Decommission of Data Collection Platforms for LA-0016 Non-Rock Alternatives Shoreline Protection Demonstration Project

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1. Map of project area depicting data collection platforms (DCPs).

APPENDICES

Appendix

A. Bi-monthly Trip Reports
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1.0 Introduction

ENCOS, Inc. (ENCOS) was contracted by SWCA Environmental Consultants (SWCA), in September 2016 to provide data collection for a six-month period. This project supports the Louisiana Coastal Protection and Restoration Authority's (CPRA) LA-0016 Non-Rock Alternatives to Shoreline Protection Demonstration Project. ENCOS provided data collection services associated with the monitoring of incident and transmitted waves, atmospheric pressure, and continuous water level. The objective of this project was to quantify wave attenuation at four types of breakwaters (products) that were previously installed at the project site in Vermilion Bay off the shoreline of Shark Island, LA. This report summarizes the project and documents the field activities associated with the project conclusion.

2.0 Data Collection

ENCOS installed and maintained five (5) Data Collection Platforms (DCPs) for a six-month period beginning on November 3, 2016 and ending on May 16, 2017. At each data collection site, ENCOS installed one (1) capacitance wave logger located behind each demonstration breakwater structure for a total of four (4) inshore wave loggers. At the offshore data collection platform, one (1) high resolution pressure sensor wave gage was co-located with the ADCP equipment, multi-parameter data sonde, and barometric pressure sensor to make up the offshore station.

ENCOS visited each data collection site on a bi-monthly basis to recover data, clean the sensors, and calibrate the pressure sensors. Bi-monthly trip reports are in Appendix A. A map of the project area (Figure 1) depicts the DCP locations. Station measurements and station photographs are in Tables 1-5.

3.0 Data Summary

The data chronology is shown in Appendix B.

4.0 Station Removal Field Activities

For the conclusion of this project, ENCOS extracted all equipment and associated structures from the project area over the span of three (3) days. In conjunction with the station decommissioning, ENCOS conducted a final station servicing prior to decommissioning the data collection stations. The following is a chronological summary of the final data recovery trip and decommissioning field days.
May 16, 2017 – ENCOS personnel, accompanied by an SWCA representative, conducted the final data servicing at each data collection site before removing the data collection equipment. After removing all wave gauges and other sensitive equipment the crew then began removing station infrastructure from each inshore data collection site. During removal, the vertical pipe at Sites 1, 2, and 4 broke and remained above the mud line but below the water surface. After the pipes broke, the field team determined that additional equipment was required to successfully remove the broken pipes. The field team returned to the dock and organized all removed material and equipment for field activities the following day.

May 17, 2017 – ENCOS personnel, accompanied by an SWCA representative, traveled to the offshore site (Site 5) to attempt to remove the DCP. After an unsuccessful attempt at tying up to the offshore station, the crew determined that the weather was too rough to safely perform the work. The crew then returned to the inshore data collection at Sites 1, 2, and 4 to locate and marked the vertical pipes that broke during extraction. Each broken vertical pipe was located and marked with another vertical pipe as reference for their removal at a later date.

May 25, 2017 – ENCOS personnel returned with an SWCA representative to remove the remaining pipes at the inshore sites and to remove the offshore site. The field crew used a davit with a pulley system inserted into one leg of the offshore 4 leg platform and removed 3 legs successfully. The davit was then mounted to the service vessel to remove the remaining leg of the offshore platform. To hasten the final legs’ removal, a pipe was inserted next to the remaining pipe and water was pumped down to loosen the sediments around the pipe. Once the sediments were loosened, the vessel mounted davit was used to remove the pipe and set it in the service vessel.

The vessel mounted davit was used to remove the remaining broken pipes at sites 1, 2, and 4. The broken vertical pipes at sites 1, 2, and 4 were removed without incident.

Photo Log showing before and after removal photographs are in Section 8.0 of this report.

5.0 Access Rights and Rights of Entry

Access agreements were negotiated between the Natural Resource Conservation Service (NRCS) and the affected landowner. There were no access restrictions to the project area during the data collection period.

6.0 Surveys

NRCS provided the survey team and surveyed each DCP at the top of the casing (TOC) for vertical control of water level. ENCOS made the necessary adjustments to the water level data and adjusted the water levels to North American Vertical Datum 1988 (NAVD 88).

7.0 Conclusion
ENCOS was contracted by SWCA to provide data collection during the period of September 20, 2016 through May 16, 2017. Five (5) DCPs were installed and began data collection began on November 3, 2016 and continued through May 16, 2017. The ENCOS field team calibrated all pressure sensors of each OSSI wave gauge, the vented water level at site 5, and the ADCP wave gauge prior to initiating data collection. All hydrographic and wave gauge instruments recorded data in Central Standard Time (CST). For the six-month period, as contracted, ENCOS serviced the instruments bi-monthly, QAQC all collected data, collated data into an acceptable format for the FTN modeler, and composed monthly trip reports.

8.0 Photolog

Before/After Removal

Site 01
Before/After Removal

Site 02

Before/After Removal

Site 03
Before/After Removal

Site 04
Site 05-Offshore
All pipe is 1½" (not drawn to scale)

Front view

Side view

Table 1

<table>
<thead>
<tr>
<th>Site 1 wave guage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument Model #</td>
</tr>
<tr>
<td>Instrument Serial Number</td>
</tr>
<tr>
<td>Date</td>
</tr>
<tr>
<td>time (CST)</td>
</tr>
<tr>
<td>Staff Length</td>
</tr>
<tr>
<td>Sample Rate (hz)</td>
</tr>
<tr>
<td>Burst Length (min)</td>
</tr>
<tr>
<td>Burst Interval (min)</td>
</tr>
<tr>
<td>Start Date</td>
</tr>
<tr>
<td>Start Time (CST)</td>
</tr>
<tr>
<td>NAVD Survey Elevation (ft)</td>
</tr>
</tbody>
</table>
All pipe is $1 \frac{1}{2}''$ (not drawn to scale)

<table>
<thead>
<tr>
<th>Site 2 wave guage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument Model #</td>
</tr>
<tr>
<td>Instrument Serial Number</td>
</tr>
<tr>
<td>Date</td>
</tr>
<tr>
<td>time (CST)</td>
</tr>
<tr>
<td>Staff Length</td>
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<tr>
<td>Sample Rate (hz)</td>
</tr>
<tr>
<td>Burst Length (min)</td>
</tr>
<tr>
<td>Burst Interval (min)</td>
</tr>
<tr>
<td>Start Date</td>
</tr>
<tr>
<td>Start Time (CST)</td>
</tr>
<tr>
<td>NAVD Survey Elevation (ft)</td>
</tr>
</tbody>
</table>

Front view

Side view

Table 2
All pipe is 1 1/2" (not drawn to scale)

### Site 3 wave guage

<table>
<thead>
<tr>
<th>Instrument Model #</th>
<th>OSSI-010-004E-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument Serial Number</td>
<td>10.14.16.00.03</td>
</tr>
<tr>
<td>Date</td>
<td>11/3/2016</td>
</tr>
<tr>
<td>time (CST)</td>
<td>900</td>
</tr>
<tr>
<td>Staff Length</td>
<td>2</td>
</tr>
<tr>
<td>Sample Rate (hz)</td>
<td>10</td>
</tr>
<tr>
<td>Burst Length (min)</td>
<td>15</td>
</tr>
<tr>
<td>Burst Interval (min)</td>
<td>60</td>
</tr>
<tr>
<td>Start Date</td>
<td>11/3/2016</td>
</tr>
<tr>
<td>Start Time (CST)</td>
<td>1800</td>
</tr>
<tr>
<td>NAVD Survey Elevation (ft)</td>
<td>6.7230</td>
</tr>
</tbody>
</table>

**Table 3**
All pipe is 1 1/2" (not drawn to scale)

### Site 4 wave guage

<table>
<thead>
<tr>
<th>Instrument Model #</th>
<th>OSSI-010-004E-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument Serial Number</td>
<td>10.14.16.00.04</td>
</tr>
<tr>
<td>Date</td>
<td>11/3/2016</td>
</tr>
<tr>
<td>time (CST)</td>
<td>830</td>
</tr>
<tr>
<td>Staff Length</td>
<td>2</td>
</tr>
<tr>
<td>Sample Rate (hz)</td>
<td>10</td>
</tr>
<tr>
<td>Burst Length (min)</td>
<td>15</td>
</tr>
<tr>
<td>Burst Interval (min)</td>
<td>60</td>
</tr>
<tr>
<td>Start Date</td>
<td>11/3/2016</td>
</tr>
<tr>
<td>Start Time (CST)</td>
<td>1800</td>
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<tr>
<td>NAVD Survey Elevation (ft)</td>
<td>7.2560</td>
</tr>
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Table 4
**Site 5 offshore, ADCP**

<table>
<thead>
<tr>
<th>Instrument Model #</th>
<th>WHM1200-1-UG19</th>
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</thead>
<tbody>
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<td>Instrument Serial Number</td>
<td>2202</td>
</tr>
<tr>
<td>Date</td>
<td>11/3/2016</td>
</tr>
<tr>
<td>Time (CST)</td>
<td>1055</td>
</tr>
<tr>
<td>Staff Length</td>
<td>N/A</td>
</tr>
<tr>
<td>Sample Rate (Hz)</td>
<td>10</td>
</tr>
<tr>
<td>Burst Length (min)</td>
<td>15</td>
</tr>
<tr>
<td>Burst Interval (min)</td>
<td>80</td>
</tr>
<tr>
<td>Start Date</td>
<td>11/3/2016</td>
</tr>
<tr>
<td>Start Time (CST)</td>
<td>1800</td>
</tr>
</tbody>
</table>

**Site 5 offshore, Pressure Sensor**

<table>
<thead>
<tr>
<th>Instrument Model #</th>
<th>OSSI-010-003C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument Serial Number</td>
<td>10.14.16.00.06</td>
</tr>
<tr>
<td>Date</td>
<td>11/3/2016</td>
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<tr>
<td>Time (CST)</td>
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<tr>
<td>Sample Rate (Hz)</td>
<td>10</td>
</tr>
<tr>
<td>Burst Length (min)</td>
<td>15</td>
</tr>
<tr>
<td>Burst Interval (min)</td>
<td>80</td>
</tr>
<tr>
<td>Start Date</td>
<td>11/3/2016</td>
</tr>
<tr>
<td>Start Time (CST)</td>
<td>1800</td>
</tr>
</tbody>
</table>

**Site 5 offshore, Sonde**

<table>
<thead>
<tr>
<th>Instrument Model #</th>
<th>YSI 6920V2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument Serial Number</td>
<td>13C101646</td>
</tr>
<tr>
<td>Date</td>
<td>11/3/2016</td>
</tr>
<tr>
<td>Time (CST)</td>
<td>1055</td>
</tr>
<tr>
<td>Deploy Filename</td>
<td>SI-05</td>
</tr>
<tr>
<td>Battery Volts</td>
<td>12,4000</td>
</tr>
<tr>
<td>Interval</td>
<td>10</td>
</tr>
<tr>
<td>Start Date</td>
<td>11/3/2016</td>
</tr>
<tr>
<td>Start Time (CST)</td>
<td>1800</td>
</tr>
</tbody>
</table>

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Mark Elevation (NAVD) (Ao) = 3.404

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**Table 5**
Figures
Appendix A

Bi-monthly Trip Reports
Trip Report

Project: 16-0063 Wave Attenuation at Various Structures

Location: Vermillion Bay

Purpose: Data recovery and sampling scheme adjustments

Personnel Involved: Adam Trahan, Joel Chaky, Ronnie Hoefeld, and Alex Fortenberry (ENCOS)

Date: November 10, 2016 and November 22, 2016

Conditions: Skies: clear and sunny; Winds: SW @ 5 mph; Temperature: High 95°F, Low 75°F

Logistics:

The above-mentioned ENCOS personnel arrived at Quintana public boat launch on LA Hwy 319 in Cypremort Point, LA on November 10 to collect recorded data after one week of data collection. The collection run was performed to evaluate the collected data and verify the performance of the installed data collection equipment. The field team loaded all necessary data recovery equipment into the boat and traveled to the data collection locations from the Quintana boat launch.

A second trip on November 22 was made to the study site with the primary purpose of installing new firmware on the ADCP to collect wave data at a frequency greater than 2 Hz.

Field Activities:

November 10, 2016

The field team of Adam Trahan, Alex Fortenberry, Ronnie Hoefeld, and Blain Cerame (SWCA) arrived at the Quintana boat launch located in Cypremort Point, LA. The necessary field equipment was loaded into the vessel by the field team and secured for travel to the study site on the west facing shoreline of Shark Island in Vermillion Bay. The field team downloaded the collected data from the installed wave loggers located behind each constructed structure. After recovering the data, the field team verified the proper operation each instrument, its sampling frequency, sampling time and sample interval. The field team did note that the file size at site 02 was much larger than the other wave logger files downloaded and processing of the data would tell of any issues once back at ENCOS office. No problems were noted for any of the instruments serviced. The offshore ADCP was downloaded via communications cable and a new script file command sent for a new deployment. After one week or more of data is collected, the field team will return to the station and recover the data for further evaluation. No issues with the any equipment were noted during this field trip.

November 22, 2016

The field team of Alex Fortenberry, Ronnie Hoefeld, and Joel Chaky arrived at the Quintana boat launch located in Cypremort Point, LA. The necessary field equipment was loaded into the vessel by the field team and secured for travel to the study site on the west facing shoreline of Shark
Island in Vermillion Bay. The field team downloaded the collected data from the installed wave loggers located behind each constructed structure. After recovering the data, the field team verified the proper operation each instrument, its sampling frequency, sampling time and sample interval. No problems were noted for any of the instruments serviced.

The offshore ADCP was recovered to perform maintenance, recover the memory cards, and install new firmware. The firmware upgrade allows the ADCP to collect data at a higher sample rate than of the original system configuration. After one week or more of data is collected, the field team will return to the station and recover the data for further evaluation. No issues with the any equipment were noted during this field trip.

**Calibrations:**

ENCOS personnel performed calibrations on an YSI 6920V2 collecting water level data at the offshore site. The water level readings were downloaded and instrument was calibrated to 0.0 feet at the water surface. All times and date stamps are set to Central Standard Time (CST).

**Data Collection:**

Data was collected from each Wave Logger via a download of the flash card in each device. The data collected from Sites 1, 3, and 4, all appeared to be of the same size and file type. Upon download the data file from the device at site 2 appeared much larger than the others. The data was analyzed and declared inaccurate. After troubleshooting and a second download of new data collected by the Wave Logger at site 2 the recordings and the data was accurate once again. No issues have been noticed since.
Trip Report

Project: 16-0063 Wave Attenuation at Various Structures

Location: Vermillion Bay

Purpose: Data recovery and Acoustic Doppler Current Profiler (ADCP) sampling scheme adjustments.

Personnel Involved: Joel Chaky (ENCOS), and Alex Fortenberry (ENCOS)

Date: December 19, 2016

Conditions: Skies: clear and sunny; Winds: NE @ 20-30 mph; Temperature: 45°F.

Logistics:

The above-mentioned ENCOS personnel arrived at Quintana public boat launch on LA Hwy 319 in Cypremort Point, LA on November 10 to collect recorded data after one week of data collection. The collection run was performed to evaluate the collected data and verify the performance of the installed data collection equipment. The field team loaded all necessary data recovery equipment into the boat and traveled to the data collection locations from the Quintana boat launch.

A second trip on November 22 was made to the study site with the primary purpose of installing new firmware on the ADCP to collect wave data at a frequency greater than 2 Hz.

Field Activities:

December 19, 2016

The field team of Alex Fortenberry and Joel Chaky arrived at the Quintana boat launch located in Cypremort Point, LA. The field computer and associated cables were loaded into the vessel for travel to Site 5, which houses the ADCP, on the west facing shoreline of Shark Island in Vermillion Bay. The trip was to make additional adjustments to the ADCP programming. The commands reset the instrument to collect the acoustic data in beam coordinates to better resolve wave direction data.

Calibrations:

No calibrations were performed during this field visit.

Data Collection:

No data was collected for this trip. The trip focused solely on the reconfiguring the ADCP sampling scheme.
Trip Report

Project: 16-0063 Wave Attenuation at Various Structures

Location: Vermillion Bay

Purpose: Data recovery and Acoustic Doppler Current Profiler (ADCP) sampling scheme adjustments.

Personnel Involved: Joel Chaky (ENCOS), and Ronnie Hoefeld (ENCOS)

Date: January 3, 2017

Conditions: Skies: partly cloudy; Winds: NW @ 10-15 mph; Temperature: 65°F.

Logistics:

The above-mentioned ENCOS personnel arrived at Quintana public boat launch on LA Hwy 319 in Cypremort Point, LA on January 3 to collect recorded data after approximately two weeks of data collection. The collection run was performed to evaluate the collected data and verify the performance of the installed data collection equipment. The field team loaded all necessary data recovery equipment into the boat and traveled to the data collection locations from the Quintana boat launch.

Field Activities:

January 3, 2017

The field team of Joel Chaky and Ronnie Hoefeld arrived at the Quintana boat launch located in Cypremort Point, LA. The necessary field equipment was loaded into the vessel by the field team and secured for travel to the study site on the west facing shoreline of Shark Island in Vermillion Bay. The field team downloaded the collected data from the installed wave loggers located behind each constructed structure. After recovering the data, the field team verified the proper operation of each instrument, its sampling frequency, sampling time and sample interval. The field team then traveled to Site 5, which houses the ADCP, on the west facing shoreline of Shark Island in Vermillion Bay. The ADCP was recovered, data downloaded, and redeployed. The water level instrument installed on the station was downloaded, cleaned and the pressure sensor was set to 0 before initiating logging.

Data Collection:

Data was collected from each Wave Logger via a download of the flash card in each device. The data collected from Sites 1, 2, 3, and 4, all appeared to be of the same size and file type after review in the field. Data was also downloaded via a flash card device from the ADCP and Wave Gauge located at Site 5. Air pressure and air temperature data was also downloaded from a separate barometer located on the Site 5 structure. Water level data was collected from the YSI 6920V2 situated at Site 5. No issues were noted after a quick field analysis of any of this data.
Calibrations:

ENCOS personnel downloaded the data from the YSI 6920-V2 installed at Site5 and calibrated it to 0.0 feet at the water surface prior to deployment. All times and date stamps are set to Central Standard Time (CST).

The ADCP and wave gauge pressure sensor was set to zero at the water surface prior to deployment of the respective instruments.
Trip Report

**Project:** 16-0063 Wave Attenuation at Various Structures

**Location:** Vermillion Bay

**Purpose:** Data recovery

**Personnel Involved:** Ronnie Hoefeld (ENCOS) and Alex Fortenberry (ENCOS)

**Date:** January 17, 2017

**Conditions:** Skies: dense fog, partly cloudy skies; Winds: W @ 10 mph; Temperature: 65°F.

**Logistics:**

The above-mentioned ENCOS personnel arrived at Quintana public boat launch on LA Hwy 319 in Cypremort Point, LA on January 17 to collect recorded data after approximately two weeks of data collection. The collection run was performed to evaluate the collected data and verify the performance of the installed data collection equipment. The field team loaded all necessary data recovery equipment into the boat and traveled to the data collection locations from the Quintana boat launch.

**Field Activities:**

**January 17, 2017**

The field team of Ronnie Hoefeld and Alex Fortenberry arrived at the Quintana boat launch located in Cypremort Point, LA. The necessary field equipment was loaded into the vessel by the field team and secured for travel to the study site on the west facing shoreline of Shark Island in Vermillion Bay. The field team downloaded the collected data from the installed wave loggers located behind each constructed structure. After recovering the data, the field team verified the proper operation of each instrument, its sampling frequency, sampling time and sample interval. The field team then traveled to Site 5, which houses the ADCP, on the west facing shoreline of Shark Island in Vermillion Bay to retrieve data collected by all instruments on Site 5.

**Data Collection:**

Data was collected from each Wave Logger via a download of the flash card in each device. The data collected from Sites 1, 2, 3, and 4, all appeared to be of the same size and file type. After recovering the data from each near shore wave gauge, the instruments logging sequence was verified. The field team connected to near shore wave gauges to initiate data logging.

During the manipulation of the data, the files for the period of January 3, 2017 to January 17 were inadvertently overwritten with older files. The loggers are not capable of accepting unique filenames for deployments. To avoid confusion in the future the field team will create folders for
each nearshore site with the date of the data recovery. This folder will be transferred directly to the server upon return to the office.

Data was downloaded from the ADCP and Wave Gauge flash disks, which are deployed concurrently at Site 5. Pressure and temperature data was also downloaded from a separate barometer located on the Site 5 structure. Water level data was recovered from the YSI 6920V2 situated at Site 5. No issues were noted after a quick field analysis of this data.

**Calibrations:**

ENCOS personnel downloaded the data from the YSI 6920-V2 installed at Site5 and calibrated it to 0.0 feet at the water surface prior to deployment. All times and date stamps are set to Central Standard Time (CST).

The ADCP and wave gauge pressure sensors were set to zero at the water surface prior to deployment of the respective instruments.
Trip Report

Project: 16-0063 Wave Attenuation at Various Structures

Location: Vermillion Bay

Purpose: Data recovery

Personnel Involved: Ronnie Hoefeld (ENCOS), Alex Fortenberry (ENCOS), and Caleb Foreman (SWCA)

Date: February 3, 2017

Conditions: Skies: Partly cloudy skies; Winds: N @ 15-20 mph; Temperature: 65°F.

Logistics:

The above-mentioned ENCOS and SWCA personnel arrived at Quintana public boat launch on LA Hwy 319 in Cypremort Point, LA on February 3 to collect recorded data after approximately two weeks of data collection. The collection run was performed to evaluate the collected data and verify the performance of the installed data collection equipment. The field team loaded all necessary data recovery equipment into the boat and traveled to the data collection locations from the Quintana boat launch.

Field Activities:

February 3, 2017

The field team of Ronnie Hoefeld, Alex Fortenberry, and Caleb Foreman arrived at the Quintana boat launch located in Cypremort Point, LA. The necessary field equipment was loaded into the vessel by the field team and secured for travel to the study site on the west facing shoreline of Shark Island in Vermillion Bay. The field team downloaded the collected data from the installed wave loggers located behind each constructed structure. After recovering the data, the field team verified the proper operation of each instrument, its sampling frequency, sampling time and sample interval. The field team then traveled to Site 5, which houses the ADCP, on the west facing shoreline of Shark Island in Vermillion Bay to retrieve data collected by all instruments on Site 5.

Data Collection:

Data was collected from each Wave Logger via a download of the flash card in each device. The data collected from Sites 1, 2, 3, and 4, all appeared to be of the same size and file type. After recovering the data from each near shore wave gauge, the instruments’ logging sequence was verified. The field team connected to near shore wave gauges to initiate data logging.

Due to inclement weather conditions and equipment malfunction, data was unable to be downloaded from the ADCP and the YSI 6920V2. Data was able to be obtained from the offshore Wave Gauge flash disks. Pressure and temperature data was also downloaded from a separate barometer located on the Site 5 structure. No issues were noted after a quick field analysis of this
Trip Report

Project: 16-0063 Wave Attenuation at Various Structures
Location: Vermillion Bay
Purpose: Data recovery
Personnel Involved: Ronnie Hoefeld (ENCOS), Alex Fortenberry (ENCOS), and Jacob Foreman (SWCA)
Date: January 6, 2017
Conditions: Skies: Partly cloudy skies; Winds: S @ 10-15 mph; Temperature: 65°F.

Logistics:
The above-mentioned ENCOS and SWCA personnel arrived at Quintana public boat launch on LA Hwy 319 in Cypremort Point, LA on February 6 to collect recorded data from the ADCP and the YSI 6920V2. The collection run was performed to evaluate the collected data and verify the performance of the installed data collection equipment after failing to retrieve the data on February 3 due to equipment malfunction and inclement weather conditions. The field team loaded all necessary data recovery equipment into the boat and traveled to the data collection locations from the Quintana boat launch.

Field Activities:
February 6, 2017

The field team of Ronnie Hoefeld, Alex Fortenberry, and Jacob Foreman arrived at the Quintana boat launch located in Cypremort Point, LA. The necessary field equipment was loaded into the vessel by the field team and secured for travel to the study site on the west facing shoreline of Shark Island in Vermillion Bay. The field team traveled to Site 5, which houses the ADCP and YSI 6920V2, on the west facing shoreline of Shark Island in Vermillion Bay to retrieve data collected by these instruments on Site 5.

Data Collection:

After attempting to download data from the ADCP, it was noted that both memory card devices were empty. The field team then changed the battery pack and re-calibrated the ADCP pressure sensor before deploying the instrument back into the water. Water level data was recovered from the YSI 6920V2 situated at Site 5. No issues were noted after a quick field analysis of this data.

Calibrations:

ENCOS personnel downloaded the data from the YSI 6920-V2 installed at Site5 and calibrated it to 0.0 feet at the water surface prior to deployment. All times and date stamps are set to Central Standard Time (CST).
The ADCP pressure sensor was set to zero at the water surface prior to deployment of the instrument. A trip was then planned for February 8, 2017 in order to verify the logging of the ADCP.
Trip Report

Project: 16-0063 Wave Attenuation at Various Structures
Location: Vermillion Bay
Purpose: Data recovery
Personnel Involved: Ronnie Hoefeld (ENCOS), Alex Fortenberry (ENCOS), and Adam Trahan (ENCOS)
Date: February 8, 2017
Conditions: Skies: dense fog, partly cloudy skies; Winds: SW @ 10-15 mph; Temperature: 70°F.

Logistics:
The above-mentioned ENCOS personnel arrived at Quintana public boat launch on LA Hwy 319 in Cypremort Point, LA on February 8 to collect recorded data after approximately 5 days of data collection at the inshore sites and to verify the logging of the ADCP at the offshore site after 2 days since recalibrating the instrument. The collection run was performed to evaluate the collected data and verify the performance of the installed data collection equipment. The field team loaded all necessary data recovery equipment into the boat and traveled to the data collection locations from the Quintana boat launch.

Field Activities:

February 8, 2017

The field team of Ronnie Hoefeld, Alex Fortenberry, and Adam Trahan arrived at the Quintana boat launch located in Cypremort Point, L.A. The necessary field equipment was loaded into the vessel by the field team and secured for travel to the study site on the west facing shoreline of Shark Island in Vermillion Bay. The field team downloaded the collected data from the installed wave loggers located behind each constructed structure. After recovering the data, the field team verified the proper operation of each instrument, its sampling frequency, sampling time and sample interval. The field team then traveled to Site 5, which houses the ADCP, on the west facing shoreline of Shark Island in Vermillion Bay to verify the ADCP was continuously logging after a re-calibration was performed 2 days prior.

Data Collection:

Data was collected from each Wave Logger via a download of the flash card in each device. The data collected from Sites 1, 2, 3, and 4, all appeared to be of the same size and file type. After recovering the data from each near shore wave gauge, the instruments logging sequence was verified. The field team connected to near shore wave gauges to initiate data logging.
The field team then travelled to Site 5 to verify the continuous logging of the ADCP. After connecting to the instrument, it was verified that the ADCP was in fact working properly and continuously logging data.
Trip Report

Project: 16-0063 Wave Attenuation at Various Structures

Location: Vermillion Bay

Purpose: Data recovery

Personnel Involved: Joel Chaky (ENCOS), Kenny Sisung (ENCOS), and Jacob Foreman (SWCA)

Date: February 23, 2017

Conditions: Skies: clear; Winds: SW @ 5-10 mph; Temperature: 70°F.

Logistics:

The above-mentioned ENCOS and SWCA personnel arrived at Quintana public boat launch on LA Hwy 319 in Cypremort Point, LA on February 3 to collect recorded data after approximately two weeks of data collection. The collection run was performed to evaluate the collected data and verify the performance of the installed data collection equipment. The field team loaded all necessary data recovery equipment into the boat and traveled to the data collection locations from the Quintana boat launch.

Field Activities:

February 23, 2017

The field team of Joel Chaky, Kenny Sisung, and Jacob Foreman arrived at the Quintana boat launch located in Cypremort Point, LA. The necessary field equipment was loaded into the vessel by the field team and secured for travel to the study site on the west facing shoreline of Shark Island in Vermillion Bay. The field team downloaded the collected data from the installed wave loggers located behind each constructed structure. The field team serviced the instruments measuring waves, water level and barometric pressure at the station installed offshore from the breakwaters.

Data Collection:

Data was recovered from all instruments installed at Site 5 located offshore from the installed breakwaters. The data collected from each site was barometric pressure, water level, ADCP directional wave data, and high resolution wave gauge data. All data was recovered without incident. Prior to deployment the ADCP, water level instrument, and high resolution pressure gauge were calibrated to zero (0) at the water surface prior to redeployment.

The data was collected from each Wave Logger via a download of the flash card in each device. The data collected from Sites 1, 2, 3, and 4, all appeared to be of the same size and file type. After recovering the data from each near shore wave gauge, the instruments logging sequence was verified. The field team connected to near shore wave gauges to initiate data logging.
The field team is noticing significant shoaling at Site 2 which is slowly encroaching on the instrument location. The field team will clear as much sediment from around the instrument as practical during each field service event and monitor the extent of the shoaling at this location. The field team evaluated the possibility of moving the data collection site but they were unable to locate another location of similar water depth and distance from the structure so the station was left in place and the field team continued to clear accumulated sediment as necessary during the station servicing.
Trip Report

**Project:** 16-0063 Wave Attenuation at Various Structures

**Location:** Vermillion Bay

**Purpose:** Data recovery

**Personnel Involved:** Joel Chaky (ENCOS), Alex Fortenberry (ENCOS), and Jacob Foreman (SWCA)

**Date:** March 8, 2017

**Conditions:** Skies: clear; Winds: E-NE @ 10-15 mph; Temperature: 70°F.

**Logistics:**

The above-mentioned ENCOS and SWCA personnel arrived at Quintana public boat launch on LA Hwy 319 in Cypremort Point, LA on February 3 to collect recorded data after approximately two weeks of data collection. The collection run was performed to evaluate the collected data and verify the performance of the installed data collection equipment. The field team loaded all necessary data recovery equipment into the boat and traveled to the data collection locations from the Quintana boat launch.

**Field Activities:**

March 8, 2017

The field team of Joel Chaky, Alex Fortenberry, and Jacob Foreman arrived at the Quintana boat launch located in Cypremort Point, LA. The necessary field equipment was loaded into the vessel by the field team and secured for travel to the study site on the west facing shoreline of Shark Island in Vermillion Bay. The field team downloaded the collected data from the installed wave loggers located behind each constructed structure. The field team serviced the instruments measuring waves, water level and barometric pressure at the station installed offshore from the breakwaters.

**Data Collection:**

Data was recovered from all instruments installed at Site 5 located offshore from the installed breakwaters. The data collected from each site was barometric pressure, water level, ADCP directional wave data, and high resolution wave gauge data. All data was recovered without incident. Prior to deployment the ADCP, water level instrument, and high resolution pressure gauge were calibrated to zero (0) at the water surface prior to redeployment.

The data collected from Sites 1, 2, 3, and 4, all appeared to be of the same size and file type. After recovering the data from each near shore wave gauge, the instruments logging sequence was verified. The field team connected to near shore wave gauges to initiate data logging. To make processing easier for the modeling team the near shore wave instruments were set to record daily files instead of one continuous file.
The field team cleared sediment from around the instrument at Site 2 during this service event.
Trip Report

Project: 16-0063 Wave Attenuation at Various Structures

Location: Vermillion Bay

Purpose: Data recovery

Personnel Involved: Adam Trahan (ENCOS), Ronnie Hoefeld (ENCOS), and Jacob Foreman (SWCA)

Date: March 28, 2017

Conditions: Skies: clear; Winds: S-SE @ 15 mph; Temperature: 75°F.

Logistics:

The above-mentioned ENCOS and SWCA personnel arrived at Quintana public boat launch on LA Hwy 319 in Cypremort Point, LA on February 3 to collect recorded data after approximately two weeks of data collection. The collection run was performed to evaluate the collected data and verify the performance of the installed data collection equipment. The field team loaded all necessary data recovery equipment into the boat and traveled to the data collection locations from the Quintana boat launch.

Field Activities:

March 28, 2017

The field team of Adam Trahan, Ronnie Hoefeld, and Jacob Foreman arrived at the Quintana boat launch located in Cypremort Point, LA. The necessary field equipment was loaded into the vessel by the field team and secured for travel to the study site on the west facing shoreline of Shark Island in Vermillion Bay. The field team downloaded the collected data from the installed wave loggers located behind each constructed structure. The field team serviced the instruments measuring waves, water level and barometric pressure at the station installed offshore from the breakwaters.

Data Collection:

Data was recovered from all instruments installed at Site 5 located offshore from the installed breakwaters. The data collected from each site was barometric pressure, water level, ADCP directional wave data, and high resolution wave gauge data. All data was recovered without incident. Prior to deployment the ADCP, water level instrument, and high resolution pressure gauge were calibrated to zero (0) at the water surface prior to redeployment.

The Data was collected from each Wave Logger via a download of the flash card in each device. The data collected from Sites 1, 2, 3, and 4, all appeared to be of the same size and file type. After recovering the data from each near shore wave gauge, the instruments logging sequence was verified. The field team connected to near shore wave gauges to initiate data logging. The battery on the ADCP was replaced during this service trip.
The field team cleared sediment that accumulated around the instrument located at Site 2.
Trip Report

**Project:** 16-0063 Wave Attenuation at Various Structures

**Location:** Vermillion Bay

**Purpose:** Data recovery

**Personnel Involved:** Ronnie Hoefeld (ENCOS), Alex Fortenberry (ENCOS), and Matt Helmer (SWCA)

**Date:** April 24, 2017

**Conditions:** Skies: Partly cloudy; Winds: NW @ 15-20 mph; Temperature: 65°F.

**Logistics:**

The above-mentioned ENCOS and SWCA personnel arrived at Quintana public boat launch on LA Hwy 319 in Cypremort Point, LA on April 24, 2017 to collect recorded data after approximately two weeks of data collection and to remove the ADCP from offshore Site 5. The collection run was performed to evaluate the collected data and verify the performance of the installed data collection equipment. The field team loaded all necessary data recovery equipment into the boat and traveled to the data collection locations from the Quintana boat launch.

**Field Activities:**

April 24, 2017

The field team of Ronnie Hoefeld, Alex Fortenberry, and Matt Helmer arrived at the Quintana boat launch located in Cypremort Point, LA. The necessary field equipment was loaded into the vessel by the field team and secured for travel to the study site on the west facing shoreline of Shark Island in Vermillion Bay. The field team downloaded the collected data from the installed wave loggers located behind each constructed structure. The field team serviced the instruments measuring waves, water level and barometric pressure at the station installed offshore from the breakwaters. After consulting with the modeling team, the ADCP and battery pack were removed from the offshore station.

**Data Collection:**

Data was recovered from all instruments installed at offshore Site 5 with the exception of the barometric pressure collected by the BaroTroll due to a faulty cable. The BaroTroll was placed back at Site 5 to continue data collection until a new cable can be acquired. The data collected from each site was water level, ADCP directional wave data, and high resolution wave gauge data. All data was recovered without incident. Prior to redeployment the water level instrument and high resolution pressure gauge were calibrated to zero (0) at the water surface.

The data was collected from each Wave Logger via a download of the flash card in each device. The data collected from Sites 1, 2, 3, and 4, all appeared to be of the same size and file type. After recovering the data from each near shore wave gauge, the instruments logging sequence was verified. The field team connected to near shore wave gauges to initiate data logging.
Appendix B
Data Chronology
## Data Chronology

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<th>Instrument Parameter</th>
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<th>11/22/16-12/14/16</th>
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<th>12/19/16-01/03/17</th>
<th>01/03/17-01/17</th>
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Appendix C
Technical Memorandum
This technical Memorandum is to clarify questions in an email dated 08/28/2017 from Tommy McGinnis with CPRA. The questions are listed below and responses appear below the original questions and numbered as the proposed question.

1. Where is Site 5 (Control) located? The map in the ENCOS report shows it being about 0.5 miles offshore, but an ENCOS trip reports starting December 19, 2016 describes it as “on the west facing shoreline of Shark Island...”. That would be great if it is closer to the shore similar to the other sites. If it is, then reflect that on the map.

2. How were water elevations determined? The ENCOS reports mention that the water surface at the time of calibration at Site 5 was designated as 0.0 feet and that the wave gauge pressure sensor was set to 0 at the water surface. How does this translate to ft. NAVD88? Please describe in the Tech Memo.

3. Site 2, Jan 31 – End of Monitoring was listed as a Bad Data Period in the Tech Memo. Shoaling at Site 2 was mentioned in the ENCOS field reports starting Feb 3 (“Field team cleared sediment from around the instrument”), but no mention was made of data not being collected or being compromised. Why was the data not used? Please explain in Tech Memo.

4. Data collection period per comment in draft decommissioning report.

Responses to the questions listed above.

1. The location of Site 5 in the figure is correct. The wave energy information from site 5 was used to determine the transmission energy of the waves. The site was selected based on the water depth needed to collect the ADCP data. Since the ADCP requires roughly 9-10 feet of water to measure waves and wave direction this site met that criteria. This location was investigated during the initial field visit and it was determined that it would provide the most appropriate data for modeling wave transmission coefficients at the installed structures. The wording used was to describe the general area of the site.

2. The water elevations were related to NAVD 88 with a vented water level instrument collocated at Site 5. The elevation used to convert the data to NAVD 88 was provided by NRCS from one of their monthly surveys. The conversion of the vented water level
data to ANVD 88 are as follows: Using the information provided to the top of the pipe where the vented water level was deployed the following formula was used to determine the sensor location relative to NAVD 88. The Survey elevation provided was 3.404 (Survey Elevation) feet NAVD 88. The top of the pipe to the stop plate measurement was 9.5 feet. The measurement from the bottom of the vented water level sensor guard to the pressure was 0.81 feet this was subtracted from the top of pipe to stop plate measurement \(9.5' - 0.81' = 8.69'\) (Mark to Sensor). This measurement was subtracted from the measurement of the top of the pipe provided by NRCS. To calculate the sensor elevation, we used the following formula \(3.404\) (Survey Elevation) \(- 8.69'\) (Mark to Sensor distance) \(= -5.29'\); this was the sensor elevation used to convert water levels to NAVD 88 from November 3, 2016 through November 22, 2016. On the November 22, 2016, the sensor guard was changed and the sensor elevation was adjusted to reflect the change. The new sensor elevation became -5.34 for the remainder of the data collection period.

The NAVD water level conversion factor for each near shore wave gauge was determined by the following method. After each wave gauge was installed the field team used the survey information, provided by NRCS, to the top of each vertical pipe to obtain an NAVD 88 water level reading. The field team then collected a water level reading from the wave each wave gauge. A sensor elevation for each near wave gauge site was determined by subtracting the wave gauge water elevation from the NAVD 88 water level reading and this provide a sensor elevation that is used to convert the collected water levels to NAVD 88 once processed. This is explained using Site 1 as an example. NAVD 88 survey elevation for Site 1 is 5.91 feet. By placing the stadia rod next to the vertical pipe at 5.91 feet, the resulting water level was read at 1.32 feet NAVD 88. A measurement from the near shore wave gauge was taken at the same time and the reading was 3.16 feet. To convert the NAVD 88 elevation of the near shore wave gauge readings, the following formula was used. NAVD 88 water level reading minus near shore wave gauge reading gives the sensor elevation to convert the water levels to NAVD 88 (NAV water level reading 1.32 feet – near shore wave gauge reading 3.16 = sensor elevation of-1.84 feet).

The sensor elevation information was provided to the modeling team and was used to convert the near shore wave gauge water levels to NAVD 88.

During the cleaning and servicing of pressure gauges each unit was removed from the water and accumulated sediment was removed from the sensor. To maintain accuracy of the sensors after each cleaning, the sensors were calibrated to 0.0 feet at the water surface. This wording in the trip report may be a source of confusion and is not the actual method used to convert water levels to NAVD 88. This field procedure ensures that the pressures sensors accurately measure water levels.

3. During each data collection event, all data were collected from each station. As the project progressed there were visual signs at Site 2, that the central area of the structure shoaling was expanding that could lead to the shoaling’s encroachment on Site 2. Various alternate locations were examined but it was determined that the best
course of action was to try to keep the sensor clear of sediment build up and keep it at its installed location. Moving the site to north would put the sensor into an area of greater accretion; Moving the station further south to deep enough water would result in the sensor being exposed to different wave conditions than the other locations. The instrument collected data for all data periods but the data become compromised as the shoaling encroached on the instrument.

The data were collected but the encroaching sediment built up on and around the sensor and attenuated the water level signal resulting in readings of “0” or negative values. After the cleaning, the organic sediments accumulated around and on the sensor rapidly after the service event. Up to twelve (12) inches of sediment were removed during each service event.

4. This addresses the comment from the decommissioning report regarding the start date of the data collection period. Instruments were installed on November 3, 2016 and began collection after deployment. The data collection period was from November 3, 2016 to May 16, 2017.

The December 14, 2016 date stated in the decommissioning report was an error. December 14, 2016 corresponded with the installation of a firmware upgrade on the ADCP that gave the ADCP the capability to sample at a higher frequency than the original firmware. The date is changed in the report and a final copy will be sent reflecting the correct data collection period.