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LAGUNA MADRE
DATA REDUCTION AND ANALYSES
WATER AND SEDIMENT QUALITY AND TISSUE CHEMISTRY

Prepared for

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

In July 1995, the U S. Army Corps of Engineers, Galveston District (USACE) issued Delivery Order 28 under Contract No DACW64-94-D-0006, for Espey Huston & Associates, Inc (EH&A) to investigate and report on the availability of information concerning water and sediment quality, tissue analyses, and sediment borings in the Laguna Madre, and to determine what data gaps existed relative to these areas A report, entitled Laguna Madre, Review of Information Concerning Water and Sediment Quality and Tissue Chemistry, (Laguna Madre Information Review), was issued in mid-January 1996, and was presented to the Interagency Coordination Team (ICT) on 25 January 1996 Section 4 4 of the Laguna Madre Information Review determined that data gaps did exist and made recommendations for filling those data gaps, i.e , the reduction and trend analysis of data bases of sufficient size and scope The purpose of this document is to satisfy the recommendations of the Laguna Madre Information Review.

1.1 STUDY AREA

The Laguna Madre is a long, narrow, hypersaline lagoon extending from Corpus Christi Bay to the southern end of South Bay near the Rio Grande (Figure 1) However, since the concerns of the ICT are with dredging and disposal practices in the Laguna Madre, the study area under DO28 is from the J. F. Kennedy Causeway, that joins Flour Bluff to Padre Island, to the old Queen Isabella Causeway that once joined Port Isabel to South Padre Island The Laguna is subdivided into two basins referred to as the upper and lower Laguna Madre with the two being separated by the Saltillo Flats (Land Cut) For the purpose of exploring potential sources of contaminants, data collected in the Baffin Bay complex and from the Arroyo Colorado were also analyzed. For the purpose of this study, the Baffin Bay complex includes the Laguna Salada, Cayo Del Grullo, Alazan Bay and Baffin Bay proper (Figure 1) U.S. Highway 77, which extends from Corpus Christi to Harlingen, was used as the westernmost boundary for the Baffin Bay complex and the Arroyo Colorado The USACE completed construction of the Gulf Intracoastal Waterway (GIWW) within the study area in 1949.

2 0 METHODS AND MATERIALS

The data bases included in this review are those which were determined to have sufficient data points to allow meaningful and useful analyses to be conducted. Other data sets are available and discussed in the Laguna Madre Information Review but the data sets are too small to be analyzed alone and any usefulness gained by including these data with the larger data sets would probably be more than offset by problems caused from differences in collection technique, chemical analyses, sample handling, etc

2 1 DATA SETS

A breakdown of the data bases reviewed by media and agency are presented below with more detailed descriptions of each in Section 2.2.

Three water quality data bases i e , those from the Texas Natural Resource Conservation Commission (TNRCC), USACE, and the Texas Water Development Board (TWDB) were deemed complete enough to be reduced and analyzed In addition, five sediment quality data bases: i.e., those from the TNRCC, USACE, the U S Fish and Wildlife Service (USFWS) Corpus Christi Bays Complex Study (CCBCS), National Oceanic Atmospheric Administration (NOAA) National Status and Trends Program (NS&T), and the U.S Environmental Protection Agency (USEPA) Environmental Monitoring and Assessment Program (EMAP) were subjected to reduction and analyzed.

The TNRCC, USFWS (CCBCS), and USEPA (EMAP) tissue chemistry data were examined to determine if they were sufficient for analyses The USFWS Lower Rio Grande Valley Study discussed in the Laguna Madre Information Review will not be discussed here The Lower Rio Grande Valley Study document summarizes the data from all the stations sampled during that study. However, only a relatively small number of stations sampled from that study are of interest to this project. Therefore, an attempt to retrieve the original data from this study was made so that the stations of interest could be singled out. However, EH&A was informed by the USFWS Corpus Christi Field Office that the original data were lost (Barrera, 1996).

2 2 STATION LOCATIONS BY AGENCY

The majority of TNRCC's information comes from the Surface Water Quality Monitoring Team's fixed station monitoring effort The remainder of the information comes primarily from special studies or stations monitored by the International Boundary and Water Commission (IBWC), river authorities, cities, local governments, and Texas Watch Volunteers The TNRCC has been involved in fixed station monitoring and/or special studies within the project area since 1969 TNRCC monitoring stations are depicted on Figures 2A and 2B, and described in Table 1. The TNRCC conducted a sampling effort in conjunction with several agencies in February 1994 entitled *Toxic Contaminants Survey of the Lower Rio Grande, Lower Arroyo Colorado, and Associated Coastal Waters,* which is currently in press A total of eight sites were sampled from streams which contribute inflow to the lower Laguna Madre and/or Gulf of Mexico (Davis *et al* , 1995). Data from appropriate stations of the Lower Rio Grande/Lower Arroyo Colorado (LRG/LAC) Survey are discussed in the text of the present document but not graphically depicted since the LRG/LAC document adequately describes conditions and further analysis would have been a duplication of efforts

The USACE Dredging History Database Management System for the Laguna Madre includes data from 45 stations from the Corpus-Christi-to-the-Mud-Flats segment and 50 stations from the Port-Isabel-to-the-Mud-Flats segment Additionally, data from the side channels, Channel to Harlingen (17 stations), Port Isabel Small Boat Harbor (one station), and Channel to Port Mansfield (13 stations) were culled to fit project requirements The USACE monitoring stations are depicted graphically on Figures 3A and 3B, and described in Table 2 Data are available from 1974 to the present, although only data from 1986 to the present is in the USACE computer data base Older data were keyboarded in as noted in Section 2.4. The stations involving the Brazos Island Harbor Entrance Channel, Brownsville Ship Channel, and Corpus Christi Entrance Channel, which comprised most of the 1970's and early 1980's data, were outside of the scope of this project

The TWDB data base consists of the Coastal Data System maintained since 1968 and includes routine monitoring information and data from special studies The Laguna Madre Information Review mentioned that the TDWR 1983 document entitled "*Laguna Madre Estuary· A Study of the Influence of Freshwater Inflows*" would be examined. However, the major portion of information in that review was derived from the Texas Water Commission (TWC, now TNRCC) and the TWDB Coastal Data System Since the TNRCC information will be discussed as a whole, it was more practical to review the Coastal Data System information separately. The TWDB Coastal Data System monitoring stations are depicted on Figures 4A and 4B and described in Table 3. One note about the TWDB data is that it was not screened for outliers by the

TWDB or EH&A and the TWDB did not record the detection limits for much of the data. Therefore, for this report the non-detected values are reported as Below Detection Limits (BDL).

The USFWS conducted baseline contaminants assessments of the Corpus Christi Bay complex in 1988-89 (Barrera *et al* , 1995) Sediment and biota were collected from a study area including Corpus Christi, Redfish, Nueces, Oso, and Baffin Bays, the upper Laguna Madre, the Nueces River; and the Corpus Christi Inner Harbor. Sixty-four sediment samples and 15 biota samples were collected from the upper Laguna Madre below the J F.K. Causeway and submitted for chemical analysis (Figure 5, from (Barrera *et al* , 1995)). Fifty-nine sediment samples and 15 biota samples were collected from the approximately 129 square kilometers of Baffin Bay and submitted for chemical analysis (Figure 6, from (Barrera *et al* , 1995)). The latitude and longitude coordinates of the stations for the USFWS (CCBCS) were not available. In addition, the USFWS Corpus Christi Ecological Services Field Office initiated a two-phase study to determine the extent of a contamination problem in the Lower Rio Grande Valley (Gamble *et al.*, 1988). However, as mentioned above, the Lower Rio Grande Valley study will not be reviewed due to the loss of original data

The NOAA (NS&T) program began in 1984 with two major monitoring components (Lauenstein and Cantillo, 1993) The National Benthic Surveillance Project is responsible for quantification of contamination in fish tissue and sediments The Mussel Watch Project monitors contaminants concentrations by quantifying chemicals in bivalve mollusks and sediments The NOAA (NS&T) program collected sediment chemistry data from five stations within the study area as depicted in Figure 7 and described in Table 4

EMAP is a national program initiated by the USEPA integrating the efforts of several Federal agencies to evaluate the status and trends of the ecological resources of the United States (Macauley *et al.*, 1994) EMAP-Estuaries (EMAP-E) is a part of EMAP organized to evaluate the status and trends of the estuarine resources of the United States The Louisianan Province represents a single biogeographic area of the country corresponding to the Gulf of Mexico The USEPA (EMAP) data consists of sediment and tissue chemistry data from five stations within the study area as depicted in Figure 8 and described in Table 5

2 3 DATA COLLECTION

The TNRCC data were collected directly from TNRCC data base management personnel at the TNRCC headquarters, Austin, Texas. The USACE, TWDB, NOAA (NS&T), and USEPA (EMAP) data were obtained in various formats from Dr George Ward of the University of Texas Center for Research and Water

Resources (CRWR). Dr. Ward is currently collecting and reviewing chemical and biological data associated with the Corpus Christi Bay National Estuary Program (CCBNEP) study area The USFWS (CCBCS) data was collected directly from the USFWS Corpus Christi field office via the computer disk which accompanied the CCBCS document

2 4 DATA REDUCTION

For consistency and ease in trend analysis, all data were formatted to be similar to that of the TNRCC Statewide Monitoring Network program STORET code format As mention above, the TNRCC data and station locations were collected directly from the TNRCC and are formatted in the STORET code format with minor exceptions for special studies The TWDB data was obtain through the Coastal Data System and was also grouped by the STORET code of each parameter. Dr Ward and his staff worked with the TWDB to determine approximate latitude and longitude coordinates of the stations. However the USACE, NOAA (NS&T), USEPA (EMAP), and USFWS (CCBCS) data were all down loaded in their respective formats The USACE data set came from a direct data down load from three sources. 1) the Dredging History Database Management System, 2) copies of older lotus files (which used to be the USACE data storage software), and 3) files that were keyboarded in from hard data copies All latitudes and longitudes for USACE information were determined by Dr George Ward and his staff by plotting the stations directly on large-scale maps based upon USACE survey stations The NOAA data were down loaded from the internet in ASCII format However, it was discovered that the filter by Estuarine Drainage Area did not retrieve all of the data for the study area, so the full Gulf of Mexico data file had to be searched manually Unfortunately, the ASCII characters separating fields were not employed uniformly, so the data files had to be completely reformatted and corrected The USFWS and USEPA data had to be reformatted from two additional styles of data bases The conversion and formatting of these data proved to be very time consuming, but essential for easier and consistent data analysis Accompanying the written report, are the converted computer files which are in STORET code format and easily workable with data base software. For this study, all data were entered in Paradox® software, along with the proper Storet Codes used to tag parameters, in the format used by the TNRCC.

2.5 DATA ANALYSES

There are two basic approaches which may be taken for impact analysis (1) comparison to baseline data, and (2) trend analysis Comparison to baseline data is difficult for an estuarine system because

of the great variability present, which means that, for valid comparisons, the database must be large, encompassing many years of seasonal data. However, even if such a database is available, because of the extreme variability, it is difficult to distinguish impacts from the background noise in the system.

Therefore, trend analysis is used for impact analysis in this report. Two types of trend analyses are used temporal (with time) and areal/spatial (with distance) For example, if a pollutant were being introduced by a point-source discharge, such as a segment of the Arroyo Colorado, one might expect to see an increase in the concentration of that pollutant with time, at any given segment (temporal trend), and one might expect to see a larger increase near the segment than would be seen at greater distances from the segment (areal/spatial trend). However, because of daily tidal exchange, wind-driven currents, and fresh water inflow, one might not expect to see a significant increase in the water concentration of that pollutant with time unless a large amount were being added Therefore, temporal trends would not be expected and temporal trend analyses would not likely provide useful information for water column data However, if the data near some contaminant source were collected at approximately the same time as that farther from the source, one would expect to see spatial trends in the water concentration, with decreasing concentrations of the pollutant with increasing distance from the original source For sediments, one might expect both temporal and spatial trends since the sediments are not exchanged on a daily basis When potential spatial and/or temporal trends were observed, statistical analyses using the students t-test (α=0 05) were conducted, if appropriate

In this report, both types of trend analyses are used for all water, elutriate, and sediment chemistry data, if appropriate, to ensure that no trends in the data were overlooked To conduct the trend analysis, the study area was divided into approximately 5 kilometer (km) segments throughout the entire reach of the upper and lower Laguna Madre, Baffin Bay complex, and Arroyo Colorado (Figure 1) The number of stations for the larger data bases made trend analysis by individual monitoring stations impractical However, when potential sources of contaminants were noted, breakdowns within segments are discussed in the text It is understood that the potential for dampening effects with the use of this size of segment for temporal and spatial trend analysis is possible However, by making this type of arbitrary division, potential sources of contaminants in these generalized areas can be more rapidly identified and further examined, and consistency among data bases reviewed will be maintained The division segments are depicted on all of the figures

3 0 RESULTS AND DISCUSSION

3 1 STATION DISTRIBUTION

The total number of stations for the above-mentioned data bases per designated segment is shown in Table 6, excluding the CCBCS and LRG/LAG special studies. The area surrounding Port Mansfield harbor and Mansfield Pass (Segment LLM25) had the greatest number of monitoring stations with 38 (26 of which were sampled by the USACE) The second highest number of stations per segment was 23, shared by both segments ULM1 and LLM37. Segment ULM1 is just south of the J.F K Causeway while segment LLM37 is just north of the Brownsville Ship Channel in the Queen Isabella Causeway area The next highest number of monitoring stations was 17 for segment ULM9 which is at the mouth of Baffin Bay The higher number of monitoring stations at these locations is expected because of the higher potential for contaminants, increased dredging activity associated with entrance channels and high shoaling areas The fewest stations (again, only for the above mentioned data bases) for any segment in the Laguna Madre were as follows 0 stations at segment ULM19 and LLM28; 1 station at segments ULM14, ULM15, ULM17, ULM18, LLM31, and LLM32 The lack of a single station at segment ULM19 is predictable since this area is covered by the Land Cut The one station each for ULM14 and ULM15 must have been taken at a time with high water as they are located on the Land Cut as well The remainder of the segments containing the fewest stations are open water stations at various locations in the Laguna Madre The lack of a station in segment LLM28 appears to be a coincidence of segment selection since segment LLM27 has 11 stations and segment LLM29 has 3 The area of the upper Laguna Madre past the mouth of Baffin Bay (ULM1 - ULM12) is fairly well covered with stations ranging from 8 to 23 per segment as is Baffin Bay proper and most of the lower Laguna Madre with the exception of the segments mentioned above A breakdown of the number of stations per segment for each agency examined in this review is presented in Figures 2A-8.

3.2 CHEMICAL PARAMETERS

A breakdown of chemical parameters sampled by agency are presented in Tables 7 through 12. The number of samples collected and minimum and maximum concentrations are recorded by the four general locations (upper Laguna Madre, Baffin Bay complex, lower Laguna Madre, and the Arroyo Colorado Tidal) Trend analyses for standard parameters, i e., temperature, salinity, dissolved oxygen, pH, etc as well as conventional parameters, i e. nitrate, phosphorus, sulfate, etc were not conducted, but all parameters were included in the parameter tables and on the accompanying floppy containing the data files. The one exception

was that trend analyses were conducted on the TNRCC salinity and chlorophyll-a data. Additionally, trend analyses were not conducted for items of no pertinence to dredged material; e g , fecal coliform, tide height, etc For this review, trend analysis focused on metals and organic pollutant parameters which were sampled ten or more times for each respective location. The exception to that was if the range of concentrations for a certain parameter sampled more than ten times was consistently low and included a majority of BDL values, the parameter was not graphically depicted The following sections will discuss the results of the trend analysis for water quality, sediment quality and tissue chemistry by agency. As noted earlier, the comparison of data will be handled within agencies instead of a comparison between different agency data Therefore, the majority of problems associated with differences in collection technique, chemical analyses, sample handling, etc. will be eliminated

3 2 1 Water Quality

As previously mentioned, trend analysis was conducted on three water quality data bases TNRCC, USACE, and TWDB The parameters for which sufficient data are present to conduct trend analysis are noted in Tables 7-9 The graphical presentations of all water quality trend analyses are included in Attachment A

3 2 1 1 TNRCC

For the upper Laguna Madre, segments ULM1, ULM4, and ULM9 had sufficient samples for analysis There were no spatial trends evident for salinity, chlorophyll-a, volatile solids, TSS, and TDS in the water from these segments Temporal analysis for salinity from these segments revealed seasonal as well as yearly variation with salinity values for all segments ranging from 22.4 to 53 0 parts per thousand (ppt) Temporal analysis for chlorophyll-a revealed increases in concentrations in 1978 and after the spring of 1990 These increases may relate to brown tide (phytoplankton) events such as the 1990 event that started in Baffin Bay There were no temporal trends detected for volatile solids, TSS, and TDS for these three segments in the upper Laguna Madre, with the exception of a few high values for volatile solids and TSS in the mid-1970's.

For the Baffin Bay complex, segments BB7, BB8, and BB10 had sufficient samples for trend analysis There were no spatial trends evident for salinity, chlorophyll-a, volatile solids, TSS, and TDS in the water from these segments Temporal analysis for salinity from these segments revealed seasonal as well as yearly variation with the range of salinity for these segments being 10 6 to 59.7 ppt. The same temporal

increases in chlorophyll-a during 1978 and after 1990, as were noted in the upper Laguna Madre, were evident in the Baffin Bay complex. Outside of seasonal variation, no temporal trends were detected for volatile solids, TSS, and TDS for these three segments in the Baffin Bay complex.

For the lower Laguna Madre, segments LLM20, LLM25, LLM30, LLM32, LLM35, LLM36, and LLM37 had sufficient samples for trend analysis for various parameters There were no spatial trends evident for salinity, chlorophyll-a, volatile solids, TSS, or TDS However, it is interesting to note that segment LLM30, at the mouth of the Arroyo Colorado had ranges of concentrations with the highest values for volatile solids and TSS, but had the lowest mean concentrations of TDS. Temporal analysis for salinity from these segments revealed seasonal and yearly variations with the range 6.7 to 47.9 ppt In comparison with the upper Laguna Madre and Baffin Bay proper, salinity ranges were slightly lower for the lower Laguna Madre. Temporal analysis for chlorophyll-a again illustrate higher values in the late 1970's and after the early 1990's In comparison with the upper Laguna Madre and Baffin Bay complex, the increases in chlorophyll-a in the 1990's appear later in the lower Laguna Madre and are essentially undistinguishable at segment LLM37, which seemed to have a bloom in the late 1980's. Again, outside of seasonal variation, no temporal trends were detected for volatile solids, TSS, and TDS for these segments

For the Arroyo Colorado Tidal, segments AC7, AC8, and AC9 had sufficient samples for trend analysis for salinity, chlorophyll-a, volatile solids, TSS and TDS in water. The only notable spatial trend for these parameters is the statistically significant (α=0 05) values of TDS for segment AC9 The large ranges in concentrations for salinity would be expected for a tidal segment There are no temporal trends evident for these parameters The high values for TSS and volatile solids at segment AC3 occurred during the Fall of 1971.

The LRG/LAC survey had two stations (7 and 8) that are considered of interest to the defined study area Station 7 was located in the lower Laguna Madre near the mouth of the North Floodway and station 8 was located in the lower Laguna Madre near the mouth of the Arroyo Colorado. The LRG/LAG report noted total arsenic (4 6 μg/L) at station 7 and total arsenic (5 2 μg/L) and total silver (1 6 μg/L) as being the only water quality parameters of concern (Davis *et al* , 1995)

3 2 1.2 USACE

For the upper Laguna Madre, only total organic carbon (TOC) and total zinc had sufficient detected samples for trend analysis. There were no spatial trends evident for either parameter, with the exception of lower mean concentrations of TOC for segments ULM1 and ULM2 (Attachment A) However, as temporal trend analyses show, all samples were low in 1990 and segments ULM1 and ULM2 were only represented by samples from 1990 Temporally, the mean concentrations for TOC were higher for all segments during the winter of 1993 compared to the winter of 1990 For total zinc, the mean concentrations were also higher during the winter of 1993, with the exception of segments ULM8 and ULM9.

For the lower Laguna Madre, the parameters noted in Table 8 were used for trend analysis Oil and grease had the highest mean concentrations at segments LLM25 and LLM33 TOC showed the greatest variability at segment LLM25 and was undetected at segments LLM30, LLM34, and LLM35. For total copper, total lead, total nickel, and total zinc the greatest variability occurred at segment LLM25 while the highest mean concentrations were reported at segment LLM33. All samples for oil and grease were collected during the same sampling effort, thus no temporal trend analysis was possible There were no temporal trends evident for TOC in water. Temporal trend analysis revealed that the highest, and in most cases only, detected values for copper, lead, nickel, and zinc were sampled during the fall of 1987 In fact, all samples collected for segment LLM33 were taken from one sampling event during the fall of 1987, which is the reason for the higher concentrations of metals at segment LLM33 The great variability at segment LLM25 is due to the large number of samples collected in this segment which includes the Port Mansfield Channel

For the Arroyo Colorado tidal, only TOC in water had enough samples for trend analysis All samples were collected during the same sampling effort, and thus only spatial trend analysis was conducted Not surprisingly, the mean concentrations of TOC decreased with distance downstream in the river This decrease in TOC was statistically significant (α=0 05) between segment AC3 and the other three downstream segments and between segment AC4 and segment AC8 Total lead in water was only detected two times, both from segment AC3 (26 4 and 35 2 μg/L)

3 2 1 3 TWDB

The TWDB data base was the only source that had enough samples of dissolved metals in water to conduct trend analysis. For these metals, comparisons to the Texas State Water Quality Standards (TSWQS)

marine criteria were made where applicable. The number of times that dissolved metals exceeded the marine chronic and/or acute criteria are presented in Table 13 and will be discussed in the following paragraphs by respective location

For the upper Laguna Madre, only TDS and TOC were detected with sufficient frequency for trend analysis There were no spatial or temporal trends evident for either parameter from the upper Laguna Madre, with the exception of some high TOC values reported from segment ULM7 in 1977 The dissolved metals data from the upper Laguna Madre did not exceed the marine chronic or acute criteria

There were no spatial or temporal trends evident for TDS, TOC, or the dissolved metals analyzed for the Baffin Bay complex. However, of 13 samples, one concentration of dissolved cadmium exceeded the chronic but not acute criterion, three dissolved copper concentrations exceeded both acute and chronic criteria and four exceeded the chronic but not acute criterion, and three dissolved zinc values exceeded both TSWQS marine criteria (Table 13)

There were no spatial or temporal trends evident for TDS and no spatial trends evident for TOC from the lower Laguna Madre. However, for most segments from the lower Laguna Madre there appears to be a subtle decrease in TOC concentrations from the mid-1970's to the late 1980's, best illustrated at segment LLM25 There were no spatial trends evident for the dissolved metals analyzed from the lower Laguna Madre, with the exception of a high value for dissolved copper and dissolved lead detected at segment LLM37, from the 1980 sample However, temporal trend analysis revealed an apparent decrease in the concentration of dissolved strontium with time (1969 to 1975) Of 20 samples, the TSWQS marine chronic but not acute criterion was exceeded once for dissolved cadmium, 12 times for dissolved copper, and six times for dissolved lead Both criteria were exceeded once for dissolved copper, and once for dissolved lead (Table 13) Four of the 22 values exceeding TSWQS were at segment LLM37 and 3 values exceeded TSWQS at segment LLM25.

TOC was the only parameter with sufficient samples from the Arroyo Colorado tidal segments to allow trend analysis There were no spatial or temporal trends evident for TOC.

3.2.2 Sediment Quality

The TNRCC, USACE, USFWS (CCBCS), NOAA (NS&T), and USEPA (EMAP) data bases were subjected to reduction and trend analysis when applicable The sediment parameters for which sufficient data were present to conduct trend analysis are marked in Tables 7-12 The graphical presentations of all sediment quality trend analyses are included in Attachment B.

3 2 2 1 TNRCC

For the upper Laguna Madre, only segment ULM4 had sufficient samples for analysis and thus spatial trend analysis was not required There were no temporal trends depicted for sediment volatile solids or oil and grease, with the exception of the high value of oil and grease detected in the spring of 1983 Of the sediment metals graphically depicted, several show a potential temporal increase in concentrations, i e., values from 1981 and earlier appear generally lower than those after 1981 However, only barium and zinc have statistically significant (α=0 05) differences before and after 1981, and the range of the concentrations for the other metals is relatively low; e g , concentrations of arsenic vary with a total range of < 1 0 mg/kg to 7.8 mg/kg. In contrast to this trend, values for 1975 were high for several metals and values for 1987 were consistently low A relatively high value for silver (3 5 mg/kg) was recorded from the summer of 1978 and a high value for mercury (5 0 mg/kg) was detected in the winter of 1975

For the Baffin Bay complex, segments BB7 and BB10 had sufficient samples for trend analysis. For almost all sediment parameters graphically depicted, the mean concentrations were slightly greater numerically (not statistically) for segment BB10 than BB7. Potential temporal trends of increasing concentrations with time for segment BB10 are displayed for volatile solids, arsenic, barium, and manganese However, it should be noted that only one value is present per date for each parameter, the range for arsenic is very small; and for volatile solids, arsenic and barium, the values for segment BB10 are less than for segment BB7 The concentration of silver (90 mg/kg) taken during the spring of 1986 for segment BB7 is noteworthy because of the high value

For the lower Laguna Madre, segments LLM25 and LLM30 had sufficient samples for spatial trend analysis while only segment LLM30 had sufficient samples for temporal trend analysis For almost all sediment parameters graphically depicted, the mean concentrations were greater for segment LLM25 than LLM30, exceptions being arsenic and silver There were no temporal trends evident for sediment parameters

for segment LLM30 The concentration for silver (6 mg/kg) detected in the summer of 1987 is noted for the higher-than-average value

The Arroyo Colorado tidal did not have sufficient sediment parameter samples and/or detections for trend analysis

The LRG/LAG report notes only p,p' DDE in sediment from both stations 7 and 8 as being of potential concern (Davis *et al* , 1995). The concentrations ranged from 22 μg/kg at station 8 near the mouth of the North Floodway to 45 6 μg/kg at station 7 near the mouth of the Arroyo Colorado

3 2 2.2 USACE

3 2 2 2 1 SEDIMENT

For the upper Laguna Madre, chromium, copper, lead, nickel, and zinc had sufficient samples for both spatial and temporal trend analysis. Spatial trend analysis revealed the greatest variability in ranges of concentrations for segments ULM10 and ULM11, just south of the mouth of Baffin Bay The highest mean concentrations for all trend analyzed metals were at segment ULM10, with the exception of sediment chromium which had the highest mean concentration at segment ULM11 As was noted with the total metals in water from the USACE upper Laguna Madre data, temporal trend analysis reveals that the highest concentrations of sediment metals were sampled in the winter of 1993 There was a statistically significant (α=0.05) difference between the 1993 data and the 1988 and 1990 samples for all sediment metals graphically depicted, with the exception of the 1990 sediment nickel data However, with only two or three data points per segment, there is no way to determine if the 1993 values indicate an actual upward trend in sediment metals or not

There are no spatial or temporal trends evident from sediment TOC, oil and grease (spatial only) or the sediment metals analyzed for the lower Laguna Madre One interesting note is that the samples collected in the winter of 1993 are not considerably higher than samples collected in previous years as was the case with the samples from the upper Laguna Madre Therefore, if there is a trend in the upper Laguna Madre data, it is not evident in the lower Laguna Madre The highest value for benzo-a-pyrene (109 μg/kg) reported in Table 8 was the only value detected and was from segment LLM25

For the Arroyo Colorado tidal, spatial trend analyses were conducted on the sediment metals with sufficient detectable concentrations chromium, copper, lead, nickel, and zinc. A decrease in mean concentrations for all sediment metals with downstream distance can be seen on the graphical depictions of sediment metals for segments AC3, AC4, AC7, AC8, with slight increases in concentrations for all metals occurring at segment AC9 Although numerical decreases were noted for lead, they were not statistically significant. For chromium, copper, nickel and zinc the decreases between segment AC3 and AC8, and the decreases between segment AC4 and AC8 were statistically significant (α=0 05). It should be noted that all samples for segments AC3, AC4, AC7 and AC8 were collected during one sampling event in 1991 and samples from segment AC9 were collected in 1988 Benzo-a-pyrene was detected five times ranging from 10 4 to 39 μg/kg at segment AC4 Fluoranthene was detected four times ranging from 10 to 35 μg/kg at segment AC3

3 2 2 2.2 ELUTRIATE

In addition to conducting chemical analyses on water and sediment samples, the USACE conducts chemical analyses on elutriate samples associated with dredged materials The elutriate sample is prepared by mixing water collected from the dredging site with a subsample of the homogenized dredged material The dredged material and unfiltered dredging-site water are combined in a sediment-to-water ratio of 1 4 on a volume basis at room temperature (USEPA/USACE, 1991) Once the samples are combined, mixing is performed for thirty minutes followed by a one hour settling period The liquid plus the material remaining in suspension after the settling period represents the 100% liquid plus suspended particulate phase and is siphoned off and filtered to produce the elutriate (USEPA/USACE, 1991) For elutriate data analyses, the data were obtained from the previously mentioned USACE Dredging History Database Management System As with the USACE sediment parameters, the elutriate parameters for which sufficient data were present to conduct trend analyses are marked in Tables 8 and graphically depicted in Attachment B.

For the upper Laguna Madre, only TOC and zinc had sufficient samples for trend analysis. As with the water samples, there were no spatial trends evident for either parameter, with the exception of lower mean concentrations of TOC for segments ULM1 and ULM2 Elutriate zinc was also low in segments ULM1 and ULM2, as well as segments ULM13 and ULM14 However, as the temporal trend analyses show, all samples were low in 1988 and 1990 and segments ULM1, ULM2, ULM13 and ULM14 were only represented by samples from 1988 and/or 1990 Temporally, the mean concentrations for both TOC and zinc were higher for all segments during the winter of 1993 As previously discussed for sediment metals from the upper

Laguna Madre, it is not possible with the limited number of data points to determine if an actual upward trend exists

Sufficient samples for trend analyses were available for TOC, barium, and zinc from the lower Laguna Madre There were no spatial trends evident for TOC, with the exception of three considerably high values at segment LLM25 The apparent higher barium concentrations from segment LLM20 were not significantly (α=0 05) different than concentrations from any other segment, while barium concentrations at segment LLM25 were significantly (α=0 05) lower than concentrations at segments LLM21, LLM22, LLM23, LLM26 and LLM27 Spatial analyses for zinc reveals the highest mean concentrations and largest ranges for concentrations at segments LLM24 and LLM25 Temporal trend analyses for zinc reveal that these higher values for zinc from segments LLM24 and LLM25 were detected in the spring of 1992 It is interesting to note that neither the water or sediment chemistry data, collected at the same sites and dates, indicate higher concentrations of zinc, which might reflect the possibility of sampling or laboratory contamination. With the exception of the three noted values for TOC, there were no temporal trends evident for TOC or barium

The samples collected for TOC, lead, and zinc from the Arroyo Colorado were taken from the same date and, thus only spatial trend analyses were conducted. A numerical (not statistical) increase in mean concentrations of lead with downstream distance can be seen on the graphical depictions of sediment metals for segments AC3, AC4, AC7, and AC8 However, it should be noted that the ranges of concentrations for all segments overlap There were no spatial trends observed for TOC and zinc from the Arroyo Colorado

3.2 2 3 USFWS (CCBCS)

The most intensive sampling effort with relation to coverage of the upper Laguna Madre and Baffin Bay complex was undertaken by the USFWS Since this effort was a one time event, only spatial trends can be evaluated In addition, a comprehensive review of the study is covered in Barrera *et al* , 1995

Spatial trend analyses were conducted for oil and grease and all sediment metals sampled in the upper Laguna Madre There were no clear spatial trends in the sediment parameters However, oil and grease had the highest mean value and the greatest range of concentrations at segment ULM9, at the mouth of Baffin Bay Segments ULM2 and ULM12 have higher concentrations of most sediment metals A further analysis reveals that, in particular, station 171(Figure 5) is the station within segment ULM2 that is causing the higher ranges of values for most sediment metals, excluding aluminum and iron, both normalizing agents Station 239

(Figure 5) is the station within segment ULM12 that causes the elevated levels of sediment metals, including aluminum and iron. With the inclusion of aluminum and iron, it may be that these higher values are simply an artifact of grain size composition whereas the concentrations at station 171 may reflect anthropogenic sources Station 171 appears to be near the discharge from Central Power and Light's Barney M. Davis Power Plant, but does not appear to be as near to the discharge as station 168 where there were not elevated values The high values for lead, nickel and vanadium from segment ULM2 (station 171) are "less than" values as is the high value for nickel from segment ULM12 (station 239) The high detection limits for these parameters might reflect the possibility of sampling or laboratory contamination associated with samples from these two stations There were no organic parameters detected at levels of concern

As they were for the upper Laguna Madre, spatial trend analyses were conducted for oil and grease and all sediment metals sampled in the Baffin Bay complex There were no spatial trends evident in the sediment parameters from the Baffin Bay complex The lower concentrations of oil and grease at segments BB10 and BB11 appear to erode any concern mentioned above involving Baffin Bay as a source of oil and grease to the upper Laguna Madre. The higher concentrations for select sediment metals, including aluminum and iron, for segment AB3 were due in particular to station 251 (Figure 6). Again, since aluminum and iron were high, these higher concentrations are likely associated with finer grain-size material There were no organic parameters detected at levels of concern.

3 2 2 4 NOAA (NS&T)

As previously noted, the NS&T program for the study area concentrates on the lower Laguna Madre There were sufficient samples collected for select sediment metals and TOC for trend analysis For all sediment parameters with the exception of arsenic, mercury, and tin, the mean concentrations are greatest in segment LLM37. However, the increases are not large and this difference may simply relate to greater number of samples collected from segment LLM37 or to the fact that aluminum, often used for normalizing sediments to grain size, also was highest at segment LLM37 There are no temporal trends evident for these sediment parameters.

3 2 2 5 USEPA (EMAP)

Although the table of parameters is provided for the EMAP program to provide a listing of parameters for an ongoing monitoring program, there are not enough samples collected to date from the study area to warrant spatial or temporal trend analysis

3 2 3 Tissue Chemistry

The TNRCC has collected tissue samples from all four general area locations discussed above; i e , upper Laguna Madre, Baffin Bay complex, lower Laguna Madre, and the Arroyo Colorado Tidal. However, there are not enough samples collected from any one of these areas to warrant spatial and/or temporal trend analysis The number of samples collected and ranges of concentrations per parameter are presented in Table 7 In addition, the LRG/LAG study involved tissue chemistry information As with the sediment chemistry parameters, the LRG/LAG stations 7 and 8 are of relevance to this report The LRG/LAG study reports that chromium, lead, selenium, zinc, and chlordane are of concern in fish tissue from station 7, while selenium, zinc, and total DDT are of potential concern at station 8 (Davis *et al.*, 1995)

As is true for sediment chemistry, the most intensive one time survey of the study area was the USFWS (CCBCS) which included 15 biota samples from the upper Laguna Madre and 15 biota samples from the Baffin Bay complex Organic and trace metal analyses were obtained for the following species hardhead catfish (*Arius felis*), toadfish *(Opsanus beta*), calico crab (*Eriphia gonagra*), blue crab (*Callinectes sapidus*), eastern oyster (*Crassostrea virginica*), and shoal grass (*Halodule wrightii*) The sampling sites for biota were selected to cover all types of estuarine habitats, such as open bay, salt marsh, seagrass beds, and oyster reefs (Figures 5 and 6) Due to the different species evaluated and different habitats involved, spatial trend analysis was deemed inappropriate Barrera *et al* (1995) found elevated zinc in crabs from Baffin Bay stations and elevated arsenic from blue crab and hardhead catfish from the upper Laguna Madre A full discussion on the tissue results from the CCBCS is reported in Barrera *et al.*, 1995 and will not be duplicated in this document

Within the defined study area, EMAP has only conducted one tissue sampling event involving several different species

4 0 CONCLUSIONS

When considering the defined study area, which excludes Corpus Christi Bay, South Bay, and the Brazos Island Harbor and Brownsville Channels, the actual amount of water, sediment, and tissue chemistry data, excluding standard parameter information, is small in comparison to other areas along the Texas coast. For instance, while the USACE data base goes back to 1974, the exclusion of Corpus Christi Bay, Brownsville Ship Channel and the Brazos Island Harbor Channel moves the starting date of pertinent data to 1987 However, in comparison to other areas along the Texas coast, the potential sources for contamination within the defined study area are also expected to be low. Potential sources that may exist include agricultural runoff, particularly in the Arroyo Colorado and Baffin Bay complex, oil and gas operations, barge traffic along the GIWW, and maintenance dredging of the GIWW The data sets reduced and analyzed for this report provided a broad scale water and sediment quality characterization of the Laguna Madre. There were some apparent spatial and/or temporal trends evident on this scale of evaluation.

Potential trends discussed in Section 3.0, such as the higher concentrations of sediment metals at select stations within the upper Laguna Madre and Baffin Bay complex, the decreasing concentrations of sediment metals and TSS with distance along the Arroyo Colorado, and larger ranges of values around the Port Mansfield Channel and Port Isabel, may reflect areas for concern or may simply be an artifact of non-replicated sampling, small ranges of concentration shifts, and variances in the number of samples per segment For example, if oil and gas activity were to produce high sediment chromium levels, via use of chrome or ferrochrome lignosulfonates in drilling muds, one might expect higher chromium levels in the upper Laguna Madre near the mouth of Baffin Bay Indeed, segment ULM10 and ULM11, just south of Baffin Bay do show elevated levels of chromium in the spatial trend analyses However, so do copper, lead, nickel, and zinc and these same metals also show elevated concentrations in sediments from ULM6, which is in a deserted area between the King Ranch and Padre Island If produced water were the source of high trace metals, chromium would not be expected to be high (API, 1989) although copper, lead, nickel and zinc might be Additionally, ULM9 and ULM8, which encompass the mouth of Baffin Bay, show no elevated sediment metals concentrations, and the temporal analyses show that most of these higher values were found in only the 1993 sample, discussed in Section 3.2.2 2 Therefore, while the USACE sediment data may or may not indicate a temporal increase in sediment metals for the upper Laguna Madre, they apparently do not indicate Baffin Bay as a source of trace metals associated with oil and gas activity

A breakdown of these certain areas on a station to station basis may or may not reveal spatial or temporal trends on a finer scale. The effort involved in a detailed station by station analysis is beyond the scope of this report, and, therefore, the ICT must determine if such analysis is necessary. Currently, the CCBNEP is conducting numerous characterization studies for its respective study area, including the majority of the upper Laguna Madre and Baffin Bay complex Therefore, the characterization of the area just south of the J F K Causeway and potential agricultural runoff in the Baffin Bay complex should be addressed in more detail and by different methods than are available for this project Areas of potential interest that might benefit from finer scale analysis are segment LLM25 including the Port Mansfield channel, and LLM37 just north of the Brazos Santiago Pass.

Finally, the areas most noted for elevated concentrations are the Arroyo Colorado (TDS, TSS, volatile solids in water, TOC in sediment, metals, chlordane, and DDT in tissue (Davis *et al.*, 1995)), Baffin Bay (dissolved metals in water, chromium, copper, and lead in sediments (Barrera *et al* , 1995), parts of the lower Laguna Madre (segments LLM25 and LLM37), and the samples from 1993 in the upper Laguna Madre. While Davis *et al* (1995) state "no station exhibited a high potential for toxic chemical impact", stations 7 and 8 (Arroyo Colorado and North Floodway mouths, respectively) were in the top three most contaminated stations for that study and were considered to have "slight potential for toxic chemical impact" While the data examined for this report found few trends, those noted immediately above would indicate potential, if not actual, sources of contamination

5 0 REFERENCES

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FIGURES

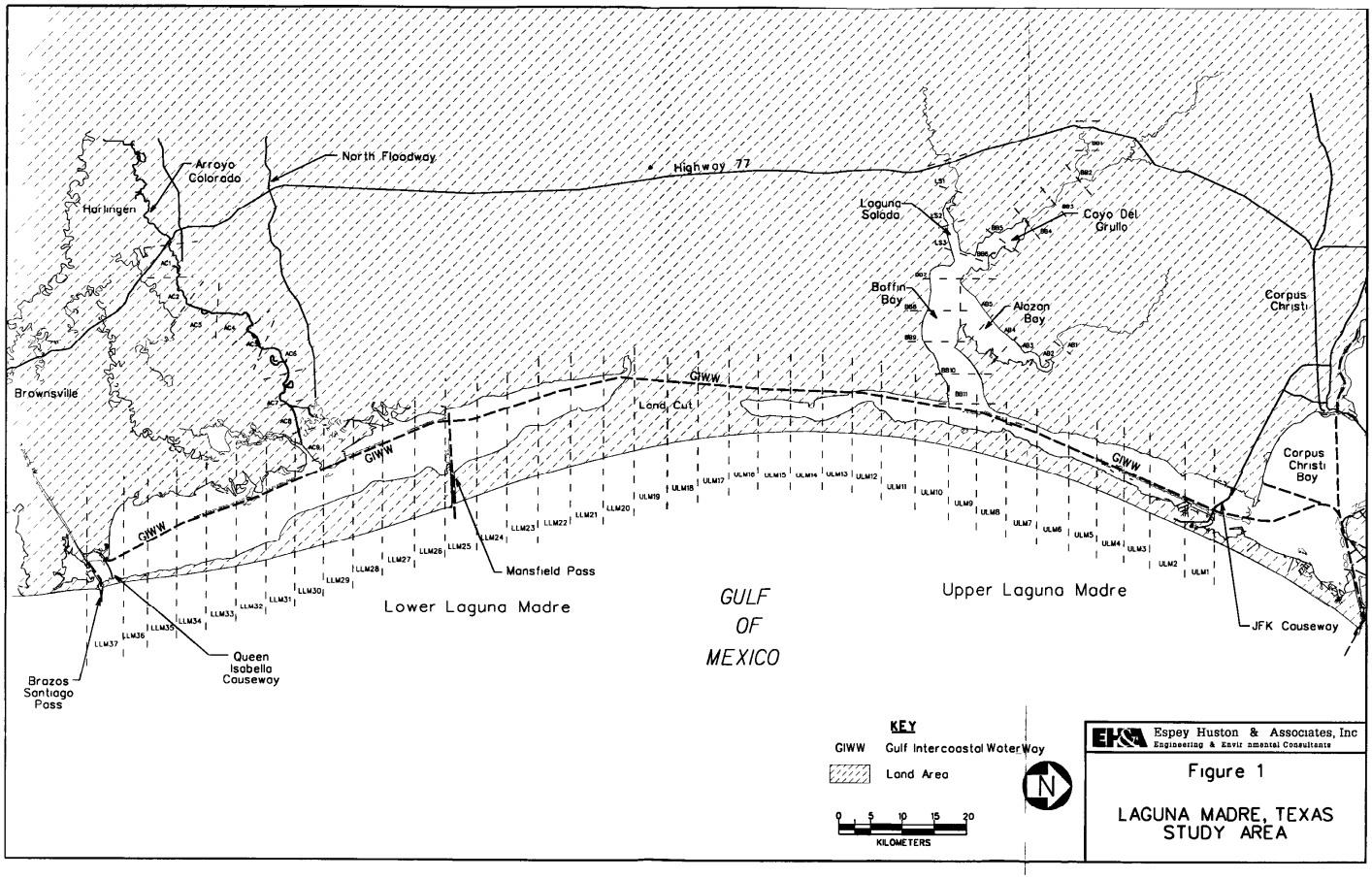

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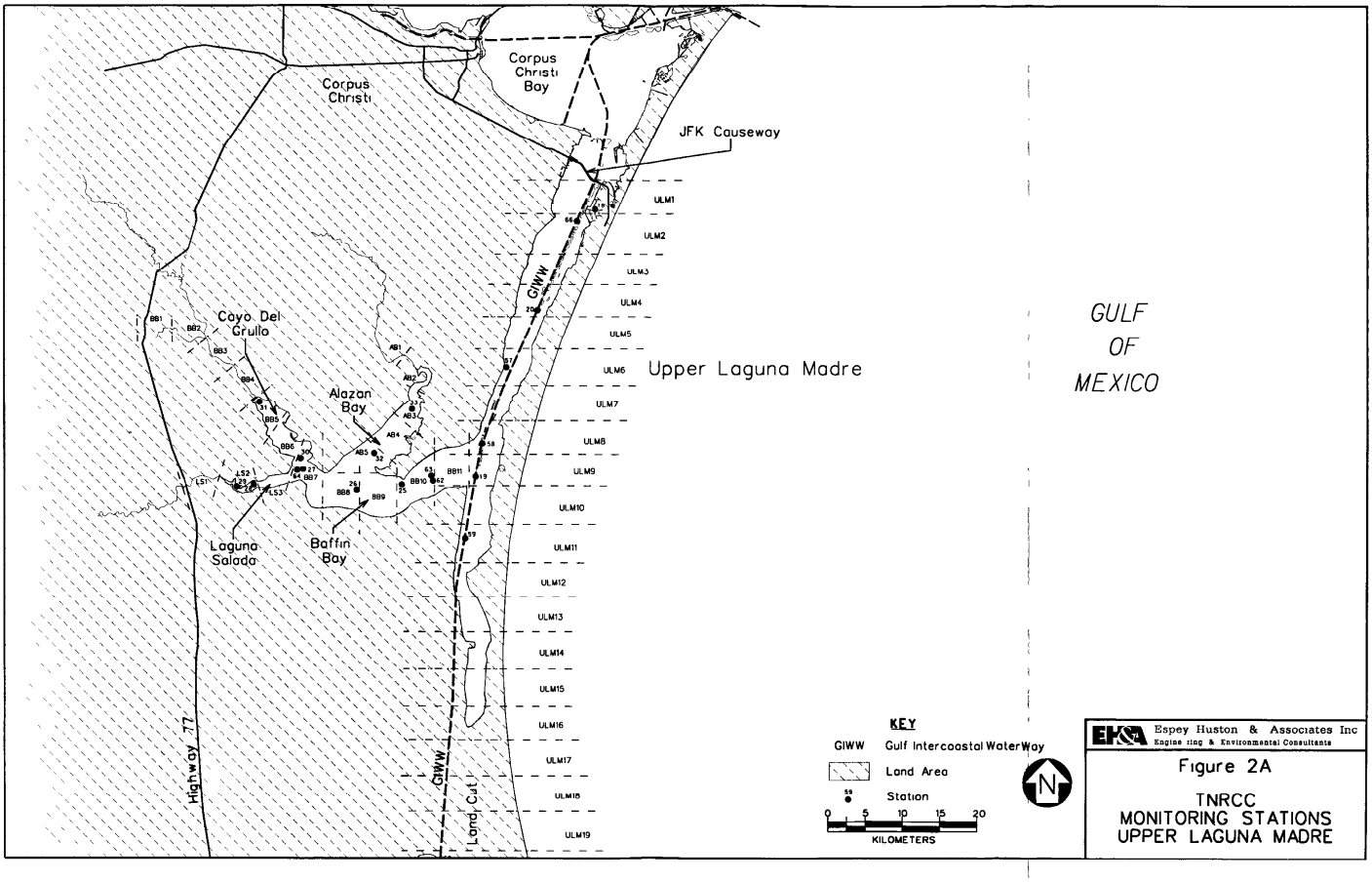
Figure 1

LAGUNA MADRE, TEXAS
STUDY AREA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Corpus Christi Bay
JFK Causeway
GIWW
Upper Laguna Madre
GULF OF MEXICO
Cayo Del Grulla
Alazan Bay
Laguna Salada
Baffin Bay
Highway 77
Land Cut
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KEY
GIWW Gulf Intercoastal WaterWay
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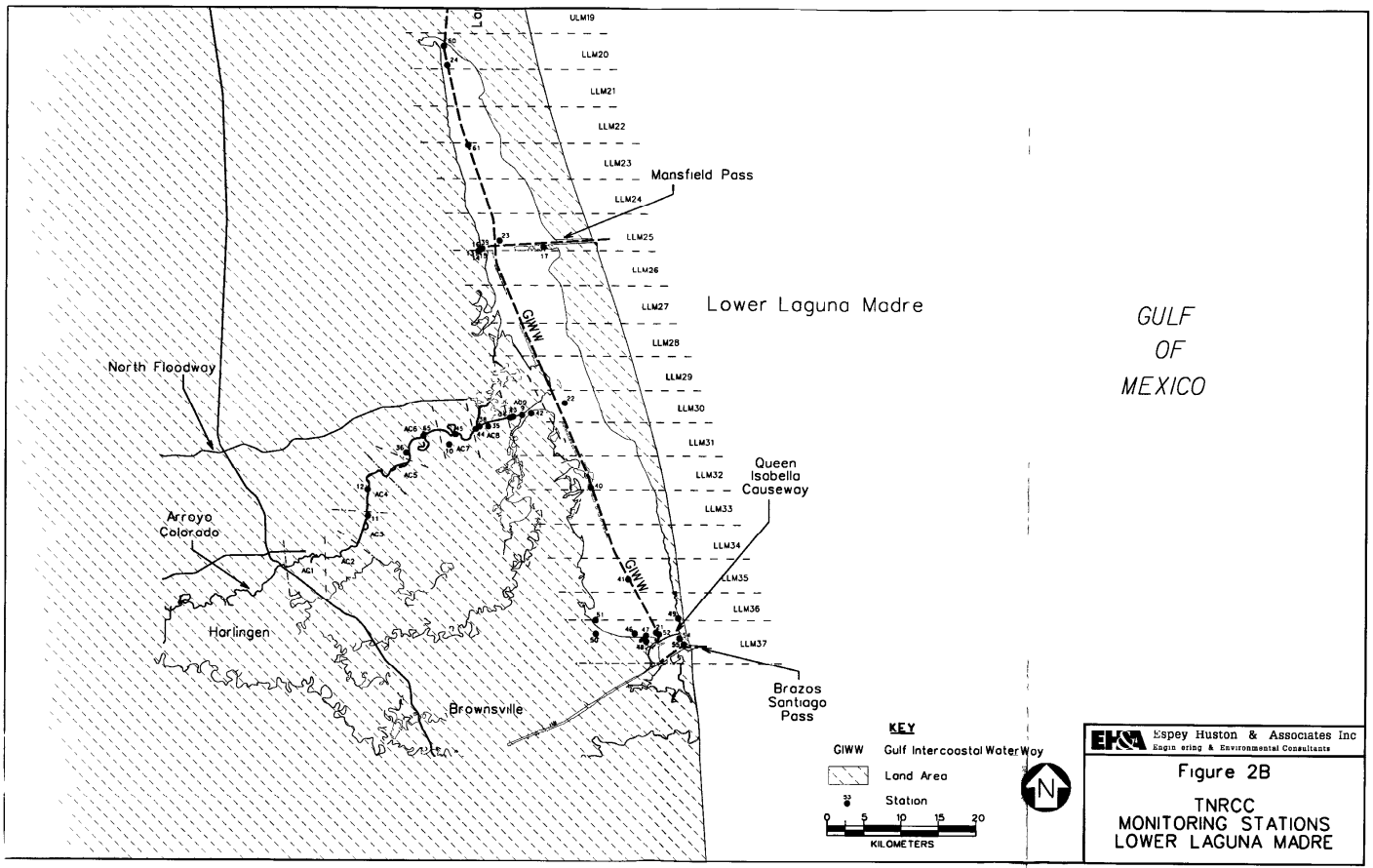
Figure 2A
TNRCC
MONITORING STATIONS
UPPER LAGUNA MADRE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Causeway
Arroyo
Colorado
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Brownsville
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Figure 2B
TNRCC
MONITORING STATIONS
LOWER LAGUNA MADRE

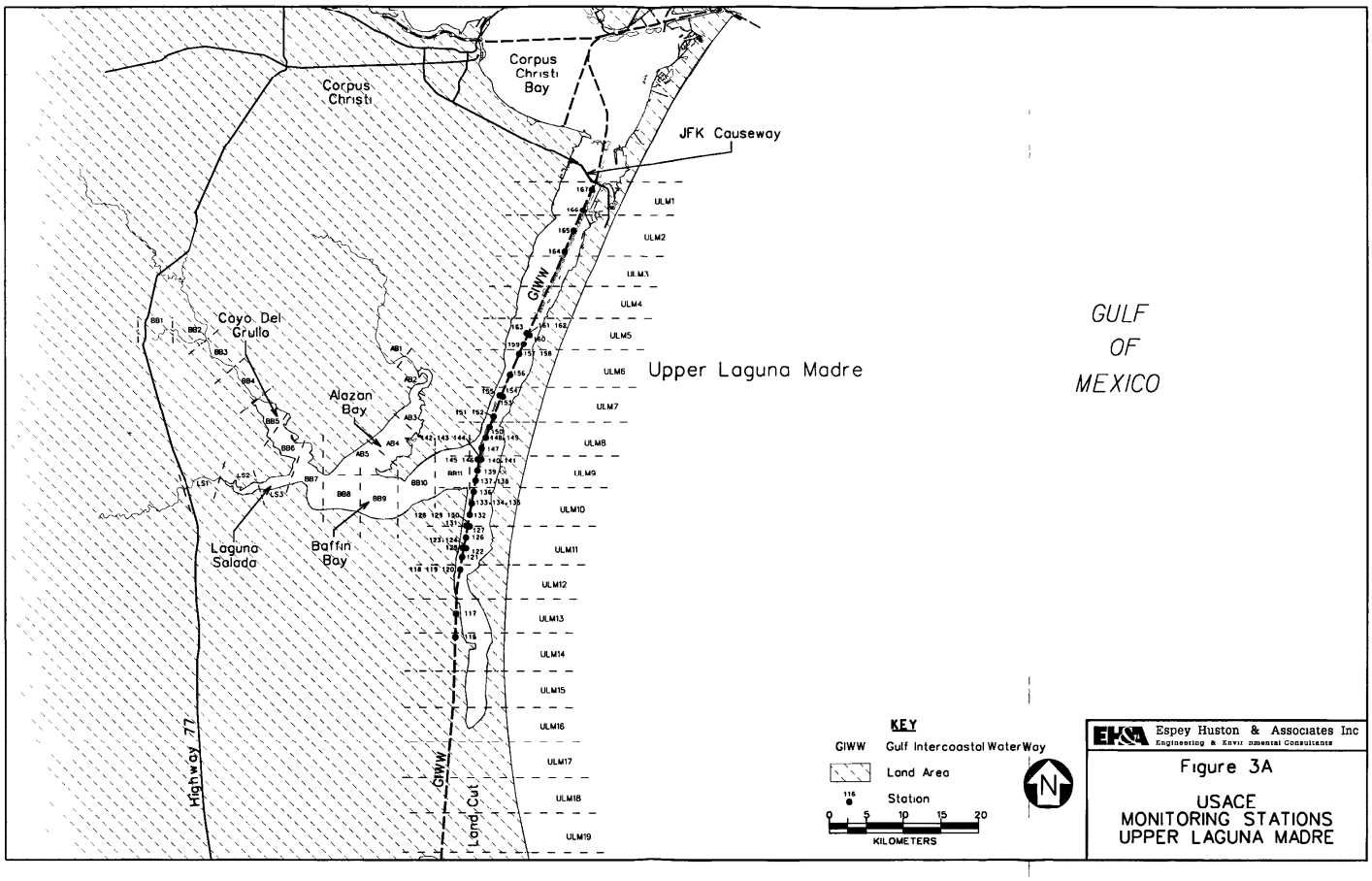

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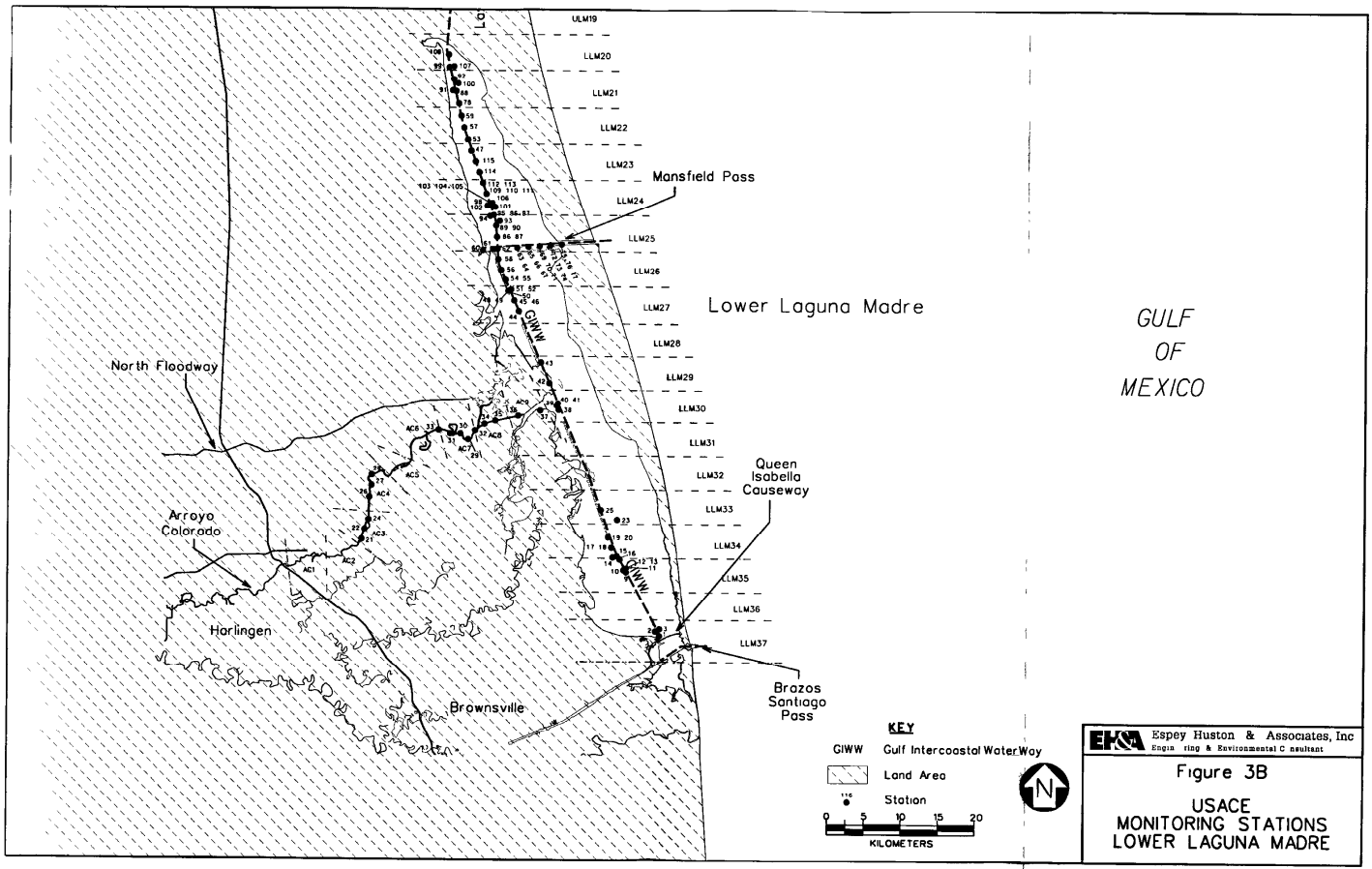
Figure 3A

USACE
MONITORING STATIONS
UPPER LAGUNA MADRE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GIWW Gulf Intercoastal Waterway
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Espey Huston & Associates, Inc
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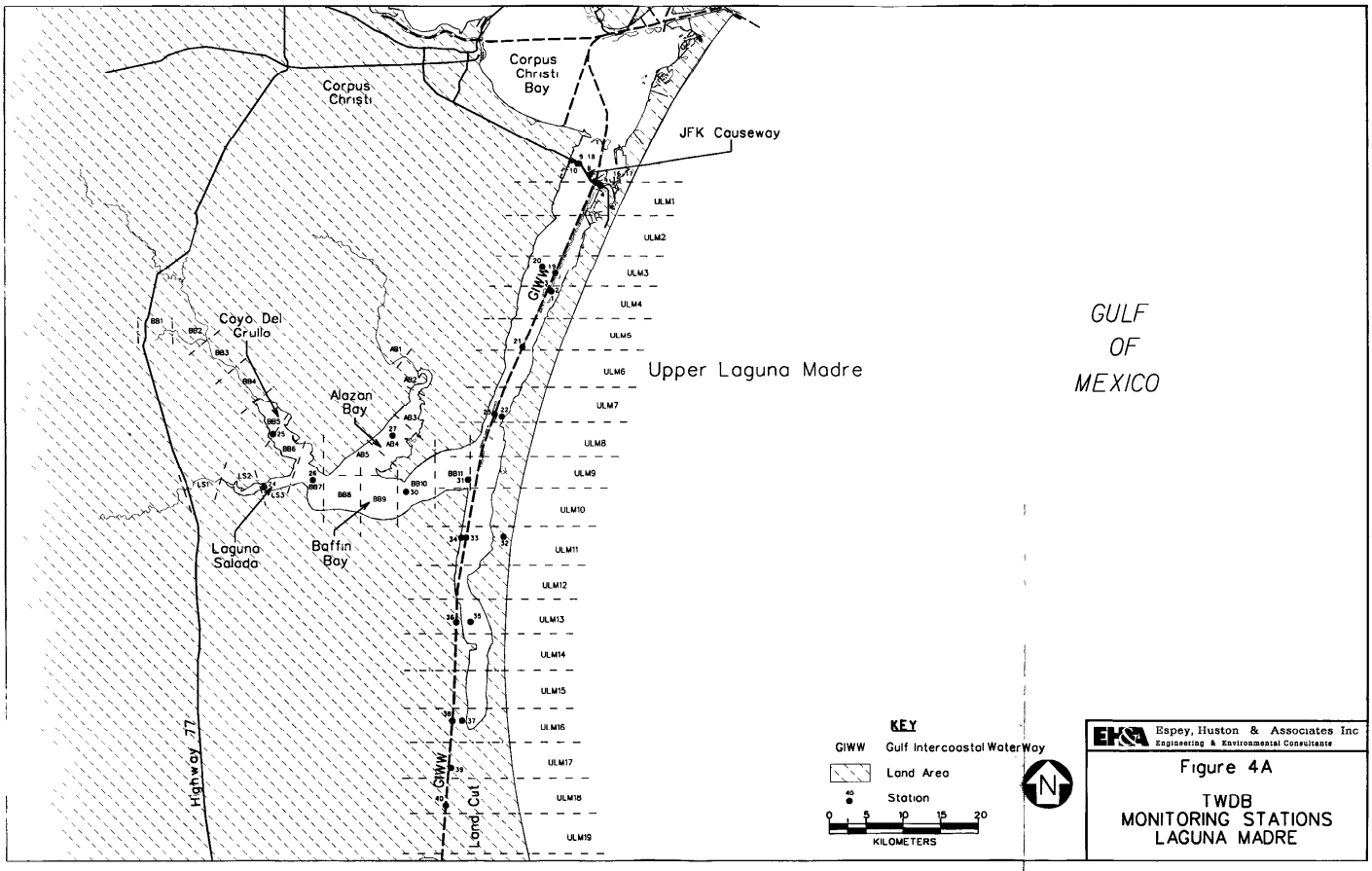
Figure 3B
USACE
MONITORING STATIONS
LOWER LAGUNA MADRE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Coyo Del Grullo
Alazan Bay
Laguna Salada
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KEY
GIWW Gulf Intercoastal Waterway
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Figure 4A
TWDB
MONITORING STATIONS
LAGUNA MADRE

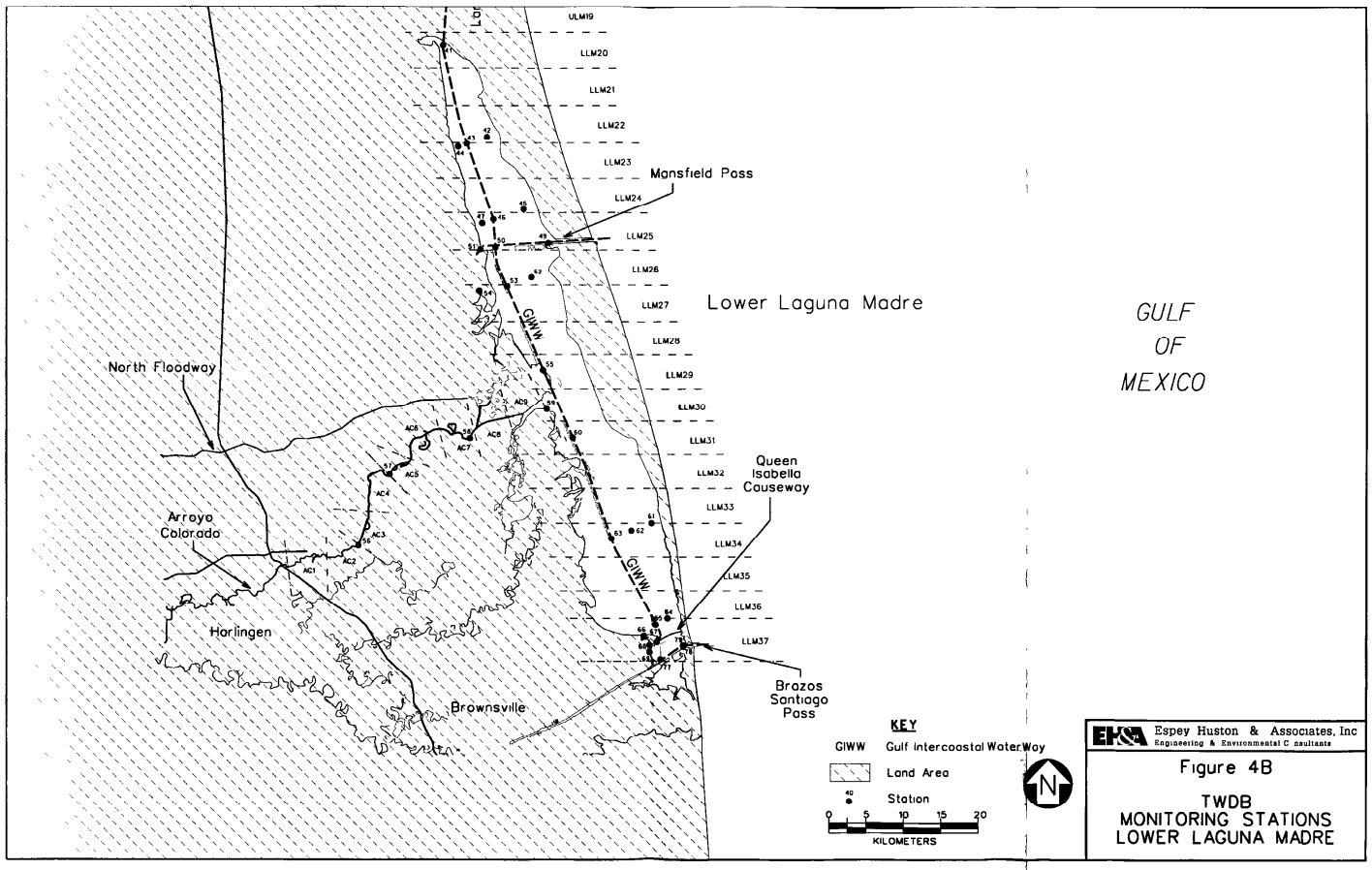

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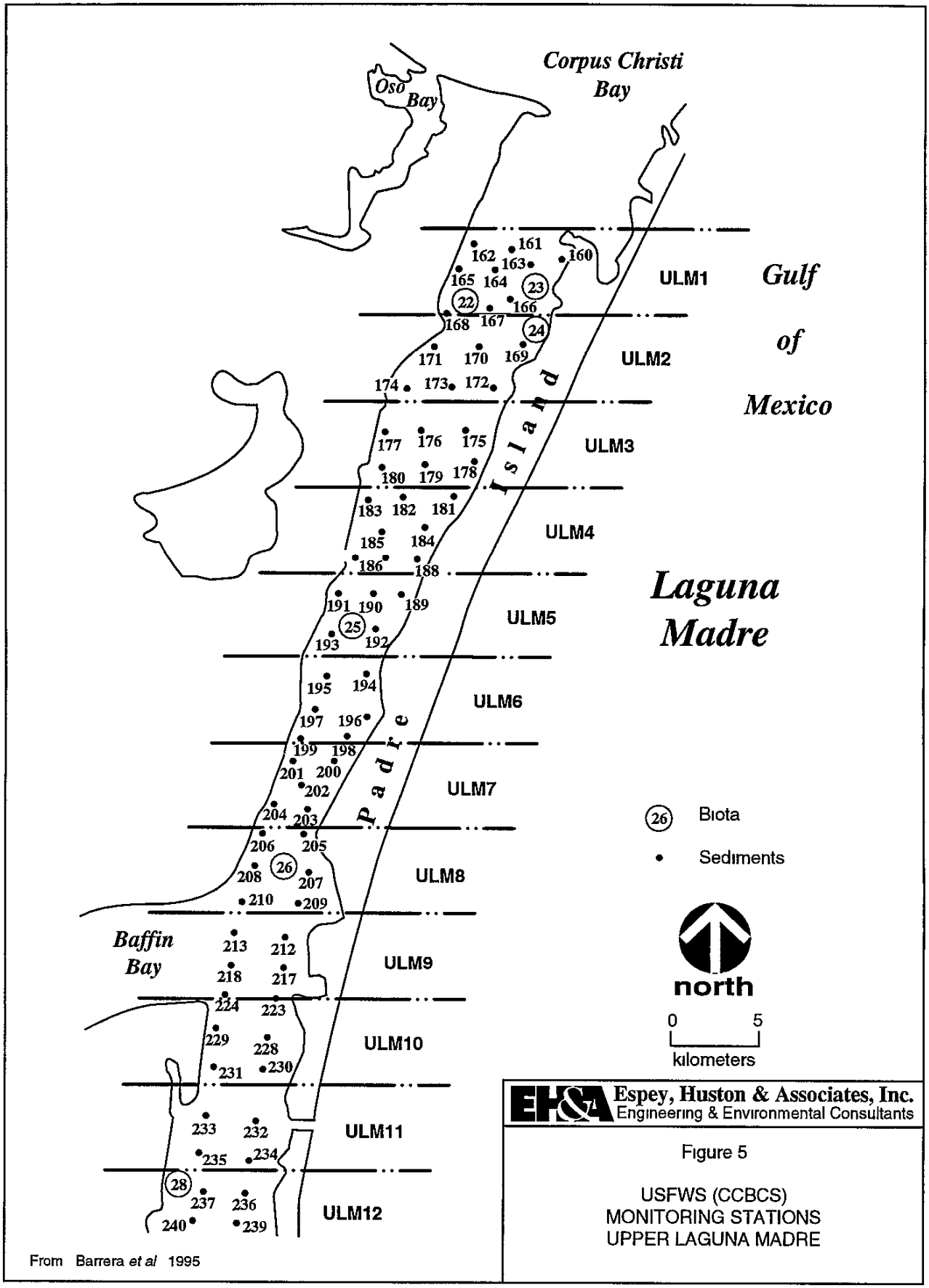
Figure 4B

TWDB
MONITORING STATIONS
LOWER LAGUNA MADRE



From Barrera *et al* 1995

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Figure 5

USFWS (CCBCS)
MONITORING STATIONS
UPPER LAGUNA MADRE

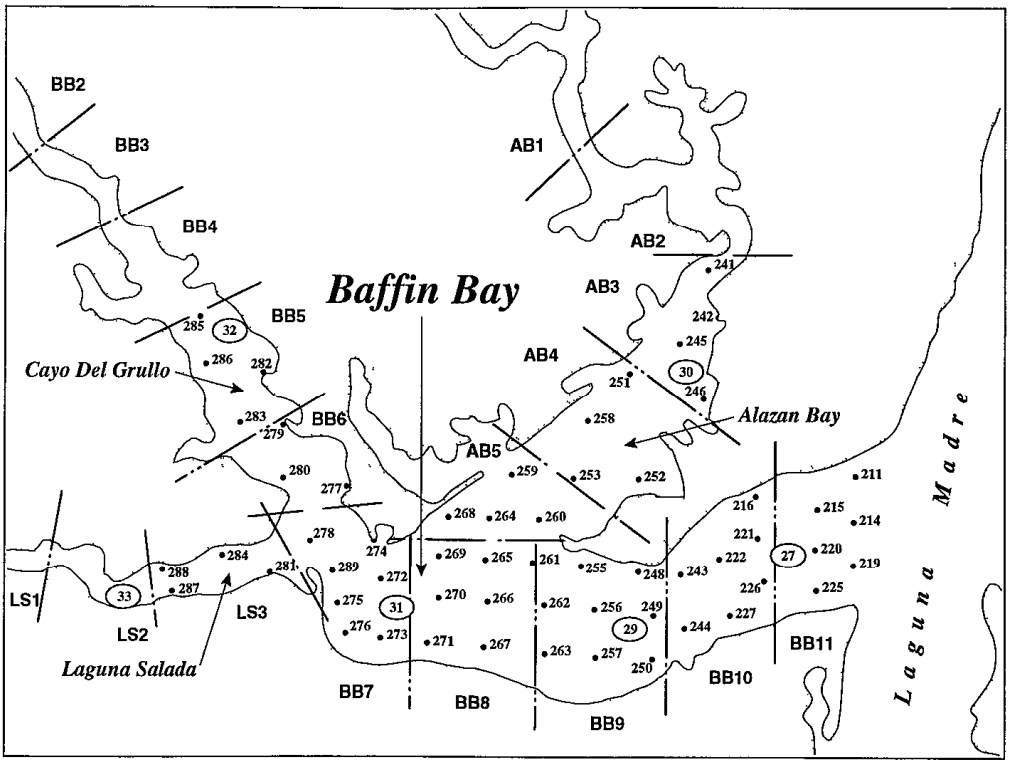

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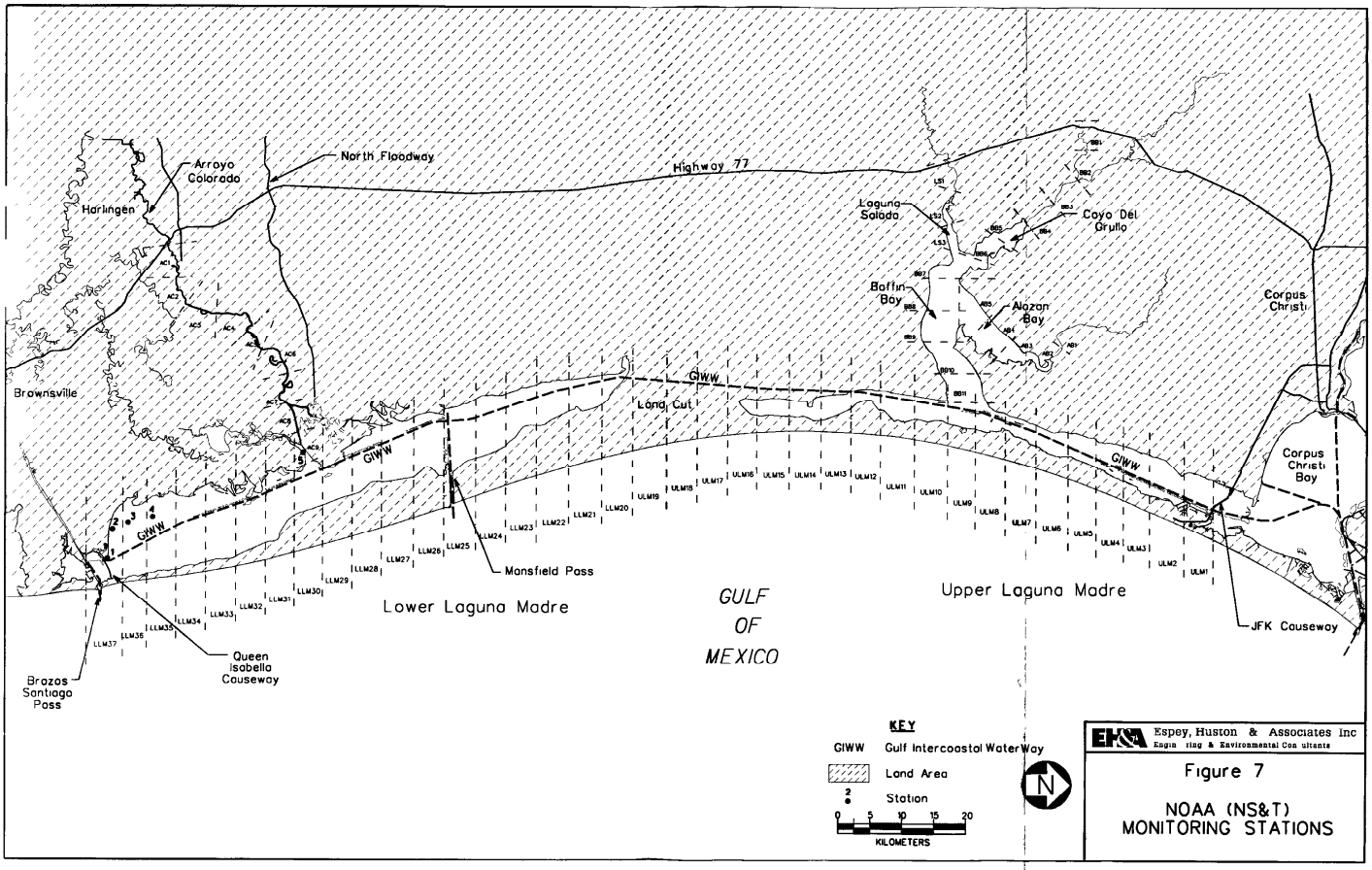
Figure 6

USFWS (CCBCS)
MONITORING STATIONS
BAFFIN BAY COMPLEX

From Barrera *et al*, 1995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Coyo Del Grullo
Baffin Bay
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JFK Causeway
Queen Isabella Causeway
Brazos Santiago Pass
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Figure 7
NOAA (NS&T) MONITORING STATIONS

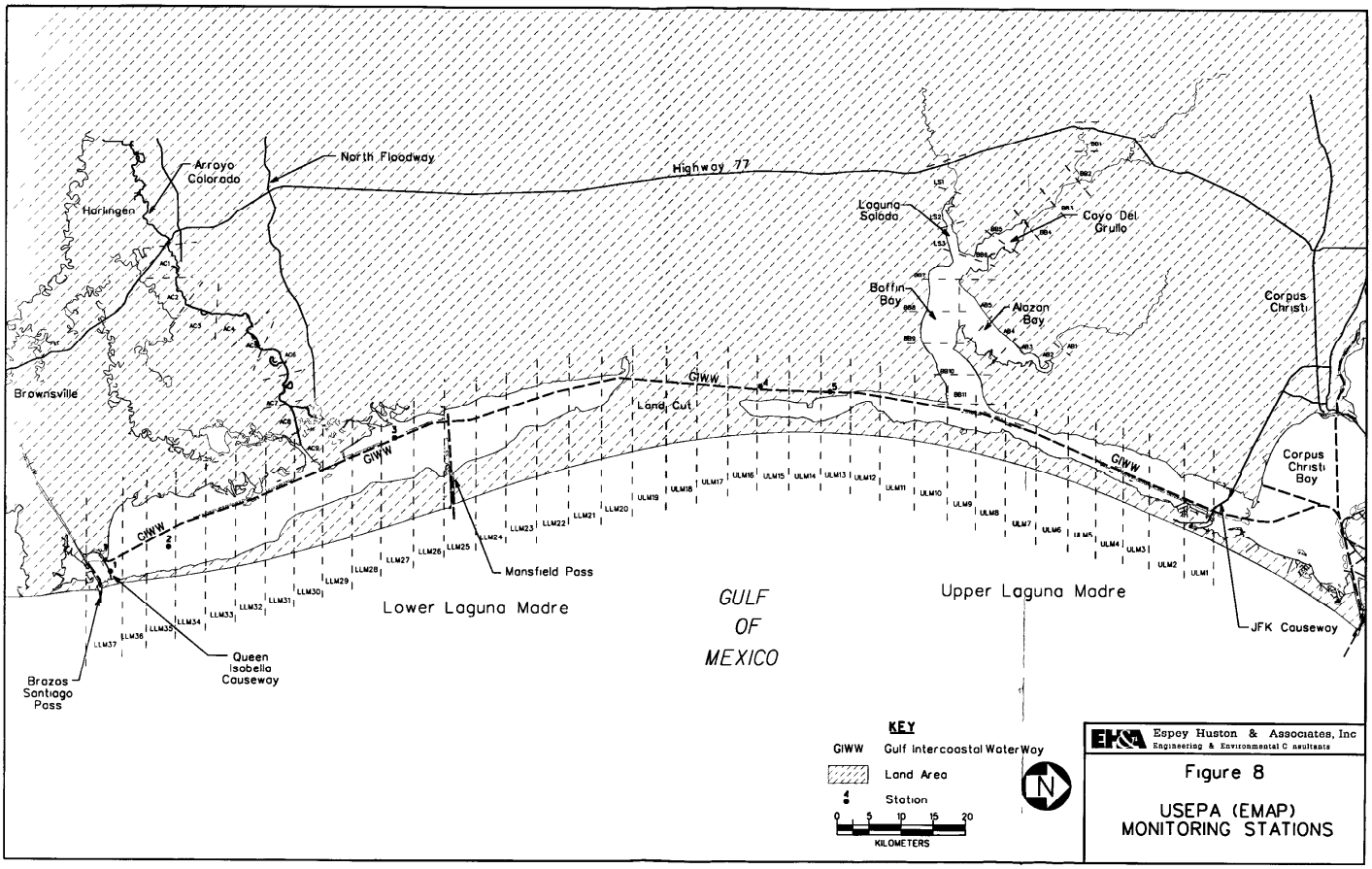
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Figure 8
USEPA (EMAP) MONITORING STATIONS

TABLES

TABLE 1

TNRCC STATION LOCATIONS AND DESCRIPTIONS

Station	Segment No	Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	TNRCC Station number
9	AC9	26	21	10	97	22	26	13070
10	AC7	26	19	8	97	28	22	13071
11	AC3	26	13	58	97	34	58	13072
12	AC4	26	15	54	97	34	58	13073
13	LLM25	26	33	25	97	25	33	13277
14	LLM25	26	33	17	97	25	44	13278
15	LLM25	26	33	21	97	25	37	13279
16	LLM25	26	33	14	97	25	40	13280
17	LLM25	26	33	28	97	20	27	13281
18	ULM1	27	36	0	97	14	23	13443
19	ULM9	27	16	33	97	24	35	13444
20	ULM4	27	28	44	97	19	15	13445
21	LLM37	26	4	58	97	12	0	13446
22	LLM30	26	22	1	97	19	1	13447
23	LLM25	26	34	1	97	24	0	13448
24	LLM20	26	46	58	97	28	1	13449
25	BB10	27	16	4	97	30	36	13450
26	BB8	27	15	46	97	34	15	13451
27	BB7	27	17	23	97	38	34	13452
28	LS2	27	16	19	97	42	35	13453
29	LS2	27	16	11	97	44	2	13454
30	BB7	27	18	14	97	38	45	13455
31	BB5	27	22	26	97	42	0	13456
32	AB5	27	18	28	97	32	45	13457
33	AB3	27	21	39	97	29	38	13458
34	AC9	26	21	3	97	23	9	13557
35	AC8	26	20	38	97	25	15	13558
36	AC6	26	18	21	97	31	33	13559
38	AC8	26	20	23	97	25	55	13782
39	LLM25	26	33	28	97	25	26	14843
40	LLM32	26	15	43	97	17	2	14844
41	LLM35	26	8	56	97	14	9	14845
42	AC9	26	21	18	97	21	43	14849
43	AC9	26	21	3	97	23	9	14850
44	AC8	26	20	13	97	26	13	14851
45	AC7	26	19	51	97	27	50	14852
46	LLM37	26	4	58	97	13	44	14861
47	LLM37	26	4	47	97	12	50	14862
48	LLM37	26	4	22	97	12	50	14863
49	LLM36	26	6	0	97	10	12	14868
50	LLM37	26	5	2	97	16	51	14869
51	LLM36	26	6	0	97	16	51	14870
52	LLM37	26	4	51	97	11	45	14876
54	LLM37	26	4	33	97	10	8	14878
55	LLM37	26	4	8	97	9	46	14879
57	ULM6	27	24	36	97	21	25	14838
58	ULM8	27	19	1	97	24	0	14839
59	ULM11	27	11	59	97	25	33	14840
60	LLM20	26	48	21	97	28	15	14841
61	LLM23	26	41	2	97	26	23	14842
62	BB10	27	16	19	97	28	4	14846
63	BB10	27	16	40	97	28	11	14847
64	BB7	27	17	20	97	39	3	14848
65	AC6	26	19	47	97	30	25	14853
66	ULM2	27	35	9	97	15	54	14892

ULM - Upper Laguna Madre
BB - Baffin Bay Complex (including Cayo Del Grullo, Alazan Bay (AB) and Laguna Salada (LS)
LLM - Lower Laguna Madre
AC - Arroyo Colorado Tidal

TABLE 2

USACE STATION LOCATIONS AND DESCRIPTIONS

Station	Segment No	Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	USACE Description
1	LLM37	26	4	42	97	11	48	GIB-PIAC-88-2A
2	LLM37	26	5	2	97	12	7	GIB-PIAC-88-DA239
3	LLM37	26	5	12	97	11	46	GIB-PIAC-88-REF239
9	LLM35	26	9	27	97	14	25	GIB-PIAC-88-8
10	LLM35	26	9	36	97	14	38	GIB-PIAC-93-DA234
11	LLM35	26	9	43	97	14	25	GIB-PIAC-93-REF234
12	LLM35	26	10	23	97	14	55	GIB-PIAC-88-10
13	LLM35	26	10	23	97	14	55	GIB-PIAC-93-10
14	LLM35	26	10	33	97	15	28	GIB-PIAC-88-DA233
15	LLM35	26	10	35	97	15	18	GIB-PIAC-93-11
16	LLM35	26	10	37	97	15	8	GIB-PIAC-88-REF233
17	LLM34	26	11	15	97	15	33	GIB-PIAC-88-12
18	LLM34	26	11	15	97	15	33	GIB-PIAC-93-12
19	LLM34	26	12	1	97	15	48	GIB-87-PIAC-13
20	LLM34	26	12	1	97	15	48	GIB-PIAC-93-13
21	AC3	26	12	13	97	35	40	GIB-H-91-30
22	AC3	26	12	58	97	35	25	GIB-H-91-29
23	LLM33	26	13	18	97	15	3	GIB-87-PIAC-14
24	AC3	26	13	40	97	35	6	GIB-H-91-28
25	LLM33	26	14	3	97	16	21	GIB-87-PIAC-15
26	AC4	26	15	19	97	35	0	GIB-H-91-26
27	AC4	26	16	12	97	34	48	GIB-H-91-25
28	AC4	26	16	58	97	34	46	GIB-H-91-24
29	AC7	26	19	28	97	26	58	GIB-H-91-11
30	AC7	26	19	54	97	27	35	GIB-H-91-12
31	AC7	26	19	55	97	28	25	GIB-H-91-13
32	AC8	26	20	6	97	26	23	GIB-H-91-10
33	AC7	26	20	12	97	29	20	GIB-H-91-14
34	AC8	26	20	34	97	25	39	GIB-H-91-09
35	AC8	26	20	47	97	24	46	GIB-H-91-08
36	AC9	26	21	7	97	22	56	GIB-H-88-4
37	AC9	26	21	28	97	21	8	GIB-H-88-2
38	LLM30	26	21	29	97	19	37	GIB-H-93-01
39	LLM30	26	21	49	97	19	47	GIB-H-93-02
40	LLM30	26	21	59	97	19	40	GIB-PIAC-88-25
41	LLM30	26	21	59	97	19	40	GIB-PIAC-93-25
42	LLM29	26	23	30	97	20	21	GIB-ACPM-88-2
43	LLM29	26	25	2	97	21	0	GIB-ACPM-88-4
44	LLM27	26	28	52	97	22	45	GIB-ACPM-94-09
45	LLM27	26	29	39	97	23	6	GIB-ACPM-88-10
46	LLM27	26	29	39	97	23	6	GIB-ACPM-94-10
47	LLM23	26	30	11	97	26	19	GIB-PMMF-94-09
48	LLM27	26	30	21	97	23	33	GIB-87-DA-221
49	LLM27	26	30	21	97	23	33	GIB-ACPM-88-DA221
50	LLM27	26	30	24	97	23	25	GIB-ACPM-94-11
51	LLM27	26	30	27	97	23	19	GIB-87-REF-221
52	LLM27	26	30	27	97	23	19	GIB-ACPM-88-REF221
53	LLM22	26	31	3	97	26	34	GIB-PMMF-94-10
54	LLM26	26	31	10	97	23	46	GIB-ACPM-88-12
55	LLM26	26	31	10	97	23	46	GIB-ACPM-94-12
56	LLM26	26	31	55	97	24	6	GIB-ACPM-94-13
57	LLM22	26	31	56	97	26	52	GIB-PMMF-94-11
58	LLM26	26	32	43	97	24	19	GIB-ACPM-94-14
59	LLM22	26	32	48	97	27	5	GIB-PMMF-94-12
60	LLM25	26	33	24	97	25	33	GIB-87-PM-10

TABLE 2

USACE STATION LOCATIONS AND DESCRIPTIONS

Station	Segment No	Latitude Deg	Latitude Min	Latitude Sec	Longitude Deg	Longitude Min	Longitude Sec	USACE Description
61	LLM25	26	33	28	97	24	46	GIB-87-PM-9
62	LLM25	26	33	29	97	24	22	GIB-ACPM-94-15
63	LLM25	26	33	32	97	22	48	GIB-87-PM-7
64	LLM25	26	33	32	97	22	48	GIB-PM-94-07
65	LLM25	26	33	35	97	21	53	GIB-87-PM-6
66	LLM25	26	33	35	97	21	53	GIB-PM-92-06
67	LLM25	26	33	35	97	21	53	GIB-PM-94-06
69	LLM25	26	33	37	97	20	58	GIB-87-PM-5
70	LLM25	26	33	37	97	20	58	GIB-PM-92-05
71	LLM25	26	33	37	97	20	58	GIB-PM-94-05
72	LLM25	26	33	40	97	20	4	GIB-87-PM-4
73	LLM25	26	33	40	97	20	4	GIB-PM-92-04
74	LLM25	26	33	40	97	20	4	GIB-PM-94-04
75	LLM25	26	33	42	97	19	9	GIB-87-PM-3
76	LLM25	26	33	42	97	19	9	GIB-PM-92-03
77	LLM25	26	33	42	97	19	9	GIB-PM-94-03
78	LLM21	26	33	42	97	27	16	GIB-PMMF-94-13
86	LLM25	26	34	21	97	24	23	GIB-87-PMMF-1
87	LLM25	26	34	21	97	24	23	GIB-PMMF-94-01
88	LLM21	26	34	38	97	27	28	GIB-PMMF-94-14
89	LLM25	26	35	12	97	24	27	GIB-87-PMMF-2
90	LLM25	26	35	12	97	24	27	GIB-PMMF-94-02
91	LLM21	26	35	31	97	27	38	GIB-PMMF-88-14
92	LLM21	26	35	31	97	27	38	GIB-PMMF-94-15
93	LLM25	26	35	32	97	24	8	GIB-87-DA-219
94	LLM25	26	35	55	97	24	56	GIB-87-REF-218
95	LLM25	26	35	59	97	24	38	GIB-87-PMMF-3
96	LLM25	26	35	59	97	24	38	GIB-PMMF-92-03
97	LLM25	26	35	59	97	24	38	GIB-PMMF-94-03
98	LLM24	26	36	24	97	28	0	GIB-PMMF-88-REF212
99	LLM20	26	36	25	97	27	57	GIB-PMMF-94-16
100	LLM21	26	36	27	97	27	37	GIB-PMMF-88-DA212
101	LLM24	26	36	35	97	24	30	GIB-87-DA-218
102	LLM24	26	36	42	97	25	8	GIB-PMMF-92-REF218
103	LLM24	26	36	46	97	24	56	GIB-87-PMMF-4
104	LLM24	26	36	46	97	24	56	GIB-PMMF-92-04
105	LLM24	26	36	46	97	24	56	GIB-PMMF-94-04
106	LLM24	26	36	52	97	24	44	GIB-PMMF-92-DA218
107	LLM20	26	37	19	97	28	2	GIB-PMMF-88-16
108	LLM20	26	37	19	97	28	2	GIB-PMMF-94-17
109	LLM24	26	37	33	97	25	11	GIB-87-PMMF-5
110	LLM24	26	37	33	97	25	11	GIB-PMMF-92-05
111	LLM24	26	37	33	97	25	11	GIB-PMMF-94-05
112	LLM24	26	38	21	97	25	28	GIB-PMMF-92-06
113	LLM24	26	38	21	97	25	28	GIB-PMMF-94-06
114	LLM23	26	39	7	97	25	44	GIB-PMMF-94-07
115	LLM23	26	39	54	97	26	1	GIB-PMMF-94-08
116	ULM14	27	4	57	97	26	36	GIC-BBMF-88-16
117	ULM13	27	6	36	97	26	30	GIC-BBMF-88-14
118	ULM12	27	9	52	97	26	5	GIC-BBMF-88-10
119	ULM12	27	9	52	97	26	5	GIC-BBMF-90-10
120	ULM12	27	9	52	97	26	5	GIC-BBMF-93-10
121	ULM11	27	10	47	97	25	54	GIC-BBMF-93-09
122	ULM11	27	11	25	97	25	34	GIC-BBMF-88-DA201
123	ULM11	27	11	27	97	25	43	GIC-BBMF-88-8

TABLE 2

USACE STATION LOCATIONS AND DESCRIPTIONS

Station	Segment No	Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	USACE Description
124	ULM11	27	11	27	97	25	43	GIC-BBMF-93-08
125	ULM11	27	11	28	97	25	52	GIC-BBMF-88-REF201
126	ULM11	27	12	16	97	25	33	GIC-BBMF-93-07
127	ULM11	27	13	4	97	25	13	GIC-BBMF-90-DA200
128	ULM10	27	13	5	97	25	21	GIC-BBMF-88-6
129	ULM10	27	13	5	97	25	21	GIC-BBMF-90-06
130	ULM10	27	13	5	97	25	21	GIC-BBMF-93-06
131	ULM10	27	13	7	97	25	30	GIC-BBMF-90-REF200
132	ULM10	27	13	54	97	25	11	GIC-BBMF-93-05
133	ULM10	27	14	43	97	25	1	GIC-BBMF-88-4
134	ULM10	27	14	43	97	25	1	GIC-BBMF-90-04
135	ULM10	27	14	43	97	25	1	GIC-BBMF-93-04
136	ULM10	27	15	33	97	24	50	GIC-BBMF-93-03
137	ULM9	27	16	21	97	24	40	GIC-BBMF-88-2
138	ULM9	27	16	21	97	24	40	GIC-BBMF-93-02
139	ULM9	27	17	9	97	24	30	GIC-BBMF-93-01
140	ULM9	27	17	57	97	24	10	GIC-CCB-88-DA197
141	ULM9	27	17	57	97	24	10	GIC-CCB-90-DA197
142	ULM9	27	17	58	97	24	19	GIC-CBB-93-33
143	ULM9	27	17	58	97	24	19	GIC-CCB-88-33
144	ULM9	27	17	58	97	24	19	GIC-CCB-90-33
145	ULM9	27	17	58	97	24	28	GIC-CCB-88-REF197
146	ULM9	27	17	58	97	24	28	GIC-CCB-90-REF197
147	ULM8	27	18	46	97	24	7	GIC-CBB-93-32
148	ULM8	27	19	32	97	23	46	GIC-CBB-93-31
149	ULM8	27	19	32	97	23	46	GIC-CCB-88-31
150	ULM8	27	20	18	97	23	26	GIC-CBB-93-30
151	ULM7	27	21	4	97	23	6	GIC-CBB-93-29
152	ULM7	27	21	4	97	23	6	GIC-CCB-88-29
153	ULM7	27	22	34	97	22	18	GIC-CCB-88-DA192
154	ULM7	27	22	37	97	22	26	GIC-CCB-88-27
155	ULM7	27	22	40	97	22	34	GIC-CCB-88-REF192
156	ULM6	27	24	7	97	21	41	GIC-CCB-88-25
157	ULM6	27	25	37	97	20	53	GIC-CBB-93-23
158	ULM6	27	25	37	97	20	53	GIC-CCB-88-23
159	ULM5	27	26	21	97	20	31	GIC-CBB-93-22
160	ULM5	27	27	1	97	20	0	GIC-CCB-88-DA187
161	ULM5	27	27	6	97	20	8	GIC-CCB-88-21
162	ULM5	27	27	7	97	20	8	GIC-CBB-93-21
163	ULM5	27	27	10	97	20	15	GIC-CCB-88-REF187
164	ULM2	27	33	6	97	16	59	GIC-CCB-90-13
165	ULM2	27	34	35	97	16	11	GIC-CCB-90-11
166	ULM1	27	36	4	97	15	25	GIC-CCB-90-09
167	ULM1	27	37	34	97	14	38	GIC-CCB-90-07

ULM - Upper Laguna Madre
LLM - Lower Laguna Madre
AC - Arroyo Colorado Tidal

TABLE 3

TWDB STATION LOCATIONS AND DESCRIPTIONS

Station	Segment No	Latitude Deg	Latitude Min	Latitude Sec	Longitude Deg	Longitude Min	Longitude Sec	TWDB Description Transect line	TWDB Description Transect site
1	ULM4	27	30	12	97	18	10	147	9
2	ULM4	27	30	14	97	18	12	147	10
3	ULM4	27	30	16	97	18	14	147	11
4	ULM1	27	37	52	97	13	55	183	4
5	ULM1	27	37	54	97	13	55	183	2
6	ULM1	27	37	56	97	13	55	183	1
7	ULM1	27	38	11	97	14	21	183	3
8	ULM1	27	38	41	97	14	46	183	5
9	ULM1	27	39	30	97	15	38	183	6
10	ULM1	27	39	30	97	15	45	183	7
15	ULM1	27	37	56	97	13	55	23	1
16	ULM1	27	38	5	97	14	10	23	2
17	ULM1	27	38	11	97	14	21	23	3
18	ULM1	27	39	30	97	15	38	23	6
19	ULM3	27	31	32	97	17	48	34	1
20	ULM3	27	32	3	97	18	51	34	2
21	ULM5	27	26	10	97	20	38	44	2
22	ULM7	27	21	4	97	22	28	53	1
23	ULM7	27	21	16	97	23	2	53	2
24	LS3	27	16	19	97	41	54	64	2
25	BB5	27	20	11	97	41	6	74	2
26	BB7	27	16	44	97	37	55	82	2
27	AB4	27	19	53	97	31	18	94	2
30	BB10	27	15	43	97	30	19	107	2
31	BB11	27	16	30	97	25	19	119	2
32	ULM11	27	12	13	97	22	34	125	1
33	ULM11	27	12	13	97	25	35	125	2
34	ULM11	27	12	13	97	25	58	125	3
35	ULM13	27	6	5	97	25	24	134	1
36	ULM13	27	6	5	97	26	32	134	2
37	ULM16	26	58	57	97	26	16	145	1
38	ULM16	26	58	57	97	27	2	145	2
39	ULM17	26	55	30	97	27	15	150	1
40	ULM18	26	52	44	97	27	44	157	2
41	LLM20	26	48	22	97	28	14	163	2
42	LLM22	26	41	36	97	24	51	175	1
43	LLM23	26	41	8	97	26	29	175	2
44	LLM23	26	40	56	97	27	11	175	3
45	LLM24	26	36	13	97	22	1	188	1
46	LLM25	26	35	32	97	24	28	188	2
47	LLM25	26	35	16	97	25	23	188	3
49	LLM25	26	33	44	97	20	5	194	2
50	LLM25	26	33	31	97	24	21	194	3
51	LLM25	26	33	23	97	25	34	194	4
52	LLM26	26	31	15	97	21	31	203	1
53	LLM27	26	30	37	97	23	28	203	2
54	LLM27	26	30	20	97	25	44	203	4
55	LLM29	26	24	23	97	20	44	217	2
56	AC2	26	11	47	97	35	57	223	2
57	AC5	26	16	56	97	33	17	233	2
58	AC7	26	19	29	97	26	45	247	2
59	LLM30	26	21	32	97	20	31	258	2

TABLE 3

TWDB STATION LOCATIONS AND DESCRIPTIONS

Station	Segment No	Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	TWDB Description Transect line	site
60	LLM31	26	19	22	97	18	28	263	2
61	LLM34	26	12	56	97	12	18	274	1
62	LLM34	26	12	26	97	13	57	274	2
63	LLM34	26	11	53	97	15	34	274	3
64	LLM37	26	5	53	97	11	12	287	1
65	LLM37	26	5	26	97	12	10	287	2
66	LLM37	26	4	39	97	13	10	287	4
67	LLM37	26	4	12	97	12	6	297	2
68	LLM37	26	3	59	97	12	43	301	2
69	LLM37	26	3	28	97	12	43	313	2
77	LLM37	26	2	56	97	11	51	370	2
78	LLM37	26	3	56	97	10	0	376	2
79	LLM37	26	3	50	97	10	0	382	4
80	LLM26	26	30	30	97	30	0	610	2

ULM - Upper Laguna Madre
BB - Baffin Bay Complex (including Cayo Del Grullo, Alazan Bay, and Laguna Salada)
LLM - Lower Laguna Madre
AC - Arroyo Colorado Tidal

TABLE 4

NOAA - NS&T STATION LOCATIONS AND DESCRIPTIONS

Station*	Segment No	Latitude Deg	Latitude Min	Latitude Sec	Longitude Deg	Longitude Min	Longitude Sec	NS&T Description
1	LLM37	26	4	37	97	12	3	NST8801
2	LLM37	26	5	6	97	14	49	NST8602
2	LLM37	26	5	6	97	14	49	NST8802
2	LLM37	26	5	6	97	14	49	NST8901
2	LLM37	26	5	6	97	14	49	NST8401
3	LLM36	26	6	25	97	15	25	NST8603
3	LLM36	26	6	25	97	15	25	NST8902
3	LLM36	26	6	25	97	15	25	NST8402
3	LLM36	26	6	29	97	15	25	NST8803
4	LLM35	26	8	31	97	15	54	NST8604
4	LLM35	26	8	31	97	15	54	NST8804
4	LLM35	26	8	31	97	15	54	NST8903
4	LLM35	26	8	31	97	15	54	NST8403
5	AC9	26	21	18	97	21	50	NST9201
5	AC9	26	21	18	97	22	5	NST9202
5	AC9	26	21	21	97	21	43	NST9203

* NOAA (NS&T) assigns separate sampling station labels per date sampled
LLM - Lower Laguna Madre
AC - Arroyo Colorado Tidal

TABLE 5

USEPA - EMAP STATION LOCATIONS AND DESCRIPTIONS

Station	Segment No	Latitude Deg	Latitude Min	Latitude Sec	Longitude Deg	Longitude Min	Longitude Sec	USEPA Description
1	LLM37	26	4	50 4	97	10	51 6	LA94LR57
2	LLM35	26	9	51	97	13	0	LA94LR58
3	LLM27	26	29	5 4	97	22	55 2	LA93LR65
4	ULM15	27	0	4 8	97	27	13 2	LA91LR55
5	ULM13	27	5	59 4	97	26	34 8	LA94LR60

ULM - Upper Laguna Madre
LLM - Lower Laguna Madre

TABLE 6

TOTAL STATIONS PER DESIGNATED SEGMENT

STUDY AREA	SEGMENT	NO. STATIONS
Upper Laguna Madre	1	23
Upper Laguna Madre	2	13
Upper Laguna Madre	3	11
Upper Laguna Madre	4	11
Upper Laguna Madre	5	14
Upper Laguna Madre	6	11
Upper Laguna Madre	7	14
Upper Laguna Madre	8	12
Upper Laguna Madre	9	17
Upper Laguna Madre	10	15
Upper Laguna Madre	11	15
Upper Laguna Madre	12	8
Upper Laguna Madre	13	4
Upper Laguna Madre	14	1
Upper Laguna Madre	15	1
Upper Laguna Madre	16	2
Mud Flats	17	1
Mud Flats	18	1
Mud Flats	19	0
Lower Laguna Madre	20	6
Lower Laguna Madre	21	5
Lower Laguna Madre	22	4
Lower Laguna Madre	23	6
Lower Laguna Madre	24	13
Lower Laguna Madre	25	38
Lower Laguna Madre	26	5
Lower Laguna Madre	27	11
Lower Laguna Madre	28	0
Lower Laguna Madre	29	3
Lower Laguna Madre	30	6
Lower Laguna Madre	31	1
Lower Laguna Madre	32	1
Lower Laguna Madre	33	2
Lower Laguna Madre	34	7
Lower Laguna Madre	35	11
Lower Laguna Madre	36	3
Lower Laguna Madre	37	23
Cayo Del Grullo/Baffin Bay	1	0
Cayo Del Grullo/Baffin Bay	2	0
Cayo Del Grullo/Baffin Bay	3	0
Cayo Del Grullo/Baffin Bay	4	0
Cayo Del Grullo/Baffin Bay	5	7
Cayo Del Grullo/Baffin Bay	6	3
Cayo Del Grullo/Baffin Bay	7	12
Cayo Del Grullo/Baffin Bay	8	8
Cayo Del Grullo/Baffin Bay	9	9

TABLE 6

TOTAL STATIONS PER DESIGNATED SEGMENT

STUDY AREA	SEGMENT	NO. STATIONS
Cayo Del Grullo/Baffin Bay	10	11
Cayo Del Grullo/Baffin Bay	11	8
Laguna Salada	1	0
Laguna Salada	2	2
Laguna Salada	3	5
Alazan Bay	1	0
Alazan Bay	2	0
Alazan Bay	3	7
Alazan Bay	4	5
Alazan Bay	5	5
Arroyo Colorado Tidal	1	0
Arroyo Colorado Tidal	2	1
Arroyo Colorado Tidal	3	4
Arroyo Colorado Tidal	4	4
Arroyo Colorado Tidal	5	1
Arroyo Colorado Tidal	6	2
Arroyo Colorado Tidal	7	7
Arroyo Colorado Tidal	8	6
Arroyo Colorado Tidal	9	7

TABLE 7
TNRCC Water, Sediment and Tissue Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE			BAFFIN BAY			LOWER LAGUNA MADRE			ARROYO COLORADO		
		No of Samples	Min Value	Max Value	No of Samples	Min Value	Max Value	No of Samples	Min. Value	Max. Value	No. of Samples	Min Value	Max Value
WATER													
TEMPERATURE, WATER (DEGREES CENTIGRADE)	00010	818	8	32 08	419	8	32	998	7 3	33 9	507	9 3	33 3
TEMPERATURE, WATER (DEGREES FAHRENHEIT)	00011	391	46 4	89 6	226	46 4	89 6	620	47 8	93	304	48 7	92
FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)	00061	1	1	1									
TURBIDITY, (JACKSON CANDLE UNITS)	00070	40	0	40	36	0	85	91	0	80	40	0	500
TRANSPARENCY, SECCHI DISC (INCHES)	00077	114	10	96	89	4	48	139	6	96	41	0 8	30
TRANSPARENCY, SECCHI DISC (METERS)	00078	71	0 1	2	50	0 03	1 52	67	0 24	2	30	0 33	1 1
SPECIFIC CONDUCTANCE,FIELD (UMHOS/CM @ 25C)	00094	811	7000	84000	409	2650	93000	959	3350	340000	484	937	63500
SPECIFIC CONDUCTANCE (UMHOS/CM @ 25C)	00095	114	8120	95480	84	2768	100408	217	4633	94080	77	1136	73080
OXYGEN, DISSOLVED (MG/L)	00300	807	0 3	11 7	419	0 3	15 2	992	0 6	17 5	501	0	20
BIOCHEM OXY DEM,NIT INHIB DISS(MG/L, 5 DAY 20C)	00307										6	0 5	2
BIOCHEM OXY DEM,NIT INHIB,TOT (MG/L,20 DAY 20C)	00308										8	4	11
BIOCHEM OXY DEM,NIT INHIB DISS(MG/L,20 DAY-20C)	00309										6	2 5	3 5
BIOCHEMICAL OXYGEN DEMAND (MG/L, 5 DAY 20DEG C	00310	7	1	5	12	0 5	7 5	46	0 3	14	21	1	14
BIOCHEM OXY DEM NIT INHIB, TOT (MG/L, 5 DAY 20C)	00314										6	1	4 5
CHEMICAL OXYGEN DEMAND, BOT DEP (MG/KG DRY WGT	00339	4	15800	82000	5	10000	52000				1	40700	40700
CHEMICAL OXYGEN DEMAND, 25N K2CR2O7 (MG/L)	00340	1	142300	142300	1	30480	30480				1	60	60
PH (STANDARD UNITS)	00400	792	6 7	9	400	7	8 9	892	6 2	9 8	470	6 9	9
PH (STANDARD UNITS) LAB	00403	150	7 1	8 74	107	7 53	8 8	217	7 1	8 9	73	7 4	8 8
ALKALINITY, TOTAL (MG/L AS CACO3)	00410	209	67	596	144	11	428	221	66	255	80	101	272
ALKALINITY, PHENOLPHTHALEIN (MG/L)	00415							3	0	13	2	5	16
BICARBONATE ION (MG/L AS HCO3)	00440	4	92	149	10	105	183	1	246	246			
CARBONATE ION (MG/L AS CO3)	00445	3	16	24	2	10	10	1	0	0			
SALINITY - PARTS PER THOUSAND	00480	273*	22 4	53 9	137*	10 6	59 7	729*	6 7	47 9	137*	2 3	40 7
NITROGEN, TOTAL (MG/L AS N)	00600							1	0 4	0 4			
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	00610	241	< 0 01	1 28	176	< 0 01	2 65	314	< 0 01	4 65	112	< 0 01	2 41
NITRITE NITROGEN, TOTAL (MG/L AS N)	00615	131	< 0 01	0 09	84	< 0 01	0 11	82	< 0 01	0 188	42	< 0 01	0 313
NITRATE NITROGEN, TOTAL (MG/L AS N)	00620	225	< 0 01	1 7	165	< 0 01	2	309	< 0 01	2 9	109	0 01	5 9
NITROGEN, KJELDAHL, TOTAL, (MG/L AS N)	00625	24	0 33	2 06	17	0 16	3 7	20	0 05	2	19	0 46	3
NITRITE PLUS NITRATE, TOTAL 1 DET (MG/L AS N)	00630	8	0	0 05	9	0	0 048	1	0 211	0 211	2	0 946	1 18
PHOSPHATE, TOTAL (MG/L AS PO4)	00650	132	0	0 58	104	< 0 03	2 2	202	< 0 03	1 88	73	0 12	3 3
PHOSPHATE, ORTHO (MG/L AS PO4)	00660	123	0 02	8 04	92	< 0 03	0 42	156	< 0 03	1 01	57	0 03	2
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	00665	240	0 006	0 24	175	< 0 01	0 719	312	0 009	0 614	112	0 039	1 078
PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)	00671	228	0 006	2 627	158	< 0 01	0 14	261	< 0 01	0 429	93	< 0 01	0 654
CARBON, TOTAL ORGANIC (MG/L AS C)	00680	209	< 1	45	147	< 1	30	242	< 1	18	84	< 1	24
CARBON, TOTAL ORGANIC, FILTERED (MG/L AS C)	00684										6	3	5
HARDNESS, TOTAL (MG/L AS CACO3)	00900										2	2100	2410
HARDNESS, CARBONATE (MG/L AS CACO3)	00901							1	3890	3890			
CALCIUM, DISSOLVED (MG/L AS CA)	00915										2	249	259
CALCIUM, TOTAL (MG/L AS CA)	00916	4	430	620	10	530	840						
MAGNESIUM, DISSOLVED (MG/L AS MG)	00925							1	690	690	2	352	434
MAGNESIUM, TOTAL (MG/L AS MG)	00927	4	1200	1800	10	1400	2200						
SODIUM, TOTAL (MG/L AS NA)	00929	4	9400	14000	10	12000	17000						
SODIUM, DISSOLVED (MG/L AS NA)	00930							1	5500	5500			
CHLORIDE (MG/L AS CL)	00940	245	257	32000	180	312	35800	314	1015	37000	114	85 5	18648
CHLORIDE, DISSOLVED IN WATER MG/L	00941	21	12600	24650	19	2625	28250	20	710	21000	17	175	6000
SULFATE (MG/L AS SO4)	00945	242	121	5120	176	110	5400	306	19	7850	109	133	2923
FLUORIDE, DISSOLVED (MG/L AS F)	00950							1	2	2			
FLOW 1=DRY,2=LOW,3=NORMAL,4=FLOOD,5=ABOVE NORM	01351	1	1	1							21	3	5
COLIFORM,TOT,MEMBRANE FILTER,IMMED M ENDO,	31501	99	0	10000	71	0	150	81	0	20000	15	0	2000
COLIFORM,TOT,MPN,CONFIRMED TEST,35C, #/100ML	31505	6	2	10	7	0	10	18	0	240000	4	2	4900

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TNRCC Water, Sediment and Tissue Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE					BAFFIN BAY					LOWER LAGUNA MADRE					ARROYO COLORADO				
		No. of Samples		Min Value		Max Value	No of Samples		Min. Value		Max. Value	No of Samples		Min. Value		Max Value	No of Samples		Min Value		Max. Value
FECAL COLIFORM,MEMBR FILTER,M FC BROTH, #/100ML	31616	89	<	2		47	68	<	2		107	180	<	1		300	83	<	1		580
FECAL COLIFORM,MPN,BORIC ACID LACTOSE BR,#/100ML	31619	6		0		10	7		0		10	523		0		22000	24		2		490
FECAL STREPTOCOCCI, MBR FILT,KF AGAR,35C,48HR	31673	1	<	10	<	10	7	<	10	<	10										
CHLOROPHYLL A UG/L SPECTROPHOTOMETRIC ACID METH	32211	228*	<	1		77 8	162*	<	1		80 2	262*	<	1		91 1	94*	<	1		211
PHEOPHYTIN A UG/L SPECTROPHOTOMETRIC ACID METH	32218	196		0		36 5	135		0		19 4	200		0		33 5	74		0		45 2
TIDE, HIGH OR LOW,BEFORE OR AFTER,HOUR,MINUTE	70211	8		1		3															
PHOSPHORUS,IN TOTAL ORTHOPHOSPHATE (MG/L AS P)	70507	5		0 02		0 06	4		0 02		0 07										
Metals																					
ARSENIC, DISSOLVED (UG/L AS AS)	01000																2		8 31		12
ARSENIC, TOTAL (UG/L AS AS)	01002	4		3		5	8		3		10	1		10		10	2		9	<	10
BARIUM, TOTAL (UG/L AS BA)	01007	4		110		500	8		40		500	1		200		200	1	<	500	<	500
BORON, TOTAL (UG/L AS B)	01022	1		6500		6500	2		330		3900	1		7		7	1		4		4
CADMIUM, DISSOLVED (UG/L AS CD)	01025																2	<	4	<	4
CADMIUM, TOTAL (UG/L AS CD)	01027	4	<	5		10	8	<	5		10	1		10		10	1	<	10	<	10
CHROMIUM, DISSOLVED (UG/L AS CR)	01030																2	<	2	<	3
CHROMIUM, TOTAL (UG/L AS CR)	01034	4	<	20		100	8		6		100	1		1000		1000	1		30		30
COPPER, DISSOLVED (UG/L AS CU)	01040																2	<	4	<	5
COPPER, TOTAL (UG/L AS CU)	01042	4	<	10		100	8	<	10		100	1		400		400	1		50		50
IRON, TOTAL (UG/L AS FE)	01045	4		140		500	8		25		2600	1		20		20	1		560		560
LEAD, DISSOLVED (UG/L AS PB)	01049																2	<	1	<	1
LEAD, TOTAL (UG/L AS PB)	01051	4		50		140	9		30		200	1		50		50	1	<	50	<	50
MANGANESE, TOTAL (UG/L AS MN)	01055	4		14		120	8	<	10		88	2		50		100	1		150		150
NICKEL, DISSOLVED (UG/L AS NI)	01065																2	<	9		10
NICKEL, TOTAL (UG/L AS NI)	01067	4	<	30		200	8		13		100	1		100		100	1		40		40
SILVER, DISSOLVED (UG/L AS AG)	01075																2	<	0 5	<	0 5
SILVER, TOTAL (UG/L AS AG)	01077	4		18		50	8		12		50	1		50		50	1		17		17
ZINC, DISSOLVED (UG/L AS ZN)	01090																2		21		33
ZINC, TOTAL (UG/L AS ZN)	01092	4		10		100	8		7		100	1		100		100	1		20		20
ALUMINUM, DISSOLVED (UG/L AS AL)	01106																2	<	8	<	34
SELENIUM, DISSOLVED (UG/L AS SE)	01145																2		8 01		19 5
SELENIUM, TOTAL (UG/L AS SE)	01147	1		1		1	1		1		1	1		10		10	2	<	2	<	8
MERCURY, TOTAL (UG/L AS HG)	71900	4	<	1		3 3	9	<	1		11	1		1		1	3	<	0 06		0 2
Organics																					
RESIDUE, TOTAL FIXED (MG/L)	00510											2		20		27	1		15		15
RESIDUE, TOTAL FILTRABLE (DRIED AT 105C),MG/L	00515											1		18700		18700					
RESIDUE, TOTAL NONFILTRABLE (MG/L)	00530	245*		0 27		238	179*		7		336	312*	<	5		416	113*		8		425
RESIDUE, VOLATILE NONFILTRABLE (MG/L)	00535	245*		1		110	179*		1		114	305*	<	1		65	109*		0 22		77
CHLOROMETHANE, WATER, WHOLE, RECOVERABLE, UG/L	30201																4	<	5	<	10
BROMOMETHANE WATER, WHOLE, RECOVERABLE, UG/L	30202																4	<	5	<	10
BROMODICHLOROMETHANE,WHOLE WATER,UG/L	32101																4	<	2	<	5
BROMODICHLOROMETHANE, WHOLE WATER,UG/L	32102																4	<	2	<	5
BROMOFORM, WHOLE WATER, UG/L	32104																4	<	2	<	5
CHLOROFORM, WHOLE WATER, UG/L	32106																4	<	2	<	5
TOLUENE IN WTR SMPLE GC MS, HEXADECONE EXTR (UG/	34010																4	<	2	<	5
BENZENE IN WTR SMPLE GC MS, HEXADECONE EXTR (UG/	34030																4	<	2	<	5
ACENAPHTYLENE TOTWUG/L	34200																4	<	5 2	<	20
ACENAPHTHENE TOTWUG/L	34205																4	<	5 2	<	20
ACRYLONITRILE TOTWUG/L	34215																4	<	10	<	100

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		No of Samples	Min Value	Max Value	No of Samples	Min Value	Max Value	No of Samples	Min. Value	Max. Value	No of Samples		Min. Value		Max Value
BENZO(B)FLUORANTHENE, WHOLE WATER, UG/L	34230										4	<	5 2	<	20
BENZO(K)FLOURANTHENE TOTWUG/L	34242										3	<	5 2	<	20
BENZO A PYRENE TOTWUG/L	34247										3	<	5 2	<	20
DELTA BENZENE HEXACHLORIDE TOTWUG/L	34259										4	<	0 03	<	0 11
BIS (CHLOROMETHYL) ETHER TOTWUG/L	34268										1	<	10	<	10
BIS (2 CHLOROETHYL) ETHER TOTWUG/L	34273										4	<	5 2	<	20
BIS (2 CHLOROETHOXY) METHANE TOTWUG/L	34278										4	<	5 2	<	20
BIS (2-CHLOROISOPROPYL) ETHER TOTWUG/L	34283										4	<	5 2	<	20
N BUTYL BENZYL PHTHALATE,WHOLE WATER,UG/L	34292										4	<	5 2	<	20
CHLOROBENZENE TOTWUG/L	34301										4	<	2	<	5
CHLORODIBROMOMETHANE TOTWUG/L	34306										4	<	2	<	5
CHLOROETHANE TOTWUG/L	34311										4	<	5	<	10
CHRYSENE TOTWUG/L	34320										4	<	5 2	<	20
DIETHYL PHTHALATE TOTWUG/L	34336										4	<	5 2	<	20
DIMEHTYL PHTHALATE TOTWUG/L	34341										4	<	5 2	<	20
1,2 DIPHENYLHYDRAZINE TOTWUG/L	34346										4	<	5 2	<	40
ENDOSULFAN SULFATE TOTWUG/L	34351										4	<	0 11	<	0 66
ETHYLBENZENE TOTWUG/L	34371										4	<	2	<	5
FLUORANTHENE TOTWUG/L	34376										4	<	5 2	<	20
FLUORENE TOTWUG/L	34381										4	<	5 2	<	20
HEXACHLOROCYCLOPENTADIENE TOTWUG/L	34386										4	<	5 2	<	21
HEXACHLOROBUTADIENE TOTWUG/L	34391										4	<	5	<	20
HEXACHLOROETHANE TOTWUG/L	34396										4	<	5 2	<	20
INDENO (1,2,3 CD) PYRENE TOTWUG/L	34403										3	<	5 2	<	20
ISOPHORONE TOTWUG/L	34408										4	<	5 2	<	20
METHYLENE CHLORIDE TOTWUG/L	34423										4	<	2	<	5
N NITROSODI N PROPYLAMINE TOTWUG/L	34428										4	<	5 2	<	20
N NITROSODIPHENYLAMINE TOTWUG/L	34433										4	<	5 2	<	20
N NITROSODIMETHYLAMINE TOTWUG/L	34438										4	<	5 2	<	40
NITROBENZENE WUG/L	34447										4	<	5 2	<	20
PARACHLOROMETA CRESOL, TOTAL UG/L	34452										2	<	11	<	21
PHENANTHRENE TOTWUG/L	34461										4	<	5 2	<	20
PYRENE TOTWUG/L	34469										4	<	5 2	<	20
TETRACHLOROETHYLENE TOTWUG/L	34475										4	<	2	<	5
1,1 DICHLOROETHANE TOTWUG/L	34496										4	<	2	<	5
1,1 DICHLOROETHYLENE TOTWUG/L	34501										4	<	2	<	5
1,1,1 TRICHLOROETHANETOTWUG/L	34506										4	<	2	<	5
1,1,2 TRICHLOROETHANE TOTWUG/L	34511										4	<	2	<	5
1,1,2,2 TETRACHLOROETHANE TOTWUG/L	34516										3	<	2	<	5
BENZO(GHI)PERYLENE1,120BENZOPERYLENE TOTWUG/L	34521										3	<	5 2	<	20
BENZO(A)ANTHRACENE1,2 BENZANTHRACENE TOTWUG/L	34526										4	<	5 2	<	20
1,2 DICHLOROETHANE TOTWUG/L	34531										4	<	2	<	5
1,2 DICHLOROBENZENE TOTWUG/L	34536										4	<	5 2	<	20
1,2 DICHLOROPROPANE TOTWUG/L	34541										4	<	2	<	5
TRANS 1,2 DICHLOROETHENE, TOTAL, IN WATER UG/L	34546										4	<	2	<	5
1,2,4-TRICHLOROBENZENE TOTWUG/L	34551										4	<	5	<	20
1,2,5,6-DIBENZANTHRACENE TOTWUGL	34556										3	<	5 2	<	20
1,3 DICHLOROBENZENE TOTWUG/L	34566										4	<	5 2	<	20
1,4-DICHLOROBENZENE TOTWUG/L	34571										4	<	5 2	<	20
2 CHLOROETHYL VINYL ETHER TOTWUG/L	34576										4	<	10	<	50
2 CHLORONAPHTHALENE TOTWUG/L	34581										3	<	5 2	<	20
2 CHLOROPHENOL IN WATER (UG/L)	34586										4	<	5 3	<	20

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TNRCC Water, Sediment and Tissue Parameters for Study Area

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		No of Samples	Min Value	Max Value	No of Samples	Min Value	Max Value	No. of Samples	Min Value	Max Value	No of Samples	Min Value		Max. Value
2 NITROPHENOL IN WATER (UG/L)	34591										4	< 11	<	20
DI N OCTYL PHTHALATE TOTWUG/L	34596										4	< 5 2	<	20
2,4-DICHLOROPHENOL, TOTAL UG/L	34601										4	< 11	<	20
2,4-DIMETHYLPHENOL, TOTAL UG/L	34606										4	< 11	<	40
2,4-DINITROTOLUENE TOTWUG/L	34611										4	< 5 2	<	20
2,4-DINITROPHENOL, TOTAL UG/L	34616										4	< 11	<	100
2,4,6-TRICHLOROPHENOL, TOTAL UG/L	34621										4	< 11	<	20
2,6-DINITROTOLUENE TOTWUG/L	34626										4	< 5 2	<	20
3,3' DICHLOROBENZIDINE TOTWUG/L	34631										3	< 5 2	<	110
4-BROMOPHENYL PHENYL ETHER TOTWUG/L	34636										4	< 5 2	<	20
4-CHLOROPHENYL PHENYL ETHER TOTWUG/L	34641										4	< 5 2	<	20
2 NITROPHENOL IN WATER (UG/L)	34646										4	< 21	<	100
DNOC(4,6 DINITRO ORTHO CRESOL),WHOLE WATER, UG/L	34657										4	< 11	<	40
PCB 1016 TOTWUG/L	34671										4	< 0 65	<	1
PHENOL (C6H50H) SINGLE COMPOUND, TOTAL UG/L	34694										4	< 5 3	<	20
NAPHTHALENE TOTWUG/L	34696										4	< 5	<	20
TRANS 1,3 DICHLOROPROPENETOTAL IN WATER UG/L	34699										4	< 2	<	5
CIS 1,3 DICHLOROPROPENE TOTAL IN WATER UG/L	34704										4	< 2	<	5
PENTACHLOROPHENOL IN WHOLE WATER, UG/L	39032										4	< 10	<	21
DIETHYLHEXYL PHTHALATE IN WHL WATER SMPL (UG/L)	39100				4	< 50	< 50				4	< 5 2	<	100
DIBUTYL PHTHALATE IN WHOLE WATER SAMPLE (UG/L)	39110				4	< 5	< 5				4	< 5 2	<	20
BENZIDINE,TOTAL IN WHOLE WATER (UG/L)	39120										3	< 5 2	<	110
VINYL CHLORIDE-WHOLE WATER SAMPLE-UG/L	39175										4	< 5	<	50
TRICHLOROETHYLENE WHOLE WATER SAMPLE UG/L	39180										4	< 2	<	5
ALDRIN IN WHOLE WATER SAMPLE (UG/L)	39330				4	< 0 02	< 0 02				4	< 0 04	<	0 2
ALPHA BENZENE HEXACHLORIDE IN WHL WATER, UG/L	39337										4	< 0 03	<	0 11
BETA BENZENE HEXACHLORIDE IN WHOLE WATER SAMP	39338										4	< 0 03	<	0 11
CHLORDANE IN WHOLE WATER SAMPLE (UG/L)	39350				4	< 0 2	< 0 2				4	< 0 14	<	0 53
DDD IN WHOLE WATER SAMPLE (UG/L)	39360				4	< 0 15	< 0 15				4	< 0 11	<	0 3
DDE IN WHOLE WATER SAMPLE (UG/L)	39365				4	< 0 1	< 0 1				5	< 0 04		231
DDT IN WHOLE WATER SAMPLE (UG/L)	39370				4	< 0 15	< 0 15				5	< 0 11		1118
DIELDRIN IN WHOLE WATER SAMPLE (UG/L)	39380				4	< 0 1	< 0 1				4	< 0 02	<	0 11
ENDOSULFAN IN WHOLE WATER SAMPLE (UG/L)	39388										4	< 0 11	<	0 2
ENDRIN IN WHOLE WATER SAMPLE (UG/L)	39390				4	< 0 2	< 0 2				4	< 0 06	<	0 2
ETHION IN WHOLE WATER SAMPLE (UG/L)	39398										4	< 81		661
TOXAPHENE IN WHOLE WATER SAMPLE (UG/L)	39400				4	< 5	< 5				4	< 0 53	<	5
HEPTACHLOR IN WHOLE WATER SAMPLE (UG/L)	39410				4	< 0 02	< 0 02				6	< 0 02	<	0 11
HEPTACHLOR EPOXIDE IN WHOLE WATER SAMPLE (UG/L)	39420				4	< 0 06	< 0 06				6	< 0 05		0 11
METHOXYCHLOR IN WHOLE WATER SAMPLE (UG/L)	39480				4	< 0 5	< 0 5				6	< 0 1	<	1 1
PCB 1221 IN THE WHOLE WATER SAMPLE UG/L	39488										4	< 0 65	<	1
PCB 1232 PCB SERIES WHOLE WATER SAMPLE UG/L	39492										4	< 0 65	<	1
PCB 1242 PCB SERIES WHOLE WATER SAMPLE UG/L	39496										4	< 0 65	<	1
PCB 1248 PCB SERIES WHOLE WATER SAMPLE UG/L	39500										4	< 0 65	<	1
PCB 1254 PCB SERIES WHOLE WATER SAMPLE UG/L	39504										4	< 0 65	<	1
PCB 1260 PCB SERIES WHOLE WATER SAMPLE UG/L	39508										4	< 0 65	<	1
PCBS IN WHOLE WATER SAMPLE (UG/L)	39516				4	< 1	< 1				5	< 1		2
MALATHION IN WHOLE WATER SAMPLE (UG/L)	39530				4	< 0 4	< 0 4				6	< 0 1		1 4
PARATHION IN WHOLE WATER SAMPLE (UG/L)	39540				4	< 0 25	< 0 25				6	< 0 1	<	10
DEMETON IN WHOLE WATER SAMPLE (UG/L)	39560										1	< 0 1	<	0 1
DIAZINON IN WHOLE WATER SAMPLE (UG/L)	39570				4	< 0 3	< 0 3				4	< 0 1	<	10
GUTHION IN WHOLE WATER SAMPLE (UG/L)	39580										4	< 0 4	<	10
METHYL PARATHION IN WHOLE WATER SAMPLE (UG/L)	39600				4	< 0 25	< 0 25							

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HEXACHLOROBENZENE IN WHOLE WATER SAMPLE (UG/L)	39700										4	< 0 02	< 20
2,4-D IN WHOLE WATER SAMPLE (UG/L)	39730				4	< 20	< 20				5	< 1	< 50
2,4,5 T IN WHOLE WATER SAMPLE (UG/L)	39740				4	< 5	< 5				5	< 0 1	< 10
SEVIN IN WHOLE WATER SAMPLE (UG/L)	39750										1	< 5	< 5
MIREX IN WHOLE WATER (UG/L)	39755										3	< 0 2	< 0 4
SILVEX IN WHOLE WATER SAMPLE (UG/L)	39760				4	< 5	< 5				5	< 0 1	< 10
DICOFOL IN WHOLE WATER SAMPLE (UG/L)	39780										3	< 0 8	< 2
LINDANE IN WHOLE WATER SAMPLE (UG/L)	39782				4	< 0 03	< 0 03				6	< 0 03	< 0 11
RESIDUE,TOTAL FILTRABLE (DRIED AT 180C),MG/L	70300	24*	31700	49200	16*	28000	46000	37*	9100	43700	22*	2600	34260
1 BUTANAMINE, N BUTYL N NITROSO TOTWUG/L	73609										3	< 5 2	< 20
ETHANAMINE, N ETHYL-N NITROSO TOTWUG/L	73611										3	< 5 2	< 40
PYRIDINE WHOLE WATER,UG/L	77045										3	< 5 2	< 20
1,2 DIBROMOETHANE WHOLE WATER,UG/L	77651										4	< 2	< 5
2,4,5 TRICHLOROPHENOL WHOLE WATER,UG/L	77687										3	< 11	< 20
1,2,4,5 TETRACHLOROBENZENE WHOLE WATER,UG/L	77734										3	< 5 2	< 40
PENTACHLOROBENZENE WHOLE WATER , UG/L	77793										3	< 0 02	< 40
CRESOL (UG/L)	79778										3	< 5 2	< 60
DURSBAN IN WHOLE WATER SAMPLE (UG/L)	81403										4	< 0 1	< 10
XYLENE WHL WATER SMPL UG/L	81551										4	< 5	< 6
HEXACHLOROPHENE, IN WATER, WHOLE SAMPLE, UG/L	88813										2	< 5 2	< 200
ANTHRACENE TOTWUG/L	34220										4	< 5 2	< 20
SEDIMENT													
NITROGEN,ORG KJEL ,BOT DEPOS (MG/KG N DRY WGT	00626	10	262	14078	12	330	3911	3	309	915	5	13 81	1680
NITROGEN KJELDAHL TOTAL BOTTOM DEP DRY WT MG/KG	00627										1	857	857
PHOSPHORUS,TOTAL, BOTTOM DEPOSIT (MG/KG DRY WGT)	00668	15	2	3620	19	12	3438	12	270	750	6	6 314	820
SULFIDE IN BOTTOM DEPOSITS MG/KG	00747										3	26	1250
Metals													
ARSENIC IN BOTTOM DEPOSITS (MG/KG AS AS DRY WGT)	01003	14* <	0 2	7 8	17* <	0 04	12	13*	1 7	8 1	6	3 239	5 4
BARIUM IN BOTTOM DEPOSITS (MG/KG AS BA DRY WGT)	01008	12*	43	830	16*	11	740	13*	98	2810	2	30	150
BORON IN BOTTOM DEPOSITS (MG/KG AS B DRY WGT)	01023	4	0 69	130	4	1 6	110						
CADMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	01028	14* <	0 2	2	18* <	0 1	3	13* <	0 1	1 1	5	< 0 018	< 5
CHROMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT	01029	15* <	0 8	34	18*	0 6	53	13*	3	23	5	< 5	21
COPPER IN BOTTOM DEPOSITS (MG/KG AS CU DRY WGT)	01043	15* <	0 2	26	19*	1 5	46	13*	4	26	5	< 5	25
LEAD IN BOTTOM DEPOSITS (MG/KG AS PB DRY WGT)	01052	15* <	1	26	19* <	1	20	13* <	1	15	5	< 5	20
MANGANESE IN BOTTOM DEPOSITS (MG/KG AS MN DRY WG	01053	15*	22	670	19*	110	520	13*	109	910	5	94	530
NICKEL, TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	01068	15* <	0 2	18	19* <	0 2	24	13*	3	17	5	< 5	40 8
SILVER IN BOTTOM DEPOSITS (MG/KG AS AG DRY WGT)	01078	14* <	0 2	3 5	19* <	0 2	90	12* <	0 2	6	5	< 0 3	< 5
ZINC IN BOTTOM DEPOSITS (MG/KG AS ZN DRY WGT)	01093	13*	8	110	17*	4	159	13*	31	100	5	6	85
SELENIUM IN BOTTOM DEPOSITS (MG/KG AS SE DRY WT)	01148	7	0 2	2 4	9 <	0 2	0 9	12* <	0 2	1 2	6	0 457	2
MERCURY,TOT IN BOT DEPOS (MG/KG AS HG DRY WGT	71921	15* <	0 02	5	19* <	0 02	1	13*	0 01	0 05	5	0 039	0 31
Organics													
LOSS ON IGNITION, BOTTOM DEPOSITS (MG/KG)	00496	12*	9700	148500	16*	5660	315200	13*	17000	137500	4	4 5	67300
OIL & GREASE (FREON EXTR GRAV METH),BOT DEPOS	00557	11* <	25	13700	15*	210	4080	12*	142	1700	2	600	710
OIL & GREASE (FREON EXTR -IR METHOD),BOT DEPOS	00561	4	90	2300	4 <	100	610				3	68 9	< 500
ACENAPHTYLENE DRY WGTBOTUG/KG	34203										4	< 330	< 3418
ACENAPHTHENE DRY WGTBOTUG/KG	34208										4	< 330	< 3418

* TREND ANALYSES CONDUCTED

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TNRCC Water, Sediment and Tissue Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE			BAFFIN BAY			LOWER LAGUNA MADRE			ARROYO COLORADO				
		No of Samples	Min. Value	Max. Value	No of Samples	Min Value	Max Value	No of Samples	Min Value	Max Value	No of Samples		Min Value		Max Value
ACRYLONITRILE DRY WGTBOTUG/KG	34218										4	<	50	<	6250
ANTHRACENE DRY WGTBOTUG/KG	34223										4	<	330	<	3418
BENZO(B)FLUORANTHENE,SEDIMENTS, DRY WGT,UG/KG	34233										4	<	330	<	3418
BENZENE DRY WGTBOTUG/KG	34237										4	<	5	<	780
BENZO(k)FLUORANTHENE,SEDIMENTS, DRY WGT,UG/KG	34245										4	<	330	<	3418
BENZO A PYRENE DRY WGTBOTUG/KG	34250										4	<	330	<	3418
BIS (CHLOROMETHYL) ETHER DRY WGTBOTUG/KG	34271										1	<	625	<	625
BIS (2 CHLOROETHYL) ETHER DRY WGTBOTUG/KG	34276										3	<	1500	<	3418
BIS (2 CHLOROETHOXY) METHANE DRY WGTBOTUG/KG	34281										4	<	330	<	3418
BIS (2 CHLOROISOPROPYL) ETHER DRY WGTBOTUG/KG	34286										4	<	330	<	3418
BROMOFORM DRY WGTBOTUG/KG	34290										4	<	5	<	780
N BUTYL BENZYL PHTHALATE,SEDIMENTS,DRY WGT,UG/KG	34295										4	<	330	<	3418
CARBON TETRACHLORIDE DRY WGTBOTUG/KG	34299										4	<	5	<	780
CHLOROBENZENE DRY WGTBOTUG/KG	34304										4	<	5	<	780
CHLORODIBROMOMETHANE DRY WGTBOTUG/KG	34309										4	<	5	<	780
CHLOROETHANE DRY WGTBOTUG/KG	34314										4	<	5	<	2000
CHLOROFORM DRY WGTBOTUG/KG	34318										4	<	5	<	780
CHRYSENE DRY WGTBOTUG/KG	34323										4	<	330	<	3418
DICHLOROBROMOMETHANE DRY WGTBOTUG/KG	34330										4	<	5	<	780
DIETHYL PHTHALATE DRY WGTBOTUG/KG	34339										4	<	330	<	3418
DIMETHYL PHTHALATE DRY WGTBOTUG/KG	34344										4	<	330	<	3418
1,2 DIPHENYLHYDRAZINE DRY WGTBOTUG/KG	34349										4	<	660	<	3418
ENDOSULFAN SULFATE DRY WGTBOTUG/KG	34354	1	< 25	< 25							5	<	25	<	210
ETHYLBENZENE DRY WGTBOTUG/KG	34374										4	<	5	<	780
FLUORANTHENE DRY WGTBOTUG/KG	34379										4	<	330	<	3418
FLUORENE DRY WGTBOTUG/KG	34384										4	<	330	<	3418
HEXACHLOROETHANE DRY WGTBOTUG/KG	34399										4	<	330	<	3418
INDENO (1,2,3 CD) PYRENE DRY WGTBOTUG/KG	34406										4	<	330	<	3418
ISOPHORONE DRY WGTBOTUG/KG	34411										4	<	330	<	3418
METHYLENE CHLORIDE DRY WGTBOTUG/KG	34426										4	<	5	<	780
N NITROSODI N PROPYLAMINE DRY WGTBOTUG/KG	34431										4	<	330	<	3418
N NITROSODIPHENYLAMINE DRY WGTBOTUG/KG	34436										4	<	330	<	3418
N NITROSODIMETHYLAMINE DRY WGTBOTUG/KG	34441										4	<	1500	<	3418
NAPHTHALENE DRY WGTBOTUG/KG	34445										4	<	5	<	2000
NITROBENZENE DRY WGTBOTUG/KG	34450										4	<	330	<	3418
PARACHLOROMETA CRESOL DRY WGTBOTUG/KG	34455										2	<	3000	<	8200
PHENANTHRENE DRY WGTBOTUG/KG	34464										4	<	330	<	3418
PYRENE DRY WGTBOTUG/KG	34472										4	<	330	<	3418
TETRACHLOROETHYLENE DRY WGTBOTUG/KG	34478										4	<	5		11000
TOLUENE DRY WGTBOTUG/KG	34483										4	<	5	<	780
TRICHLOROETHYLENE DRY WGTBOTUG/KG	34487										4	<	5	<	780
VINYL CHLORIDE IN BOTTOM DEPOSITS (UG/KG DRYWGT)	34495										4	<	5	<	2000
1,1 DICHLOROETHANE DRY WGTBOTUG/KG	34499										4	<	5	<	780
1,1 DICHLOROETHYLENE DRY WGTBOTUG/KG	34504										4	<	5	<	780
1,1,1 TRICHLOROETHANE DRY WGTBOTUG/KG	34509										4	<	5	<	780
1,1,2 TRICHLOROETHANE DRY WGTBOTUG/KG	34514										4	<	5	<	780
1,1,2,2-TETRACHLOROETHANE DRY WGTGBOTUG/KG	34519										3	<	530	<	780
BENZO(GHI)PERYLENE1,12 BENZOPERYLENDRY WGTBOTUG/	34524										4	<	330	<	3418
BENZO(A)ANTHRACENE1,2 BENZANTHRACENDRYWGTBOTUG/	34529										4	<	330	<	3418
1,2 DICHLOROETHANE DRY WGTBOTUG/KG	34534										4	<	5	<	780
1,2 DICHLOROBENZENE DRY WGTBOTUG/KG	34539										4	<	5	<	2000
TRANS 1,2 DICHLOROETHENE, IN SED DRY WT UG/KG	34544										4	<	5	<	780

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PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE					BAFFIN BAY					LOWER LAGUNA MADRE					ARROYO COLORADO				
		No of Samples		Min Value		Max Value	No. of Samples		Min Value		Max Value	No. of Samples		Min Value		Max Value	No. of Samples		Min Value		Max Value
TRANS 1,2 DICHLOROETHENE, IN SED DRY WT UG/KG	34549																4	<	5	<	780
1,2,4-TRICHLOROBENZENE DRY WGTBOTUG/KG	34554																4	<	5	<	2000
1,2,5,6-DIBENZANTHRACENE DRY WGTBOTUG/KG	34559																4	<	330	<	3418
1,3 DICHLOROBENZENE DRY WGTBOTUG/KG	34569																4	<	5	<	2000
1,4 DICHLOROBENZENE DRY WGTBOTUG/KG	34574																4	<	5	<	2000
2-CHLOROETHYL VINYL ETHER DRY WGTBOTUG/KG	34579																4	<	50	<	7800
2 CHLORONAPHTHALENE DRY WGTBOTUG/KG	34584																4	<	330	<	3418
2 CHLOROPHENOL DRY WGTBOTUG/KG	34589																4	<	330	<	3418
2 NITROPHENOL DRY WGTBOTUG/KG	34594																4	<	330	<	4100
DI N OCTYL PHTHALATE DRY WGTBOTUG/KG	34599																4	<	330	<	3418
2,4-DICHLOROPHENOL DRY WGTBOTUG/KG	34604																4	<	330	<	4100
2,4-DIMETHYLPHENOL DRY WGTBOTUG/KG	34609																4	<	330	<	4100
2,4 DINITROTOLUENE DRY WGTBOTUG/KG	34614																4	<	330	<	3418
2,4-DINITROPHENOL DRY WGTBOTUG/KG	34619																4	<	1650	<	17090
2,4,6-TRICHLOROPHENOL DRY WGTBOTUG/KG	34624																4	<	330	<	4100
2,6-DINITROTOLUENE DRY WGTBOTUG/KG	34629																4	<	330	<	3418
3,3' DICHLOROBENZIDINE DRY WGTBOTUG/KG	34634																3	<	660	<	34180
4-BROMOPHENYL PHENYL ETHER DRY WGTBOTUG/KG	34639																4	<	330	<	3418
4-CHLOROPHENYL PHENYL ETHER DRY WGTBOTUG/KG	34644																4	<	330	<	3418
4-NITROPHENOL DRY WGTBOTUG/KG	34649																4	<	1650	<	17090
DNOC (4,6-DINITRO ORTHO CRESOL) DRY WGTBOTUG/KG	34660																4	<	660	<	8200
PHENOL(C6H5OH) SINGLE COMPOUND DRY WGTTUGL/KG	34695																4	<	330	<	3418
TRANS 1,3 DICHLOROPROPENE SEDIMENT DRY WGT UG/KG	34697																4	<	5	<	780
CIS 1,3 DICHLOROPROPENE SEDIMENT DRY WEIGHT UG/K	34702																4	<	5	<	780
PENTACHLOROPHENOL IN BOT DEPOS UG/KG DRY SOL	39061	5	<	5	<	5						4	<	5	<	5	9	<	5	<	8200
CHLORDANE CIS ISOMER BOTTOM DEPOSITS(UG/KG DRY)	39064	4	<	3	<	3						4	<	3	<	3	4	<	3	<	3
CHLORDANE TRANS ISOMER BOTTOM DEPOSITS UG/KG DRY	39067	4	<	3	<	3						4	<	3	<	3	4	<	3	<	3
CHLORDANE NONACHLOR,TRANS ISO BOT DEPOS (UG/KG)	39073	4	<	3	<	3						4	<	3	<	3	4	<	3	<	3
BHC ALPHA ISOMER, BOTTOM DEPOS UG/KG DRY SOLIDS	39076	4	<	1	<	1						4	<	1	<	1	8	<	1	<	210
DIETHYLHEXYL PHTHALATE IN BOT DEP (UG/KG DRY)	39102						4	<	300	<	300	2	<	300	<	300	6	<	300	<	3418
DIBUTYL PHTHALATE IN BOT DEPOSITS (UG/KG DRY)	39112						4	<	50		146	2	<	50	<	50	6	<	50	<	3418
PENTACHLOROBENZENE IN SEDIMENT UG/KG	39118																3	<	1 2	<	660
BENZIDINE IN BOTTOM DEPOS UG/KG DRY SOLIDS	39121																3	<	330	<	34180
P,P' DDT IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39301	3	<	3	<	3						4	<	3	<	3	4	<	3	<	3
O,P' DDT IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39306	4	<	3	<	3						4	<	3	<	3	4	<	3	<	3
P,P DDD IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39311	4	<	3	<	3						4	<	3	<	3	4	<	3	<	3
O,P DDD IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39316	3	<	3	<	3						4	<	3	<	3	4	<	3	<	3
P,P DDE IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39321	4	<	1 5	<	1 5						4	<	1 5	<	1 5	4	<	1 5		2 2
O,P' DDE IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39328	4	<	1 5	<	1 5						4	<	1 5	<	1 5	4	<	1 5	<	1 5
ALDRIN IN BOTTOM DEPOS (UG/KILOGRAM DRY SOLIDS)	39333	14		0	<	1	6		0	<	1	7	<	0 5	<	1	16	<	0 5		21
CHLORDANE IN BOT DEPOS (UG/KILOGRAM DRY SOLIDS	39351	14		0	<	20	6		0		20	7	<	3	<	10	16	<	3		20
DDD IN BOTTOM DEPOS (UG/KILOGRAM DRY SOLIDS)	39363	13		0	<	8	6		0	<	3	7	<	3	<	8	16	<	3	<	210
DDE IN BOTTOM DEPOS (UG/KILOGRAM DRY SOLIDS)	39368	14		0	<	6 5	6		0		4 8	7	<	1 5	<	6 5	15	<	1 5		70
DDT IN BOTTOM DEPOS (UG/KILOGRAM DRY SOLIDS)	39373	15		0	<	8	6		0		5	7	<	3	<	8	16	<	3	<	210
DIELDRIN IN BOTTOM DEPOS (UG/KILOGRAM DRY SOL)	39383	14		0	<	3	6		0		3	7	<	2	<	2	16	<	2	<	210
ENDOSULFAN IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39389																4	<	5 3	<	210
ENDRIN IN BOTTOM DEPOS (UG/KILOGRAM DRY SOLIDS)	39393	14		0	<	3	6		0	<	3	7	<	3	<	3	16	<	2 9	<	210
TOXAPHENE IN BOTTOM DEPOS (UG/KILOGRAM DRY SOL	39403	14		0	<	50	6		0	<	50	7	<	50	<	50	16	<	50	<	1600
HEPTACHLOR IN BOT DEP (UG/KILOGRAM DRY SOLIDS)	39413	14		0	<	1	6		0		1	7	<	0 5	<	0 5	16	<	0 5	<	210
HEPTACHLOR EPOXIDE IN BOT DEP (UG/KG DRY SOL)	39423	14		0	<	1	6		0	<	1	7	<	1	<	1	16	<	1	<	210
METHOXYCHLOR IN BOTTOM DEPOSITS (UG/KG DRY SOL)	39481	14		0	<	20	6		0		20	7	<	10	<	10	16	<	10		20
PCB 1221 BOT DEP ,PCB SERIES DRY SOL UG/KG	39491																4	<	33	<	2110

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PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE					DAFFIN BAY					LOWER LAGUNA MADRE					ARROYO COLORADO				
		No of Samples		Min Value		Max Value	No. of Samples		Min. Value		Max. Value	No of Samples		Min Value		Max. Value	No. of Samples		Min. Value		Max Value
PCB 1232 BOT DEP ,PCB SERIES DRY SOL UG/KG	39495																4	<	33	<	2110
PCB 1242 BOT DEP ,PCB SERIES DRY SOL UG/KG	39499																4	<	33	<	2110
PCB 1248 IN BOTTOM DEPOS DRY SOLIDS UG/KG	39503																4	<	33	<	2110
AROCLOR 1254 IN BOTTOM DEPOS (UG/KG DRY SOLIDS)	39507																4	<	33	<	2110
PCB 1260 IN BOTTOM DEPOS DRY SOLIDS UG/KG	39511																4	<	33	<	2110
PCB 1016 IN BOTTOM SEDIMENTS DRY WT UG/KG	39514																4	<	33	<	2110
PCBS IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39519	14	<	20		147	6	<	20		120	7	<	20		185	14	<	20		31
MALATHION IN BOT DEPOS (UG/KILOGRAM DRY SOLIDS	39531	6		0	<	5	5		0	<	5	6	<	5	<	5	11	<	5	<	225
PARATHION IN BOT DEPOS (UG/KILOGRAM DRY SOLIDS	39541	14		0	<	5	6		0		5	7	<	3	<	3	16	<	3		5
DIAZINON IN BOT DEPOS (UG/KILOGRAM DRY SOLIDS)	39571	14		0	<	5	6		0		5	7	<	5		15	15	<	5		5
GUTHION IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39581																2	<	10	<	225
METHYL PARATHION IN BOT DEPOS (UG/KG DRY SOLIDS	39601	13		0	<	5	6		0		5	7	<	3	<	3	11	<	3		5
HEXACHLOROBENZENE IN BOT DEPOS UG/KG DRY SOLIDS	39701	5	<	1	<	1						4	<	1	<	1	9	<	1	<	3418
HEXACHLOROBUTADIENE IN BOT DEPOS (UG/KG DRY W	39705																4	<	5	<	4100
2,4-D IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39731	5	<	50	<	50						4	<	50	<	50	9	<	15	<	150
2,4,5 T IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39741	5	<	5	<	10						4	<	10	<	10	9	<	0 5	<	29
SILVEX IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39761	7		0	<	20	2		0		20	4	<	10	<	10	11	<	1 5		20
LINDANE IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39783	14		0	<	1	6		0	<	1	7	<	1	<	1	16	<	1	<	210
XYLENE SEDIMENT,DRY WGT,UG/KG	45510																4	<	5	<	2300
BETA BHC IN SOIL (UG/KG DRY WGT)	46290																4	<	1 7		47
DELTA BHC IN SOIL (NG/G DRY WGT)	46292																4	<	1 7	<	210
HEXACHLOROPHENE,DRY WEIGHT, SEDIMENT UG/KG	73120																2	<	1500	<	3300
N NITROSO DI N BUTYLAMINE, DRY WT,SEDIMENT UG/KG	73159																3	<	330	<	2000
2,4,5 TRICHLOROPHENOL IN SEDIMENT,DRY WEIGHT,UG/	78401																3	<	330	<	4100
DICOFOL (KELTHANE) SEDIMENT, DRY, WT, UG/KG	79799																3		11 2	<	83
MIREX SEDIMENT, DRY, WT, UG/KG	79800																3	<	5 9	<	13 3
SOLIDS IN SEDIMENT, PERCENT BY WEIGHT (DRY)	81373																5		34 72		53 3
DURSBAN BOTTOM DEPOSITS DRY WGT UG/KG	81404																4	<	2 9	<	225
SEVIN IN SEDIMENT DRY WEIGHT UG/KG	81818																1	<	167	<	167
TOTAL ORGANIC CARBON IN SEDIMENT DRY WGT MG/KG	81951																4		4		10840
DEMETON IN SEDIMENT (SYSTOX) DRY WEIGHT UG/KG	82400																2	<	5	<	225
BROMOMETHANE IN SEDIMENT, UG/KG	88802																4	<	5	<	2000
1,2 DIBROMOETHANE SEDIMENT, DRY WEIGHT UG/KG	88805																4	<	5	<	780
CRESOL IN SEDIMENT, DRY WEIGHT, UG/KG	88811																4	<	990	<	4100
N NITROSODIETHYLAMINE, SED DRY WT UG/KG	88817																3	<	660	<	2000
PYRIDINE SEDIMENT DRY WEIGHT UG/KG	88823																3	<	330	<	2000
1,2,4,5 TETRACHLOROBENZENE SEDIMENT DRY WT UG/KG	88826																3	<	660	<	2000
CHLOROMETHANE SEDIMENT DRY,WEIGHT,UG/KG	88835																4	<	5	<	2000
TISSUE																					
Metals																					
ARSENIC TOTAL IN FISH OR ANIMAL WET WGT (MG/KG)	01004	6	<	0 3	<	0 5						4	<	2 3		3 9	2	<	0 4	<	0 4
SELENIUM, TOTAL IN FISH OR ANIMALS WET WGT MG/KG	01149	6		0 47		0 79											2		0 52		0 67
MERCURY,TOTAL IN FISH OR ANIMAL-WET WEIGHT BASIS	71930	6		0 046		0 22						4		0 08		0 26	2		0 058		0 115
LEAD,TOTAL IN FISH OR ANIMALS WET WEIGHT BASIS	71936	6	<	1 5	<	1 6						4	<	0 6	<	0 7	2	<	1 7	<	1 8
COPPER,TOTAL IN FISH OR ANIMALS WET WEIGHT BASIS	71937	6	<	0 6		1 96						4		0 68		1 1	2	<	0 7		0 77
CHROMIUM,TOT IN FISH OR ANIMALS WET WEIGHT BASIS	71939	6	<	0 6		1 1						4	<	0 6	<	0 7	2	<	0 7		0 95
CADMIUM,TOTAL IN FISH OR ANIMAL WET WEIGHT BASIS	71940	6	<	0 3	<	0 4						4	<	0 3	<	0 4	2	<	0 4	<	0 4

* TREND ANALYSES CONDUCTED

TABLE 7
TNRCC Water, Sediment and Tissue Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE No. of Samples	Min Value	Max. Value	BAFFIN BAY No of Samples	Min Value	Max Value	LOWER LAGUNA MADRE No of Samples	Min. Value	Max. Value	ARROYO COLORADO No of Samples	Min Value	Max Value
Organics													
PHENOLICS, TISSUE, WET WEIGHT, MG/KG	32734							4	< 0 4	< 0 4			
ACENAPHTHYLENE, TISSUE, WET WEIGHT, MG/KG	34204							4	< 0 2	< 0 2			
ACENAPHTHENE, TISSUE, WET WEIGHT, MG/KG	34209							4	< 0 2	< 0 2			
ANTHRACENE, TISSUE, WET WEIGHT, MG/KG	34224							4	< 0 2	< 0 2			
BENZIDINE, TISSUE, WET WEIGHT, MG/KG	34241							4	< 0 2	< 0 2			
BENZO(K)FLUORANTHENE, TISSUE, WET WEIGHT, MG/KG	34246							4	< 0 2	< 0 2			
BENZO A PYRENE, TISSUE, WET WEIGHT, MG/KG	34251							4	< 0 2	< 0 2			
B BHC BETA, WET WGT TIS MG/KG	34258							4	< 0 2	< 0 2			
DELTA BENZENE HEXACHLORIDE, WET WGT TIS MG/KG	34263							4	< 0 2	< 0 2			
BIS (2 CHLOROETHYL) ETHER, TIS, WET WGT, MG/KG	34277							4	< 0 2	< 0 2			
BIS (2 CHLOROETHOXY) METHANE, TIS,WET WGT, MG/KG	34282							4	< 0 2	< 0 2			
BIS (2 CHLOROISOPROPYL) ETHER, TIS,WET WGT,MG/KG	34287							4	< 0 2	< 0 2			
CHRYSENE, TISSUE, WET WEIGHT, MG/KG	34324							4	< 0 2	< 0 2			
DIETHYL PHTHALATE, TISSUE, WET WEIGHT, MG/KG	34340							4	< 0 2	< 0 2			
DIMETHYL PHTHALATE, TISSUE, WET WEIGHT, MG/KG	34345							4	< 0 2	< 0 2			
1,2 DIPHENYLHYDRAZINE, TISSUE, WET WEIGHT, MG/KG	34350							4	< 0 2	< 0 2			
ENDOSULFAN SULFATE, TISSUE, WET WEIGHT, MG/KG	34355							4	< 0 2	< 0 2			
ENDOSULFAN,BETA TISSUE, WET WEIGHT, MG/KG	34360							4	< 0 2	< 0 2			
ENDRIN ALDEHYDE, WET WGT,TISSUE, MG/KG	34370							4	< 0 2	< 0 2			
FLUORANTHENE, TISSUE, WET WEIGHT, MG/KG	34380							4	< 0 2	< 0 2			
FLUORENE, TISSUE, WET WEIGHT, MG/KG	34385							4	< 0 2	< 0 2			
HEXACHLOROCYCLOPENTADIENE WET WGTTOS,GLG	34389										4	< 330	< 8200
HEXACHLOROCYCLOPENTADIENE, TIS, WET WGT, MG/KG	34390							4	< 0 2	< 0 2			
HEXACHLOROETHANE, TISSUE, WET WEIGHT, MG/KG	34400							4	< 0 2	< 0 2			
INDENO(1,2,3 CO) PYRENE, TISSUE, WET WEIGHTMG/KG	34407							4	< 0 2	< 0 2			
ISOPHORONE, TISSUE, WET WEIGHT, MG/KG	34412							4	< 0 2	< 0 2			
N NITROSODI N PROPYLAMINE, TIS,WET WGT, MG/KG	34432							4	< 0 2	< 0 2			
N NITROSODIPHENYLAMINE, TISS, WET WEIGHT, MG/KG	34437							4	< 0 2	< 0 2			
N NITROSODIMETHYLAMINE, TISS , WET WGT, MG/KG	34442							4	< 0 2	< 0 2			
NAPHTHALENE, TISSUE, WET WEIGHT, MG/KG	34446							4	< 0 2	< 0 2			
NITROBENZENE, TISSUE, WET WEIGHT, MG/KG	34451							4	< 0 2	< 0 2			
PHENANTHRENE, TISSUE, WET WEIGHT, MG/KG	34465							4	< 0 2	< 0 2			
PYRENE, TISSUE, WET WEIGHT, MG/KG	34473							4	< 0 2	< 0 2			
BENZO(A)ANTHRACENE1,2 BENZANTHRACEN,TIS,WT,MG/KG	34530							4	< 0 2	< 0 2			
1,2 DICHLOROBENZENE, TISSUE, WET WEIGHT, MG/KG	34540							4	< 0 2	< 0 2			
1,2,4-TRICHLOROBENZENE, TISS, WET WEIGHT, MG/KG	34555							4	< 0 2	< 0 2			
1,3 DICHLOROBENZENE, TISSUE, WET WEIGHT, MG/KG	34570							4	< 0 2	< 0 2			
1,4-DICHLOROBENZENE, TISSUE, WET WEIGHT, MG/KG	34575							4	< 0 2	< 0 2			
2 CHLORONAPHTHALENE, TISSUE, WET WEIGHT, MG/KG	34585							4	< 0 2	< 0 2			
2 NITROPHENOL, TISSUE, WET WEIGHT, MG/KG	34595							4	< 0 4	< 0 4			
DI N OCTYL PHTHALATE, TISSUE, WET WEIGHT, MG/KG	34600							4	< 0 2	< 0 2			
2,4-DICHLOROPHENOL, TISSUE, WET WEIGHT, MG/KG	34605							4	< 0 4	< 0 4			
2,4-DIMETHYLPHENOL, TISSUE, WET WEIGHT, MG/KG	34610							4	< 0 4	< 0 4			
2,4-DINITROTOLUENE, TISSUE, WET WEIGHT, MG/KG	34615							4	< 0 2	< 0 2			
2,4-DINITROPHENOL, TISSUE, WET WEIGHT, MG/KG	34620							4	< 0 4	< 0 4			
2,4,6-TRICHLOROPHENOL, TISSUE, WET WEIGHT, MG/KG	34625							4	< 0 4	< 0 4			
2,6-DINITROTOLUENE, TISSUE, WET WEIGHT, MG/KG	34630							4	< 0 2	< 0 2			
3,3' DICHLOROBENZIDINE, TISS, WET WEIGHT, MG/KG	34635							4	< 0 2	< 0 2			
4-BROMOPHENYL PHENYL ETHER, TIS, WET WGT, MG/KG	34640							4	< 0 2	< 0 2			
4-CHLOROPHENYL PHENYL ETHER, TIS, WET WGT, MG/KG	34645							4	< 0 2	< 0 2			

* TREND ANALYSES CONDUCTED

TABLE 7
TNRCC Water, Sediment and Tissue Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE					BAFFIN BAY					LOWER LAGUNA MADRE					ARROYO COLORADO				
		No of Samples		Min Value		Max Value	No of Samples		Min Value		Max Value	No of Samples		Min. Value		Max. Value	No of Samples		Min Value		Max Value
4-NITROPHENOL, TISSUE, WET WEIGHT, MG/KG	34650											4	<	0 4	<	0 4					
ALDRIN IN FISH TISSUE WET WT UG/G	34680	5	<	0 002	<	0 002	1	<	0 002	<	0 002	6	<	0 001	<	2	2	<	0 002	<	0 002
CHLORDANE TOT (TECH MIX & METABS) TISS WET UG/G	34682	5	<	0 01	<	0 02	1	<	0 02	<	0 02	6	<	0 005	<	0 02	2	<	0 02	<	0 02
DI N BUTYL PHTHALATE, TISSUE, WET WEIGHT, MG/KG	34683											4	<	0 2	<	0 2					
ENDRIN IN TISSUE, WET WEIGHT (MG/KG)	34685	5	<	0 006	<	0 006	1	<	0 006	<	0 006	6	<	0 003		0 035	7	<	0 006		0 113
HEPTACHLOR EPOXIDE TISSUE WET WT UG/G	34686	5	<	0 004	<	0 004	1	<	0 004	<	0 004	4	<	0 004	<	0 004	2	<	0 004	<	0 004
HEPTACHLOR IN FISH TISSUE, UG/G WET WT	34687	5	<	0 002	<	0 002	1	<	0 002	<	0 002	4	<	0 002	<	0 002	2	<	0 002	<	0 002
HEXACHLOROBENZENE IN TISSUE, WET WEIGHT (MG/KG)	34688	5	<	0 002	<	0 002	1	<	0 002	<	0 002	6	<	0 001	<	0 002	2	<	0 002	<	0 002
TOXAPHENE IN FISH TISSUE,UG/G WET WT	34691	5	<	0 1	<	0 1	1	<	0 1	<	0 1	4	<	0 1	<	0 1	18	<	0 1		18 605
KETO ENDRIN IN ORGANISMS, WET WT (UG/KG)	38924																2		94		144
PENTACHLOROPHENOL IN TISSUE (UG/G)	39060											4	<	0 4	<	0 4					
CHLORDANE CIS ISOMER,TISSUE WET WGT (UG/G)	39063	3	<	0 01	<	0 01	1	<	0 01	<	0 01	6	<	0 005	<	0 005	1	<	0 01	<	0 01
CHLORDANE TRANS ISOMER,TISSUE WET WGT (UG/G)	39066	3	<	0 01	<	0 01	1	<	0 01	<	0 01	6	<	0 005	<	0 005	1	<	0 01	<	0 01
CHLORDANE NONACHLOR,TRANS ISO,TISSUE WETWGT UG/G	39072	3	<	0 01	<	0 01	1	<	0 01	<	0 01	6	<	0 005	<	0 005	1	<	0 01	<	0 01
BHC ALPHA ISOMER, TISSUE (UG/G WET WT)	39074	3	<	0 002	<	0 002	1	<	0 002	<	0 002	6	<	0 001	<	0 002	1	<	0 002	<	0 002
BHC GAMMA ISOMER, TISSUE WET WGT (UG/G)	39075	5	<	0 002	<	0 002	1	<	0 002	<	0 002	6	<	0 001	<	0 002	2	<	0 002	<	0 002
BIS(2 ETHYLHEXYL)PHTHALATE,TISS,WET WEIGHT,MG/KG	39099											4	<	0 2	<	0 2					
P,P' DDT IN TISSUE, WET WEIGHT (MG/KG)	39302	3	<	0 01	<	0 01	1	<	0 01	<	0 01	6	<	0 005	<	0 01	1	<	0 01	<	0 01
O,P DDT IN TISSUE, WET WEIGHT (UG/G)	39307	3	<	0 01	<	0 01	1	<	0 01	<	0 01	6	<	0 005	<	0 01	1	<	0 01	<	0 01
P,P' DDD IN TISSUE, WET WEIGHT (MG/KG)	39312	3	<	0 01	<	0 01	1	<	0 01	<	0 01	6	<	0 003	<	0 01	1	<	0 01	<	0 01
P,P' DDE IN TISSUE, WET WEIGHT (MG/KG)	39322	3		0 007		0 01	1		0 006		0 006	6	<	0 002		0 056	1		0 02		0 02
O,P DDD IN TISSUE, WET WGT (UG/G)	39325	3	<	0 01	<	0 01	1	<	0 01	<	0 01	6	<	0 005	<	0 01	1	<	0 01	<	0 01
O,P DDE IN TISSUE, WET WGT (UG/G)	39329	3	<	0 005	<	0 005	1	<	0 005	<	0 005	6	<	0 005	<	0 005	1	<	0 005	<	0 005
DDE IN SHELLFISH OR ANIMAL (UG/KG WET WEIGHT)	39369																12		29		7890
DDT SUM ANALOGS IN TISSUE WET WT BASIS (UG/G)	39376	4	<	0 02	<	0 02	1	<	0 02	<	0 02	4	<	0 01	<	0 01	11		0 019		0 524
DIELDRIN IN AQ ORGANISMS WT WT BASIS (UG/G)	39406	5	<	0 006	<	0 006	1	<	0 006	<	0 006	6	<	0 003	<	0 074	10	<	0 006		0 51
PCBS FISH TISSUE WET UG/G	39515	5	<	0 04	<	0 04	1	<	0 04	<	0 04	6	<	0 004	<	0 04	2	<	0 04	<	0 04
HEXACHLOROBUTADIENE IN TISSUE,WET WGT (UG/KG)	39704											4	<	200	<	200					
DIPHENYLAMINE, TISSUE, WET WEIGHT, MG/KG	78877											4	<	0 2	<	0 2					
CHLOROPHENOL, TISSUE, WET WEIGHT, MG/KG	79035											4	<	0 4	<	0 4					
4-CHLORO 3 CRESOL, TISSUE, WET WEIGHT, MG/KG	79036											4	<	0 4	<	0 4					
2,6-DINITRO 2 CRESOL, TISSUE, WET WEIGHT, MG/KG	79037											4	<	0 4	<	0 4					
BUTYLBENZYL PHTHALATE, TISSUE, WET WEIGHT, MG/KG	79038											4	<	0 2	<	0 2					
BENZO(J)FLUORANTHENE, TISSUE, WET WEIGHT, MG/KG	79039											4	<	0 2	<	0 2					
DIBENZ(A,H)ANTHRACENE, TISSUE, WET WEIGHT, MG/KG	79040											4	<	0 2	<	0 2					
BENZO(GHI)PERYLENE, TISSUE, WET WEIGHT, MG/KG	79041											4	<	0 2	<	0 2					
METHOXYCHLOR IN FISH TISSUE, UG/G WET WEIGHT	81644	5	<	0 03	<	0 03	1	<	0 03	<	0 03	6	<	0 02	<	0 03	2	<	0 03	<	0 03
DDE TOTAL IN TISSUE WET WT UG/G	81896	5		0 007		0 01	1		0 006		0 006	4	<	0 005		0 056	12	<	0 01		3 46
DDD TOTAL IN TISSUE WET WT UG/G	81897	5	<	0 01	<	0 02	1	<	0 02	<	0 02	4	<	0 01	<	0 01	13	<	0 017		1 26
DACTHAL IN TISSUE, WET WEIGT, MG/KG	82004																5		0 023		0 159

* TREND ANALYSES CONDUCTED

TABLE 8
USACE Water, Sediment, and Elutriate Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE No. of Samples	Min. Value	Max. Value	LOWER LAGUNA MADRE No. of Samples	Min. Value	Max. Value	ARROYO COLORADO No. of Samples	Min. Value	Max. Value
WATER										
Metals										
ARSENIC, TOTAL (UG/L AS AS)	01002	52	< 1 00	< 2 00	87	< 1.00	4 80	15	< 2 00	< 2.00
BARIUM, TOTAL (UG/L AS BA)	01007				29*	22 20	57 30			
CADMIUM, TOTAL (UG/L AS CD)	01027	52	< 0 10	< 2 00	87	< 0 10	2 00	15	< 2 00	< 2 00
CHROMIUM, TOTAL (UG/L AS CR)	01034	52	< 1 00	< 10 00	87	< 1 00	10 00	15	< 10 00	< 10 00
COPPER, TOTAL (UG/L AS CU)	01042	52	< 1 00	< 1 00	87*	< 1 00	24 00	15	< 1 00	3 80
LEAD, TOTAL (UG/L AS PB)	01051	52	< 1 00	< 5 00	87*	1 00	44.00	15	< 5 00	35 20
MERCURY, TOTAL (UG/L AS HG)	71900	52	< 0.20	< 0 20	87	< 0 20	< 0 20	15	< 0 20	1 00
NICKEL, TOTAL (UG/L AS NI)	01067	52	< 1 00	< 5 00	87*	< 1 00	58 60	15	< 5 00	5 40
SELENIUM, TOTAL (UG/L AS SE)	01147	52	< 2 00	< 2 00	87	< 2 00	2 00	15	< 2.00	< 2 00
SILVER, TOTAL (UG/L AS AG)	01077				29	< 1.00	1 00			
ZINC, TOTAL (UG/L AS ZN)	01092	52*	< 1 00	15 70	87*	< 1 00	362 00	15	< 5 00	9 00
Organics										
ACENAPHTHENE TOTWUG/L	34205	52	< 2 00	< 2 00	87	< 2 00	< 2 00	15	< 2 00	< 2 00
BENZO-A-PYRENE TOTWUG/L	34247	52	< 0 50	< 0 50	87	< 0 50	< 0 50	15	< 0 50	< 0 50
OIL & GREASE (FREON EXTR -GRAV METH) TOT,REC,MG/L	00556				20*	1 60	22 10			
CARBON, TOTAL ORGANIC (MG/L AS C)	00680	30*	1 00	20 70	48*	< 1 00	17250 00	13*	11 30	18 30
CHLORDANE IN WHOLE WATER SAMPLE (UG/L)	39350	52	< 0 02	< 0 14	87	< 0 02	< 0 14	15	< 0 02	< 0 02
DDT IN WHOLE WATER SAMPLE (UG/L)	39370	52	< 0 02	< 0.12	87	< 0.02	< 0 12	15	< 0 02	< 0 02
FLUORANTHENE TOTWUG/L	34376	52	< 0 50	< 0 50	87	< 0.50	< 0 50	15	< 0 50	< 0 50
NAPHTHALENE TOTWUG/L	34696	52	< 2 00	< 2 00	87	< 2 00	< 2.00	15	< 2 00	< 2 00
PCBS IN WHOLE WATER SAMPLE (UG/L)	39516	52	< 0 50	< 0.50	87	< 0 50	< 0.50	15	< 0 50	< 0 50
TOTAL PAH'S (UG/L)	WAPAH	52	< 0 50	< 5.00	87	< 0 50	< 5.00	15	< 0 50	< 5 00
TOXAPHENE IN WHOLE WATER SAMPLE (UG/L)	39400	52	< 0 50	< 0 50	87	< 0.50	< 0 50	15	< 0 50	< 0 50

* TREND ANALYSES CONDUCTED

TABLE 8
USACE Water, Sediment, and Elutriate Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE No. of Samples	Min. Value	Max. Value	LOWER LAGUNA MADRE No. of Samples	Min. Value	Max. Value	ARROYO COLORADO No. of Samples	Min. Value	Max. Value
SEDIMENT										
Metals										
ARSENIC IN BOTTOM DEPOSITS (MG/KG AS AS DRY WGT)	01003	52	< 0 10	< 1 00	87*	< 0 10	2 60	15	< 1 00	1 90
BARIUM IN BOTTOM DEPOSITS (MG/KG AS BA DRY WGT)	01008				29*	5 22	99 12			
CADMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	01028	52	< 0 10	0 50	87	< 0 10	25 90	15	< 0 10	0 90
CHROMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WG	01029	52*	< 1 00	69 60	87*	0 80	15 00	15*	2 80	6 70
COPPER IN BOTTOM DEPOSITS (MG/KG AS CU DRY WGT)	01043	52*	0.40	16 40	87*	0 89	14 87	15*	2 10	6 00
LEAD IN BOTTOM DEPOSITS (MG/KG AS PB DRY WGT)	01052	52*	< 1 00	30 10	87*	0 90	9 10	15*	2 20	6 70
MERCURY,TOT IN BOT DEPOS (MG/KG AS HG DRY WGT	71921	52	< 0 10	< 0 20	87	< 0 10	< 0 20	15	< 0 10	< 0 10
NICKEL, TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	01068	52*	0 40	13 40	87*	0.49	10 94	15*	2 50	5 60
SELENIUM IN BOTTOM DEPOSITS (MG/KG AS SE DRY WT)	01148	52	< 0 10	< 0 50	87	< 0 10	1 00	15	< 0.50	< 0 50
SILVER IN BOTTOM DEPOSITS (MG/KG AS AG DRY WGT)	01078				29	< 0 20	< 0 20			
ZINC IN BOTTOM DEPOSITS (MG/KG AS ZN DRY WGT)	01093	52*	3 30	69 40	87*	< 0 50	51 93	15*	11 60	30 60
Organics										
ACENAPHTHENE DRY WGTBOTUG/KG	34208	52	< 30 00	< 50 00	87	< 30 00	< 50 00	15	< 50 00	< 50 00
BENZO-A-PYRENE DRY WGTBOTUG/KG	34250	52	< 10 00	< 30 00	87	< 10 00	109 00	15	< 10 00	39 00
CHLORDANE IN BOT DEPOS (UG/KILOGRAM DRY SOLIDS	39351	52	< 0 20	< 10 00	87	< 0 20	< 10 00	15	< 0 20	< 0 20
DDT IN BOTTOM DEPOS (UG/KILOGRAM DRY SOLIDS)	39373	52	< 0 20	< 10 00	87	< 0 20	< 10 00	15	< 0 20	< 0 20
FLUORANTHENE DRY WGTBOTUG/KG	34379	52	< 10 00	< 30 00	87	< 10 00	< 30 00	15	< 10 00	35 00
NAPHTHALENE DRY WGTBOTUG/KG	34445	52	< 30 00	< 50 00	87	< 30 00	< 50 00	15	< 50.00	< 50 00
OIL & GREASE (FREON EXTR -IR METHOD),BOT. DEPOS	00561				20*	< 5 00	514 00			
PCBS IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39519	52	< 5 00	< 5 00	87	< 5 00	< 5 00	15	< 5 00	< 5 00
TOTAL ORGANIC CARBON IN SEDIMENT DRY WGT MG/KG	81951	30	32 00	119 00	48*	14 00	823 00	13	< 100 00	< 100 00
TOTAL PAH'S (SEDIMENT)	SEPAH	52	< 0 50	< 0 50	87	< 0 50	< 0 50	15	< 0 50	< 0 50
TOXAPHENE IN BOTTOM DEPOS (UG/KILOGRAM DRY SOL	39403	52	< 5 00	< 50 00	87	< 5 00	< 50 00	15	< 5.00	< 50 00

* TREND ANALYSES CONDUCTED

TABLE 8
USACE Water, Sediment, and Elutriate Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE No. of Samples	Min. Value	Max. Value	LOWER LAGUNA MADRE No. of Samples	Min. Value	Max. Value	ARROYO COLORADO No. of Samples	Min. Value	Max. Value
ELUTRIATE										
Metals										
ARSENIC, TOTAL (UG/L AS AS)	EAS	48	< 1 00	< 1 00	55	< 1 00	< 1 00	13	< 1 00	< 1 00
BARIUM, TOTAL (UG/L AS BA)	EBA				29*	37 20	391 80			
CADMIUM, TOTAL (UG/L AS CD)	ECD	48	< 0 10	< 0 10	55	< 0 10	< 0 10	13	< 0 10	< 0 10
CHROMIUM, TOTAL (UG/L AS CR)	ECR	48	< 1 00	< 1 00	55	< 1 00	10 90	13	< 1 00	< 1 00
COPPER, TOTAL (UG/L AS CU)	ECU	48	< 1 00	< 1 00	55	< 1 00	2 30	13	< 1 00	3 30
LEAD, TOTAL (UG/L AS PB)	EPB	48	< 1 00	< 1 00	55	< 1 00	15 60	13*	< 1 00	39 00
MERCURY, TOTAL (UG/L AS HG)	EHG	48	< 0 20	< 0 20	55	< 0 20	< 0 20	13	< 0 20	1 10
NICKEL, TOTAL (UG/L AS NI)	ENI	48	< 1 00	< 1 00	55	< 1 00	20 10	13	< 1 00	< 1 00
SELENIUM, TOTAL (UG/L AS SE)	ESE	48	< 2 00	< 2 00	55	< 2 00	< 2 00	13	< 2 00	< 2 00
SILVER, TOTAL (UG/L AS AG)	EAG				29	< 1 00	< 1 00			
ZINC, TOTAL (UG/L AS ZN)	EZN	48*	< 1 00	6 50	55*	< 1 00	81 00	13*	< 1 00	14 00
Organics										
ACENAPHTHENE TOTWUG/L	EACN	48	< 2 00	< 2 00	55	< 2 00	< 2 00	13	< 2 00	< 2 00
BENZO-A-PYRENE TOTWUG/L	EBAP	48	< 0 50	< 0 50	55	< 0 50	0 88	13	< 0 50	< 0 50
CARBON, TOTAL ORGANIC (MG/L AS C)	ETOC	30*	< 1 00	24 40	46*	< 1 00	8700 00	13*	11 90	23 00
CHLORDANE IN WHOLE WATER SAMPLE (UG/L)	ECHD	48	< 0 02	< 0 02	55	< 0 02	< 0 02	13	< 0 02	< 0 02
DDT IN WHOLE WATER SAMPLE (UG/L)	EDDT	48	< 0 02	< 0 02	55	< 0 02	< 0 02	13	< 0 02	< 0 02
FLUORANTHENE TOTWUG/L	EFLU	48	< 0 50	< 0 50	55	< 0 50	< 0 50	13	< 0 50	< 0 50
NAPHTHALENE TOTWUG/L	ENAP	48	< 2 00	< 2 00	55	< 2 00	< 2 00	13	< 2 00	< 2 00
PCBS IN WHOLE WATER SAMPLE (UG/L)	EPCB	48	< 0 50	< 0 50	55	< 0 50	< 0 50	13	< 0 50	< 0 50
TOTAL PAH'S (UG/L)	EPAH	48	< 0 50	< 0 50	55	< 0 50	< 0 50	13	< 0 50	< 0 50
TOXAPHENE IN WHOLE WATER SAMPLE (UG/L)	ETOX	48	< 0 50	< 0 50	55	< 0 50	< 0 50	13	< 0 50	< 0 50

* TREND ANALYSES CONDUCTED

TABLE 9
TWDB Water and Sediment Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE			BAFFIN BAY			LOWER LAGUNA MADRE			ARROYO COLORADO		
		No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value
WATER													
WATER TEMP CENT	10	1171	0 23	99 48	294	9 00	30 80	2148	7 50	32 50	274	7 50	31.60
TURBITY JKSN JU	70	302	BDL	375 00	114	BDL	225 00	718	BDL	500 00	60	2.50	140 00
TRANSP SECCHI CM	78	310	20 00	770 00	108	9 00	149 00	633	5 30	252 00	60	16.00	122 00
CNDUCTVY FIELD @25C UMHO	93	482	16000 00	79000 00	156	920 00	75000 00	1198	0 55	75000 00	153	1400.00	61000 00
CNDUCTVY AT @25C UMHO	95	768	0 00	76300 00	201	0 00	85100 00	1143	0 00	72700 00	158	20 20	60800 00
DISSOLVED OXYGEN MG/L	300	1166	0 00	67 40	293	1 80	10 33	2119	0 00	16 50	273	0 00	23 04
DISSOLVED OXYGEN %	301	705	0 00	236 00	174	28 00	149 00	1514	0 00	860 00	189	0 00	1240 00
BOD 5 DAY @20C MG/L	310	87	0 70	8 10	73	BDL	8 60	235	BDL	7 90	60	0.20	9 30
COD 025N K2CR07 MG/L	335	6	29 00	41 00	3	66.00	70 00	13	1 00	42 00	7	17 00	25 00
PH STD U	400	672	4 59	9 00	159	7 60	9 00	1478	6 50	9 30	175	6 80	8 80
PH LAB STD U	403	8	8 10	8 30				8	8 10	8 20			
CARBON DIOX CO2 MG/L	405	9	0 70	1 70	2	3 10	4 30	13	0 80	2 40	1	0.60	0 60
ALKLNTY TOT CACO3 MG/L	410	30	115 00	180 00	3	123 00	203 00	26	107 00	156.00	1	156 00	156 00
HCO3 ION HCO3 MG/L	440	213	40 00	220 00	72	81 00	247 00	283	83 00	427 00	49	138 00	708 00
CO3 ION CO3 MG/L	445	27	BDL	BDL	7	BDL	BDL	24	BDL	BDL	7	BDL	BDL
NITROGEN TOT AS N MG/L	600	86	BDL	2 30	30	BDL	1 90	112	BDL	2 60	31	BDL	4 60
NITROGEN ORGANIC MG/L	605	101	BDL	2 20	30	BDL	1 80	112	BDL	2.30	31	BDL	3 40
AMMONIA NH3-N MG/L	610	346	BDL	0 67	143	BDL	0 44	521	BDL	0 88	91	BDL	6 00
NITRITE NO2-N MG/L	615	346	BDL	0 20	143	BDL	0 07	521	BDL	0 14	92	BDL	0.64
NITRATE NO3-N MG/L	620	318	BDL	1 00	142	BDL	0 20	515	BDL	0 97	92	BDL	3 20
NITROGENTOT KDJ N MG/L	625	279	BDL	4 50	89	BDL	4 60	348	BDL	6 00	59	BDL	3 40
NITRITE + NITRATE MG/L	630	115	BDL	0 31	32	BDL	0 13	116	BDL	1.10	31	BDL	3 40
PHOSPHATE TOT PO4 MG/L	650	8	0 09	0 15	1	0 18	0 18	10	0.12	0.25	2	0 37	1 40
PHOSPHAT TOT WET MG/L	665	346	BDL	0 48	143	0 01	12 00	521	BDL	0 77	92	0 08	3 60
PHOSPHAT ORTHO P MG/L	671	207	BDL	0 18	94	BDL	0 51	350	BDL	0.32	47	0 09	3 60
T O C AS C MG/L	680	238*	2 50	42 00	90*	2 70	31 00	359*	BDL	32 00	67*	2 60	21 00
CARBON DIS ORGAN MG/L	681	2	4 80	8 20	2	8.80	11 00	10	3.40	7 00	4	6 20	9 20
CARBON SUS ORGAN MG/L	689	2	0 30	0 50	2	0.50	0.50	10	0.10	1 00	4	0 20	1 10
HARDNESS AS CACO3 MG/L	900	39	3600 00	8400 00	7	2000 00	8500 00	30	3900 00	7900 00	7	700 00	5200 00
HARDNESS NC CACO3 MG/L	902	38	800 00	8200.00	7	1800 00	8400 00	30	3800 00	7800 00	7	580 00	5000 00
CALCIUM DIS AS CA MG/L	915	62	155.00	1050.00	14	41 00	650 00	58	210 00	530.00	20	87 00	500 00
MAGNSIUM DISS MG MG/L	925	62	334 00	1960 00	14	26 00	1890.00	58	649 00	1700 00	20	38 00	1130 00
SODIUM DISS AS NA MG/L	930	51	6500 00	15000 00	9	3100 00	15000 00	40	6600 00	13100 00	14	560 00	8300 00
NA ABSN RATIO SAR	931	32	46 00	70 00	7	30 00	76 00	30	44 00	64 00	7	8 90	138 00
SODIUM PERCENT %	932	39	46 00	80 00	7	76 00	80 00	30	71 00	80 00	7	61 00	96 00

* TREND ANALYSES CONDUCTED

TABLE 9
TWDB Water and Sediment Parameters for Study Area

		UPPER LAGUNA MADRE			BAFFIN BAY			LOWER LAGUNA MADRE			ARROYO COLORADO		
PARAMETER DESCRIPTION	STORET	No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value
NA PLUS K NA<K MG/L	933	17	2530 00	15700 00	6	130 00	15000 00	23	5680 00	13700 00	6	140 00	9170 00
POTASIUM DIS AS K MG/L	935	47	160 00	650 00	8	70 00	510 00	37	140 00	520 00	12	11 00	300 00
CHLORIDE AS CL MG/L	940	62	4550 00	27900 00	14	240 00	26700 00	58	9800 00	24400 00	22	260 00	16100 00
SULFATE AS SO4 MG/L	945	226	780 00	5131 00	72	55 00	40800 00	289	1225 00	3706 00	49	200 00	2480 00
FLOURIDE DIS AS F MG/L	950	50	0 40	3.80	11	0.20	2 20	45	0 60	3 60	17	0 40	1 50
SILICA DISS SIO2 MG/L	955	91	BDL	9 50	48	2 10	19 00	146	BDL	15 00	34	3 00	33 00
COLIFORMIMEDEND0MF/100ML	31501	7	BDL	39 00	16	BDL	480 00	26	BDL	100 00	8	BDL	260 00
FEC COLIMF-C44 5MF/100ML	31616	8	BDL	4 00	16	BDL	400 00	29	BDL	120 00	12	BDL	210 00
STPCOCCIM-ENTCCSMF/100ML	31679	8	BDL	34 00	16	BDL	290 00	28	BDL	66 00	13	BDL	1100 00
CHLOROPHYL A MG/L	32230	167	BDL	6 50	68	BDL	11 00	252	BDL	8 40	40	BDL	56 00
CHLOROPHYL B MG/L	32231	6	BDL	7 10	10	BDL	17 00	17	BDL	2 60	10	BDL	32 00
CHLOROPHYL C MG/L	32232	6	BDL	11 00	10	BDL	45 00	17	BDL	7 40	10	1 10	98 00
Metals (Total and Dissolved)													
ARSENIC DIS AS AS UG/L	1000	5	BDL	12 00	11*	BDL	17 00	15	BDL	3 00	4	6 00	10 00
ARSENIC TOTAL UG/L	1002	1	3.00	3 00	2	7 00	12 00	2	2.00	3 00	2	3 30	9 00
BARIUM DIS BA AS UG/L	1005				5	200 00	400 00	4	100 00	400 00			
BORON DISS AS B UG/L	1020	6	920 00	6800 00	3	900 00	8100 00	11	2900 00	5200 00	4	460 00	5300 00
CADMIUM DIS AS CD UG/L	1025	9	BDL	BDL	13	BDL	20 00	20	BDL	30 00	6	BDL	2.00
CADIUM TOTAL CD UG/L	1027	1	BDL	BDL	2	BDL	BDL	2	BDL	BDL	1	BDL	BDL
CHROMIUM DISS CR UG/L	1030	7	BDL	BDL	10*	BDL	30.00	19*	BDL	40 00	5	BDL	1 00
CHROMIUM TOTAL UG/L	1034	1	60 00	60.00	2	70 00	80 00	2	30 00	70 00			
COBALT DISS AS CO UG/L	1035	4	BDL	BDL	5	BDL	BDL	10	BDL	1 00	3	BDL	BDL
COBALT TOTAL CO UG/L	1037	1	BDL	BDL	2	BDL	3 00	2	BDL	3 00			
COPPER CU UG/L	1040	9	4 00	14 00	13*	BDL	50 00	20*	BDL	100 00	6	4.00	11 00
COPPER TOTAL CU UG/L	1042	1	13 00	13 00	2	14 00	17 00	2	5 00	8 00			
IRON TOTAL UG/L	1045	5	BDL	310 00	4	BDL	740 00	9	BDL	610 00	2	10 00	80 00
IRON DISS AS FE UG/L	1046	5	BDL	200 00	11*	BDL	210 00	15*	BDL	190 00	4	10 00	170 00
LEAD DISS AS PB UG/L	1049	9	BDL	5 00	13	BDL	4 00	20*	BDL	200 00	6	BDL	4 00
LEAD TOTAL AS PB UG/L	1051	1	3 00	3 00	2	8 00	10 00	2	7 00	9 00			
MANGNESE AS MN UG/L	1055	1	150 00	150 00	2	130 00	150 00	2	82 00	150 00			
MANGNESE DISS MN UG/L	1056	9	BDL	130 00	13*	BDL	120 00	22*	BDL	200 00	6	10 00	2100 00
NICKEL DISS AS NI UG/L	1065	4	BDL	3.00	5	BDL	7 00	10	BDL	3 00	3	3 00	4 00
SILVER DISS AS AG UG/L	1075				5	BDL	1 00	4	BDL	1 00			
STRONTUM DISS SR UG/L	1080	9	2900.00	12000 00	8	470 00	15000.00	18*	9 30	9200 00	6	1700 00	10000 00
ZINC DISS AS ZN UG/L	1090	9	3.00	440 00	13*	2 00	820 00	20*	7 00	80 00	6	8 00	40 00

* TREND ANALYSES CONDUCTED

TABLE 9
TWDB Water and Sediment Parameters for Study Area

		UPPER LAGUNA MADRE			BAFFIN BAY			LOWER LAGUNA MADRE			ARROYO COLORADO		
PARAMETER DESCRIPTION	STORET	No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value
ZINC TOTAL AS ZN UG/L	1092	1	70 00	70 00	2	70 00	80 00	2	60 00	60 00			
ALUMINUM DISS AL UG/L	1106	3	20 00	50 00	2	30 00	50 00	9	20.00	70 00	2	40 00	40.00
LITHIUM DIS AS LI UG/L	1130	9	40 00	280 00	8	10 00	320 00	18*	0 18	240 00	6	50.00	240 00
SELENIUM DISS SE UG/L	1145				5	BDL	1.00	4	BDL	1.00			
Organics													
PHENOLS X*C6H5OH UG/L	32730	27	BDL	5 00	18	BDL	3 00	78	BDL	11 00	23	BDL	19 00
NAPHTHALENES POLY UG/L	39250				2	BDL	BDL	2	BDL	BDL			
ALDRIN WHL SMPL UG/L	39330	4	BDL	BDL	10	BDL	BDL	10	BDL	BDL	5	BDL	BDL
BHC WHL SMPL UG/L	39340	4	BDL	BDL	7	BDL	BDL	9	BDL	BDL	4	BDL	0 01
CHLRDANEWHL SMPL UG/L	39350	4	BDL	BDL	7	BDL	BDL	9	BDL	BDL	3	BDL	0 10
DDD WHL SMPL UG/L	39360	4	BDL	BDL	10	BDL	BDL	10	BDL	BDL	4	BDL	BDL
DDE WHL SMPL UG/L	39365	4	BDL	BDL	10	BDL	BDL	10	BDL	BDL	4	BDL	0.05
DDT WHL SMPL UG/L	39370	4	BDL	BDL	10	BDL	0 01	10	BDL	BDL	5	BDL	BDL
DIELDRINWHL SMPL UG/L	39380	4	BDL	BDL	10	BDL	BDL	10	BDL	BDL	5	BDL	0 02
ENDOSULFAN WH WTR UG/L	39388				3	BDL	BDL	3	BDL	BDL			
ENDRIN WHL SMPL UG/L	39390	4	BDL	BDL	10	BDL	BDL	10	BDL	BDL	5	BDL	BDL
ETHION TOTAL UG/L	39398				3	BDL	BDL	3	BDL	BDL			
TOXPHENE WHL SMPL UG/L	39400	2	BDL	BDL	4	BDL	BDL	5	BDL	BDL			
HCHLR WHL SMPL UG/L	39410	4	BDL	BDL	10	BDL	BDL	10	BDL	BDL	4	BDL	BDL
HCHLR-EPWHL SMPL UG/L	39420	4	BDL	BDL	10	BDL	BDL	10	BDL	BDL	5	BDL	BDL
METHOXYCHLOR WTR UG/L	39480				3	BDL	BDL	3	BDL	BDL			
PCB TOTAL UG/L	39516	4	BDL	0 10	10	BDL	0.10	9	BDL	0 10	5	BDL	0 10
MALATHONWHL SMPL UG/L	39530	4	BDL	BDL	7	BDL	BDL	9	BDL	BDL	4	BDL	0 02
PARATHIO WHL SMPL UG/L	39540	4	BDL	BDL	7	BDL	BDL	9	BDL	BDL	4	BDL	0 02
DIAZINON WHL SMPL UG/L	39570	4	BDL	BDL	7	BDL	0 01	9	BDL	BDL	4	BDL	0 05
MPARATHN WHL SMPL UG/L	39600	4	BDL	BDL	7	BDL	BDL	9	BDL	BDL	4	BDL	0 02
2,4-D WHL SMPL UG/L	39730	5	BDL	0 02	14	BDL	0 05						
2,4,5-T WHL SMPL UG/L	39740	5	BDL	0 01	14	BDL	0 05	18	BDL	0 02	6	BDL	BDL
MIREX WHL SMPL UG/L	39755				3	BDL	BDL	3	BDL	BDL			
SILVEX WHL SMPL UG/L	39760	5	BDL	0 01	14	BDL	BDL	18	BDL	BDL	6	BDL	BDL
LINDANE WHL SMPL UG/L	39782	1	BDL	BDL	1	BDL	BDL	1	BDL	BDL	1	0 01	0.01
METHYL TRITHION TOTAL	39790				3	BDL	BDL	3	BDL	BDL			
RESIDUE AT 180 C MG/L	70300	165*	BDL	51480.00	55*	24210 00	57580 00	219*	BDL	43660 00	28*	3550 00	17770 00

* TREND ANALYSES CONDUCTED

TABLE 9
TWDB Water and Sediment Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE			BAFFIN BAY			LOWER LAGUNA MADRE			ARROYO COLORADO		
		No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value
SEDIMENT													
CYANIDE BOTTOM DEPOSIT	721				2	BDL	BDL	3	BDL	BDL			
Metals													
ARSENIC BOTTOM DEPOSIT	1003				6	0 80	4 90	3	BDL	3 00	1	5 00	5 00
CADIUM BOTTOM DEPOSIT	1028				6	BDL	10 00	3	10 00	10 00	1	BDL	BDL
COBALT BOTTOM DEPOSIT	1038				6	2 10	11 00	3	10 00	10 00	2	1 70	7.40
COPPER BOTTOM DEPOSIT	1043				6	2 70	12 00	3	10 00	10 00	2	7 10	11 00
LEAD BOTTOM DEPOSIT	1052				6	3 00	16 00	3	10 00	10 00	2	2 00	8 80
MAGANESE BOTTOM DEPOST	1053				6	50 00	300 00	3	80 00	290 00	2	320.00	500 00
ZINC BOTTOM DEPOSIT ZN	1093				6	18 00	50 00	3	30 00	80 00	2	56 00	57.00
IRON BOTTOM DEPOSIT	1170				4	3500 00	16000 00				2	17000 00	18000 00
Organics													
PERTHANE TOTAL UG/KG	39034				3	BDL	BDL	3	BDL	BDL			
PCN TOT BOT MAT UG/KG	39251				2	BDL	BDL	2	BDL	BDL			
ALDRIN MUD UG/KG	39333	2	BDL	BDL	16	BDL	0 50	4	BDL	BDL	5	BDL	0 20
BHC MUD UG/KG	39343	2	BDL	BDL	16	BDL	2 00	3	BDL	BDL	3	BDL	2 00
CHLORDAN IN SEDIMENT	39351	2	BDL	BDL	13	BDL	5 00	3	BDL	BDL	2	BDL	1 00
DDD MUD UG/KG	39363	2	BDL	BDL	16	BDL	2 20	4	BDL	BDL	3	1 10	10.00
DDE MUD UG/KG	39368	2	BDL	BDL	16	BDL	5 70	4	0 10	0 84	3	5 10	39.00
DDT MUD UG/KG	39373	2	BDL	BDL	16	BDL	0 50	4	BDL	BDL	3	BDL	0 20
DIELDRIN MUD UG/KG	39383	2	BDL	BDL	16	BDL	0 50	3	BDL	BDL	2	BDL	0 20
ENDOSULN MUD UG/KG	39389				2	BDL	BDL	2	BDL	BDL			
ENDRIN MUD UG/KG	39393	2	BDL	BDL	16	BDL	0 50	4	BDL	BDL	3	BDL	0 20
ETHION BOTTOM DEPOSIT	39399				2	BDL	BDL	3	BDL	BDL			
TOXPHENE MUD UG/KG	39403	1	BDL	BDL	7	BDL	BDL	2	BDL	BDL	3	BDL	0 90
HCHLR MUD UG/KG	39413	2	BDL	BDL	16	BDL	0 50	4	BDL	BDL	3	BDL	0 20
HCHLR-EP MUD UG/KG	39423	2	BDL	BDL	16	BDL	0 50	4	BDL	BDL	3	BDL	0 20
MTHXYCLR MUD DRY UG/KG	39481				3	BDL	0 50	2	BDL	BDL			
PCBS MUD UG/KG	39519	2	BDL	BDL	8	BDL	5 00	2	BDL	BDL	1	BDL	BDL
MALATHION IN SEDIMENT	39531	1	BDL	BDL	4	BDL	BDL	3	BDL	BDL			
PARATHIO IN SEDIMENT	39541	1	BDL	BDL	2	BDL	BDL						
DIAZINON IN SEDIMENT	39571	1	BDL	BDL	4	BDL	BDL	3	BDL	BDL			

* TREND ANALYSES CONDUCTED

TABLE 9
TWDB Water and Sediment Parameters for Study Area

		UPPER LAGUNA MADRE			BAFFIN BAY			LOWER LAGUNA MADRE			ARROYO COLORADO		
PARAMETER DESCRIPTION	STORET	No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value
PARATHIO METHYL SED	39601	1	BDL	BDL	4	BDL	BDL	3	BDL	BDL			
2,4-D MUD UG/KG	39731	1	BDL	BDL	2	BDL	BDL						
2,4,5-T MUD UG/KG	39741	1	BDL	BDL	2	BDL	BDL	18	BDL	0 03	6	BDL	0 02
SILVEX MUD UG/KG	39761	1	BDL	BDL	2	BDL	BDL						
TRITHION TOTAL UG/KG	39786				3	BDL	BDL	3	BDL	BDL			
METHYL TRITHION BOT/DEP	39791				2	BDL	BDL	3	BDL	BDL			

* TREND ANALYSES CONDUCTED
BDL = Below Detection Limits

TABLE 10
USFWS - CCBCS Sediment and Tissue Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE No. of Samples		Min. Value		Max. Value	BAFFIN BAY No of Samples		Min. Value		Max. Value
SEDIMENT											
Metals											
ARSENIC IN BOTTOM DEPOSITS (MG/KG AS AS DRY WGT)	01003	64*		0 40		27 80	59*		0 59		7 95
BARIUM IN BOTTOM DEPOSITS (MG/KG AS BA DRY WGT)	01008	64*		30 30		724 00	59*		19 30		2380 00
BERYLLIUM IN BOTTOM DEPOSITS (MG/KG DRY WGT)	01013	64*	<	0 10		5 00	59*	<	0 10		1 60
BORON IN BOTTOM DEPOSITS (MG/KG AS B DRY WGT)	01023	64*		6 00		343 00	59*		5 00		103 00
CADMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	01028	64*	<	0 20		5 00	59*	<	0 20		1 69
CHROMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT	01029	64*		1 00		31 00	59*		1 00		38 50
COPPER IN BOTTOM DEPOSITS (MG/KG AS CU DRY WGT)	01043	64*		0 73		52 20	59*		0 65		53 10
LEAD IN BOTTOM DEPOSITS (MG/KG AS PB DRY WGT)	01052	64*	<	4 00		79 80	59*	<	4 00		87 30
MANGANESE IN BOTTOM DEPOSITS (MG/KG AS MN DRY WG	01053	64*		13 00		630 00	59*		28 70		554 00
NICKEL, TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	01068	64*	<	1 00		16 00	59*	<	1 00		18 30
SILVER IN BOTTOM DEPOSITS (MG/KG AS AG DRY WGT)	01078	64	<	2 00	<	46 00	59	<	2 00	<	16 00
ZINC IN BOTTOM DEPOSITS (MG/KG AS ZN DRY WGT)	01093	64*		3 80		248 00	59*		3 10		86 30
ANTIMONY IN BOTTOM DEPOSITS (MG/KG AS SB DRY WGT	01098	64*		0 04		0 73	28*		0 05		0 39
ALUMINUM IN BOTTOM DEPOSITS (MG/KG AS AL DRY WGT	01108	64*		814 00		31500 00	59*		1210 00		46900 00
SELENIUM IN BOTTOM DEPOSITS (MG/KG AS SE DRY WT)	01148	64*		0 10		1 90	59*	<	0 10		0 51
IRON IN BOTTOM DEPOSITS (MG/KG AS FE DRY WGT)	01170	64*		683 00		26800 00	59*		821 00		29200 00
THALLIUM IN BOTTOM DEPOSITS (MG/KG DRY WGT)	34480	64	<	0 13	<	4 00	59	<	0 12	<	4 00
MERCURY,TOT IN BOT DEPOS (MG/KG AS HG DRY WGT	71921	64*	<	0 01		0 52	59*	<	0 01		0 32
MAGNESIUM IN BOTTOM DEPOSITS (MG/KG AS MG DRY WGT)	MAGNE	64*		1190 00		43900 00	59*		1170 00		17300 00
MOLYBDENUM IN BOTTOM DEPOSITS (MG/KG AS MO DRY WGT)	MOLYB	64	<	1 00		5 70	59	<	1 00	<	16 00
STRONTIUM IN BOTTOM DEPOSITS (MG/KG AS SR DRY WGT)	STRON	64*		22 30		1780 00	59*		72 90		2170 00
VANADIUM IN BOTTOM DEPOSITS (MG/KG AS V DRY WGT)	VANAD	64*		0 90		50 00	59*		2 10		45 50
Organics											
OIL & GREASE (FREON EXTR IR METHOD),BOT DEPOS	00561	64*	<	50 00		420 00	59*	<	50 00		390 00
ANTHRACENE DRY WGTBOTUG/KG	34223	5	<	0 01	<	0 01	6	<	0 01	<	0 01
BENZO(B)FLUORANTHENE,SEDIMENTS, DRY WGT,UG/KG	34233	5	<	0 01		0 04	6	<	0 01		0 01
BENZO(k)FLUORANTHENE,SEDIMENTS, DRY WGT,UG/KG	34245	5	<	0 01		0 01	6	<	0 01		0 01
BENZO A-PYRENE DRY WGTBOTUG/KG	34250	5	<	0 01		0 02	6	<	0 01	<	0 01
CHRYSENE DRY WGTBOTUG/KG	34323	5	<	0 01		0 03	6	<	0 01		0 02
FLUORANTHENE DRY WGTBOTUG/KG	34379	5	<	0 01		0 03	6	<	0 01	<	0 01

* TREND ANALYSES CONDUCTED

TABLE 10
USFWS - CCBCS Sediment and Tissue Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE No. of Samples		Min. Value		Max. Value	BAFFIN BAY No. of Samples		Min. Value		Max. Value
Sediment Organics (continued)											
FLUORENE DRY WGTBOTUG/KG	34384	5	<	0 01	<	0 01	6	<	0 01	<	0 01
NAPHTHALENE DRY WGTBOTUG/KG	34445	5	<	0 01	<	0 01	6	<	0 01	<	0 01
PHENANTHRENE DRY WGTBOTUG/KG	34464	5	<	0 01	<	0 01	6	<	0 01	<	0 01
PYRENE DRY WGTBOTUG/KG	34472	5	<	0 01		0 05	6	<	0 01	<	0 01
BENZO(GHI)PERYLENE1,12-BENZOPERYLENDRY WGTBOTUG/	34524	5	<	0 01		0 01	6	<	0 01		0 01
BENZO(A)ANTHRACENE1,2-BENZANTHRACENDRYWGTBOTUG/K	34529	5	<	0 01		0 02	6	<	0 01		0 01
BENZO(e)PYRENE IN BOTTOM DEPOSITS (UG/KG - DRY WGT)	BNZEPY	5	<	0 01		0 05	6	<	0 01		0 02
1,2,5,6 DIBENZANTHRACENE IN BOTTOM DEPOSITS (UG/KG - DRY WGT)	DIBEN	5	<	0 01		0 01	6	<	0 01		0 01
ALL ORGANOCHLORINES IN BOTTOM DEPOSITS (UG/KG - DRY WGT)	ORCHL	5	<	0 01	<	0 01	3	<	0 01	<	0 01
alpha-BHC											
beta BHC											
delta-BHC											
gamma-BHC											
Heptachlor epoxide											
HCB											
Total PCBs											
alpha chlordane											
gamma chlordane											
oxychlordane											
trans nonachlor											
cis nonachlor											
Dieldrin											
Endrin											
Mirex											
o,p' - DDE											
o,p' - DDD											
o,p' - DDT											
p,p' - DDE											
p,p' - DDD											
p,p' - DDT											
Toxaphene											
Lindane											
Aldrin											

TABLE 10
USFWS - CCBCS Sediment and Tissue Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE					BAFFIN BAY				
		No. of Samples		Min. Value		Max. Value	No. of Samples		Min. Value		Max. Value
TISSUE											
Metals											
ARSENIC TOTAL IN FISH OR ANIMAL WET WGT (MG/KG)	01004	14	<	0 37		101 74	16		1 07		27 80
NICKEL, TOTAL IN FISH OR ANIMALS WET WT MG/KG	01069	14	<	0 50		7 48	16	<	0 50		4 24
ANTIMONY,TISSUE,WET WEIGHT,MG/KG	01099	7	<	5 00	<	5 00	11	<	5 00	<	5 00
SELENIUM, TOTAL IN FISH OR ANIMALS WET WGT MG/KG	01149	14	<	0 37		3 49	16	<	0 30		4 12
BERYLLIUM,TOTAL IN FISH OR ANIMALS-WET WGT BASIS	34252	14	<	0 05	<	0 10	16	<	0 10		0 41
SILVER IN TISSUE, WET WEIGHT, MG/KG	34474	10	<	0 50	<	3 00	11	<	3 00	<	3 00
MERCURY,TOTAL IN FISH OR ANIMAL WET WEIGHT BASIS	71930	14		0 06		0 86	16	<	0 05		0 49
LEAD,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71936	14	<	0 30		8 54	16	<	1 50		3 40
COPPER,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71937	14		1 16		68 26	16		0 63		69 00
ZINC,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71938	14		14 44		746 00	16		1 20		596 00
CHROMIUM,TOT IN FISH OR ANIMALS-WET WEIGHT BASIS	71939	14	<	0 37		4 94	16		0 80		2 24
CADMIUM,TOTAL IN FISH OR ANIMAL-WET WEIGHT BASIS	71940	14	<	0 10		5 43	16	<	0 10		5 05
ALUMINUM,TOTAL IN FISH OR ANIMALS-WET WGT BASIS	81666	14	<	2 00		450 25	16	<	2 00		1428 00
BARIUM TOTAL IN FISH OR ANIMAL WET WGT (MG/KG)	TBARI	14		3 73		55 22	16		3 65		79 20
BORON TOTAL IN FISH OR ANIMAL WET WGT (MG/KG)	TBORO	14		4 97		275 00	16		5 71		306 00
IRON TOTAL IN FISH OR ANIMAL WET WGT (MG/KG)	TIRON	14		36 20		247 83	16		59 10		1079 00
MAGNESIUM TOTAL IN FISH OR ANIMAL WET WGT (MG/KG)	TMAGN	14		1590 00		9920 00	16		2170 00		12500 00
MANGANESE TOTAL IN FISH OR ANIMAL WET WGT (MG/KG)	TMANG	14		21 60		103 00	16		10 30		140 00
MOLYBDENUM TOTAL IN FISH OR ANIMAL WET WGT (MG/KG)	TMOLY	14	<	0 50		1 98	16		0 17		0 62
STRONTIUM TOTAL IN FISH OR ANIMAL WET WGT (MG/KG)	TSTRO	14		98 70		1950 00	16		38 10		1390 00
TIN TOTAL IN FISH OR ANIMAL WET WGT (MG/KG)	TTIN	3		8 52		52 61					
VANADIUM TOTAL IN FISH OR ANIMAL WET WGT (MG/KG)	TVANA	11	<	0 50		1 81	16	<	0 50		1 65

TABLE 11
NOAA - NS&T Sediment Parameters for Study Area

PARAMETER DESCRIPTION	STORET	LOWER LAGUNA MADRE			ARROYO COLORADO		
		No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value
SEDIMENT							
Metals (ug/g)							
Silver	AG	15*	0 020	0 102	3	0.048	0 127
Aluminum	AL	15*	23598.2	53126.0	3	27106.3	72033 8
Arsenic	AS	15*	2 262	13 200	3	1.719	5 010
Cadmium	CD	15*	0 020	0.221	3	0 082	0 294
Chromium	CR	15*	4 858	30 000			
Copper	CU	15*	3.526	15 159	3	3.330	16 575
Iron	FE	15*	6785 6	23800.0	3	0 756	3 252
Mercury	HG	15*	0.021	0 060	3	0 135	0 285
Manganese	MN	15*	35 587	404 000			
Nickel	NI	15*	2 000	12 476			
Lead	PB	15*	8 778	17 900	3	7 547	17 540
Antimony	SB	6	0 800	0 800			
Selenium	SE	14*	0 048	0 240			
Silicon	SI	9	261324 0	357431 4			
Tin	SN	15*	0.571	5 704	3	0 575	1.833
Thallium	TL	6	0 290	0 489			
Zinc	ZN	15*	18 969	65.499	3	20 372	98 87
ORGANICS (ng/g)							
Acenaphthene	ACENTHE	2	2 500	3 300			
Acenaphthylene	ACENTHY	2	2 500	4.100			
Aldrin	ALDRIN	3	0 020	0 142			
Anthracene	ANTHRA	2	5 000	9 500			
Benz[a]anthracene	BENANTH	3	27 000	37 100			
Benzo[a]pyrene	BENAPY	3	22 000	46 500			
Benzo[e]pyrene	BENEPY	3	23 000	37 000			
Benzo[b]fluoranthene	BENZOBFL	3	47 000	65 100			
Benzo[k]fluoranthene	BENZOKFL	3	6 650	50 300			
Benzo[ghi]perylene	BENZOP	3	18 000	33 500			
Biphenyl	BIPHENYL	2	3 300	5 000			
Chrysene	CHRYSENE	3	33 000	39 800			
cis-Chlordane	CISCDANE	3	0 007	0 020			
2,4'-DDD	DDD24	2	0 071	0 210			
4,4'-DDD	DDD44	3	0 259	0 948			
2,4'-DDE	DDE24	1	0 020	0 020			
4,4'-DDE	DDE44	3	0 165	0 925			
2,4'-DDT	DDT24	3	0 126	0 225			
4,4'-DDT	DDT44	3	0 012	0 182			
Dibenz[a,h]anthracene	DIBENZ	3	9 500	16 900			
Dieldrin	DIELDRIN	3	0 035	0 158			
2,6-Dimethylnaphthalene	DIMETH	2	1 500	3 300			
Fluoranthene	FLUORANT	3	53 500	75 500			
Fluorene	FLUORENE	3	3 000	4 000			

* TREND ANALYSES CONDUCTED

TABLE 11
NOAA - NS&T Sediment Parameters for Study Area

PARAMETER DESCRIPTION	STORET	LOWER LAGUNA MADRE			ARROYO COLORADO		
		No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value
Organics continued (ng/g)							
Heptachlor	HEPTACHL	2	0 014	0 020			
Heptachlorepoxide	HEPTAEPO	2	0 020	0 043			
Hexachlorobenzene	HEXACHL	1	0 020	0 020			
Indeno[1,2,3-cd]pyrene	INDENO	3	22 000	41.000			
Lindane	LINDANE	3	0 007	0 055			
1-Methylnaphthalene	MENAP1	3	1 700	4 500			
2-Methylnaphthalene	MENAP2	3	1 300	4 500			
1-Methylphenanthrene	MEPHEN1	3	2 800	4 500			
Mirex	MIREX	1	0 020	0 020			
Naphthalene	NAPH	2	2 500	4 000			
PC101	PC101	3	0 117	1 229			
PC105	PC105	3	0 081	0 225			
PC118	PC118	3	0 117	1 322			
PC128	PC128	3	0 006	0 049			
PC138	PC138	3	0 197	0 323			
PC153	PC153	3	0 122	0.484			
PC170	PC170	3	0.020	0 204			
PC180	PC180	3	0.034	0 102			
PC187	PC187	3	0.035	0 074			
PC195	PC195	1	0 020	0 020			
PC206	PC206	3	0 005	0 049			
PC209	PC209	3	0 001	0 005			
PCB18	PCB18	3	0 152	4 500			
PCB28	PCB28	3	0 214	3 348			
PCB44	PCB44	3	0 085	1 691			
PCB52	PCB52	3	0 020	6 529			
PCB66	PCB66	3	0.380	3 972			
PCB8	PCB8	3	0 219	1 396			
Perylene	PERYLENE	3	9 000	86 600			
Phenanthrene	PHENANTH	3	6 000	11 000			
Pyrene	PYRENE	3	49 500	94 900			
trans-Nonachlor	TNONCHL	3	0 007	0.069			
Total Organic Carbon	TOC	12*	1000 000	6000 000			
1,6,7-Trimethylnaphthalene	TRIMETH	3	2 000	3 000			

* TREND ANALYSES CONDUCTED

TABLE 12
USEPA - EMAP Water, Sediment and Tissue Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE			LOWER LAGUNA MADRE		
		No. of Samples	Mın. Value	Max. Value	No. of Samples	Min. Value	Max. Value
WATER							
Surface - Dıssolved Oxygen	S-DO	2	5 40	6 00	3	5 30	6.00
Surface - PAR	S-PAR	2	1096 00	1418.00	3	207 00	766 00
Surface - pH	S-PH	2	8 20	8 60	3	8 00	8 70
Surface - salınıty	S-SAL	2	31 65	36 75	3	36.45	36 60
Surface - temperature	S-TEMP	2	29 00	29 65	3	24 70	30 05
Surface - transparency	S-TRNS	2	74 00	91 00	3	42 00	87 00
Bottom - PAR	B-PAR	2	4.00	355 00	3	81 00	213 00
Bottom - dıssolved oxygen	B-DO	2	5.10	6 10	3	5 20	5 90
Bottom - pH	B-PH	2	8.20	8 60	3	8 00	8 70
Bottom - salınıty	B-SAL	2	31 45	36 70	3	36 55	36.70
Bottom - temperature	B-TEMP	2	29 00	29 70	3	24 60	30 10
Bottom - transparency	B-TRNS	2	0 00	23 00	3	8 00	45.00
Average - K	AVG-K	2	0 79	1.82	3	0 62	1 62
Secchı dısk measurement	SECCHI	1	1 00	1 00	1	0 50	0 50
Transparency - 1 meter	TRANS-1MT	2	19 00	23 00	3	22 00	45 00
SEDIMENT							
Metals							
Aluminum	AL	2	38100 00	50800.00	3	28300 00	40900 00
Antımony	SB	2	0.15	0 70	3	0 27	0 47
Arsenıc	AS	2	3 90	9 50	3	3 84	7 40
Cadmıum	CD	2	0 03	0 27	3	0 10	0.37
Chromıum	CR	2	7 10	35 00	3	10 30	13 80
Copper	CU	2	2 10	15 00	3	5 80	6.90
Iron	FE	2	2200 00	21200 00	3	7600 00	12400 00
Lead	PB	2	3 10	14 80	3	8 20	9 00
Manganese	MN	2	36 00	595.00	3	139 00	294 00
Mercury	HG	2	BDL	0 02	3	0 01	0 02
Nıckel	NI	2	2 00	15 80	3	5 70	7 80
Selenıum	SE	2	0 11	0 80	3	0 03	0 43
Sılver	AG	2	0 05	0 09	3	0 06	0 09
Tın	SN	2	0 17	1 40	3	0 52	0 90
Zınc	ZN	2	7 80	64 00	3	22 20	33 90
Organics							
1-METHYLPHENANTHRENE	MEPHEN1	1	5 74	5 74	1	0 10	0 10
2,3,5-TRIMETHYLNAPHTHALENE	TRIMETH	1	9 43	9 43	1	0 10	0 10
2,6-DIMETHYLNAPHTHALENE	DIMETH	1	7 06	7 06	1	0 20	0.20
2-METHYLNAPHTHALENE	MENAP2	1	2 52	2 52	1	0 40	0.40
ACENAPHTHENE	ACENTHE	1	0 77	0 77	1	0 10	0 10
ACENAPHTHYLENE	ACENTHY	1	0 43	0 43	1	0 20	0 20
ALDRIN	ALDRIN	1	BDL	BDL	2	BDL	BDL
ANTHRACENE	ANTHRA	1	2 42	2 42	1	0 10	0 10
Acıd-Volatile Sulfides	AVS_CON	2	0 32	6 57	2	0 46	0 93
BENZO(a)ANTHRACENE	BENANTH	1	4 22	4 22	1	0 20	0 20
BENZO(a)PYRENE	BENAPY	1	3.82	3.82	1	0 30	0 30
BENZO(b)FLUORANTHENE	BENZOBFL	1	7 45	7 45	1	0 40	0.40

TABLE 12
USEPA - EMAP Water, Sediment and Tissue Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE			LOWER LAGUNA MADRE		
		No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value
BENZO(e)PYRENE	BENEPY	1	3 99	3 99	1	0 30	0 30
BENZO(g,h,i)PERYLENE	BENZOP	1	5 16	5 16	1	0 40	0 40
BENZO(k)FLUORANTHENE	BENZOKFL	1	2 77	2 77	1	0 40	0 40
BIPHENYL	BIPHENYL	1	0 77	0 77	1	0 40	0 40
C1-CHRYSENES	C1CHRYS	1	3 73	3 73	1	0 20	0 20
C1-DIBENZOTHIOPHENES	C1DIBENZ	1	6 23	6.23			
C1-FLUORANTHENE PYRENE	C1FLRAN	1	8 48	8 48	1	0 50	0 50
C1-FLUORENES	C1FLUOR	1	6 58	6.58	1	0.30	0 30
C1-NAPHTHALENES	C1NAPH	1	4 08	4.08	1	0 80	0 80
C1-PHENANTHRENES	C1PHENAN	1	18 21	18 21	1	0 60	0 60
C2-CHRYSENES	C2CHRYS	1	2 70	2 70	1	0 40	0 40
C2-DIBENZOTHIOPHENES	C2DIBENZ	1	18 24	18 24	1	0 40	0 40
C2-FLUORENES	C2FLUOR	1	24 73	24 73	1	0 80	0 80
C2-NAPHTHALENES	C2NAPH	1	15 70	15 70	1	0.70	0 70
C2-PHENANTHRENES	C2PHENAN	1	39 68	39 68	1	0.90	0 90
C3-DIBENZOTHIOPHENES	C3DIBENZ	1	17 78	17 78	1	0 50	0 50
C3-FLUORENES	C3FLUOR	1	29 66	29 66	1	2 60	2 60
C3-NAPHTHALENES	C3NAPH	1	41 04	41.04	1	1 60	1 60
C3-PHENANTHRENES	C3PHENAN	1	34 15	34.15	1	0 90	0.90
C4-NAPHTHALENES	C4NAPH	1	43 57	43.57	1	0 70	0.70
C4-PHENANTHRENES	C4PHENAN	1	18 17	18 17	1	0 90	0 90
CHRYSENE	CHRYSENE	1	7.24	7 24	1	0 04	0.04
CIS-NONACHLOR	CISNONA	1	0 01	0 01	1	0 40	0 40
DIBENZO(a,h)ANTHRACENE	DIBENZ	1	0 87	0 87	1	0 10	0 10
DIBENZOTHIOPHENE	DIBENZO	1	1 63	1 63	1	0 10	0 10
DICOFOL	DICOFOL	1	BDL	BDL	3	BDL	0 01
DIELDRIN	DIELDRIN	1	BDL	BDL	2	BDL	BDL
Di-butyl Tin	DBT	2	1 00	2 20	3	BDL	0 06
ENDRIN	ENDRIN	1	BDL	BDL	2	BDL	BDL
FLUORANTHENE	FLUORANT	1	12 52	12.52	1	0 80	0 80
FLUORENE	FLUORENE	1	1 69	1 69	1	0 20	0 20
HEPTACHLOR	HEPTACHL	1	BDL	BDL	2	BDL	BDL
HEPTACHLOR-EPOXIDE	HEPTAEPO	1	BDL	BDL	2	BDL	BDL
HEXACHLOROBENZENE	HEXACHL	2	BDL	0 12	2	BDL	BDL
HIGH MOLECULAR WT - TOT PAH	PAH_HMW	1	66 17	66 17	1	4 70	4 70
LINDANE (gamma-BHC)	LINDANE	2	BDL	0 11	3	BDL	0 07
LOW MOLECULAR WT - TOT PAH	PAH_LMW	1	43 98	43 98	1	3 60	3 60
MIREX	MIREX	1	BDL	BDL	2	BDL	BDL
Mono butyl Tin	MBT	2	BDL	2 00	1	0 19	0.19
NAPHTHALENE	NAPH	1	2 66	2 66	1	1 00	1 00
OXYCHLORDANE	OXYCHL				1	0 01	0 01
OXYFLUORFEN	OXYFL	1	BDL	BDL	2	BDL	BDL
PCB 101	PCB101	2	0 14	0 17	2	BDL	0 33
PCB 105	PCB105	1	BDL	BDL	2	BDL	BDL
PCB 118/108/149	PCB118	2	0 03	0 12	2	BDL	0 15
PCB 126	PCB126	1	BDL	BDL	2	BDL	BDL
PCB 128	PCB128	1	BDL	BDL	2	BDL	BDL
PCB 138	PCB138	2	BDL	0 05	3	BDL	0 13
PCB 153	PCB153	1	BDL	BDL	2	BDL	BDL
PCB 170	PCB170	1	BDL	BDL	2	BDL	BDL
PCB 18	PCB18	1	BDL	BDL	2	BDL	BDL
PCB 180	PCB180	1	BDL	BDL	3	BDL	0 01

TABLE 12
USEPA - EMAP Water, Sediment and Tissue Parameters for Study Area

PARAMETER DESCRIPTION	STORET	UPPER LAGUNA MADRE			LOWER LAGUNA MADRE		
		No. of Samples	Min. Value	Max. Value	No. of Samples	Min. Value	Max. Value
PCB 187/182/159	PCB187	1	BDL	BDL	2	BDL	0 00
PCB 195	PCB195	1	BDL	BDL	3	BDL	0 01
PCB 206	PCB206	1	BDL	BDL	3	BDL	0 04
PCB 209	PCB209	1	BDL	BDL	3	BDL	0 04
PCB 28	PCB28	1	BDL	BDL	3	BDL	0 01
PCB 44	PCB44	2	BDL	0.10	2	BDL	0 15
PCB 52	PCB52	1	0.19	0.19	3	BDL	0.54
PCB 66	PCB66	1	BDL	BDL	2	BDL	0.12
PCB 8	PCB8	1	0 12	0 12	2	BDL	0.22
PCB-200	PCB200	1	BDL	BDL	2	BDL	BDL
PCB-29	PCB29	1	BDL	BDL	2	BDL	BDL
PCB-77	PCB77	1	BDL	BDL	2	BDL	BDL
PCB-87	PCB87	1	BDL	BDL	2	BDL	0 31
PERYLENE	PERYLENE	1	2 30	2 30	1	0.40	0 40
PHENANTHRENE	PHENANTH	1	8 93	8 93	1	0 40	0 40
PHYTANE	PHYTANE	1	251 40	251 40			
PRISTANE	PRISTANE	1	186.00	186 00			
PYRENE	PYRENE	1	11 62	11 62	1	0.70	0 70
TOTAL ALKANES	ALKANE_T	1	8135 31	8135 31	1	233 00	233 00
TOTAL BHC	BHC_TOT	1	0 11	0 11	1	0 16	0 16
TOTAL CHLORDANE	CHL_TOT	1	0 01	0 01	1	0 01	0 01
TOTAL DDT	DDT_TOT	1	0 27	0 27	2	0.14	0 23
TOTAL ISOPRENOIDS	ISOPRN_T	1	437 40	437.40			
TOTAL PAHS	PAH_TOT	1	110 15	110.15	1	8.30	8 30
TOTAL PAHS - LA PROVINCE	PAHTOT_L	1	400 63	400 63	1	20 20	20.20
TOTAL PCBS	PCB_TOT	2	0 32	0 60	3	0 12	1 52
TOTAL PCBS - LA PROVINCE	PCBTOT_L	2	0 32	0 60	3	0 12	1.52
TOXAPHENE	TOXAPHEN	1	BDL	BDL	2	BDL	BDL
TRANS-NONACHLOR	TNONCHL	1	BDL	BDL	2	BDL	BDL
Total Organic Carbon	TOC	2	0 31	3 95	3	0 35	1.43
Tri-butyl Tin	TBT	1	15 00	15 00	3	0.06	15 00
alpha-CHLORDANE	ALPHACHL	1	BDL	BDL	2	BDL	BDL
alpha-ENDOSULFAN	ENDOSUL1	1	BDL	BDL	2	BDL	BDL
beta-BHC	BETABHC				1	0 09	0.09
beta-ENDOSULFAN	ENDOSUL2	1	BDL	BDL	3	BDL	0 04
n-Decane Aliphatic Hydrocarbons	N_DECANE	1	10 05	10 05	1	3 00	3 00
n-Docosane Aliphatic Hydrocarbons	N_DOCOSN	1	54.90	54.90	1	3 00	3.00
n-Dodecane Aliphatic Hydrocarbons	N_DODECA	1	12 36	12 36	1	1 00	1.00
n-Dotriacontane Aliphatic Hydrocarbons	N_DOTRCT	1	138 41	138 41			
n-Eicosane Aliphatic Hydrocarbons	N_EICOSN	1	62 50	62 50	1	2 00	2 00
n-Heneicosane Aliphatic Hydrocarbons	N_HENESN	1	324 30	324 30	1	13 00	13.00
n-Hentriacontane Aliphatic Hydrocarbons	N_HENTCT	1	785 23	785 23	1	9 00	9.00
n-Heptacosane Aliphatic Hydrocarbons	N_HEPTSN	1	557 23	557 23	1	20 00	20 00
n-Heptadecane Aliphatic Hydrocarbons	N_HEPADC	1	2503 00	2503 00	1	32 00	32 00
n-Hexacosane Aliphatic Hydrocarbons	N_HEXASN	1	84 86	84 86	1	2 00	2 00
n-Hexadecane Aliphatic Hydrocarbons	N_HEXADC	1	93 35	93 35	1	2 00	2 00
n-Nonacosane Aliphatic Hydrocarbons	N_NONASN	1	680 16	680 16	1	15 00	15.00
n-Nonadecane Aliphatic Hydrocarbons	N_NONADC	1	206 40	206 40	1	5 00	5.00
n-Octacosane Aliphatic Hydrocarbons	N_OCTASN	1	123 45	123.45	1	2 00	2.00
n-Octadecane Aliphatic Hydrocarbons	N_OCTADC	1	86 30	86.30			
n-Pentacosane Aliphatic Hydrocarbons	N_PENTSN	1	585 52	585 52	1	37 00	37 00
n-Pentedecane Aliphatic Hydrocarbons	N_PENTDC	1	840 24	840 24	1	27 00	27 00

TABLE 12
USEPA - EMAP Water, Sediment and Tissue Parameters for Study Area

PARAMETER DESCRIPTION		STORET	UPPER LAGUNA MADRE No. of Samples	Min. Value	Max. Value	LOWER LAGUNA MADRE No. of Samples	Min. Value	Max. Value
n-Tetracosane Aliphatic Hydrocarbons		N_TETRSN	1	73.22	73.22	1	3 00	3 00
n-Tetradecane Aliphatic Hydrocarbons		N_TETRDC	1	27.33	27.33	1	2 00	2 00
n-Tetratriacontane Aliphatic Hydrocarbon		N_TETRCT	1	33 78	33.78	1	3 00	3 00
n-Triacontane Aliphatic Hydrocarbons		N_TRIACT	1	180 14	180 14	1	2 00	2 00
n-Tricosane Aliphatic Hydrocarbons		N_TRICSN	1	342 16	342 16	1	26 00	26.00
n-Tridecane Aliphatic Hydrocarbons		N_TRIDC	1	13 26	13 26	1	1 00	1 00
n-Tritriacontane Aliphatic Hydrocarbons		N_TRITCT	1	302 29	302 29	1	22 00	22 00
n_Undecane Aliphatic Hydrocarbons		N_UNDECA	1	14 87	14 87	1	1.00	1.00
o,p'DDD		OPDDD	1	BDL	BDL	2	BDL	BDL
o,p'DDE		OPDDE	2	BDL	0 06	3	BDL	0 03
o,p'DDT		OPDDT	1	BDL	BDL	2	BDL	BDL
op-DDD + pp-DDD		DDD	1	0 06	0 06	1	0 02	0.02
op-DDE + pp-DDE		DDE	1	0 21	0 21	2	0 14	0 21
p,p'DDD		PPDDD	2	BDL	0 06	3	BDL	0.02
p,p'DDE		PPDDE	2	BDL	0 15	3	BDL	0.18
p,p'DDT		PPDDT	1	BDL	BDL	2	BDL	BDL
TISSUE - (Detected parameters)								
	Metals							
TISSUE	Aluminum	TISAL				1	7 21	7.21
TISSUE	Arsenic	TISAS				1	11 93	11 93
TISSUE	Chromium	TISCR				1	0 13	0.13
TISSUE	Copper	TISCU				1	0 54	0.54
TISSUE	Iron	TISFE				1	9 62	9.62
TISSUE	Lead	TISPB				1	0 37	0 37
TISSUE	Mercury	TISHG				1	0 97	0 97
TISSUE	Nickel	TISNI				1	0 17	0 17
TISSUE	Selenium	TISSE				1	0.37	0.37
TISSUE	Silver	TISAG				1	0 10	0 10
TISSUE	Zinc	TISZN				1	14 43	14 43
	Organics							
TISSUE	"o,p'-DDT"	TISOPDDT				1	5 85	5 85
TISSUE	"o,p-DDT + p,p-DDT"	TISDDT				1	9 34	9 34
TISSUE	"p,p'-DDE"	TISPPDDE				1	104.79	104 79
TISSUE	"p,p'-DDT"	TISPPDDT				1	3 49	3.49
TISSUE	PCB 170	TISPCB170				1	1 80	1.80
TISSUE	PCB 180	TISPCB180				1	2 12	2 12
TISSUE	PCB 187/182/159	TISPCB187				1	1 26	1 26
TISSUE	PCB 99	TISPCB99				1	1 97	1 97
TISSUE	TOTAL DDTs	TISDDT_TOT				1	114 13	114.13
TISSUE	TOTAL PCBS	TISPCB_TOT				2	5 18	7 15

BDL - Below Detection Limits

TABLE 13

TWDB - Values exceeding the Texas State Water Quality Standards

Parameter	Marine Criteria (ug/L) Chronic	Acute	Baffin Bay Complex Value (ug/L)	Segment	Lower Laguna Madre Value (ug/L)	Segment
Dissolved Cadmium	10 02	45 62	20	BB10	30	LLM37
Dissolved Copper	4 37	16.27	50	BB10	100	LLM37
			50	BB10	43	LLM25
			18	BB5	12 values between	
			15	BB5	5 and 13	
			11	BB5		
			11	LS3		
			10	BB10		
Dissolved Lead	5 6	140			200	LLM37
					23	LLM24
					23	LLM25
					14	LLM34
					7	LLM25
					6	LLM31
					6	LLM37
Dissolved Zinc	89	98	820	BB5		
			500	AB4		
			230	LS3		