Measurements of lateral flow from the Mississippi River at Mardi Gras Pass in the Bohemia Spillway using synoptic ADCP

A field report

# Submitted to

# The Lake Pontchartrain Basin Foundation

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#### Introduction

The Coastal Hydrodynamics and Sediment Transport Laboratory at the Pontchartrain Institute for Environmental Sciences conducted synoptic ADCP surveys at Mardi Gras Pass (MGP), which is a Pass connected to the Mississippi River near the Bohemia Spillway. The survey was conducted on November 14, 2016.

## Objective

The objective of the survey was to measure the discharge (flow) at MGP to continue the construction of a stage-discharge curve, by adding a point for the low flow 2016 (Figure 1).

### Methods

To measure discharge, we used a vessel-mounted Teledyne Acoustic Doppler Current Profiler (ADCP), used in tandem with a differential global positioning system (DGPS, Trimble GS232). The surveys followed a pre-determined schedule of transects, targeted to establish a flow balance within reach four of MGP.

#### Results

The average flow in Mardi Gras Pass on November 14, 2016 was approximately 111.1 m<sup>3</sup>/s or 3925.0 cfs. Using a standard deviation derived from the field measurements, the average flow at the time of measurement was  $111.1 \pm 1.5$  m<sup>3</sup>/s, or 3925.0 ± 52.1 cfs. Figure 1 shows the updated rating curve for MGP using only ADCP flow data, and Table 1 provides a summary of all flows measured in MGP from each survey conducted throughout the monitoring period.



Figure 1. Evolving Stage Discharge curve for Margi Gras Pass showing all flow measurements to date.

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Survey number	Date	Average Velocity (ft/s)	Average Discharge (cfs)	Average Discharge (cms)	Standard Deviation (cfs)	Standard Error (cfs)	Standard Deviation (cms)	Standard Error (cms)	Stage (ft) NAVD88
MGP01	3/28/2012	4.2	2,303.0	65.2	59.4	24.3	1.7	0.7	5.6
MGP02	4/18/2012	1.2	630.3	17.8	10.8	5.4	0.3	0.2	3.5
MGP03	5/3/2012	0.9	479.9	13.6	23.3	10.4	0.7	0.3	2.6
MGP04	7/3/2012	0.8	436.1	12.3	13.5	6.0	0.4	0.2	2.1
MGP05	1/16/2013	2.0	981.9	27.8	24.7	12.4	0.7	0.3	2.5
MGP06	2/1/2013	4.0	2,097.2	59.4	16.6	6.8	0.5	0.2	4.6
MGP07	5/14/2013	2.9	3,840.5	108.8	194.2	97.1	5.5	2.8	6.2
MGP08	6/23/2013		3,510.3	99.4	40.0	28.2	1.1	0.8	5.8
MGP09	7/31/2013	2.3	2,167.2	61.4	31.0	17.8	0.9	0.5	3.6
MGP10	11/11/2013	0.5	537.8	15.2	37.2	21.5	1.1	0.6	1.2
MGP11	6/11/2014	1.9	2,353.6	66.6	46.2	26.7	1.3	0.8	1.2
MGP12	8/6/2014	1.2	1,535.1	43.5	40.4	20.2	1.1	0.6	2.1
MGP 13	4/17/2015	2.9	4,300.4	121.8	115.6	81.8	3.3	2.3	6.2
MGP 14	5/8/2015	3.2	4,508.6	127.7	193.1	136.6	5.5	3.9	6.4
MGP 15	1/19/2016	5.2	9,123.1	258.3	115.7	81.8	3.3	2.3	7.2
MGP 15	1/19/2016	4.7	8,517.5	241.2	268.9	134.5	7.6	6.6	7.2
MGP 16	11/14/2016	1.7	3,925.0	111.1	52.1	30.1	1.5	1.2	1.4

Table 1. Discharge details from each survey (1-15) with statistics and Stage (ft NAVD88) at West point a la Hache (from rivergauges.com)

# Appendix A. Mardi Gras Pass Survey November 14, 2016

Transect 003

 $Q \sim 111 \text{ m}^{3}/\text{s}$ 



#### Transect 004

### Q~113m<sup>3</sup>/s



#### Transect 012

Q ~ 110m<sup>3</sup>/s

