LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES DIVISION

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

LOWER PONTCHARTRAIN
SUB-BASIN

CAERNARVON - DELACROIX /
BAYOU BIENVENUE CENTRAL WETLANDS UNIT

WATERBODY EVALUATION & RECOMMENDATIONS

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED ANNUALLY

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TABLE OF CONTENTS

WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational
Sportfish species such as largemouth bass (LMB) are managed to maintain a sustainable population while providing anglers the opportunity to catch or harvest adequate numbers of fish to maintain angler interest and efforts.

Commercial
Commercial species are managed with statewide regulations for maximum sustainable yield.

Species of Special Concern
Species of special concern are managed to protect the current population and to provide an opportunity for recovery to a sustainable population.

EXISTING HARVEST REGULATIONS

Recreational
Statewide regulations for all fish species. Recreational fishing regulations may be viewed at this link: http://www.wlf.louisiana.gov/fishing/regulations

Commercial
Statewide regulations apply. Commercial fishing regulations may be viewed at this link: http://www.wlf.louisiana.gov/fishing/regulations

Species of Special Concern
The taking or harassment of any threatened or endangered species is a violation of state and federal law and includes the Gulf sturgeon (*Acipenser oxyrinchus desotoi*).

SPECIES EVALUATION

Recreational
Historically, inland fisheries monitoring efforts have been confined to the Caernarvon outfall area and not the greater Lower Pontchartrain Sub-Basin (LPSB). All references contained in this section refer to the Caernarvon outfall area of the LPSB.

Largemouth Bass
LMB are utilized as an indicator species for the overall fish population due to their trophic position. Electrofishing has proven to be the most effective method for collecting warmwater freshwater fishes and is used to evaluate LMB relative abundance (catch per unit effort = CPUE) and size distribution. Standardized electrofishing samples have been collected in the Caernarvon outfall area by Inland Fisheries District 8 for routine LMB population monitoring in the spring and fall since 1992. A summary of electrofishing samples collected within the Lower Pontchartrain Sub-Basin (LPSB) is found in LPSB MP-A.

Largemouth bass relative abundance, size distribution and relative weight
The length distributions for largemouth bass collected in the spring and fall of 2009-2013 are presented in Figure 1. The LMB ranged from 3 to 18 inches total length (TL) with bi-modal

peaks at 6 and 12 inches TL. A similar trend is prominent in the Barataria Basin which displays many of the same characteristic as the LPSB. The most recent length distributions for LMB collected in the spring and fall of 2013 are presented in Figures 2 and 3, respectively. Mean relative weight (Wr) of LMB sampled in the fall of 2013 is in the acceptable range (i.e., above 80). Wr is the ratio of a fish's weight to the weight of a ''standard'' fish of the same length. The index is calculated by dividing the weight of a fish by the standard weight for its length, and multiplying the quotient by 100. LMB mean relative weights below 80 may indicate a potential problem with forage availability.

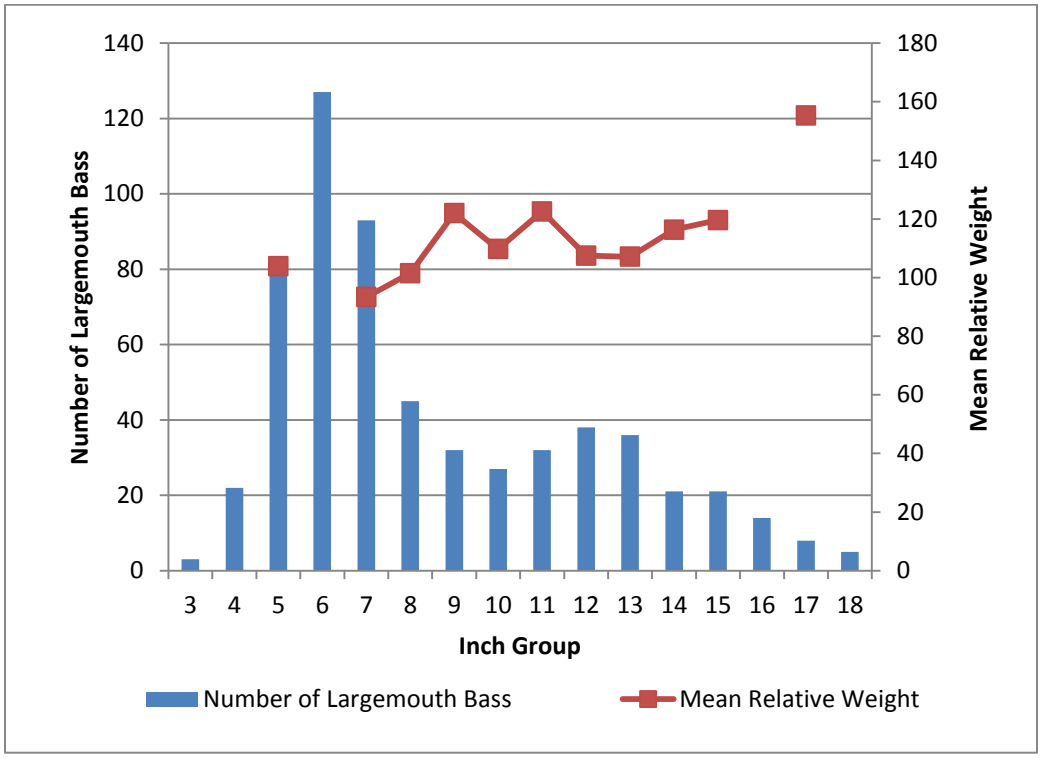

Figure 1. Size distribution by inch group of LMB collected from the Carnarvon outfall area from 2009-2013. Wr calculated from fish collected during fall electrofishing in 2013.

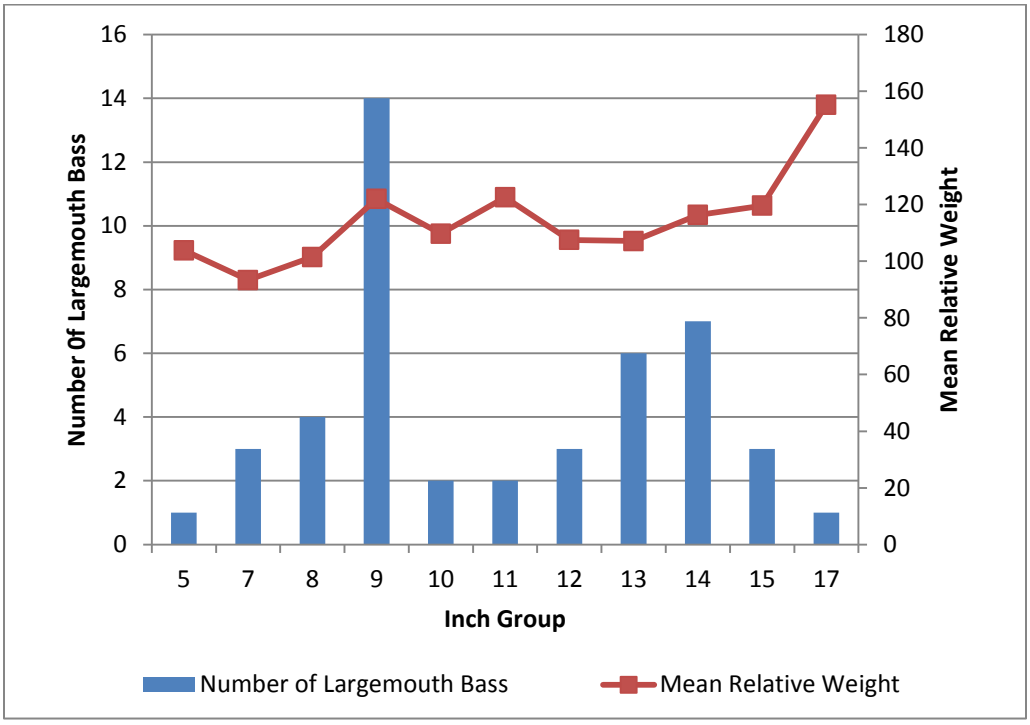

Figure 2. Size distribution and mean relative weight (Wr) by inch group of LMB collected in the spring 2013 from the Caernarvon outfall area. n=46.

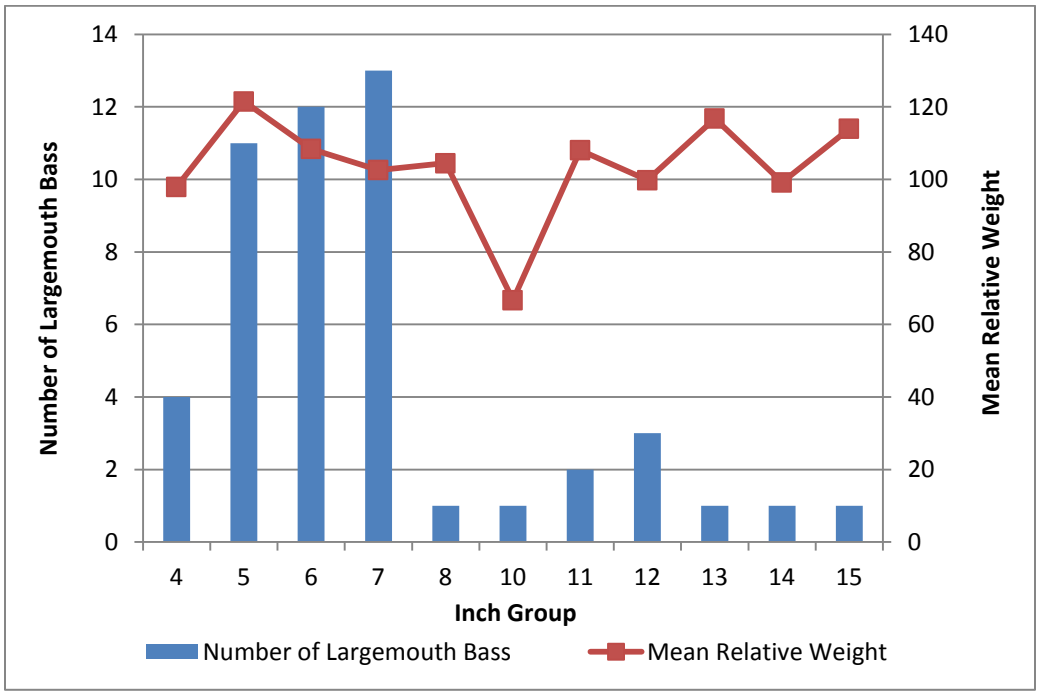

Figure 3. Size distribution and mean relative weight (Wr) by inch group of LMB collected in the fall 2013 from the Caernarvon outfall area. n=50

Catch per unit effort (CPUE) is the term used to describe the number of fish collected during a given time period of sampling. For electrofishing samples, the standard CPUE time period is one hour and the unit is the number of fish captured. CPUE is an index of relative abundance for electrofishing results and is usually displayed as the number of fish captured per hour of sampling effort. CPUE for LMB collected in the spring and fall 1995-2013 have displayed a general downward trend (Figures 4 and 5). From 1995-2013, sampling was conducted at stations located in areas affected by habitat loss. A more expansive sampling

regime of the LPSB will begin in 2015 to capture a comprehensive data set across the entire sub-basin. CPUE of LMB by size class for samples collected during spring and fall electrofishing 1995-2013 are illustrated in Figures 6 and 7 respectfully.

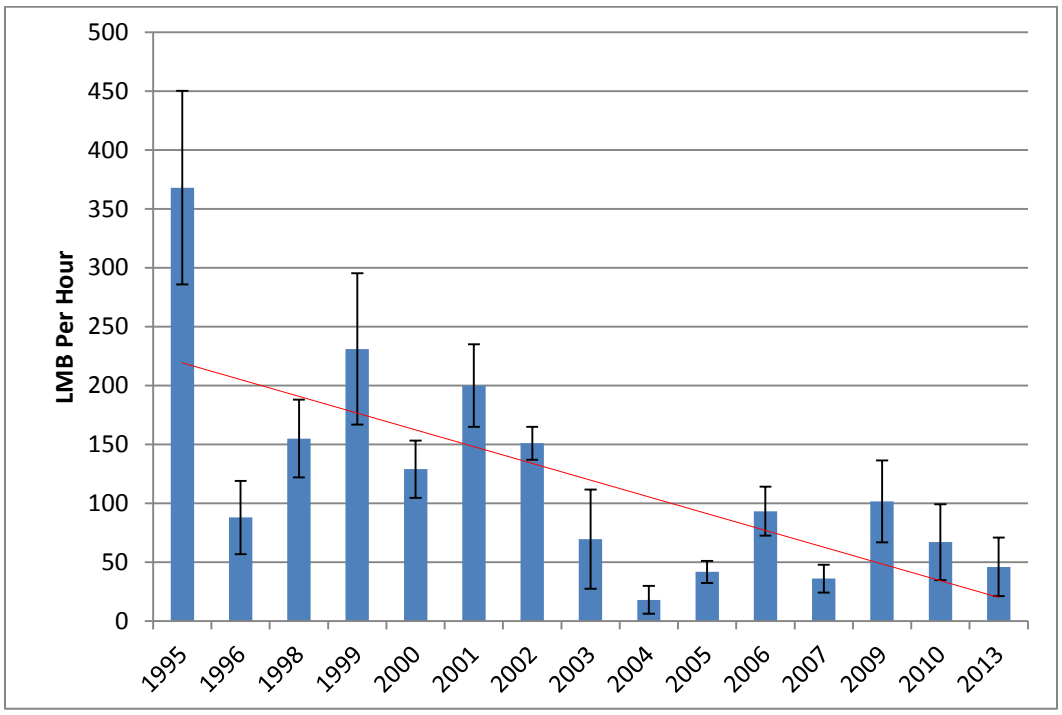

Figure 4. The mean CPUE (+ SE) in number per hour for LMB collected from the Caernarvon outfall area during spring electrofishing from 1995 – 2013.

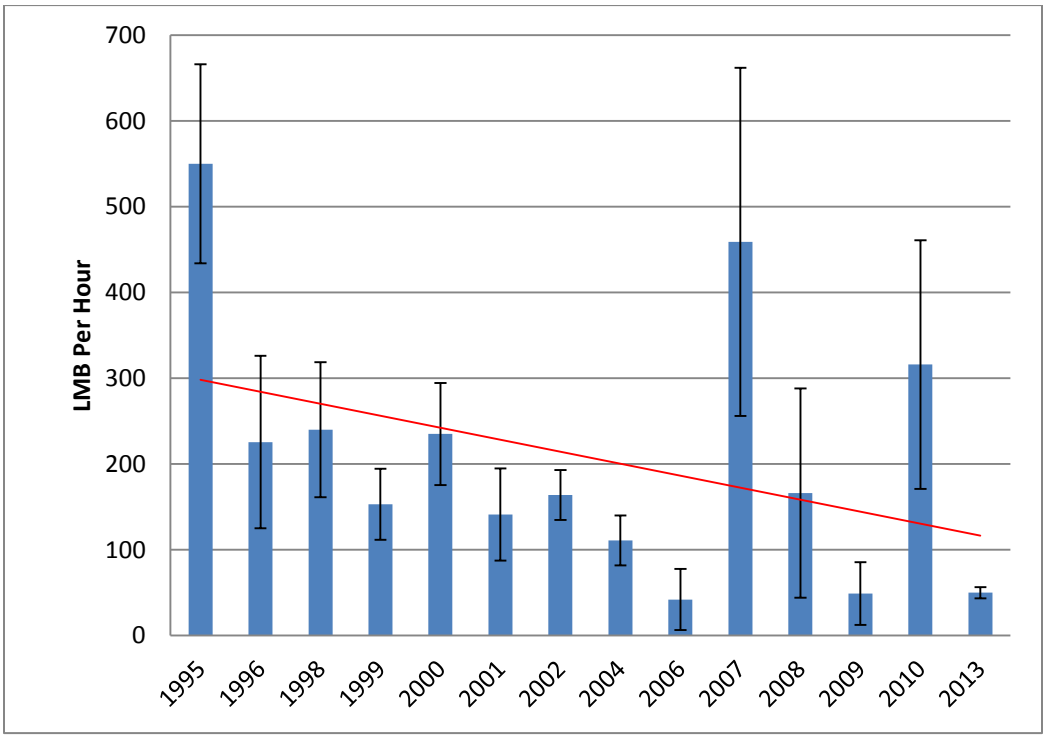

Figure 5. The mean CPUE (+ SE) in number per hour for LMB collected from the Caernarvon outfall area during fall electrofishing in 1995 – 2013.

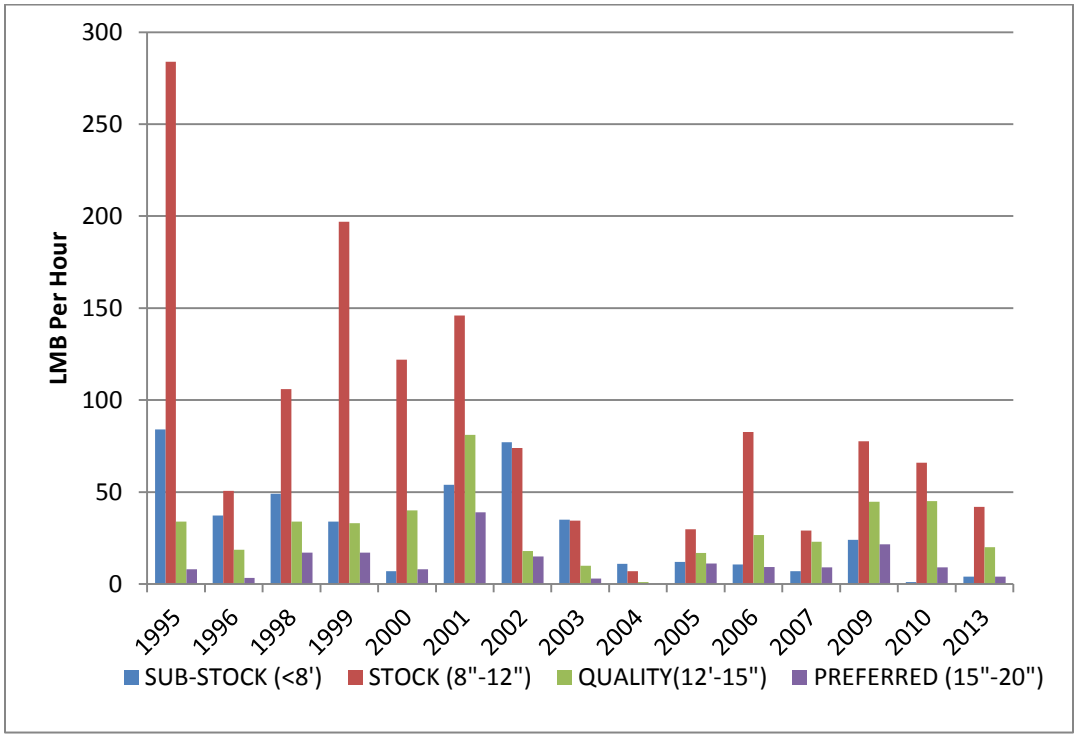

Figure 6. CPUE for LMB by size class collected during standardized spring electrofishing samples from 1995-2013 in the Caernarvon outfall area.

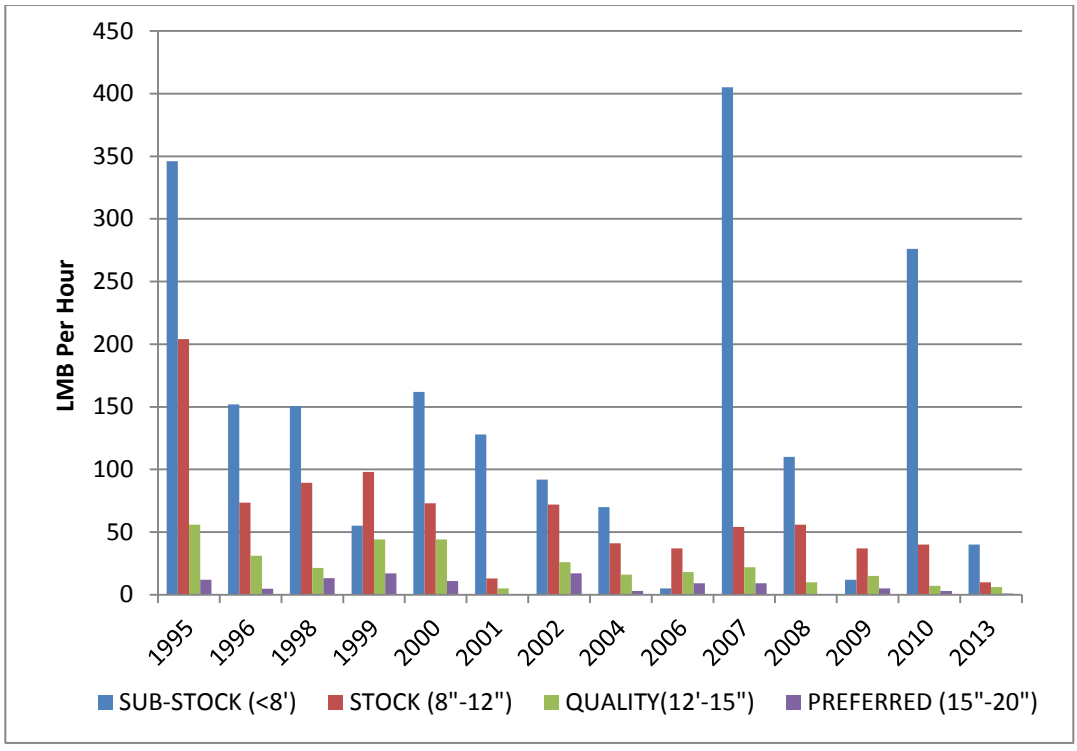

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Figure 7. CPUE for LMB by size class collected during standardized fall electrofishing samples from 1995-2013 in the Caernarvon outfall area

Size structure indices

Proportional stock density (PSD) and relative stock density (RSD) are indices used to numerically describe length-frequency data (Anderson and Neumann 1996).

Recent (2007-2013) proportional stock densities (PSD) and relative stock densities for preferred length fish (14-20 inches) in the Caernarvon area are within the optimum range of 40-70 and 10-40, respectively, for a balanced largemouth bass population (Figure 8; Anderson and Neumann 1996).

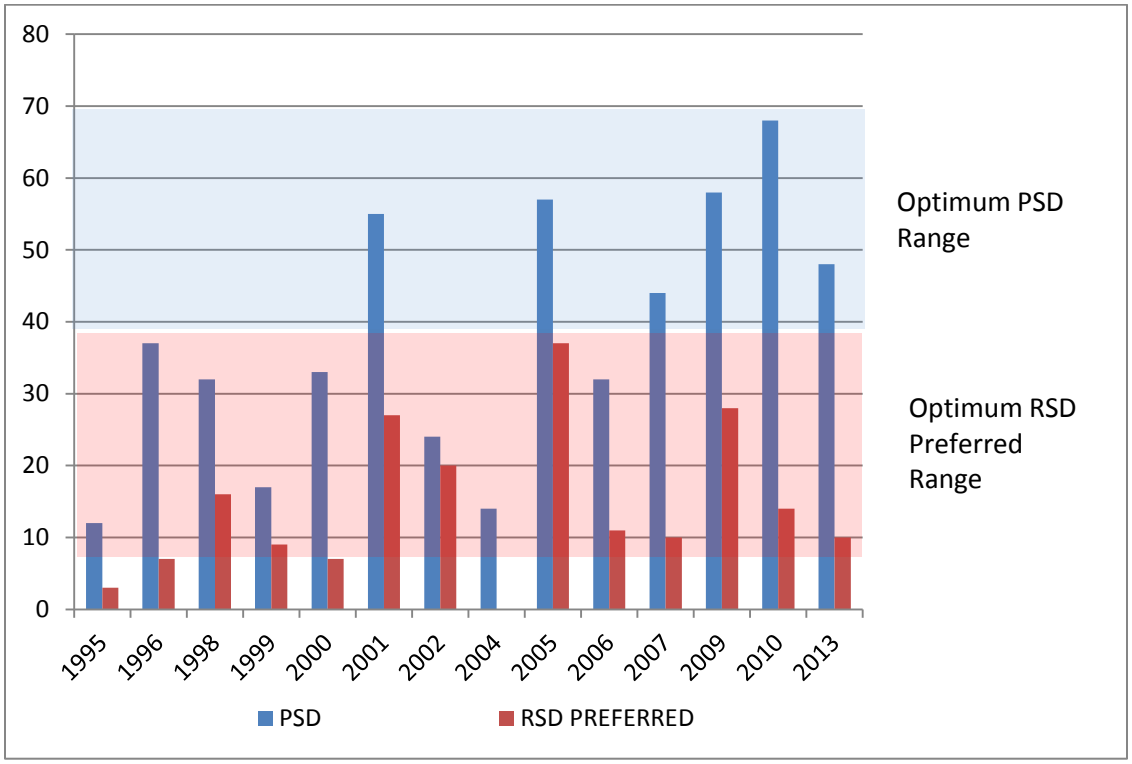

Figure 8. Proportional stock density and relative stock density (preferred) for LMB in the Caernarvon outfall area, from spring electrofishing results, 1995 – 2013.

2000-2002 Creel Survey

In response to angler requests for more protective regulations for largemouth bass in the Caernarvon area, a three year access point creel survey was initiated in 2000. The purpose of the survey was to collect data to describe public use of the largemouth bass fishery. The number of creel days ranged from 48-55 per year from 2000-2002 (Figure 9). The number of interviews conducted and the number of anglers interviewed ranged from 255-354 and 428-693, respectively from 2000-2002 (Figure 9).

The majority of angler caught bass were released in 2000, 2001, and 2002 (76, 83, and 85%, respectively; Figure 10). Only 31, 18, and 42 percent of harvested bass in 2000, 2001, and 2002, respectively, were < 12 inches TL. A 12 inch minimum length regulation would have protected only a small percentage of harvested fish. The application of a protected length range (slot limit) in this situation would have provided protection to for some bass from harvest. However, the existing high voluntary release rate would undermine any potential benefits. LDWF analysis of creel data determined that concerns of bass overharvest were unfounded and that more restrictive harvest regulations would provide no significant effect.

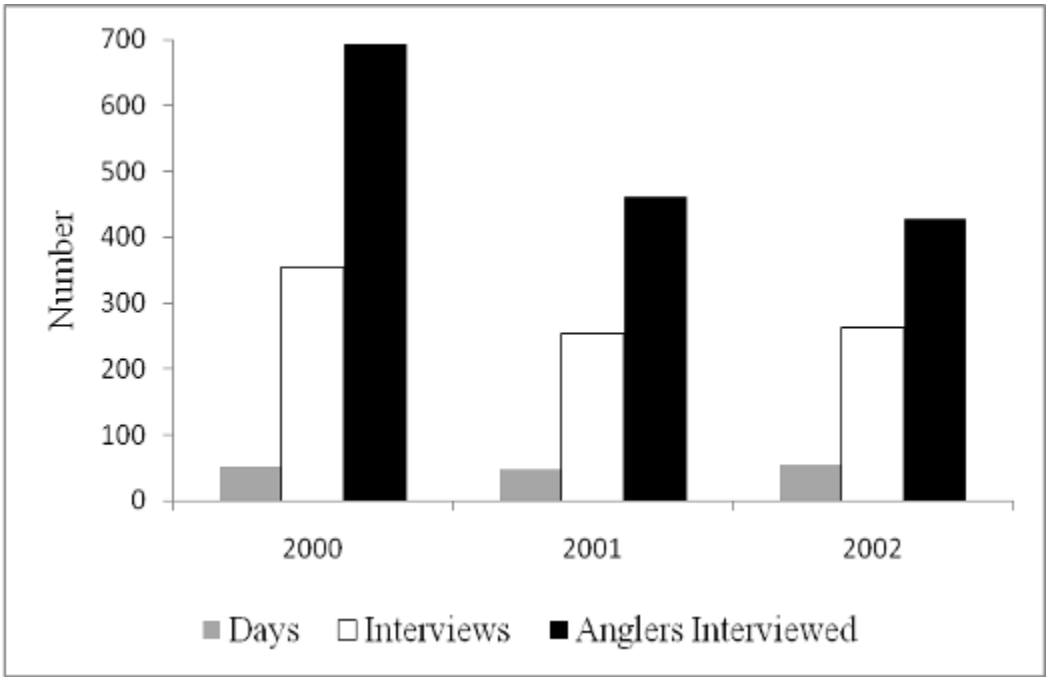

Figure 9. Number of creel days, interviews, and anglers interviewed during a three year (2000-2002) access point creel survey in the Caernarvon area.

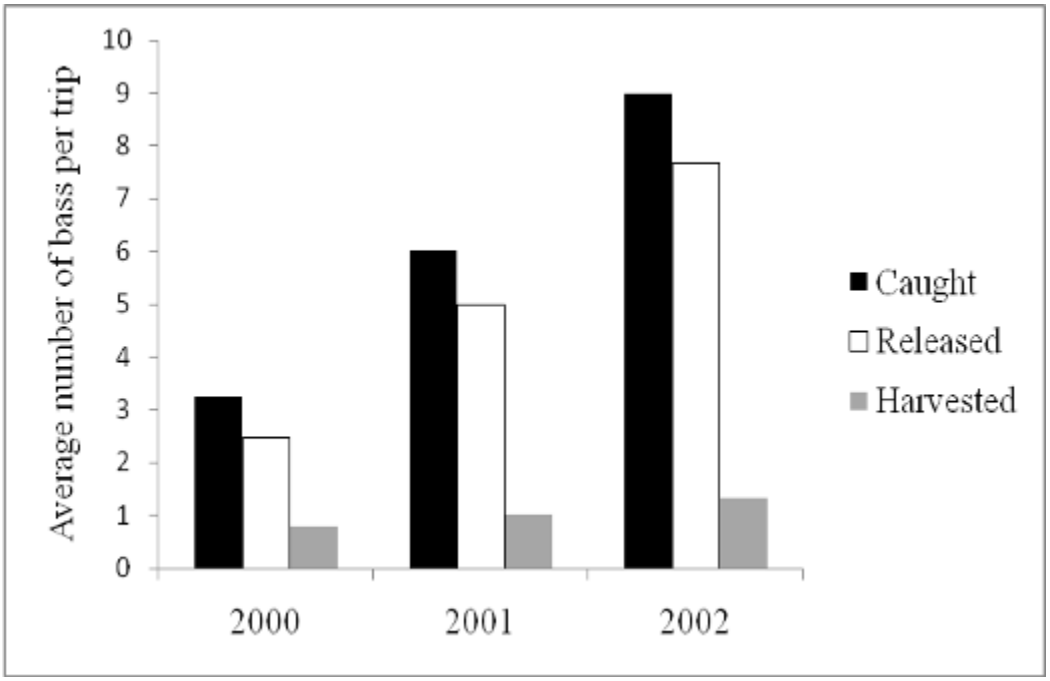

Figure 10. Average number of bass caught, released, and harvested per trip and reported by anglers during a three year (2000-2002) access point creel survey in the Caernarvon area.

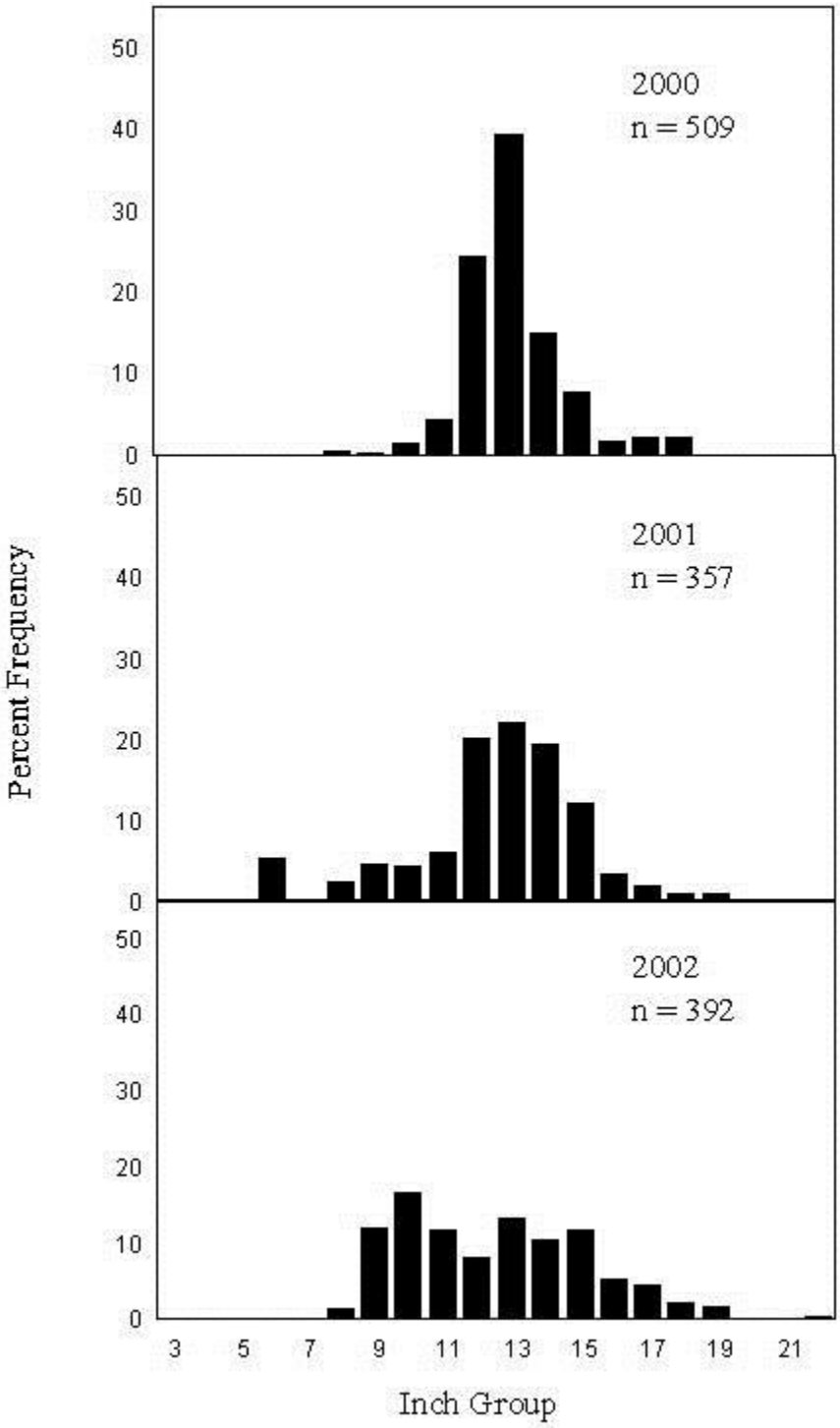

Figure 11. Length frequency distribution for largemouth bass harvested by anglers and reported during a three year (2000-2002) access point creel survey in the Caernarvon area.

Genetics

Genetic analyses have been conducted on a series of largemouth bass samples collected in the Caernarvon area (Table 1). Allozyme starch gel electrophoresis analyses were conducted at the Louisiana State University School of Renewable Natural Resources. Results of analyses determined that LDWF stocking efforts have not successfully incorporated Florida genetics into the Caernarvon largemouth bass population. Competition from the native bass population is considered to be the primary obstacle. LDWF sampling indicates strong native bass recruitment in response to the frequent and extensive fish kills that occur in the Caernarvon area. Competition from the resilient native bass population is the suspected as a primary contributor to the poor success of Florida bass introductions.

Table 1. Composition of northern, Florida, and F_x largemouth bass (intraspecific hybrids) collected during fall electrofishing samples. Included are size and number of Florida largemouth bass stocked in the Caernarvon area.

YEAR	SIZE	FLMB STOCKED	GENETIC SAMPLING RESULTS				
			N	% NLMB	% FLMB	% F_x	TOTAL FLORIDA INFLUENCE
1996	Fingerlings	39,000					
1997	Fingerlings	55,235	75	80	2	18	20
1998	Fingerlings	243,603					
	Adults	43					
1999	Advanced Fry	300,000	100	88	0	12	12
	Fingerlings	260,956					
2000	Sac Fry	119,900	91	84	16	0	16
	Fingerlings	120,208					
2001	Phase II Fingerlings	10,010					
2002	Phase II Fingerlings	1,520	43	81	5	14	19
2003	Phase II Fingerlings	2,178					
	Adults	173					
2005	Phase II Fingerlings	14,710					
2006	Fingerlings	96,424					
	Phase II Fingerlings	2,025					
	Adults	92					
2007			100	82	1	17	18
2008	Phase II Fingerlings	1,200					

Forage and Fish Assemblage

Forage abundance and availability is typically measured directly through LDWF fishery independent sampling (electrofishing and shoreline seine sampling) and indirectly through assessment of largemouth bass body condition (relative weight). Relative weight (Wr) is the ratio of a fish's weight to the weight of a "standard" fish of the same length. The index is calculated by dividing the weight of a fish by the standard weight for its length, and multiplying the quotient by 100. Largemouth bass relative weights below 80 indicate a

potential problem with forage availability. Values near 100 indicate robust body condition. Relative weights of largemouth bass caught in the Caernarvon area (fall 2013) ranged between 97 and 117 (Figure 1). Electrofishing samples are conducted in the fall to evaluate fish assemblages (Figure 12). Sunfishes (Lepomis spp.) comprise the majority of the vertebrate forage. Invertebrates are also an important prey item.

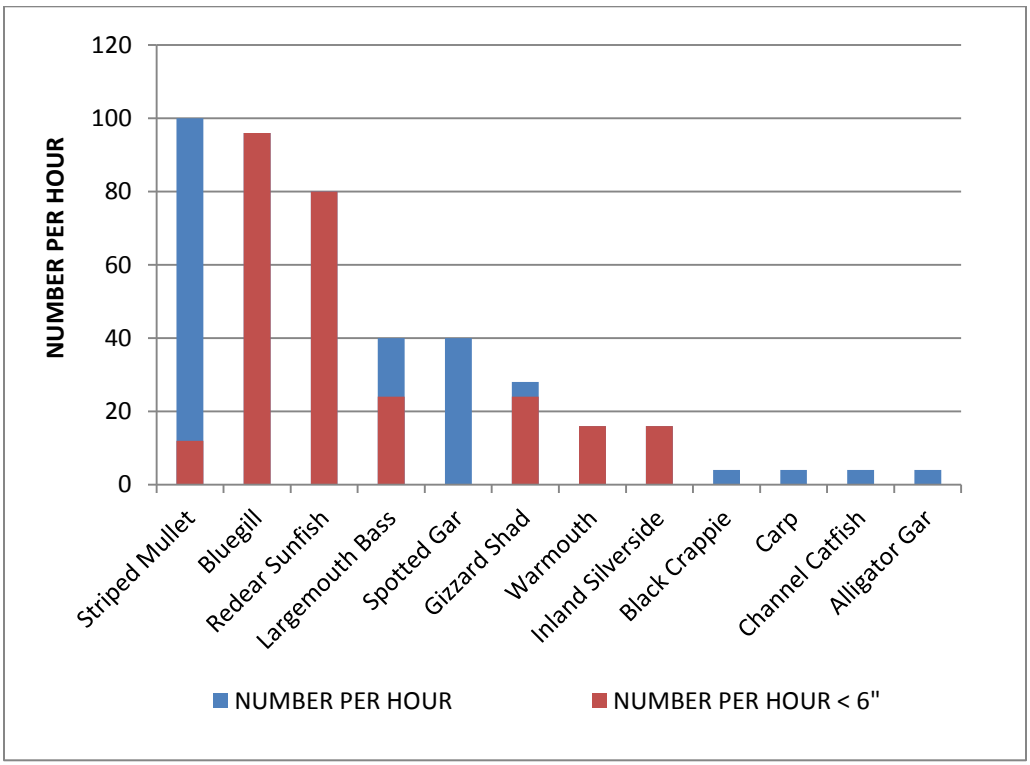

Figure 12. CPUE of all fish species and fishes < 6" collected in standardized fall assemblage / forage electrofishing samples in 2013.

Crappie

Crappies are only occasionally collected in Caernarvon fish population sampling and seldom observed in angler creel surveys for the area. Because crappies are such a minor component of the Caernarvon fish population, continuous monitoring and specific management for the species is not conducted.

Commercial

According to trip ticket information submitted by commercial fisherman, commercial species of interest in the Caernarvon area include alligator gar, minnows, blue catfish, channel catfish, and gizzard shad (Table 2). Commercial landings are low and no cause for consideration of additional regulations.

Table 2. Commercial landings reported from the Caernarvon area from 2000-2014 at the non-confidential level ("0" indicates confidential landings and "." indicates no reported landings).

SPECIES	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Alligator Gar	13,964	11,477	0	0	0	0	0	.	.	0	.	0	0	.	0
Blue Catfish	0	0	.	0	.	.	.	.	.	.	0	.	0	.	0
Channel Catfish	0	.	.	.	.	0	.	.	.	0	0	.	.	.	.
Gizzard Shad	.	.	.	.	.	.	.	.	0	.	.	0	.	.	.
Minnows	1003	0	575	0	994	.	.	.	.	.	.	.	.	.	.

An evaluation of channel catfish population characteristics was conducted in Lake Des Allemands and Lake Maurepas from 1985-1987 (McElroy et al. 1990). Repeated requests from commercial fishermen to lower the commercial channel catfish minimum size limit regulation prompted the study. Fishermen suggested that the population was stunted and that additional harvest was needed. Results from the age, growth and maturity study indicated the channel catfish population in Lake Des Allemands reached sexual maturity at 360-379 mm TL which was similar to other commercially important stocks in Louisiana (Tilyou 1984). Lake Maurepas channel catfish matured at smaller sizes, but were not found to be short for their ages. The authors suggested neither population was stunted but may be effected by the physicochemical attributes of the mesohaline environment in which they live.

Species of Special Concern

The Gulf Sturgeon (*Acipenser oxyrinchus desotoi)* is a threatened species of concern in southeastern Louisiana. On January 25, 1994 a 42 lb. gulf sturgeon measuring 57 inches total length was caught, tagged and released in the southeastern part of Caernarvon near Delacroix.

HABITAT EVALUATION

Habitat and hydrology are major components influencing fish populations. Periods of poor water quality can have an extended negative impact on the fishery. The Caernarvon outfall area has experienced habitat degradation from tropical activity and the effects of siltation. Other areas of the LPSB have experienced expansion of freshwater habitat.

2010 *Deepwater Horizon* Oil Spill

The 2010 *Deepwater Horizon* Oil Spill in the Gulf of Mexico was the nation's largest oil spill. The Lower Pontchartrain Sub-basin was affected by direct oiling and response activities. The investigation into the impacts of the Deepwater Horizon oil spill on natural resources including fisheries, aquatic vegetation, and wetlands is still ongoing.

Aquatic Vegetation

Aquatic vegetation is highly influenced by natural and anthropogenic alterations to the hydrology of the LPSB. An annual survey of aquatic vegetation is used to produce a type map and an estimate of current aquatic vegetation coverages.

Caernarvon / Delacroix
Salinity spikes, such as those that resulted from Hurricanes Katrina, Gustav, Ike and Isaac have limited the spread of giant salvinia (*Salvinia molesta*) and water hyacinth (*Eichhornia crassipes*) in the Caernarvon / Delacroix area. LDWF spray crews treated 108 acres of water hyacinth around the Caernarvon outfall area in 2012. No herbicide applications were necessary in 2013. In 2014, annual vegetation surveys indicated a resurgent population of water hyacinth with an estimated 200 acres in the area. Water hyacinth is treated with glyphosate (0.75 gal/acre)/Red River 90 (0.25 gal/acre) from March 15 to September 15 and 2, 4-D (0.5 gal/acre)/Red River 90 (1 pint/acre) from September 16 to March 14 in those areas that lie within St. Bernard Parish. In those areas that lie within Plaquemines Parish, water hyacinth is treated with glyphosate (0.75 gal/acre)/Red River 90 (0.25 gal/acre). The use of 2,4-D is prohibited in Plaquemines Parish

Coontail *(Ceratophyllum demersum),* a beneficial submerged aquatic plant, is the dominant species with 20% - 80% coverage in some waterbodies. It provides a microhabitat for small and juvenile fish as well as invertebrate species.

Bayou Bienvenue Central Wetlands
Approximately 800 acres of giant salvinia were documented in the marsh east of Bayou Bienvenue to the Violet canal during a November 2013 aerial survey. Giant salvinia weevils (*Cyrtobagous salviniae*) have been introduced and herbicide applications will be conducted in the area.

CONDITION IMBALANCE / PROBLEM

1. There is an abundance of organic material in this area. Organic material is not ideal for optimal largemouth bass spawning success.

2. Several popular fishing canals were silted in as a result of Hurricanes Katrina, Gustav, Ike and Isaac.

3. Fine scale problems affecting freshwater fisheries in the LPSB include eutrophication, excessive turbidity, predation, habitat loss, invasive species and storm related fish kills. Many of these problems can be exacerbated by the operation of the diversion. Exotic aquatic fauna such as silver carp (*Hypophthalmichthys molitrix*) and nuisance aquatic vegetation such as giant salvinia (*Salvinia molesta*) are associated with connections to the Mississippi river. Also water column light attenuation issues resulting from nutrient overloading and total suspended solids, which may affect submersed aquatic vegetation (fish habitat), can be connected to the operation of freshwater diversions. Understanding the relationship between diversion operations and fisheries is paramount. X

CORRECTIVE ACTION NEEDED

1. A self-sustained population of giant salvinia weevils (*Cyrtobagous salviniae*) should be established to serve as a biological control measure.

RECOMMENDATIONS

There are numerous stakeholders in the Caernarvon Freshwater Diversion Outfall Area and the entire LPSB that are impacted by the operations of the diversion, siphons and flood control gates. However, it is difficult to manage the diversion and satisfy all stakeholders. The Caernarvon Freshwater Diversion Project (CFDP) was authorized to enhance emergent marsh vegetation growth, reduce marsh loss, and increase the productivity of significant commercial and recreational fish and wildlife (LDNR 2003). The operational plan for the CFDP is subject to adaptive management practices and is set annually. The actual amount of diverted flow depends on a detailed operational plan that is set by the Caernarvon Interagency Advisory Committee every year and river stages in the Mississippi River. The current 2014 Caernarvon operations are based on the monthly salinity range at the 15 ppt line from December through May and based on the monthly salinity range at the 5 ppt line from June through November (see Caernarvon Freshwater Diversion Operational Plan 2014 – **APPENDIX I**).

The following are recommended monitoring practices to closely observe changes in fisheries and aquatic habitat in response to alterations in the operational practices of the CFDP.

1. Continuation of standard sampling and increase efforts to:
    a. Take an adapted approach to standardize sampling site selection, which includes habitat evaluation and water chemistry parameters. A more expansive sampling regime of the LPSB will begin in 2015 to capture a comprehensive data set across the entire sub-basin.
    b. Include a 225 second fish assemblage sample at every sample station to evaluate changes in relative abundances.

2. Freshwater diversions and siphons are a large component of the basin's hydrology. Understanding their effects on water quality is important. Monitoring parameters such as turbidity and chlorophyll *a* would aid in quantifying thresholds in which submersed aquatic vegetation is productive, therefore increasing our ability to define suitable aquatic habitat. Adding these parameters to existing constant recording devices or acquiring and locating devices owned and operated by LDWF is an alternative.

Recommendations for aquatic weed management in the area include:

1. Annual boat surveys will be conducted in the spring to produce a comprehensive site map of the LPSB and an aerial survey will be conducted in the fall to estimate total acreage of aquatic vegetation.

2. When giant salvinia manifests as a problem in the area, giant salvinia weevils should be introduced as a biological control method. Giant and/or common salvinia will be treated with foliar applications of glyphosate (0.75 gal/acre) and diquat (0.25 gal/acre) with Aqua King Plus (0.25 gal/acre) and Air Cover (12 oz/acre) surfactants from April 1 - October 31. Giant and/or common salvinia will be treated with foliar applications of diquat (0.75 gal/acre) and a non-ionic surfactant (0.25 gal/acre) from November 1 – March 31.

3. Water hyacinth should be treated with 2,4-D at a rate of 0.5 gallons per acre in those areas that lie within St. Bernard Parish. In those areas that lie within Plaquemines Parish, water hyacinth should be treated with glyphosate (0.75 gal/acre)/Red River 90 (0.25 gal/acre). The use of 2,4-D is prohibited in Plaquemines Parish.

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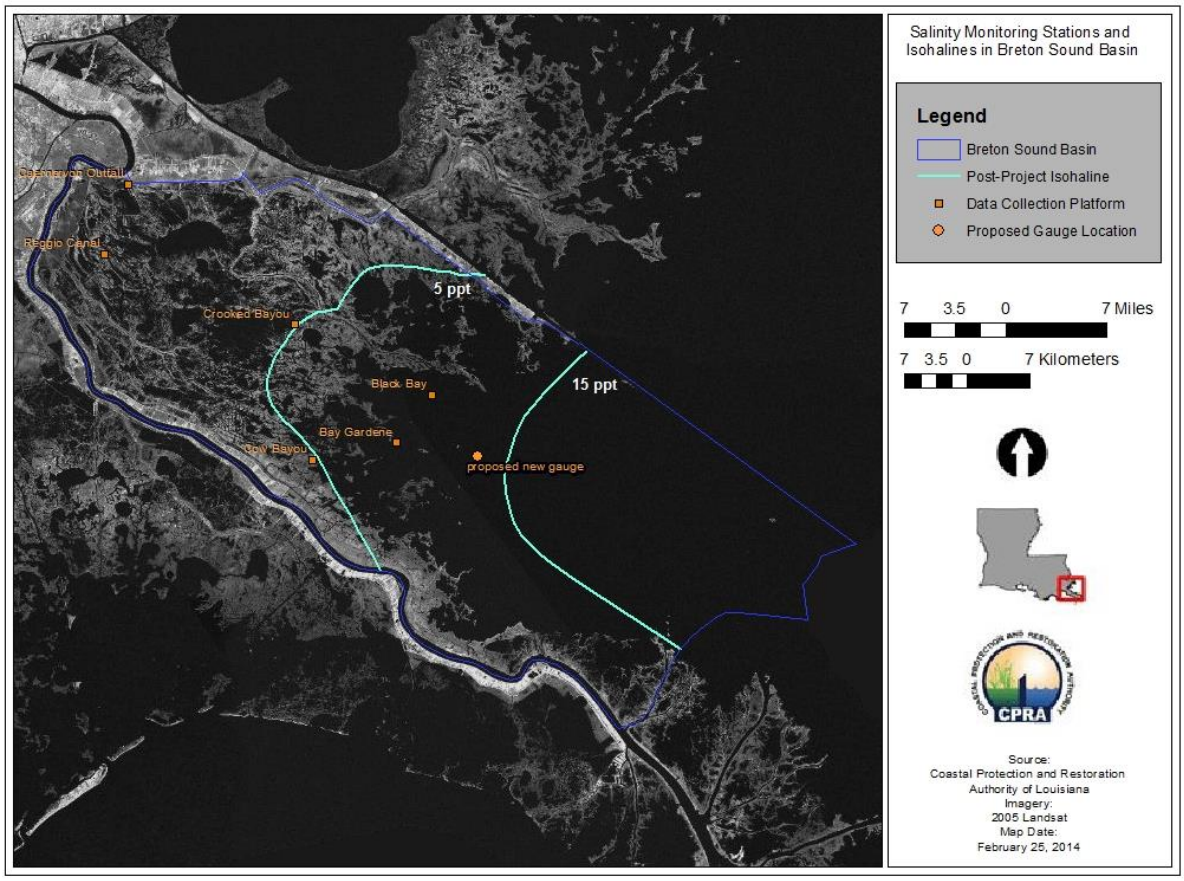
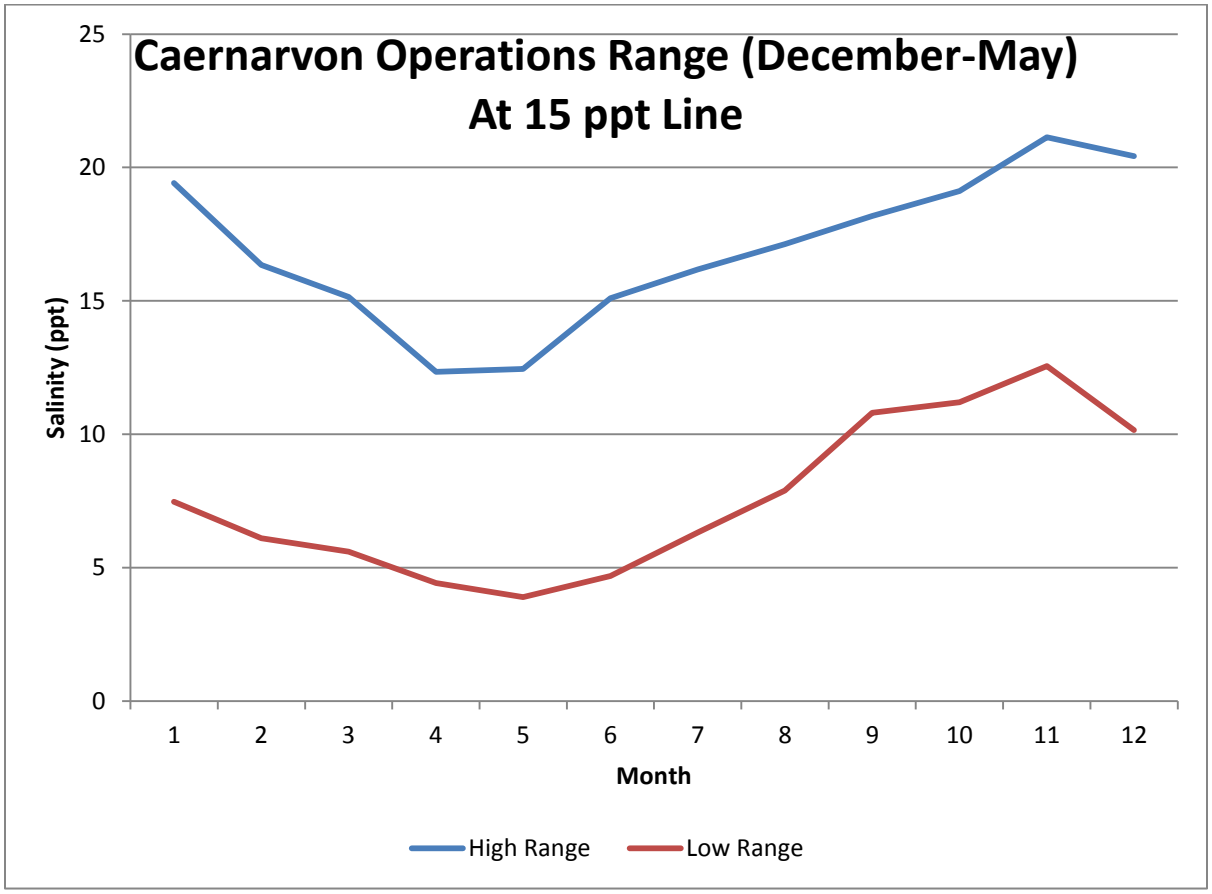
APPENDIX I

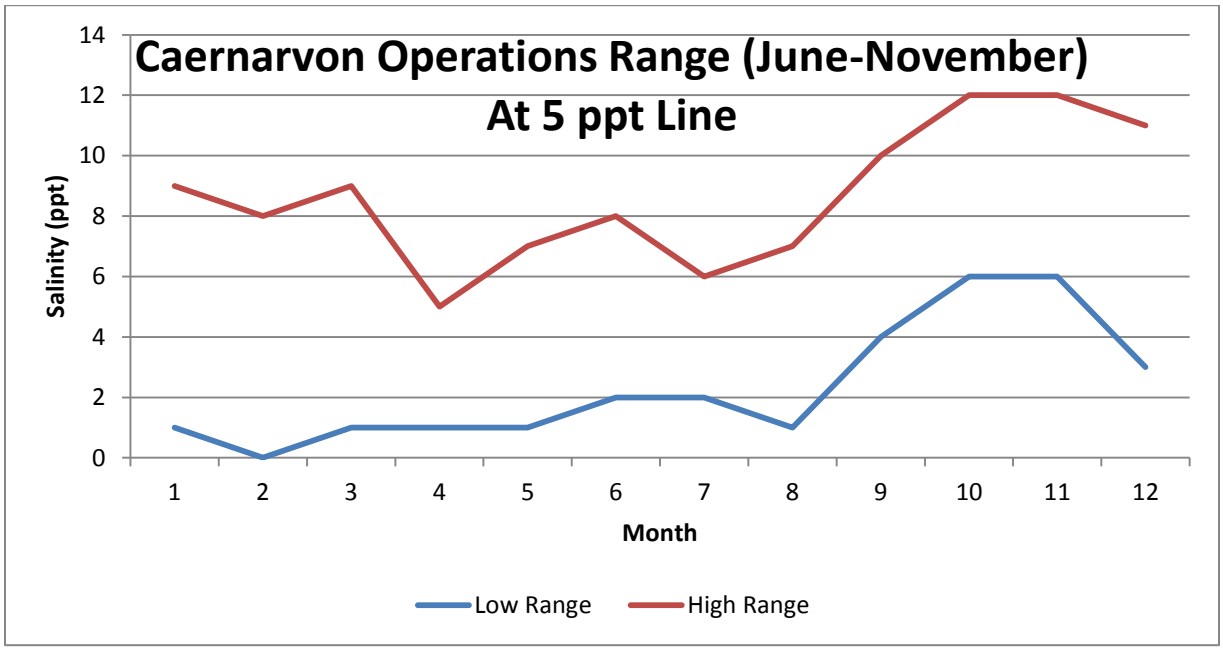
CAERNARVON OPERATIONAL PLAN 2014

The goals of the Caernarvon project are to reduce marsh loss, enhance marsh vegetation, and increase wildlife and fisheries productivity. Recent research and analysis indicated greater wetland benefits from increased freshwater and sediment distribution.

From December through May, Caernarvon operations will be based on the monthly salinity range at the 15 ppt line specified by the graph and map below, utilizing the Black Bay gauge until such time as the proposed new gauge becomes operable. From June through November, Caernarvon operations will be based on the monthly salinity range at the 5 ppt line specified by the graph and map below.




Caernarvon Operations Range (December-May)
At 15 ppt Line
Salinity (ppt)
25
20
15
10
5
0
1
2
3
4
5
6
7
8
9
10
11
12
Month
High Range
Low Range


Caernarvon Operations Range (June-November)
At 5 ppt Line
Salinity (ppt)
14
12
10
8
6
4
2
0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Low Range
High Range