTU)</th>
<th>25% Io depth (meters)</th>
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<tbody>
<tr>
<td>Target Values</td>
<td>&lt; 11</td>
<td>CE &lt;70</td>
<td>SCB &lt;11</td>
<td>CE &lt; 18 SCB &lt; 5 CE = 1 m SCB = 2.2m</td>
</tr>
<tr>
<td>Iona</td>
<td>15.5</td>
<td>243</td>
<td>2.6</td>
<td>0.64</td>
</tr>
<tr>
<td>Causeway</td>
<td>28.4</td>
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<tr>
<td>Sanibel</td>
<td>20.6</td>
<td>77.1</td>
<td>9.6</td>
<td>0.84</td>
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</tbody>
</table>

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

Definition of 25% Iz: \( z \) where \( I_z \) is 25% of surface \( I \).

ACOE Daily Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<tbody>
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<td>2/9/2016</td>
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<td>9555</td>
<td>6918</td>
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<td>6336</td>
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<td>7 Day Avg</td>
<td></td>
<td>8254</td>
<td>6189</td>
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</table>
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Jeff Kivett, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
Paul Trawik & Joyce Palmer - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex
James Evans & Holly Milbrandt - City of Sanibel
Keith Kibbey - Lee County
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: February 16 - 22, 2016

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: Lake water levels have begun to recede with high discharges into the Caloosahatchee at S77. Although no rain was recorded the past week, watershed inflows to the Franklin pool between S78 and S79 were significant, averaging 2,630 cfs. High flows have lowered salinities at the mouth of the river to as low as 0.9 psu, too low for many salt water invertebrates. Salinities at Iona have been in the lethal range for oysters since 1/24/16. Over the past week, discharges into the estuary at S79 increased to an average of 8,995 cfs. Discharges to the river from Lake O at S77 decreased to an average of 6,327 cfs.

USACE Action: The USACE continues maximum practicable releases to the Caloosahatchee through S-77 on the west side of the lake and S-308 on the east side of the lake. Flows to the Caloosahatchee from the lake could be as high as 9,300 cfs and as high as 7,600 cfs to the St Lucie. On 2/15/16, the USACE announced that it had granted a 90 day deviation to raise water levels in the L-29 canal to allow more water to flow from WCA-3 to Everglades National Park.

Recommendation: We appreciate the state and Federal actions to implement emergency deviations to move water south. We request the SFWMD provide weekly updates on the Periodic Scientists calls on the status of all available dispersed and emergency water storage on all public and private lands in the C&SF system and ask that all agencies look to pursue any and all actions that will limit the impact to the estuaries. We recommend maximum practical releases to all outlets with the goal of lowering the Lake fast enough to reduce releases to support a successful spring spawning season.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Lake Okeechobee Inflow:</td>
<td>4,490 cfs</td>
<td>Lake Okeechobee Outflow: 9,823 cfs</td>
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<tr>
<td>Weekly Rainfall:</td>
<td>WP Franklin 0”</td>
<td>Ortona 0”</td>
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<tr>
<td>Salinity Beautiful Island:</td>
<td>0.2 – 0.2 psu (SCCF RECON Marker 18)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
</tr>
<tr>
<td>Salinity Fort Myers:</td>
<td>0.2 – 0.2 psu (SCCF RECON Marker 52)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
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<tr>
<td>Salinity Shell Point:</td>
<td>0.9 - 29 psu (SCCF RECON)</td>
<td>Previous wk 0.6 - 25 psu</td>
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</table>

Salinity (psu)

<table>
<thead>
<tr>
<th></th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Island</td>
<td>0.2 -0.2</td>
<td>&lt; 5 psu</td>
<td>In Range</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.2 -0.2</td>
<td>&lt;10 psu</td>
<td>Low</td>
</tr>
<tr>
<td>Shell Point</td>
<td>0.9 - 29</td>
<td>25 -31 psu</td>
<td>Low</td>
</tr>
</tbody>
</table>

Light (25% Iz depth meters)

<table>
<thead>
<tr>
<th></th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
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<tbody>
<tr>
<td>Iona</td>
<td>0.66</td>
<td>1 meter</td>
<td>Low</td>
</tr>
<tr>
<td>Causeway</td>
<td>1.08</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
<tr>
<td>San Carlos Bay</td>
<td>1.64</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
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</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 8,995 cfs. Over the past 14 days 63% of Lake Okeechobee outflows were directed to the Caloosahatchee and 37% were delivered to the St Lucie at S308. No water was discharged to the EAA. Discharges of 202 AF were made thru S310 & 636 AF to L8.

<table>
<thead>
<tr>
<th>ACOE February 12, 2016 Pulse Release at S77</th>
<th>Surface Salinity (SCCF) at Fort Myers Yacht Basin</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date</strong></td>
<td><strong>Day</strong></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
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<tr>
<td><strong>7 day avg</strong></td>
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</table>

Upstream of S79/Franklin Conditions: On 2/23/16 the Olga Water Treatment plant chlorides measured 47 mg/L, apparent color was 200 CU and turbidity measured 3.72 NTU. Microcystis and Dolichospermum, potentially toxic blue green algae, was observed and sampled the past week upstream of the Franklin Lock. The plant is online operating at 2000 GPM.

Upper Estuary Conditions: Salinities in the upper estuary are in the suitable range for tape grass.

Lower Estuary Condition: Salinity was below the optimal range for oysters and shoal grass at Iona (2.3 psu on 2/22/16). The average salinity was within the optimal range for oysters at Shell Point, however, it was too low for many salt water benthic invertebrates.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR:
McIntyre Creek Salinity: 18 – 26.5 psu; CDOM: 48-66 qsde; Dissolved oxygen: 5.5 – 19.5 mg/L. Chlorophyll has been greater than 11 µg/L twice since 2/16/16, ranging from 4.6 – 11.5 µg/L. Tarpon Bay data not available. Salinities are below the preferred range for seagrasses and have not been this low during January and February since monitoring began in 2010.

Red Tide: The past week FWC reported a patchy bloom of Karenia brevis, the Florida red tide organism, persisting along Pinellas, Manatee, Sarasota, Charlotte, Lee, and Collier counties in Southwest Florida.

Wildlife Impacts: The past week CROW, the Wildlife rehabilitation clinic on Sanibel, treated 7 new cases of red tide poisoning; 3 Double-crested Cormorants, 2 royal terns, 1 brown pelican and 1 laughing gull.

Manatees: Lee County Manatee park staff report as many as 141 manatees and a mating herd were observed the past week congregating at Manatee Park on the Orange River and FPL discharge canal.

<table>
<thead>
<tr>
<th>Caloosahatchee Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>CDOM (qse)</th>
<th>Turbidity (NTU)</th>
<th>25% Io depth (meters)</th>
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<tr>
<td>Target Values</td>
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<td>SCB &lt; 11</td>
<td>CE &lt; 18</td>
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<td>5.5</td>
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<td>Causeway</td>
<td>13.8</td>
<td>79.1</td>
<td>4.5</td>
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<tr>
<td>Sanibel</td>
<td>6.7</td>
<td>27.3</td>
<td>3.6</td>
<td>1.64</td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>ACOE Daily Reports</th>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<td>2/18/2016</td>
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<td>2/20/2016</td>
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<td>6288</td>
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<td>2/21/2016</td>
<td>Sun</td>
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<td>6261</td>
<td>6278</td>
<td></td>
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<td>2/22/2016</td>
<td>Mon</td>
<td>8138</td>
<td>6187</td>
<td>6222</td>
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<td>7 Day Av</td>
<td></td>
<td>8995</td>
<td>6365</td>
<td>6327</td>
<td></td>
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</tbody>
</table>
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
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Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report


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: Lake water levels continue to recede with high discharges into the Caloosahatchee at S77. Although minimal rain was recorded during the past week, watershed inflows to the Franklin pool between S78 and S79 were significant, averaging 1,803 cfs. High flows have lowered salinities at the mouth of the river to as low as 0.7 psu, too low for many salt water invertebrates. Over the past week, discharges into the estuary at S79 decreased to an average of 7,485 cfs. Discharges to the river from Lake O at S77 decreased to an average of 5,874 cfs. Lake discharges made up 78% of estuary discharges.

USACE Action: The USACE continues maximum practicable releases to the Caloosahatchee through S-77 on the west side of the lake and S-308 on the east side of the lake. Flows to the Caloosahatchee from the lake could be as high as 9,300 cfs and as high as 7,600 cfs to the St Lucie.

Recommendation: With a dry forecast for the coming week and three weeks of lake recession we recommend maximum practical releases to all outlets for the next week with the goal of lowering Lake water levels now to allow for a decrease in flows during the spring spawning season. Given the unusually wet conditions we request the COE not target a lake level of 13.5 ft on June 1, but instead target levels closer to 14 or 14.5 ft.

Lake Okeechobee Level: 15.89 ft. (Intermediate Sub-Band) Last week: 16.08 ft.
Lake Okeechobee Inflow: 6,416 cfs Lake Okeechobee Outflow: 9,643 cfs
Weekly Rainfall: WP Franklin 0.58" Ortona 0.51" Moore Haven 0.30"
Salinity Beautiful Island: 0.2 - 0.2 psu (SCCF RECON Marker 18) Previous wk 0.2 – 0.2 psu
Salinity Fort Myers: 0.2 - 0.2 psu (SCCF RECON Marker 52) Previous wk 0.2 – 0.2 psu
Salinity Shell Point: 0.7 - 29 psu (SCCF RECON) Previous wk 0.9 – 29 psu

Salinity (psu)

<table>
<thead>
<tr>
<th>Location</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Island</td>
<td>0.2 -0.2</td>
<td>&lt; 5 psu</td>
<td>In Range</td>
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<tr>
<td>Fort Myers</td>
<td>0.2 -0.2</td>
<td>&lt;10 psu</td>
<td>Low</td>
</tr>
<tr>
<td>Shell Point</td>
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<td>25 -31 psu</td>
<td>Low</td>
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Light (25% Iz depth meters)

<table>
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<tr>
<th>Location</th>
<th>Depth</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>Iona</td>
<td>0.63</td>
<td>1 meter</td>
</tr>
<tr>
<td>Causeway</td>
<td>0.89</td>
<td>2.2 meters</td>
</tr>
<tr>
<td>Sanibel Boat Ramp</td>
<td>0.95</td>
<td>2.2 meters</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 7,485 cfs. Over the past 14 days 62% of Lake Okeechobee outflows were directed to the Caloosahatchee and 37% were delivered to the St Lucie at S308. Discharges to the EAA at S352 were 800 AF, through S310 were 243 AF and 737 AF to L8.

| ACOE February 12, 2016 Pulse Release at S77 |  |
|---|---|---|---|---|
| Date | Pulse Target | S79 Flow (cfs) | S78 Flow (cfs) | S77 Flow (cfs) |
| 2/19/2016 | 1 Max | 8798 | 6462 | 6460 |
| 2/20/2016 | 2 Max | 9056 | 6288 | 6358 |
| 2/21/2016 | 3 Max | 8719 | 6261 | 6278 |
| 2/22/2016 | 4 Max | 8138 | 6187 | 6222 |
| 2/23/2016 | 5 Max | 8230 | 6193 | 6285 |
| 2/24/2016 | 6 Max | 7530 | 5193 | 5070 |
| 2/25/2016 | 7 Max | 6714 | 5147 | 5202 |
| 7 day avg | Max | 8169 | 5962 | 5982 |

Upstream of S79/Franklin Conditions: On 3/1/16 the Olga Water Treatment plant chlorides measured 48 mg/L, apparent color was 192 CU and turbidity measured 2.98 NTU. No visible algae for the past week. The plant is offline for maintenance to install a temporary alum feed pump.

Upper Estuary Conditions: Salinities in the upper estuary are in the suitable range for tape grass. Submarine light levels were too low for SAV below depths of less than one meter. Cyanobacteria were visible in some areas.

Lower Estuary Condition: Salinity was in the lethal range for oysters and shoal grass at Iona (0.5 psu) on 2/29/16. The average salinity went below the optimal range for oysters at Shell Point 2/26 - 2/28, and was too low for many estuarine benthic invertebrates. There were visible cyanobacteria and elevated phycoerythrin (a cyanobacteria pigment) and chlorophyll levels at Iona on 2/26/16.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Refuge waters are dark brown and impoundments have floating mats of green, filamentous Cladophora sp. Salinities are below the preferred range for seagrasses and have not been this low during January, February or March since monitoring began in 2010. McIntyre Creek Salinity: 20.8 - 29.2 psu; CDOM: 25.1 - 52 qsde; Dissolved oxygen: 4.8 - 11 mg/L, Chlorophyll: 4 - 11 µg/L

Oysters: February oyster sampling in the Caloosahatchee by FGCU reported disease the prevalence of Perkinsus marinus for all oysters sampled ranged from 86.6% to 100%. P. marinus disease intensity ranged from 0.98 to 1.07. Larval recruitment ranged from 0.00 to 0.03 spat per shell in the estuary.

Red Tide: The past week FWC reported a patchy bloom of Karenia brevis, the Florida red tide organism, persisting along Pinellas, Manatee, Sarasota, Charlotte, Lee, and Collier counties in Southwest Florida.

Manatees: Lee County Manatee park staff report as cool front came through last week as many as 200 manatees were observed from Manatee Park on the Orange River and FPL discharge canal.
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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    Rae Ann Wessel & Rick Bartleson, Ph.D. -Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: March 1 – 7, 2016

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: Lake water levels continue to recede with high discharges into the Caloosahatchee at S77. Despite no rain recorded during the past week, significant watershed inflows averaging 1,412 cfs continue into the Franklin pool between S79 and S78. High flows have lowered salinities at the mouth of the river to as low as 2 psu, too low for many salt water invertebrates. Over the past week, discharges into the estuary at S79 decreased to an average of 4,786 cfs. Discharges to the river from Lake O at S77 decreased to an average of 5,570 cfs. Lake discharges made up 78% of estuary discharges.

USACE Action: On March 4, 2016 the USACE reduced releases to the Caloosahatchee through S-77 from maximum releases to up to 4,000 cfs. On the St. Lucie they changed the point of measurement to S-80 and reduced flows to 1800 cfs.

Recommendation: With a dry forecast for the coming week and three weeks of lake recession we recommend maximum practical releases to all outlets for the next week with the goal of lowering Lake water levels now to allow for a decrease in flows during the spring spawning season. Given the unusually wet conditions we request the COE not target a lake level of 13.5 ft on June 1, but instead target levels closer to 14 or 14.5 ft.

Lake Okeechobee Level: 15.65 ft. (Low Sub-Band) Last week: 15.89 ft.

Lake Okeechobee Inflow: 3,104 cfs
Lake Okeechobee Outflow: 7,360 cfs

Weekly Rainfall:
WP Franklin 0”
Ortona 0”
Moore Haven 0”

Salinity Beautiful Island: 0.2 – 0.2 psu (SCCF RECON Marker 18)
Previous wk 0.2 – 0.2 psu

Salinity Fort Myers: 0.2 – 0.2 psu (SCCF RECON Marker 52)
Previous wk 0.2 – 0.2 psu

Salinity Shell Point: 2.0 – 28 psu (SCCF RECON)
Previous wk 0.7 – 29 psu

Salinity (psu)

<table>
<thead>
<tr>
<th></th>
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<th>High/ Low</th>
</tr>
</thead>
<tbody>
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<td>&lt; 5 psu</td>
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<tr>
<td>Fort Myers</td>
<td>0.2 -0.2</td>
<td>&lt;10 psu</td>
<td>Low</td>
</tr>
<tr>
<td>Shell Point</td>
<td>2.0 - 28</td>
<td>25 -31 psu</td>
<td>Low</td>
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Light (25% Iz depth meters)

<table>
<thead>
<tr>
<th></th>
<th>Iz Value</th>
<th>Depth</th>
<th>Category</th>
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<td>Iona</td>
<td>0.66</td>
<td>1 meter</td>
<td>Low</td>
</tr>
<tr>
<td>Causeway</td>
<td>0.82</td>
<td>2.2 meters</td>
<td>Low</td>
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<tr>
<td>Sanibel Boat Ramp</td>
<td>0.95</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
**Flow & Water Quality:** Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 5,570 cfs. Over the past 14 days 59% of Lake Okeechobee outflows were directed to the Caloosahatchee. 35% were delivered to the St Lucie at S308, 5% of flows were discharged south to the EAA for water supply and 1% to the L8.

<p>| ACOE February 12, 2016 Pulse Release at S77 |
|-------------------------------|------------------|------------------|-------------------|</p>
<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<td>7 day avg</td>
<td>Max</td>
<td>7137</td>
<td>5521</td>
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**Upstream of S79/Franklin Conditions:** On 3/8/16 the Olga Water Treatment plant chlorides measured 50 mg/L, apparent color was 162 CU and turbidity measured 2.35 NTU. No visible algae for the past week. The plant is online and operating at 2000 GPM.

**Upper Estuary Conditions:** Salinities in the upper estuary are in the suitable range for tape grass. Submarine light levels were too low for SAV below depths of less than one meter.

**Lower Estuary Condition:** Salinity was in the lethal range for oysters and shoal grass at Iona (1.0 psu on 3/7/16). The average salinity at Shell Point was too low for many estuarine benthic invertebrates. Phycocerythrin (a cyanobacteria pigment) and chlorophyll levels were elevated at Iona on 3/7/16, and chlorophyll was spiking at the Shell Point RECON during the week.

**McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR:** Refuge waters are dark brown and the west impoundment has floating mats of green, filamentous algae, Cladophora sp. Salinities are below the preferred range for seagrasses and have not been this low during January, February or March since monitoring began in 2010. Dissolved oxygen dipped below 4 mg/L twice over the last week and chlorophyll spiked above 11 µg/L four times. McIntyre Creek Salinity: 20 – 26.5 psu; CDOM: 30-46 qsde; Dissolved oxygen: 3.5 – 11.6 mg/L, Chlorophyll: 4.8 - 13 µg/L

**Red Tide:** The past week FWC reported Karenia brevis, the Florida red tide organism, persists in background to very low concentrations in several areas in Southwest Florida particularly in southern collier and northern Monroe Counties. No red tide was detected by SCCF sampling or by the Mote Marine Lab optical phytoplankton descriminator at SCCFs Gulf RECON site this week.

**Wildlife Impacts:** The past week CROW, the Wildlife rehabilitation clinic on Sanibel, treated 5 new cases of red tide poisoning; 3 double-crested cormorants and 2 brown pelicans.

**Manatees:** Lee County Manatee park staff report mating herds and as many as 128 manatees in the Orange River and FPL discharge canal the past week. Manatees have also been sighted moving through the WP Franklin Locks regularly.

<table>
<thead>
<tr>
<th>Caloosahatchee Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>CDOM (qs)</th>
<th>Turbidity (NTU)</th>
<th>25% Io depth (meters)</th>
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<tr>
<td>Target Values</td>
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<td>CE = 1 m</td>
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<tr>
<td></td>
<td></td>
<td>SCB &lt; 11</td>
<td>SCB &lt; 5</td>
<td>SCB = 2.2m</td>
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<td>Iona</td>
<td>23</td>
<td>204</td>
<td>4.0</td>
<td>0.66</td>
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<tr>
<td>Causeway</td>
<td>8.0</td>
<td>158</td>
<td>4.5</td>
<td>0.82</td>
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<tr>
<td>Sanibel Boat Ramp</td>
<td>8.8</td>
<td>114</td>
<td>4.9</td>
<td>0.95</td>
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</table>

**ACOE Daily Reports**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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</thead>
<tbody>
<tr>
<td>3/1/2016</td>
<td>Tues</td>
<td>7036</td>
<td>5429</td>
<td>5910</td>
</tr>
<tr>
<td>3/2/2016</td>
<td>Wed</td>
<td>6600</td>
<td>4974</td>
<td>5706</td>
</tr>
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<td>3/3/2016</td>
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<td>3/5/2016</td>
<td>Sat</td>
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<td>3154</td>
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<td>3/6/2016</td>
<td>Sun</td>
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<td>3/7/2016</td>
<td>Mon</td>
<td>5011</td>
<td>3622</td>
<td>4047</td>
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</table>

**Surface Salinity at Iona Oyster Reef**

**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
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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
   Rae Blake – Town of Fort Myers Beach
   Connie Jarvis & Harry Phillips – City of Cape Coral
   Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: March 8 – 14, 2016

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: Lake water levels continue to recede with high discharges into the Caloosahatchee at S77. Despite no rainfall recorded over the past week, significant watershed inflows averaging 1,052 cfs continue into the Franklin pool between S78 and S79. Over the past week, discharges into the estuary at S79 decreased to an average of 4,456 cfs. Discharges to the river from Lake O at S77 decreased to an average of 3,982 cfs. Lake discharges made up 89% of estuary discharges.

USACE Action: On March 11, 2016 the USACE continued releases to the Caloosahatchee through S-77 of up to 4,000 cfs and up to 1800 cfs to the St. Lucie measured at S-80.

Recommendation: With five weeks of lake recession and the lake in the Low Sub band, we recommend further reducing releases to the Caloosahatchee to 2,800 cfs measured at S79 for this coming week to reduce flows and improve estuary salinities to support spring spawning. Reduced flows are critical to prevent the advection of eggs and larvae from critical habitat within the estuary. Given the unusually wet conditions we request the COE not target a June 1 lake level target of 13.5 ft, but instead target levels closer to 14 or 14.5 ft.

<table>
<thead>
<tr>
<th>Lake Okeechobee Level:</th>
<th>15.41 ft. (Low Sub-Band)</th>
<th>Last week: 15.65 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Okeechobee Inflow:</td>
<td>1,384 cfs</td>
<td>Lake Okeechobee Outflow: 7,193 cfs</td>
</tr>
<tr>
<td>Weekly Rainfall:</td>
<td>WP Franklin 0”</td>
<td>Ortona 0”</td>
</tr>
<tr>
<td>Salinity Beautiful Island:</td>
<td>0.2 – 0.2 psu (SCCF RECON Marker 18)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
</tr>
<tr>
<td>Salinity Fort Myers:</td>
<td>0.2 – 0.2 psu (SCCF RECON Marker 52)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
</tr>
<tr>
<td>Salinity Shell Point:</td>
<td>4.5 – 32 psu (SCCF RECON)</td>
<td>Previous wk 2.0 – 28 psu</td>
</tr>
</tbody>
</table>

### Salinity (psu)

<table>
<thead>
<tr>
<th></th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Island</td>
<td>0.2 - 0.2</td>
<td>&lt; 5 psi</td>
<td>In Range</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.2 - 0.2</td>
<td>&lt;10 psi</td>
<td>Low</td>
</tr>
<tr>
<td>Shell Point</td>
<td>4.5 – 32</td>
<td>25 -31 psi</td>
<td>Low</td>
</tr>
</tbody>
</table>

### Light (25% Iz depth meters)

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Iona</td>
<td>0.90</td>
<td>1 meter</td>
<td>Low</td>
</tr>
<tr>
<td>Causeway</td>
<td>0.91</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
<tr>
<td>Sanibel Boat Ramp</td>
<td>1.63</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 4,456 cfs. Over the past 14 days 55% of Lake Okeechobee outflows were directed to the Caloosahatchee, 27% were delivered to the St Lucie at S308, 16% of flows were discharged south to the EAA and 2% to the L8.

Upstream of S79/Franklin Conditions: On 3/15/16 the Olga Water Treatment plant chlorides measured 48 mg/L, apparent color was 154 CU and turbidity measured 2.6 NTU. No visible algae for the past week. The plant is online and operating at 2000 GPM.

Upper Estuary Conditions: Salinities in the upper estuary are in the suitable range for tape grass. Submarine light levels were too low for SAV below depths of less than one meter.

Lower Estuary Condition: Salinity was below the optimal range for oysters at Iona (11 psu on 3/13/16). The average salinity at Shell Point was in the optimal range for oysters (22 psu).

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR Refuge waters are dark brown and the west impoundment has floating mats of green, filamentous algae, Cladophora sp. Salinities are below the preferred range for seagrasses and have not been this low during January, February or March since monitoring began in 2010. Tarpon Bay Salinity: 28.4 – 32.8 psu; CDOM: 10-32 qsde; Dissolved oxygen: 6.1 – 8.2 mg/L, Chlorophyll: 3.0 – 7.8 µg/L. McIntyre Creek Salinity: 23.2 – 32.6 psu; CDOM: 10-36 qsde; Dissolved oxygen: 4.3 – 9.3 mg/L, Chlorophyll: 2.4 – 20 µg/L. Chlorophyll spiked above 11 µg/L once on March 14 at McIntyre Creek.

Red Tide: The past week FWC reported Karenia brevis, the Florida red tide organism, persists in background to very low concentrations in several areas in Southwest Florida particularly in southern Collier and northern Monroe Counties. No red tide was detected by SCCF sampling or by the Mote Marine Lab optical phytoplankton descriminator at SCCFs Gulf RECON site this week.

Manatees: Lee County Manatee park staff report warming river water temperatures are dispersing manatees. Approximately 35 manatees were observed congregating in the Orange River and FPL discharge canal the past week.

<table>
<thead>
<tr>
<th>Caloosahatchee Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>CDOM (qse)</th>
<th>Turbidity (NTU)</th>
<th>25% Io depth (meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Values</td>
<td>&lt; 11</td>
<td>CE &lt;70 SCB &lt;11</td>
<td>CE &lt; 18 SCB &lt; 5</td>
<td>CE = 1 m SCB = 2.2m</td>
</tr>
<tr>
<td>Iona</td>
<td>4.2</td>
<td>146</td>
<td>3.6</td>
<td>0.90</td>
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<tr>
<td>Causeway</td>
<td>3.5</td>
<td>39.2</td>
<td>14.2</td>
<td>0.91</td>
</tr>
<tr>
<td>Sanibel Boat Ramp</td>
<td>0.5</td>
<td>9.3</td>
<td>6.5</td>
<td>1.63</td>
</tr>
</tbody>
</table>

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

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

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
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Rae Blake – Town of Fort Myers Beach
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: March 15 – 21, 2016

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: Lake water levels continue to recede with high discharges into the Caloosahatchee. The past week, Lake discharges made up 83% of estuary discharges and watershed inflows averaged 762 cfs into the Franklin pool between S78 and S79. Over the past week, discharges into the estuary at S79 decreased to an average of 3,355 cfs. Discharges to the river from Lake Okeechobee at S77 decreased to an average of 2,796 cfs.

USACE Action: On March 18, 2016 the USACE reduced releases to the Caloosahatchee through S-79 to a weekly average of 3,000 cfs and 1,170 cfs to the St. Lucie measured at S-80.

Recommendation: With six weeks of lake recession and the lake in the Low Sub band, we recommend further reducing releases to the Caloosahatchee to 2,800 cfs or less measured at S79 for this coming week to reduce flows to support spring spawning and improve estuary salinities. Reduced flows are critical to prevent the advection of eggs and larvae from critical habitat within the estuary. Given the unusually wet conditions we request the COE not target a June 1 lake level target of 13.5 ft, but instead target levels closer to 14 or 14.5 ft, unless conditions allow without the need for higher discharges to the estuaries.

Lake Okeechobee Level: 15.20 ft. (Low Sub-Band)       Last week: 15.41 ft.
Lake Okeechobee Inflow: 1,249 cfs                         Lake Okeechobee Outflow: 6,230 cfs
Weekly Rainfall: WP Franklin 0.77 "  Ortona 0.21 "  Moore Haven 0.38 "
Salinity Beautiful Island: 0.2 – 0.2 psu (SCCF RECON Marker 18)  Previous wk 0.2 – 0.2 psu
Salinity Fort Myers: 0.2 – 0.2 psu (SCCF RECON Marker 52)  Previous wk 0.2 – 0.2 psu
Salinity Shell Point: 5.5 – 31 psu (SCCF RECON)  Previous wk 4.5 – 32 psu

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Island</td>
<td>0.2 - 0.2</td>
<td>&lt; 5 psu</td>
<td>In Range</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.2 - 0.2</td>
<td>&lt;10 psu</td>
<td>Low</td>
</tr>
<tr>
<td>Shell Point</td>
<td>5.5 – 31</td>
<td>25 -31 psu</td>
<td>Low</td>
</tr>
</tbody>
</table>

| Light (25% Iz depth meters) | | | |
|-----------------------------|-------------------|-----------------|
| Iona | 0.61 | 1 meter | Low |
| Causeway | 0.59 | 2.2 meters | Low |
| Sanibel Boat Ramp | 0.82 | 2.2 meters | Low |
**Flow & Water Quality:** Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 3,355 cfs. Over the past 14 days 50% of Lake Okeechobee outflows were directed to the Caloosahatchee, 20% were delivered to the St Lucie at S308, 27% of flows were discharged south to the EAA and 2% to the L8.

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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</table>

**Upstream of S79/Franklin Conditions:** On 3/22/16 the Olga Water Treatment plant chlorides measured 50 mg/L, apparent color was 147 CU and turbidity measured 3.24 NTU. No visible algae for the past week. The plant is online and operating at 2000 GPM.

**Upper Estuary Conditions:** Salinities in the upper estuary are in the suitable range for tape grass. Submarine light levels were too low for SAV below depths of less than one meter.

**Lower Estuary Conditions:** Salinity was below the optimal range for oysters at Iona (4.4 psu on 3/21/16). The average salinity at Shell Point was in the optimal range for oysters (18 psu).

**McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR:** Refuge waters are still brown and floating mats of green, filamentous algae (Cladophora sp.) persist in the west impoundment. Salinities are below the preferred range for seagrasses and have not been this low during January, February or March since monitoring began in 2010. Dissolved oxygen dropped below 4 mg/L twice over the last week at McIntyre Creek.

Tarpon Bay Salinity: 28.1 – 33.6 psu; CDOM: 9.5 - 32 qsde; Dissolved oxygen: 6 – 8.3 mg/L, Chlorophyll: 2.9 – 9.9 µg/L.

McIntyre Creek Salinity: 26.9 – 32.5 psu; CDOM: 10.5- 23.8 qsde; Dissolved oxygen: 3.2 – 10.6 mg/L, Chlorophyll: 2.4 – 7 µg/L.

**Oysters:** March oyster sampling in the Caloosahatchee by FGCU reported disease prevalence of Perkinsus marinus for all oysters sampled ranging from 40.00% to 86.66%. *P. marinus* disease intensity ranged from 0.40 to 0.93. Scale 0 = no infection, 1 = low, 3 = medium, 5 = high. Larval recruitment ranged from 0.53 to 0.00 spat per shell with an average of 0.15 spat per shell in the estuary.

**Red tide:** On March 18, 2016 FWC reports Karenia brevis, the Florida red tide organism, was observed in background concentrations in one sample collected from inshore waters of Manatee County and in one sample collected alongshore of Collier County. Additional samples collected throughout Florida this past week did not contain *K. brevis.*
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: March 22 – 28, 2016

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: Lake water levels continue to recede with relatively high discharges into the Caloosahatchee. Over the past week, discharges into the estuary at S79 decreased but remain above the harm threshold averaging 3,039 cfs. Discharges to the river from Lake Okeechobee at S77 decreased to an average of 2,179 cfs. The past week, Lake discharges made up 72% of estuary discharges. Watershed inflows into the Franklin pool between S78 and S79 averaged 811 cfs.

USACE Action: On March 25, 2016 the USACE continued releases to the Caloosahatchee through S-79 to a weekly average of 3,000 cfs and 1,170 cfs to the St. Lucie measured at S-80.

Recommendation: With seven weeks of lake recession, higher evapotranspiration off the lake and spawning beginning in the Caloosahatchee estuary, we recommend further reducing releases to the Caloosahatchee to 2,800 cfs or less measured at S79 for this coming week. Reduced flows are critical to prevent the advection of eggs and larvae from critical habitat within the estuary. Given this season's unusually wet conditions we request the COE adjust the June 1 lake level target of 13.5 ft, to levels closer to 14 or 14.5 ft.

Lake Okeechobee Level: 15.07 ft. (Low Sub-Band)  Last week: 15.20 ft.
Lake Okeechobee Inflow: 3,921 cfs  Lake Okeechobee Outflow: 4,410 cfs
Weekly Rainfall: WP Franklin 0.02” Ortona 0.65” Moore Haven 1.19”
Salinity Beautiful Island: 0.2 – 0.2 psu (SCCF RECON Marker 18)  Previous wk 0.2 – 0.2 psu
Salinity Fort Myers: 0.2 – 0.2 psu (SCCF RECON Marker 52)  Previous wk 0.2 – 0.2 psu
Salinity Shell Point: 5.5 – 31 psu (SCCF RECON)  Previous wk 5.5 – 31 psu

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Value</td>
</tr>
<tr>
<td>Beautiful Island</td>
</tr>
<tr>
<td>Fort Myers</td>
</tr>
<tr>
<td>Shell Point</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iona</td>
</tr>
<tr>
<td>Causeway</td>
</tr>
<tr>
<td>Sanibel Boat Ramp</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 3,039 cfs. Over the past 14 days 50% of Lake Okeechobee outflows were directed to the Caloosahatchee, 20% were delivered to the St Lucie at S308, 27% of flows were discharged south to the EAA and 3% to the L8.

Upstream of S79/Franklin Conditions: On 3/22/16 the Olga Water Treatment plant chlorides measured 51 mg/L, apparent color was 123 CU and turbidity measured 3.23 NTU. No visible algae for the past week. The plant is online and operating at 2000 GPM.

Upper Estuary Conditions: Salinities in the upper estuary are in the suitable range for tape grass. Submarine light levels were too low for SAV below depths of less than one meter.

Lower Estuary Condition: Salinity was below the optimal range for oysters at Iona (8.7 psu on 3/26/16). The average salinity at Shell Point was in the optimal range for oysters (22 psu).

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Refuge waters are still brown and floating mats of green, filamentous algae (Cladophora sp.) persist in the west impoundment. Salinities are below the preferred range for sea grasses and have not been this low during January, February or March since monitoring began in 2010. Dissolved oxygen dropped below 4 mg/L three times over the last week at McIntyre Creek.

Tarpon Bay Salinity: 24.5 – 33 psu; CDOM: not available; Dissolved oxygen: 5.5 – 9.2 mg/L, Chlorophyll: 3.4 – 9 µg/L. McIntyre Creek Salinity: 26.9 – 31.3 psu; CDOM: 11 – 26.5 qsd; Dissolved oxygen: 3.7 – 9 mg/L, Chlorophyll: 2.9 – 7.1 µg/L.

Red tide: On March 25, 2016 FWC reported no Karenia brevis, the Florida red tide organism, in samples from southwest Florida.

Wildlife Impacts: The past week CROW, the wildlife rehabilitation clinic on Sanibel, treated 3 new cases of red tide poisoning; 2 brown pelicans and 1 double-crested cormorant.

<table>
<thead>
<tr>
<th>Caloosahatchee Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>CDOM (qse)</th>
<th>Turbidity (NTU)</th>
<th>25% io depth (meters)</th>
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</thead>
<tbody>
<tr>
<td>Target Values</td>
<td>&lt; 11</td>
<td>CE &lt; 70</td>
<td>CE &lt; 18 SCB &lt; 5</td>
<td>CE = 1 m S79 SCB = 2.2m</td>
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<tr>
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<td>4.1</td>
<td>12.9</td>
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<td>1.75</td>
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</table>

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
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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 & Lesli Haynes - Lee County
Rae Blake – Town of Fort Myers Beach
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: March 29 – April 5, 2016

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: Lake water levels continue to recede with relatively high discharges into the Caloosahatchee. Over the past week, discharges into the estuary at S79 decreased but remain above the harm threshold averaging 2,993 cfs. Discharges to the river from Lake Okeechobee at S77 decreased to an average of 2,142 cfs. The past week, Lake discharges made up 72% of estuary discharges. Watershed inflows into the Franklin pool between S78 and S79 averaged 863 cfs.

USACE Action: On April 1, 2016 the USACE continued pulse releases to the Caloosahatchee through S-79 to a weekly average of 3,000 cfs and 1,170 cfs to the St. Lucie measured at S-80.

Recommendation: With higher evapotranspiration off the lake and spawning beginning in the Caloosahatchee estuary, we recommend further reducing releases to the Caloosahatchee to 2,800 cfs or less measured at S79 for this coming week. Reduced flows are critical to prevent the advection of eggs and larvae from critical habitat within the estuary. Given this seasons unusually wet conditions we request the COE adjust the June 1 lake level target of 13.5 ft to levels closer to 14 or 14.5 ft.

Lake Okeechobee Level: 15.08 ft. (Low Sub-Band) Last week: 15.07 ft.
Lake Okeechobee Inflow: 6,173 cfs Lake Okeechobee Outflow: 4,005 cfs
Weekly Rainfall: WP Franklin 0.93” Ortona 0.42” Moore Haven 0.54”
Salinity Beautiful Island: 0.2 – 0.2 psu (SCCF RECON Marker 18) Previous wk 0.2 – 0.2 psu
Salinity Fort Myers: 0.2 – 0.2 psu (SCCF RECON Marker 52) Previous wk 0.2 – 0.2 psu
Salinity Shell Point: 7.9 – 32 psu (SCCF RECON) Previous wk 5.5 – 31 psu
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 2,993 cfs. Over the past 14 days 58% of Lake Okeechobee outflows were directed to the Caloosahatchee, 16% were delivered to the St Lucie at S308, 23% of flows were discharged south to the EAA and 3% to the L8.

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<td>2400</td>
<td>2163</td>
<td>1554</td>
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<td>7 day avg</td>
<td></td>
<td>3000</td>
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<td>2183</td>
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Increased turbidities during high flow periods reflect increased loading of suspended solids that settle out in calm conditions and become re-suspended by currents or wave action contributing to reduced production.

Upstream of S79/Franklin Conditions: On 4/5/16 the Olga Water Treatment plant chlorides measured 53 mg/L, apparent color was 135 CU and turbidity measured 3.11 NTU. No visible algae for the past week. The plant is online and operating at 2000 GPM.

Upper Estuary Conditions: Salinities in the upper estuary are in the suitable range for tape grass. Submarine light levels were too low for SAV below depths of less than one meter.

Lower Estuary Condition: Salinity was below the optimal range for oysters at Iona (6.7 psu on 4/4/16). The average salinity at Shell Point was in the optimal range for oysters (22 psu).

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Refuge waters are still brown and floating mats of green, filamentous algae (Cladophora sp.) persist in the west impoundment. Salinities are at or below the preferred range for sea grasses. Dissolved oxygen dropped below 4 mg/L three times over the last week at McIntyre Creek.

Tarpon Bay Salinity: <25.5 – 33.5 psu; CDOM: 1.5 – 8.0 qsde; Dissolved oxygen: 5.0 – 8.5 mg/L, Chlorophyll: 2.3 – 10.5 mg/L. McIntyre Creek Salinity: 27.0 – 32.8 psu; CDOM: 8.0 – 20.0 qsde; Dissolved oxygen: 2.8 – 11.0 mg/L, Chlorophyll: 2.5 – 10.5 mg/L.

Red tide: On April 1, 2016 FWC reported patchy bloom of Karenia brevis, the Florida red tide organism, in samples along Pinellas, Manatee, Sarasota, Charlotte, and Lee counties in southwest Florida. Dead fish were present on some East end Sanibel beaches on 3/30 and 3/31 and 4/4/16.

Wildlife Impacts: The past week CROW, the wildlife rehabilitation clinic on Sanibel, received 11 new patients suffering from red tide poisoning; 7 double-crested cormorants, 1 Kemps Ridley sea turtle, 1 tricolor heron, 1 laughing gull and 1 royal tern.

<table>
<thead>
<tr>
<th>Caloosahatchee Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>CDOM (qse)</th>
<th>Turbidity (NTU)</th>
<th>25% light penetration (meters)</th>
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</thead>
<tbody>
<tr>
<td>Target Values</td>
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<td>CE &lt; 70</td>
<td>SCB &lt; 11</td>
<td>CE &lt; 18 SCB &lt; 5</td>
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<td>Iona</td>
<td>8.4</td>
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</table>

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) |
| 3/29/2016         | Tues      | 3867           | 2900           | 2763           |
| 3/30/2016         | Wed       | 4289           | 3155           | 2718           |
| 3/31/2016         | Thur      | 3178           | 2093           | 2677           |
| 4/1/2016          | Fri       | 1942           | 1325           | 1465           |
| 4/2/2016          | Sat       | 2050           | 1468           | 1173           |
| 4/3/2016          | Sun       | 2761           | 1829           | 1967           |
| 4/4/2016          | Mon       | 2861           | 2140           | 2232           |

| 7 Day Avg         | 2993       | 2130           | 2142           |
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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
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Rae Blake – Town of Fort Myers Beach
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: April 6 - 12, 2016

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 past week Lake Okeechobee water levels continue to recede with relatively high discharges to the Caloosahatchee. Over the past week, discharges into the estuary at S79 increased slightly to an average of 3,078 cfs and discharges to the river from Lake Okeechobee at S77 increased almost 1,000 cfs to an average of 3,121 cfs to supply agricultural irrigation demand. Watershed inflows into the Franklin pool between S78 and S79 averaged 504 cfs.

USACE Action: On April 8, 2016 the USACE continued pulse releases to the Caloosahatchee through S-79 to a weekly average of 3,000 cfs and 1,170 cfs to the St. Lucie measured at S-80.

Recommendation: High estuary discharges the past twelve weeks and increased evapotranspiration off the lake have contributed to significant lake recession. To protect spawning in the Caloosahatchee estuary and to improve salinity conditions throughout the estuary, we recommend reducing average discharges to the Caloosahatchee to 2,000 cfs or less measured at S79 for the coming week. Reduced flows are critical to prevent the advection of eggs and larvae from critical habitat within the estuary. Given this year’s unseasonably wet conditions we request the COE adjust the June 1 lake level target of 13.5 ft to levels closer to 14 or 14.5 ft.

Lake Okeechobee Level: 14.85 ft. (Low Sub-Band) Last week: 15.08 ft.

Lake Okeechobee Inflow: 3,859 cfs Lake Okeechobee Outflow: 6,840 cfs

Weekly Rainfall: WP Franklin 0" Ortona 0" Moore Haven 0"

Salinity Beautiful Island: 0.2 – 0.2 PSU (SCCF RECON Marker 18) Previous wk 0.2 – 0.2 PSU

Salinity Fort Myers: 0.2 – 0.2 PSU (SCCF Yacht Basin) Previous wk 0.2 – 0.2 PSU

Salinity Shell Point: 10 – 31 PSU (SCCF RECON) Previous wk 7.9 – 32 PSU

Salinity (psu)

<table>
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<th>Location</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
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<tr>
<td>Shell Point</td>
<td>10 – 31 PSU</td>
<td>25 -31 PSU</td>
<td>Low</td>
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</table>

Light (25% Iz depth meters)

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<th>Location</th>
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<th>Condition</th>
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<td>Tarpon Bay Ramp</td>
<td>1.65</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
**Caloosahatchee Estuary**

**Flow & Water Quality:** Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged **3,078 cfs**. Over the past 14 days, **55%** of Lake Okeechobee outflows were directed to the Caloosahatchee. **20%** were delivered to the St Lucie at S308, and **22%** of flows were discharged south to the EAA for irrigation demand and **3%** to the L8.

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**ACOE April 1 Pulse Release at S79**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<td>3500</td>
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<td>3905</td>
</tr>
</tbody>
</table>

**7 day avg** 3000 2995 2278 2557

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**S79 Flow (cfs) and turbidity (ntu x 1000, uncorrected) at Beautiful Island and Fort Myers RECONs.**

---

**Upstream of S79/Franklin Conditions:** On 4/12/16 the Olga Water Treatment plant chlorides measured **50 mg/L**, apparent color was **138 CU** and turbidity measured **3.86 NTU**. No visible algae for the past week. The plant is online and operating at 2000 GPM.

**Upper Estuary Conditions:** Salinities in the upper estuary are in the suitable range for tape grass. Submarine light levels were too low for SAV below depths of less than one meter.

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

**McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR:** Refuge waters are still brown and floating mats of green, filamentous algae (Cladophora sp.) persist in the west impoundment. Salinities are at or below the preferred range for sea grasses.

Tarpon Bay Salinity: **27 – 33 psu**; CDOM: **1.5 – 5.3 qsde**; Dissolved oxygen: **5.3 – 8.5 mg/L**, Chlorophyll: **2.9 – 6.4 µg/L**

McIntyre Creek Salinity: **28 – 31 psu**; CDOM: **12.9 – 19.75 qsde**; Dissolved oxygen: **3.7 – 8.7 mg/L**, Chlorophyll: **2.2 – 5.5 µg/L**.

**Red tide:** On April 8, 2016 FWC reported Karenia brevis, the Florida red tide organism, persists in samples along Pinellas, Manatee, Sarasota, Charlotte, and Lee Counties in southwest Florida.

**Wildlife Impacts:** The past week CROW, the wildlife rehabilitation clinic on Sanibel, received **15 new patients** suffering from red tide poisoning; 13 double-crested cormorants, 1 Kemp’s Ridley sea turtle, 1 laughing gull.

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**CAEO Daily Reports**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<tr>
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<td>4/11/2016</td>
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<td>2808</td>
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</table>

**7 Day Avg** 3078 2574 3121

---

**Chlorophyll** (µg/L) 0.11 1.5 3.0 4.2 5.3

**CDOM** (qsde) 1 2 3 4 5

**Turbidity** (NTU) 0 0.5 1.0 1.5 2.0

**25% Iz** = depth (meters)

**Target Values**

**Causeway** 2.8

**Sanibel Boat Ramp** 2.9

**Tarpon Bay Ramp** 3.5

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

---

**Caloosahatchee Stations**

<table>
<thead>
<tr>
<th>Target Values</th>
<th>Chlorophyll (µg/L)</th>
<th>CDOM (qsde)</th>
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<td>CE &lt; 70 SCB</td>
<td>CE &lt; 18 SCB</td>
<td>CE = 1 m SCB = 2.2 m</td>
</tr>
</tbody>
</table>

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

**ACOE Daily Reports**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
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<tr>
<td>4/5/2016</td>
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<td>Mon</td>
<td>2897</td>
<td>2808</td>
<td>3350</td>
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</table>

**7 Day Avg** 3078 2574 3121
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
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Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: April 13 - 19, 2016

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: During the past week Lake Okeechobee water levels continued to recede with flows to the Caloosahatchee still exceeding the high-flow harm threshold of 2,800 cfs. Lake discharges into the estuary at S79 the past week decreased slightly to an average of 2,943 cfs and discharges to the river from Lake Okeechobee at S77 decreased to an average of 2,700 cfs. Watershed inflows into the Franklin pool between S78 and S79 averaged 581 cfs.

USACE Action: On April 15, 2016 the USACE continued pulse releases to the Caloosahatchee through S-79 to a weekly average of 3,000 cfs and 1,170 cfs to the St. Lucie measured at S-80.

Recommendation: High estuary discharges the past thirteen weeks and increased evapotranspiration off the lake have contributed to significant lake recession. To protect spawning in the Caloosahatchee estuary and to improve the salinity gradient throughout the estuary, we recommend reducing average discharges to the Caloosahatchee to 2,000 cfs or less measured at S79 for the coming week. Reduced flows are critical to prevent the advection of eggs and larvae from critical habitat within the estuary. In addition, a shift in climate forecast to a La Niña condition poses a risk of water shortage if a typical pattern emerges that delays the onset of the wet season.

Lake Okeechobee Inflow: 2,769 cfs Lake Okeechobee Outflow: 5,550 cfs
Weekly Rainfall: WP Franklin 0.09” Ortona 0.01” Moore Haven 0.85”
Salinity Beautiful Island: 0.2 – 0.2 psu (SCCF RECON Marker 18) Previous wk 0.2 – 0.2 psu
Salinity Fort Myers: 0.2 – 0.2 psu (SCCF Yacht Basin) Previous wk 0.2 – 0.2 psu
Salinity Shell Point: 11 – 30 psu (SCCF RECON) Previous wk 10 – 31 psu

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Island</td>
</tr>
<tr>
<td>Fort Myers</td>
</tr>
<tr>
<td>Shell Point</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
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</thead>
<tbody>
<tr>
<td>Colonial Br</td>
</tr>
<tr>
<td>Causeway</td>
</tr>
<tr>
<td>Sanibel Boat Ramp</td>
</tr>
</tbody>
</table>

*Higher than normal dry-season flows have prevented salinity variation in the upper estuary.
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 2,943 cfs. Over the past 14 days 51% of Lake Okeechobee outflows were directed to the Caloosahatchee, 18% were delivered to the St Lucie at S308, 27% of flows were discharged south to the EAA for irrigation demand, 3% to the L8 and 1% to S310.

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<td>3003</td>
<td>2535</td>
<td>3068</td>
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Salinity at Fort Myers RECON

Upstream of S79/Franklin Conditions: On 4/19/16 the Olga Water Treatment plant chlorides measured 53 mg/L, apparent color was 126 CU and turbidity measured 4.47 NTU. No visible algae for the past week. The plant is online and operating at 2000 GPM.

Upper Estuary Conditions: Salinities in the upper estuary are increasing and are in the suitable range for tape grass. Submarine light levels were too low for SAV below depths of less than one meter.

Lower Estuary Condition: The average salinity at the Cape Coral Bridge (5 psu) was below optimal for oysters, while the average salinity at Shell Point (21 psu) was in the optimal range for oysters.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Refuge waters are still brown and floating mats of green, filamentous algae (Cladophora sp.) persist in the west impoundment. Salinities are below the preferred range for seagrass. Tarpon Bay Salinity: 25.6 – 31.2 psu; CDOM: 0.5 – 3.0 qsde; Dissolved oxygen: 5.0 – 8.3 mg/L, Chlorophyll: 2.7 – 7.9 µg/L McIntyre Creek Salinity: 26.4 – 29.6 psu; CDOM: 14.3 – 18.1 qsde; Dissolved oxygen: 2.3 – 11.0 mg/L, Chlorophyll: 2.6 – 6.2 µg/L. Dissolved oxygen dropped below 4 mg/L four times over the last week at McIntyre Creek.

Red tide: On April 15, 2016 FWC reported Karenia brevis, the Florida red tide organism, persists in samples along Pinellas and Manatee Counties in southwest Florida.

Oysters: April oyster sampling in the Caloosahatchee by FGCU reported disease prevalence of Perkinsus marinus for all oysters sampled ranged from 86.66% to 100%. P. marinus disease intensity ranged from 0.87 to 1.07. Scale 0 = no infection, 1 = low, 3 = medium, 5 = high. Larval recruitment ranged from 1.89 to 28.58 spat per shell.

<table>
<thead>
<tr>
<th>Caloosahatchee Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>CDOM (qse)</th>
<th>Turbidity (NTU)</th>
<th>25% Io depth (meters)</th>
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</thead>
<tbody>
<tr>
<td>Target Values</td>
<td>&lt; 11</td>
<td>CE &lt;70 SCB &lt;11</td>
<td>CE &lt; 18 SCB &lt; 5</td>
<td>CE = 1 m SCB = 2.2m</td>
</tr>
<tr>
<td>Colonial Br</td>
<td>6.3</td>
<td>182</td>
<td>1.9</td>
<td>0.83</td>
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<tr>
<td>Causeway</td>
<td>4.3</td>
<td>99.8</td>
<td>3.5</td>
<td>1.11</td>
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<tr>
<td>Sanibel Boat Ramp</td>
<td>3.1</td>
<td>62.5</td>
<td>2.0</td>
<td>1.50</td>
</tr>
</tbody>
</table>

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
MEMORANDUM

To:  USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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 & Lesli Haynes - Lee County
        Rae Blake – Town of Fort Myers Beach
        Connie Jarvis & Harry Phillips – City of Cape Coral
        Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject:  Caloosahatchee & Estuary Condition Report

Reporting Period:  April 20 - 26, 2016

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:** During the past week Lake Okeechobee water levels continued to recede with flows to the Caloosahatchee exceeding the high-flow harm threshold of 2,800 cfs for three days. Lake discharges into the estuary at S79 the past week decreased to an average of **2,664 cfs** while discharges to the river from Lake Okeechobee at S77 increased to an average of **2,829 cfs**. Watershed inflows to the Franklin pool between S78 and S79 averaged **298 cfs**.

**USACE Action:** On April 22, 2016 the USACE reduced pulse releases to the Caloosahatchee through S-79 to a weekly average of 2,500 cfs and 950 cfs to the St. Lucie measured at S-80.

**Recommendation:** High estuary discharges the past fourteen weeks together with low rainfall, a waning El Nino and high evapotranspiration off the lake have contributed to significant lake recession. To protect spawning in the Caloosahatchee estuary and to improve the salinity gradient throughout the estuary, **we recommend reducing average discharges to the Caloosahatchee to 2,000 cfs or less measured at S79**. Reduced flows are critical to prevent the advection of eggs and larvae from critical habitat within the estuary.

| Lake Okeechobee Inflow: | 2,354 cfs | Lake Okeechobee Outflow: 6,118 cfs |
| Weekly Rainfall: | WP Franklin 0.39” | Ortona 0.21” | Moore Haven 0.50” |
| Salinity Beautiful Island: | 0.2 – 0.2 psu (SCCF RECON Marker 18) | Previous wk 0.2 – 0.2 psu |
| Salinity Fort Myers: | 0.3 – 1.8 psu (SCCF Yacht Basin) | Previous wk 0.2 – 0.2 psu |
| Salinity Shell Point: | 11– 32 psu (SCCF RECON) | Previous wk 11– 30 psu |

**Salinity (psu)**

<table>
<thead>
<tr>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Island</td>
<td>0.2 - 0.2</td>
<td>&lt; 5 psu</td>
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<tr>
<td>Fort Myers</td>
<td>0.3 – 1.8</td>
<td>&lt;10 psu</td>
</tr>
<tr>
<td>Shell Point</td>
<td>11 – 32</td>
<td>25 -31 psu</td>
</tr>
</tbody>
</table>

**Light (25% Iz depth meters)**

<table>
<thead>
<tr>
<th>Current Value</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Causeway</td>
<td>1.78</td>
<td>1 meter</td>
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<tr>
<td>Sanibel Boat Ramp</td>
<td>2.20</td>
<td>2.2 meters</td>
</tr>
<tr>
<td>Tarpon Bay Dock</td>
<td>1.52</td>
<td>2.2 meters</td>
</tr>
</tbody>
</table>

*Higher than normal dry-season flows have prevented salinity variation in the upper estuary.
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 2,664 cfs. Over the past 14 days 47% of Lake Okeechobee outflows were directed to the Caloosahatchee, 15% were delivered to the St Lucie at S308, 34% of flows were discharged south to the EAA for irrigation demand, 3% to the L8 and 1% to S310.

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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</thead>
<tbody>
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<td>1624</td>
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</table>

**ACOE April 15 Pulse Release at S79**

**SCCF Salinity at Fort Myers Yacht Basin**

**Upstream of S79/Franklin Conditions:** On 4/26/16 the Olga Water Treatment plant chlorides measured 52 mg/L, apparent color was 113 CU and turbidity measured 3.95 NTU. No visible algae for the past week. The plant is online and operating at 2000 GPM.

**Upper Estuary Conditions:** Salinities in the upper estuary are increasing and are in the suitable range for tape grass.

**Lower Estuary Condition:** The average salinity at Shell Point (23 psu) was in the optimal range for oysters.

**McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR:** Refuge waters are still brown and floating mats of green, filamentous algae (*Cladophora* sp.) persist in the west impoundment. Salinities are below the preferred range for seagrass.

Tarpon Bay Salinity 27.2 – 33.9 psu; CDOM: 0.5 – 27.0 qsde; Dissolved oxygen: 5.5 – 9.1 mg/L, Chlorophyll: 1.5 – 5.6 µg/L

McIntyre Creek Salinity: Salinity: 26.5 – 30.66 psu; CDOM: 11.0 – 18.5 qsde; Dissolved oxygen: 2.6 – 8.2 mg/L, Chlorophyll: 2.6 – 25.5 µg/L. Dissolved oxygen dropped below 4 mg/L four times over the last week at McIntyre Creek.

**Red Tide:** On April 22, 2016 FWC reported *Karenia brevis*, the Florida red tide organism, persists in samples along Pinellas, Manatee, Sarasota, and Charlotte Counties in southwest Florida.

**Wildlife Impacts:** The past week CROW, the wildlife rehabilitation clinic on Sanibel, received 2 new patients suffering from suspected red tide poisoning; 1 double-crested cormorant and 1 snowy plover.
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
Paul Tritaik & Joyce Palmer - J.N. “Ding” Darling National Wildlife Refuge (NWR) Complex
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Rae Blake – Town of Fort Myers Beach
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: April 27 – May 3, 2016

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: During the past week Lake Okeechobee water levels continued to recede. Discharges into the estuary at S79 the past week increased to an average of 2,739 cfs while discharges to the river from Lake Okeechobee at S77 decreased to an average of 2,645 cfs. Watershed inflows to the Franklin pool between S78 and S79 averaged 555 cfs.

USACE Action: On April 29, 2016 the USACE reduced pulse releases to the Caloosahatchee through S-79 to a weekly average of 2,000 cfs and 650 cfs to the St. Lucie measured at S-80.

Recommendation: We recommend reducing average discharges to the Caloosahatchee to 1,500 cfs measured at S79 to moderate lake recession and protect spawning in the Caloosahatchee estuary by improving the salinity gradient throughout the estuary. Reduced flows are critical to prevent the advection of eggs and larvae from critical habitat within the estuary.

Lake Okeechobee Inflow: 1,160 cfs  Lake Okeechobee Outflow: 6,540 cfs
Weekly Rainfall: WP Franklin 1.56”  Ortona 1.16”  Moore Haven 1.35”
Salinity Beautiful Island: ND psu (SCCF RECON Marker 18)  Previous wk 0.2 – 0.2 psu
Salinity Fort Myers: 0.5 – 2.4 psu (SCCF Yacht Basin)  Previous wk 0.3 – 1.8 psu
Salinity Shell Point: 13 – 32 psu (SCCF RECON)  Previous wk 11 – 32 psu

Salinity (psu)  

<table>
<thead>
<tr>
<th>Location</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Island</td>
<td>ND</td>
<td>&lt; 5 psu</td>
<td>-</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.5 – 2.4</td>
<td>&lt;10 psu</td>
<td>Low*</td>
</tr>
<tr>
<td>Shell Point</td>
<td>13 – 32</td>
<td>25 -31 psu</td>
<td>Low</td>
</tr>
</tbody>
</table>

Light (25% Iz depth meters)

<table>
<thead>
<tr>
<th>Location</th>
<th>Depth</th>
<th>Range</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causeway</td>
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<td>1 meter</td>
<td>Low</td>
</tr>
<tr>
<td>Sanibel Boat Ramp</td>
<td>2.19</td>
<td>2.2 meters</td>
<td>In Range</td>
</tr>
<tr>
<td>Tarpon Bay Dock</td>
<td>1.57</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>

*Higher than normal dry-season flows have limited salinity variation in the upper estuary.
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 2,739 cfs. Over the past 14 days 42% of Lake Okeechobee outflows were directed to the Caloosahatchee, 14% were delivered to the St Lucie at S308, 40% of flows were discharged south to the EAA for irrigation demand, 3% to the L8 and 1% to S310.

### Table: ACOE April 22 Pulse Release at S79

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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</table>

### Diagram: SCCF Salinity at Fort Myers Yacht Basin

**Upstream of S79/Franklin Conditions:** On 5/3/16 the Olga Water Treatment plant chlorides measured 53 mg/L, apparent color was 105 CU and turbidity measured 3.89 NTU. No visible algae for the past week. The plant is online and operating at 2000 GPM.

**Upper Estuary Conditions:** Salinities in the upper estuary are increasing and are in the suitable range for tape grass. Dissolved oxygen concentrations dropped towards the hypoxia range during April.

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

**McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR:** Refuge waters are still brown and floating mats of green, filamentous algae (Cladophora sp.) persist in the west impoundment. Salinities are in the low end of the preferred range for seagrass.

Tarpon Bay Salinity 28.5 – 34.0 psu; CDOM: 8 – 24.0 qsde; Dissolved oxygen: 4.75 – 8.0 mg/L, Chlorophyll: 1.75 – 5.25 µg/L

McIntyre Creek Salinity: Salinity: 29.8 – 31.7 psu; CDOM: 7.9 – 15.1 qsde; Dissolved oxygen: 2.6 – 10.5 mg/L, Chlorophyll: 1.9 – 3.6 µg/L. Dissolved oxygen dropped below 4 mg/L seven times over the last week at McIntyre Creek.

**Red tide:** On April 29, 2016 FWC reported a bloom of Karenia brevis, the Florida red tide organism, persists in samples along Pinellas, Manatee, Sarasota, and Charlotte and northern Lee Counties in southwest Florida.
Dissolved oxygen in the lower layer of the water column dropped towards hypoxia during April.
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
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Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: May 4 - 10, 2016

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: During the past week Lake Okeechobee water levels continued to recede. Discharges into the estuary at S79 the past week decreased to an average of 2,255 cfs and discharges to the river from Lake Okeechobee at S77 decreased to an average of 1,294 cfs. Watershed inflows to the Franklin pool between S78 and S79 averaged 624 cfs.

USACE Action: On May 6, 2016 the USACE continued pulse releases to the Caloosahatchee through S-79 to a weekly average of 2,000 cfs and 650 cfs to the St. Lucie measured at S-80.

Recommendation: For 16 weeks there has been no salinity signature in the middle Caloosahatchee estuary at Fort Myers. With successful lake recession occurring, high ET and little rainfall we request a gradual reduction in flows directed to the Caloosahatchee. We request flows be reduced the coming week to an average of 1,500 cfs at S79 with further reductions the next two weeks to 1,000 cfs to recover a salinity gradient throughout the estuary and protect and promote spawning in the Caloosahatchee estuary. Consideration should be made for providing dry season flows to the Caloosahatchee in light of potential development of La Nina conditions.

<table>
<thead>
<tr>
<th>Lake Okeechobee Level:</th>
<th>13.90 ft. (Low Sub-Band)</th>
<th>Last week: 14.12 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Okeechobee Inflow:</td>
<td>1,984 cfs</td>
<td>Lake Okeechobee Outflow: 5,105 cfs</td>
</tr>
<tr>
<td>Weekly Rainfall:</td>
<td>WP Franklin 0.66” Ortona 0.52”</td>
<td>Moore Haven 1.10”</td>
</tr>
<tr>
<td>Salinity Beautiful Island:</td>
<td>ND (SCCF RECON Marker 18)</td>
<td>Previous wk ND</td>
</tr>
<tr>
<td>Salinity Fort Myers:</td>
<td>0.2 – 2.0 psu (SCCF Yacht Basin)</td>
<td>Previous wk 0.5 – 2.4 psu</td>
</tr>
<tr>
<td>Salinity Shell Point:</td>
<td>13 – 32 psu (SCCF RECON)</td>
<td>Previous wk 13 – 32 psu</td>
</tr>
</tbody>
</table>

*Higher than normal dry-season flows have limited salinity variation in the upper estuary.
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 2,255 cfs. Over the past 14 days 38% of Lake Okeechobee outflows were directed to the Caloosahatchee, 13% were delivered to the St Lucie at S308, 43% of flows were discharged south to the EAA for irrigation demand, 5% to the L8 and 1% to S310.

**ACOE April 29 Pulse Release at S79**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
</tr>
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<tbody>
<tr>
<td>4/29/2016</td>
<td>1</td>
<td>2300</td>
<td>2622</td>
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<td>2292</td>
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<td>2353</td>
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<tr>
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<td>3</td>
<td>2600</td>
<td>2815</td>
<td>2200</td>
<td>2777</td>
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<td>4</td>
<td>2100</td>
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<td>1874</td>
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<td>5</td>
<td>1700</td>
<td>1979</td>
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<tr>
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<td>6</td>
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<td>5/5/2016</td>
<td>7</td>
<td>1000</td>
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<td>7 day avg</td>
<td></td>
<td>2000</td>
<td>2355</td>
<td>1739</td>
<td>1756</td>
</tr>
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</table>

**SCCF Salinity at Fort Myers Yacht Basin**

**Upstream of S79/Franklin Conditions:** On 5/10/16 the Olga Water Treatment plant chlorides measured 55 mg/L, apparent color was 107 CU and turbidity measured 4.32 NTU. No visible algae for the past week. The plant is off line for maintenance. Water appearance is extremely dark, turbid and murky.

**Upper Estuary Conditions:** Salinities in the upper estuary are in the suitable range for tape grass. Light was sufficient for SAV at 1 m depth at the Colonial Bridge in the middle estuary.

**Lower Estuary Condition:** The average salinity at Shell Point (21 psu) was in the optimal range for oysters.

**McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR:** Refuge waters are still brown and floating mats of green, filamentous algae (Cladophora sp.) persist in the west impoundment. Salinities are in the low end of the preferred range for seagrass.

**Tarpon Bay:** Salinity: 28.1 – 34.0 psu; CDOM: 8 – 26 qsde; Dissolved oxygen: 4.9 – 8.1 mg/L; Chlorophyll: 1.7 – 10.2 µg/L.

**McIntyre Creek:** Salinity: Salinity: 29.4 – 32.1 psu; CDOM: 3 – 14 qsde; Dissolved oxygen: 2.7 – 10.0 mg/L; Chlorophyll: 2.0 – 5.2 µg/L. Dissolved oxygen dropped below 4 mg/L four times over the last week at McIntyre Creek.

**Red tide:** On May 6, 2016 FWC reported a bloom of Karenia brevis, the Florida red tide organism, persists in samples along Pinellas, Manatee, Sarasota, and Charlotte Counties in southwest Florida.

**Caloosahatchee Stations**

<table>
<thead>
<tr>
<th>Station</th>
<th>Chlorophyll (µg/L)</th>
<th>CDOM (qs)</th>
<th>Turbidity (NTU)</th>
<th>25% of depth (meters)</th>
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</thead>
<tbody>
<tr>
<td>Target</td>
<td>&lt; 11</td>
<td>CE &lt; 0</td>
<td>SCB &lt; 1</td>
<td>CE &lt; 1</td>
</tr>
<tr>
<td>Colonial Br</td>
<td>4.6</td>
<td>152</td>
<td>1.5</td>
<td>1.01</td>
</tr>
<tr>
<td>Causeway</td>
<td>4.3</td>
<td>37.6</td>
<td>4.8</td>
<td>1.45</td>
</tr>
<tr>
<td>Sanibel Boat</td>
<td>3.0</td>
<td>31.5</td>
<td>5.2</td>
<td>1.49</td>
</tr>
</tbody>
</table>

**ACOE Daily Reports**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/3/2016</td>
<td>Tues</td>
<td>1979</td>
<td>1167</td>
<td>1466</td>
</tr>
<tr>
<td>5/5/2016</td>
<td>Thur</td>
<td>2550</td>
<td>1714</td>
<td>654</td>
</tr>
<tr>
<td>5/6/2016</td>
<td>Fri</td>
<td>2284</td>
<td>1673</td>
<td>1641</td>
</tr>
<tr>
<td>5/7/2016</td>
<td>Sat</td>
<td>2451</td>
<td>1752</td>
<td>1510</td>
</tr>
<tr>
<td>5/8/2016</td>
<td>Sun</td>
<td>2460</td>
<td>1758</td>
<td>1495</td>
</tr>
<tr>
<td>5/9/2016</td>
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<td>2061</td>
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<td>1671</td>
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<tr>
<td>7 Day Avg</td>
<td></td>
<td>2255</td>
<td>1631</td>
<td>1294</td>
</tr>
</tbody>
</table>

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

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

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
Paul Titaik & Joyce Palmer - J.N. “Ding” Darling National Wildlife Refuge (NWR) Complex
James Evans & Holly Milbrandt - City of Sanibel
Keith Kibbey & Lesli Haynes - Lee County
Rae Blake – Town of Fort Myers Beach
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: May 11 - 17, 2016

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:** During the past week Lake Okeechobee water flows continued to recede at S-79. Discharges into the estuary at S-79 during the past week decreased to an average of 2,164 cfs, while discharges to the river from Lake Okeechobee at S-77 increased to an average of 2,178 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 averaged 443 cfs.

**USACE Action:** On May 13, 2016 the USACE continued pulse releases to the Caloosahatchee through S-79 to a weekly average of 2,000 cfs and 650 cfs to the St. Lucie measured at S-80.

**Recommendation:** We request flows be reduced to an average of 1,000 cfs at S-79 to improve a salinity gradient throughout the estuary and enhance conditions for spawning in the Caloosahatchee estuary. Consideration should be made for providing dry season flows to the Caloosahatchee in light of potential development of La Niña conditions.

<table>
<thead>
<tr>
<th>Lake Okeechobee Level:</th>
<th>13.64 ft. (Low Sub-Band)</th>
<th>Last week: 13.90 ft.</th>
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</thead>
<tbody>
<tr>
<td>Lake Okeechobee Inflow:</td>
<td>2,008 cfs</td>
<td>Lake Okeechobee Outflow: 5,878 cfs</td>
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<tr>
<td>Weekly Rainfall:</td>
<td>WP Franklin 0.00”</td>
<td>Ortona 0.00”</td>
</tr>
<tr>
<td>Salinity Beautiful Island:</td>
<td>0.2 – 0.3 psu (SCCF RECON Marker 18)</td>
<td>Previous wk ND</td>
</tr>
<tr>
<td>Salinity Fort Myers:</td>
<td>0.8 – 1.9 psu (SCCF Yacht Basin)</td>
<td>Previous wk 0.2 – 2.0 psu</td>
</tr>
<tr>
<td>Salinity Shell Point:</td>
<td>12 – 32 psu (SCCF RECON)</td>
<td>Previous wk 13 – 32 psu</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Island</td>
<td>0.2 – 0.3</td>
<td>&lt; 5 psu</td>
<td>-</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.8 – 1.9</td>
<td>&lt;10 psu</td>
<td>-</td>
</tr>
<tr>
<td>Shell Point</td>
<td>12 – 32</td>
<td>25 - 31 psu</td>
<td>Low</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
<th>Beautiful</th>
<th>0.88</th>
<th>1 meter</th>
<th>Low</th>
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</thead>
<tbody>
<tr>
<td>Iona</td>
<td>1.11</td>
<td>1 meter</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Causeway</td>
<td>1.67</td>
<td>2.2 meters</td>
<td>Low</td>
<td></td>
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</tbody>
</table>
Over the past 14 days 34% of Lake Okeechobee outflows were directed to the Caloosahatchee, 12% were delivered to the St Lucie at S308, 47% of flows were discharged south to the EAA for irrigation demand, 5% to the L8 and 2% to S310.

Upstream of S79/Franklin Conditions: On 5/17/16 the Olga Water Treatment plant chlorides measured 54 mg/L, apparent color was 72 CU and turbidity measured 2.74 NTU. No visible algae for the past week. The plant is off line for maintenance.

Upper Estuary Conditions: Salinities in the upper estuary are in the suitable range for tape grass. Dissolved oxygen concentrations at Fort Myers RECON dipped into the hypoxic range (~1 mg/L) on 05/15/16.

Lower Estuary Condition: The average salinity at Shell Point (21 psu) was in the optimal range for oysters. The salinity at Iona was below optimal for oysters (12.8 psu on 05/11/16).

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Refuge waters are still brown and floating mats of green, filamentous algae (Cladophora sp.) persist in the west impoundment. Salinities are in the low end of the preferred range for seagrass.

Tarpon Bay: Salinity: 28.0 – 33.4 psu; CDOM: 10 – 23.8 qsde; Dissolved oxygen: 4.5 – 8.7 mg/L; Chlorophyll: 1.75 – 5.75 µg/L.

McIntyre Creek: Salinity: Salinity: 28.5 – 31.25 psu; CDOM: 6.7 – 13.5 qsde; Dissolved oxygen: 2.7 – 10.7 mg/L; Chlorophyll: 2.4 – 5.9 µg/L. Dissolved oxygen dropped below 3 mg/L three times over the last week at McIntyre Creek.

Red tide: Updated on May 13, 2016 FWC reported a bloom of Karenia brevis, the Florida red tide organism, persists along Pinellas, Manatee, Sarasota, Charlotte, and Lee counties in Southwest Florida.

Oysters: For May in the Caloosahatchee, the Perkinsus marinus prevalence of all oysters sampled ranged from 80.00% to 100%. P. marinus intensity ranged from 0.80 to 1.0 with an estuary average of 0.89. Larval recruitment ranged from 0.47 to 29.78 spat per shell with an average of 11.06 spat per shell in the estuary.

### ACOE May 5 Pulse Release at S79

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/6/2016</td>
<td>1</td>
<td>2300</td>
<td>2284</td>
<td>1673</td>
<td>1641</td>
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<tr>
<td>5/7/2016</td>
<td>2</td>
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<td>1752</td>
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<tr>
<td>5/8/2016</td>
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<td>5/9/2016</td>
<td>4</td>
<td>2100</td>
<td>2061</td>
<td>1732</td>
<td>1671</td>
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<tr>
<td>5/10/2016</td>
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<td>1700</td>
<td>2027</td>
<td>1696</td>
<td>1986</td>
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<tr>
<td>5/11/2016</td>
<td>6</td>
<td>1400</td>
<td>2395</td>
<td>1708</td>
<td>2073</td>
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<tr>
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<td>1000</td>
<td>1368</td>
<td>1128</td>
<td>1728</td>
</tr>
</tbody>
</table>

7 day avg: 2000

### SCCF Salinity at Fort Myers Yacht Basin

### McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR

**Tarpon Bay**: Salinity: 28.0 – 33.4 psu; CDOM: 10 – 23.8 qsde; Dissolved oxygen: 4.5 – 8.7 mg/L; Chlorophyll: 1.75 – 5.75 µg/L.

**McIntyre Creek**: Salinity: Salinity: 28.5 – 31.25 psu; CDOM: 6.7 – 13.5 qsde; Dissolved oxygen: 2.7 – 10.7 mg/L; Chlorophyll: 2.4 – 5.9 µg/L. Dissolved oxygen dropped below 3 mg/L three times over the last week at McIntyre Creek.

**Red tide**: Updated on May 13, 2016 FWC reported a bloom of *Karenia brevis*, the Florida red tide organism, persists along Pinellas, Manatee, Sarasota, Charlotte, and Lee counties in Southwest Florida.

**Oysters**: For May in the Caloosahatchee, the *Perkinsus marinus* prevalence of all oysters sampled ranged from 80.00% to 100%. *P. marinus* intensity ranged from 0.80 to 1.0 with an estuary average of 0.89. Larval recruitment ranged from 0.47 to 29.78 spat per shell with an average of 11.06 spat per shell in the estuary.

### ACOE Daily Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<tbody>
<tr>
<td>5/10/2016</td>
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<td>5/12/2016</td>
<td>Thur</td>
<td>1368</td>
<td>1128</td>
<td>1728</td>
</tr>
<tr>
<td>5/13/2016</td>
<td>Fri</td>
<td>1666</td>
<td>1602</td>
<td>1921</td>
</tr>
<tr>
<td>5/14/2016</td>
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<td>2567</td>
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<tr>
<td>5/15/2016</td>
<td>Sun</td>
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<td>2051</td>
<td>2616</td>
</tr>
<tr>
<td>5/16/2016</td>
<td>Mon</td>
<td>2242</td>
<td>1805</td>
<td>2358</td>
</tr>
</tbody>
</table>

7 Day Avg
Unfertilized tape grass flower in the Caloosahatchee 05/10/16.
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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 & Lesli Haynes - Lee County
  - Rae Blake – Town of Fort Myers Beach
  - Connie Jarvis & Harry Phillips – City of Cape Coral
  - Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: May 18 - 24, 2016

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:** Discharges into the estuary at S-79 during the past week increased to an average of 4,183 cfs, while discharges to the river from Lake Okeechobee at S-77 decreased to an average of 350 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 averaged 2,139 cfs.

**USACE Action:** On May 19, 2016 the USACE continued pulse releases to the Caloosahatchee through S-79 to a weekly average of 2,000 cfs and 650 cfs to the St. Lucie measured at S-80.

**Recommendation:** We request flows be reduced to an average of 2,000 cfs at S-79 to improve a salinity gradient throughout the estuary and enhance conditions for spawning in the Caloosahatchee estuary. Consideration should be made for providing dry season flows to the Caloosahatchee in light of potential development of La Nina conditions.

---

**Lake Okeechobee Level:** 14.32 ft. (Low Sub-Band)  
**Last week:** 13.64 ft.

**Lake Okeechobee Inflow:** 12,486 cfs  
**Lake Okeechobee Outflow:** 997 cfs

**Weekly Rainfall:**  
WP Franklin 0.23″  
Ortona 1.24″  
Moore Haven 0.72″

**Salinity Beautiful Island:** 0.2 – 0.3 psu (SCCF RECON Marker 18)  
**Previous wk:** 0.2 – 0.3 psu

**Salinity Fort Myers:** 0.2 – 1.9 psu (SCCF Yacht Basin)  
**Previous wk:** 0.8 – 1.9 psu

**Salinity Shell Point:** 8 – 32 psu (SCCF RECON)  
**Previous wk:** 12 – 32 psu

---

**Salinity (psu)**

<table>
<thead>
<tr>
<th>Location</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.2 – 0.3</td>
<td>&lt; 5 psu</td>
<td>-</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.2 – 1.9</td>
<td>&lt;10 psu</td>
<td>-</td>
</tr>
<tr>
<td>Shell Point</td>
<td>8 – 32</td>
<td>25 - 31 psu</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Light (25% Iz depth meters)**

<table>
<thead>
<tr>
<th>Location</th>
<th>Current Value</th>
<th>Depth (meters)</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.76</td>
<td>1 meter</td>
<td>Low</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.74</td>
<td>1 meter</td>
<td>Low</td>
</tr>
<tr>
<td>Cape Coral</td>
<td>0.75</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 2,164 cfs. Over the past 14 days 38% of Lake Okeechobee outflows were directed to the Caloosahatchee, 12% were delivered to the St Lucie at S308, 45% of flows were discharged south to the EAA for irrigation demand, 5% to the L8 and 0% to S310.

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/13/2016</td>
<td>1</td>
<td>2300</td>
<td>1666</td>
<td>1602</td>
<td>1921</td>
</tr>
<tr>
<td>5/14/2016</td>
<td>2</td>
<td>2900</td>
<td>2612</td>
<td>2057</td>
<td>2567</td>
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<td>2600</td>
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<td>7 Day avg</td>
<td></td>
<td>2000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Upstream of S79/Franklin Conditions: On 5/17/16 the Olga Water Treatment plant chlorides measured 47 mg/L, apparent color was 148 CU and turbidity measured 3.83 NTU. Light algae showed up last Wednesday in the plant intake increased to medium over the weekend, and back to light Monday, medium levels today. Plant is on at 2000 GPM. Cyanobacteria was present at Alva and Olga.

Upper Estuary Conditions: Salinities in the upper estuary are in the suitable range for tape grass. Turbidity was elevated and cyanobacteria (*Microcystis* sp.) slicks were visible between Beautiful Island and Fort Myers 05/23/16.

Lower Estuary Condition: The average salinity at Shell Point (19 psu) was in the optimal range for oysters. The salinity at Iona was in the harmful range for oysters (4 psu) on 05/23/16.

Mclntyre Creek & Tarpon Bay in J.N. "Ding" Darling NWR: Salinities are in the low end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

Tarpon Bay: Salinity: 26.5 – 33.8 psu; CDOM: 8.0 – 24.5 qse; Dissolved oxygen: 4.5 – 7.3 mg/L; Chlorophyll: 1.2 – 7.0 µg/L.

Mclntyre Creek: Salinity: 27.4 – 31.75 psu; CDOM: 4.9 – 8.7 qse; Dissolved oxygen: 2.5 – 8.0 mg/L; Chlorophyll: 2.4 – 5.5 µg/L. Dissolved oxygen dropped below 3 mg/L one time over the last week at Mclntyre Creek.

Red tide: Updated on May 20, 2016 FWC reported a bloom of *Karenia brevis*, the Florida red tide organism, persists along Pinellas, Sarasota, and Charlotte counties in Southwest Florida.
Cyanobacteria slick downstream of Beautiful Island 05/23/16.

Cyanobacteria bloom in Alva oxbow (photo Mike Dove 5/23/16).
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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 & Lesli Haynes - Lee County
Rae Blake – Town of Fort Myers Beach
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: May 25 - 31, 2016

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: Discharges into the estuary at S-79 during the past week increased to an average of 4,305 cfs, while discharges to the river from Lake Okeechobee at S-77 increased to an average of 2,515 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 averaged 1,048 cfs.

USACE Action: On May 27, 2016 the USACE continued pulse releases to the Caloosahatchee through S-79 to a weekly average of 4,000 cfs and 1,800 cfs to the St. Lucie measured at S-80.

Recommendation: We request flows be reduced to an average of no more than 2,800 cfs at S-79 to improve a salinity gradient throughout the estuary and enhance conditions for spawning in the Caloosahatchee estuary. Consideration should be made for providing dry season flows to the Caloosahatchee in light of potential development of La Niña conditions.

Lake Okeechobee Inflow: 7,833 cfs Lake Okeechobee Outflow: 6,828 cfs
Weekly Rainfall: WP Franklin 0.60" Ortona 1.31" Moore Haven 0.29"
Salinity Beautiful Island: 0.2 – 0.3 ρsu (SCCF RECON Marker 18) Previous wk 0.2 – 0.3 ρsu
Salinity Fort Myers: 0.2 – 0.5 ρsu (SCCF Yacht Basin) Previous wk 0.2 – 1.9 ρsu
Salinity Shell Point: 8 – 32 ρsu (SCCF RECON) Previous wk 8 – 32 ρsu

<table>
<thead>
<tr>
<th>Salinity (ρsu)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.2 – 0.3</td>
<td>&lt; 5 ρsu</td>
<td>-</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.2 – 0.5</td>
<td>&lt;10 ρsu</td>
<td>-</td>
</tr>
<tr>
<td>Shell Point</td>
<td>8 – 32</td>
<td>25 - 31 ρsu</td>
<td>Low</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iona</td>
</tr>
<tr>
<td>Causeway</td>
</tr>
<tr>
<td>E. Sanibel</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 4,305 cfs. Over the past 14 days 60% of Lake Okeechobee outflows were directed to the Caloosahatchee, 26% were delivered to the St Lucie at S308, 7% of flows were discharged south to the EAA for irrigation demand, 7% to the L8 and 0% to S310.

ACOE May 13 Pulse Release at S79

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<td>5/21/2016</td>
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<td>5</td>
<td>1700</td>
<td>3921</td>
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<td>5/25/2016</td>
<td>6</td>
<td>1400</td>
<td>1717</td>
<td>1540</td>
<td>705</td>
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<td>5/26/2016</td>
<td>7</td>
<td>1000</td>
<td>1715</td>
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<tr>
<td>7 day avg</td>
<td></td>
<td>2000</td>
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<td></td>
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</table>

SCCF Salinity at Fort Myers Yacht Basin

Upstream of S79/Franklin Conditions: On 5/31/16 the Olga Water Treatment plant chlorides measured 50 mg/L, apparent color was 244 CU and turbidity measured 5.65 NTU. Light algae showed up last Wednesday in the plant intake increased to medium over the weekend, and back to light Monday, medium levels today. Plant is off line since 5/24 as a precaution due to algae.

Lower Estuary Condition: The average salinity at Shell Point (19 psu) was in the optimal range for oysters. The salinity at Iona was below optimal for oysters (5.2 psu) on 05/30/16.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Salinities are in the low end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

Red tide: Updated on May 27, 2016 FWC reported a bloom of Karenia brevis, the Florida red tide organism, persists along Sarasota and Charlotte counties in Southwest Florida.
MEMORANDUM

To:  USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From:  Periodic Scientists Conference Call Participants
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Rae Ann Wessel & Rick Bartleson, Ph.D. -Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period:  June 1 – 7, 2016

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: Discharges into the estuary at S-79 during the past week increased to an average of 4,821 cfs. Lake Okeechobee discharges to the river measured at S-77 increased to an average of 3,835 cfs. Approximately 80% of the flows to the Caloosahatchee estuary came from Lake Okeechobee the past week. Watershed inflows to the Franklin pool between S-78 and S-79 averaged 1,300 cfs.

USACE Action: On June 2, 2016 the USACE continued Lake Okeechobee discharges of 4,000 cfs to the Caloosahatchee through S-77 and 1,800 cfs to the St. Lucie measured at S-80.

Recommendation: We request flows be reduced to an average of no more than 2,800 cfs at S-79 to improve a salinity gradient throughout the estuary and enhance conditions for spawning in the Caloosahatchee estuary.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Okeechobee Inflow:</td>
<td>6,001 cfs</td>
<td>Lake Okeechobee Outflow: 5,566 cfs</td>
</tr>
<tr>
<td>Weekly Rainfall:</td>
<td>WP Franklin 3.19”</td>
<td>Ortona 0.40”</td>
</tr>
<tr>
<td>Salinity Beautiful Island:</td>
<td>0.2 – 0.3 psu (SCCF RECON Marker 18)</td>
<td>Previous wk 0.2 – 0.3 psu</td>
</tr>
<tr>
<td>Salinity Fort Myers:</td>
<td>0.2 – 0.4 psu (SCCF Yacht Basin)</td>
<td>Previous wk 0.2 – 0.5 psu</td>
</tr>
<tr>
<td>Salinity Shell Point:</td>
<td>8 – 32 psu (SCCF RECON)</td>
<td>Previous wk 8 – 32 psu</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Salinity (psu)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
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</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.2 – 0.3</td>
<td>&lt; 5 psu</td>
<td>-</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.2 – 0.4</td>
<td>&lt;10 psu</td>
<td>-</td>
</tr>
<tr>
<td>Shell Point</td>
<td>8 – 32</td>
<td>25 - 31 psu</td>
<td>Low</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.66</td>
<td>1 meter</td>
<td>Low</td>
</tr>
<tr>
<td>Causeway</td>
<td>1.73</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
<tr>
<td>E. Sanibel</td>
<td>1.91</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
**Flow & Water Quality:** Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 4,821 cfs. Over the past 14 days 60% of Lake Okeechobee outflows were directed to the Caloosahatchee, 28% were delivered to the St Lucie at S308, 7% of flows were discharged south to the EAA for irrigation demand and 5% to the L8.

**Upstream of S79/Franklin Conditions:** On 6/7/16 the Olga Water Treatment plant chlorides measured 45 mg/L, apparent color was 222 CU and turbidity measured 7.66 NTU. Light algae was observed Saturday at the plant intake. Plant is offline since 5/24/16 as a precaution due to algae.

**Upper Estuary Conditions:** Salinities in the upper estuary are in the suitable range for tape grass. Turbidity and chlorophyll were elevated and cyanobacteria was visible between Beautiful Island and the Colonial Bridge.

**Lower Estuary Condition:** The average salinity at Shell Point (20 psu) was in the optimal range for oysters.

**McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR:** Salinities were below or in the lower end of the preferred range for shoal grass and turtle grass (30 to 40 psu).

**Tarpon Bay:** Salinity: 24.6 – 34.6 psu; CDOM: 6.0 – 27.0 qsde; Dissolved oxygen: 4.2 – 8.4 mg/L; Chlorophyll: 1.6 – 8.6 µg/L.

**McIntyre Creek:** Salinity: 26.5 – 33.5 psu; CDOM: 5.0 – 14.5 qsde; Dissolved oxygen: 2.6 – 10.2 mg/L; Chlorophyll: 2.2 – 5.1 µg/L. Dissolved oxygen dropped below 3 mg/L two times over the last week at McIntyre Creek.

**Red tide:** On June 3, 2016 FWC reported finding *Karenia brevis*, the Florida red tide organism, in samples from Pinellas, Sarasota and Charlotte counties in Southwest Florida.

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**Caloosahatchee Stations**

<table>
<thead>
<tr>
<th>Target Values</th>
<th>Chlorophyll (µg/L)</th>
<th>CDOM (qse)</th>
<th>Turbidity (NTU)</th>
<th>25% Io depth (meters)</th>
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<tr>
<td>&lt; 11</td>
<td></td>
<td>CE &lt; 70 SCB &lt; 11</td>
<td>CE &lt; 18 SCB &lt; 5</td>
<td>CE = 1 m SCB = 2.2m</td>
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<tr>
<td>Beautiful Is</td>
<td>19</td>
<td>216</td>
<td>3.7</td>
<td>0.66</td>
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<tr>
<td>Causeway</td>
<td>4.1</td>
<td>20.7</td>
<td>3.9</td>
<td>1.73</td>
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<tr>
<td>E. Sanibel</td>
<td>2.7</td>
<td>4.61</td>
<td>4.5</td>
<td>1.91</td>
</tr>
</tbody>
</table>

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

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**SCCF Salinity at Fort Myers Yacht Basin**

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**ACOE Daily Reports**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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</thead>
<tbody>
<tr>
<td>5/31/2016</td>
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<td>3513</td>
<td>3727</td>
</tr>
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<td>6/1/2016</td>
<td>Wed</td>
<td>4730</td>
<td>3224</td>
<td>3641</td>
</tr>
<tr>
<td>6/2/2016</td>
<td>Thur</td>
<td>4519</td>
<td>3335</td>
<td>3752</td>
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<tr>
<td>6/3/2016</td>
<td>Fri</td>
<td>5253</td>
<td>3761</td>
<td>4116</td>
</tr>
<tr>
<td>6/4/2016</td>
<td>Sat</td>
<td>4755</td>
<td>3520</td>
<td>3912</td>
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<tr>
<td>6/5/2016</td>
<td>Sun</td>
<td>4983</td>
<td>3583</td>
<td>3924</td>
</tr>
<tr>
<td>6/6/2016</td>
<td>Mon</td>
<td>4182</td>
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<td>3772</td>
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<tr>
<td>7 Day Avg</td>
<td></td>
<td>4821</td>
<td>3521</td>
<td>3835</td>
</tr>
</tbody>
</table>
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: June 8 – 14, 2016

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: Blue green algae blooms are present over 27 miles of the river from the Alva boat ramp above the Franklin Lock downstream to the Colonial Bridge in the middle estuary.

Discharges into the estuary at S-79 during the past week nearly doubled to an average of 9,054 cfs with flows as high as 12,801 cfs. Lake Okeechobee discharges to the river measured at S-77 decreased slightly to an average of 3,339 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 averaged 4,431 cfs.

USACE Action: On June 10, 2016 the USACE continued Lake Okeechobee discharges of 4,000 cfs to the Caloosahatchee through S-77 and 1,800 cfs to the St. Lucie measured at S-80.

Recommendation: We request flows be reduced to an average of no more than 2,800 cfs at S-79 to reduce estuary harm from high volume discharges to the estuary.

Lake Okeechobee Level: 14.73 ft. (Low Sub-Band) Last week: 14.40 ft.
Lake Okeechobee Inflow: 17,657 cfs Lake Okeechobee Outflow: 5,335 cfs
Weekly Rainfall: WP Franklin 5.11” Ortona 4.68” Moore Haven 3.48”
Salinity Beautiful Island: 0.2 – 0.2 psu (SCCF RECON Marker 18) Previous wk 0.2 – 0.3 psu
Salinity Fort Myers: 0.2 – 0.2 psu (SCCF Yacht Basin) Previous wk 0.2 – 0.4 psu
Salinity Shell Point: 0.6 - 33 psu (SCCF RECON) Previous wk 8 – 32 psu

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
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<tbody>
<tr>
<td><strong>Current Value</strong></td>
</tr>
<tr>
<td>Beautiful Is</td>
</tr>
<tr>
<td>Fort Myers</td>
</tr>
<tr>
<td>Shell Point</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Light (25% lz depth meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Colonial Br</strong></td>
</tr>
<tr>
<td><strong>Iona</strong></td>
</tr>
<tr>
<td><strong>Causeway</strong></td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 9,054 cfs more than three times the harm threshold. Blue green algae blooms are present over 27 miles of the river from Alva to the Colonial Bridge. Over the past 14 days 64% of Lake Okeechobee outflows were directed to the Caloosahatchee. 26% were delivered to the St Lucie at S308, 6% of flows were discharged south to the EAA for irrigation demand and 4% to the L8. The City of Clewiston back flowed 885 acre feet back into the lake from S310.

Upstream of S79/Franklin Conditions: Lee County’s Environmental Lab found Microcystis and Dolichospermum cyanobacteria blooms on the Caloosahatchee from Alva to the Franklin Lock. On 6/14/16 the Olga Water Treatment plant chlorides measured 40 mg/L, apparent color was 200 CU and turbidity measured 5.29 NTU. Algae are present at the plant intake. Plant is offline.

Upper Estuary Conditions: Lee County’s Environmental Lab found Microcystis and Dolichospermum cyanobacteria blooms on the Caloosahatchee on the downstream side of the Franklin Lock and at the Davis Boat ramp, Centennial Marina and North Shore Park. Turbidity and chlorophyll were elevated and cyanobacteria was present between Beautiful Island and the Colonial Bridge. Salinities in the upper estuary are in the suitable range for tape grass.

Lower Estuary Condition: A dinoflagellates bloom (Alexandrium sp.) was present and salinity (0.6psu) was in the lethal range for oysters at Iona on 6/12/16. The average salinity at Shell Point (15 psu) was in the optimal range for oysters.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Salinities were below the preferred range for shoal grass and turtle grass (30 to 40 psu) in McIntyre Creek for the last 6 days.

Tarpon Bay: (Sensor stopped working on 6/10/16) Salinity: 25.7 – 34.0 psu; CDOM: 7.0 – 33.0 qsde; Dissolved oxygen: 4.4 – 7.6 mg/L; Chlorophyll: 3.3 – 12.2 µg/L.

McIntyre Creek: Salinity: 18.4 – 34.0 psu; CDOM: 4.0 – 27.0 qsde; Dissolved oxygen: 2.8 – 10.2 mg/L; Chlorophyll: 2.2 – 11.1 µg/L. Dissolved oxygen dropped below 3 mg/L one time over the last week at McIntyre Creek.

Red tide: On June 10, 2016 FWC reported finding Karenia brevis, the Florida red tide organism, in background concentrations in samples collected from Sarasota and Gulf counties.

| ACOE June 3 Release at S77 | \n|---|---|---|---|---|---|
| Date | Day | Pulse Target | S79 Flow (cfs) | S78 Flow (cfs) | S77 Flow (cfs) |
| 6/3/2016 | 1 | 4000 | 5253 | 3761 | 4116 |
| 6/4/2016 | 2 | 4000 | 4755 | 3520 | 3912 |
| 6/5/2016 | 3 | 4000 | 4983 | 3583 | 3924 |
| 6/6/2016 | 4 | 4000 | 4182 | 3709 | 3772 |
| 6/7/2016 | 5 | 4000 | 4200 | 2820 | 2814 |
| 6/8/2016 | 6 | 4000 | 4600 | 3055 | 2752 |
| 6/9/2016 | 7 | 4000 | 8006 | 3360 | 2903 |
| 7 day avg | | 4000 | 5140 | 3401 | 3456 |

| ACOE Daily Reports | | | | |
|---|---|---|---|---|---|
| Date | Day | S79 Flow (cfs) | S78 Flow (cfs) | S77 Flow (cfs) |
| 6/7/2016 | Tues | 4200 | 2820 | 2814 |
| 6/8/2016 | Wed | 4600 | 3055 | 2752 |
| 6/9/2016 | Thur | 8006 | 3360 | 2903 |
| 6/10/2016 | Fri | 11186 | 4914 | 3409 |
| 6/11/2016 | Sat | 12801 | 5811 | 3723 |
| 6/12/2016 | Sun | 11059 | 6244 | 3802 |
| 6/13/2016 | Mon | 11526 | 6155 | 3968 |
| 7 Day Avg | | 9054 | 4623 | 3339 |

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
Cyanobacteria at the Fort Myers boat ramp on the Caloosahatchee 6/14/16.
Photo SCCF

Seagrass washing up on Sanibel’s Lighthouse Beach Park 6/14/2016.
Photo City of Sanibel
MEMORANDUM

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Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: June 15 – 21, 2016

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: Discharges into the estuary at S-79 during the past week averaged 9,046 cfs, over three times the harm threshold. Lake Okeechobee discharges to the river, measured at S-77, increased to an average of 4,261 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 averaged 3,466 cfs. On 6/16/16 Lee county Labs documented blue green algae from the Alva boat ramp above the Franklin Lock downstream to North shore Park at the US 41 bridge.

USACE Action: On June 17, 2016 the USACE continued Lake Okeechobee discharges of 4,000 cfs to the Caloosahatchee through S-77 and 1,800 cfs to the St. Lucie measured at S-80.

Recommendation: We request flows to the Caloosahatchee be reduced to the maximum amount possible and that all emergency storage options be engaged to reduce estuary harm from high volume discharges to the estuary at S79.

<table>
<thead>
<tr>
<th>Lake Okeechobee Level:</th>
<th>14.92 ft. (Low Sub-Band)</th>
<th>Last week: 14.73 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Okeechobee Inflow:</td>
<td>9,890 cfs</td>
<td>Lake Okeechobee Outflow: 6,680 cfs</td>
</tr>
<tr>
<td>Weekly Rainfall:</td>
<td>WP Franklin 0.70”</td>
<td>Ortona 1.29”</td>
</tr>
<tr>
<td>Salinity Beautiful Island:</td>
<td>0.2 – 0.2 psu (SCCF RECON Marker 18)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
</tr>
<tr>
<td>Salinity Fort Myers:</td>
<td>0.2 – 0.2 psu (SCCF Yacht Basin)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
</tr>
<tr>
<td>Salinity Shell Point:</td>
<td>0.3 – 29 psu (SCCF RECON)</td>
<td>Previous wk 0.6 – 33 psu</td>
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<td>-</td>
</tr>
<tr>
<td>Fort Myers</td>
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<td>&lt;10 psu</td>
<td>-</td>
</tr>
<tr>
<td>Shell Point</td>
<td>0.3 - 29</td>
<td>25 - 32 psu</td>
<td>Low</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
<th>Beautiful Is</th>
<th>1 meter</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causeway</td>
<td>0.60</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
<tr>
<td>E. Sanibel</td>
<td>0.78</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 9,046 cfs. Cyanobacteria was present from Alva to the US 41 Bridge. Over the past 14 days 69% of Lake Okeechobee outflows were directed to the Caloosahatchee, 25% were delivered to the St Lucie at S308, 1.5% of flows were discharged south to the EAA for irrigation demand and 4.5% to the L8. The City of Clewiston back flowed 2,801 acre feet into the lake from S310.

<table>
<thead>
<tr>
<th>ACOE June 10 Release at S77</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
</tr>
<tr>
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</tr>
<tr>
<td>6/11/2016</td>
</tr>
<tr>
<td>6/12/2016</td>
</tr>
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<td>6/14/2016</td>
</tr>
<tr>
<td>6/15/2016</td>
</tr>
<tr>
<td>6/16/2016</td>
</tr>
<tr>
<td>7 day avg</td>
</tr>
</tbody>
</table>

Upstream of S79/Franklin Conditions: On 6/16/16 Lee County’s Environmental Lab found Microcystis and Dolichospermum cyanobacteria on the Caloosahatchee from Alva to the Franklin Lock. On 6/21/16 the Olga Water Treatment plant chlorides measured 50 mg/L, apparent color was 203 CU and turbidity measured 4.52 NTU. Slight traces of algae are present at the plant intake. The plant is offline.

Upper Estuary Conditions: On 6/16/16 Lee County’s Environmental Lab sampled Microcystis and Dolichospermum cyanobacteria on the Caloosahatchee on the downstream side of the Franklin Lock, at the Davis Boat ramp and North Shore Park. Salinities in the upper estuary are in the suitable range for tape grass.

Lower Estuary Condition: A dinoflagellate bloom was present and salinity (0.7 psu) was in the lethal range for oysters at Iona on 06/20/16. The average salinity at Shell Point (13 psu) was below the optimal range for oysters and seagrass.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Salinities were below the preferred range for shoal grass and turtle grass (30 to 40 psu) in McIntyre Creek for the last 7 days.

Tarpon Bay: Salinity: 16.8 – 29.4 psu; CDOM: 20.0 – 58.0 qsde; Dissolved oxygen: 2.9 – 8.9 mg/L; Chlorophyll: 4.2 – 14.0 μg/L.

McIntyre Creek: Salinity: 18.0 – 30.0 psu; CDOM: 9.0 – 27.0 qsde; Dissolved oxygen: 2.3 – 9.0 mg/L; Chlorophyll: 4.8 – 14.8 μg/L. Dissolved oxygen dropped below 3 mg/L one time over the last week at both McIntyre Creek and Tarpon Bay.

Oysters: June oyster sampling in the Caloosahatchee by FGCU reported disease prevalence of Perkinsus marinus for all oysters sampled ranged from 73.33% to 93.33%. Disease intensity of P. marinus ranged from 0.80 to 1.07. Scale 0 = no infection, 1 = low, 3 = medium, 5 = high. Larval recruitment ranged from 2.28 to 9.75 spat per shell.

Coastal conditions: A plume of dark, murky water extends out from the Caloosahatchee into the Gulf of Mexico, Pine Island Sound, through Blind Pass, Redfish Pass and along Fort Myers Beach. On Fort Myers Beach extensive deposits of Ceramium algae washed onto the beach along with nine armed sea stars, Luidia senegalensis, that are intolerant of low salinities.

Red tide: On June 17, 2016 FWC reported finding Karenia brevis, the Florida red tide organism in only one sample collected from Sarasota.
Caloosahatchee Estuary

ACOE Daily Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<td>Thur</td>
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<td>7 Day</td>
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<td>4261</td>
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Caloosahatchee Stations | Chlorophyll (µg/L) | CDOM (qse) | Turbidity (NTU) | 25% lo depth (meters) |
<table>
<thead>
<tr>
<th></th>
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<tr>
<td>Target Values</td>
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<td>CE &lt; 70</td>
<td>SCB &lt; 11</td>
<td>CE &lt; 18</td>
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<tr>
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<td>206</td>
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<td>0.60</td>
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<tr>
<td>Causeway</td>
<td>10.2</td>
<td>178</td>
<td>3.3</td>
<td>0.78</td>
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</tbody>
</table>

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

Nine armed sea stars, *Luidia senegalensis*, intolerant of low salinities, washed up on Fort Myers Beach 6/18/16 as Gulf salinities near the Caloosahatchee dropped. Extensive deposits of *Ceramium* algae washed up over 5 miles of beach. Photos: Town of Fort Myers

Beautiful Is. 7.3 211 1.8 0.75
Iona 34 206 5.5 0.60
Causeway 10.2 178 3.3 0.78

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MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director
Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
Paul Trites - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex
James Evans & Holly Milbrandt - City of Sanibel
Keith Kibbey & Lesli Haynes - Lee County
Rae Blake – Town of Fort Myers Beach
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

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:** On 6/23/16 Lee County’ Environmental Lab documented blue green algae from the Alva boat ramp above the Franklin Lock downstream to Centennial Marina and North Shore Park. SCCF’s Marine Lab documented elevated cyanobacteria levels at Iona, the Sanibel Causeway and East Sanibel. A bloom of diatoms was present in Pine Island Sound and *Pyrodinium bahamense* was documented by SCCF at 6 sites in the central part of the Sound.

Discharges into the estuary at S-79 during the past week averaged 7,135 cfs, two and a half times the harm threshold. Lake Okeechobee discharges to the river, measured at S-77, averaged 4,156 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 averaged 2,835 cfs.

**USACE Action:** On June 24, 2016 the USACE continued Lake Okeechobee discharges of 4,000 cfs to the Caloosahatchee through S-77 and 1,800 cfs to the St. Lucie measured at S-80.

**Recommendation:** We request flows to the Caloosahatchee be reduced to the maximum amount possible and that all emergency storage options be engaged to reduce estuary harm from high discharges to the estuary at S79.

<table>
<thead>
<tr>
<th>Lake Okeechobee Level:</th>
<th>14.90 ft. (Low Sub-Band)</th>
<th>Last week: 14.92 ft.</th>
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</thead>
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<tr>
<td>Lake Okeechobee Inflow:</td>
<td>7,550 cfs</td>
<td>Lake Okeechobee Outflow: 5,820 cfs</td>
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<tr>
<td>Weekly Rainfall:</td>
<td>WP Franklin 1.02”</td>
<td>Ortona 1.54”</td>
</tr>
<tr>
<td>Salinity Beautiful Island:</td>
<td>0.2 – 0.2 psu (SCCF RECON Marker 18)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
</tr>
<tr>
<td>Salinity Fort Myers:</td>
<td>0.2 – 0.2 psu (SCCF Yacht Basin)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
</tr>
<tr>
<td>Salinity Shell Point:</td>
<td>0.2 – 26 psu (SCCF RECON)</td>
<td>Previous wk 0.3 – 29 psu</td>
</tr>
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</table>

Salinity (psu)

<table>
<thead>
<tr>
<th></th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.2 – 0.2</td>
<td>&lt; 5 psu</td>
<td>-</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.2 – 0.2</td>
<td>&lt;10 psu</td>
<td>-</td>
</tr>
<tr>
<td>Shell Point</td>
<td>0.2 - 26</td>
<td>25 - 32 psu</td>
<td>Low</td>
</tr>
</tbody>
</table>

Light (25% Iz depth meters)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Iona</td>
<td>0.66</td>
<td>1 meter</td>
</tr>
<tr>
<td>Causeway</td>
<td>0.83</td>
<td>2.2 meters</td>
</tr>
<tr>
<td>E. Sanibel</td>
<td>0.99</td>
<td>2.2 meters</td>
</tr>
</tbody>
</table>
**Flow & Water Quality:** Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 7,135 cfs. Cyanobacteria was present from Alva to Sanibel Island. Over the past 14 days 70% of Lake Okeechobee outflows were directed to the Caloosahatchee, 26% were delivered to the St Lucie at S308, 4% to the L8 and 0% of flows were discharged south to the EAA. The City of Clewiston back flowed 1,812 acre feet of stormwater into the lake at S310.

### Upper Estuary Conditions: On 6/23/16 Lee County's Environmental Lab identified *Microcystis* cyanobacteria in the Caloosahatchee from the Alva Boat Ramp to the Franklin Lock. On 6/28/16 the Olga Water Treatment plant chlorides measured 40 mg/L, apparent color was 274 CU and turbidity measured 4.12 NTU. Slight traces of algae are present at the plant intake. The plant is offline.

### Upper Estuary Conditions: On 6/23/16 Lee County's Environmental Lab identified *Microcystis* cyanobacteria in the Caloosahatchee from the downstream side of the Franklin Lock, the Davis Boat ramp, Centennial Marina and North Shore Park. Salinities in the upper estuary are in the suitable range for tape grass. The 25% light depth at Marsh Point, east of the Caloosahatchee Bridge was 0.41 m on 6/23/16 under calm conditions. Dissolved oxygen concentrations dipped into the hypoxic range (<3mg/L) at Beautiful Island on four occasions.

### Lower Estuary Condition: Cyanobacteria levels were elevated at Iona, the Sanibel Causeway and East Sanibel. A bloom of diatoms was present in Pine Island Sound and *Pyrodinium bahamense* was found by SCCF at 6 sites in the central part of the Sound. Salinity (0.7 psu) was in the lethal range for oysters at Iona on 6/27/16. The average salinity at Shell Point (12 psu) was below the optimal range for oysters and seagrass. The maximum salinity at Shell Point RECON was below 15 from 6/21-24/16. Light levels were below optimal for seagrasses at depth.

### McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Salinities were below the preferred range for shoal grass and turtle grass (30 to 40 psu) in McIntyre Creek and Tarpon Bay for the last 19 days and below the preferred range for manatee grass (22 to 35 psu) in McIntyre Creek for the last 8 days.

**Tarpon Bay:** Salinity: 17.0 – 27.2 psu; CDOM: 33.0 – 60.0 qsde; Dissolved oxygen: 4.2 – 9.0 mg/L; Chlorophyll: 3.0 – 18.0 µg/L. **McIntyre Creek:** Salinity: 18.1 – 22.8 psu; CDOM: 21.0 – 27.0 qsde; Dissolved oxygen: 2.3 – 10.4 mg/L; Chlorophyll: 9.0 – 24.0 µg/L. Dissolved oxygen dropped below 3 mg/L one time over the last week at both McIntyre Creek and Tarpon Bay.

### Coastal conditions: Dark, murky water extends out from the Caloosahatchee into the Gulf of Mexico, Pine Island Sound, through Blind Pass, Redfish Pass and along both Sanibel Islands and Fort Myers Beach.
Sanibel Causeway water conditions. Photos Jim Szabo for City of Sanibel

*Microcystis* at Marsh Point, North Fort Myers on 6/23/16. Photo SCCF
MEMORANDUM

To:  USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From:  Periodic Scientists Conference Call Participants
        Paul Tritaik - J.N. “Ding” Darling National Wildlife Refuge (NWR) Complex
        James Evans & Holly Milbrandt - City of Sanibel
        Keith Kibbey & Lesli Haynes - Lee County
        Rae Blake – Town of Fort Myers Beach
        Connie Jarvis & Harry Phillips – City of Cape Coral
        Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject:  Caloosahatchee & Estuary Condition Report

Reporting Period:  June 29 – July 5, 2016

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:** Discharges into the estuary at S-79 during the past week averaged 6,203 cfs, over two times the harm threshold. Lake Okeechobee discharges to the river, measured at S-77, decreased to a weekly average of 2,700 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 averaged 2,811 cfs. On 6/30/16 Lee County' Environmental Lab documented blue green algae from the Alva boat ramp above the Franklin Lock downstream to North shore Park at the US 41 bridge. Salinities at Iona are in the harmful range for oysters.

**USACE Action:** On July 1, 2016 the USACE reduced Lake Okeechobee discharges of 3,000 cfs to the Caloosahatchee through S-77 and 1,170 cfs to the St. Lucie measured at S-80.

**Recommendation:** We request any and all emergency storage capacity be maximized in the Kissimme, EAA and Caloosahatchee watersheds to reduce flows and harm to the Caloosahatchee estuary caused by high volume and long duration discharges at S79.

<table>
<thead>
<tr>
<th>Lake Okeechobee Level:</th>
<th>14.95 ft. (Low Sub-Band)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last week:</td>
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</tr>
<tr>
<td>Lake Okeechobee Inflow:</td>
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</tr>
<tr>
<td>Lake Okeechobee Outflow:</td>
<td>4,256 cfs</td>
</tr>
<tr>
<td>Weekly Rainfall:</td>
<td>WP Franklin 1.65”</td>
</tr>
<tr>
<td></td>
<td>Ortona 2.12”</td>
</tr>
<tr>
<td></td>
<td>Moore Haven 2.17”</td>
</tr>
<tr>
<td>Salinity Beautiful Island:</td>
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<td>Salinity Fort Myers:</td>
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<tr>
<td>Salinity Shell Point:</td>
<td>2.1- 27 psu (SCCF RECON)</td>
</tr>
</tbody>
</table>

**Salinity (psu)**

<table>
<thead>
<tr>
<th></th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/Low</th>
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<tr>
<td>Shell Point</td>
<td>2.1- 27</td>
<td>25 - 32 psu</td>
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**Light (25% Iz depth meters)**

<table>
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<tr>
<th></th>
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<th>1 meter</th>
<th>Low</th>
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<tbody>
<tr>
<td>Iona</td>
<td>0.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Causeway</td>
<td>0.92</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
<tr>
<td>Tarpon Bay</td>
<td>0.62</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 6,203 cfs. Cyanobacteria was present from Alva to the US 41 Bridge. Over the past 14 days 65% of Lake Okeechobee outflows were directed to the Caloosahatchee, 30% were delivered to the St Lucie at S308 and 4% to the L8. The City of Clewiston back flowed 1,332 acre feet of stormwater into the lake at S310. No water, 0%, was discharged south to the EAA.

Upstream of S79/Franklin Conditions: On 6/30/16 Lee County’s Environmental Lab found abundant levels of cyanobacteria including Dolichospermum, Microcystis and Aphanizomenon in the Caloosahatchee from the Alva Boat Ramp to the Franklin Lock. On 7/5/16 the Olga Water Treatment plant chlorides measured 43 mg/L, apparent color was 226 CU and turbidity measured 3.44 NTU. Slight traces of algae are present at the plant intake. The plant is offline.

Upper Estuary Conditions: On 6/30/16 Lee County’s Environmental Lab recorded abundant levels of cyanobacteria including Dolichospermum, Microcystis and Aphanizomenon in the Caloosahatchee on the downstream side of the Franklin Lock and recorded Microcystis at the Davis Boat ramp, Dolichospermum and Microcystis at Centennial Marina and Microcystis at North Shore Park. Salinities in the upper estuary are in the suitable range for tape grass. Dissolved oxygen concentrations dipped into the hypoxic range (<3mg/L) on four occasions.

Lower Estuary Condition: Salinity (1.6 psu) was in the harmful range for oysters at Peppertree Pointe Marina in Iona on 7/5/16 and the intertidal oysters there are dead. The average salinity at Shell Point (15 psu) was in the optimal range for oysters. Light levels were below optimal for seagrasses at depth. Suboptimal light and salinity conditions for seagrass are associated with significant accumulations of seagrass washing onto Sanibel and Fort Myers Beaches.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darley NWR: Salinities were below the preferred range for shoal grass and turtle grass (30 to 40 psu) in McIntyre Creek and Tarpon Bay the past 26 days.

Tarpon Bay: Salinity: 20 – 29 psu; CDOM: 27 - 51 qsde; Dissolved oxygen: 4 – 8.8 mg/L; Chlorophyll: 1.0 – 5.5 µg/L.

McIntyre Creek: Salinity: 20.5 – 23.2 psu; CDOM: 20 – 25 qsde; Dissolved oxygen: 2.7 – 9.3 mg/L; Chlorophyll: 4.1 – 16.2 µg/L. Dissolved oxygen dropped below 3 mg/L four times over the last week at McIntyre Creek.

Coastal conditions: Dark, murky water extends out from the Caloosahatchee into the Gulf of Mexico, Pine Island Sound, through Blind Pass, Redfish Pass and along both Sanibel Islands and Fort Myers Beaches.

<table>
<thead>
<tr>
<th>Caloosahatchee Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>CDOM (qsde)</th>
<th>Turbidity (NTU)</th>
<th>25% I0 depth (meters)</th>
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<tr>
<td>Target Values</td>
<td>&lt; 11</td>
<td>CE &lt;70 SCB &lt;11</td>
<td>CE &lt; 18 SCB &lt; 5</td>
<td>CE = 1 m SCB = 2.2m</td>
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<tr>
<td>Iona</td>
<td>11</td>
<td>206</td>
<td>4.1</td>
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<td>Causeway</td>
<td>5.5</td>
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<tr>
<td>Tarpon Bay</td>
<td>3.8</td>
<td>100</td>
<td>20.1</td>
<td>0.62</td>
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</table>

**ACOE Daily Reports**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<tbody>
<tr>
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<td>3274</td>
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<td>7 Day Avg</td>
<td></td>
<td>6203</td>
<td>3392</td>
<td>2700</td>
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</table>
Seagrass on Sanibel's beaches along East Gulf Drive on 7/4/16. Photos City of Sanibel

*Ulva*, a green algae is blooming and washing onto Sanibel east end beaches. Photo City of Sanibel 7/3/16
MEMORANDUM

To:  USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From:  Periodic Scientists Conference Call Participants
Paul Tritaik - J.N. “Ding” Darling National Wildlife Refuge (NWR) Complex
James Evans & Holly Milbrandt - City of Sanibel
Keith Kibbey & Lesli Haynes - Lee County
Rae Blake – Town of Fort Myers Beach
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. -Sanibel Captiva Conservation Foundation

Subject:  Caloosahatchee & Estuary Condition Report

Reporting Period:  July 6 - 12, 2016

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:  Discharges into the estuary at S-79 during the past week averaged 4,158 cfs, one and a half times the harm threshold.  Lake Okeechobee discharges to the river, measured at S-77, decreased to a weekly average of 2,285 cfs.  Watershed inflows to the Franklin pool between S-78 and S-79 averaged 2,211 cfs.  Blue green algae was documented over 35 miles of the river from the Alva boat ramp above the Franklin Lock downstream to Cape Coral Yacht Club at the mouth of the river.  Salinities at Iona are in the harmful range for oysters.

USACE Action:  On July 8, 2016 the USACE continued Lake Okeechobee discharges of 3,000 cfs to the Caloosahatchee through S-77 and 1,170 cfs to the St. Lucie measured at S-80.

Recommendation:  We request any and all emergency storage capacity be maximized in the Kissimme, EAA and Caloosahatchee watersheds to reduce flows and harm to the Caloosahatchee estuary caused by high volume and long duration discharges at S79.

Lake Okeechobee Level:  14.78 ft. (Low Sub-Band)  Last week: 14.95 ft.
Lake Okeechobee Inflow:  1,929 cfs  Lake Okeechobee Outflow:  4,758 cfs
Weekly Rainfall:  WP Franklin 3.21” Ortona 0.83” Moore Haven 0”
Salinity Beautiful Island:  0.2 – 0.2 psu (SCCF RECON Marker 18)  Previous wk 0.2 – 0.2 psu
Salinity Fort Myers:  0.2 – 0.2 psu (SCCF Yacht Basin)  Previous wk 0.2 – 0.2 psu
Salinity Shell Point:  2.6 – 28 psu (SCCF RECON)  Previous wk 2.1 – 27 psu

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
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<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.2 – 0.2</td>
<td>&lt; 5 psu</td>
<td>-</td>
</tr>
<tr>
<td>Fort Myers</td>
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<tr>
<td>Shell Point</td>
<td>2.6 - 28</td>
<td>25 - 32 psu</td>
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<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iona</td>
</tr>
<tr>
<td>Causeway</td>
</tr>
<tr>
<td>Tarpon Bay</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 4,158 cfs. Cyanobacteria was present from Alva to the Midpoint Bridge in Cape Coral. Over the past 14 days 58% of Lake Okeechobee outflows were directed to the Caloosahatchee, 32% were delivered to the St Lucie at S308, 6.5% to the L8 and 2.8% was delivered south to the EAA for irrigation demand. The City of Clewiston back flowed 606 acre feet of stormwater into the lake at S310.

**Upstream of S79/Franklin Conditions:** On 7/7/16 Lee County Environmental Lab found abundant levels of cyanobacteria including *Dolichospermum* and *Microcystis* in the Caloosahatchee from the Alva Boat Ramp to the Franklin Lock. On 7/12/16 the Olga Water Treatment plant chlorides measured 44mg/L, apparent color was 221 CU and turbidity measured 1.44 NTU. Slight traces of algae were present at the plant intake. The plant is online at 2000 GPM.

**Upper Estuary Conditions:** On 7/7/16 Lee County Environmental Lab recorded cyanobacteria including *Microcystis* and *Dolichospermum* in the Caloosahatchee from the downstream side of the Franklin Lock to the park at the midpoint bridge. Salinities in the upper estuary are in the suitable range for tape grass. **Dissolved oxygen concentrations at Beautiful Island dipped into the hypoxic range (<3mg/L) during the week.**

**Lower Estuary Condition:** Salinity (4.3 psu) was in the harmful range for oysters at Peppertree Pointe Marina in Iona on 7/11/16. The average salinity at Shell Point (16 psu) was in the optimal range for oysters. Phytoplankton and cyanobacteria levels were elevated at Iona on 7/11/16. Light levels were below optimal for seagrasses at depth. Suboptimal light and salinity conditions for seagrass are associated with significant amounts of seagrass washing onto Sanibel and Fort Myers Beaches.

McIntyre Creek & Tarpon Bay in J.N. **“Ding” Darling NWR:** Salinities were below the preferred range for shoal grass and turtle grass (30 to 40 psu) in McIntyre Creek and Tarpon Bay the past 33 days.

Tarpon Bay Salinity: 21 – 30 psu; CDOM: 24 - 49 qsde; Dissolved oxygen: 3.8 – 8.5 mg/L; Chlorophyll: ND

McIntyre Creek: Salinity: 22.5 – 24.5 psu; CDOM: 19 – 23.5 qsde; Dissolved oxygen: 2.3 – 10 mg/L; Chlorophyll: 3.5 – 7.1 µg/L. Dissolved oxygen dropped below 3 mg/L six times over the last week at over the last week at McIntyre Creek.

**Coastal conditions:** Dark, murky water extends out from the Caloosahatchee into Pine Island Sound, through Blind Pass, Redfish Pass and along both Sanibel Islands and Fort Myers Beach. *Ulva*, a green algae, and seagrass are washing up on Sanibel and Fort Myers Beaches.

*Table ACOE July 1 Release at S77*

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<td>7024</td>
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</tbody>
</table>

**SCCF Shell Point RECON Salinity**

![Graph showing salinity data]

**Table: ACOE Daily Reports**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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</thead>
<tbody>
<tr>
<td>7/5/2016</td>
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<td>Wed</td>
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<td>1650</td>
<td>2479</td>
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<td>7/7/2016</td>
<td>Thur</td>
<td>4224</td>
<td>2025</td>
<td>2443</td>
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<td>7/8/2016</td>
<td>Fri</td>
<td>3929</td>
<td>1876</td>
<td>2285</td>
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<td>7/9/2016</td>
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<td>7/11/2016</td>
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<td>7 Day Avg</td>
<td>4158</td>
<td>1947</td>
<td>2285</td>
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**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
Green algae washing ashore along Sanibel’s east end beaches on 7/10/16. Photo City of Sanibel.

Bluegreen algae at the Best Western Hotel dock construction project along the Caloosahatchee in North Fort Myers 7/6/16. Photo SteMic Marine Construction

Very sparse Shoal grass in Iona Cove on 7/8/16. Photo SCCF

Turtle grass near the mouth of the Caloosahatchee covered in epiphytic algae 7/7/16. Photo SCCF
MEMORANDUM

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Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: July 13 - 19, 2016

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:** Discharges into the estuary at S-79 during the past week averaged 3,697 cfs, still exceeding the harm threshold of 2,800 cfs established for the estuary. Lake Okeechobee discharges to the river, measured at S-77, decreased to a weekly average of 1,973 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 averaged 1,822 cfs. Sampling detected blue green algae presence at monitoring sites from the Alva boat ramp above the Franklin Lock downstream to Cape Coral Yacht Club at the mouth of the river. Salinities at Iona continue to be in the harmful range for oysters.

**USACE Action:** On July 15, 2016 the USACE reduced Lake Okeechobee discharges to 2,800 cfs to the Caloosahatchee through S-79 and 650 cfs to the St. Lucie measured at S-80.

**Recommendation:** We request flows to the Caloosahatchee Estuary at S79 be maintained below the harm threshold of 2,800 cfs and all emergency storage capacity be maximized in the Kissimmee, EAA and Caloosahatchee watersheds to reduce flows and harm to the Caloosahatchee estuary caused by high volume and long duration discharges at S79.

<table>
<thead>
<tr>
<th>Lake Okeechobee Level: 14.69 ft. (Low Sub-Band)</th>
<th>Last week: 14.78 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Okeechobee Inflow: 3,066 cfs</td>
<td>Lake Okeechobee Outflow: 5,000 cfs</td>
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<tr>
<td>Weekly Rainfall: WP Franklin 2.49” Ortona 2.87”</td>
<td>Moore Haven 4.20”</td>
</tr>
<tr>
<td>Salinity Beautiful Island: 0.2 – 0.2 psu (SCCF RECON Marker 18)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
</tr>
<tr>
<td>Salinity Fort Myers: 0.2 – 0.2 psu (SCCF Yacht Basin)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
</tr>
<tr>
<td>Salinity Shell Point: 5.9 - 28 psu (SCCF RECON)</td>
<td>Previous wk 2.6 - 28 psu</td>
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</table>

**Salinity (psu)**

<table>
<thead>
<tr>
<th></th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.2 – 0.2</td>
<td>&lt; 5 psu</td>
<td>-</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.2 – 0.2</td>
<td>&lt; 10 psu</td>
<td>-</td>
</tr>
<tr>
<td>Shell Point</td>
<td>5.9 - 28</td>
<td>25 - 32 psu</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Light (25% Iz depth meters)**

<table>
<thead>
<tr>
<th></th>
<th>Current Value</th>
<th>Iz Depth</th>
<th>Depth Range</th>
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</thead>
<tbody>
<tr>
<td>Iona</td>
<td>0.79</td>
<td>1 meter</td>
<td>Low</td>
</tr>
<tr>
<td>Causeway</td>
<td>0.81</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
<tr>
<td>Tarpon Bay</td>
<td>1.56</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 3,697 cfs. Cyanobacteria was present at sample stations from Alva to the Cape Coral Yacht Club. Over the past 14 days 53% of Lake Okeechobee outflows were directed to the Caloosahatchee, 26% were delivered to the St Lucie at S308, 12% was delivered south to the EAA for irrigation demand, 8% was directed to the L8 and 1% out S310.

<table>
<thead>
<tr>
<th>ACOE July 8 Release at S77</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>7/8/2016</td>
</tr>
<tr>
<td>7/9/2016</td>
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<tr>
<td>7/10/2016</td>
</tr>
<tr>
<td>7/11/2016</td>
</tr>
<tr>
<td>7/12/2016</td>
</tr>
<tr>
<td>7/13/2016</td>
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<tr>
<td>7/14/2016</td>
</tr>
<tr>
<td>7 day avg</td>
</tr>
</tbody>
</table>

Upstream of S79/Franklin Conditions: On 7/14/16 Lee County Environmental Lab found *Microcystis* cyanobacteria in the Caloosahatchee from the Alva Boat Ramp to the Franklin Lock. On 7/19/16 the Olga Water Treatment plant chlorides measured 43 mg/L, apparent color was 220 CU and turbidity measured 2.3 NTU. Slight traces of algae were present at the plant intake. The plant is online at 2000 GPM.

Upper Estuary Conditions: On 7/14/16 Lee County Environmental Lab recorded cyanobacteria including *Microcystis* and *Dolichospermum* in the Caloosahatchee from the downstream side of the Franklin Lock, at the Davis boat ramp and at the midpoint bridge park. Salinities in the upper estuary are in the suitable range for tape grass. Dissolved oxygen concentrations at Beautiful Island dipped into the hypoxic range (<3mg/L) during the past week.

Lower Estuary Condition: Cyanobacteria toxin levels reported by DEP resulted in the closure of the beach at the Cape Coral Yacht Club on 7/17/16. Salinity (4.7 psu) was in the harmful range for oysters and seagrass at Peppertree Pointe Marina in Iona on 7/18/16. The average salinity at Shell Point (17 psu) was in the optimal range for oysters. Light levels were below optimal for seagrasses at the lower depths of occurrence.

McIntyre Creek & Tarpon Bay in J.N. *“Ding”* Darling NWR: Salinities were below the preferred range for shoal grass and turtle grass (30 to 40 psu) in McIntyre Creek and Tarpon Bay the past 40 days.

Tarpon Bay Salinity: 20 – 28.9 psu; CDOM: 26 - 49 qsde; Dissolved oxygen: 2.6 – 7.8 mg/L; Chlorophyll: 2.5 – 13.2 µg/L. McIntyre Creek Salinity: 22.2 – 25 psu; CDOM: 19 – 23 qsde; Dissolved oxygen: 2.8 – 7.3 mg/L; Chlorophyll: 4 – 8.8 µg/L. Dissolved oxygen dropped below 3 mg/L one time over the last week at McIntyre Creek and Tarpon Bay.

Coastal conditions: Dark, murky water extends from the Caloosahatchee to the Gulf of Mexico, Pine Island Sound, through Blind Pass, Redfish Pass and along Lighthouse Beach on Sanibel Island and Bowditch Point on Fort Myers Beach.

Caloosahatchee Stations

<table>
<thead>
<tr>
<th>Chlorophyll (µg/L)</th>
<th>CDOM (qsde)</th>
<th>Turbidity (NTU)</th>
<th>25% Iz depth (meters)</th>
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</thead>
<tbody>
<tr>
<td>Target Values</td>
<td>&lt; 11</td>
<td>CE &lt; 70 SCB &lt; 11</td>
<td>CE &lt; 18 SCB &lt; 5</td>
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<tr>
<td>Fort Myers</td>
<td>5.8</td>
<td>189</td>
<td>3.3</td>
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<td>Iona</td>
<td>5.7</td>
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<tr>
<td>Tarpon Bay</td>
<td>7.9</td>
<td>68.4</td>
<td>1.8</td>
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Target light penetration: CE- Caloosahatchee Estuary = 1 m
SCB-San Carlos Bay = 2.2 meters

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

ACOE Daily Reports

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<td>7 Day Avg</td>
<td>3697</td>
<td>1875</td>
<td>1973</td>
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Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: July 20 - 26, 2016

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:** Discharges into the estuary at S-79 during the past week averaged **3,196 cfs**, still exceeding the harm threshold of **2,800 cfs established for the estuary**. Lake Okeechobee discharges to the river, measured at S-77, decreased to a weekly average of **350 cfs**. Watershed inflows to the Franklin pool between S-78 and S-79 averaged **2,487 cfs**.

**USACE Action:** On July 22, 2016 the USACE continued Lake Okeechobee pulse releases to **2,800 cfs** to the Caloosahatchee through S-79 and **650 cfs** to the St. Lucie measured at S-80.

**Recommendation:** We request flows to the Caloosahatchee Estuary at S79 be reduced below the harm threshold of 2,800 cfs and all emergency storage capacity be maximized in the Kissimmee, EAA and Caloosahatchee watersheds to reduce flows and harm to the Caloosahatchee estuary caused by high volume and long duration discharges at S79.

| Lake Okeechobee Level       | 14.69 ft. (Low Sub-Band)       | Last week: 14.69 ft.       |
| Lake Okeechobee Inflow:     | 3,510 cfs                      | Lake Okeechobee Outflow:  2,070 cfs |
| Weekly Rainfall:            | WP Franklin 0.98”              | Ortona 3.07”               | Moore Haven 1.06” |
| Salinity Beautiful Island:  | 0.2 – 0.2 psu (SCCF RECON Marker 18) | Previous wk 0.2 – 0.2 psu |
| Salinity Fort Myers:        | 0.2 – 0.2 psu (SCCF Yacht Basin) | Previous wk 0.2 – 0.2 psu |
| Salinity Shell Point:       | 6.3 – 29 psu (SCCF RECON)      | Previous wk 5.9 - 28 psu |

**Salinity (psu)**

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**Light (25% Iz depth meters)**

<table>
<thead>
<tr>
<th></th>
<th>Current Value</th>
<th>Depth</th>
<th>Light</th>
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<tbody>
<tr>
<td>Fort Myers</td>
<td>0.75</td>
<td>1 meter</td>
<td>Low</td>
</tr>
<tr>
<td>Iona</td>
<td>0.75</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
<tr>
<td>Causeway A</td>
<td>1.55</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
**Flow & Water Quality:** Flows to the Caloosahatchee Estuary at S79 during the past seven days averaged 3,196 cfs. Over the past 14 days 36% of Lake Okeechobee outflows was directed to the Caloosahatchee, 24% was delivered to the St. Lucie at S308, 31% was delivered south to the EAA for irrigation demand, 8% was directed to the L8 and 1% out S310.

Upper Estuary Conditions: On 7/21/16 Lee County Environmental Lab found Microcystis present at the Davis Boat Ramp and Midpoint Bridge Park. Salinities in the upper estuary are in the suitable range for tape grass and have started rising above zero at the Colonial Bridge. Dissolved oxygen concentrations at the Beautiful Island RECON were in the harmful range (<5 mg/L) during the past week.

Lower Estuary Condition: Salinity (6.6 psu) was below optimal for oysters and seagrass at Peppertree Pointe Marina in Iona on 7/25/16. The average salinity at Shell Point (18 psu) was in the optimal range for oysters. A bloom (up to 700,000 cells/L) of the bioluminescent and potentially toxic dinoflagellate, Pyrodinium bahamense, was detected in Pine Island Sound (SCCF, 7/20/16). A bloom of another dinoflagellate, Ceratium hiricus (up to 440,000 cells/L on 7/20/16), was detected by Tarpon Bay RECON. Light levels were below optimal for seagrasses at the lower depths of occurrence. The measured 25% light depth was less than 1 meter in seven of nine sites in Pine Island Sound 7/20/16.

**McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR:** Salinities were below the preferred range for shoal grass and turtle grass (30 to 40 psu) in McIntyre Creek and Tarpon Bay the past 47 days.

**Coastal conditions:** Dark, murky water extends from the Caloosahatchee to the mouth of the river, Pine Island Sound, and along Lighthouse Beach on Sanibel Island and Bowditch Point on Fort Myers Beach. On 7/25/16, a mass stranding of thousands of sea hares occurred at Tarpon Bay Beach on Sanibel.

### ACOE July 15 Release at S79

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
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<tr>
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<td>2965</td>
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<td>284</td>
</tr>
<tr>
<td>7/21/2016</td>
<td>7</td>
<td>1200</td>
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<td>7 day avg</td>
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### SCCF Colonial Bridge Salinity

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<td>7/29/16</td>
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### ACOE Daily Reports

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<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<td>7/19/2016</td>
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<td>497</td>
<td>389</td>
</tr>
<tr>
<td>7/20/2016</td>
<td>Wed</td>
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<tr>
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**Target light penetration:** CE- Caloosahatchee Estuary = 1 m
SCB- San Carlos Bay = 2.2 meters

**Definition of 25% Iz:** I = irradiance, z = depth

When I is 25% of surface I, the 25% light depth is the depth where I is 25% of surface light.
Seagrass washing ashore on Sanibel's Beach Road Beach on 7/25/16. Photo City of Sanibel

Mass stranding of thousands of sea hares on Sanibel's Tarpon Bay Beach on 7/25/16. Photo City of Sanibel
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director
Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
Paul Trites - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex
James Evans & Holly Milbrandt - City of Sanibel
Keith Kibbey & Lesli Haynes - Lee County
Rae Blake – Town of Fort Myers Beach
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: July 27 - August 2, 2016

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: Discharges into the estuary at S-79 during the past week averaged 3,309 cfs, still exceeding the harm threshold of 2,800 cfs established for the estuary. Lake Okeechobee discharges to the river, measured at S-77, decreased to a weekly average of 775 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 averaged 2,155 cfs. Sampling detected blue green algae presence at monitoring sites upstream of the WP Franklin Lock and Alva boat ramp. Shellfish harvesting is closed in Pine Island Sound due to the potential for paralytic shellfish poisoning from a bloom of the dinoflagellate Pyrodinium bahamense.

USACE Action: On July 29, 2016 the USACE continued Lake Okeechobee pulse releases of 2,800 cfs to the Caloosahatchee through S-79 and 650 cfs to the St. Lucie measured at S-80.

Recommendation: We request flows to the Caloosahatchee Estuary at S79 be maintained at or below the harm threshold of 2,800 cfs and all emergency storage capacity be maximized in the Kissimmee, EAA and Caloosahatchee watersheds to reduce flows and harm to the Caloosahatchee estuary caused by high volume and long duration discharges at S-79.

Lake Okeechobee Inflow: 2,911 cfs  Lake Okeechobee Outflow: 2,227 cfs
Weekly Rainfall: WP Franklin 1.65”  Ortona 2.23”  Moore Haven 0.03”
Salinity Beautiful Island: 0.2 – 0.2 psu (SCCF RECON Marker 18)  Previous wk 0.2 – 0.2 psu
Salinity Fort Myers: 0.2 – 0.2 psu (SCCF Yacht Basin)  Previous wk 0.2 – 0.2 psu
Salinity Shell Point: 7.8 - 29 psu (SCCF RECON)  Previous wk 6.3 - 29 psu

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
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<td>Fort Myers</td>
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</tr>
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<td>Shell Point</td>
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<td>25 - 32 psu</td>
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<table>
<thead>
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<th>Light (25% Iz depth meters)</th>
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<tr>
<td>Causeway</td>
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<td>2 meter</td>
</tr>
<tr>
<td>Sanibel East</td>
<td>1.78</td>
<td>2.2 meters</td>
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</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 3,309 cfs. Cyanobacteria was present at sample stations in Alva and upstream of the Franklin Lock. Over the past 14 days 19% of Lake Okeechobee outflows was directed to the Caloosahatchee, 23% was delivered to the St Lucie at S308, 50% was delivered south to the EAA for irrigation demand, 9% was directed to the L8.

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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</thead>
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<td>7/24/2016</td>
<td>3</td>
<td>3600</td>
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<td>32</td>
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<td>6</td>
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<td>2486</td>
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<tr>
<td>7/28/2016</td>
<td>7</td>
<td>1200</td>
<td>2860</td>
<td>883</td>
<td>556</td>
</tr>
<tr>
<td>7 day avg</td>
<td></td>
<td>2800</td>
<td>3268</td>
<td>869</td>
<td>335</td>
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Upstream of S-79/Franklin Conditions: On 7/28/16 Lee County Environmental Lab found Microcystis cyanobacteria in the Caloosahatchee at the Alva Boat Ramp and Franklin Lock. On 8/2/16 the Olga Water Treatment plant chlorides measured 41 mg/L; apparent color was 190 CU and turbidity measured 2.36 NTU. Slightly increased traces of algae were present at the plant intake most of last week. The plant is online at 2000 GPM.

Upper Estuary Conditions: On 7/28/16 Lee County Environmental Lab found no cyanobacteria at sample sites. Salinities in the upper estuary are in the suitable range for tape grass.

Lower Estuary Condition: Salinity (6.4 psu) was below optimal for oysters and seagrass at Peppertree Pointe Marina in Iona on 8/1/16. The average salinity at Shell Point (19 psu) was in the optimal range for oysters. Light levels were below optimal for seagrasses at the lower depths of occurrence.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Salinities were below the preferred range for shoal grass and turtle grass (30 to 40 psu) in McIntyre Creek the past 54 days and in Tarpon Bay, 53 of the past 54 days.

Tarpon Bay Salinity: 21.7 – 30.9 psu; CDOM: 17.5 – 42.5 qsde; Dissolved oxygen: 4.4 – 8.2 mg/L; Chlorophyll: 3.4 – 12.8 µg/L. McIntyre Creek: Salinity: 23.6 – 25.8 psu; CDOM: 10.0 – 18.5 qsde; Dissolved oxygen: 2.6 – 8.2 mg/L; Chlorophyll: 2.4 – 12.8 µg/L. Dissolved oxygen dropped below 3 mg/L three times over the last week at McIntyre Creek and Tarpon Bay.

Red Tide: On 7/29/16 FWC reported Karenia brevis, the Florida red tide organism, only in background concentrations in samples collected from Charlotte County.

Shellfish Harvesting Harmful Algal Bloom Closure: On 7/28/16 The Florida Department of Agriculture and Consumer Services closed Pine Island Sound Shellfish Harvest Area #6212 in Lee County for the harvest of oysters, clams, and mussels due to presence of Pyrodinium bahamense. The closure does not include scallops, shrimp, or crabs.

<table>
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<tr>
<th>Caloosahatchee Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>CDOM (qsde)</th>
<th>Turbidity (NTU)</th>
<th>25% Iz depth (meters)</th>
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<tbody>
<tr>
<td>Target Values</td>
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<td>CE &lt; 70</td>
<td>CE &lt; 18 SCB &lt; 1</td>
<td>CE = 1 m SCB = 2.2m</td>
</tr>
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<td>Iona</td>
<td>5.7</td>
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<td>0.81</td>
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<tr>
<td>Causeway</td>
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<td>98.6</td>
<td>3.2</td>
<td>1.03</td>
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<td>Sanibel E</td>
<td>7.0</td>
<td>51.8</td>
<td>3.6</td>
<td>1.78</td>
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</table>

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

Definition of 25% Iz: $z = \frac{I}{I_0}$ where $I$ is 25% of surface $I$. $I = \text{irradiance}, z = \text{depth}$

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<td>7 Day Avg</td>
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**Oysters:** July oyster sampling in the Caloosahatchee by FGCU reported disease prevalence of *Perkinsus marinus* for all oysters sampled ranged from 40.00% to 64.29%. Disease intensity of *P. marinus* ranged from 0.40 to 0.64. Scale 0 = no infection, 1 = low, 3 = medium, 5 = high. Larval recruitment ranged from 0.00 to 28.5 spat per shell.
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
- Paul Tritaik - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex
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- Connie Jarvis & Harry Phillips – City of Cape Coral
- Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: August 10 - 16, 2016

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:** Discharges into the estuary at S-79 during the past week averaged 3,376 cfs, still exceeding the harm threshold of 2,800 cfs established for the estuary. Lake Okeechobee discharges to the river, measured at S-77, decreased to a weekly average of 350 cfs (10%). Watershed inflows to the Franklin pool between S-78 and S-79 averaged 2,578 cfs. Sampling detected sparse blue green algae at the Alva boat ramp, upstream of the WP Franklin Lock.

**USACE Action:** On August 12, 2016 the USACE continued Lake Okeechobee pulse releases with a target of 2,800 cfs to the Caloosahatchee through S-79 and 650 cfs to the St. Lucie measured at S-80.

**Recommendation:** We request flows to the Caloosahatchee Estuary at S-79 be maintained at or below the harm threshold of 2,800 cfs and all emergency storage capacity be maximized throughout the system reduce flows and harm to the Caloosahatchee estuary caused by high volume and long duration discharges at S-79.

| Lake Okeechobee Level: | 14.76 ft. (Low Sub-Band) | Last week: 14.63 ft. |
| Lake Okeechobee Inflow: | 2,620 cfs | Lake Okeechobee Outflow: 1,170 cfs |
| Weekly Rainfall: | WP Franklin 1.17” | Ortona 1.92” | Moore Haven 2.26” |
| Salinity Beautiful Island: | 0.2 – 0.2 psu (SCCF RECON Marker 18) | Previous wk 0.2 – 0.2 psu |
| Salinity Fort Myers: | 0.2 – 0.2 psu (SCCF Yacht Basin) | Previous wk 0.2 – 0.2 psu |
| Salinity Shell Point: | 5.0 – 28 psu (SCCF RECON) | Previous wk 7.6 – 29 psu |

**Salinity (psu)**

<table>
<thead>
<tr>
<th>Location</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
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</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.2 – 0.2</td>
<td>&lt; 5 psu</td>
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</tr>
<tr>
<td>Fort Myers</td>
<td>0.2 – 0.2</td>
<td>&lt;10 psu</td>
<td>-</td>
</tr>
<tr>
<td>Shell Point</td>
<td>5.0 - 28</td>
<td>25 - 32 psu</td>
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</table>

**Light (25% Iz depth meters)**

<table>
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<tr>
<th>Location</th>
<th>Value</th>
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<th>Status</th>
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<tbody>
<tr>
<td>Iona</td>
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<tr>
<td>Causeway</td>
<td>1.17</td>
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</tr>
<tr>
<td>Sanibel East</td>
<td>1.44</td>
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</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 3,376 cfs. Cyanobacteria presence was reduced upstream of the Franklin Lock the past week. Over the past 14 days 38% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 40% was delivered to the St Lucie at S-308, 7% was delivered south to the EAA for irrigation demand, 15% was directed to the L8. S-310 backflowed 1,157 acre feet into Lake O.

<table>
<thead>
<tr>
<th>Date</th>
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<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<td>3275</td>
<td>1073</td>
<td>817</td>
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Upstream of S-79/Franklin Conditions: On 8/11/16 Lee County Environmental Lab found sparse levels of *Microcystis* cyanobacteria in the Caloosahatchee at the Alva Boat Ramp. On 8/16/16 the Olga Water Treatment plant chlorides measured 42 mg/L, apparent color was 230 CU and turbidity measured 2.3 NTU. Slight traces of algae were present at the plant intake some of last week. The plant is online at 2000 GPM.

Upper Estuary Conditions: On 8/11/16 Lee County Environmental Lab found no cyanobacteria at sample sites. Salinities in the upper estuary are in the suitable range for tape grass.

Lower Estuary Condition: Average salinity (4.7 psu) was sub-optimal for oysters and seagrass at Peppertree Pointe Marina in Iona. The average salinity at Shell Point (18 psu) was in the optimal range for oysters.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Salinities were below the preferred range for shoal grass and turtle grass (30 to 40 psu) in McIntyre Creek for 63 days (sensor down 8/6-8/11) and in Tarpon Bay, 64 of the past 68 days.

Tarpon Bay Salinity: 21.7 – 28.7 psu; CDOM: 25.5 – 39.5 qsde; Dissolved oxygen: 4.3 – 8.9 mg/L; Chlorophyll: 3.5 – 19.0 µg/L. McIntyre Creek: Salinity: 22.6 – 25.8 psu; CDOM: 12.0 – 30.0 qsde; Dissolved oxygen: 3.7 – 10.4 mg/L; Chlorophyll: 6.2 – 15.0 µg/L. Dissolved oxygen did not drop below 3 mg/L last week at either McIntyre Creek or Tarpon Bay.

Red Tide: On 8/12/16 FWC reported Karenia brevis, the Florida red tide organism, in very low concentrations in Charlotte County and background concentrations in samples collected from Manatee and Pinellas Counties.

Shellfish Harvesting Harmful Algal Bloom Closure: On 8/10/16 The Florida Department of Agriculture and Consumer Services closed Area #6222 Pine Island Sound East in Matlacha Pass for the harvest of oysters, clams, and mussels. The closure, triggered by heavy rainfall, does not include scallops, shrimp, or crabs.
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
  Paul Tritaik - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex
  James Evans & Holly Milbrandt - City of Sanibel
  Keith Kibbey & Lesli Haynes - Lee County
  Rae Blake – Town of Fort Myers Beach
  Connie Jarvis & Harry Phillips – City of Cape Coral
  Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: August 17 - 23, 2016

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: Discharges into the estuary at S-79 during the past week averaged 2,952 cfs, still exceeding the harm threshold of 2,800 cfs established for the estuary. Lake Okeechobee discharges to the river, measured at S-77, averaged 545 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 averaged 1,772 cfs.

USACE Action: On August 19, 2016 the USACE continued Lake Okeechobee pulse releases with a target of 2,800 cfs to the Caloosahatchee through S-79 and 650 cfs to the St. Lucie measured at S-80.

Recommendation: We request flows to the Caloosahatchee Estuary at S-79 be maintained between the harm thresholds of 2,800 cfs and 650 cfs.

<table>
<thead>
<tr>
<th>Lake Okeechobee Level:</th>
<th>14.70 ft. (Low Sub-Band)</th>
<th>Last week: 14.76 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Okeechobee Inflow:</td>
<td>1,808 cfs</td>
<td>Lake Okeechobee Outflow: 2,962 cfs</td>
</tr>
<tr>
<td>Weekly Rainfall:</td>
<td>WP Franklin 0.25”</td>
<td>Ortona 1.32”</td>
</tr>
<tr>
<td>Salinity Beautiful Island:</td>
<td>0.2 – 0.2 psu (SCCF RECON Marker 18)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
</tr>
<tr>
<td>Salinity Fort Myers:</td>
<td>0.2 – 0.2 psu (SCCF Yacht Basin)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
</tr>
<tr>
<td>Salinity Shell Point:</td>
<td>7.4 – 29 psu (SCCF RECON)</td>
<td>Previous wk 5.0 – 28 psu</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.2 – 0.2</td>
<td>&lt; 5 psu</td>
<td>-</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.2 – 0.2</td>
<td>&lt;10 psu</td>
<td>-</td>
</tr>
<tr>
<td>Shell Point</td>
<td>7.4 – 29</td>
<td>25 - 32 psu</td>
<td>Low</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Iona</td>
<td>0.80</td>
<td>1 meter</td>
</tr>
<tr>
<td>Causeway</td>
<td>1.22</td>
<td>2.2 meters</td>
</tr>
<tr>
<td>Sanibel East</td>
<td>1.39</td>
<td>2.2 meters</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 2,952 cfs. Cyanobacteria was not present upstream of the Franklin Lock the past week. Over the past 14 days 39% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 47% was delivered to the St Lucie at S-308, 3% was delivered south to the EAA for irrigation demand, 11% was directed to the L8. S-310 backflowed 1,308 acre feet into Lake O.

Upstream of S-79/Franklin Conditions: On 8/23/16 the Olga Water Treatment plant chlorides measured 43 mg/L, apparent color was 223 CU and turbidity measured 2.47 NTU. Slight traces of algae were present at the plant intake for a few days last week. The plant is online at 2000 GPM.

Upper Estuary Conditions: On 8/18/16 Lee County Environmental Lab found no cyanobacteria at their upper estuary sample sites. Salinities are in the suitable range for tape grass and have begun increasing slightly at the Fort Myers RECON.

Lower Estuary Condition: Average salinity (5.5 psu) was sub-optimal for oysters and seagrass at Peppertree Pointe Marina in Iona. The average salinity at Shell Point (20 psu) was in the optimal range for oysters.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Salinities were below the preferred range for shoal grass and turtle grass (30 to 40 psu) in McIntyre Creek for 70 days (sensor down 8/6-8/11) and in Tarpon Bay, 69 of the past 75 days.

Tarpon Bay Salinity: 23.7 – 31.1 psu; CDOM: 15.0 – 36.0 qsde; Dissolved oxygen: 4.7 – 8.8 mg/L; Chlorophyll: 3.5– 10.5 µg/L.  McIntyre Creek: Salinity: 23.7 – 26.2 psu; CDOM: 21.2 – 28.8 qsde; Dissolved oxygen: 2.3 – 8.3 mg/L; Chlorophyll: 3.7 – 9.5 µg/L. Dissolved oxygen dropped below 3 mg/L last week six times at McIntyre Creek.

Red Tide: On 8/19/16 FWC reported finding no Karenia brevis, the Florida red tide organism, in their Lee County samples.

**Shellfish Harvesting Harmful Algal Bloom Closure:** On 8/10/16 The Florida Department of Agriculture and Consumer Services closed Area #6222 Pine Island Sound East in Matlacha Pass for the harvest of oysters, clams, and mussels. The closure, triggered by heavy rainfall, does not include shrimp, or crabs.
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
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   Rae Blake – Town of Fort Myers Beach
   Connie Jarvis & Harry Phillips – City of Cape Coral
   Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: August 24 - 30, 2016

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:** Discharges into the estuary at S-79 during the past week averaged **2,110 cfs**. Lake Okeechobee discharges to the river, measured at S-77, averaged **659 cfs**. Watershed inflows to the Franklin pool between S-78 and S-79 averaged **998 cfs**.

**USACE Action:** On August 25, 2016, despite the LORS 2008 guidance (releases of up to 450 cfs at S-79 and up to 200 cfs at S-80) but due to the uncertainty of the potential impact of Tropical Storm 9, the USACE, employing operational flexibility, continued Lake Okeechobee pulse releases with a target of **2,800 cfs** to the Caloosahatchee through S-79 and **650 cfs** to the St. Lucie measured at S-80.

**Recommendation:** We request flows to the Caloosahatchee Estuary at S-79 be maintained at or below 2,800 cfs harm threshold.

<table>
<thead>
<tr>
<th>Lake Okeechobee Level</th>
<th>14.73 ft. (Low Sub-Band)</th>
<th>Last week: 14.70 ft.</th>
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</thead>
<tbody>
<tr>
<td>Lake Okeechobee Inflow</td>
<td>3,010 cfs</td>
<td>Lake Okeechobee Outflow: 1,130 cfs</td>
</tr>
<tr>
<td>Weekly Rainfall:</td>
<td>WP Franklin 0.95&quot;</td>
<td>Ortona 1.15&quot;</td>
</tr>
<tr>
<td>Salinity Beautiful Island:</td>
<td>0.2 – 0.2 psu (SCCF RECON Marker 18)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
</tr>
<tr>
<td>Salinity Fort Myers:</td>
<td>0.2 – 1.4 psu (SCCF Yacht Basin)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
</tr>
<tr>
<td>Salinity Shell Point:</td>
<td>8.9 – 30 psu (SCCF RECON)</td>
<td>Previous wk 7.4 – 29 psu</td>
</tr>
</tbody>
</table>

**Salinity (psu)**

<table>
<thead>
<tr>
<th>Location</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.2 – 0.2</td>
<td>&lt; 5 psu</td>
<td>-</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.2 – 1.4</td>
<td>&lt;10 psu</td>
<td>-</td>
</tr>
<tr>
<td>Shell Point</td>
<td>8.9 – 30</td>
<td>25 - 32 psu</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Light (25% Iz depth meters)**

<table>
<thead>
<tr>
<th>Location</th>
<th>Value</th>
<th>Depth</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iona</td>
<td>0.80</td>
<td>1 meter</td>
<td>Low</td>
</tr>
<tr>
<td>Causeway</td>
<td>1.64</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
<tr>
<td>Sanibel East</td>
<td>1.33</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 2,110 cfs. Cyanobacteria was not present upstream of the Franklin Lock the past week. Over the past 14 days 44% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 34% was delivered to the St Lucie at S-308, 15% was delivered south to the EAA for irrigation demand, 7% was directed to the L8. S-310 backflowed 8 acre feet into Lake O.

### ACOE August 12 Release at S-79

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/19/2016</td>
<td>1</td>
<td>3300</td>
<td>2824</td>
<td>925</td>
<td>252</td>
</tr>
<tr>
<td>8/20/2016</td>
<td>2</td>
<td>4100</td>
<td>3668</td>
<td>2042</td>
<td>1680</td>
</tr>
<tr>
<td>8/21/2016</td>
<td>3</td>
<td>3600</td>
<td>4004</td>
<td>2214</td>
<td>1964</td>
</tr>
<tr>
<td>8/22/2016</td>
<td>4</td>
<td>2700</td>
<td>3170</td>
<td>1539</td>
<td>1465</td>
</tr>
<tr>
<td>8/23/2016</td>
<td>5</td>
<td>2500</td>
<td>2487</td>
<td>1296</td>
<td>955</td>
</tr>
<tr>
<td>8/24/2016</td>
<td>6</td>
<td>2200</td>
<td>2376</td>
<td>1294</td>
<td>954</td>
</tr>
<tr>
<td>8/25/2016</td>
<td>7</td>
<td>1200</td>
<td>2061</td>
<td>1282</td>
<td>795</td>
</tr>
<tr>
<td>7 day avg</td>
<td></td>
<td>2800</td>
<td>2941</td>
<td>1346</td>
<td>1152</td>
</tr>
</tbody>
</table>

Upstream of S-79/Franklin Conditions: On 8/30/16 the Olga Water Treatment plant chlorides measured 47 mg/L, apparent color was 218 CU and turbidity measured 2.87 NTU. Very slight traces of algae along the edges of the plant intake 8/29/16 only. The plant is online at 2000 GPM.

Upper Estuary Conditions: On 8/26/16 Lee County Environmental Lab found no cyanobacteria at their upper estuary sample sites. Salinities are in the suitable range for tape grass and have begun increasing slightly at the Fort Myers Yacht Basin.

Lower Estuary Condition: Average salinity (7.2 psu) was sub-optimal for oysters and seagrass at Peppertree Pointe Marina in Iona. The average salinity at Shell Point (21 psu) was in the optimal range for oysters.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Salinities were below the preferred range for shoal grass and turtle grass (30 to 40 psu) in McIntyre Creek for 77 days (sensor down 8/6-8/11) and in Tarpon Bay, 74 of the past 82 days.

Tarpon Bay Salinity: 24.0 – 33.4 psu; CDOM: 9.0 – 34.5 qsde; Dissolved oxygen: 4.6 – 8.4 mg/L; Chlorophyll: 3.2 – 8.4 µg/L. McIntyre Creek: Salinity: 22.7 – 27.9 psu; CDOM: 17.5 – 24.9 qsde; Dissolved oxygen: 2.6 – 8.6 mg/L; Chlorophyll: 3.4 – 8.6 µg/L. Dissolved oxygen dropped below 3 mg/L last week one time at McIntyre Creek.

Red Tide: On 8/26/16 FWC reported finding no Karenia brevis, the Florida red tide organism, in their Lee County samples.

Shellfish Harvesting Harmful Algal Bloom Closure: On 8/10/16 The Florida Department of Agriculture and Consumer Services closed Area #6222 Pine Island Sound East in Matlacha Pass for the harvest of oysters, clams, and mussels. The closure, triggered by heavy rainfall, does not include shrimp, or crabs.

### Caloosahatchee Stations Chlorophyll (µg/L) CDOM (qsde) Turbidity (NTU) 25% to depth (meters) Target Values

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Target</td>
<td>11</td>
<td>CE &lt;70</td>
<td>CE &lt;18</td>
<td>CE = 1 m</td>
</tr>
<tr>
<td>Iona</td>
<td>5.2</td>
<td>209</td>
<td>0.3</td>
<td>0.80</td>
</tr>
<tr>
<td>Causeway</td>
<td>1.8</td>
<td>29.5</td>
<td>4.2</td>
<td>1.64</td>
</tr>
<tr>
<td>Sanibel E</td>
<td>13.4</td>
<td>11.5</td>
<td>7.3</td>
<td>1.33</td>
</tr>
</tbody>
</table>

Target light penetration: CE- Caloosahatchee Estuary = 1 m  
SCB- San Carlos Bay = 2.2 meters  
Definition of 25% I_z: z where I is 25% of surface I.  
I = irradiance, z = depth
MEMORANDUM
To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Governing Board, Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson
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Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: August 31 - September 6, 2016

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:** Discharges into the estuary at S-79 during the past week increased to an average of 3,622 cfs, still exceeding the harm threshold of 2,800 cfs established for the estuary. Lake Okeechobee discharges to the river, measured at S-77, averaged 547 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 increased to an average of 2,410 cfs.

**USACE Action:** On September 1, 2016 the USACE continued Lake Okeechobee pulse releases with a target of 2,800 cfs to the Caloosahatchee through S-79 and 650 cfs to the St. Lucie measured at S-80.

**Recommendation:** We request flows to the Caloosahatchee Estuary at S-79 be maintained at or below the 2,800 cfs high flow harm threshold.

<table>
<thead>
<tr>
<th>Lake Okeechobee Level: 15.03 ft. (Low Sub-Band)</th>
<th>Last week: 14.73 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Okeechobee Inflow: 9,919 cfs</td>
<td>Lake Okeechobee Outflow: 1,379 cfs</td>
</tr>
<tr>
<td>Weekly Rainfall: WP Franklin 5.94” Ortona 1.92”</td>
<td>Moore Haven 1.60”</td>
</tr>
<tr>
<td>Salinity Beautiful Island: 0.2 – 0.2 psu (SCCF RECON Marker 18)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
</tr>
<tr>
<td>Salinity Fort Myers: 0.2 – 2.5 psu (SCCF Yacht Basin)</td>
<td>Previous wk 0.2 – 1.4 psu</td>
</tr>
<tr>
<td>Salinity Shell Point: 7.5 – 33 psu (SCCF RECON)</td>
<td>Previous wk 8.9 – 30 psu</td>
</tr>
</tbody>
</table>

![Salinity Map]

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.2 – 0.2</td>
<td>&lt; 5 psu</td>
<td>-</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.2 – 2.5</td>
<td>&lt; 10 psu</td>
<td>-</td>
</tr>
<tr>
<td>Shell Point</td>
<td>7.5 – 33</td>
<td>25 - 32 psu</td>
<td>Low</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Iona</td>
<td>0.74</td>
</tr>
<tr>
<td>Causeway</td>
<td>1.12</td>
</tr>
<tr>
<td>Sanibel East</td>
<td>1.32</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 3,622 cfs. Cyanobacteria was not detected in samples by Lee County Environmental Lab the past week. Over the past 14 days 47% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 28% was delivered to the St Lucie at S-308, 23% was delivered south to the EAA, 2% was directed to the L8. S-310 backflowed 374 acre feet into Lake O.

**ACOE August 26 Release at S-79**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/26/2016</td>
<td>1</td>
<td>3300</td>
<td>2307</td>
<td>1266</td>
<td>614</td>
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<tr>
<td>8/27/2016</td>
<td>2</td>
<td>4100</td>
<td>1932</td>
<td>882</td>
<td>478</td>
</tr>
<tr>
<td>8/28/2016</td>
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<td>3600</td>
<td>1658</td>
<td>743</td>
<td>344</td>
</tr>
<tr>
<td>8/29/2016</td>
<td>4</td>
<td>2700</td>
<td>1954</td>
<td>1027</td>
<td>477</td>
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<tr>
<td>8/30/2016</td>
<td>5</td>
<td>2500</td>
<td>2956</td>
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<td>886</td>
</tr>
<tr>
<td>8/31/2016</td>
<td>6</td>
<td>2200</td>
<td>2607</td>
<td>1173</td>
<td>880</td>
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<tr>
<td>9/1/2016</td>
<td>7</td>
<td>1200</td>
<td>3599</td>
<td>1435</td>
<td>417</td>
</tr>
<tr>
<td>7 day avg</td>
<td></td>
<td>2800</td>
<td>2388</td>
<td>1058</td>
<td>585</td>
</tr>
</tbody>
</table>

**Surface Salinity at Iona Oyster Reef**

**Upstream of S-79/Franklin Conditions:** On 9/6/16 the Olga Water Treatment plant chlorides measured 40 mg/L, apparent color was 208 CU and turbidity measured 2.88 NTU. No visible algae was noted at the plant intake for the last week. The plant is online at 2000 GPM.

**Upper Estuary Conditions:** On 9/1/16 Lee County Environmental Lab found no cyanobacteria at their upper estuary sample sites. Salinities are in the suitable range for tape grass.

**Lower Estuary Condition:** Average salinity (5.0 psu) was sub-optimal for oysters and seagrass at Peppertree Pointe Marina in Iona. The average salinity at Shell Point (17 psu) was in the optimal range for oysters.

**McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR:** Salinities were below the preferred range for shoal grass and turtle grass (30 to 40 psu) in McIntyre Creek for 72 of the past 77 days (sensor down 8/6-8/11) and in Tarpon Bay, 71 of the past 82 days.

**Tarpon Bay Salinity:** 24.2 – 34.0 psu; CDOM: 7.5 – 36.0 qsde; Dissolved oxygen: 4.4 – 8.8 mg/L; Chlorophyll: 3.5 – 10.1 µg/L.

**McIntyre Creek Salinity:** 25.9 – 33.4 psu; CDOM: 7.0 – 20.5 qsde; Dissolved oxygen: 1.7 – 9.4 mg/L; Chlorophyll: 2.2 – 7.1 µg/L. Dissolved oxygen dropped below 3 mg/L last week **five times** at McIntyre Creek.

**Coastal Conditions:** Significant volumes of floating seagrasses were observed in Pine Island Sound, Matlacha Pass and the bay side of Sanibel. Fort Myers Beach wrack line has accumulations of drift algae, pen shells, Florida fighting conch, clams, sea urchins and nine armed starfish.

**Red Tide:** On 9/21 FWC reported *Karenia brevis*, the Florida red tide organism, in background concentrations in samples collected offshore of Lee County over the past week. Additional samples collected throughout Florida did not contain *K. brevis*.

**Shellfish Harvesting Harmful Algal Bloom Closure:** On 9/1/16 The Florida Department of Agriculture and Consumer Services closed Area #6212 Pine Island Sound West for the harvest of oysters, clams, and mussels. The closure, triggered by heavy rainfall, does not include shrimp, or crabs. **Wild oyster harvest season is closed for the months of July-September from Pinellas to Collier counties.**

**ACOE Daily Reports**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<tr>
<td>7 Day Avg</td>
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**Caloosahatchee Estuary Chlorophyll (µg/L) CDOM (qse) Turbidity (NTU) 25% Iz to depth (meters)**

<table>
<thead>
<tr>
<th>Target Values</th>
<th>CE &lt;70 SCB &lt;11</th>
<th>CE &lt;18 SCB &lt;5</th>
<th>CE = 1 m SCB = 2.2m</th>
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</thead>
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<tr>
<td>Iona</td>
<td>12.3</td>
<td>198</td>
<td>2.6</td>
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<tr>
<td>Causeway</td>
<td>8.0</td>
<td>87.0</td>
<td>3.9</td>
</tr>
<tr>
<td>Sanibel E</td>
<td>5.9</td>
<td>26.1</td>
<td>7.2</td>
</tr>
</tbody>
</table>

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

**Definition of 25% Iz:** I = irradiance, z = depth
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Governing Board, Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
    Paul Trites - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex
    James Evans & Holly Milbrandt - City of Sanibel
    Keith Kibbey & Lesli Haynes - Lee County
    Rae Blake – Town of Fort Myers Beach
    Connie Jarvis & Harry Phillips – City of Cape Coral
    Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: September 7 - 13, 2016

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:** Discharges into the estuary at S-79 during the past week increased to an average of 4,597 cfs, still exceeding the harm threshold of 2,800 cfs established for the estuary. Lake Okeechobee discharges to the river, measured at S-77, decreased to an average of 532 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 increased to an average of 3,006 cfs, which accounts for 65% of the flows through S79.

**USACE Action:** On September 9, 2016 the USACE continued Lake Okeechobee pulse releases with a target of 2,800 cfs to the Caloosahatchee through S-79 and 650 cfs to the St. Lucie measured at S-80.

**Recommendation:** We request flows to the Caloosahatchee Estuary at S-79 be maintained at or below the 2,800 cfs high flow harm threshold.

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<th>Lake Okeechobee Level:</th>
<th>15.25 ft. (Low Sub-Band)</th>
<th>Last week: 15.03 ft.</th>
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<tr>
<td>Lake Okeechobee Inflow:</td>
<td>7,955 cfs</td>
<td>Lake Okeechobee Outflow: 1,321 cfs</td>
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<td>Weekly Rainfall:</td>
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<td></td>
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<tr>
<td></td>
<td>WP Franklin 0.50”</td>
<td>Ortona 1.33”</td>
</tr>
<tr>
<td></td>
<td>Moore Haven 0.12”</td>
<td></td>
</tr>
<tr>
<td>Salinity Beautiful Island:</td>
<td>0.2 – 0.2 psu (SCCF RECON Marker 18)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
</tr>
<tr>
<td>Salinity Fort Myers:</td>
<td>0.2 – 0.2 psu (SCCF Yacht Basin)</td>
<td>Previous wk 0.2 – 2.5 psu</td>
</tr>
<tr>
<td>Salinity Shell Point:</td>
<td>3.7 – 28 psu (SCCF RECON)</td>
<td>Previous wk 7.5 – 33 psu</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.2 – 0.2</td>
<td>&lt; 5 psu</td>
<td>-</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.2 – 0.2</td>
<td>&lt;10 psu</td>
<td>-</td>
</tr>
<tr>
<td>Shell Point</td>
<td>3.7 – 28</td>
<td>25 - 32 psu</td>
<td>Low</td>
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</table>

<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
<th>Iona</th>
<th>Causeway</th>
<th>Sanibel East</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.73</td>
<td>1.45</td>
<td>1.54</td>
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</table>

Low
**Flow & Water Quality:** Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 4,597 cfs. Cyanobacteria was not detected in samples by Lee County Environmental Lab the past week. Over the past 14 days 38% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 39% was delivered to the St Lucie at S-308, 14% was delivered south to the EAA, 9% was directed to the L8. S-310 backflowed 1469 acre feet into Lake O.

**Upstream of S-79/Franklin Conditions:** On 9/6/16 the Olga Water Treatment plant chlorides measured 45 mg/L, apparent color was 198 CU and turbidity measured 1.50 NTU. No visible algae was noted at the plant intake for the last week. The plant is online at 2000 GPM.

**Upper Estuary Conditions:** Salinities are in the suitable range for tape grass.

**Lower Estuary Condition:** Average salinity (3.3 psu) was sub-optimal for oysters and seagrass at Peppertree Pointe Marina in Iona where cyanobacteria and chlorophyll concentrations were elevated. The average salinity at Shell Point (16 psu) was in the optimal range for oysters.

**McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR:** Salinities were below the preferred range for shoal grass and turtle grass (30 to 40 psu) in McIntyre Creek for 79 of the past 84 days and in Tarpon Bay, 78 of the past 89 days.

**Tarpon Bay Salinity:** 19.6 – 29.0 psu; FDOM: 20.5 – 45.5 qse; Dissolved oxygen: 3.2 – 8.3 mg/L; Chlorophyll: 2.5–34.0 µg/L. **McIntyre Creek:** Salinity: 19.6 – 26.4 psu; FDOM: 19.5 – 32.0 qse; Dissolved oxygen: 3.2 – 10.6 mg/L; Chlorophyll: 3.5 – 8.0 µg/L. Dissolved oxygen did not drop below 3 mg/L last week at either McIntyre Creek or Tarpon Bay.

**Coastal Conditions:** A plume of dark water from the Caloosahatchee extends to the Sanibel Lighthouse and throughout Pine Island Sound. On Fort Myers Beach water clarity has been reduced.

**Red Tide:** On 9/9/16 FWC reported Karenia brevis, the Florida red tide organism, in background concentrations in samples collected offshore Charlotte and Lee County over the past week.

**Shellfish Harvesting Harmful Algal Bloom Closure:** On 9/9/16 The Florida Department of Agriculture and Consumer Services Reopened Area #6212 Pine Island Sound West for the harvest of oysters, clams, and mussels. Wild oyster harvest season is closed for the months of July-September from Pinellas to Collier counties.

**ACOE September 2 Release at S-79**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<tr>
<td>9/2/2016</td>
<td>1</td>
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<td>1314</td>
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<td>2</td>
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<td>4405</td>
<td>1202</td>
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</tr>
<tr>
<td>9/4/2016</td>
<td>3</td>
<td>3600</td>
<td>4088</td>
<td>1303</td>
<td>709</td>
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<tr>
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<td>9/6/2016</td>
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**Surface Salinity at Iona Oyster Reef**

**ACOE Daily Reports**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<tbody>
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<td>9/6/2016</td>
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<tr>
<td>9/8/2016</td>
<td>Thur</td>
<td>5761</td>
<td>2101</td>
<td>158</td>
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<td>1506</td>
<td>825</td>
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<tr>
<td>9/10/2016</td>
<td>Sat</td>
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<td>1256</td>
<td>604</td>
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<tr>
<td>9/11/2016</td>
<td>Sun</td>
<td>3844</td>
<td>1224</td>
<td>557</td>
</tr>
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<td>9/12/2016</td>
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<tr>
<td>7 Day Avg</td>
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<td>4597</td>
<td>1591</td>
<td>432</td>
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</table>

**Defination of 25% Iz:** CE- Caloosahatchee Estuary = 1 m  
SCB- San Carlos Bay = 2.2 meters
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Governing Board, Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: September 13 - 19, 2016

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: Discharges into the estuary at S-79 during the past week averaged 4,491 cfs, still exceeding the harm threshold of 2,800 cfs established for the estuary. Lake Okeechobee discharges to the river, measured at S-77, increased over three times to an average of 1,742 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 the past week averaged 2,108 cfs.

USACE Action: On September 16, 2016 the USACE increased releases from Lake Okeechobee with a constant release of 2,800 cfs to the Caloosahatchee measured at S-77 and pulse release of 1170 cfs to the St. Lucie measured at S-80.

Recommendation: We request flows to the Caloosahatchee Estuary at S-79 be maintained at or below the 2,800 cfs high flow harm threshold.

Lake Okeechobee Level: 15.50 ft. (Low Sub-Band) Last week: 15.25 ft.

Lake Okeechobee Inflow: 9,357 cfs Lake Okeechobee Outflow: 4,568 cfs

Weekly Rainfall: WP Franklin 0.60” Ortona 2.22” Moore Haven 2.68”

Salinity Beautiful Island: 0.2 – 0.2 psu (SCCF RECON Marker 18) Previous wk 0.2 – 0.2 psu

Salinity Fort Myers: 0.2 – 0.2 psu (SCCF Yacht Basin) Previous wk 0.2 – 2.5 psu

Salinity Shell Point: 7.0 – 28 psu (SCCF RECON) Previous wk 3.7 – 28 psu

Salinity (psu)

<table>
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<tr>
<th></th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
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<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.2 – 0.2</td>
<td>&lt; 5 psu</td>
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<tr>
<td>Fort Myers</td>
<td>0.2 – 0.2</td>
<td>&lt;10 psu</td>
<td>-</td>
</tr>
<tr>
<td>Shell Point</td>
<td>7.5 – 33</td>
<td>25 - 32 psu</td>
<td>Low</td>
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Light (25% Iz depth meters)

<table>
<thead>
<tr>
<th></th>
<th>Current Value</th>
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<th>Condition</th>
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<tr>
<td>Causeway</td>
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<tr>
<td>Sanibel East</td>
<td>1.24</td>
<td>2.2 meters</td>
<td>Low</td>
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</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 4,491 cfs. Cyanobacteria was not detected in samples by Lee County Environmental Lab the past week. Over the past 14 days 64% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 24% was delivered to the St Lucie at S-308, 4% was delivered south to the EAA, 8% was directed to the L8. S-310 back flowed 1,384 acre feet into Lake O.

**ACOE September 9 Release at S-79**

<table>
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<th>Date</th>
<th>Day</th>
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<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<tr>
<td>9/9/2016</td>
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<td>3300</td>
<td>4028</td>
<td>1506</td>
<td>825</td>
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<td>9/10/2016</td>
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<td>1256</td>
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</table>

**Surface Salinity at Iona Oyster Reef**

**Upstream of S-79/Franklin Conditions:** On 9/20/16 the Olga Water Treatment plant chlorides measured 46 mg/L, apparent color was 181 CU and turbidity measured 2.25 NTU. No visible algae was noted at the plant intake for the last week. The plant is online at 2000 GPM.

**Upper Estuary Conditions:** Salinities are in the suitable range for tape grass.

**Lower Estuary Condition:** Average salinity (3.7 psu) was sub-optimal for oysters, pink shrimp and seagrass. Chlorophyll and phycoerythrin were elevated at Peppertree Pointe Marina in Iona. The average salinity at Shell Point (17 psu) was in the optimal range for oysters.

**McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR:** Salinities were below the preferred range for shoal grass and turtle grass (30 to 40 psu) in McIntyre Creek for 79 of the past 84 days (sensor down 8/6-8/11) and in Tarpon Bay, 77 of the past 89 days. Tarpon Bay Salinity: 23.0 – 30.3 psu; FDOM: 12.0 – 36.0 qsde; Dissolved oxygen: 4.1 – 8.2 mg/L; Chlorophyll: 2.5-22.9 µg/L. McIntyre Creek: Salinity: 22.4 – 26.1 psu; FDOM: 20.4 – 27.5 qsde; Dissolved oxygen: 1.4 – 6.9 mg/L; Chlorophyll: 2.7 – 7.2 µg/L. Dissolved oxygen dropped below 3 mg/L last week seven times at McIntyre Creek. Working with SCCF, the refuge installed a new water quality monitoring station at Wulfert Flats on September 28th, which is now operational.

**Coastal Conditions:** A plume of dark water from the Caloosahatchee extends to the Sanibel lighthouse and throughout Pine Island Sound, Matlacha Pass and the bay side of Sanibel.

**Red Tide:** On 9/16/16 FWC reported Karenia brevis, the Florida red tide organism, in background concentrations in samples collected offshore of Lee County over the past week. Samples from Pinellas, Manatee and Sarasota County also contained K. brevis.

**Oysters:** September sampling in the Caloosahatchee by FGCU reported disease prevalence of Perkinsus marinus of all oysters sampled ranged from 53.33% to 80.00%. Disease intensity of P. marinus ranged from 0.53 to 0.80. Scale 0 = no infection, 1 = low, 3 = medium, 5 = high. Larval recruitment ranged from 2.31 to 45.14 spat per shell.

**ACOE Daily Reports**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
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<td>98</td>
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<td>9/15/2016</td>
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<td>2383</td>
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**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 \( I \). \( I_0 \) = irradiance, \( z \) = depth
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Governing Board, Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: September 20 - 26, 2016

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:** Discharges into the estuary at S-79 increased during the past week averaged 5,247 cfs, still exceeding the harm threshold of 2,800 cfs established for the estuary. Lake Okeechobee discharges to the river, measured at S-77, increased more than two-fold to an average of 3,907 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 the past week averaged 1,563 cfs.

**USACE Action:** On September 23, 2016 the USACE increased releases from Lake Okeechobee to a constant release of 4,000 cfs to the Caloosahatchee and pulse release of 1,800 cfs to the St. Lucie measured at S-80.

**Recommendation:** The Caloosahatchee has suffered low salinities and algal blooms from harmful flows for the past 8 consecutive months. Dispersed water management projects capacity have been filled by rainfall and very little water has been directed south. We recognize the concern with current high lake O level, but caution against continued large lake discharges at the end of the rainy season with forecasts of drier conditions. We respectfully request that flows to the Caloosahatchee Estuary at S-79 be maintained at or below the 2,800 cfs high flow harm threshold.

Lake Okeechobee Level: 15.69 ft. (Low Sub-Band) Last week: 15.50 ft.
Lake Okeechobee Inflow: 8,259 cfs Lake Okeechobee Outflow: 5,429 cfs
Weekly Rainfall: WP Franklin 0.43” Ortona 2.35” Moore Haven 1.32”
Salinity Beautiful Island: 0.2 – 0.2 psu (SCCF RECON Marker 18) Previous wk 0.2 – 0.2 psu
Salinity Fort Myers: 0.2 – 0.2 psu (SCCF Yacht Basin) Previous wk 0.2 – 0.2 psu
Salinity Shell Point: 4.1 – 28 psu (SCCF RECON) Previous wk 7.0 – 28 psu

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.2 – 0.2</td>
<td>&lt; 5 psu</td>
<td>-</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.2 – 0.2</td>
<td>&lt;10 psu</td>
<td>-</td>
</tr>
<tr>
<td>Shell Point</td>
<td>4.1 – 28</td>
<td>25 - 32 psu</td>
<td>Low</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
<th>Iona</th>
<th>1 meter</th>
<th>Low</th>
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<tr>
<td>Causeway</td>
<td>1.44</td>
<td>2.2 meters</td>
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</tr>
<tr>
<td>Sanibel East</td>
<td>1.63</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
Caloosahatchee Estuary

Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 5,247 cfs. Cyanobacteria was detected above S79 by Lee County Environmental Lab the past week. Over the past 14 days 72% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 24% was delivered to the St Lucie at S-308, 1% was delivered south to the EAA, 2% was directed to the L8. S-310 back flowed 271 acre feet into Lake O.

<table>
<thead>
<tr>
<th>ACOE September 16 Release at S-77</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date</strong></td>
</tr>
<tr>
<td>9/16/2016</td>
</tr>
<tr>
<td>9/17/2016</td>
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<tr>
<td>9/20/2016</td>
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<tr>
<td>9/21/2016</td>
</tr>
<tr>
<td>9/22/2016</td>
</tr>
<tr>
<td>7 day avg</td>
</tr>
</tbody>
</table>

Upstream of S-79/Franklin Conditions: On 9/22/16 Lee County Environmental Lab observed a sparse bloom of Microcystis upstream of the Franklin Locks. On 9/20/16 the Olga Water Treatment plant chlorides measured 43 mg/L, apparent color was 196 CU and turbidity measured 2.40 NTU. No visible algae was noted at the plant intake for the last week. The plant is online at 2000 GPM.

Upper Estuary Conditions: Salinities are in the suitable range for tape grass.

Lower Estuary Condition: Average salinity (3.7 psu) was sub-optimal for oysters, pink shrimp and seagrass at Peppertree Pointe Marina in Iona. The average salinity at Shell Point (17 psu) was in the optimal range for oysters.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Salinities were below the preferred range for shoal grass and turtle grass (30 to 40 psu) in McIntyre Creek for 86 of the past 91 days and in Tarpon Bay, 84 of the past 96 days. fDOM exceeded 25 qsde (less than 25% light penetration at 2.2 meters) in each of 5 days in Tarpon Bay and 7 days in McIntyre Creek. Dissolved oxygen dropped below 4 mg/L (FL water quality standard) in each of 7 days in McIntyre Creek. Chlorophyll exceeded 11 µg/L (NMC) in each of 5 days in Tarpon Bay and 3 days in McIntyre Creek. Tarpon Bay Salinity: 22.0 – 28.5 psu; fDOM: 18.0 – 33.2 qsde; Dissolved oxygen: 4.0 – 8.8 mg/L; Chlorophyll: 5.2 – 14.0 µg/L. McIntyre Creek: Salinity: 22.0 – 25.3 psu; fDOM: 21.2 – 28.4 qsde; Dissolved oxygen: 1.9 – 7.6 mg/L; Chlorophyll: 3.6 – 12.4 µg/L.

Coastal Conditions: The dark colored, freshwater plume from the Caloosahatchee extends to the midpoint of Sanibel Island on the Gulf side and throughout Pine Island Sound, Matlacha Pass and the bay side of Sanibel. A Trichodesmium bloom was observed on 9/22/16 approximately 17 miles SW of Redfish Pass.

Red Tide: On 9/23/16 FWC reported Karenia brevis, the Florida red tide organism, in background to low concentrations in samples collected from offshore Lee County, background to very low off Charlotte, Collier and Pinellas Counties and high concentrations in Manatee and Sarasota Counties over the past week.

**Surface Salinity at Iona Oyster Reef**

**ACOE Daily Reports**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<td>4513</td>
<td>4481</td>
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<td>9/25/2016</td>
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<td>7 Day Avg</td>
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<td>5247</td>
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**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
A *Trichodesmium* bloom was observed on 9/22/16 approximately 17 miles SW of Redfish Pass in the Gulf of Mexico off Lee County.  

Photo Lee County
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Governing Board, Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
    Paul Tritaik - J.N. “Ding” Darling National Wildlife Refuge (NWR) Complex
    James Evans & Holly Milbrandt - City of Sanibel
    Keith Kibbey & Lesli Haynes - Lee County
    Rae Blake – Town of Fort Myers Beach
    Connie Jarvis & Harry Phillips – City of Cape Coral
    Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: September 27 - October 3, 2016

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: Discharges into the estuary at S-79 increased one and a half times over the past week to an average of 8,100 cfs, and has been exceeding the harm threshold of 2,800 cfs established for the estuary since the end of January. Lake Okeechobee discharges to the river, measured at S-77, averaged 3,648 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 during the past week increased to an average of 2,213 cfs.

USACE Action: On September 30, 2016 the USACE continued releases from Lake Okeechobee to a constant release of 4,000 cfs to the Caloosahatchee measured at S-77 and pulse release of 1,800 cfs to the St. Lucie measured at S-80.

Recommendation: The Caloosahatchee estuary is experiencing low salinities and algal blooms from harmful high discharges for the past 8 consecutive months. The dispersed water management projects capacity have been taken up by rainfall and very little water has been directed south. We recognize the concern with the current high lake O level and potential impacts from Hurricane Matthew, and request emergency action to increase flows to the south to help share some of the adversity that the estuaries have been experiencing for more than 8 months. We request that flows to the Caloosahatchee Estuary at S-79 be maintained at or below the 2,800 cfs high flow harm threshold.

Lake Okeechobee Level: 15.78 ft. (Low Sub-Band) Last week: 15.69 ft.
Lake Okeechobee Inflow: 8,522 cfs Lake Okeechobee Outflow: 6,343 cfs
Weekly Rainfall: WP Franklin NR Ortona 4.05" Moore Haven 3.92"
Salinity Beautiful Island: 0.2 – 0.2 psu (SCCF RECON Marker 18) Previous wk 0.2 – 0.2 psu
Salinity Fort Myers: 0.2 – 0.2 psu (SCCF Yacht Basin) Previous wk 0.2 – 0.2 psu
Salinity Shell Point: 1.4 – 28 psu (SCCF RECON) Previous wk 4.1 – 28 psu

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
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<td>-</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>0.2 – 0.2</td>
<td>&lt;10 psu</td>
<td>-</td>
</tr>
<tr>
<td>Shell Point</td>
<td>1.4 – 28</td>
<td>25 - 32 psu</td>
<td>Low</td>
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<table>
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<tr>
<th>Light (25% Iz depth meters)</th>
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</thead>
<tbody>
<tr>
<td>Iona</td>
<td>0.66</td>
<td>1 meter</td>
<td>Low</td>
</tr>
<tr>
<td>Causeway</td>
<td>0.86</td>
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<tr>
<td>Sanibel East</td>
<td>0.97</td>
<td>2.2 meters</td>
<td>Low</td>
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</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 8,100 cfs. Cyanobacteria was detected by Lee County Environmental Lab the past week. Over the past 14 days 61% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 36% was delivered to the St Lucie at S-308, <1% was delivered south to the EAA, 2% was directed to the L8. S-310 back flowed a net 189 acre feet into Lake O.

<table>
<thead>
<tr>
<th>ACOE September 23 Release at S-77</th>
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<tbody>
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<tr>
<td>9/29/2016</td>
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<tr>
<td>7 day avg</td>
</tr>
</tbody>
</table>

Upstream of S-79/Franklin Conditions: On 9/29/16 Lee County Environmental Lab observed a sparse bloom of *Dolichospermum, Microcystis* and *Aphanizomenon* at the Alva Boat Ramp. On 10/4/16 the Olga Water Treatment plant chlorides measured 42mg/L, apparent color was 214 CU and turbidity measured 3.19 NTU. No visible algae was noted at the plant intake for the last week. The plant is online at 2000 GPM.

Upper Estuary Conditions: On 9/29/16 Lee County Environmental Lab observed a sparse bloom of *Microcystis* at the Davis Boat Ramp. Salinities are in the suitable range for tape grass. Light levels are less than half of the requirement for submersed angiosperms at depth.

Lower Estuary Condition: On 10/03/16, salinity (0.5 psu) was in the lethal range for oysters at Peppertree Pointe Marina in Iona. The average salinity at Shell Point (13 psu) was below optimal for oysters. Light levels are less than half of the requirement for seagrass at depth.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Salinities were below the preferred range for shoal and turtle grass (30 to 40 psu) in McIntyre Creek for 93 of the past 98 days and in Tarpon Bay, 91 of the past 103 days.

Tarpon Bay Salinity: 17.4 – 28.1 psu; FDOM: 22.5 – 47.1 qse; Dissolved oxygen: 4.5 – 8.7 mg/L; Chlorophyll: 4.2– 11.3 µg/L. McIntyre Creek: Salinity: 18.2 – 25.3 psu; FDOM: 22.1 – 32.5 qse; Dissolved oxygen: 1.3 – 7.4 mg/L; Chlorophyll: 3.6 – 11.7 µg/L. FDOM exceeded 25 qse (less than 25% light penetration at 2.2 meters) in each of 7 days in Tarpon Bay and 5 days in McIntyre Creek. Dissolved oxygen dropped below 4 mg/L (FL water quality standard) in each of 7 days in McIntyre Creek.

Coastal Conditions: A dark colored, freshwater plume from the Caloosahatchee extends to beyond the midpoint of Sanibel Island and to the southern end of Fort Myers Beach on the Gulf side and throughout Pine Island Sound, Matlacha Pass and the bay side of Sanibel.

Red Tide: On 9/30/16 FWC reported *Karenia brevis*, the Florida red tide organism, in background to medium concentrations in Lee County, background to high concentrations off Charlotte County. Pinellas, Manatee and Sarasota Counties had high concentrations over the past week.

Shellfish Harvesting Harmful Algal Bloom Closure: On 9/30/16 The Florida Department of Agriculture and Consumer Services closed Area #6212 Pine Island Sound West for the harvest of oysters, clams, and mussels. The closure, due to red tide, does not include scallops, shrimp or crabs.
**Wildlife Impacts:** The past week CROW, the wildlife rehabilitation clinic on Sanibel received 1 **laughing gull** suffering from red tide poisoning.

### Caloosahatchee Stations

<table>
<thead>
<tr>
<th>Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>IDOM (qse)</th>
<th>Turbidity (NTU)</th>
<th>25% Io depth (meters)</th>
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<td>SCB &lt; 11</td>
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<td>Sanibel E</td>
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</table>

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

**Definition of 25% Io:** \( z \) where \( I \) is 25% of surface \( I \).

\( I = \text{irradiance}, \quad z = \text{depth} \)

### ACOE Daily Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<tbody>
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<td>9/27/2016</td>
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<td><strong>7 Day Avg</strong></td>
<td></td>
<td>8100</td>
<td>5887</td>
<td>3648</td>
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</tbody>
</table>
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Governing Board, Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
Paul Tiraik - J.N. “Ding” Darling National Wildlife Refuge (NWR) Complex
James Evans & Holly Milbrandt - City of Sanibel
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Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: October 4-10, 2016

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: Discharges into the estuary at S-79 over the past week averaged 7,325 cfs, exceeding the harm threshold of 2,800 cfs established for the estuary since the end of January. Lake Okeechobee discharges to the river, measured at S-77, increased to an average of 4,598 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 during the past week averaged 1,650 cfs.

USACE Action: In advance of and during Hurricane Matthew the USACE increased releases from Lake Okeechobee to maximum practicable to the Caloosahatchee measured at S-77 and the St. Lucie measured at S-80. Following the storm on 10/10/16, flows were reduced to 6,500 cfs at S-77 and 2,800 cfs at S-80.

Recommendation: The Caloosahatchee estuary continues to suffer low salinities and algal blooms from harmful high discharges for the past 8 consecutive months. Dispersed water management projects storage capacity has been taken up by rainfall and very little water has been directed south. With drier conditions emerging and forecasts of below average rainfall the next 3 months we request relief by reducing flows to the Caloosahatchee Estuary to 2800 cfs or below at S79 to begin reducing the harm to the estuary.

Lake Okeechobee Level: 16.01 ft. (Intermediate/Low Sub-Band)  Last week: 15.78 ft.
Lake Okeechobee Inflow: 7,068 cfs  Lake Okeechobee Outflow: 9,151 cfs
Weekly Rainfall: WP Franklin NR Ortona 0.35” Moore Haven 0.42”
Salinity Beautiful Island: 0.2 – 0.2 psu (SCCF RECON Marker 18)  Previous wk 0.2 – 0.2 psu
Salinity Fort Myers: 0.2 – 0.2 psu (SCCF Yacht Basin)  Previous wk 0.2 – 0.2 psu
Salinity Shell Point: 0.5 – 28 psu (SCCF RECON)  Previous wk 1.4 – 28 psu

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.2 – 0.2</td>
<td>&lt; 5 psu</td>
<td>-</td>
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<tr>
<td>Fort Myers</td>
<td>0.2 – 0.2</td>
<td>&lt;10 psu</td>
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<tr>
<td>Shell Point</td>
<td>0.5 – 28</td>
<td>25 - 32 psu</td>
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<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iona</td>
<td>0.64</td>
<td>1 meter</td>
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</tr>
<tr>
<td>Causeway</td>
<td>0.81</td>
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<td>Low</td>
</tr>
<tr>
<td>Sanibel East</td>
<td>1.06</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 7,325 cfs. Cyanobacteria was detected by Lee County Environmental Lab the past week. Over the past 14 days 67% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 31% was delivered to the St Lucie at S-308, 0.5% was delivered south to the EAA, 1% was directed to the L8. S-310 back flowed a net 146 acre feet into Lake O.

Salinity at Shell Point nearing zero psu on outgoing tides.

<table>
<thead>
<tr>
<th>ACOE September 30 Release at S-77</th>
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<tbody>
<tr>
<td>Date</td>
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<tr>
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<td>10/5/2016</td>
</tr>
<tr>
<td>10/6/2016</td>
</tr>
<tr>
<td>7 day avg</td>
</tr>
</tbody>
</table>

Upstream of S-79/Franklin Conditions: On 10/6/16 Lee County Environmental Lab observed a sparse bloom of *Microcystis* and *Dolichospermum* upstream of the Franklin Lock. On 10/11/16 the Olga Water Treatment plant chlorides measured 48 mg/L, apparent color was 192CU and turbidity measured 3.64 NTU. No visible algae was noted at the plant intake for the last week. The plant is online at 2000 GPM.

Upper Estuary Conditions: On 10/6/16 Lee County Environmental Lab observed a sparse bloom of *Microcystis, Dolichospermum,* and *Aphanocapsa* downstream of the Franklin Lock and *Microcystis* and *Dolichospermum* at the Davis Boat Ramp. Salinities are in the suitable range for tape grass.

Lower Estuary Condition: The average salinity at Shell Point (14 psu) was below optimal for oysters and seagrass.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Salinities were below the preferred range for shoal and turtle grass (30 to 40 psu) in McIntyre Creek for 99 of the past 105 days and in Tarpon Bay, 97 of the past 110 days.

Tarpon Bay Salinity: 15.8 – 30.6 psu; FDOM: 14.0 – 47.0 qsde; Dissolved oxygen: 4.4 – 7.8 mg/L; Chlorophyll: 3.0– 16.0 µg/L. McIntyre Creek: Salinity: 17.8 – 31.0 psu; FDOM: 11.5 – 34.0 qsde; Dissolved oxygen: 1.3 – 9.5 mg/L; Chlorophyll: 3.5 – 14.5 µg/L. FDOM exceeded 25 qsde (less than 25% light penetration at 2.2 meters) in each of 7 days in Tarpon Bay and 4 days in McIntyre Creek. Dissolved oxygen dropped below 3 mg/L in 5 days in McIntyre Creek.

Coastal Conditions: A very dark colored, murky, plume of freshwater is flowing down the Caloosahatchee to the coastal waters extending to Redfish Pass on Captiva and Lovers Key south of Fort Myers Beach on the Gulf side and throughout Pine Island Sound, Matlacha Pass and the bay side of Sanibel.

Red Tide: On 10/10/16 FWC reported *Karenia brevis*, the Florida red tide organism, in background to medium concentrations in Lee, Charlotte and Pinellas Counties, background to high concentrations in Manatee and Sarasota Counties and background to low concentrations in Collier County over the past week.

Wildlife Impacts: Dead fish on Sanibel beaches included sharks, tunny, pompano, redfish, mullet, sea robins and sardines. On 10/9/16, 65 dead fish m-1 were washed up at Clam Bayou opening on Sanibel. On Fort Myers Beach dead juvenile bonnethead and hammerhead sharks washed up. The dead The past week the CROW wildlife rehabilitation clinic on Sanibel received 5 new cases of wildlife suffering from red tide poisoning: 2 Laughing Gulls, 1 Pied Billed Grebe and 2 Double Crested Cormorants. Three of the patients died.

Shellfish Harvesting Harmful Algal Bloom Closure: On 10/5/16 The Florida Department of Agriculture and Consumer Services reopened shellfish harvesting area #6212 Pine Island Sound West for *Aquaculture Use Zones and Leases ONLY* - Public Shellfish Harvesting Area remains closed- for the harvest of oysters, clams, and mussels. The closure, due to red tide, does not include scallops, shrimp or crabs.
### Caloosahatchee Stations

<table>
<thead>
<tr>
<th>Chlorophyll (µg/L)</th>
<th>IDOM (qse)</th>
<th>Turbidity (NTU)</th>
<th>25% Io depth (meters)</th>
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<td>CE &lt; 18 SCB &lt; 5 CE = 1 m SCB = 2.2m</td>
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<td>Sanibel E</td>
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<td>1.1</td>
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</table>

**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

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
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MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Governing Board, Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
Paul Tritesak - J.N. “Ding” Darling National Wildlife Refuge (NWR) Complex
James Evans & Holly Milbrandt - City of Sanibel
Keith Kibbey & Lesli Haynes - Lee County
Rae Blake – Town of Fort Myers Beach
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: October 11 - 17, 2016

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: Discharges into the estuary at S-79 over the past week averaged 5,795 cfs, over twice the harm threshold of 2,800 cfs established for the estuary. Lake Okeechobee discharges to the river, measured at S-77, increased to an average of 5,331 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 during the past week averaged 616 cfs.

USACE Action: On 10/14/16 the USACE decreased releases from Lake Okeechobee to 4,000 cfs to the Caloosahatchee measured at S-77 and 1,800 cfs to the St. Lucie measured at S-80.

Recommendation: The Caloosahatchee estuary has experienced low salinities and algal blooms from harmful high discharges for the past 8 consecutive months. Storage capacity of dispersed water management projects has been taken up by rainfall and very little water has been directed south. With drier conditions emerging and forecasts of below average rainfall for the next 3 months, we request that flows to the Caloosahatchee estuary be reduced to 2800 cfs or less at S-79 to begin reducing harm and provide much needed relief to the estuary.

<table>
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<tr>
<th>Lake Okeechobee Level:</th>
<th>15.90 ft. (Low Sub-Band)</th>
<th>Last week: 16.01 ft.</th>
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<td>Lake Okeechobee Outflow: 5,583 cfs</td>
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<td>Weekly Rainfall:</td>
<td>WP Franklin 0.02”</td>
<td>Ortona 0”</td>
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<td>Moore Haven 0.07”</td>
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<tr>
<td>Salinity Beautiful Island:</td>
<td>0.2 – 0.2 psu (SCCF RECON Marker 18)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
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<td>Salinity Fort Myers:</td>
<td>0.2 – 0.2 psu (SCCF Yacht Basin)</td>
<td>Previous wk 0.2 – 0.2 psu</td>
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<tr>
<td>Salinity Shell Point:</td>
<td>1.4 – 30 psu (SCCF RECON)</td>
<td>Previous wk 0.5 – 28 psu</td>
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<table>
<thead>
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<th>Salinity (psu)</th>
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<tr>
<td>Fort Myers</td>
</tr>
<tr>
<td>Shell Point</td>
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</table>

<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
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<td>Iona</td>
</tr>
<tr>
<td>Causeway</td>
</tr>
<tr>
<td>Sanibel East</td>
</tr>
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</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 5,795 cfs. Cyanobacteria was detected by Lee County Environmental Lab the past week. Over the past 14 days 79% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 20% was delivered to the St Lucie at S-308, no flow was delivered south to the EAA and 0.4% was directed to the L8. A net outflow of 94 cfs was delivered thru S-310 where water is still being back flowed into Lake Okeechobee.

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<td>4712</td>
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<td>10/8/2016</td>
<td>2</td>
<td>Max</td>
<td>8250</td>
<td>7554</td>
<td>7224</td>
</tr>
<tr>
<td>10/9/2016</td>
<td>3</td>
<td>Max</td>
<td>7845</td>
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<td>10/10/2016</td>
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Upstream of S-79/Franklin Conditions: On 10/13/16, Lee County Environmental Lab observed a sparse bloom of *Microcystis* and *Dolichospermum* upstream of the Franklin Lock. On 10/18/16, the Olga Water Treatment plant chlorides measured 42 mg/L, apparent color was 190 CU and turbidity measured 2.99 NTU. No visible algae was noted at the plant intake for the last week. The plant is off line for maintenance.

Upper Estuary Conditions: On 10/13/16, Lee County Environmental Lab observed a sparse bloom of *Microcystis* and *Dolichospermum* downstream of the Franklin Lock and at the Davis Boat Ramp. Salinities are in the suitable range for tape grass.

Lower Estuary Condition: The average salinity at Peppertree Pointe Marina in Iona (2.5 psu) is in the harmful range for oysters. The average salinity at Shell Point (20 psu) was optimal for oysters.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Salinities were below the preferred range for shoal and turtle grass (30 to 40 psu) in McIntyre Creek, 106 of the past 112 days and in Tarpon Bay, 102 of the past 117 days.

Tarpon Bay Salinity: 20.0 – 30.8 psu; FDOM: 18.0 – 43.0 qsde; Dissolved oxygen: 5.3 – 8.0 mg/L; Chlorophyll: 3.2– 6.2 µg/L. McIntyre Creek: Salinity: 21.8 – 25.4 psu; FDOM: 18.0 – 25.0 qsde; Dissolved oxygen: 2.3 – 7.1 mg/L; Chlorophyll: 3.0 – 15.0 µg/L. FDOM exceeded 25 qsde (less than 25% light penetration at 2.2 meters) in each of 7 days in Tarpon Bay. Dissolved oxygen dropped below 3 mg/L on 3 days in McIntyre Creek.

Coastal Conditions: Dark colored, freshwater extends down the Caloosahatchee to the coastal waters extending to Redfish Pass on Captiva and Lovers Key south of Fort Myers Beach on the Gulf side and throughout Pine Island Sound, Matlacha Pass and the bay side of Sanibel on the outgoing tide.

Red Tide: On 10/14/16, FWC reported *Karenia brevis*, the Florida red tide organism, in background to medium concentrations in Lee County; background to high concentrations in Collier, Manatee and Pinellas Counties and background to low concentrations in Charlotte County.

Wildlife Impacts: The past week CROW, the wildlife rehabilitation clinic on Sanibel received 10 new cases of wildlife suffering from red tide poisoning: 9 Double Crested Cormorants and 1 Laughing Gull.
Freshwater plume off Sanibel close to high (King) tide on 10/17/16. Photos Jim Szabo

<table>
<thead>
<tr>
<th>Caloosahatchee Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>IDOM (qse)</th>
<th>Turbidity (NTU)</th>
<th>25% Io depth (meters)</th>
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<tbody>
<tr>
<td>Target Values</td>
<td>&lt; 11</td>
<td>CE &lt; 70</td>
<td>SCB &lt; 11</td>
<td>CE = 1 m SCB = 2.2m</td>
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<td>Iona</td>
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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

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<td>10/11/2016</td>
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<td>6808</td>
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MEMORANDUM

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Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: October 18 - 24, 2016

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: Discharges into the estuary at S-79 during the past week averaged 3,638 cfs, over the harm threshold of 2,800 cfs established for the estuary. Lake Okeechobee discharges to the river, measured at S-77, decreased to an average of 3,133 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 during the past week averaged 604 cfs.

USACE Action: On 10/21/16 the USACE decreased releases from Lake Okeechobee to 3,000 cfs to the Caloosahatchee measured at S-79 and 1,170 cfs to the St. Lucie measured at S-80.

Recommendation: With drier than normal conditions forecast for the coming months, we recommend reducing flows to the Caloosahatchee estuary to 2,800 cfs or less at S-79 and gradually reducing flows to acclimate the system for drier conditions. We do NOT recommend abruptly dropping flows from 3,000 cfs to 650 cfs. With reduced watershed inflow we request the flows be delivered in pulse releases.

### Lake Okeechobee Summary

- **Level:** 15.70 ft. (Low Sub-Band) Last week: 15.90 ft.
- **Inflow:** 2,036 cfs
- **Outflow:** 5,034 cfs
- **Weekly Rainfall:**
  - WP Franklin 0”
  - Ortona 0 ”
  - Moore Haven 0.05”
- **Salinity Beautiful Island:** 0.2 – 0.2 psu (SCCF RECON Marker 18) Previous wk 0.2 – 0.2 psu
- **Salinity Fort Myers:** 0.2 – 0.3 psu (SCCF Yacht Basin) Previous wk 0.2 – 0.2 psu
- **Salinity Shell Point:** 6.5 – 31 psu (SCCF RECON) Previous wk 1.4 – 30 psu

### Salinity (psu)

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### Light (25% Iz depth meters)

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<td>Sanibel East</td>
<td>1.46</td>
<td>2.2 meters</td>
<td>Low</td>
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**Flow & Water Quality:** Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 3,638 cfs. Cyanobacteria was detected by Lee County Environmental Lab the past week. Over the past 14 days 75% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 18% was delivered to the St Lucie at S-308, 5% was delivered south to the EAA and 1% was directed to the L8. A net outflow of 593 cfs was delivered thru S-310 where water is still being back flowed into Lake O.

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
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**Upstream of S-79/Franklin Conditions:** On 10/20/16, Lee County Environmental Lab observed a sparse bloom of *Microcystis* and Dolichospermum upstream of the Franklin Lock. On 10/25/16 the Olga Water Treatment plant chlorides measured 45 mg/L, apparent color was 138 CU and turbidity measured 2.21 NTU. No visible algae was noted at the plant intake for the last week. The plant is online at 2000 GPM.

**Upper Estuary Conditions:** On 10/20/16, Lee County Environmental Lab observed a very sparse bloom of *Microcystis* and Dolichospermum downstream of the Franklin Lock and a sparse bloom at the Davis Boat Ramp. Salinities are in the suitable range for tape grass.

**Lower Estuary Condition:** The average salinity at Peppertree Pointe Marina in Iona is (5.5 psu) below optimal for oysters and seagrass. The average salinity at Shell Point (18 psu) was in the optimal range for oysters.

**McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR:** Salinities were below the preferred range for shoal and turtle grass (30 to 40 psu) in McIntyre Creek for 113 of the past 119 days and in Tarpon Bay, 108 of the past 124 days.

**Tarpon Bay Salinity:** 23.2 – 30.5 psu; FDOM: 20.0 – 41.0 qsde; Dissolved oxygen: 5.2 – 8.2 mg/L; Chlorophyll: 3.0–7.2 µg/L. **McIntyre Creek:** Salinity: 25.0 – 29.7 psu; FDOM: 15.0 – 25.0 qsde; Dissolved oxygen: 2.6 – 9.3 mg/L; Chlorophyll: 2.7 – 6.0 µg/L. FDOM exceeded 25 qsde (less than 25% light penetration at 2.2 meters) in each of 7 days in Tarpon Bay. Dissolved oxygen dropped below 3 mg/L in 3 days in McIntyre Creek.

**Coastal Conditions:** Dark colored, freshwater extends down the Caloosahatchee to the Sanibel Lighthouse and throughout Pine Island Sound. Green algae is present along Sanibel’s east end beaches.

**Red Tide:** On 10/21/16, FWC reported *Karenia brevis*, the Florida red tide organism, persists in Southwest Florida from Pinellas to Collier counties.

**Wildlife Impacts:** The past week CROW, the wildlife rehabilitation clinic on Sanibel received 15 new cases of wildlife suffering from red tide poisoning: 13 Double Crested Cormorants, 1 Sandwich Tern and 1 Anhinga. Four of the Cormorants, both the Anhinga and Sandwich Tern did not survive.

**Oysters:** October sampling in the Caloosahatchee by FGCU reported disease prevalence of *Perkinsus marinus* of all oysters sampled ranged from 21.43% to 40.00%. Disease intensity of *P. marinus* ranged from 0.21 to 0.47. Scale 0 = no infection, 1 = low, 3 = medium, 5 = high. Larval recruitment ranged from 0.39 to 24.03 spat per shell.
Caloosahatchee Estuary

ACOE Daily Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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7 Day Avg | 3638 | 3034 | 3133 |

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<tr>
<th>Caloosahatchee Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>IDOM (qse)</th>
<th>Turbidity (NTU)</th>
<th>25% Io depth (meters)</th>
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<td>Target Values</td>
<td>&lt; 11</td>
<td>CE &lt;70</td>
<td>CE &lt; 18 SCB &lt; 3</td>
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Target light penetration: **CE**- Caloosahatchee Estuary =1 m  
**SCB**- San Carlos Bay = 2.2 meters

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

Green algae along Sanibel’s eastern beaches 10/26/16. Photo provided by the City of Sanibel
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Governing Board, Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
Paul Tritesik - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex
James Evans & Holly Milbrandt - City of Sanibel
Keith Kibbey & Lesli Haynes - Lee County
Rae Blake – Town of Fort Myers Beach
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: October 25 - 31, 2016

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: Discharges into the estuary at S-79 during the past week averaged 2,965 cfs, over the harm threshold of 2,800 cfs established for the estuary. Lake Okeechobee discharges to the river, measured at S-77, decreased to an average of 2,674 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 during the past week averaged 703 cfs.

USACE Action: On 10/28/16 the USACE announced a three week, pulse release schedule to step down releases from Lake Okeechobee.

Recommendation: We recommend continuing with the planned 21 day gradual reduction in flows to the Caloosahatchee to acclimate the estuary to more normal dry season conditions.

Lake Okeechobee Level: 15.46 ft. (Low Sub-Band) Last week: 15.70 ft.
Lake Okeechobee Inflow: 1,622 cfs Lake Okeechobee Outflow: 5,933 cfs
Weekly Rainfall: WP Franklin 0" Ortona 0" Moore Haven 0.02"
Salinity Beautiful Island: 0.2 – 0.2 psu (SCCF RECON Marker 18) Previous wk 0.2 – 0.2 psu
Salinity Fort Myers: 0.2 – 1.2 psu (SCCF Yacht Basin) Previous wk 0.2 – 0.3 psu
Salinity Shell Point: 9.3 - 32 psu (SCCF RECON) Previous wk 6.5 – 31 psu

### Salinity (psu)

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<th>Sustainable Range</th>
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<td>Fort Myers</td>
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<td>Shell Point</td>
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### Light (25% Iz depth meters)

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</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 2,965 cfs. Very sparse cyanobacteria was detected by Lee County Environmental Lab the past week. Over the past 14 days 28.5% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 33.5% was delivered to the St Lucie at S-308, 33% was delivered south to the EAA and 4% was directed to the L8. A net outflow of 1% was delivered thru S-310.

### ACOE October 14 Release at S-77

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<th>S77 Flow (cfs)</th>
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Upstream of S-79/Franklin Conditions: On 10/27/16, Lee County Environmental Lab observed a very sparse bloom of Dolichospermum and Microcystis upstream of the Franklin Lock. On 11/1/16 the Olga Water Treatment plant chlorides measured 45 mg/L, apparent color was 188 CU and turbidity measured 3.4 NTU. No visible algae was noted at the plant intake for the last week. The plant is online at 2000 GPM.

Upper Estuary Conditions: Salinities are in the suitable range for tape grass.

Lower Estuary Condition: The average salinity at Peppertree Pointe Marina in Iona (7.2 psu) is below optimal for oysters and seagrass. The average salinity at Shell Point (23 psu) was in the optimal range for oysters.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Salinities were below the preferred range for shoal and turtle grass (30 to 40 psu) in McIntyre Creek for 120 of the past 126 days and in Tarpon Bay, 108 of the past 131 days. Tarpon Bay Salinity: 25.2 – 29.4 psu; FDOM: 23.0 – 36.0 qsde; Dissolved oxygen: 5.6 – 7.7 mg/L; Chlorophyll: 2.7 – 60.5 µg/L. McIntyre Creek: Salinity: 25.8 – 28.2 psu; FDOM: 9.0 – 19.0 qsde; Dissolved oxygen: 3.4 – 8.9 mg/L; Chlorophyll: 2.6 – 5.5 µg/L. FDOM exceeded 25 qsde (less than 25% light penetration at 2.2 meters) in 5 of 7 days in Tarpon Bay.

Coastal Conditions: The freshwater plume extends to the south of the Sanibel causeway. Water clarity has improved along Sanibel’s beaches during the past week with the reduction in freshwater flow to the estuary. Small amounts of green macroalgae have been washing up sporadically on Sanibel and Fort Myers Beach.

Red Tide: On 10/28/16, FWC reported Karenia brevis, the Florida red tide organism, A bloom of the Florida red tide organism, Karenia brevis, persists in Southwest Florida from northern Manatee County to central Lee County, with very low concentrations detected in southern Pinellas County and southern Collier County.

Wildlife Impacts: The past week CROW, the wildlife rehabilitation clinic on Sanibel received 1 green sea turtle suffering from red tide poisoning.

### Surface Salinity at Iona Oyster Reef

![Surface Salinity at Iona Oyster Reef](image)

### ACOE Daily Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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**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
Green macroalgae washing up along beaches at Sanibel (above) and Fort Myers beaches (left).

Water color improving but continues to be murky along the northern end of Fort Myers Beach.

Photos 11/1/16 courtesy of the City of Sanibel and Town of Fort Myers Beach.
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Governing Board, Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
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Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: November 1 - 7, 2016

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:** Discharges into the estuary at S-79 during the past week averaged 2,163 cfs, dropping below the harm threshold of 2,800 cfs established for the estuary the first time in 9.5 months. Lake Okeechobee discharges to the river, measured at S-77, decreased to an average of 2,081 cfs. Watershed inflows to the Franklin pool between S-78 and S-79 during the past week averaged 406 cfs.

**USACE Action:** On 11/4/16 the USACE announced a reduction in the pulse release schedule to a 7-day average of 1,425 cfs from Lake Okeechobee at S-79 and no discharge to the St Lucie at S-80.

**Recommendation:** We recommend continuing the gradual reduction in flows to the Caloosahatchee to acclimate the estuary to more normal dry season conditions to a target no less than 650 cfs at S-79.

| Lake Okeechobee Level: | 15.26 ft. (Low Sub-Band) | Last week: 15.46 ft. |
| Lake Okeechobee Inflow: | 1,054 cfs | Lake Okeechobee Outflow: 3,284 cfs |
| Weekly Rainfall: | WP Franklin 0" Ortona 0" | Moore Haven 0.01" |
| Salinity Beautiful Island: | 0.2 – 0.7 psu (SCCF RECON Marker 18) | Previous wk 0.2 – 0.2 psu |
| Salinity Fort Myers: | 0.2 – 4.6 psu (SCCF Yacht Basin) | Previous wk 0.2 – 1.2 psu |
| Salinity Shell Point: | 13 - 32 psu (SCCF RECON) | Previous wk 9.3 - 32 psu |

**Salinity (psu)**

<table>
<thead>
<tr>
<th>Location</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
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</thead>
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<td>Beautiful Is</td>
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<tr>
<td>Fort Myers</td>
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<td>&lt;10 psu</td>
<td>-</td>
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<tr>
<td>Shell Point</td>
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<td>25 - 32 psu</td>
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**Light (25% Iz depth meters)**

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<td>Causeway</td>
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<tr>
<td>Sanibel East</td>
<td>1.42</td>
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</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 2,163 cfs. Cyanobacteria was detected by Lee County Environmental Lab the past week. Over the past 14 days 44% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 23% was delivered to the St Lucie at S-308, 28% was delivered south to the EAA, 4% was directed to the L8 and 1% was delivered thru S-310.

### ACOE October 28 Release at S-79

<table>
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<td>2185</td>
<td>2497</td>
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</table>

Upstream of S-79/Franklin Conditions: On 11/3/16, Lee County Environmental Lab observed a very sparse bloom of *Dolichospermum* and *Microcystis* upstream of the Franklin Lock. On 11/8/16 the Olga Water Treatment plant chlorides measured 49 mg/L, apparent color was 131 CU and turbidity measured 2.69 NTU. No visible algae was noted at the plant intake for the last week. The plant is online at 2000 GPM.

### Upper Estuary Conditions

Salinities are in the suitable range for tape grass and rising.

Lower Estuary Condition: The salinity at Peppertree Pointe Marina in Iona on 11/5/16 (10 psu) was below optimal for oysters and seagrass. The average salinity at Shell Point (22 psu) was in the optimal range for oysters.

McIntyre Creek & Tarpon Bay in J.N. “Ding” Darling NWR: Salinities were below the preferred range for shoal and turtle grass (30 to 40 psu) in McIntyre Creek for 127 of the past 133 days and in Tarpon Bay, 112 of the past 138 days.

Tarpon Bay Salinity: 25.0 – 31.1 psu; FDOM: 19.5 – 32.5 qsde; Dissolved oxygen: 5.7 – 8.0 mg/L; Chlorophyll: 3.0–3.5 µg/L. McIntyre Creek: Salinity: 25.9 – 27.8 psu; FDOM: 12.0 – 22.0 qsde; Dissolved oxygen: 3.2 – 10.0 mg/L; Chlorophyll: 2.5 – 5.5 µg/L.

Coastal Conditions: The dark plume of freshwater extends to the Sanibel causeway, through Pine Island Sound to Redfish Pass. Accumulations of macroalgae have been washing up on Sanibel beaches.

Red Tide: On 11/4/16, FWC reported *Karenia brevis*, the Florida red tide organism, persists in Southwest Florida from Pinellas to northern Collier County. The *Karenia* sp. concentration at Sanibel Boat Ramp was 598,000 cells/L on 11/5/16 (SCCF).

### Caloosahatchee Stations

<table>
<thead>
<tr>
<th>Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>IDOM (qse)</th>
<th>Turbidity (NTU)</th>
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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

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
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MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Governing Board, Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
Paul Tritaik - J.N. “Ding” Darling National Wildlife Refuge (NWR) Complex
James Evans & Holly Milbrandt - City of Sanibel
Keith Kibbey & Lesli Haynes - Lee County
Rae Blake – Town of Fort Myers Beach
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: November 8 - 14, 2016

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: Discharges into the estuary at S-79 during the past week dropped to one third of the previous week averaging 782 cfs. Lake Okeechobee discharges to the river, measured at S-77, decreased to an average of 1,014 cfs.

USACE Action: On 11/11/16 the USACE reduced flows to the Caloosahatchee to a 7-day average pulse of 650 cfs at S-79 and continued no discharge from Lake Okeechobee to the St Lucie.

Recommendation: We recommend continuing to provide the Caloosahatchee with weekly average pulse releases of 650 cfs measured at S-79. With below average rainfall forecast, drier conditions and rapidly rising salinities we request water supply decisions manage salinities below the MFL harm threshold.

Lake Okeechobee Level: 15.13 ft. (Low Sub-Band) Last week: 15.26 ft.

Lake Okeechobee Inflow: 756 cfs
Lake Okeechobee Outflow: 2,919 cfs

Weekly Rainfall: WP Franklin 0" Ortona 0.08 " Moore Haven 0"

Salinity Beautiful Island: 0.4 – 3.1 psu (SCCF RECON Marker 18) Previous wk 0.2 – 0.7 psu
Salinity Fort Myers: 1.9 – 7.4 psu (SCCF Yacht Basin) Previous wk 0.2 – 4.6 psu
Salinity Shell Point: 15 – 32 psu (SCCF RECON) Previous wk 13 – 32 psu

| Location          | Salinity (psu) | Current Value | Sustainable Range | High/Low
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.4 – 3.1</td>
<td>&lt; 5 psu</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Fort Myers</td>
<td>1.9 – 7.4</td>
<td>&lt;10 psu</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Shell Point</td>
<td>15 – 32</td>
<td>25 – 32 psu</td>
<td>Low</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Light (25% Iz depth meters)</th>
<th>In Range</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Iona</td>
<td>1.08</td>
<td>1 meter</td>
<td></td>
</tr>
<tr>
<td>Causeway</td>
<td>1.28</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
<tr>
<td>Sanibel East</td>
<td>1.40</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 782 cfs. Cyanobacteria was detected by Lee County Environmental Lab the past week. Over the past 14 days 40% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 14% was delivered to the St Lucie at S-308, 39% was delivered south to the EAA, 6% was directed to the L8 and 1% was delivered thru S-310.

| ACOE November 4 Release at S-79 |
|---------------------|---------------------|---------------------|---------------------|
| Date               | Day | Pulse Target | S79 Flow (cfs) | S78 Flow (cfs) | S77 Flow (cfs) |
| 11/4/2016          | 1   |              | 2119           | 1918           | 2394           |
| 11/5/2016          | 2   |              | 2031           | 1455           | 1867           |
| 11/6/2016          | 3   |              | 1740           | 1348           | 1634           |
| 11/7/2016          | 4   |              | 1490           | 1334           | 1652           |
| 11/8/2016          | 5   |              | 1576           | 2686           | 1423           |
| 11/9/2016          | 6   |              | 991            | 534            | 981            |
| 11/10/2016         | 7   |              | 574            | 391            | 965            |
| 7 day avg          | 1425|              | 1503           | 1375           | 1559           |

Upstream of S-79/Franklin Conditions: On 11/10/16, Lee County Environmental Lab observed a very sparse bloom of Dolichospernum and Microcystis upstream of the Franklin Lock. On 11/15/16 the Olga Water Treatment plant chlorides measured 51 mg/L, apparent color was 119 CU and turbidity measured 2.46 NTU. No visible algae was noted at the plant intake for the last week. The plant is online at 2000 GPM.

Upper Estuary Conditions: On 11/10/16, Lee County Environmental Lab observed a very sparse bloom of Microcystis at the Davis Boat Ramp. Salinities are in the suitable range for tape grass and rising.

Lower Estuary Condition: The salinity at Peppertree Pointe Marina in Iona on 11/14/16 (17 psu) and the average salinity at Shell Point (26 psu) was in the optimal range for oysters. The freshwater plume line has receded to the north side of the Sanibel Causeway and water clarity on the south side of the causeway and along Sanibel’s eastern beaches has improved significantly during the past week.

J.N. “Ding” Darling NWR: Salinities were below the preferred range for shoal and turtle grass (30 to 40 psu) in McIntyre Creek for 134 of the past 140 days and in Tarpon Bay, 115 of the past 145 days.

Tarpon Bay Salinity: 25.8 – 33.0 psu; FDOM: 10.8 – 26.8 qsd; Dissolved oxygen: 5.7 – 8.4 mg/L; Chlorophyll: 2.6–5.5 µg/L. McIntyre Creek: Salinity: 25.9 – 29.1 psu; FDOM: 12.7 – 26.7 qsd; Dissolved oxygen: 3.2 – 10.9 mg/L; Chlorophyll: 2.3 – 4.5 µg/L.

Oysters: November sampling in the Caloosahatchee by FGCU reported disease prevalence of Perkinsus marinus of all oysters sampled ranged from 33.30% to 40.00%. Disease intensity of P. marinus ranged from 0.33 to 0.60. Scale 0 = no infection, 1 = low, 3 = medium, 5 = high. Larval recruitment ranged from 0.06 to 27.92 spat per shell.

Red Tide: On 11/10/16, FWC reported Karenia brevis, red tide, persists in Southwest Florida from Pinellas to Collier County. SCCF samples 11/14/16 found near shore Karenia sp. concentrations of 56,000/L in Tarpon Bay, 324,000/L at Sanibel Boat Ramp and 167,000/L at Tarpon Beach. Dead mullet were seen in Commodore Creek in Tarpon Bay.

Wildlife status: The past week CROW, the wildlife rehabilitation clinic on Sanibel received 22 animals suffering from red tide poisoning; 21 Double Crested Cormorants and 1 Brown Pelican.
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Governing Board, Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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   Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: November 15 - 21, 2016

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:** Discharges into the estuary at S-79 during the past week decreased to a weekly average of 700 cfs. Lake Okeechobee discharges to the river, measured at S-77, decreased to an average of 786 cfs. Moderate accumulations of red drift algae are washing up on area beaches. Red tide blooms in Pine Island Sound have resulted in isolated fish kills.

**USACE Action:** On 11/11/16 the USACE reduced flows to the Caloosahatchee to a 7-day average pulse of 650 cfs at S-79 and continued no discharge from Lake Okeechobee to the St Lucie estuary at S-80.

**Recommendation:** We recommend continuing to provide the Caloosahatchee with pulse releases sufficient to provide healthy salinities and maintain a low salinity zone in the upper estuary with no less than a weekly average of 650 cfs at S-79.

<table>
<thead>
<tr>
<th>Lake Okeechobee Level: 14.95 ft. (Low Sub-Band)</th>
<th>Last week: 15.13 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Okeechobee Inflow: 680 cfs</td>
<td>Lake Okeechobee Outflow: 3,264 cfs</td>
</tr>
<tr>
<td>Weekly Rainfall: WP Franklin 0&quot; Ortona 0&quot; Moore Haven 0&quot;</td>
<td></td>
</tr>
<tr>
<td>Salinity Beautiful Island: 1.2 - 4 psu (SCCF RECON Marker 18)</td>
<td>Previous wk 0.4 – 3.1 psu</td>
</tr>
<tr>
<td>Salinity Fort Myers: 2.7 – 9.9 psu (SCCF Yacht Basin)</td>
<td>Previous wk 1.9 – 7.4 psu</td>
</tr>
<tr>
<td>Salinity Shell Point: 17 - 33 psu (SCCF RECON)</td>
<td>Previous wk 15 – 32 psu</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Salinity (psu)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current Value</strong></td>
</tr>
<tr>
<td><strong>Sustainable Range</strong></td>
</tr>
<tr>
<td><strong>High/ Low</strong></td>
</tr>
<tr>
<td>Beautiful Is 1.2 - 4 &lt; 5 psu In Range</td>
</tr>
<tr>
<td>Fort Myers 2.7 - 9.9 &lt;10 psu In Range</td>
</tr>
<tr>
<td>Shell Point 17 - 33 25 - 32 psu In Range</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Light (25% Iz depth meters)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site</strong></td>
</tr>
<tr>
<td><strong>Currently</strong></td>
</tr>
<tr>
<td><strong>25% Iz</strong></td>
</tr>
<tr>
<td><strong>In Range</strong></td>
</tr>
<tr>
<td>Iona 0.93 1 meter Low</td>
</tr>
<tr>
<td>Causeway 1.50 2.2 meters Low</td>
</tr>
<tr>
<td>Sanibel East 1.57 2.2 meters Low</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 700 cfs. Over the past 14 days 30% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 3% was delivered to the St Lucie at S-308, 58% was delivered south to the EAA, 7% was directed to the L8 and 2% was delivered thru S-310.

### ACOE November 11 Release at S-79

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
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<tbody>
<tr>
<td>11/11/2016</td>
<td>1</td>
<td>900</td>
<td>523</td>
<td>422</td>
<td>950</td>
</tr>
<tr>
<td>11/12/2016</td>
<td>2</td>
<td>1000</td>
<td>578</td>
<td>529</td>
<td>935</td>
</tr>
<tr>
<td>11/13/2016</td>
<td>3</td>
<td>900</td>
<td>594</td>
<td>641</td>
<td>921</td>
</tr>
<tr>
<td>11/14/2016</td>
<td>4</td>
<td>750</td>
<td>638</td>
<td>689</td>
<td>924</td>
</tr>
<tr>
<td>11/15/2016</td>
<td>5</td>
<td>400</td>
<td>505</td>
<td>356</td>
<td>822</td>
</tr>
<tr>
<td>11/16/2016</td>
<td>6</td>
<td>300</td>
<td>311</td>
<td>NR</td>
<td>624</td>
</tr>
<tr>
<td>11/17/2016</td>
<td>7</td>
<td>300</td>
<td>299</td>
<td>NR</td>
<td>619</td>
</tr>
<tr>
<td>7 day avg</td>
<td></td>
<td>650</td>
<td>493</td>
<td>-</td>
<td>828</td>
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</table>

### SCCF Surface Salinity at Fort Myers Yacht Basin

<table>
<thead>
<tr>
<th>Date</th>
<th>Salinity (psu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/3/2016</td>
<td>25</td>
</tr>
<tr>
<td>11/4/2016</td>
<td>30</td>
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<td>11/5/2016</td>
<td>35</td>
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<tr>
<td>11/6/2016</td>
<td>40</td>
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<tr>
<td>11/7/2016</td>
<td>45</td>
</tr>
<tr>
<td>11/8/2016</td>
<td>50</td>
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<td>11/9/2016</td>
<td>55</td>
</tr>
<tr>
<td>11/10/2016</td>
<td>60</td>
</tr>
<tr>
<td>11/11/2016</td>
<td>65</td>
</tr>
<tr>
<td>11/12/2016</td>
<td>70</td>
</tr>
<tr>
<td>11/13/2016</td>
<td>75</td>
</tr>
<tr>
<td>11/14/2016</td>
<td>80</td>
</tr>
<tr>
<td>11/15/2016</td>
<td>85</td>
</tr>
<tr>
<td>11/16/2016</td>
<td>90</td>
</tr>
<tr>
<td>11/17/2016</td>
<td>95</td>
</tr>
</tbody>
</table>

Upstream of S-79/Franklin Conditions: On 11/22/16 the Olga Water Treatment plant chlorides measured 53 mg/L, apparent color was 107 CU and turbidity measured 2.21 NTU. No visible algae was noted at the plant intake for the last week. The plant is online at 2000 GPM.

Upper Estuary Conditions: Salinities are in the suitable range for tape grass and rising.

Lower Estuary Condition: The salinity at Iona and Shell Pointe was in the optimal range for oysters; Peppertree Pointe Marina in Iona on 11/14/16 (14 psu) and the average salinity at Shell Point was (25 psu).

J.N. “Ding” Darling NWR: Salinities were below the preferred range for shoal and turtle grass (30 to 40 psu) in McIntyre Creek for 139 of the past 147 days and in Tarpon Bay, 117 of the past 152 days.

Tarpon Bay Salinity: 27.9 – 31.8 psu; FDOM: 15.8 – 26.2 qsde; Dissolved oxygen: 5.1 – 8.1 mg/L; Chlorophyll: 2.7 – 7.5 µg/L. McIntyre Creek: Salinity: 28.6 – 31.9 psu; FDOM: 15.6 – 26.0 qsde; Dissolved oxygen: 3.2 – 9.2 mg/L; Chlorophyll: 2.2 – 5.2 µg/L.

Beach Conditions: Water clarity has improved. Red drift algae strandings have occurred on Sanibel and Fort Myers beaches, with accumulations on the beach and in the surf zone. Abundance and frequency appears to be increasing as water clarity improves following 9.5 months of excess flows and associated nutrient loading.

Red Tide: On 11/18/16, FWC reported Karenia brevis, the Florida red tide organism, persists in Southwest Florida from Pinellas to Monroe County. SCCF sampling on 11/21/16 found near shore Karenia sp. concentrations of 181,000 cells/L in Tarpon Bay, 167,000 cells/L at Sanibel Boat Ramp and 185,000 cells/L at Tarpon Beach. Fish kills were documented in Matlacha on 11/18/16.

Wildlife status: The past week CROW, the wildlife rehabilitation clinic on Sanibel received 18 animals suffering from red tide poisoning; 14 Double Crested Cormorants, 2 Anhingas, 1 Laughing Gull and 1 Sandwich Tern. Ten died.

### Caloosahatchee Estuaries

<table>
<thead>
<tr>
<th>Caloosahatchee Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>IDOM (qse)</th>
<th>Turbidity (NTU)</th>
<th>25% Iz (Depth)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Values</td>
<td>&lt; 11</td>
<td>CE &lt; 70</td>
<td>CE &lt; 18</td>
<td>CE = 1 m</td>
</tr>
<tr>
<td>Iona</td>
<td>8.5</td>
<td>157</td>
<td>1.1</td>
<td>0.93</td>
</tr>
<tr>
<td>Causeway</td>
<td>2.3</td>
<td>70.1</td>
<td>1.3</td>
<td>1.50</td>
</tr>
<tr>
<td>Sanibel E</td>
<td>4.9</td>
<td>63.4</td>
<td>0.9</td>
<td>1.57</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/15/2016</td>
<td>Tues</td>
<td>505</td>
<td>356</td>
<td>822</td>
</tr>
<tr>
<td>11/16/2016</td>
<td>Wed</td>
<td>311</td>
<td>NR</td>
<td>624</td>
</tr>
<tr>
<td>11/17/2016</td>
<td>Thur</td>
<td>299</td>
<td>NR</td>
<td>619</td>
</tr>
<tr>
<td>11/18/2016</td>
<td>Fri</td>
<td>763</td>
<td>NR</td>
<td>709</td>
</tr>
<tr>
<td>11/19/2016</td>
<td>Sat</td>
<td>1068</td>
<td>684</td>
<td>904</td>
</tr>
<tr>
<td>11/20/2016</td>
<td>Sun</td>
<td>1109</td>
<td>679</td>
<td>929</td>
</tr>
<tr>
<td>11/21/2016</td>
<td>Mon</td>
<td>844</td>
<td>690</td>
<td>895</td>
</tr>
<tr>
<td>7 day Avg</td>
<td></td>
<td>700</td>
<td>-</td>
<td>786</td>
</tr>
</tbody>
</table>
Red drift macro algae accumulating on Sanibel Island beaches and in the wash line in greater volumes and frequency as water clarity improves. Photos above Nerita Beach 11/22/16. Photo left beach between Algiers and Island Club 11/20/16. Photo below, Fulger Beach 11/22/16. City of Sanibel.

Red drift algae accumulating on Fort Myers Beach at Bowditch Point on 11/22/16. Photo Town of Fort Myers Beach.
MEMORANDUM

To:  USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Governing Board, Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

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Subject:  Caloosahatchee & Estuary Condition Report

Reporting Period:  November 22 - 28, 2016

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: Discharges into the estuary at S-79 during the past week decreased to a weekly average of 665 cfs. Lake Okeechobee discharges to the river, measured at S-77, increased to an average of 875 cfs. Salinities have risen rapidly in the upper and middle estuary. Red tide blooms have caused fish kills from north of Bokeelia off Pine Island throughout the Refuge. Visitors to Wildlife Drive are complaining of the smell of dead fish and reporting respiratory issues.

USACE Action: The USACE continued flows to the Caloosahatchee to a 7-day average pulse of 650 cfs at S-79 and continued no discharge from Lake Okeechobee to the St Lucie estuary at S-80.

Recommendation: Due to rapidly rising salinities at Fort Myers we recommend increasing pulse releases to provide healthy salinities below 10 psu at Fort Myers and below 5 psu at Beautiful Island and to maintain a low salinity zone in the upper estuary. We request the weekly call resume next week to discuss rapidly changing conditions.

<table>
<thead>
<tr>
<th>Lake Okeechobee Level:</th>
<th>14.79 ft. (Low Sub-Band)</th>
<th>Last week: 14.95 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Okeechobee Inflow:</td>
<td>660 cfs</td>
<td>Lake Okeechobee Outflow: 3,089 cfs</td>
</tr>
<tr>
<td>Weekly Rainfall:</td>
<td>WP Franklin 0.01”</td>
<td>Ortona 0”</td>
</tr>
<tr>
<td>Salinity Beautiful Island:</td>
<td>2.2 - 7.0 psu (SCCF RECON Marker 18)</td>
<td>Previous wk 1.2 - 4 psu</td>
</tr>
<tr>
<td>Salinity Fort Myers:</td>
<td>5.6 - 11 psu (SCCF Yacht Basin)</td>
<td>Previous wk 2.7 - 9.9 psu</td>
</tr>
<tr>
<td>Salinity Shell Point:</td>
<td>18 - 31 psu (SCCF RECON)</td>
<td>Previous wk 17 - 33 psu</td>
</tr>
</tbody>
</table>

### Salinity (psu)

<table>
<thead>
<tr>
<th>Location</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>2.2 - 7</td>
<td>&lt; 5 psu</td>
<td>In Range</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>5.6 - 11</td>
<td>&lt;10 psu</td>
<td>In Range</td>
</tr>
<tr>
<td>Shell Point</td>
<td>18 - 31</td>
<td>25 - 32 psu</td>
<td>In Range</td>
</tr>
</tbody>
</table>

### Light (25% Iz depth meters)

<table>
<thead>
<tr>
<th>Location</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tarpon Bay</td>
<td>1.58</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
<tr>
<td>Causeway</td>
<td>1.42</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
<tr>
<td>Sanibel E</td>
<td>1.59</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 665 cfs. Over the past 14 days 27% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 3% was delivered to the St Lucie at S-308, 62% was delivered south to the EAA, 6% was directed to the L8 and 1% was delivered thru S-310.

**ACOE November 18 Release at S-79**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/18/2016</td>
<td>1</td>
<td>900</td>
<td>763</td>
<td>NR</td>
<td>709</td>
</tr>
<tr>
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<tr>
<td>11/22/2016</td>
<td>5</td>
<td>400</td>
<td>574</td>
<td>501</td>
<td>778</td>
</tr>
<tr>
<td>11/23/2016</td>
<td>6</td>
<td>300</td>
<td>330</td>
<td>336</td>
<td>752</td>
</tr>
<tr>
<td>11/24/2016</td>
<td>7</td>
<td>300</td>
<td>503</td>
<td>220</td>
<td>881</td>
</tr>
<tr>
<td>7 day avg</td>
<td></td>
<td>650</td>
<td>742</td>
<td>-</td>
<td>835</td>
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</tbody>
</table>

Upstream of S-79/Franklin Conditions: On 11/29/16 the Olga Water Treatment plant chlorides measured 54 mg/L, apparent color was 102 CU and turbidity measured 2.53 NTU. No visible algae was noted at the plant intake for the last week. The plant is online at 2000 GPM.

**ACOE Daily Reports**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/22/2016</td>
<td>Tues</td>
<td>574</td>
<td>501</td>
<td>778</td>
</tr>
<tr>
<td>11/23/2016</td>
<td>Wed</td>
<td>330</td>
<td>338</td>
<td>752</td>
</tr>
<tr>
<td>11/24/2016</td>
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<td>11/25/2016</td>
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<td>11/26/2016</td>
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<td>11/27/2016</td>
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<tr>
<td>11/28/2016</td>
<td>Mon</td>
<td>709</td>
<td>560</td>
<td>939</td>
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</tbody>
</table>

**SCCF Surface Salinity at Fort Myers Yacht Basin**

**SCF Condition**: Salinities are in the suitable range for tape grass down to Fort Myers. The Fort Myers and Beautiful Island RECONs have been recording phytoplankton blooms of up to 20 µg chlorophyll/L.

**Lower Estuary Condition**: The average salinity at Shell Point was (25 psu); in the optimal range for oysters.

**J.N. “Ding” Darling NWR:**

<table>
<thead>
<tr>
<th>Monitor Site</th>
<th>Salinity (psu)</th>
<th>Diss O₂ (mg/L)</th>
<th>FDOM (qsde)</th>
<th>Chlorophyll (µg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>McIntyre Creek</td>
<td>29.4 – 32.6</td>
<td>3.5 – 11.5</td>
<td>13.4 – 22.5</td>
<td>2.8 – 9.9</td>
</tr>
<tr>
<td>Tarpon Bay</td>
<td>29.3 – 32.2</td>
<td>5.7 – 8.2</td>
<td>15.5 – 28.3</td>
<td>2.2 – 13.8</td>
</tr>
</tbody>
</table>

**Beach Conditions**: Water clarity has improved. Red drift algae strandings have occurred on Sanibel and Fort Myers beaches, with accumulations on the beach and in the surf zone. Abundance and frequency appears to be increasing as water clarity improves following 9.5 months of excess flows and associated nutrient loading.

**Red Tide**: On 11/23/16, FWC reported Karenia brevis, the Florida red tide organism, persists in Southwest Florida from Pinellas to Monroe County. SCCF sampling on 11/28/16 found nearshore Karenia sp. concentrations of 897,000 cells/L in Tarpon Bay, 194,000 cells/L at Sanibel Boat Ramp and 111,000 cells/L at Tarpon Beach.

**Wildlife status**: The past week CROW, the wildlife rehabilitation clinic on Sanibel received 5 Double Crested Cormorants suffering from red tide poisoning. 1 died, 2 were euthanized and 2 are still being treated.

**Manatees**: Lee County Park staff reported up to 42 manatees congregating in the Orange River and FPL discharge canal the past week. Manatee season began on November 15th.
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Governing Board, Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
Paul Trites - J.N. "Ding" Darling National Wildlife Refuge (NWR) Complex
James Evans & Holly Milbrandt - City of Sanibel
Keith Kibbey & Lesli Haynes - Lee County
Rae Blake - Town of Fort Myers Beach
Connie Jarvis & Harry Phillips - City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D. - Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: November 29 - December 5, 2016

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: Discharges into the estuary at S-79 during the past week decreased to a weekly average of 651 cfs. Lake Okeechobee discharges to the river, measured at S-77, increased to an average of 882 cfs. Salinities have risen rapidly in the upper and middle estuary. Red tide persists in coastal waters.

USACE Action: The USACE continued flows to the Caloosahatchee to a 7-day average pulse of 650 cfs at S-79 and continued no discharge from Lake Okeechobee to the St Lucie estuary at S-80.

Recommendation: Due to rapidly rising salinities at Fort Myers we recommend increasing pulse releases to provide healthy salinities below 10 psu at Fort Myers and below 5 psu at Beautiful Island and to maintain a low salinity zone in the upper estuary. We request a Periodic Scientist call be scheduled next week to discuss rapidly rising salinities.

Lake Okeechobee Level: 14.68 ft. (Low Sub-Band) Last week: 14.79 ft.
Lake Okeechobee Inflow: 683 cfs Lake Okeechobee Outflow: 2,749 cfs
Weekly Rainfall: WP Franklin 0.08" Ortona 0.16 " Moore Haven 0.09"
Salinity Beautiful Island: 4.2 - 7.0 psu (SCCF RECON Marker 18) Previous wk 2.2 - 7.0 psu
Salinity Fort Myers: 7.3 – 12 psu (SCCF Yacht Basin) Previous wk 5.6 - 11 psu
Salinity Shell Point: 19 – 32 psu (SCCF RECON) Previous wk 18 - 31 psu

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>4.2 - 7.0</td>
<td>&lt; 5 psu</td>
<td>In Range</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>7.3 – 12</td>
<td>&lt;10 psu</td>
<td>In Range</td>
</tr>
<tr>
<td>Shell Point</td>
<td>19 – 32</td>
<td>25 - 32 psu</td>
<td>In Range</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tarpon Bay</td>
</tr>
<tr>
<td>Causeway</td>
</tr>
<tr>
<td>Sanibel E</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 651 cfs. Over the past 14 days 30% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 2.5% was delivered to the St Lucie at S-308, 61% was delivered south to the EAA, 5.5% was directed to the L8 and 1% was delivered thru S-310.

### ACOE November 25 Release at S-79

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Pulse Target</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/25/2016</td>
<td>1</td>
<td>900</td>
<td>741</td>
<td>405</td>
<td>842</td>
</tr>
<tr>
<td>11/26/2016</td>
<td>2</td>
<td>1000</td>
<td>947</td>
<td>501</td>
<td>852</td>
</tr>
<tr>
<td>11/27/2016</td>
<td>3</td>
<td>900</td>
<td>854</td>
<td>609</td>
<td>1078</td>
</tr>
<tr>
<td>11/28/2016</td>
<td>4</td>
<td>750</td>
<td>709</td>
<td>560</td>
<td>939</td>
</tr>
<tr>
<td>11/29/2016</td>
<td>5</td>
<td>400</td>
<td>421</td>
<td>271</td>
<td>639</td>
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<td>11/30/2016</td>
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<td>256</td>
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<td>592</td>
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<tr>
<td>12/1/2016</td>
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<td>617</td>
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<td>7 day avg</td>
<td></td>
<td>650</td>
<td>595</td>
<td>385</td>
<td>794</td>
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</table>

Upstream of S-79/Franklin Conditions: On 11/29/16 the Olga Water Treatment plant chlorides measured 52 mg/L, apparent color was 101 CU and turbidity measured 2.44 NTU. No visible algae was noted at the plant intake for the last week. The plant is online at 2000 GPM.

Upper Estuary Conditions: Salinities are in the suitable range for tape grass down to Fort Myers. The Beautiful Island RECON has been recording a phytoplankton bloom of over 20 µg chlorophyll/L.

Lower Estuary Condition: The average salinity at Shell Point was (27 psu); in the optimal range for oysters.

J.N. “Ding” Darling NWR:

<table>
<thead>
<tr>
<th>Monitor Site</th>
<th>Salinity (psu)</th>
<th>Diss O₂ (mg/L)</th>
<th>FDOM (µg/L)</th>
<th>Chlorophyll (µg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>McIntyre Creek</td>
<td>29.4 – 31.7</td>
<td>2.5 – 9.1</td>
<td>14.0 – 21.6</td>
<td>2.4 – 69.0</td>
</tr>
<tr>
<td>Tarpon Bay</td>
<td>30.2 – 33.9</td>
<td>5.0 – 7.6</td>
<td>9.2 – 23.6</td>
<td>3.2 – 7.0</td>
</tr>
</tbody>
</table>

**Beach Conditions**: Water clarity continues to improve. Red drift algae strandings continue on Sanibel and Fort Myers beaches, with accumulations on the beach and in the surf zone. Abundance and frequency appears to be increasing as water clarity improves following 9.5 months of excess flows and associated nutrient loading.

**Red Tide**: On 12/2/16, FWC reported Karenia brevis, the Florida red tide organism, persists in Southwest Florida from southern Pinellas to Lee County, with patches observed in Collier and northern Monroe counties. SCCF sampling on 12/5/16 found Karenia sp. concentrations of over 100,000 cells/L in Tarpon Bay and San Carlos Bay, <100,000 cells/L at Sanibel Boat Ramp and Tarpon Beach.

**Manatees**: Lee County Park staff reported up to 15 manatees congregating in the Orange River and FPL discharge canal the past week.
Drift algae accumulating on the beaches and in the wash zone from the north end to mid island of Fort Myers Beach 12/1-6/16. Photos Town of Fort Myers Beach. Note an accumulation of sea hares in the wrack line.

Below: Fort Myers Beach near Red Coconut RV Park. Photo 12/6/16.

Aerial photo of Sanibel Lighthouse and east end beaches on 12/5/16. Clearer water and small accumulations of algae. Photo Jim Szabo
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Governing Board, Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
James Evans & Holly Milbrandt - City of Sanibel
Keith Kibbey & Lesli Haynes - Lee County
Rae Blake – Town of Fort Myers Beach
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: December 6 - 12, 2016

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:** Discharges into the estuary at S-79 during the past week decreased to a weekly average of 700 cfs. Lake Okeechobee discharges to the river, measured at S-77, averaged 621 cfs. Salinities at Fort Myers continue to range above 10 psu in the middle estuary. Red tide persists, causing fish kills in coastal waters.

**USACE Action:** The USACE continued flows to the Caloosahatchee to a 7-day average pulse of 650 cfs at S-79 and continued no discharge from Lake Okeechobee to the St Lucie estuary at S-80.

**Recommendation:** Due to increasing salinities at Fort Myers we recommend pulse releases adequate to provide healthy salinities below 10 psu at Fort Myers and below 5 psu at Beautiful Island and to maintain a low salinity zone in the upper estuary.

<table>
<thead>
<tr>
<th>Lake Okeechobee Level:</th>
<th>14.61 ft. (Low Sub-Band)</th>
<th>Last week: 14.68 ft.</th>
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<tr>
<td>Lake Okeechobee Inflow:</td>
<td>825 cfs</td>
<td>Lake Okeechobee Outflow: 2,707 cfs</td>
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<tr>
<td>Weekly Rainfall:</td>
<td>WP Franklin 0.18&quot;</td>
<td>Ortona 0.33&quot;</td>
</tr>
<tr>
<td>Salinity Beautiful Island:</td>
<td>3.3 - 4.7 psu (SCCF RECON Marker 18)</td>
<td>Previous wk 4.2 - 7.0 psu</td>
</tr>
<tr>
<td>Salinity Fort Myers:</td>
<td>6.5 – 12 psu (SCCF Yacht Basin)</td>
<td>Previous wk 7.3 – 12 psu</td>
</tr>
<tr>
<td>Salinity Shell Point:</td>
<td>19 – 33 psu (SCCF RECON)</td>
<td>Previous wk 19 – 32 psu</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>3.3 - 4.7</td>
<td>&lt; 5 psu</td>
<td>In Range</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>6.5 – 12</td>
<td>&lt;10 psu</td>
<td>In Range</td>
</tr>
<tr>
<td>Shell Point</td>
<td>19 – 33</td>
<td>25 - 32 psu</td>
<td>In Range</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tarpon Bay</td>
</tr>
<tr>
<td>Causeway</td>
</tr>
<tr>
<td>Sanibel E</td>
</tr>
</tbody>
</table>
**Flow & Water Quality:** Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 700 cfs. Over the past 14 days 26% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 1% was delivered to the St Lucie at S-308, 63% was delivered south to the EAA, 8% was directed to the L8 and 2% was delivered thru S-310.

### ACOE Daily Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/6/2016</td>
<td>Tues</td>
<td>524</td>
<td>348</td>
<td>640</td>
</tr>
<tr>
<td>12/7/2016</td>
<td>Wed</td>
<td>360</td>
<td>296</td>
<td>504</td>
</tr>
<tr>
<td>12/8/2016</td>
<td>Thur</td>
<td>310</td>
<td>295</td>
<td>400</td>
</tr>
<tr>
<td>12/9/2016</td>
<td>Fri</td>
<td>1059</td>
<td>640</td>
<td>412</td>
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<td>12/12/2016</td>
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<td>465</td>
<td>845</td>
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**7 day Avg** 700 486 621

### Caloosahatchee Stations

<table>
<thead>
<tr>
<th>Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>fDOM (qse)</th>
<th>Turbidity (NTU)</th>
<th>25% to depth (meters)</th>
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<tbody>
<tr>
<td>Target</td>
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<td>&lt; 70</td>
<td>&lt; 18</td>
<td>CE = 1 m SCB = 2.2m</td>
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<tr>
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<td>9.0</td>
<td>33.3</td>
<td>1.2</td>
<td>1.82</td>
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<tr>
<td>Causeway</td>
<td>2.7</td>
<td>47.4</td>
<td>1.2</td>
<td>1.77</td>
</tr>
<tr>
<td>Sanibel E</td>
<td>2.6</td>
<td>28.9</td>
<td>1.4</td>
<td>2.03</td>
</tr>
</tbody>
</table>

**Upstream of S-79/Franklin Conditions:** On 12/13/16 the Olga Water Treatment plant chlorides measured 52 mg/L, apparent color was 74 CU and turbidity measured 1.28 NTU. No visible algae was noted at the plant intake for the last week. The plant is online at 2000 GPM.

**Upper Estuary Conditions:** Salinities are in the suitable range for tape grass down to Fort Myers.

**Lower Estuary Condition:** The average salinity at Shell Point was (27 psu); in the optimal range for oysters.

### J.N. “Ding” Darling NWR:

<table>
<thead>
<tr>
<th>Monitor Site</th>
<th>Salinity (psu)</th>
<th>Diss O₂ (mg/L)</th>
<th>FDOM (qqde)</th>
<th>Chlorophyll (µg/L)</th>
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</thead>
<tbody>
<tr>
<td>McIntyre Creek</td>
<td>30.7 – 33.5</td>
<td>3.3 – 10.2</td>
<td>8.0 – 19.0</td>
<td>1.8 – 15.0</td>
</tr>
<tr>
<td>Tarpon Bay</td>
<td>30.5 – 34.1</td>
<td>5.8 – 7.9</td>
<td>8.0 – 21.0</td>
<td>2.5 – 11.0</td>
</tr>
</tbody>
</table>

**Beach Conditions:** Water clarity continues to improve with very limited drift algae on Fort Myers Beach.

**Red Tide:** On 12/9/16, FWC reported *Karenia brevis*, the Florida red tide organism, persists in Southwest Florida from southern Pinellas to Lee County, with patches observed along Collier County. Dead fish, particularly Black drum were observed in local waters. SCCF sampling (to 12/16) found *Karenia* sp. concentrations of over 100,000 cells/L in a Refuge creek, Tarpon Bay and San Carlos Bay, and <100,000 cells/L at Tarpon Beach. Lee County received a report of hundreds of dead fish between Bokeelia and Boca Grande Pass accompanied by a very bad smell and sheen of oil on the water surface.

**Wildlife status:** The past two weeks, CROW, the wildlife rehabilitation clinic on Sanibel received 20 animals suffering from red tide poisoning; 18 Double Crested Cormorants, 1 Green Sea Turtle and 1 Sandwich Tern.

**Manatees:** Lee County Park staff reported up to 100 manatees congregating in the Orange River and FPL discharge canal the past week with larger numbers as cold fronts drop water temperatures. At least one manatee was rescued suffering from red tide.
MEMORANDUM

To: USACE Colonel Jason A. Kirk, LTC Jennifer A. Reynolds, Richard McMillen, Kim Taplin, SFWMD Governing Board, Executive Director Peter Antonacci, Terrie Bates, Susan Gray, Peter Doering, DEP Secretary Jon Steverson

From: Periodic Scientists Conference Call Participants
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Rae Blake – Town of Fort Myers Beach
Connie Jarvis & Harry Phillips – City of Cape Coral
Rae Ann Wessel & Rick Bartleson, Ph.D.-Sanibel Captiva Conservation Foundation

Subject: Caloosahatchee & Estuary Condition Report

Reporting Period: December 13 - 19, 2016

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: Discharges into the estuary at S-79 during the past week decreased to a weekly average of 685 cfs. Lake Okeechobee discharges to the river, measured at S-77, averaged 710 cfs.

USACE Action: As of 12/20/16 the USACE continued flows to the Caloosahatchee to a 7-day average pulse of 650 cfs at S-79.

Recommendation: We recommend pulse releases adequate to provide healthy salinities below 10 psu at Fort Myers and below 5 psu at Beautiful Island to maintain a low salinity zone in the upper estuary.

Lake Okeechobee Level: NR* ft. (Low Sub-Band)  Last week: 14.61 ft.
Lake Okeechobee Inflow: 0 cfs*  Lake Okeechobee Outflow: 765 cfs*
Weekly Rainfall: WP Franklin* 0.0“  Ortona 0.00 ”  Moore Haven 0.03“
Salinity Beautiful Island: 0.7 – 5.3 psu (SCCF RECON Marker 18)  Previous wk 3.3 – 4.7 psu
Salinity Fort Myers: 6.5 – 13 psu (SCCF Yacht Basin)  Previous wk 6.5 – 12 psu
Salinity Shell Point: 14 – 33 psu (SCCF RECON)  Previous wk 19 – 33 psu

<table>
<thead>
<tr>
<th>Salinity (psu)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Is</td>
<td>0.7 – 5.3</td>
<td>&lt; 5 psu</td>
<td>In Range</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>6.5 – 13</td>
<td>&lt;10 psu</td>
<td>In Range</td>
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<tr>
<td>Shell Point</td>
<td>14 – 33</td>
<td>25 - 32 psu</td>
<td>In Range</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Light (25% Iz depth meters)</th>
<th>Current Value</th>
<th>Sustainable Range</th>
<th>High/ Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tarpon Bay</td>
<td>1.75</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
<tr>
<td>Causeway</td>
<td>2.14</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
<tr>
<td>Sanibel E</td>
<td>2.46</td>
<td>2.2 meters</td>
<td>Low</td>
</tr>
</tbody>
</table>
Flow & Water Quality: Flows to the Caloosahatchee Estuary at S-79 during the past seven days averaged 685 cfs. Over the past 14 days 31% of Lake Okeechobee outflow was directed to the Caloosahatchee at S-77, 1% was delivered to the St Lucie at S-308, 53% was delivered south to the EAA, 13% was directed to the L8 and 1% was delivered thru S-310.

### ACOE Daily Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>S79 Flow (cfs)</th>
<th>S78 Flow (cfs)</th>
<th>S77 Flow (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/13/2016</td>
<td>Tues</td>
<td>440</td>
<td>382</td>
<td>829</td>
</tr>
<tr>
<td>12/14/2016</td>
<td>Wed</td>
<td>388</td>
<td>NR</td>
<td>280</td>
</tr>
<tr>
<td>12/15/2016</td>
<td>Thur</td>
<td>289</td>
<td>NR</td>
<td>136</td>
</tr>
<tr>
<td>12/16/2016</td>
<td>Fri</td>
<td>882</td>
<td>568</td>
<td>584</td>
</tr>
<tr>
<td>12/17/2016</td>
<td>Sat</td>
<td>952</td>
<td>795</td>
<td>1136</td>
</tr>
<tr>
<td>12/18/2016</td>
<td>Sun</td>
<td>NR</td>
<td>801</td>
<td>1242</td>
</tr>
<tr>
<td>12/19/2016</td>
<td>Mon</td>
<td>915</td>
<td>801</td>
<td>765</td>
</tr>
<tr>
<td>7 day Avg</td>
<td></td>
<td>685*</td>
<td>669*</td>
<td>710</td>
</tr>
</tbody>
</table>

Upstream of S-79/Franklin Conditions: On 12/20/16 the Olga Water Treatment plant chlorides measured 52 mg/L, apparent color was 80 CU and turbidity measured 1.39 NTU. No visible algae was noted at the plant intake for the last week. The plant is online at 2000 GPM.

Upper Estuary Conditions: Salinities are in the suitable range for tape grass down to Fort Myers.

Lower Estuary Condition: The average salinity at Shell Point was (27 psu); in the optimal range for oysters. Drift algae is accumulating on the bottom in some areas in San Carlos Bay.

J.N. “Ding” Darling NWR:

<table>
<thead>
<tr>
<th>Monitor Site</th>
<th>Salinity (psu)</th>
<th>Diss O₂ (mg/L)</th>
<th>FDOM (qse)</th>
<th>Chlorophyll (µg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>McIntyre Creek</td>
<td>30.5 – 32.0</td>
<td>3.2 – 9.2</td>
<td>12.0 – 21.0</td>
<td>1.4 – 5.0</td>
</tr>
<tr>
<td>Tarpon Bay</td>
<td>31.2 – 33.5</td>
<td>5.5 – 7.3</td>
<td>9.0 – 22.0</td>
<td>1.3 – 5.0</td>
</tr>
</tbody>
</table>

Oysters: December sampling in the Caloosahatchee by FGCU reported disease prevalence of *Perkinsus marinus* of all oysters sampled ranged from 60.00% to 46.66%. Disease intensity of *P. marinus* ranged from 0.47 to 0.73. Scale 0 = no infection, 1 = low, 3 = medium, 5 = high. Larval recruitment ranged from 0.28 to 1.89 spat per shell.

Red Tide: On 12/16/16, FWC reported *Karenia brevis*, the Florida red tide organism, persists in Southwest Florida from southern Pinellas to Lee County, with medium concentrations observed along Collier County. SCCF *Karenia* sp. sampling on 12/19/16 found low concentrations in Dinkin’s Bayou and none at Tarpon Beach, Tarpon Bay, or San Carlos Bay.

Manatees: Lee County Park staff reported up to 49 manatees congregating in the Orange River and FPL discharge canal the past week.

*Data was not recorded one or more days resulting in incomplete data.

<table>
<thead>
<tr>
<th>Caloosahatchee Stations</th>
<th>Chlorophyll (µg/L)</th>
<th>fDOM (qse)</th>
<th>Turbidity (NTU)</th>
<th>25% Io depth (meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Values</td>
<td>&lt; 11</td>
<td>CE &lt;70</td>
<td>CE &lt; 18</td>
<td>CE = 1 m SCB = 2.2m</td>
</tr>
<tr>
<td>Tarpon Bay</td>
<td>3.9</td>
<td>47.9</td>
<td>1.1</td>
<td>1.75</td>
</tr>
<tr>
<td>Causeway</td>
<td>1.7</td>
<td>23.3</td>
<td>1.5</td>
<td>2.14</td>
</tr>
<tr>
<td>Sanibel E</td>
<td>1.6</td>
<td>10.5</td>
<td>1.4</td>
<td>2.46</td>
</tr>
</tbody>
</table>

Target light penetration: 

**CE** - Caloosahatchee Estuary =1 m  
**SCB** - San Carlos Bay = 2.2 meters

Definition of 25% Io: \[ z \text{ where } I = 25\% \text{ of surface } I. \] 

I = irradiance, z = depth