

Lake Pontchartrain, Louisiana Bottlenose Dolphin Survey Summary

28 April 2008 – 10 May 2008

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Background

Lake Pontchartrain is a large (Area = 1,630 km²) brackish lagoon in southeastern Louisiana with a mean water depth of 3.7 m and a maximum depth of 5 m (Figure 1). Salinity in the lake varies seasonally and is influenced by freshwater inputs from the Mississippi River. The Bonnet Carré Spillway controls the discharge of freshwater into the lake and is used to protect New Orleans from floods (Sikora et al. 1985).

Since early spring 2007, a group of approximately 30-40 bottlenose dolphins (*Tursiops truncatus*) has been observed in Lake Pontchartrain. The dolphins typically occur on the west side of the Norfolk Southern train bridge and Highway 11 bridges, which both run approximately north to south across Lake Pontchartrain. The two bridges have a low clearance to the water and run parallel to each other, separated by approximately 20 meters, in the area where the dolphins were reported (Figure 1). The bottlenose dolphin is not thought to be a regular inhabitant of Lake Pontchartrain, and it is presumed that some factor is holding the dolphins in this unusual habitat. There are a large number of dolphins that occupy Mississippi Sound/Lake Borgne (MS/LB) adjacent to Lake Pontchartrain to the east (see Waring et al. 2007). Bottlenose dolphins from MS/LB could access the Lake from two tidal passes, the Rigolets and Chef Menteur, that connects these bodies of water, or via the Industrial Canal/Mississippi River Gulf Outlet which connects with Breton Sound (Figure 1). The occurrence of dolphins far from the extreme eastern boundary of the Lake was thought to be uncommon by Louisiana Department of Wildlife and Fisheries (LDWF) personnel.

Dolphins inhabiting low salinity environments for an extended period of time (i.e. several weeks) experience a number of negative health conditions. Primarily, these impacts manifest as severe skin lesions that worsen with longer exposure and lower salinities. In addition, the degradation of the skin disrupts electrolyte balance in the blood, and dolphins suffering from freshwater exposure exhibit changes in blood chemistry including decreased sodium and chloride levels associated with over-hydration due to increased water absorption through the skin. In addition, swelling in the eye (corneal edema) has also been observed. The associated physiological stress may lead to mortality in some cases, and data suggest that intervention should occur within 5-7 days of exposure to 0 ppt salinities to avoid severe health impacts (Southeast Fisheries Science Center, unpublished data). The presence of skin lesions associated with freshwater exposure was confirmed in the Lake Pontchartrain dolphins during low-level monitoring in 2007 (summarized below).

The Bonnet Carré Spillway was opened by the Army Corps of Engineers (ACOE) from 11 April to 8 May 2008 to divert Mississippi River flood waters into Lake Pontchartrain. The salinity in the lake was expected to rapidly decline to essentially freshwater conditions. In addition, the increase in freshwater inflow would possibly result in increased turbidity, decreased water temperature, a decline in food availability, and increased potential for harmful algal blooms. These conditions may have represented an additional stress on the already compromised bottlenose dolphins inhabiting the lake, and it may have been necessary to capture and translocate these dolphins if their condition

worsened. Due to these concerns, the ACOE and NMFS coordinated in an effort to increase monitoring of these animals during the period when the spillway was open, and eleven small boat surveys were conducted between 29 April and 10 May 2008.

The goals of this monitoring effort were to:

1. Determine if the trapped group of 30-40 bottlenose dolphins remained in the primary location west of the bridges, and if this group consisted of some or all of the same individual dolphins observed on prior surveys.
2. Conduct larger scale surveys to determine if individual bottlenose dolphins from the target group and/or different dolphins inhabited other areas of the lake.
3. Document the occurrence and progression of skin lesions associated with freshwater exposure for dolphins in the lake.
4. Collect salinity and temperature measurements at dolphin sighting locations and along the survey route to evaluate the exposure to low salinity conditions.



Figure 1. Map of Lake Pontchartrain, Louisiana with the primary bottlenose dolphin (“target group”) monitoring location identified by yellow “X.” Arrows indicate tidal entrances into the lake through Chef Menteur Pass and Rigolets Pass.

Low-Level Monitoring of Lake Pontchartrain dolphins: May – December 2007

Following the initial report of a group of dolphins “trapped” in Lake Pontchartrain in March 2007, NMFS personnel, with logistic support provided by the Louisiana Department of Wildlife and Fisheries (LDWF), began a low-level monitoring program of the dolphins (hereafter referred to as “the target group”). The initial photographic assessment occurred on 9 May 2007 and revealed that dolphins had skin lesions of varying severity which were consistent with exposure to low salinities. These lesions were dark orange-green in color, and the coverage over the body ranged from small circular areas to near total coverage (see Appendix I for examples). Most of the 30-40 dolphins in the target group exhibited these lesions, and several dolphins were considered severely compromised. It was not known if the target group was actually trapped on the west side of the bridges or if they were passing back and forth and could access higher salinity waters. In addition, three dolphins were reported dead in Lake Pontchartrain on April 20th and 22nd of 2007.

NMFS and LDWF personnel conducted three photo-identification (photo-ID) surveys (22 May 2007, 7 June 2007, and 21 June 2007) with the goal of photographing all of the dolphins from the target group on each trip. Individual dolphins can be identified by notches on the trailing edge of their dorsal fins (Würsig and Jefferson 1990, Appendix II). For the Lake Pontchartrain dolphins, skin lesion patterns were also used to identify individuals. A catalog of identifiable individuals was created, and preliminary analysis of the photographs from these surveys revealed that most dolphins were sighted on multiple surveys. This suggested both that a single group of animals was trapped within the Lake, and that all or the majority of the dolphins were staying on the west side of the bridges. The skin lesions did not appear to become significantly more severe over these 30 days and no additional dolphins were reported dead in the area. Salinity measurements near the site were 7.6 ppt during May (Table 1). The data indicated that there was no critical threat to the dolphin’s survival at that time, and NMFS initiated periodic photographic surveys to monitor the behavior and health status of the dolphins.

Subsequent photographic surveys of the dolphins during fall (5 November) and winter (19 December) of 2007 revealed improvement in the condition of the dolphins’ skin and overall appearance. No additional mortalities were reported and the animals were exhibiting normal dolphin behavior, such as foraging and social behavior. It was assumed that the higher salinities (e.g., 9.2 ppt) were the cause of the apparent improvement of the dolphins’ condition. However, a survey conducted on 28 March 2008, revealed that the skin lesions were re-appearing in varying severity on most of the dolphins. This apparent decline in their skin condition appeared to coincide with the lower salinity observed (i.e., 5.2 ppt) which is typical during the spring (Sikora et al. 1985).

Monitoring and assessment of bottlenose dolphins during the 2008 Bonnet Carré Spillway opening

The opening of the Bonnet Carré spillway was expected to dramatically reduce salinity in Lake Pontchartrain with possible impacts to the survival of the dolphins inhabiting the Lake. An intensive monitoring effort was undertaken by the ACOE and NMFS to document and evaluate potential impacts. Therefore, eleven small boat surveys were conducted between 29 April and 10 May 2008. During the enhanced monitoring period, photo-ID sampling surveys were conducted from a 7-m center-console outboard boat. Two scientists conducted each survey and used digital cameras with 100-400 mm lenses. Each day, the primary location and the adjacent area east of the bridges were surveyed. Other wider ranging surveys focused on the eastern portion of the Lake, the northern shore, and the passes leading to marine bodies of water (Appendix III). Over 5000 photos were taken for photo-ID and visual assessment of dolphin skin condition.

Whenever a dolphin group was encountered, an attempt was made to obtain a dorsal fin photograph of each animal in the group. Photographs were also taken to document the skin condition of animals with an abnormal appearance. Additional data were recorded for each group including: beginning and ending time of the encounter, the latitude and longitude, the number of adult/juveniles, calf and neonate dolphins, behaviors, number of dolphins with skin conditions, salinity, and water temperature. Salinity and water temperature were also recorded at ad hoc locations along the survey route. Daily summaries of the surveys and sightings are provided in Appendix III.

The surveys included 61.5 hours in the field, and there were 26 dolphin groups sighted with estimated group sizes ranging between 1 and 32 animals (average = 11.6 animals per group). Five groups of dolphins (total 44 animals) were observed in the Chef Menteur Pass, and 6 groups (total 7 animals) were observed in the Rigolets Pass. Several individual dolphins were seen within Rigolets Pass on multiple occasions. Interestingly, dolphins with extensive skin lesions were observed in each sighting in Rigolets Pass, while none of the animals in Chef Menteur Pass had lesions.

The target group of animals, consisting of 30-40 individuals, was sighted on at least seven occasions in the general area where they had been previously observed in low-level monitoring to the west of the highway and railroad bridges. The group included at least two neonates and at least one animal with extensive skin lesions. The animals were observed feeding and conducting social behavior.

There were at least an additional 6 groups of dolphins sighted that did not appear to be members of the target group, and these groups included individuals that had not been seen in previous survey efforts. The groups ranged from 1 to 12 animals (average = 5.1) and did include animals with skin lesions. These groups were seen only on the eastern side of the highway and railroad bridges.

The water salinity ranged between 0.9 – 3.9 ppt within the surveyed area. This salinity level was much lower than that observed in May of 2007 (7.2 ppt). Dolphins were

sighted throughout this observed salinity range. The average salinity at dolphin sighting locations was 2.0 ppt in Rigolets Pass, 1.5 ppt in Chef Menteur Pass, and 2.3 ppt in Lake Pontchartrain. Thus, the dolphins appear to have been exposed to much lower salinities during this period than when they had initially been seen with high levels of skin lesions in 2007.

Despite the observed low salinity levels, there was no apparent progression of skin lesions during the survey period. Animals within the target group showed varying degrees of mottled and pale skin, consistent with observations in 2007 and in other animals exposed to low salinity water. However, the observation of the extensive skin lesions consisting of an orange to green growth covering a significant portion of the body had not been previously observed (Appendix I). One animal in the target group had these more extensive lesions, and there were at least six individual animals sighted in Rigolets Pass with extensive skin lesions. It is uncertain whether the growth on the Lake Pontchartrain dolphins was algal or fungal in nature.

Conclusions

The results of this monitoring effort indicate that:

1. The “trapped” group of approximately 30-40 dolphins remained in the primary location west of the bridges, and the group included some or all of the individual dolphins observed on prior surveys.
2. Larger scale surveys indicated that there were additional dolphins within this portion of the Lake including small groups of animals on the eastern side of the bridges, in Rigolets Pass, and in Chef Menteur Pass.
3. The appearance of the skin lesions in the target group were similar to that observed in previous surveys. However, extensive lesions were observed on one animal in the target group and multiple animals within Rigolets Pass that had not been previously observed. Animals observed in Chef Menteur Pass did not have these extensive lesions.
4. Dolphins were exposed to salinities of 1-3 ppt during this period, which were significantly lower than that observed in spring of 2007.

The opening of the Bonnet Carré Spillway did not appear to directly impact the target group of bottlenose dolphins during the enhanced monitoring period. The animals remained in their position on the west side of the bridges and did not appear to alter behavior or group composition. The two neonates that were born earlier in 2008 were still present throughout this monitoring, and the dolphins in the group were observed socializing and feeding. There was no observable decline in skin condition of animals in the target group of dolphins during the monitoring period.

There is a limited amount of data available on the relationship between the length of exposure to low salinity conditions and the progression of the associated skin conditions

and over-hydration. Of the six well documented cases, there were two animals that survived for prolonged periods (>45 days) at salinities between 1-5 ppt. It is hypothesized that animals in such conditions may be able to maintain electrolyte balance by feeding on prey that contain sufficient sodium levels (SEFSC, unpublished data). Therefore, it is possible that the target group of dolphins are able to maintain their body condition despite experiencing low salinity levels for what is now an extended period of time (> 1.5 year).

The high incidence of severe skin conditions in animals within Rigolets Pass is an interesting finding of the current study. It does not appear that these animals experience salinities that are markedly lower than those of the target group or those animals within the Chef Menteur Pass. The available data on freshwater exposure do indicate that the onset of the skin condition can be quite rapid, occurring within 5-10 days of exposure (SEFSC, unpublished data). Thus, it is possible that those animals experienced at least a short-term stress of reduced or low salinity, but did not have prey available to them that would allow them to maintain electrolyte balance or otherwise experienced environmental conditions that exacerbated the impacts of low salinity on these animals. As a follow on to the current study, it would be interesting to compare the prey resources, salinity field, and the progression of skin lesions on the target group, the Chef Menteur Pass animals, and the Rigolets Pass animals to better understand these processes.

Prior to this study, very little was known about the use of Lake Pontchartrain by bottlenose dolphins. From the more extensive surveys conducted during this monitoring effort, it does appear that the occurrence of large groups of bottlenose dolphins is unusual. However, this study documented that dolphins do use the lake and the associated passes. It would be interesting to continue this monitoring to determine if animals inhabit the passes on a year-round basis, or if these smaller groups could be considered transient animals using the lake habitats intermittently.

Subsequent monitoring surveys of the target group of dolphins were conducted in June, July, and September 2008. The 30-40 dolphins continue to remain in the same general area to the west of the bridges. The salinity during June remained low (1.2 ppt) but increased to 4.8 in July (Table 1). Their skin conditions have improved, as was the case in 2007 during these months. Their behaviors have remained consistent, with feeding and social interactions being observed. Of note, a previously un-photographed dolphin with a very distinct dorsal fin and her small calf were seen with the target group on the last two surveys.

It does appear that some factor is “holding” the large target group in its place. This may be abundant prey resources, aversion to the bridges, or some other poorly understood factor. In addition to the target group, a small group of five dolphins just to the east of the bridges has been sighted on numerous surveys since November 2007, including surveys conducted during low salinity conditions. It is unknown why these dolphins choose to remain in the area, and there are no low-lying bridges serving as a potential barrier to their leaving the Lake. Continued low-level monitoring of both groups will be useful to better understand their usage of this unusual bottlenose dolphin habitat.

Literature Cited

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- Waring, G. T., E. Josephson, C. P. Fairfield and K. Maze-Foley, eds. 2007. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments -- 2006. NOAA Technical Memorandum NMFS-NE-2001.
- Würsig, B., and T.A. Jefferson. 1990. Methods of photo-identification for small cetaceans. Pages 43-52 in P.S. Hammond, S.A. Mizroch, and G.P. Donovan (eds). Individual recognition of cetaceans: Use of photo-identification and other techniques to estimate population parameters. Reports of the International Whaling Commission, Special Issue 12.

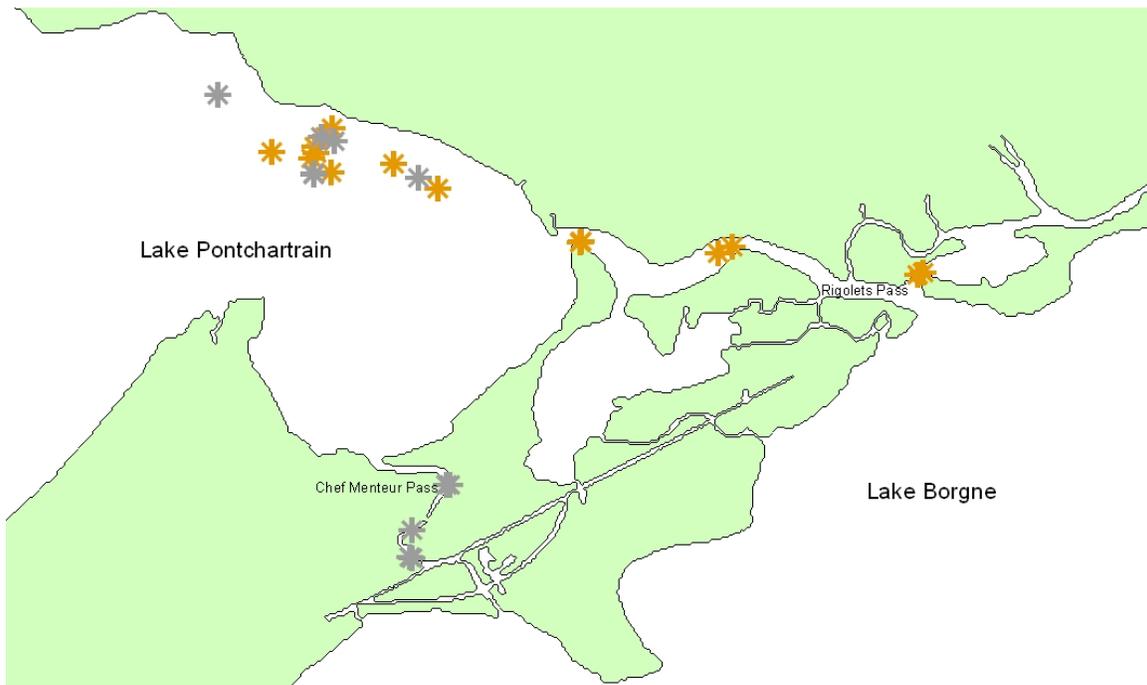
Lake Pontchartrain Bottlenose Dolphin Monitoring, April 28 - May 10, 2008

Table 1 – Summary of data collected during Lake Pontchartrain bottlenose dolphin surveys by the NMFS and LDWF from 9 May 2007 to 5 September 2008. Field estimates of the number of dolphins encountered are verified by analysis of photographs to identify unique individuals within the group. In several cases, the field estimates underestimated the number of individuals.

Date	Survey Hours	Salinity Range (ppt)	Water Temperature Range (C)	Number of Dolphin Groups Observed	Field Estimate of the Number of Dolphins Encountered	Number of Calves (c) or Neonates (n) Observed	Number of Photos Taken	Number of Individuals Identified
9 May 2007	nr	nr	nr	1	35	nr	247	20
22 May 2007	0.83	7.6	25.3	1	18	1c	349	23
7 June 2007	1.92	nr	nr	1	25	2c 1n	133	14
21 June 2007	1.22	6.4	28.2	1	22	2c	Unknown	27
5 November 2007	2.05	7.5	19.3	2	30	1c	Unknown	31
19 December 2007	1.00	9.2	14.6	1	30	1c	Unknown	33
28 March 2008	2.17	5.2	19.5	1	31	1c 1n	Unknown	37
Enhanced Monitoring								
28 April 2008	2.65	1.1-3.9	20.4-23.1	0	0	0	0	0
29 April 2008	9.62	0.9-3.3	19.7-21.9	1	15	1c	184	10
30 April 2008	7.62	1.3-3.1	20.4-23.6	4	27	1c 1n	337	15
1 May 2008	3.63	3.1-3.4	22.6-22.9	1	1	0	83	1
3 May 2008	5.92	2.3-2.7	23.1-24.1	4	52	0	843	58
4 May 2008	4.02	1.6-2.7	22.8-23.9	2	31	2n	486	21
5 May 2008	5.90	1.5-2.6	21.9-23.9	2	38	2n	1007	52
6 May 2008	6.68	1.7-2.4	22.4-22.9	3	32	3n	462	41
7 May 2008	4.68	1.7-2.3	23.2-23.5	2	33	2n	825	38
9 May 2008	5.27	1.6-2.3	24.1-24.5	2	35	2n	672	35
10 May 2008	5.47	1.4-2.2	24.7-25.4	5	35	2n	574	41
Total	61.47			26	299	2 c 14n	5473	
6 June 2008	1.80	1.4	29.6	1	20	1c 2n	437	30
16 July 2008	1.87	4.8	30.9	2	37	3c	675	46
5 September 2008	1.57	nr	26.0	1	30	2c	435	40

Appendix I. Bottlenose Dolphin Skin Conditions in Lake Pontchartrain.

Seven dolphins were photographed during the enhanced monitoring from 28 April 2008 to 10 May 2008 that had an orange to green growth in varying severity on their skin. Similar growths have been seen on bottlenose dolphins exposed to freshwater for long periods of time in other areas. It is unknown whether the growth on the Lake Pontchartrain dolphins is algal or fungal in nature. The following map indicates the locations where these dolphins were observed. Of note, every dolphin that was seen in the Rigolets Pass was affected by this condition. In contrast, many more dolphins were seen in Chef Menteur Pass than the Rigolets Pass; however, not a single dolphin that was observed in Chef Menteur Pass had this skin condition.



The orange asterisks indicate sightings which contained at least one dolphin with the orange to green growth. The gray asterisks indicate sightings where no dolphins were observed with the growth.

Photographs of each of the seven dolphins observed that were affected by this growth follow. The middle photograph on each page is of the dorsal fin, which was used to differentiate between individuals.

Lake Pontchartrain Bottlenose Dolphin Monitoring, April 28 - May 10, 2008

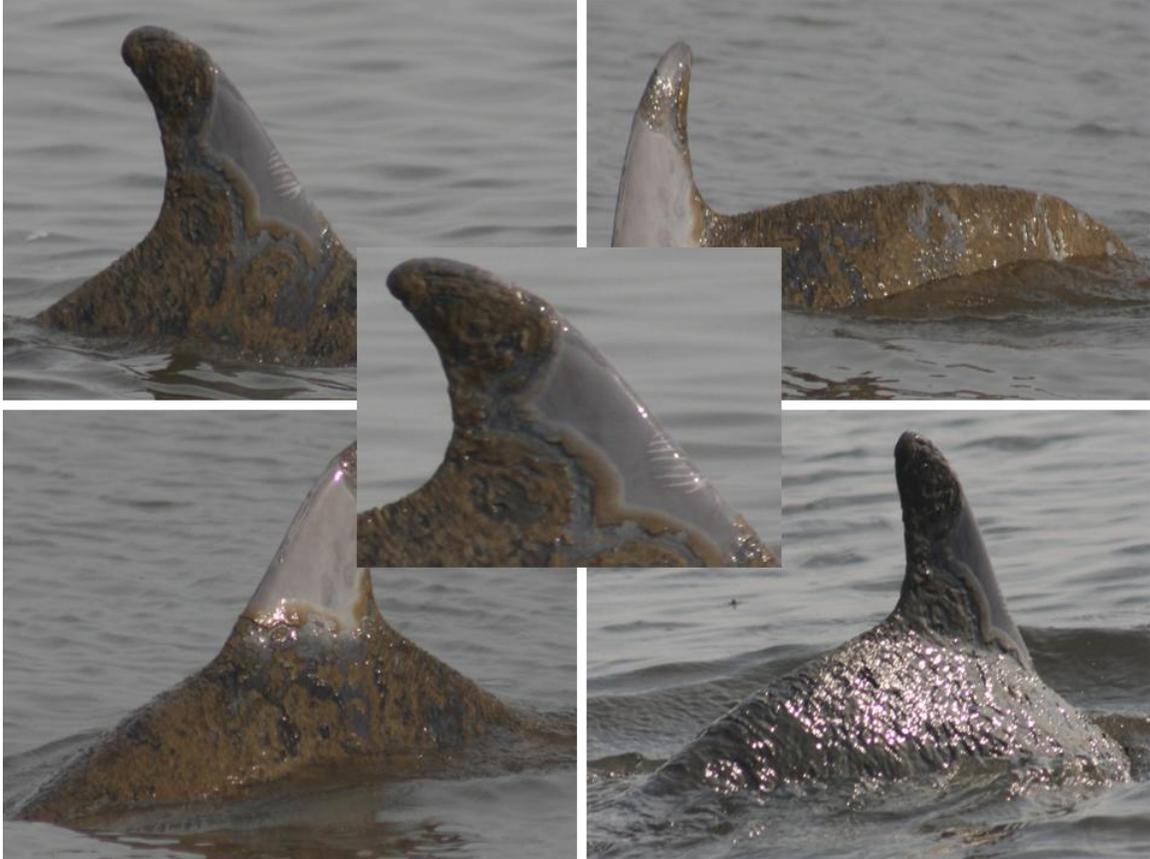


This individual was observed on the following occasions:

04/30/2008 30.17369N 89.68942W

05/10/2008 30.17118N 89.69415W

Lake Pontchartrain Bottlenose Dolphin Monitoring, April 28 - May 10, 2008



This individual was observed on the following occasions:

05/07/2008 30.16464N 89.62266W

05/10/2008 30.16377N 89.62434W

Lake Pontchartrain Bottlenose Dolphin Monitoring, April 28 - May 10, 2008



This individual was observed on the following occasions:

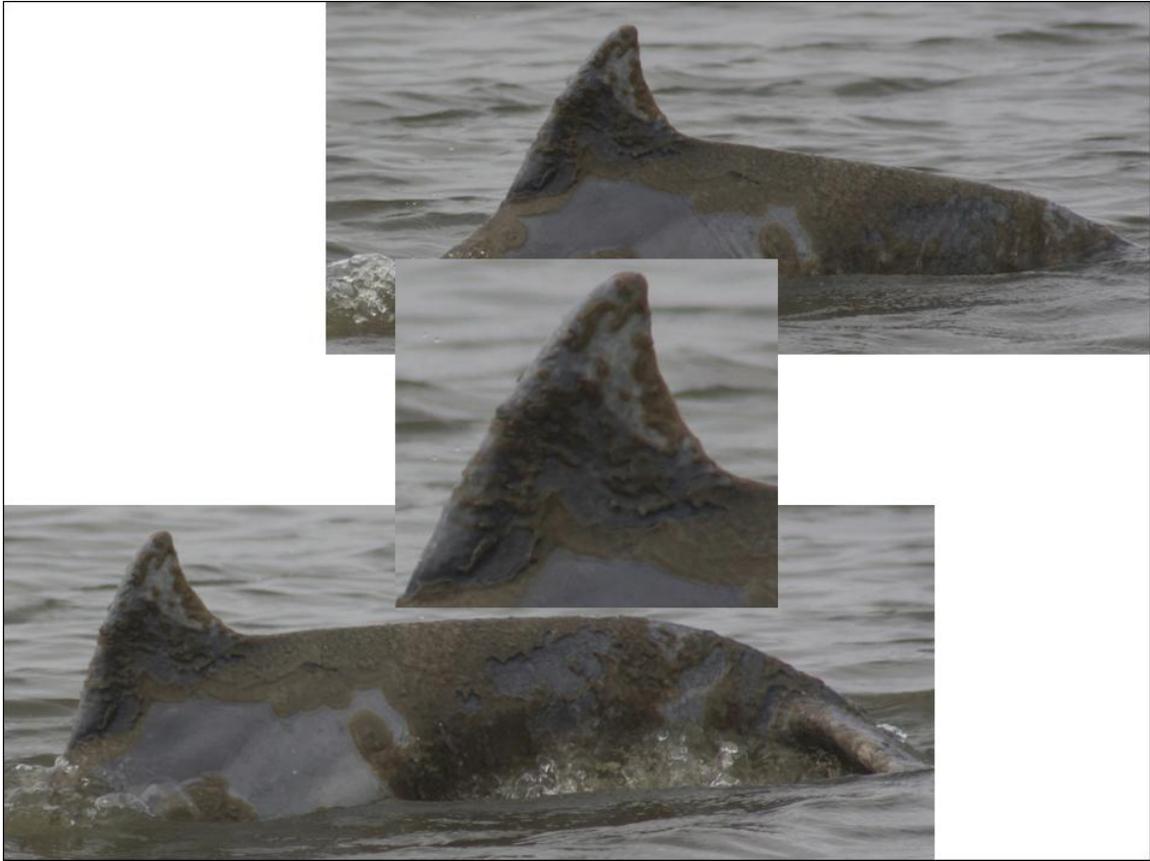
05/03/2008	30.20445N	89.83669W
05/05/2008	30.21532N	89.82933W
05/06/2008	30.20678N	89.85042W
05/07/2008	30.20650N	89.83515W
05/09/2008	30.20866N	89.83560W
05/10/2008	30.21194N	89.83149W

Lake Pontchartrain Bottlenose Dolphin Monitoring, April 28 - May 10, 2008



This individual was observed on the following occasions:

05/01/2008	30.20261N	89.80771W
05/10/2008	30.19978N	89.82971W



This individual was observed on the following occasions:

05/04/2008 30.17545N 89.74226W

05/10/2008 30.17531N 89.74270W

Lake Pontchartrain Bottlenose Dolphin Monitoring, April 28 - May 10, 2008



This individual was observed on the following occasion:

05/03/2008

30.19391N

89.79239W

Lake Pontchartrain Bottlenose Dolphin Monitoring, April 28 - May 10, 2008



This individual was observed on the following occasion:

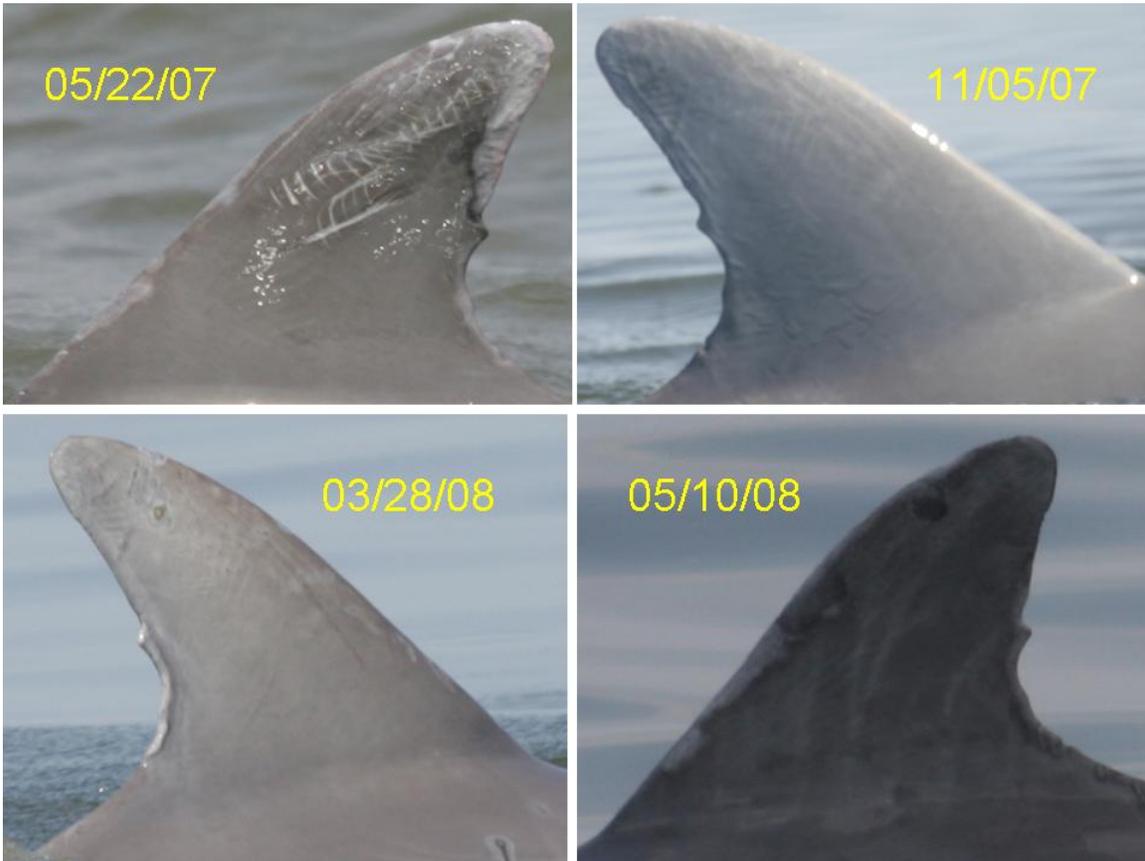
05/10/2008

30.17118N

89.69415W

Appendix II. Examples of Bottlenose Dolphin Dorsal Fin Matches from Lake Pontchartrain.

The following are three examples of individual dolphins that were seen on numerous occasions from first NMFS/LDWF survey 22 May 2007 to the completion of the enhanced monitoring on 10 May 2008.



Lake Pontchartrain Bottlenose Dolphin Monitoring, April 28 - May 10, 2008

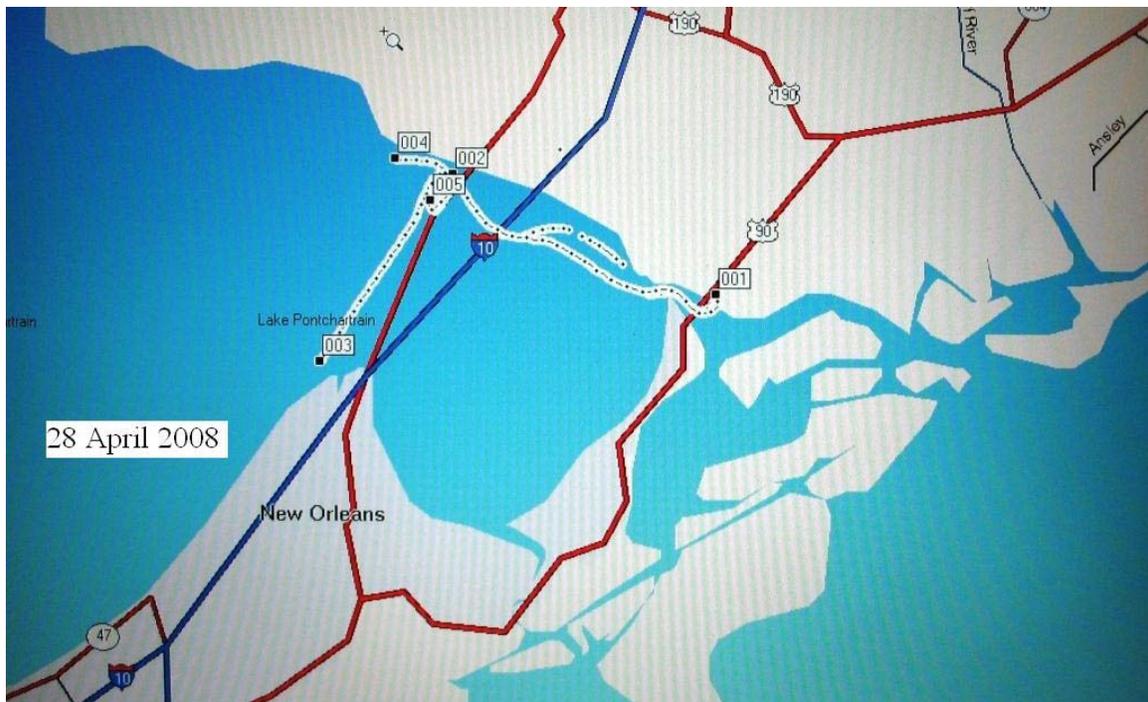


Appendix III. Daily Survey Summaries

For each day of the enhanced monitoring survey from 28 April to 10 May 2008, a summary is given which consists of a brief narrative, a table of survey waypoints with water temperature and salinity, a plot of the effort and waypoint locations, and a plot for each sighting of a dolphin group. Water temperatures are given in degrees Celsius, depths in feet and salinities in parts per thousand (ppt).

Monday, 28 April: Left dock at Rigolets Marina at 09:11 under windy conditions. The survey was conducted from the marina to the north shore of Lake Pontchartrain where the group of 30+ target dolphins had been located over the past year. Although Beaufort sea state conditions were marginal, the area just west of the Highway 11 and Norfolk Southern train bridges from the north shore to the south shore were covered. No dolphins were spotted and due to worsening conditions, the boat returned to the marina at 11:50.

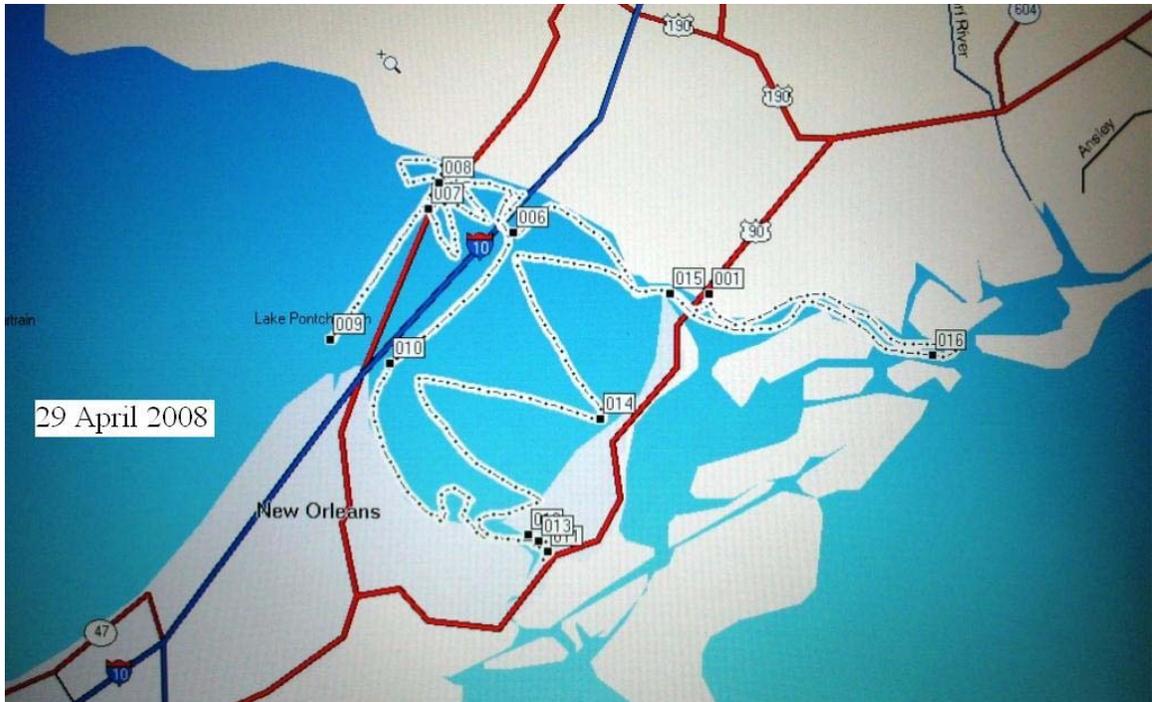
04/28/2008		2.65 survey hours		0 sightings	
Time	Waypoint	Latitude	Longitude	Water Temp (°C)	Salinity (ppt)
9:11	1	30.17612	89.72698		
10:01	2	30.21548	89.82709	23.1	3.9
10:36	3	30.15402	89.87754	20.4	1.1
10:58	4	30.22089	89.84895	23.1	3.8
11:11	5	30.20667	89.83566	22.4	3.1
11:50	1	30.17612	89.72698		



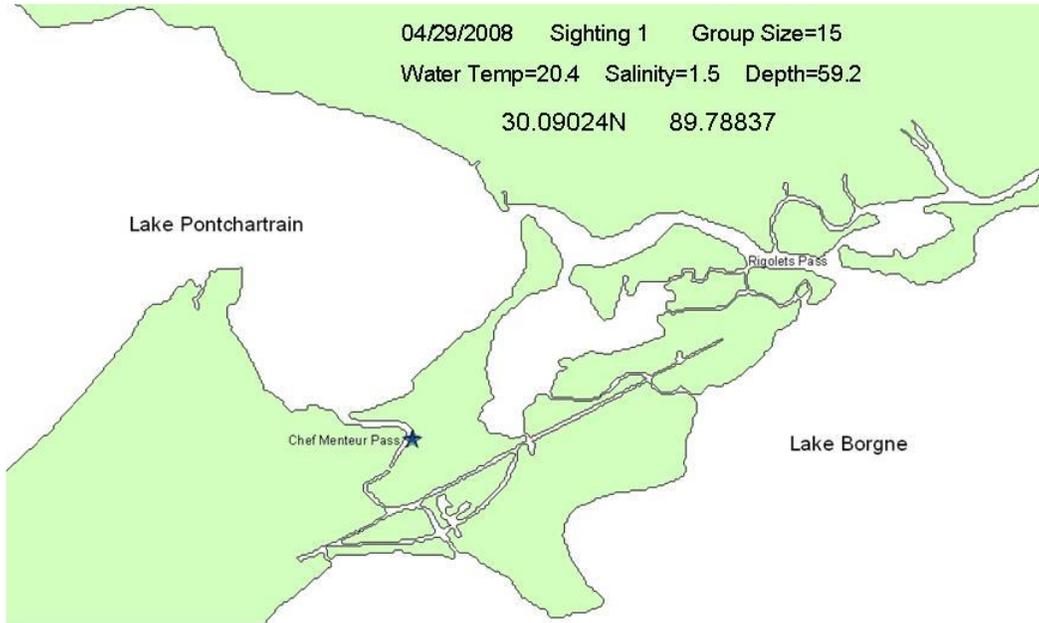
Tuesday, April 29: Left the dock at Rigolets Marina at 07:42 with a photographer from the New Orleans Times-Picayune newspaper. The survey was conducted along the north shore from the marina to the area just west of the Highway 11/train bridges (Beaufort sea state 2-3). The north end of the Lake to the south end was surveyed without locating any dolphins. The area between the Highway 11 bridge and the I-10 bridge was then surveyed in a sawtooth pattern from the drawbridges of both bridges to the north shore without locating any dolphins. The boat surveyed down the east side of the I-10 bridge to the south shoreline until reaching the entrance to Chef Menteur Pass. After proceeding into the Pass, several dolphins were located. After this sighting, the boat exited the Pass and began a sawtooth search pattern from the eastern shoreline of the Lake to the I-10 bridge, working gradually northwards until reaching the northern shoreline. No dolphins were located during this transect. The Rigolets Pass was then surveyed until the boat reached the train bridge which designates the beginning of Lake Borgne. No dolphins were seen in this area and the boat returned to the marina at 14:37.

04/29/2008		6.92 survey hours		1 sighting	
Time	Waypoint	Latitude	Longitude	Water Temp (°C)	Salinity (ppt)
7:42	1	30.17612	89.72698		
8:12	6	30.19603	89.80205	21.8	3.0
8:45	7	30.20365	89.83445	21.8	3.0
8:52	8	30.21247	89.83033	21.9	3.3
9:30	9	30.16056	89.87221	19.7	1.2
10:50	10	30.15287	89.84936	19.9	0.9
11:30	11	30.09024	89.78837	20.4	1.5
12:29	12	30.09567	89.79577	20.5	1.6
13:21	14	30.13436	89.76827	20.9	2.4
13:48	15	30.17589	89.74184	21.0	2.3
14:07	16	30.15607	89.63870	21.4	2.8
14:37	1	30.17612	89.72698		

Lake Pontchartrain Bottlenose Dolphin Monitoring, April 28 - May 10, 2008



Sighting 1 (29 April)

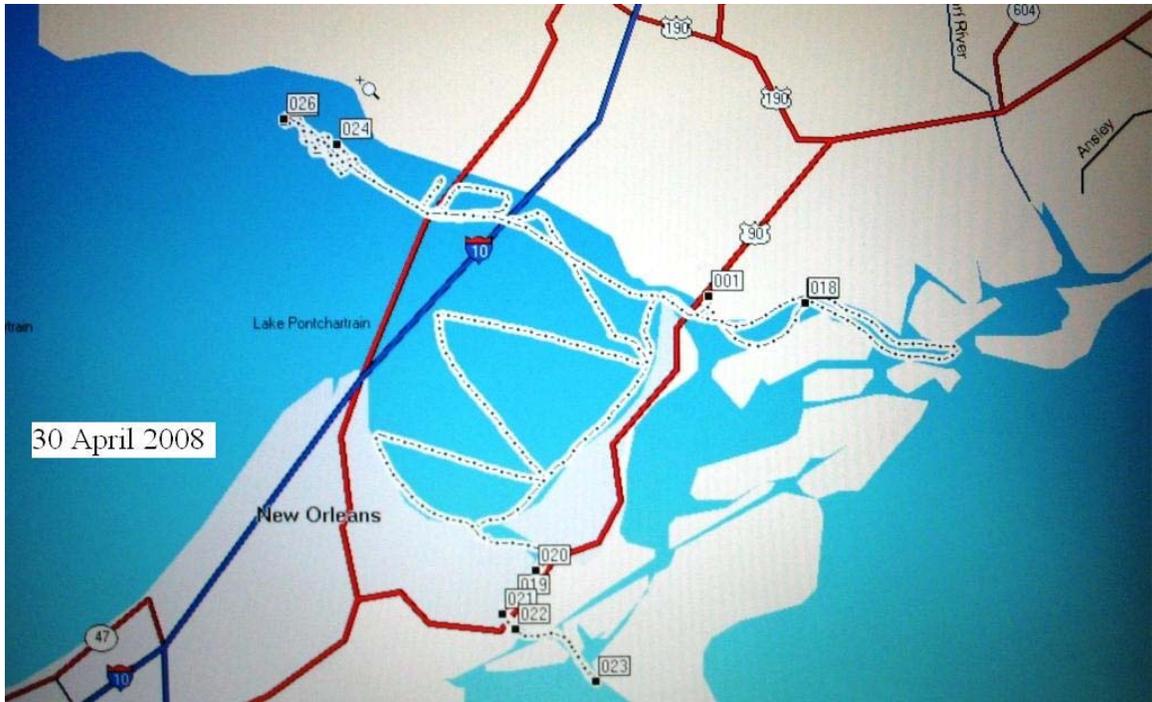


Sighting 1 - Fifteen dolphins were located in Chef Menteur Pass at 11:30 shown by blue star on map. These dolphins exhibited social behaviors, slow and fast travel during the sighting. After observing these dolphins, it was believed that this group did not contain the dolphins from the target group. This was verified once the photographs were compared to the catalog.

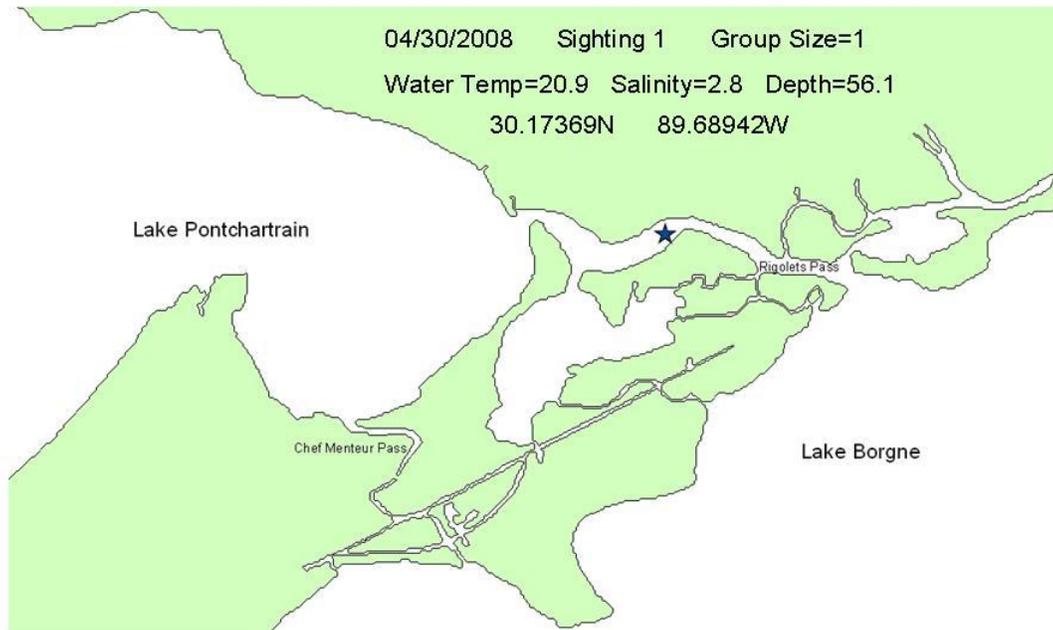
Wednesday, 30 April: The boat left the marina at 08:02 under excellent survey conditions (Beaufort sea state 0-1). The boat surveyed Rigolets Pass to the train bridge at the opening of Lake Borgne. A single dolphin was located and photographed. The boat continued from this location down the eastern shore of the Lake and into Chef Menteur Pass. Several groups of dolphins were located, from the area where dolphins were found the previous day to the opening of Lake Borgne. The boat exited the Pass and surveyed the Lake between the eastern shore to the I-10 bridge in a sawtooth pattern from the south end to the north end of the Lake without locating any dolphins. The boat then went to the area west of the Highway 11/ train bridges and did not locate any dolphins. The boat began to survey the area between the Highway 11 and I-10 bridges when a call was received from LWFS who reported 3-4 dolphins by their boat while they were conducting a trawling sample 2 miles west of the Highway 11 bridge near the north shore of the Lake. Conditions had deteriorated all day and were now at a sea state 4-5 in this location. Several glimpses of dolphin dorsal fins were observed, but due to the very rough seas were unable to keep visuals on these animals long enough to collect photographs. The boat then returned back to the marina at 15:39, as conditions no longer allowed effective surveying.

04/30/2008		7.62 survey hours		4 sightings	
Time	Waypoint	Latitude	Longitude	Water Temp (°C)	Salinity (ppt)
8:02	1	30.17612	89.72698		
8:16	17	30.17369	89.68942	20.9	2.8
9:41	19	30.07439	89.80155	20.4	1.3
10:04	20	30.08457	89.79336	20.4	1.3
10:51	21	30.06978	89.80638	20.5	2.1
11:35	23	30.04648	89.77031	20.7	1.4
14:58	25	30.23463	89.88957	23.6	3.1
15:39	1	30.17612	89.72698		

Lake Pontchartrain Bottleneck Dolphin Monitoring, April 28 - May 10, 2008

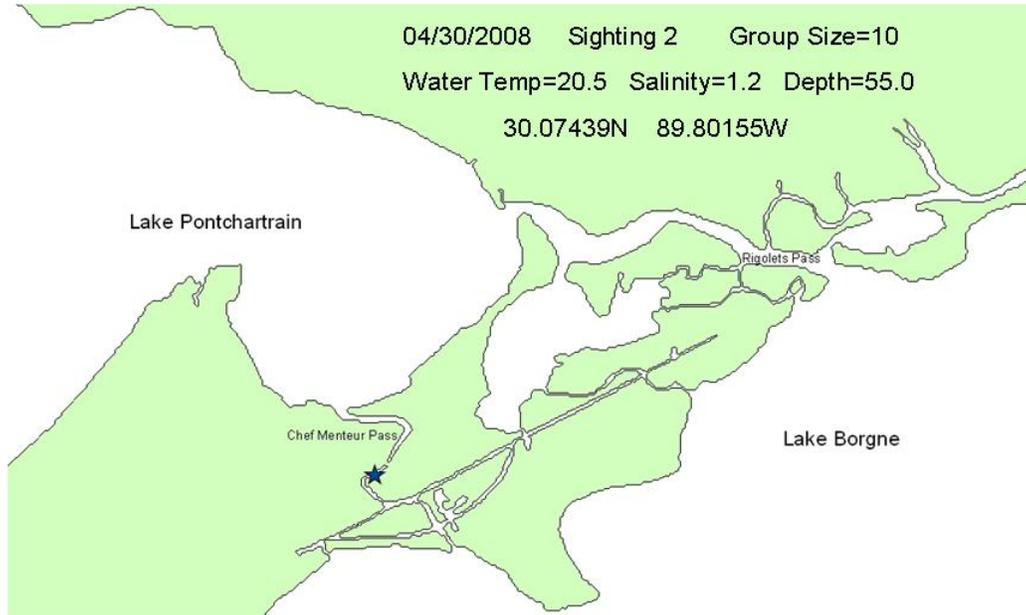


Sighting 1 (30 April)



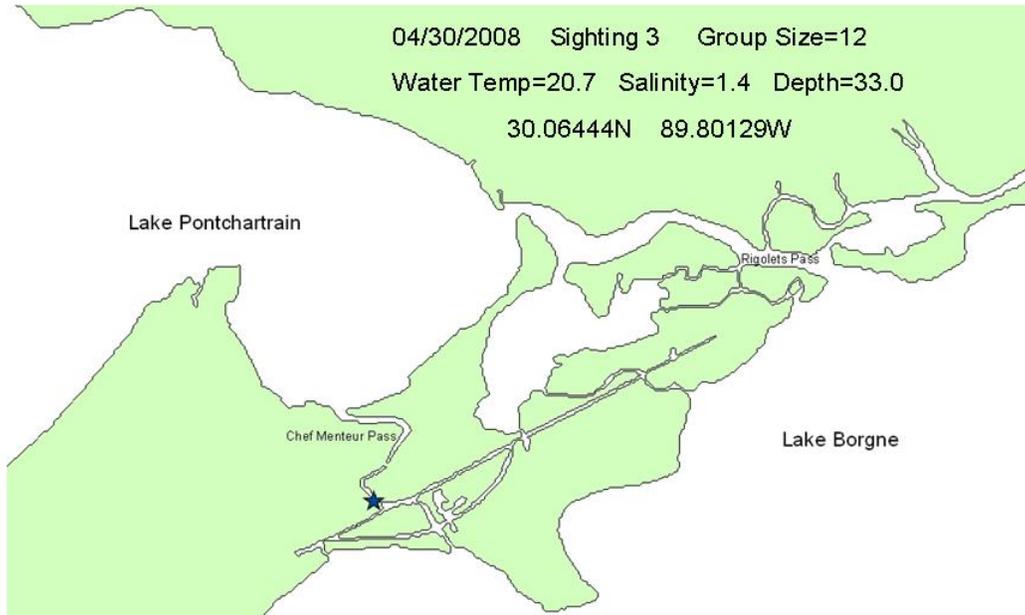
Sighting 1 - This sighting was of a single dolphin at 08:16 that appeared to be in a probable feeding behavior due to its repeated deep dives and erratic directional movement. This dolphin was the first animal observed during this enhanced monitoring period that exhibited lesions on its skin. After photographic analysis, this dolphin was not one of the original dolphins in the catalog collected during the previous year.

Sighting 2 (30 April)



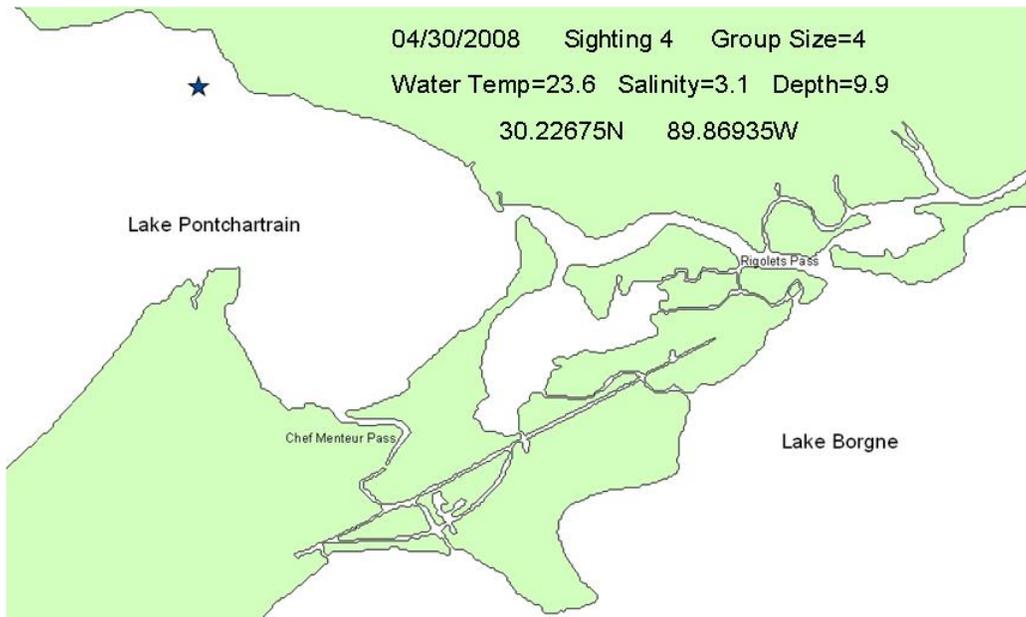
Sighting 2 - This group of dolphins was located at 09:41. They were found in the location that dolphins had been found the previous day. They were feeding (fish seen in a dolphin's mouth) and fast traveling. Upon photographic analysis, these dolphins were not in the original catalog collected during the previous year.

Sighting 3 (30 April)



Sighting 3 - This group of dolphins were located slightly further into Chef Menteur Pass than the previous group at 10:57. These dolphins exhibited slow travel and were feeding. Upon photographic analysis, these dolphins were not in the original catalog collected during the previous year.

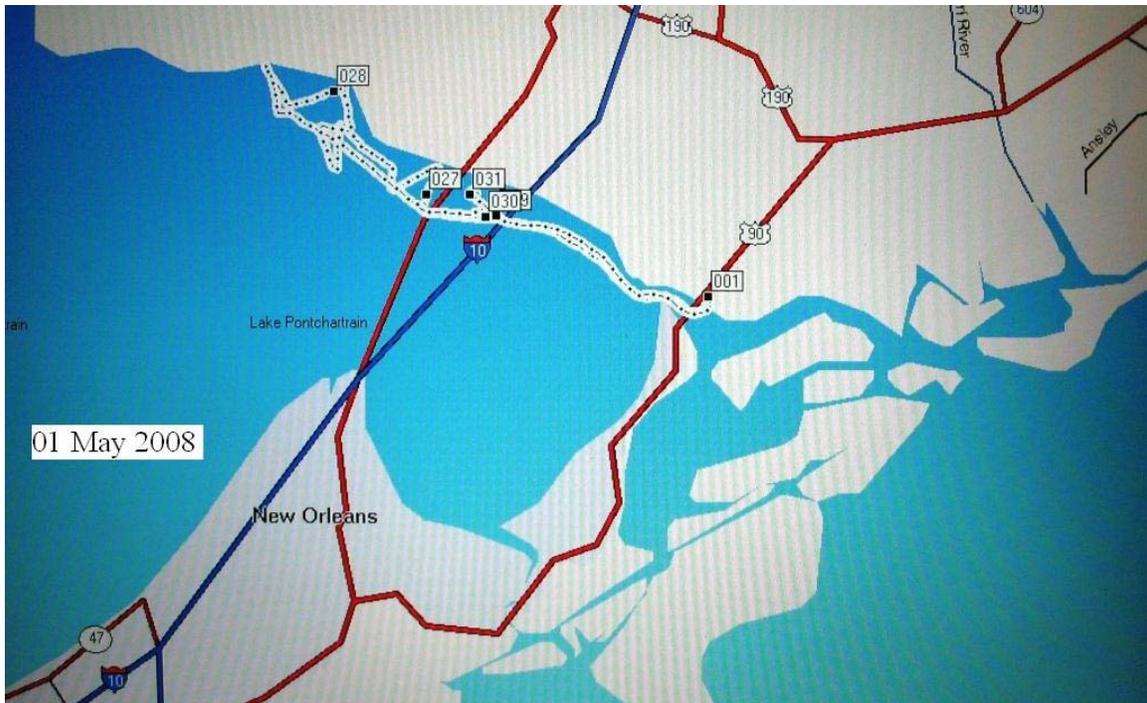
Sighting 4 (30 April)



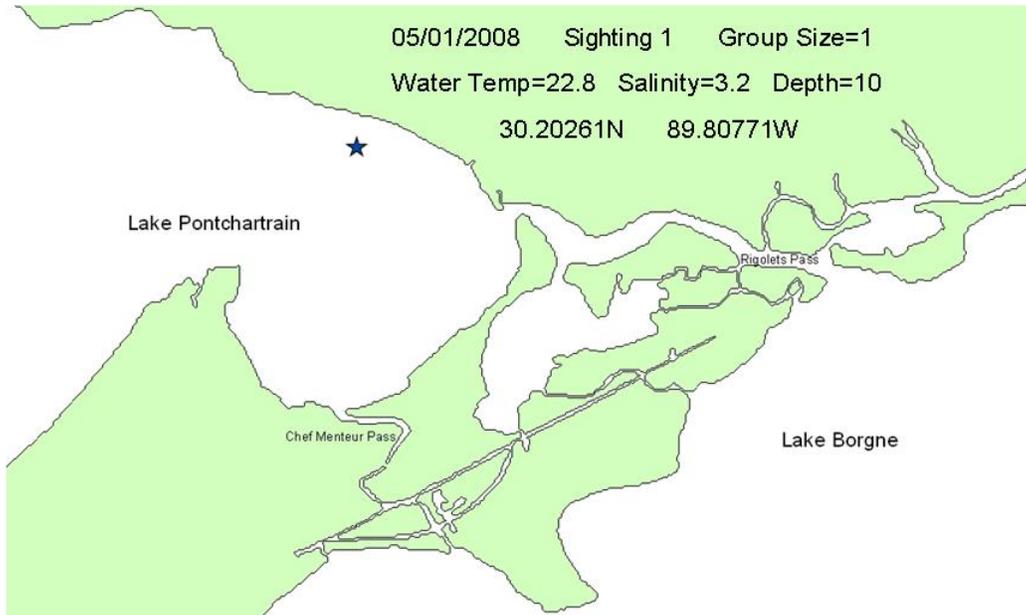
Sighting 4 - Sighting 4 resulted from LDWF personnel giving notification that several dolphins were near their vessel about two miles west of the Highway 11/ train bridges. The boat arrived at 14:12, and the dolphins were no longer around the LDWF boat. The sea state was poor (Beaufort 4-5) for locating dolphins. Several glimpses of dolphin dorsal fins cutting through the waves were observed, but no photographs were collected. This was the first time dolphins were seen west of the bridge during this monitoring period.

Thursday, 1 May: The boat departed the marina at 06:57 in search of the dolphins that were seen the previous afternoon west of the bridges. The sea state started at a Beaufort 2-3 and by mid-morning became 4-5. The area near the northern shore of the Lake west of the Highway 11/ train bridges was surveyed with no dolphins being located. Conditions became unworkable so the survey was ended. While transiting back between the Highway 11 and I-10 bridges, one dolphin was located. A little over an hour in rough seas was spent photographing this animal. After completing this sighting, the boat finished the transit back to the marina at 10:35.

05/01/2008		3.63 survey hours		1 sighting	
Time	Waypoint	Latitude	Longitude	Water Temp (°C)	Salinity (ppt)
6:57	1	30.17612	89.72698		
7:24	27	30.20953	89.83387	22.6	3.1
8:09	28	30.24387	89.86980	22.9	3.4
8:58	29	30.20261	89.80771	22.8	3.2
10:35	1	30.17612	89.72698		



Sighting 1 (01 May)



Sighting 1 - A single dolphin was spotted at 08:58 and was observed milling, traveling slowly and changing direction often, with no overall directional movement. This dolphin's skin was covered in skin lesions. Although the rough seas did not allow for the collection of photographs that were ideal for photographic identification, this dolphin was not in the catalog.

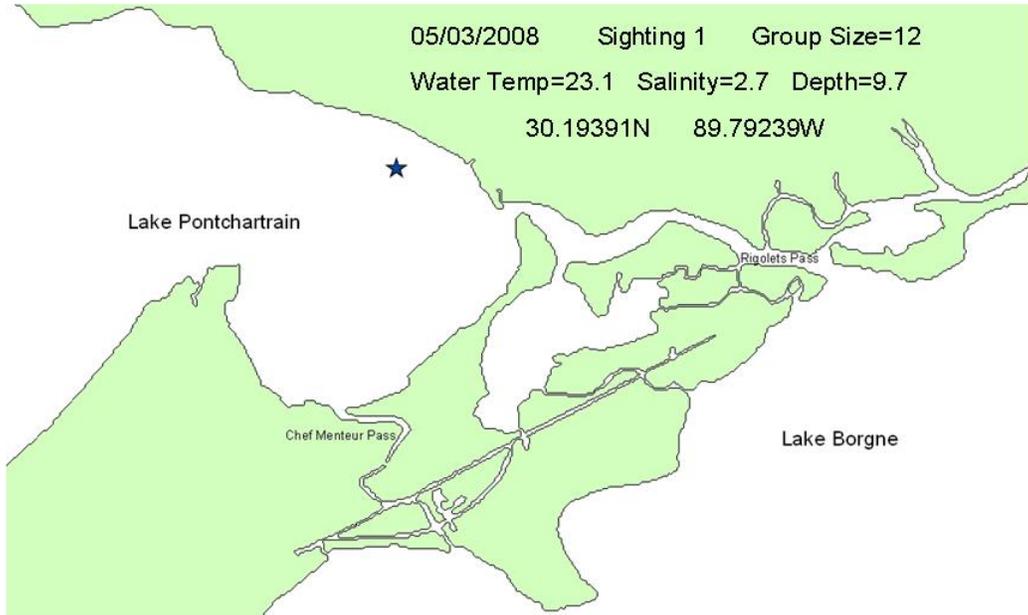
Saturday, 3 May: Due to severe thunderstorms and high winds, the boat did not depart the marina until 12:00. Shortly after leaving, a group of dolphins was encountered just east of the I-10 bridge. The boat was with these dolphins for a little over an hour. After leaving this group, the boat continued westward and encountered another group of dolphins east of the Highway 11 bridge on the north side of the drawbridge. After photographing all of these animals, the boat ran saw-tooth transects between the I-10 bridge and the Highway 11 bridge starting on the northshore and working south. As a transect that took us near the Highway 11 bridge was completed, a small group of dolphins were located. Shortly after starting to photograph these animals, a large group of dolphins were sighted on the west side of the bridges. The boat quickly left the initial small group of dolphins and located the new animals at 16:25. It was determined that this large group of dolphins contained many if not all of the target group of dolphins. After taking a large number of photographs, the boat returned to the marina at 17:21.

05/03/2008		5.92 survey hours		4 sightings	
Time	Waypoint	Latitude	Longitude	Water Temp (°C)	Salinity (ppt)
12:00	1	30.17612	89.72698		
12:12	32	30.19391	89.79239	23.1	2.7
13:26	33	30.18581	89.80304	23.1	2.7
13:34	34	30.20181	89.79590	23.4	2.8
13:56	35	30.24258	89.86325	23.6	3
14:22	37	30.22620	89.91584	22.4	1.4
14:44	38	30.25272	89.95165	23.9	2.7
15:18	39	30.21049	89.83215	23.2	2.5
15:23	40	30.21048	89.82847	23.7	2.3
15:53	41	30.20665	89.83177	23.7	2.3
16:25	44	30.20445	89.83669	23.8	2.5
17:08	45	30.21680	89.83753	24.1	2.7
17:21	46	30.21381	89.84332	23.8	2.5
17:55	1	30.17612	89.72698		

Lake Pontchartrain Bottleneck Dolphin Monitoring, April 28 - May 10, 2008

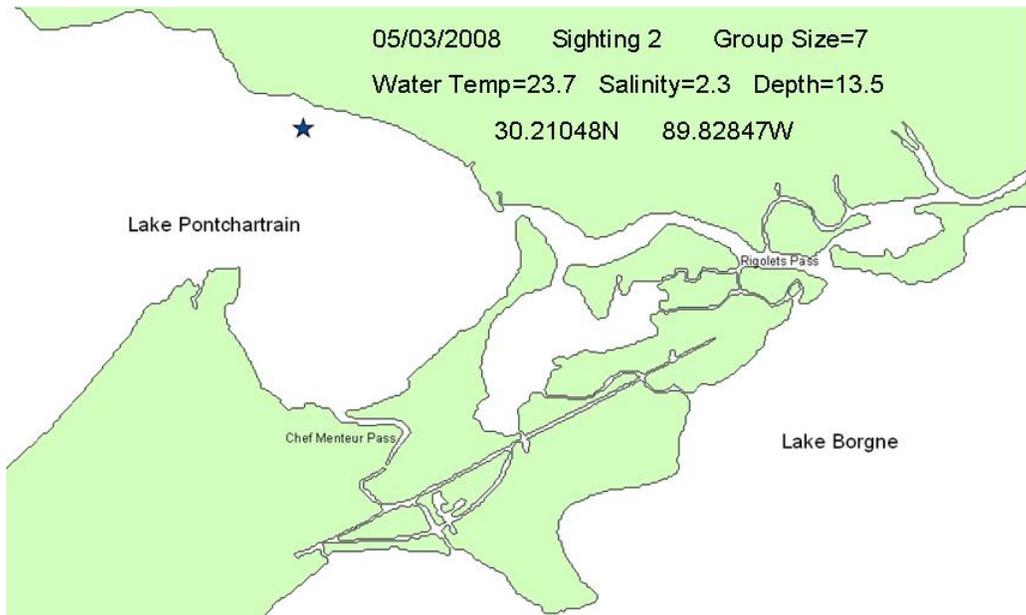


Sighting 1 (03 May)



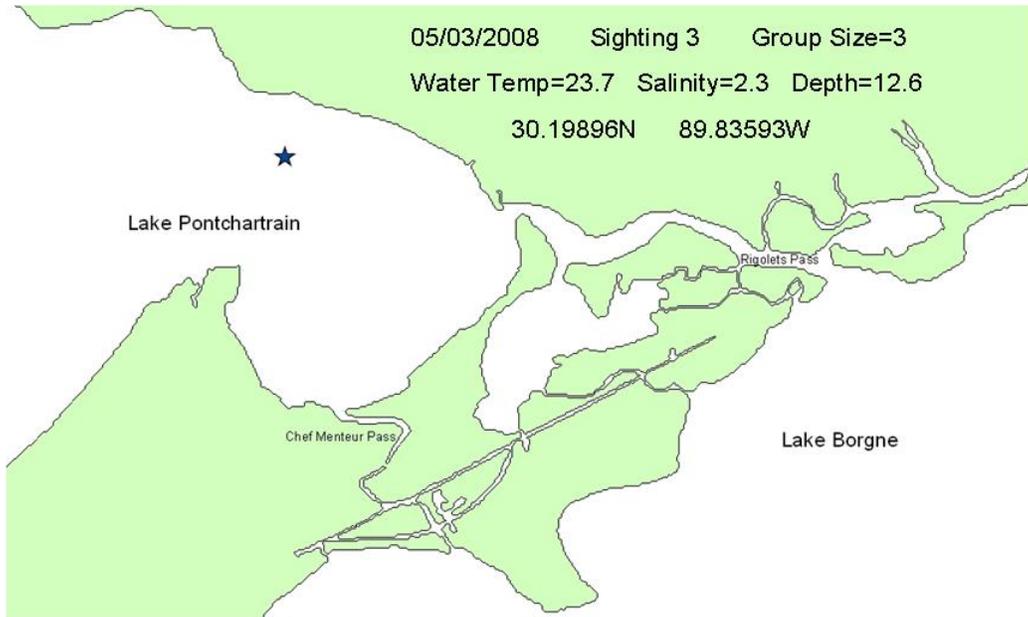
Sighting 1 - Dolphins were located at 12:12 and were seen exhibiting slow travel, and feeding. Tailslapping was also observed by several dolphins, especially by the one dolphin that had skin lesions. Photographic analysis revealed that none of these dolphins were in the original catalog.

Sighting 2 (03 May)



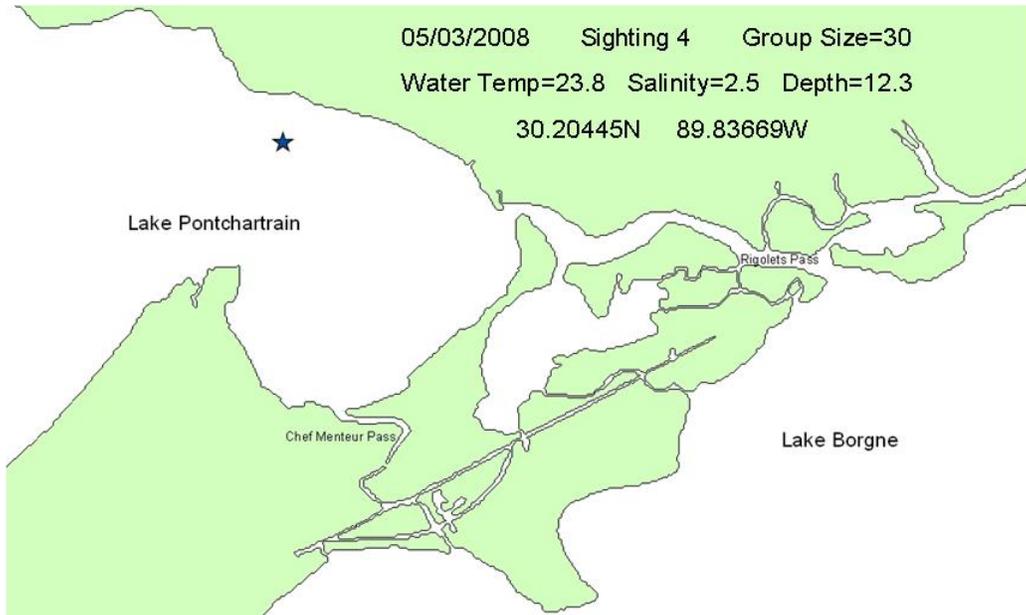
Sighting 2 - Dolphins were located at 15:23 and were exhibiting tailslapping and chuffing behaviors. This group of dolphins contained five dolphins that were seen and photographed in this area just east of the Highway 11 bridge during the previous year. In addition, the two additional dolphins seen in this group were dolphins in the catalog of animals that had been photographed on the west side of the bridges, the first indication that at least some of the dolphins were able to swim under the bridges.

Sighting 3 (03 May)



Sighting 3 consisted of three dolphins, which were located at 16:19. Only a few photographs were collected before leaving this group to photograph the dolphins spotted on the west side of the bridges. Upon photographic analysis, these three dolphins were from Sighting 2.

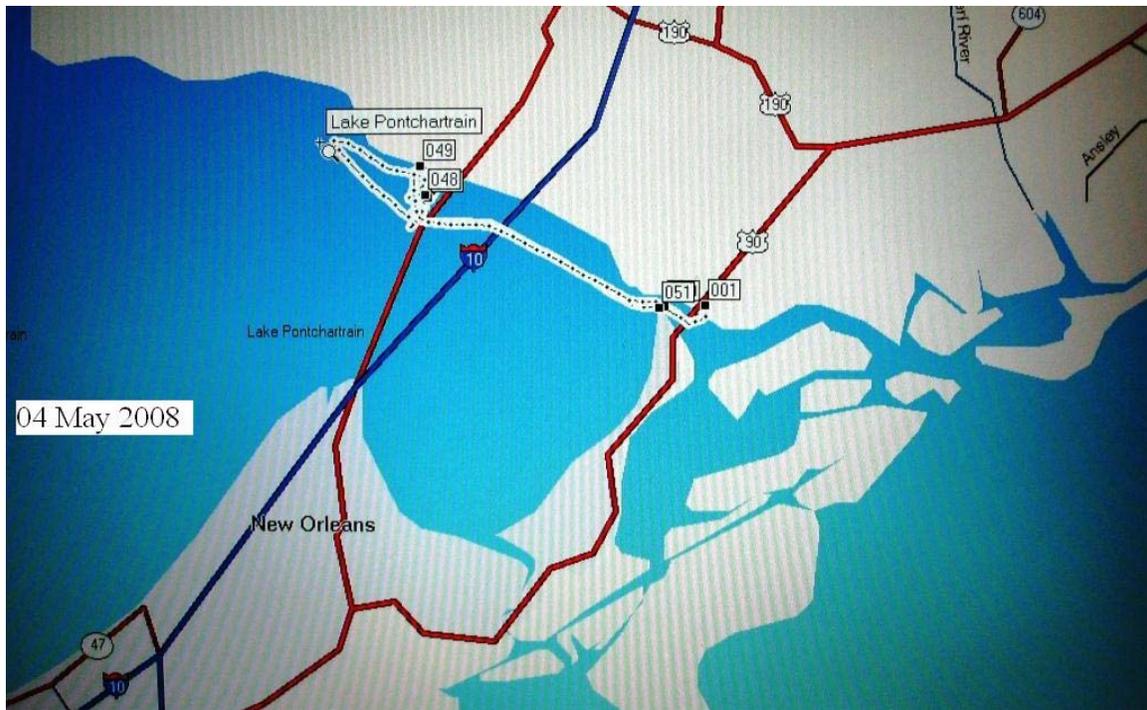
Sighting 4 (03 May)



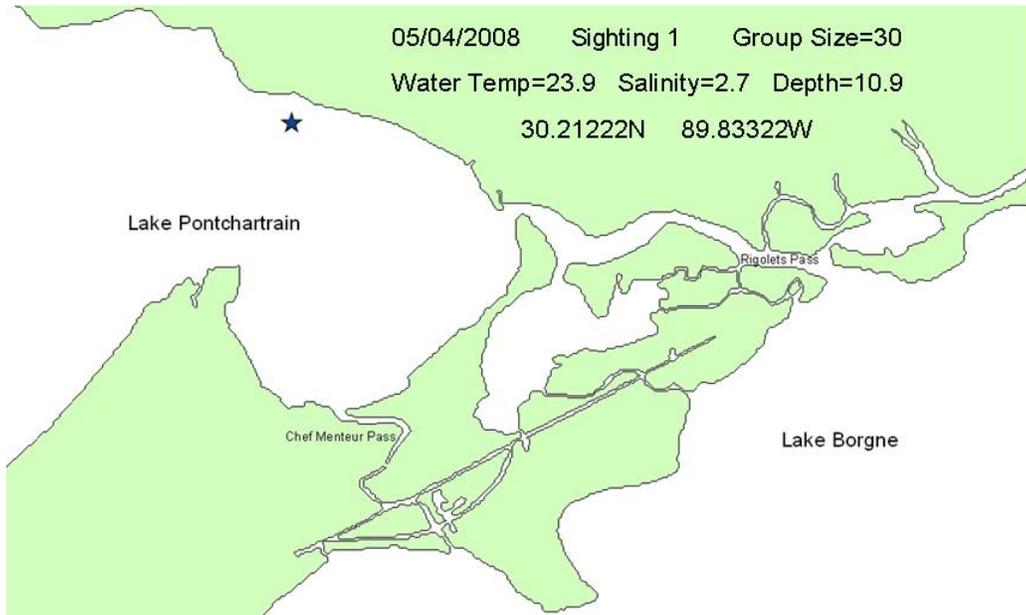
Sighting 4 began at 16:25. Some of the fins were recognized as being from the 30-35 dolphins from the past year's sightings. These dolphins exhibited slow travel, probable feeding, breaching, and tailslapping behaviors and were orientated in a tight group. Only one of these dolphins appeared to be affected by skin lesions.

Sunday, 4 May: The boat left the marina at 08:11 and headed to the location the dolphins were encountered yesterday. After a brief search, the large group were located again very close to the northshore west of the train bridge. After photographing all of the animals in this group, the boat left for the marina. One small dolphin was encountered just west of the Highway 90 bridge, that was covered in skin lesions, the fifth dolphin with this condition. After collecting photographs the boat returned to the marina at 12:12.

05/04/2008		4.02 survey hours		2 sightings	
Time	Waypoint	Latitude	Longitude	Water Temp (°C)	Salinity (ppt)
8:11	1	30.17612	89.72698		
8:33	47	30.21100	89.83222	22.8	1.9
8:55	48	30.21222	89.83322	23.9	2.7
11:39	49	30.22152	89.83519	23.9	2.7
11:48	50	30.17545	89.74226	23.6	1.6
11:59	51	30.17533	89.74416	23.6	1.6
12:12	1	30.17612	89.72698		



Sighting 1 (04 May)



Sighting 4 - The group of dolphins were located at 08:55 and observed feeding, breaching, tailslapping slow and fast travel with social behaviors. The one dolphin with skin lesions was not seen during this sighting. Both neonates seen from a survey on 3/28/2008 were sighted. In addition, the two dolphins that were sighted on the east side of the bridge the previous day were on the west side of the bridges with this larger group of dolphins.

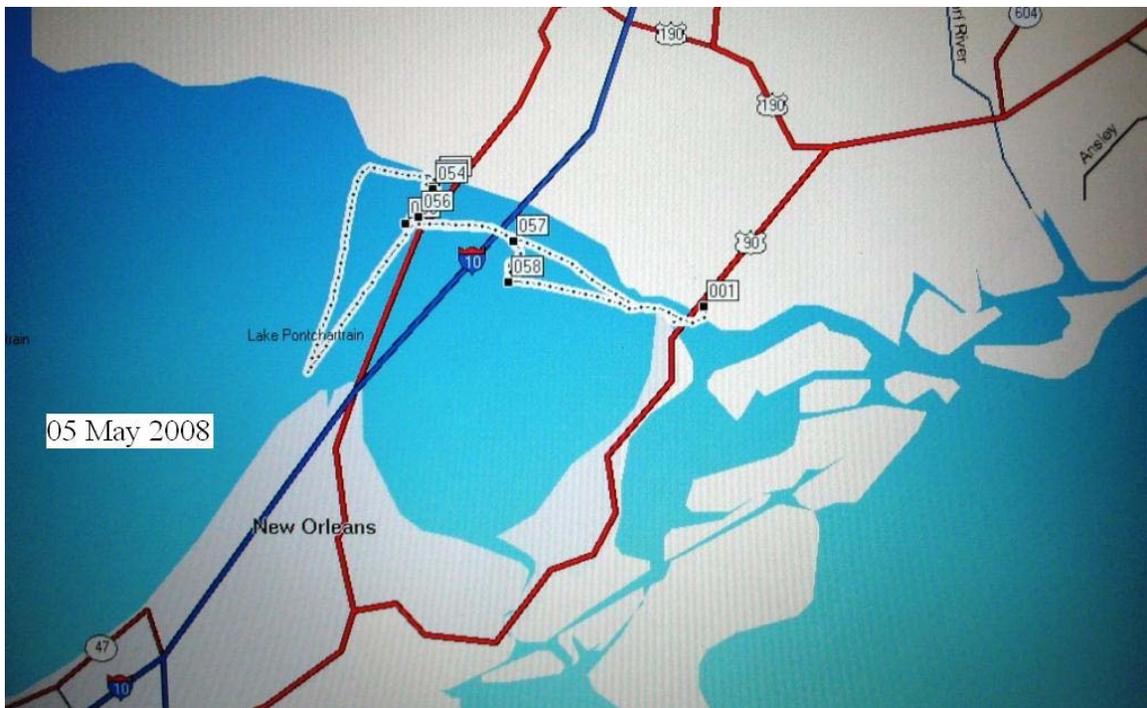
Sighting 2 (04 May)



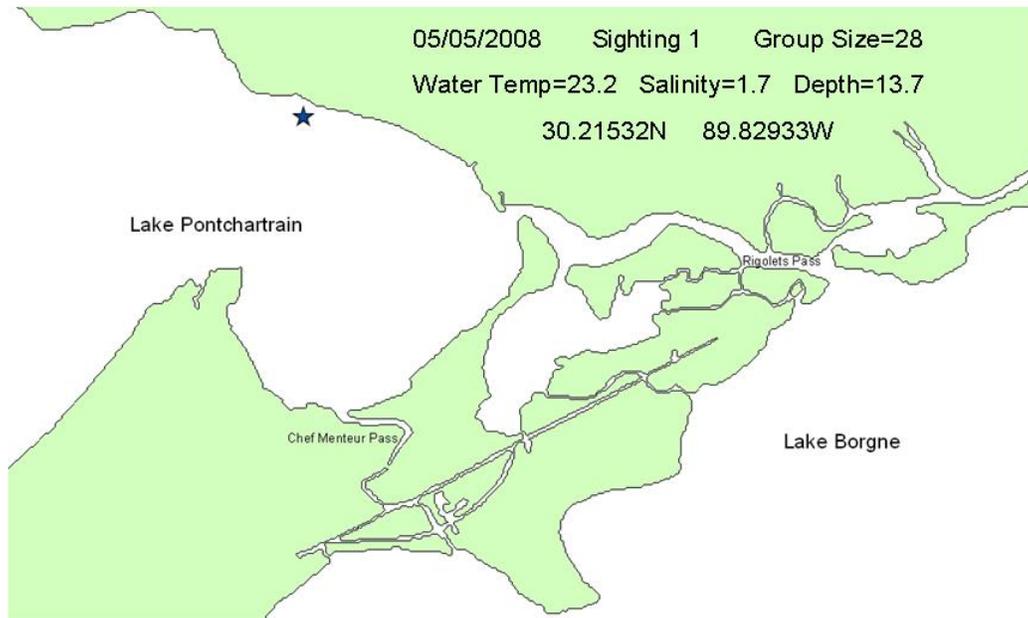
Sighting 2 - The single small dolphin with skin lesions was located at 11:48 and was observed feeding. This dolphin was a small juvenile with no other dolphins in the area. This dolphin was not in the photo-identification catalog.

Monday, 5 May: The boat left the marina at 07:51 and headed to the location west of the Highway 11 and train bridges. The dolphins were spotted just west of the bridges on the north side where they remained for the entire sighting. On the transit back, another group of dolphins was located east of the I-10 bridge. A few photographs were collected and the boat then returned to the marina at 13:45.

05/05/2008		5.90 survey hours		2 sightings	
Time	Waypoint	Latitude	Longitude	Water Temp (°C)	Salinity (ppt)
7:51	1	30.17612	89.72698		
8:20	52	30.21708	89.82809	23.9	2.6
8:48	53	30.21609	89.82938	21.9	1.5
9:17	54	30.21532	89.82933	23.2	1.7
11:33	55	30.20371	89.84014	22.5	1.8
12:53	56	30.20608	89.83514	23.2	1.7
13:04	57	30.19767	89.79918	22.8	1.8
13:25	58	30.18423	89.80095	22.8	1.8
13:45	1	30.17612	89.72698		

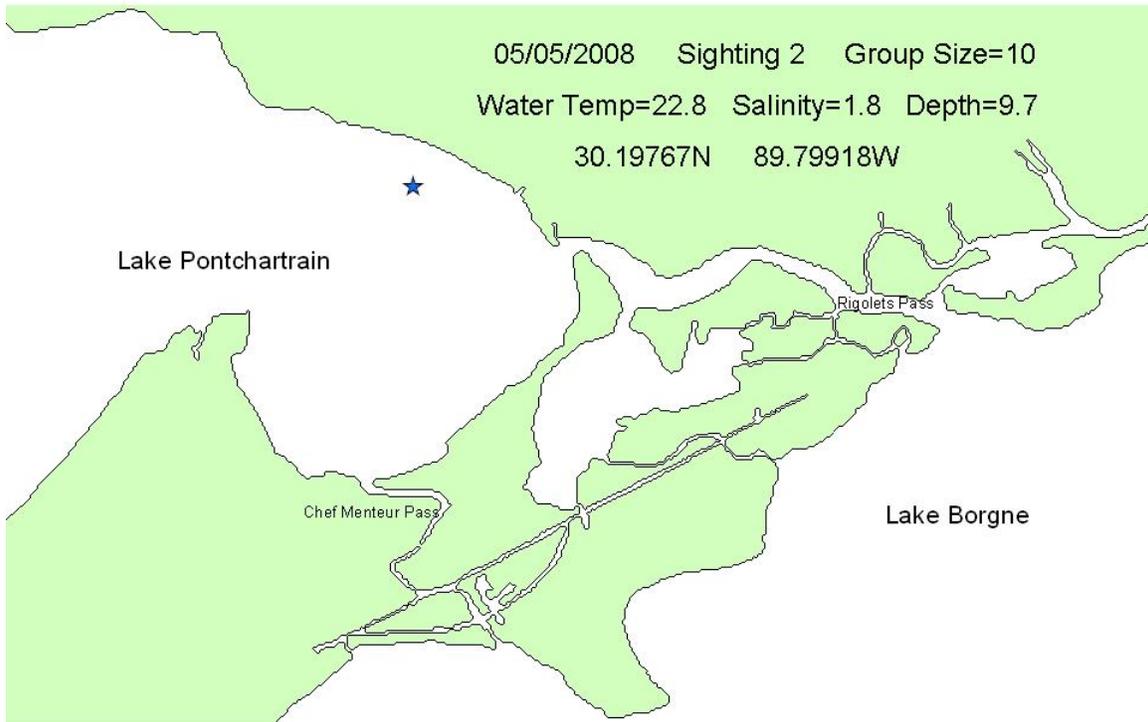


Sighting 1 (05 May)



Sighting 1 - The dolphins were located at 09:17. Behaviors observed were feeding, social, slow and fast travel. Most of this sighting, many of the dolphins were engaged in social behavior. The dolphin with skin lesions was seen in this group, as well as two dolphins that were seen on the east side of the bridges.

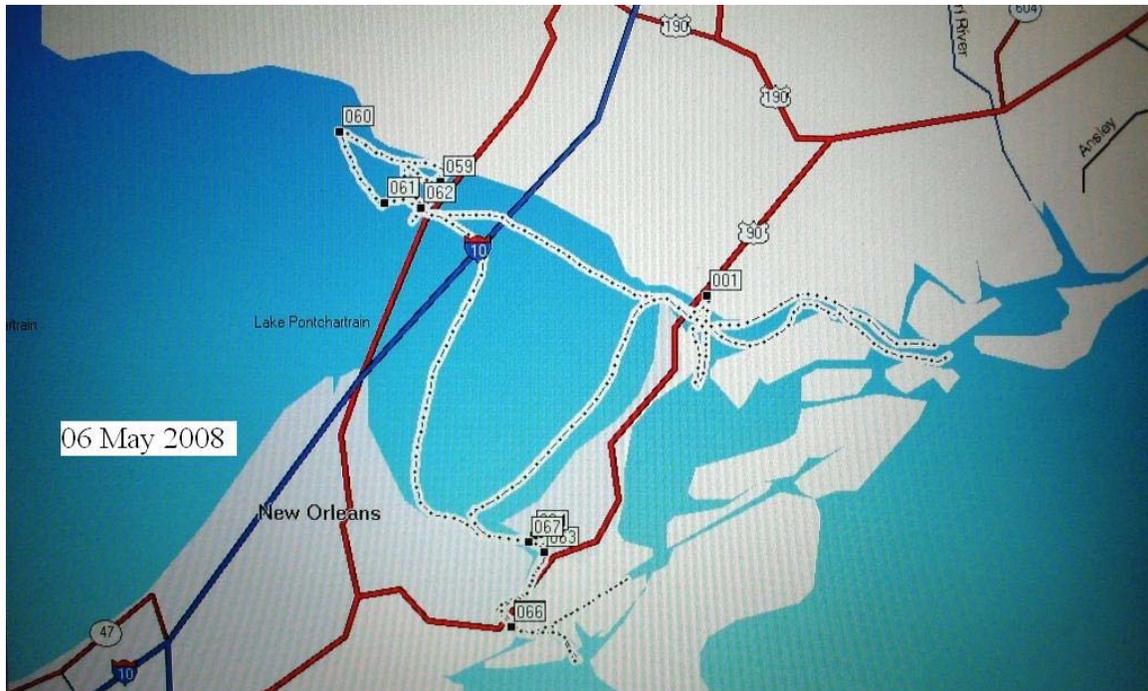
Sighting 2 (05 May)



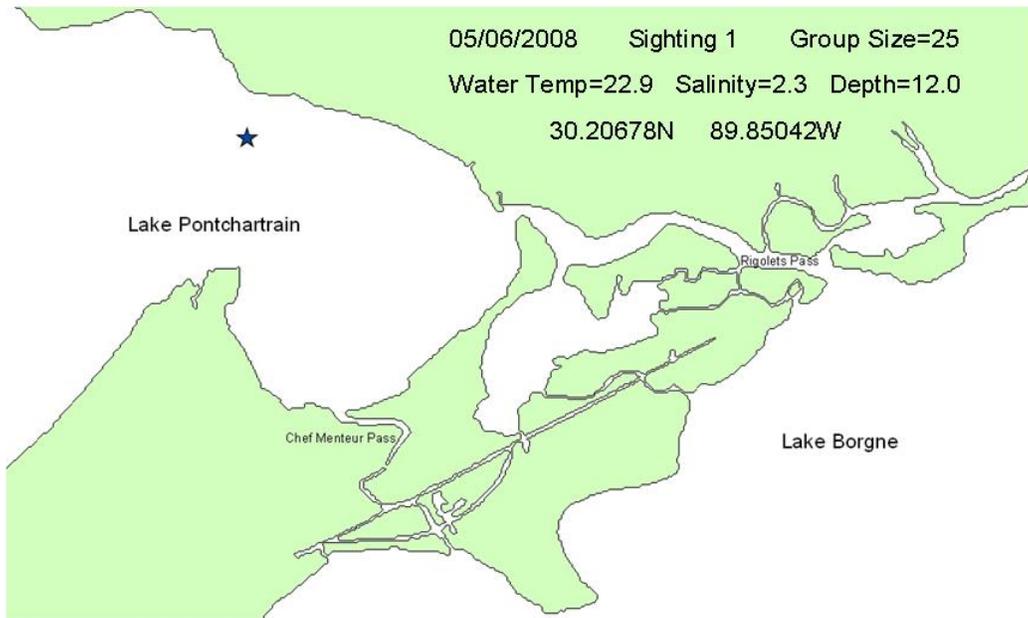
Sighting 2 - The dolphin group was spotted at 13:04 and exhibited fast travel throughout the sighting. Some photographs were collected, but because of the fast travel and lack of cohesion, it was not possible to photograph all of the dolphins in the group. None of these dolphins had skin lesions and they were not in the catalog.

Tuesday, May 6: The boat departed the marina at 08:09 and headed to the location west of the bridges where the target group of dolphins are usually located. The dolphins were found after a brief search and photographs were collected. The boat then proceeded across the lake to Chef Menteur Pass. A small group of dolphins were located in the same general area where dolphins had previously been found. After photographing these dolphins, the boat proceeded further into the Pass and another group of dolphins were encountered and were photographed. The boat proceeded out of the Pass and headed northward towards the marina. Before ending, Rigolets Pass was surveyed without finding any dolphins. The boat returned to the marina at 14:50.

05/06/2008		6.68 survey hours		3 sightings	
Time	Waypoint	Latitude	Longitude	Water Temp (°C)	Salinity (ppt)
8:09	1	30.17612	89.72698		
8:40	59	30.21394	89.82914	23.1	2.1
8:58	60	30.23095	89.86809	22.4	2.2
9:07	61	30.20678	89.85042	22.5	2.4
11:16	62	30.20532	89.83645	22.9	2.3
11:57	63	30.09041	89.78934	22.5	1.7
12:08	64	30.09600	89.79328	22.5	1.7
12:24	65	30.06510	89.80230	22.8	1.8
12:30	66	30.06444	89.80232	22.8	1.8
14:50	1	30.17612	89.72698		

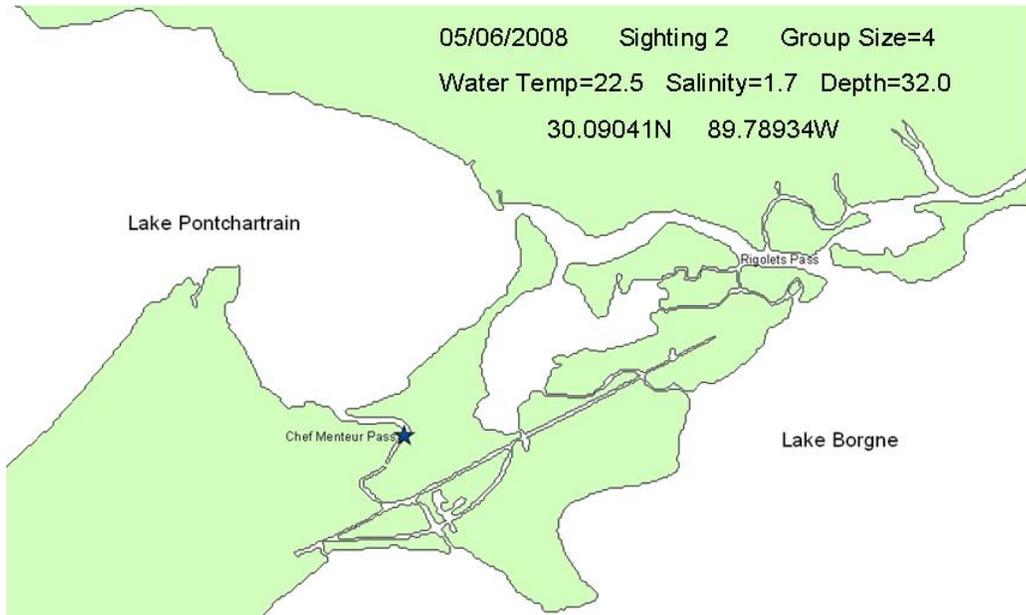


Sighting 1 (06 May)



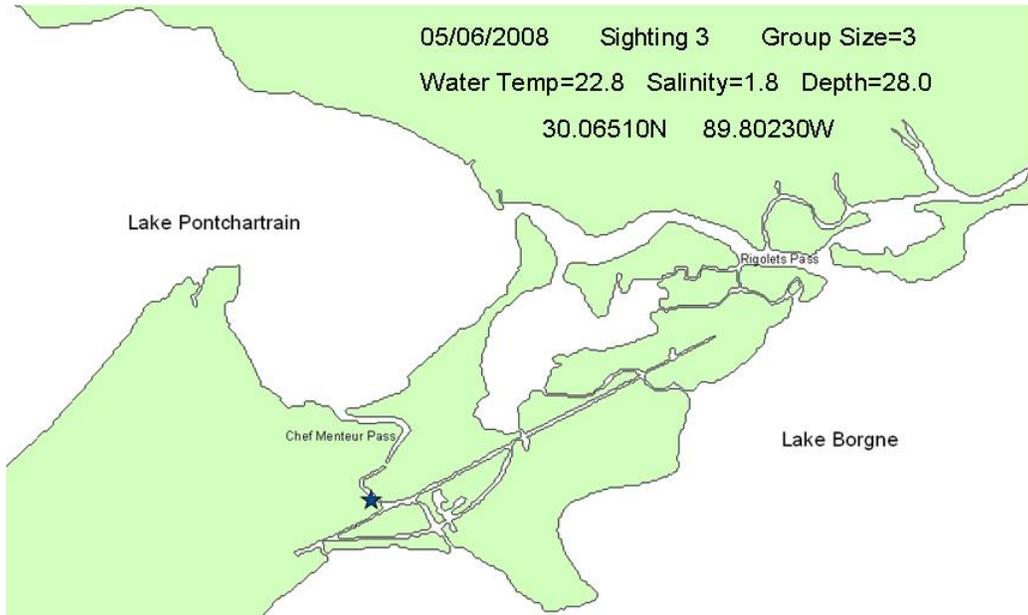
Sighting 1 - The target group of dolphins was located at 09:07 and fast travel, feeding, and social behaviors were observed. It appeared that all of the dolphins were still in this group, including the two neonates, the dolphin with the skin lesions and the two dolphins seen on the east side of the bridges.

Sighting 2 (06 May)



Sighting 2 - This group of three adults and one neonate dolphins was located at 11:57 in Chef Menteur Pass. They were slow traveling and feeding behaviors. None of these four dolphins have ever been photographed west of the bridges.

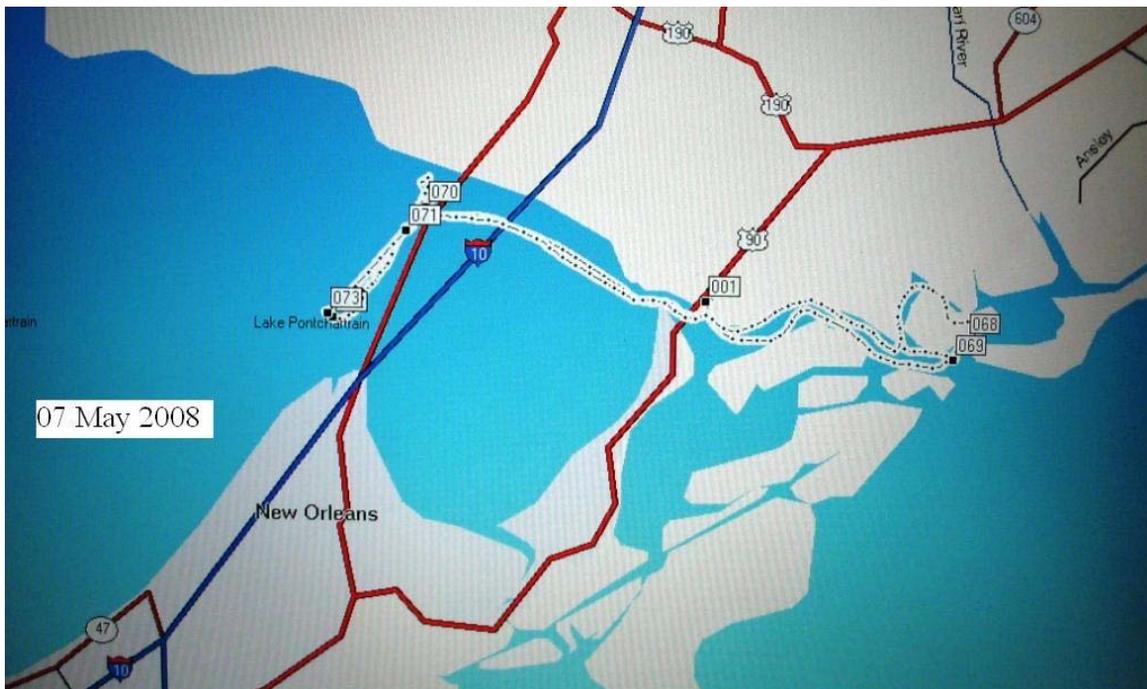
Sighting 3 (06 May)



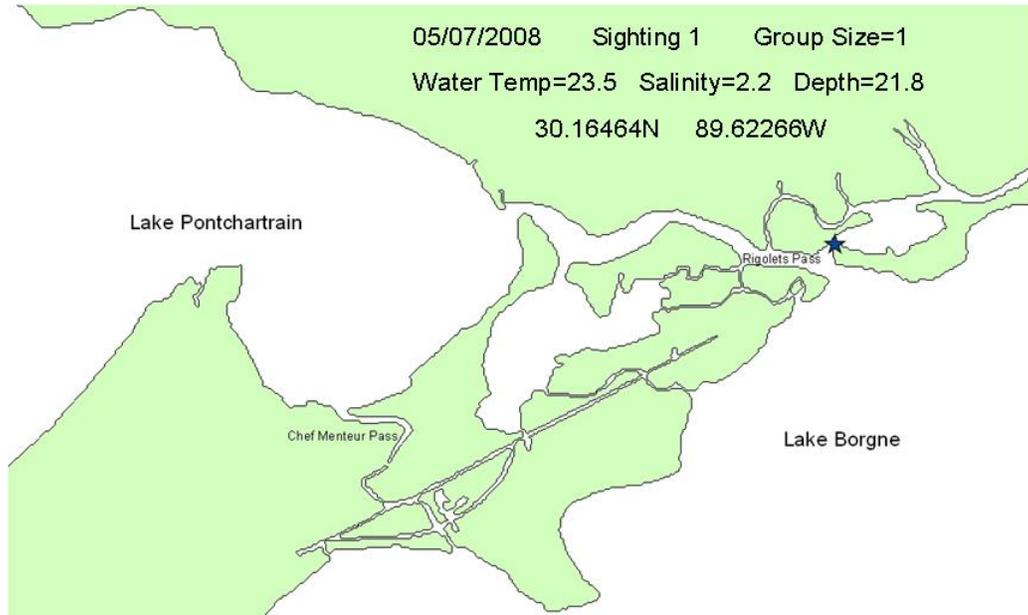
Sighting 3 - Three dolphins were located further into Chef Menteur Pass at 12:24. These dolphins were observed possibly feeding by repeatedly diving around a train bridge in a high current area. None of these dolphins are in the catalog.

Wednesday, 7 May: At 07:51, the boat left the marina and surveyed the Rigolets Pass area. A single dolphin was located and photographs were collected until it swam under the train bridge and into Lake Borgne. The boat then headed from Rigolets Pass to the area west of the Highway 11 and train bridges to photograph the target group of dolphins. The group of dolphins was located at 10:00 and photographs were collected. After this sighting, the boat returned to the marina at 12:32.

05/07/2008		4.68 survey hours		2 sightings	
Time	Waypoint	Latitude	Longitude	Water Temp (°C)	Salinity (ppt)
7:51	1	30.17612	89.72698		
8:21	68	30.16464	89.62266	23.5	2.2
8:34	69	30.15750	89.62780	23.5	2.2
10:00	70	30.20650	89.83515	23.3	1.7
10:48	71	30.19856	89.84282	23.6	2.3
11:50	72	30.16943	89.87060	23.3	1.7
11:55	73	30.17089	89.87256	23.2	1.7
12:32	1	30.17612	89.72698		

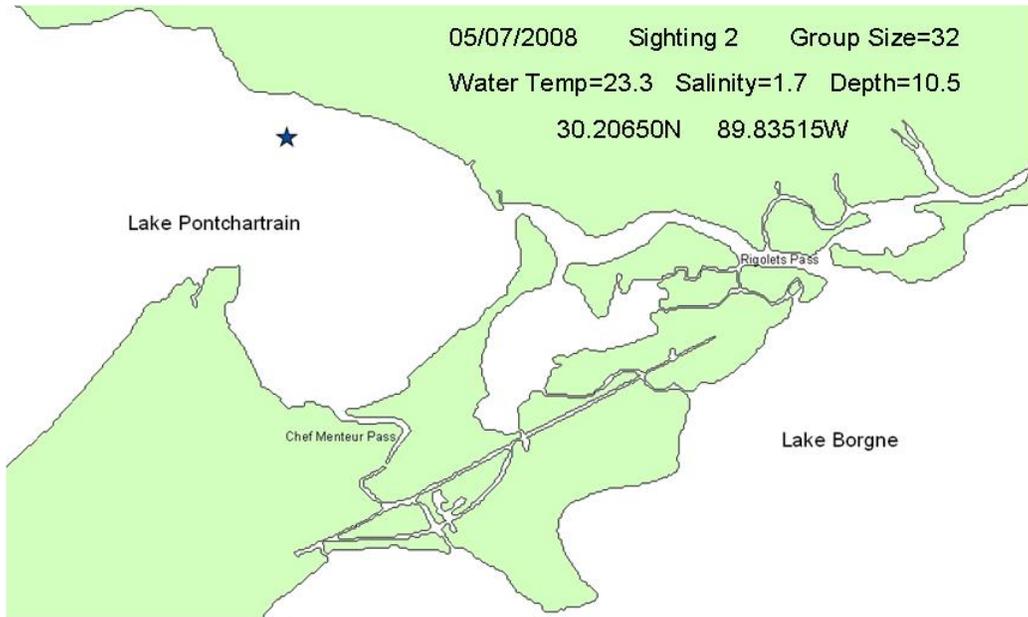


Sighting 1 (07 May)



Sighting 1 - A single dolphin was located in Rigolets Pass near the entrance to Lake Borgne at 08:21. The dolphin was covered with skin lesions and was tailslapping on every surfacing that it made. Photographs were collected until it swam under the train bridge into Lake Borgne.

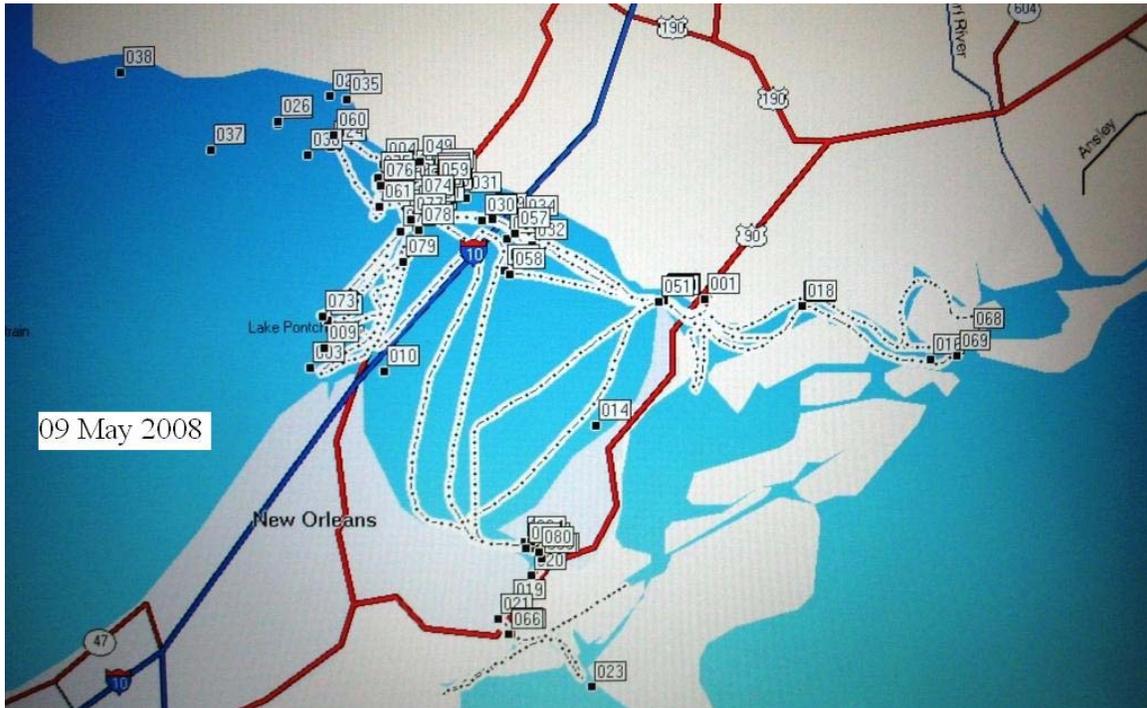
Sighting 2 (07 May)



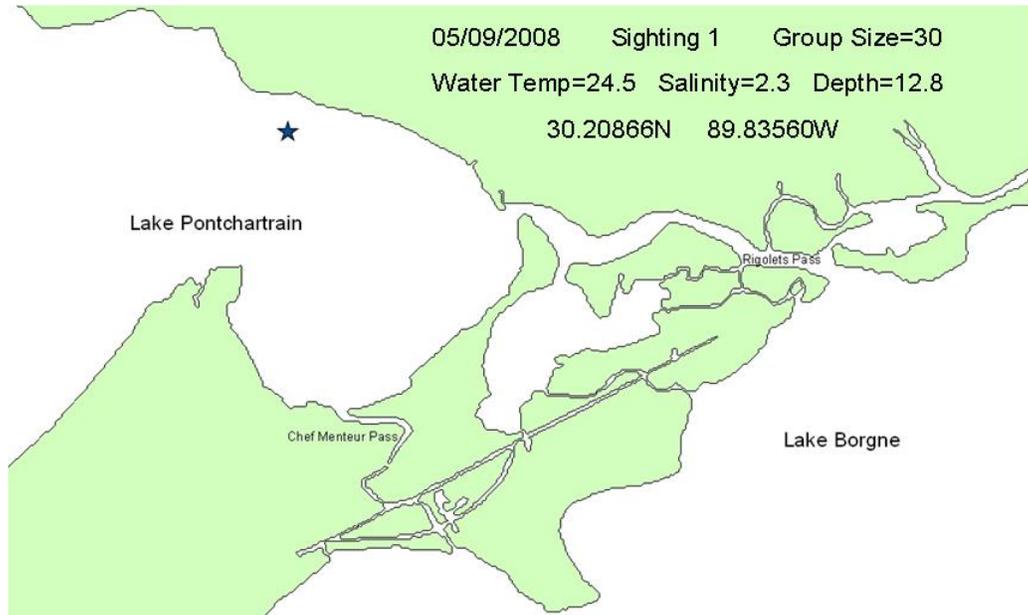
Sighting 2 - The target group of dolphins was located at 10:00. The dolphins were active, with multiple dolphins breaching repeatedly. Frequent tailslapping and social behavior was observed, in addition to a few occasions of feeding.

Friday, May 9: After departing the marina at 08:22, the boat headed directly to the location west of the bridges to look for the target group of dolphins. The dolphins were located after minimal searching. Photographs were collected. The boat then proceeded under the two bridges and a small group of dolphins that have been found just east of the train bridge were sighted. These dolphins were photographed and the boat continued back into Chef Menteur Pass. No dolphins were spotted in the Pass. The boat surveyed on the way back to the marina and arrived at 13:16.

05/09/2008		5.27 survey hours		2 sightings	
Time	Waypoint	Latitude	Longitude	Water Temp (°C)	Salinity (ppt)
8:00	1	30.17612	89.72698		
8:27	74	30.20866	89.83560	24.5	2.3
8:45	75	30.21662	89.85135	24.5	2.3
9:30	76	30.21385	89.85001	24.5	2.3
10:11	77	30.20262	89.83862	24.5	2.3
10:18	78	30.19916	89.83582	24.1	1.6
10:35	79	30.18879	89.84139	24.1	1.6
12:44	80	30.09240	89.79029	24.4	1.7
13:16	1	30.17612	89.72698		

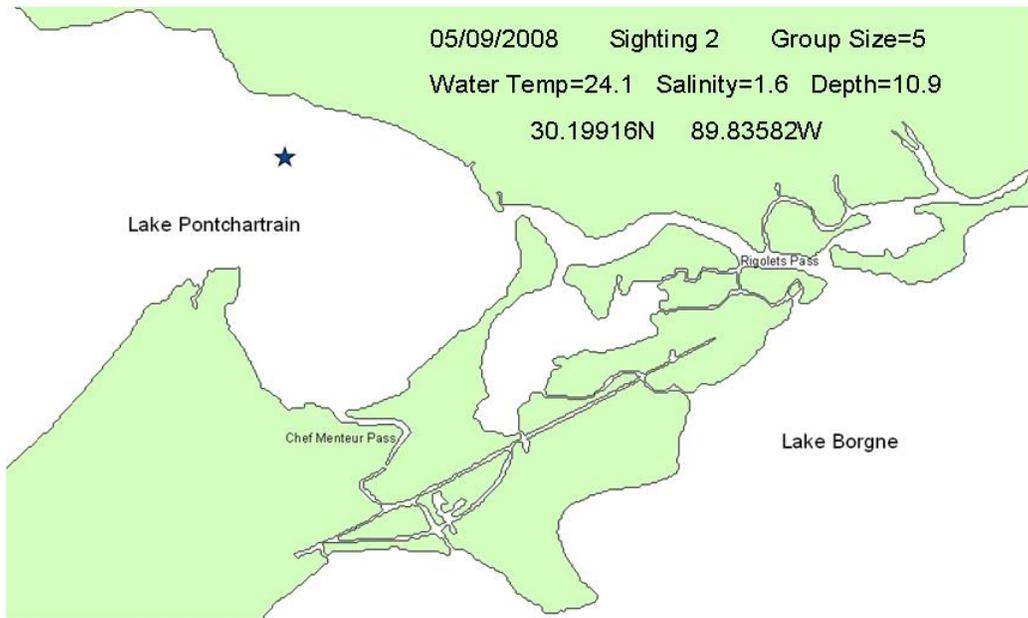


Sighting 1 (09 May)



Sighting 1 - The target group of dolphins were located at 08:27. The dolphins were spotted at a distance from the boat. When the boat was approaching them, the one dolphin with skin lesions usually sighted in this target group was located. It appeared to be isolated and was seen repeatedly surfacing next to a crab pot float. As it would dive, the crab float would be pulled under and the dolphin may have been rubbing itself along the crab pot line. The dolphin continued this behavior for approximately 15 minutes,. The boat then moved on to the target group. These dolphins were slow traveling and possible feeding behaviors.

Sighting 2 (09 May)

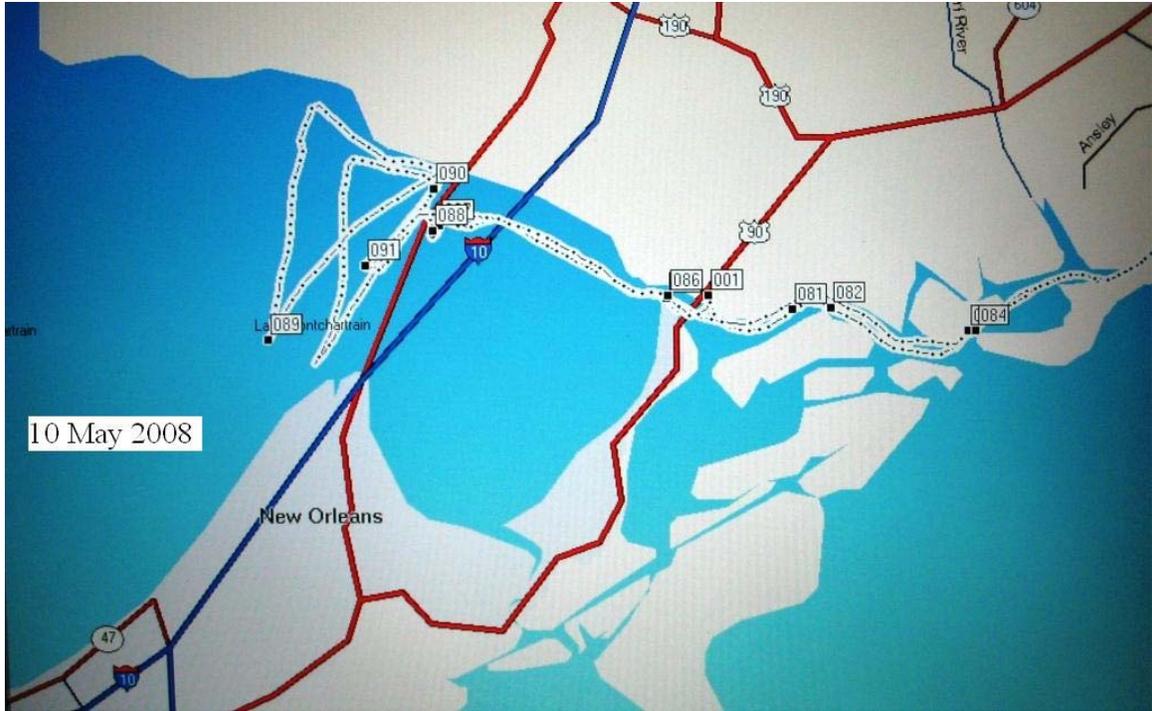


Sighting 2 - Five dolphins were located at 10:18 immediately to the east of the Highway 11 and train bridges. These dolphins are often found in this general area. The dolphins were slow traveling. Photographs of all of the dolphins were collected.

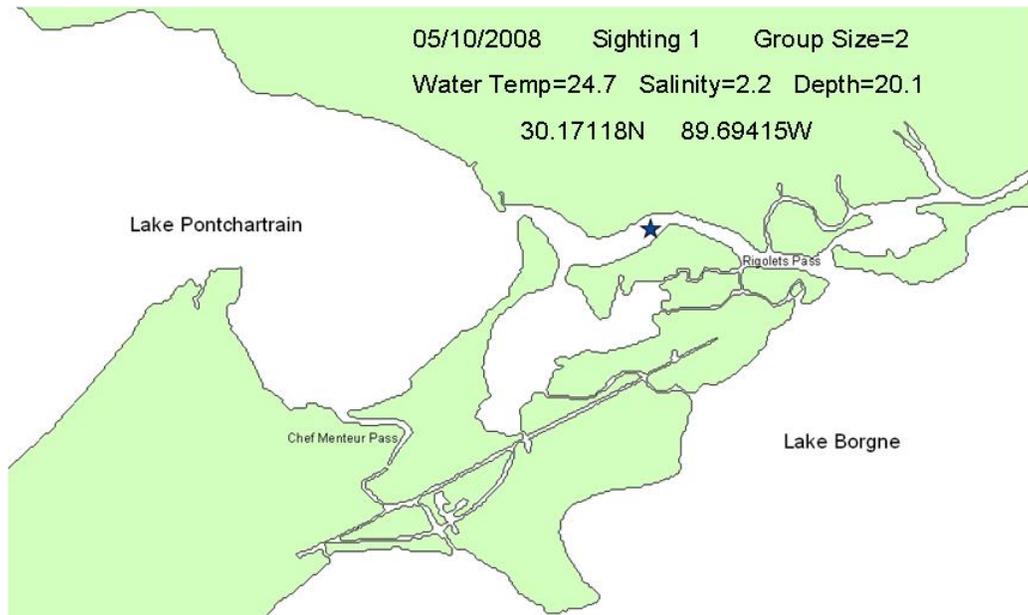
Saturday, May 10: After departing the marina at 07:42, the boat began surveying in the Rigolets Pass area and two dolphins were encountered. Photographs were taken and the survey continued further into Rigolets Pass. A single dolphin was encountered near the train bridge at the beginning of Lake Borgne. The survey continued out of Rigolets Pass in search of the target group. Another single dolphin was located just west of the Highway 90 bridge. After photographing this dolphin, the survey continued on towards the location of the target group. Another single dolphin was encountered during this time. This dolphin was located just east of the Highway 11 bridge. After collecting photograph, the boat made it to the target group of dolphins. Photographs were collected and observations were made of these dolphins. The boat returned to the marina at 13:10.

05/10/2008		5.47 survey hours		5 sightings	
Time	Waypoint	Latitude	Longitude	Water Temp (°C)	Salinity (ppt)
7:42	1	30.17612	89.72698		
7:51	81	30.17118	89.69415	24.7	2.2
8:14	82	30.17156	89.67901	24.7	2.2
8:28	83	30.16377	89.62434	25.2	1.9
8:36	84	30.16398	89.62140	25.2	1.9
9:35	85	30.17531	89.74270	25.3	1.8
10:01	86	30.17600	89.74233	25.3	1.8
10:19	87	30.19978	89.82971	24.9	1.8
10:32	88	30.19825	89.83207	24.9	1.8
11:28	89	30.16279	89.89619	24.9	1.3
11:52	90	30.21194	89.83149	25.4	1.4
12:42	91	30.18706	89.85807	25.4	1.4
13:10	1	30.17612	89.72698		

Lake Pontchartrain Bottleneck Dolphin Monitoring, April 28 - May 10, 2008

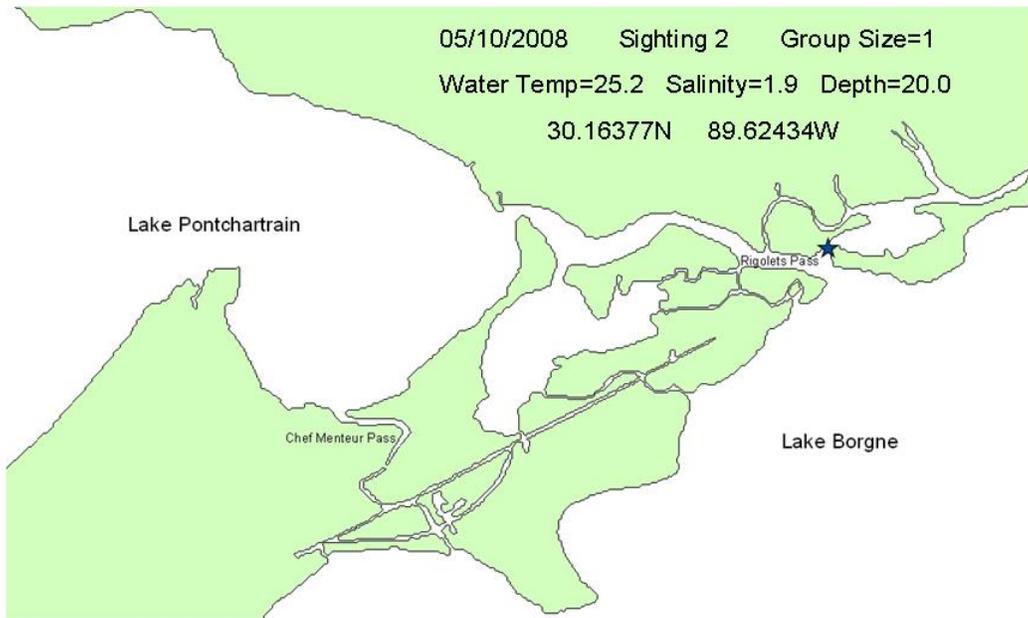


Sighting 1 (10 May)



Sighting 1 - Two dolphins were located at 07:51 in the Rigolets Pass area. Photographs were collected, both observed with skin lesions. Both of these dolphins had been photographed previously on separate occasions in Rigolets Pass during the monitoring. Both of these dolphins were traveling slowly in an eastward direction.

Sighting 2 (10 May)



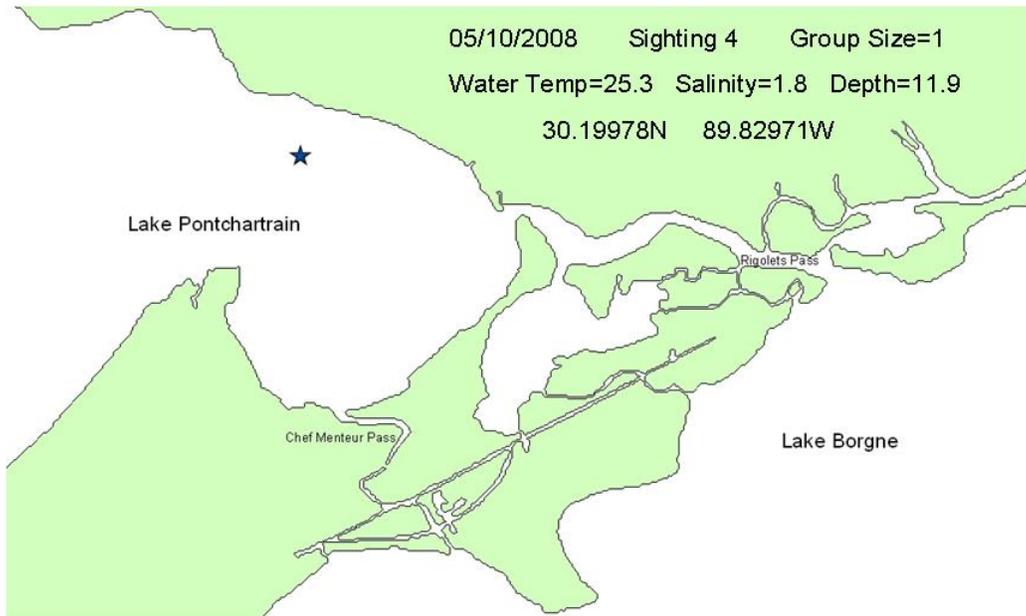
Sighting 2 - A single dolphin was located at 08:28 near the train bridge at Lake Borgne. This animal was covered in skin lesions and was not previously photographed. The dolphin was traveling slowly in a northeastern direction.

Sighting 3 (10 May)



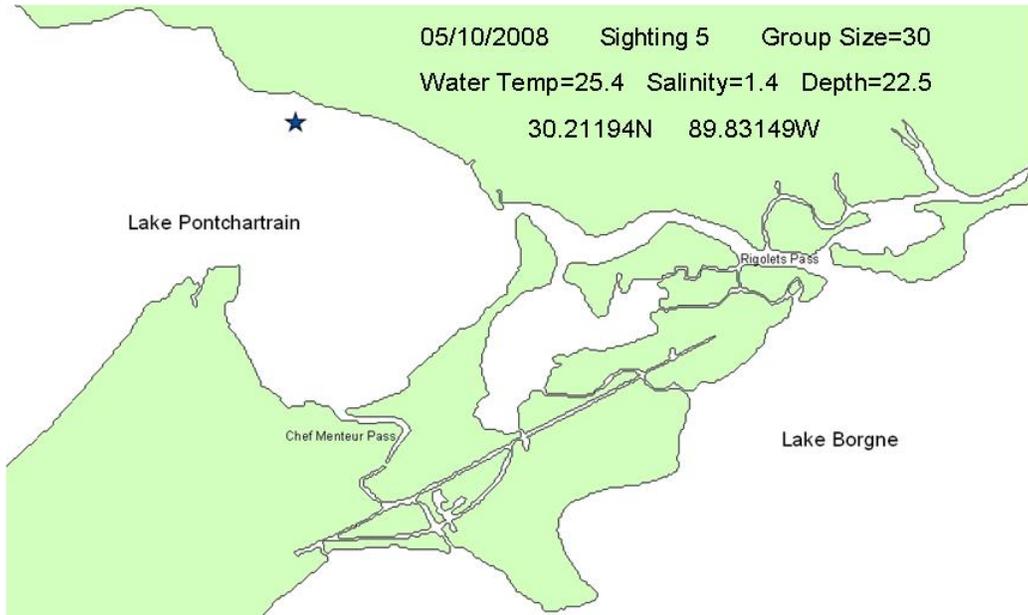
Sighting 3 - A single dolphin was sighted out of the Rigolets Pass at 09:35. This dolphin had skin lesions and was previously sighted in this location during the monitoring. This dolphin was traveling slowly and was probably feeding.

Sighting 4 (10 May)



Sighting 4 - A single dolphin was located at 10:19 on the east side of the Highway 11 bridge. This dolphin was also covered in skin lesions and was also previously photographed during the monitoring near the current location. This dolphin was milling and slowly traveling without any significant directional movement.

Sighting 5 (10 May)



Sighting 5 - The target group of animals was located at 11:52 on the west side of the Highway 11 and train bridges. The dolphins were slow traveling, feeding, and complex social behaviors were observed.