From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 12/3/2009 10:24 AM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

MWD 69298

H

>>> <flowers_ea@yahoo.com> 12/2/2009 9:07 AM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME: Elayne Arne
E-MAIL:flowers_ea@yahoo.com
COMPANY:
ADDRESS:PO BOX 694
ROCKPORT TX 78381-0694
PHONE:
FAX:
COMMENTS: Dear Sir or Madam I am writing to request a public hearing on the matter of the above permit. The Rockport Waste Water Treatment Plant (WWTP) is currently unregulated as to the amounts of nitrogen they release to Aransas bay. This harms bay grasses and ultimately wildlife in the area. The Rockport WWTP should be required to have a filtration system of some kind to reduce nitogen releases to the bay and the amounts released should be regulated. Thank you for your time, Elayne Arne

MW

Belaire Environmental Inc.
Planning • Permitting • Habitat Creation

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2010 MAR -1 AM 10: 13
CHIEF CLERKS OFFICE

February 25, 2010

OPA RECEIVED
FEB 25 2010
AT PUBLIC MEETING

Texas Commission on Environmental Quality
12100 Park 35 Circle
Austin, TX 78753

Dear Sir or Madam:

I have lived in Rockport, Texas since 1980. I am a founder and owner of Belaire Environmental, Inc., an environmental consulting firm headquartered in Rockport. We have provided water quality assessment and wetland/seagrass bed evaluation and restoration services to a wide array of clients along the Texas Coast for the past 30 years. As a local resident and an environmental professional, I am concerned with the City's proposal to continue the discharge of treated municipal waste into Little Bay. As you may be aware, Little Bay thrived for decades as a model seagrass habitat that was enjoyed and appreciated by recreational fishermen, bird watchers, boaters, tourists, aquatic scientists and the general public. Then in 2004, most of the seagrass beds in Little Bay disappeared. The cause of seagrass loss has not been definitively determined. However, it is likely that the combination of the continued discharge of treated municipal waste and increased sedimentation from stormwater into Little Bay have contributed significantly a decline in water quality and the subsequent loss of seagrass. The combination of uncontrolled stormwater runoff and the continual discharge of secondary wastewater have very likely led to increased turbidity and eutrophic conditions and the ultimate destruction of the seagrass ecosystem in Little Bay. My company installed experimental seagrass transplant plots in Little Bay in 2007 in an effort to re-establish the seagrass beds. This experiment failed probably due to the unacceptable water column turbidity due to the combination of sediment resuspension and algal production. The National Oceanic and Atmospheric Administration (NOAA) has classified parts of Aransas Bay as "moderately to highly eutrophic"[1]. Of the six eutrophication indicators NOAA used in its evaluation, Little Bay exhibits 4 of them: (1) Macroalgae (as recently as last

[1] Bricker, S.B., C.G. Clement, D.E. Pirhalla, S.P. Orlando, and D.R.G. Farrow. 1999. National Estuarine Eutrophication Assessment: Effects of Nutrient Enrichment in the Nation's Estuaries. NOAA, National Ocean Service, Special Projects Office and the National Centers for Coastal Ocean Science. Silver Spring, MD: 71 pp.

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week dense mats of macroalgae lined the western shoreline of Little Bay – in the midst of winter); (2) seagrass loss (well documented); (3) High Chloraphyll *a* – UTMSI's 2009 testing in Little Bay found Chloryphyll *a* levels in excess of NOAA's thresholds for medium and high eutrophic conditions (10 and 20 µg/l, respectively); and (4) Epiphytes (see attachment). Additionally, NOAA provides guidance for nutrient thresholds. Nitrogen and phosphorous concentrations above 1.0 mg/l and 0.1 mg/l, respectively, are considered high levels in the context of the eutrophic condition of an estuarine water body. The EPA (1986) found that phosphorous concentrations of 0.03 to 0.1 mg/l or higher will trigger algal blooms in systems that are not nitrogen limited[2]. Water samples taken from the treated municipal waste effluent which is eventually discharged into Little Bay indicate that relatively high levels of Phosphorous are being discharged. This being the case, Phosphorous is very likely contributing to the present eutrophic conditions in Little Bay.

The City is giving much attention to nitrogen loading into Little Bay, but virtually no attentions is being given to phosphorous loading and its contributions to eutrophication. NOAA experts noted that "phosphorous may be an important contributor to eutrophication in some Gulf of Mexico estuaries" and that the "relative roles of nitrogen and phosphorous need clarification". In the 1970's, the Texas Parks and Wildlife Department (TPWD) evaluated the roles of nitrogen and phosphorous in the eutrophic estuary of Dickinson Bayou, a tributary of Galveston Bay that suffered chronic dissolved oxygen fish kills (see attachment). TPWD found that phosphorous was the limiting nutrient in Dickinson Bayou and the Texas Water Quality Board required the City of Dickinson to drastically reduce its phosphorous loading into Dickinson Bayou. Little Bay does not yet suffer from chronic fish kills, but the loss of seagrass is a major indicator of eutrophication and a regrettable loss to the ecosystem and to the community. To prevent further degradation of the water quality of Little Bay, I ask that the TCEQ carefully evaluate the effects of and the alternatives to the continued discharge of city wastewater into Little Bay. My recommendations are as follows:

2 Osmond, D.L., D.E. Line, J.A. Gale, R.W. Gannon, C.B. Knott, K.A. Bartenhagen, M.H. Turner, S.W. Coffey, J. Spooner, J. Wells, J.C. Walker, L.L. Hargrove, M.A. Foster, P.D. Robillard, and D.W. Lehning. 1995. *WATERSHEDSS: Water, Soil and Hydro-Environmental Decision Support System*, http://h2osparc.wq.ncsu.edu.

1. Determine the limiting nutrient an the roles of both nitrogen and phosphorous in Little Bay; or
2. Reduce the levels of nitrogen and phosphorous into Little Bay to levels which will not result in excess algal production and excess water column turbidity; and
3. In lieu of 1 and 2, above, determine if means are economically available to reroute the discharge to another receiving body which has a greater capacity to assimilate the nutrient loading in the effluent.

Thank you for your consideration.

Sincerely,

Charlie Belaire

Encl.

TEXAS
COMMISSION
ON ENVIRONMENTAL
QUALITY

2010 MAR -1 AM 10: 13

CHIEF CLERKS OFFICE

Little Bay Project Summary

OPA RECEIVED

FEB 25 2010

AT PUBLIC MEETING

Mike Gill, Kim Jackson, and Sally Morehead
Submitted by Ken Dunton, Professor
UT Marine Science Institute
Port Aransas, TX 78373
30 July 2007

Introduction:

Little Bay is a relatively small and semi-enclosed coastal lagoon on the north side of Aransas Bay in Rockport, Texas. This bay has historically supported lush seagrass beds that provide shelter and nursery areas for a variety of aquatic species. Some of these species are preyed upon by the diverse bird population in the area that has made Little Bay a popular spot for birders around the state. However, recent aerial photography and local surveys show that the shoal grass (*Halodule wrightii*) beds in Little Bay are in decline, having diminished considerably over the past decade (Figure 1). Consequently, the city of Rockport is considering a planting program in an attempt to restore the seagrass beds to their historically healthy status. In support of this effort, a sampling program was designed to assess the abiotic factors that ultimately determine the suitability of the sediments and water column to support shoalgrass establishment and growth. This brief report summarizes the results of measurements made in and around the fringing seagrass beds at four locations in Little Bay.

Methods:

Multiple key parameters were chosen to assess the chemistry and abiotic conditions of each of four study sites at Little Bay (Figure 2) on 26 June 2007. Station locations included a site located just south of a storm water outfall adjacent to Cherry Street (site 1), just south of Tule Creek outfall (site 3), and a station located between sites 1 and 3 in proximity to a nearby storm drain (site 2). A fourth station (Bayside site) was established on the channel that connects Little Bay with Aransas Bay. We used a YSI sonde to take basic water quality measurements of temperature (degrees C), salinity (ppt), dissolved oxygen (% and mg/L), and pH at the surface and at depth from within the seagrass bed and an adjacent unvegetated (barren) area at each of the four locations. A light meter was also employed to measure photosynthetically active radiation (PAR) at surface and bottom depths from within the seagrass bed and barren patch at each location. Additionally, duplicate samples were taken for total suspended solids (TSS), nitrite (NO_2^-) + nitrate (NO_3^-), ammonium (NH_4^+), and chlorophyll *a* content in the water column at the barren patch at each site. We collected replicate benthic sediment samples for porewater ammonium analysis within both the seagrass bed and barren patch at each site. Finally, we constructed a landscape profile of each of the four sites by measuring the distance from the shore to the center of the fringing seagrass bed, the depth in the center of the bed, the distance from the shore to the barren patch sampling location, and the depth at that location. GPS coordinates were used to mark the shore location and barren patch location of each study site.

Water and sediment samples were processed in the lab. Nitrate + nitrite content was measured by first running samples through a cadmium reduction column to reduce nitrate to nitrite, with absorbance measured at a given wavelength to determine concentrations after additional reagents were added on a spectrophometer. Similarly, both the water column and

sediment ammonium (after centrifugation and isolation) samples were oxidized by several chemical reagents to yield a sample that could be run through the spectrometer at a specific wavelength to determine concentrations. Total suspended sediment samples were weighed following filtration; chlorophyll *a* samples were first filtered, extracted with acetone overnight, and then run on a spectrometer to determine concentrations.

Results:

At midday on 26 June, we noted seagrasses at sites 1, 2 and Bayside. At site 1, a *H. wrightii* bed 2.5 in width was located at 0.5 m depths 16 m from the shoreline. No grasses were present at 0.65 m in the adjacent barren area 30 m from shore. At site 2, a bed 12 m in width was located at 0.42 m depths 25 m from the shoreline. No grasses were present at 0.68 m in the adjacent barren area 40 m from shore. We found no grasses at site 3, although water depths were only 0.39 m about 30 m from the shoreline. At the bayside site, a bed 17.5 in width was located at 0.37 m depths 21 m from the shoreline. In comparison to sites 1 and 2, blades of *H. wrightii* were shorter and narrower. No grasses were present at 0.75 m in the adjacent barren area 40 m from shore. The slope of the seabed from shore to barren patch was greatest at the bayside site and least at site 1.

The water quality data from the four study sites at Little Bay were consistent, showing very little horizontal or vertical variation between sites and within each site. Overall, temperature varied slightly from 30.7 to 31.9 °C, and salinity from 15.1 to 15.6 ppt, Dissolved oxygen was slightly higher at the surface than at depth with an overall range of 6.0 to 9.1 mgL^{-1}. PAR data was used to calculate the light attenuation (k_s) coefficients for each respective location. We found the most turbid waters at the bayside site, while all other sites were characterized by slightly higher attenuation coefficients within the seagrass bed compared to the adjacent barren patch (Figure 3). Light attenuation coefficients ranged from 1.8 to 3.0 m^{-1} except at the bayside seagrass site (5.8 m^{-1}). TSS levels were high, ranging from 34 to 40 mgL^{-1} except at the bayside seagrass site, which was 56 m^{-1} (Figure 4). Chlorophyll *a* content ranged from 14-16 μg/L and was quite consistent among all sites, except for site 2, which was nearly half the value of the others (Figure 5). Porewater ammonium concentrations (150-300 μM) were highest at the bayside barren site, though sites 1 and 2 indicated higher values within the seagrass bed (Figure 6). As shown in Figure 7, there were significant amounts of ammonium (1.5-3.0 μM) in the water column at all sites, with the highest concentrations occurring at the barren areas at sites 2 and 3. Only trace amounts of nitrate and nitrite were found in the water column samples, the highest of which (0.3 μM) was recorded in the barren area at site 1 (Figure 8).

Discussion:

The data collected on a single visit to Little Bay in June demonstrated that there are no conditions that in themselves are well outside the tolerances for establishment and growth of shoal grass. However, the water quality conditions in Little Bay are also not conducive for seagrass bed proliferation. Salinities in Little Bay are on the low side (15 ppt) to maintain healthy populations of shoal grass (*Halodule wrightii*), although the brackish waters are ideal for widgeon grass (*Ruppia maritima*). It is important to note that the water quality concentrations, including salinity, were collected on a single day and may not be representative of the average water quality concentrations. In the six days prior to sampling, the area experienced several days of rainfall (2 inches total) (Weather Underground, www.wunderground.com), which combined with the large number of storm water outfalls into Little Bay, could be the cause of the low

salinity values. It is likely that the average salinities in Little Bay are sufficient for the current populations of shoal grass, but additional water quality monitoring would be required to test this hypothesis. Both TSS and PAR data (Figures 3 and 4) verify the field observations that the bayside site in Little Bay is subject to greater light attenuation which may be related to its closer proximity to the centrally-located channel used for recreational boating. The less favorable light conditions at this site is likely the reason for the noticeably less robust seagrass specimens that were present at this site. The light attenuation coefficients at all sites were high; values equal or greater than 2 for k_s are not conducive for seagrass bed expansion into deeper waters. The restriction of shoal grass in Little Bay to relatively very shallow depths (0.5 m) reflect the poor light environment in which these plants must live. The high light attenuation coefficients are clearly associated with elevated TSS vales and chlorophyll. The higher k_s values in the seagrass beds (Figure 3) could be the result of terrestrial runoff that affects the near-shore fringing seagrass patches to a greater extent than the offshore barren areas.

Photosynthetic organisms preferentially take up ammonium over other nitrogen nutrient forms because of its energy-efficient conversion into amino acids. The presence of this nutrient in significant amounts in the water column is likely responsible for the higher chlorophyll concentrations noted at all the sites. Since nitrate levels are low, the source for the water column ammonium is likely the sediments, which were characterized by relatively high ammonium values (150-300 μM). The high porewater ammonium values in seagrass beds in this area are not unusual, but the longer residence time of waters in Little Bay allows for limited dilution by bay waters.

Based on the limited data available, low salinity and high light attenuation of waters in Little Bay are likely responsible for the disappearance of shoal grass. The absence of grasses at site 2 is probably related to the presence of a storm drain which exposes the immediate area to periods of freshwater inundation and higher turbidity. Elevated light attenuation coefficients (>2) are related to both chlorophyll and TSS. Although non-point anthropogenic sources of nitrogen may be responsible for the ammonium present in the water column, this cannot be determined without stable isotopic analyses of the plants and water.

Figures:

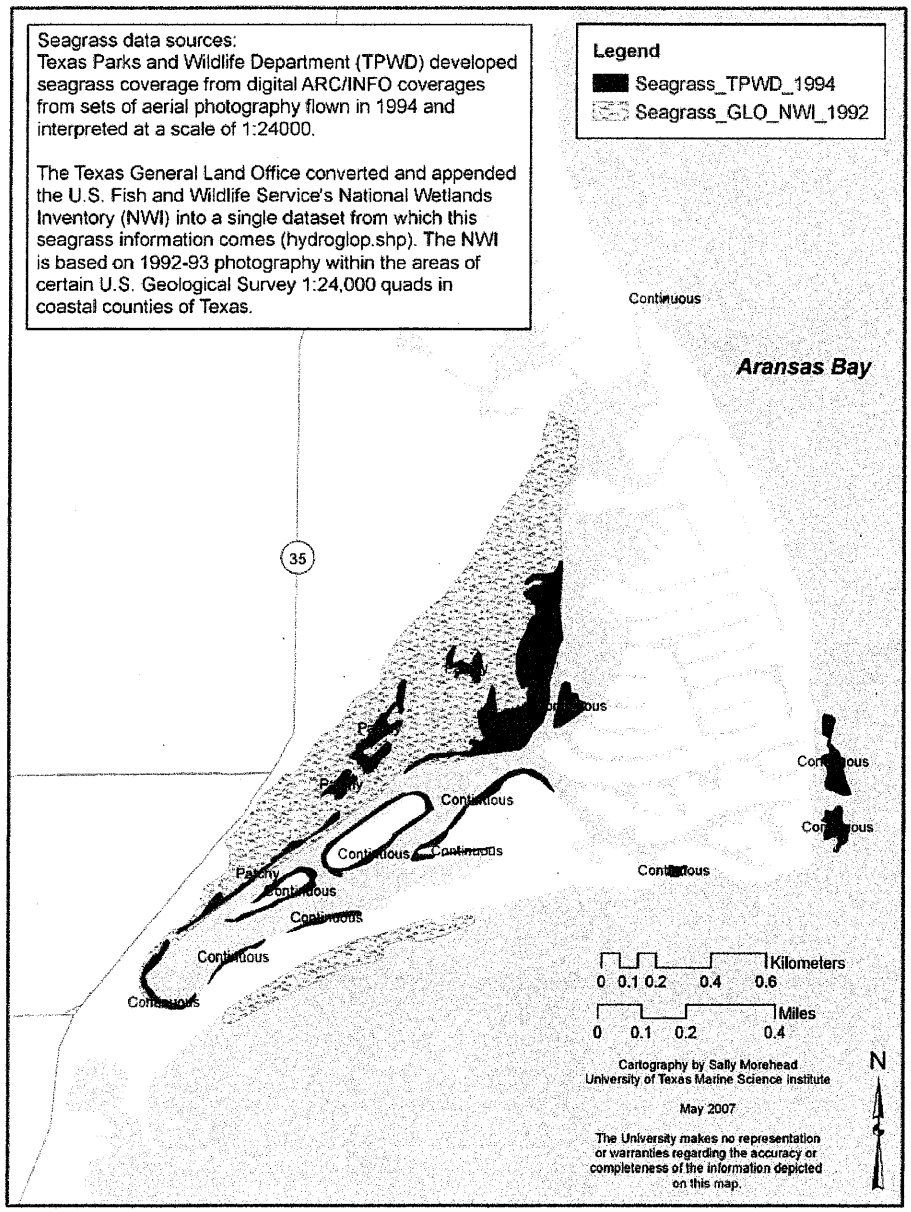

Figure 1: Historical coverage of seagrass beds in Little Bay.

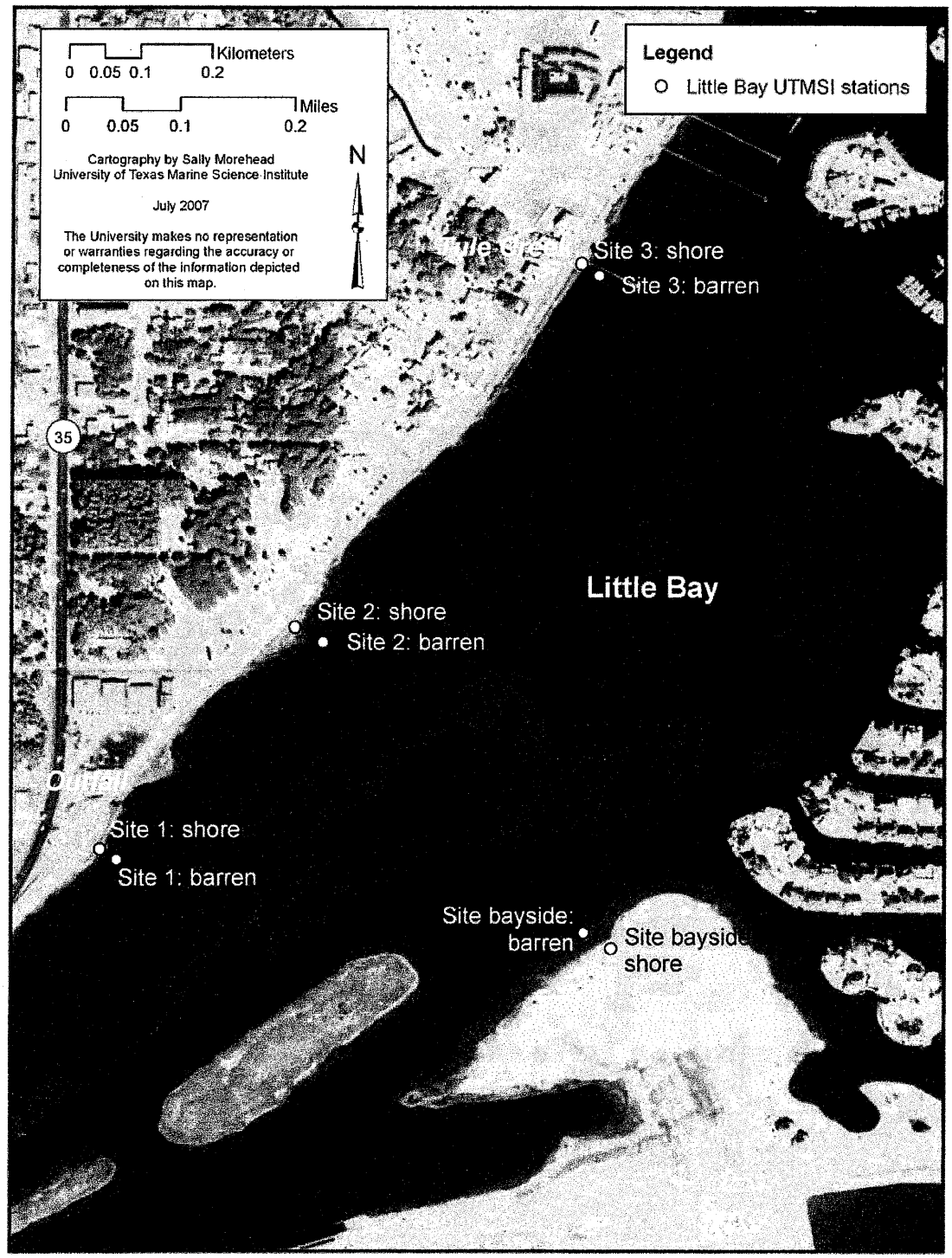

Figure 2: Location of sampling sites in Little Bay, Rockport.

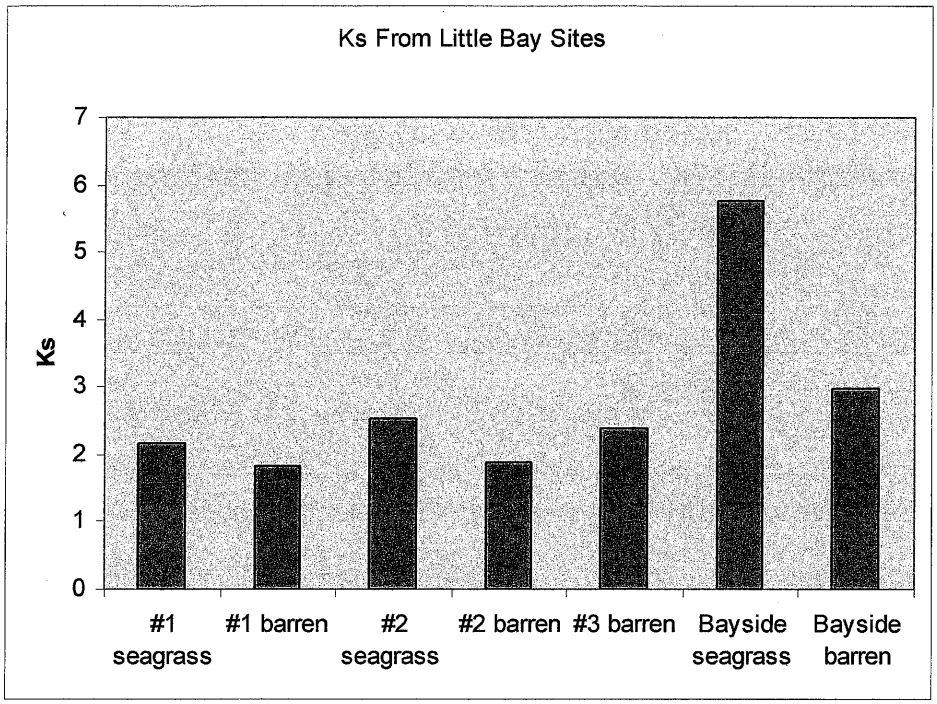

Figure 3: The light attenuating coefficients (K_s) for the seagrass beds and barren patches at each study site.

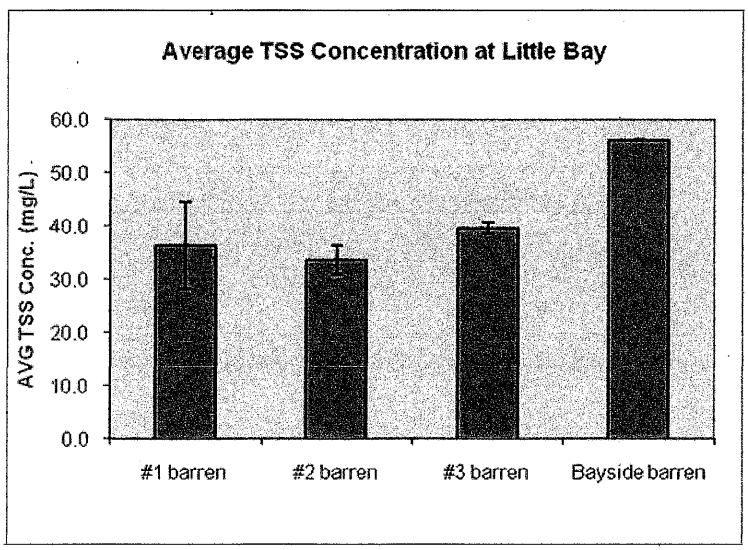

Figure 4: The mean (± SE) total suspended solids (TSS) measured from water column samples taken at the barren areas of each site.

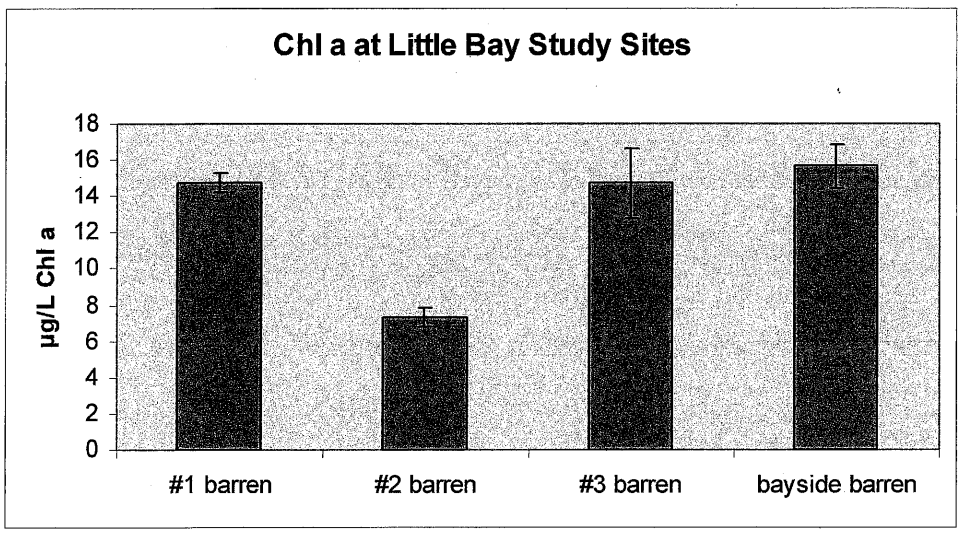

Figure 5: The mean (± SE) chlorophyll *a* concentrations measured from the water column samples taken at the barren areas of each site.

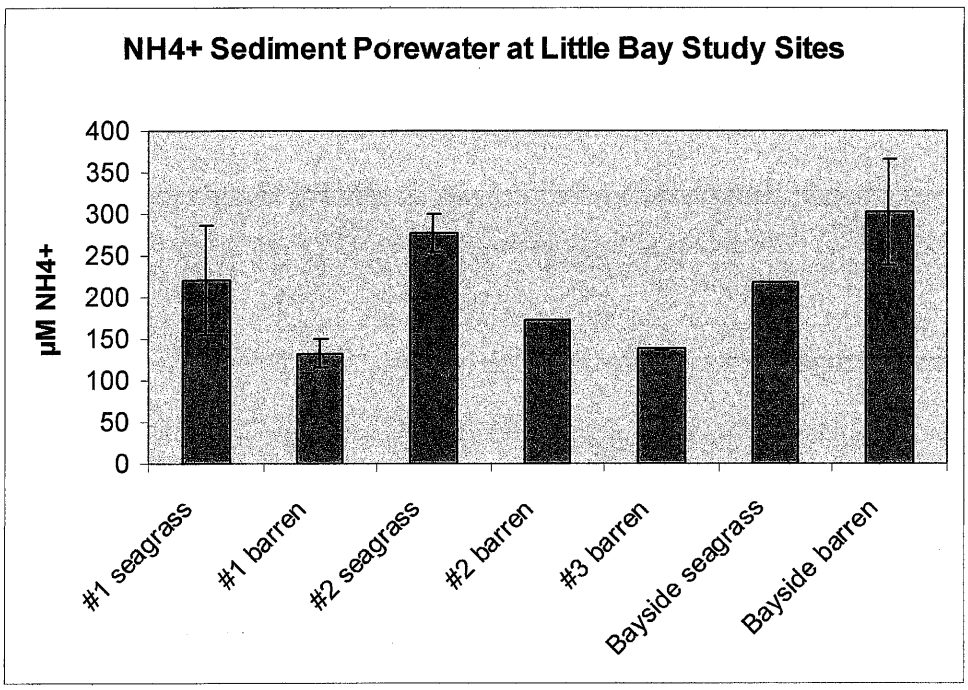

Figure 6: The average NH_4^+ (± SE) concentrations in sediment porewater within the seagrass beds and barren patches at each study site.

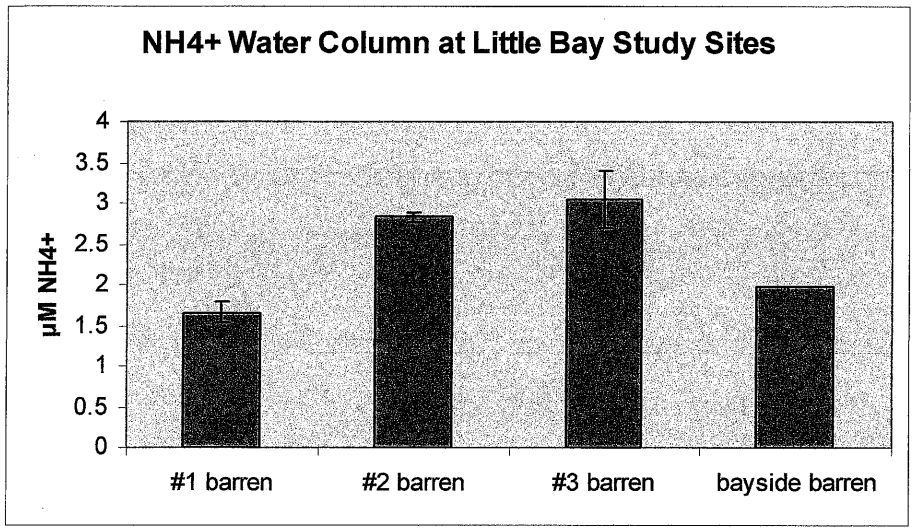

Figure 7: The mean (± SE) NH_4^+ concentrations measured from the water column samples taken at the barren areas of each site.

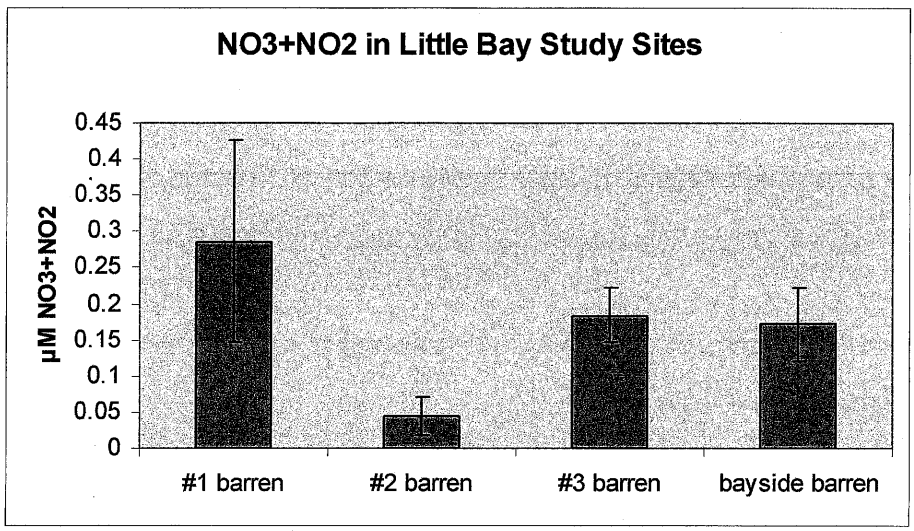

Figure 8: The average (± SE) NO_3^- and NO_2^- concentrations measured from the water column samples taken at the barren areas of each site.

CONTRIBUTIONS IN MARINE SCIENCE

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CAUSES AND PROBABLE CORRECTIVES FOR OXYGEN DEPLETION FISH KILLS IN THE DICKINSON BAYOU ESTUARY: A FIELD STUDY AND SIMPLIFIED ALGAL ASSAY

Ken Knudson and Charles E. Belaire

Texas Parks and Wildlife Department, Seabrook Marine Laboratory, P. O. Box 8, Seabrook 77586

ABSTRACT

Frequent oxygen depletion fish kills, caused by dense algal blooms, have occurred during summers in the six-kilometer portion of Dickinson Bayou directly upstream from two sewage treatment plants. These plants are the major contributors of wastes to the bayou. During summer periods of low freshwater inflow, the treatment plant effluents are carried upstream by tidal action, causing dense algal blooms; algal density is much less above tidal influence and downstream from the plant outfalls. Algal assays demonstrated that if the plants employed chemical coagulation to remove phosphorus, the summer algal densities in the critical six-kilometer portion of the bayou would be reduced to concentrations corresponding to, or less than, the levels found in the rest of the bayou. Such treatment would thereby reduce the probability of summer fish kills.

INTRODUCTION

Man's activities, which introduce excess nutrients into bodies of water, can adversely effect the aquatic environment. The artificial addition of nutrients accelerates the process of eutrophication and leads to increased algal growth. The consequences of hyper-eutrophication are usually unpleasant and solutions to the problem are often complex and difficult to attain.

In the coastal areas of Texas, where population and industrial development are increasing at a rapid rate, the problem of eutrophication is becoming a serious one. Our department investigated 48 eutrophication-related fish kills during 1971 and 1972, all in the Houston-Galveston area. Recurring kills were investigated in some of the small, shallow, tidal streams, or bayous, during periods of light rainfall. One such bayou was Dickinson Bayou, located in Galveston and Brazoria counties, Texas, where it meanders some 36 kilometers from its source near Alvin to its confluence with Galveston Bay (Fig. 1).

Dickinson Bayou has a watershed of 106 square miles (275 km^2) which is drained by seventeen small tributaries. Most of the tributaries carry only rainfall runoff. The land in the watershed is used primarily for livestock grazing and for the farming of rice, soy beans, milo, corn and sweet sorghum. The principal

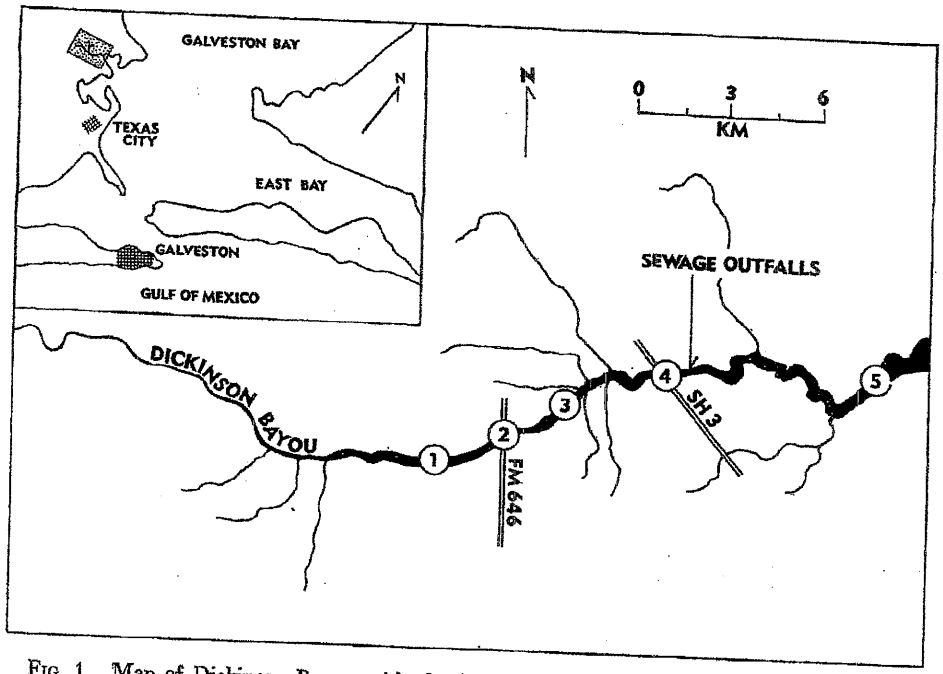

FIG. 1. Map of Dickinson Bayou with the locations of the sewage treatment plant outfalls and sampling stations.

residential and commercial development along the bayou is in and around the unincorporated town of Dickinson, which has a population of 14,000. The area has a mild climate with an average winter temperature of 53 F (11.7 C), an average summer temperature of 83 F (28.3 C) and an annual mean temperature of 69 F (20.6 C). The average annual rainfall in the watershed is 45 to 50 inches (114–127 cm). Kirkpatrick (1972) provides a very detailed description of the area.

Dickinson Bayou is used for recreational fishing, canoeing, swimming and water skiing. Saline water intrudes nearly halfway up the bayou during dry weather, providing salt water fishing, crabbing and shrimping as additional recreation. But, according to long time residents, the aesthetics of Dickinson Bayou have deteriorated in recent years. During the warmer months floating mats of algae are present and fish kills are frequent. In 1971 our department investigated five fish kills in the bayou and estimated that over four million fish were destroyed. These fish kills, and a large kill in July, 1972, were concentrated in the area of Dickinson Bayou between State Highway 3 (SH 3) and Farm to Market Road 646 (FM 646) (Fig. 1). The cause of all these fish kills was attributed to low dissolved oxygen concentrations.

The normal diel fluctuation of dissolved oxygen is disturbed by two principal factors: (1) the addition of industrial, agricultural and domestic wastes which are available for biological and chemical oxidation, and (2) "blooms" of algae, which supersaturate the water with oxygen during the day through photosyn-

thesis and deplete the oxygen at night through respiration. In Dickinson Bayou, the most damaging of man's activities appears to be the introduction of domestic waste. Only two small industries discharge into the bayou, and agricultural runoff usually occurs during periods of heavy rainfall in spring and autumn. In contrast, two domestic treatment plants, located along the bayou within two kilometers of each other, discharge nearly two million gallons (7571 m^3) of wastewater per day. Both plants provide secondary treatment and have no facilities for nutrient removal.

Early in 1972, the larger of the two sewage treatment plants announced plans to increase the volume of its 1.2 million- gallon (4542 m^3) per day discharge. Because of these expansion plans, we conducted a field study of Dickinson Bayou from April through August of 1972 to determine what factors were likely causing a disturbance in the oxygen balance of the stream, particularly between SH 3 and FM 646, where the numerous fish kills have been concentrated. We wanted to determine if the sewage treatment plants' effluents contributed to the algal blooms and fish kills, since they were immediately downstream from this area. Once we suspected that the plants might be an influence, we conducted laboratory algal assays to determine if advanced treatment for phosphorous removal might alleviate the majority of the water quality problems in the bayou.

FIELD STUDY

Methods

Five stations on Dickinson Bayou were sampled weekly from 20 April through 31 August, 1972. Three stations were within the area of frequent fish kills, with one station above and one station below this area (Fig. 1). The sewage treatment plants' effluents were sampled monthly for total phosphorous. Surface and bottom salinity, dissolved oxygen and temperature were measured in the bayou. All samples were collected at mid-stream between 9:00 A.M. and 11:30 A.M. on each date. Surface values for total phosphorous and chlorophyll-*a* were also determined beginning in the first week of July, when saline water became detectable on the botton at all three stations within the area of the fish kills. To estimate the phosphorous content of incoming tidal waters, weekly surface samples for total phosphorous analysis were collected from the mouth of the bayou between 7 July and 31 August, 1972. Salinities were measured with a Goldberg Model TC Refractometer. The azide modification of the Winkler Method was used for dissolved oxygen measurements. Phosphorous samples were separated into dissolved and suspended fractions by filtering the samples through a 0.45 micron Millipore filter. The samples were then digested using persulfate oxidation, followed by the ascorbic acid technique for the final colorimetric determination (Amer. Public Health Ass. 1971.).

Since chlorophyll-*a* limits the rate of photosynthesis (Holmes 1968), and can usually be directly related to plant biomass (Odum 1959), this pigment was measured as a rough index of algal standing crop. Chlorophyll-*a* was determined by the technique of Odum, McConnell and Abbott (1958). After filtering the sample through a 0.45 micron Millipore filter, the filter and residue were dissolved in 90% acetone and kept in the dark at 4 C for twenty-four hours. To determine the chlorophyll-*a* concentration, the optical density of the acetone extract was measured on a Bausch and Lomb Spectronic 20 at a wave length of 665 mμ.

Results

In April and May, due to heavy rainfall, freshwater runoff dominated the bayou's circulation. Salinity values were negligible, while the dissolved oxygen

content of surface and bottom waters was near saturation at all sample stations. As the rain decreased in June, saline water began to intrude upstream, first on the bottom, then on the surface. Only a small amount of mixing occurred between the surface water and the more dense saline layers, resulting in very low dissolved oxygen concentrations on the bottom (Fig. 2). Precipitation and surface runoff into the bayou continued to be negligible in July and August, and tidal action dominated circulation (Fig. 3).

Ketchum (1971) stated that a pollutant is carried upstream in an estuary to the same extent that salt is carried upstream, and by the same mechanism. To show that this type of tidal transport system functions in Dickinson Bayou, surface phosphorous samples were collected weekly in July and August (Fig. 4). The highest phosphorous concentration was found at the station nearest the sewage treatment plants, decreasing upstream in proportion to decreasing salinity ($p < 0.01$, for the product-moment correlation between surface phosphorous and salinity concentrations; $r = 0.76$ with 23 degrees of freedom). The average total phosphorous concentration of incoming tidal waters, found by sampling the mouth of the bayou in July and August, was 0.325 mg/l, with a range from 0.47 mg/l, on August 31, to 0.20 mg/l on July 7. The phosphorous levels at the "affected" stations, stations 2 through 4, differed significantly from those at "unaffected" station 1 ($p < 0.01$, using the t-test for paired observations with 7 degrees of freedom) and from those measured at the bayou's mouth ($p < 0.05$,

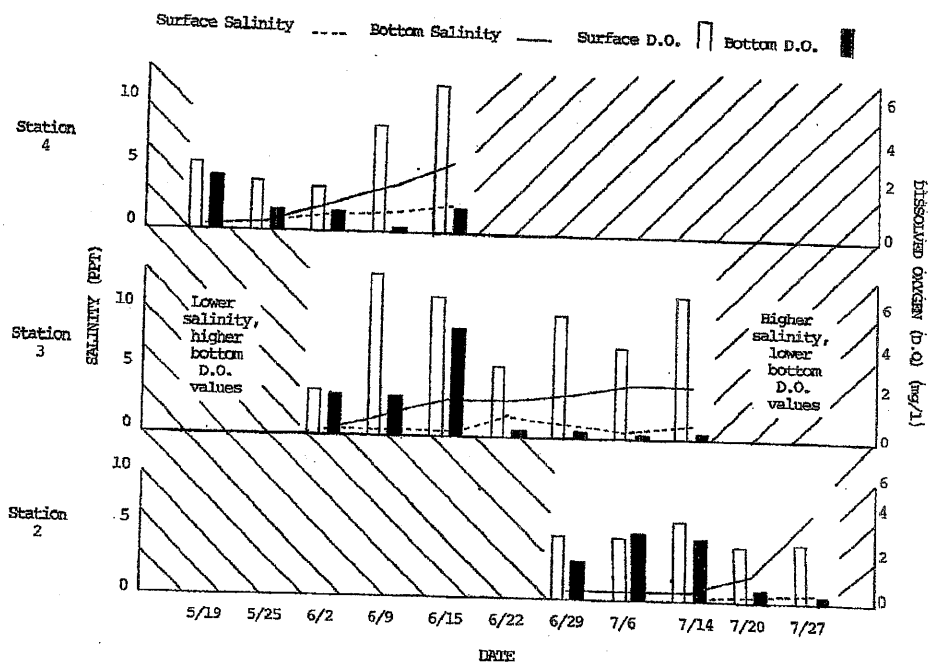

FIG. 2. Salinity and dissolved oxygen values for selected dates at stations 2, 3, and 4, showing the upstream movement of saline water with its low dissolved oxygen content.

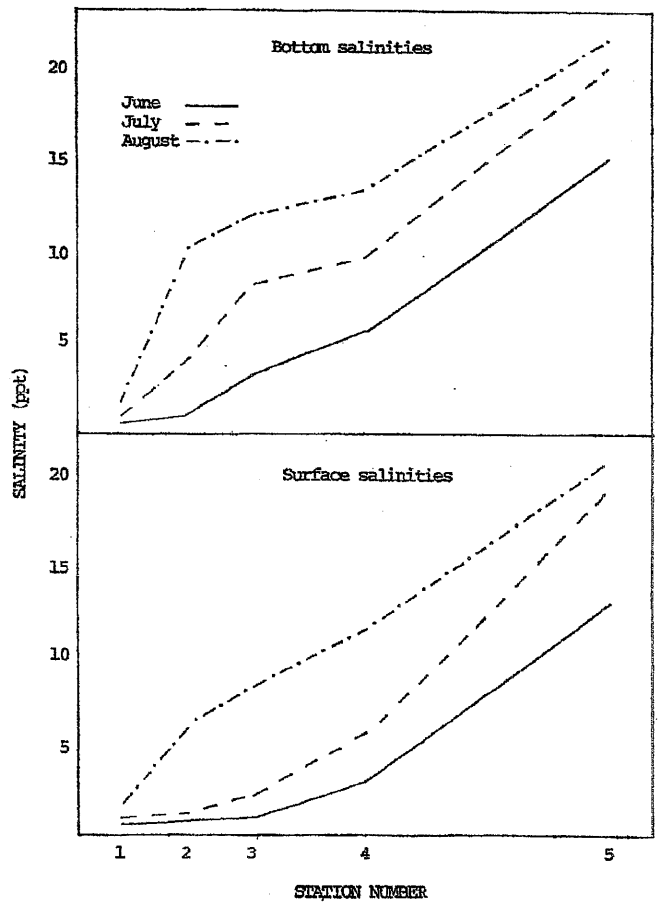

FIG. 3. Monthly station averages for salinity on the surface and the bottom. Distances are to scale along the x-axis.

using the *t*-test for paired observations with 7 degrees of freedom). The highest chlorophyll-*a* concentrations were found in the same segment of the bayou as were the highest total phosphorous concentrations, i.e., stations 2 through 4 (Figure 5). The chlorophyll-*a* levels at stations 1 and 5 were significantly different from those at stations 2, 3 and 4 ($p < 0.05$, using the *t*-test for paired observations with 7 degrees of freedom).

Since the area between stations 2 and 4 was the focal point of frequent fish kills, a cause-and-effect relationship between algal density and oxygen balance was evaluated. On August 17, the chlorophyll-*a* value for stations 4 and 5 were 0.48 mg/l and 0.31 mg/l, respectively. These values represented the densest algal concentrations found at each during the study. Dissolved oxygen concentrations were determined over a twenty-four hour period, at three-hour intervals, beginning at noon on August 17. The dissolved oxygen range fluctuated 13.4 mg/l at station 4 compared to 6.5 mg/l at station 5 (Fig. 6). Extreme diel

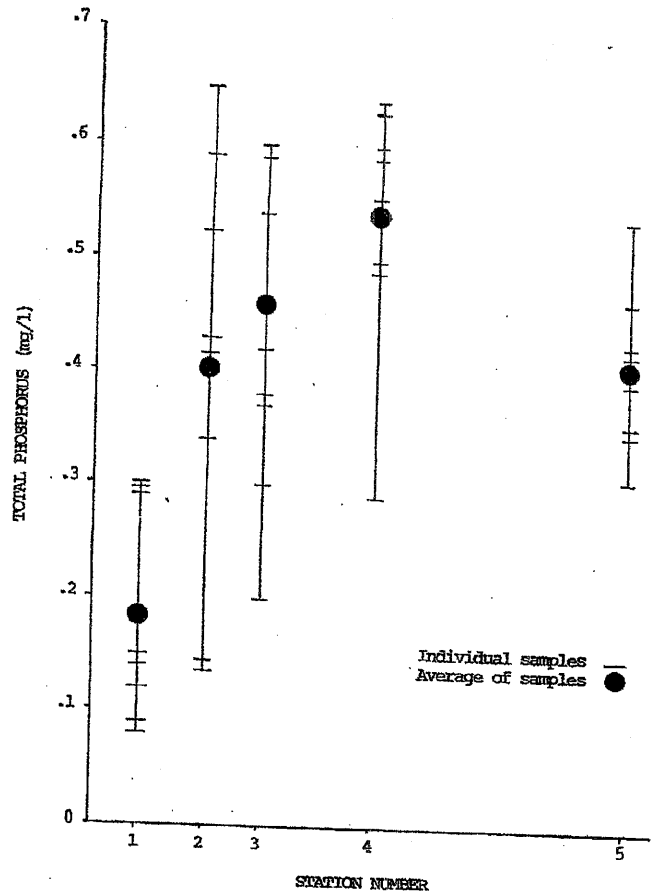

FIG. 4. Individual samples and averages for total surface phosphorus concentrations at each station in July and August, 1972. Distances between stations are to scale along the x-axis.

fluctuations in dissolved oxygen in Dickinson Bayou can be attributed to algal density, since the incident solar radiation, vertical mixing or wind, would be nearly equal throughout all of the stations. As shown by the chlorophyll-α data in Figure 5, algal populations capable of producing extreme dissolved oxygen fluctuations, such as occurred at station 4 on August 17, were present on at least five occasions at stations within the area of frequent fish kills, but never at the other "unaffected" stations.

Monthly total phosphorous analyses on the effluents from the sewage treatment plants showed that the average phosphorous concentration at the larger plant was 11.1 mg/l, with levels ranging from 9.6 mg/l in April to 14.2 mg/l in July. The smaller plant's discharge averaged 10.2 mg/l of total phosphorous, with a low value of 8.8 mg/l in April and a high value of 12.7 mg/l in August. Scudday and Nichols (1972) calculated that if the larger treatment plant reduced its effluent's total phosphorous concentration to 1.0 mg/l, then the resulting "dry

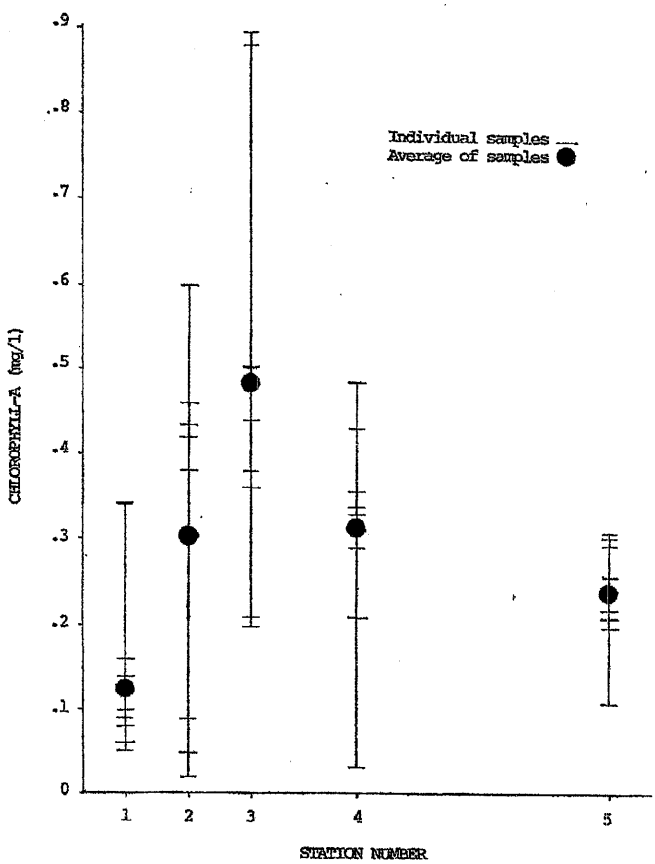

FIG. 5. Individual samples and averages of samples for surface chlorophyll-*a* concentrations at each station in July and August, 1972. Distances between stations are to scale along the x-axis.

weather" phosphorous load in Dickinson Bayou would be reduced by 70%. Their estimate took into account all known phosphorous-containing inflows to the bayou.

ALGAL ASSAYS

Methods

Since enrichment by secondary sewage effluent was shown to contribute to the cause of algal blooms in Dickinson Bayou, it was left to be demonstrated if advanced treatment for phosphorous removal would help reduce algal populations. Phosphorous rather than nitrogen removal was advocated as the preferred form of advanced treatment for several reasons: (1) the algal community in Dickinson Bayou often contained a large percentage of blue-green algae; Thomas (1971) found that the addition of phosphorous alone to water is sufficient to increase the growth of this type of algae, (2) blue-green algae are able to bind gaseous nitrogen organically, thereby producing nitrates and nitrites for green algae; Shapiro and Ribeiro (1965) have shown that the increased growth of blue-gree algae with available phosphorous may even supply enough nutrient nitrogen to produced blooms of green algae, (3) out of the putrified parts of organisms

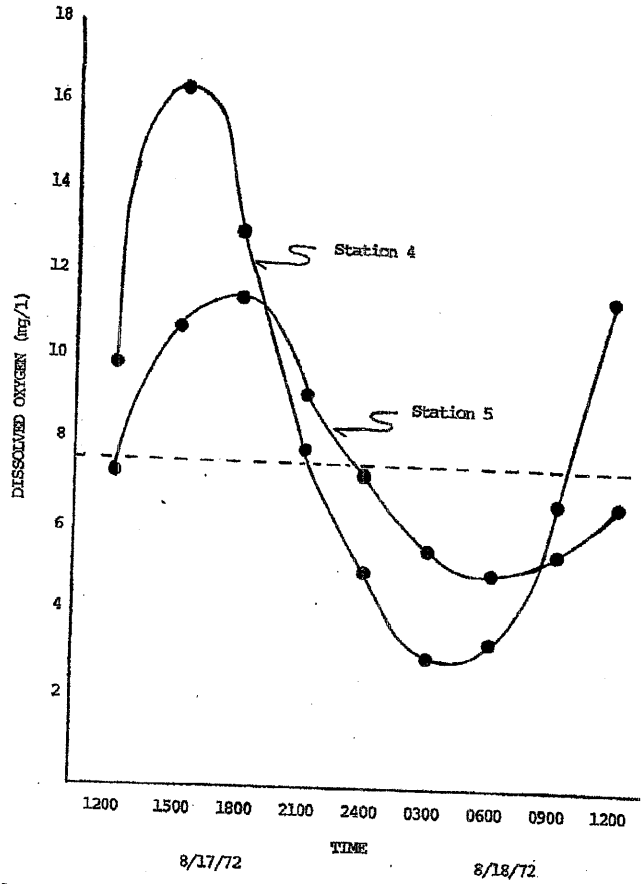

FIG. 6. Diel fluctuations in dissolved oxygen at stations 4 and 5 on August 17 and 18, a time of the highest chlorophyll-*a* concentrations at both stations during the study period. The dashed line indicates the normal saturation value for dissolved oxygen at the temperature and chloride values encountered during the twenty-four hour period.

and sludge, nitrogen compounds return in larger quantities than phosphorous compounds in the biochemical cycle (Thomas 1971), and (4) in the industralized areas of the Texas Gulf Coast, numerous industries produce ferric chloride and alum as by-products, providing a cheap and ample source of these compounds for sewage treatment plants to use for the coagulation of phosphorus.

Algal assays were conducted to demonstrate the benefits of using advanced treatment for phosphorus removal. The use of such algal growth tests has increased in recent years as a tool to help control eutrophication. Most of the assays now in use, including the test developed by the Joint Industry/Government Task Force on Eutrophication (United States Environmental Protection Agency, 1971), employ unialgal cultures, spiked with various combinations of nutrients, with the intent of determining which nutrient or nutrients are limiting to the growth of a specific algal species in a particular body of water. These tests usually require several replicates of each possible limiting nutrient, several culture media preparations, and strict measures to avoid bacteriological and chemical contamination. Even when a waste effluent is to be evaluated, the same procedures and precautions must be followed. In this study we used an assay that does not define a limiting nutrient *per se*, but does indicate how the algal population of a receiving

stream will respond to a particular sewage effluent. Here, the test was used to determine if there were any significant differences in algal growth between solutions of Dickinson Bayou water mixed with secondary sewage and bayou water mixed with actual and simulated tertiary sewage (phosphorous significantly removed by chemical coagulation). This assay procedure does not require elaborate laboratory facilities.

Algal assays were conducted beginning on 30 August, 1972, and again on 9 April, 1973. On the day prior to the tests, bayou water was collected from station 5 and secondary sewage effluent was collected from the larger plant on Dickinson Bayou. All water samples were filtered through Reeve Angel 1934 AH filter paper to remove the suspended solids. A portion of the Bayou water was kept unfiltered for use as a mixed phytoplankton seed. For the first assay, tertiary effluent (phosphorous substantially removed) was collected from the Houston Lighting and Power Company domestic waste treatment plant at Webster, Texas. This plant employs chemical coagulation and filtration and removes over 95% of the total influent phosphorous. For the second assay, phosphorus was removed from the secondary effluent in the laboratory, using the same coagulation process that is used at the Webster plant—$Al_2(SO_4)_3 \cdot 18H_2O$ was added to the secondary effluent and NaOH was used to neutralize the treated effluent.

To begin the assays, 200 ml solutions containing percentages of the sewage effluents with Dickinson Bayou water were placed in 300 ml erlenmeyer flasks. The dilutions of the effluents in the bayou water were chosen in accord with dilutions expected in actual practice. The volume of Dickinson Bayou from the sewage treatment plants upstream to FM 646 is approximately 90 million gallons ($341 \times 10^3 m^3$) (Texas Water Quality Board, unpublished). Assuming that the downstream flow of the bayou is negligible and that the sewage treatment plants discharge 2.0 million gallons (7571 m^3) per day, tidal action, by moving the effluent upstream, could cause this segment of the bayou to become as much as 50% sewage in 45 days. So, dilutions of 50, 30, 10, 5, and 0% sewage in bayou water were evaluated in the assays to represent the more extreme and less extreme conditions. A duplicate of each solution was prepared. Five milliliters of well mixed unfiltered Dickinson Bayou water were added to each solution to provide a mixed phytoplankton population as seed. The flasks were stoppered with cotton and placed on a three square foot surface within a Marsh Instruments Model 805 incubator. Two 15 watt fluorescent lamps with reflectors were placed above the flasks. To simulate summer conditions, the lamps were cycled on and off for 14 hours and 10 hours, respectively, and the temperature of the incubator was kept at 27 ± 1 C. During the assays the flasks were swirled daily to provide adequate CO_2 exchange. The positions of the flasks were altered daily to insure even light distribution.

The maximum standing crop, after a given period of time, was used to evaluate the growth of the algal populations. The first assay was concluded after 21 days. The algal mass in each flask was thoroughly mixed and the chlorophyll-*a* of the suspensions was determined. The second test was concluded after 23 days. For this assay the total suspended solids, rather than chlorophyll-*a* was used to measure algal biomass. This change in procedure was made because total suspended solids provides a more direct measurement of biomass. Microscopic examination of the algal cultures showed that algal forms were the dominant organisms, and that no zooplankters or other animal forms were present. At the beginning of this assay, the initial total suspended solids in each flask was negligible; therefore any weight increase was attributed to algal growth. To measure the suspended solids, a portion of each well mixed algal suspension was filtered through a pre-weighed 0.45 micron Millipore filter and dried overnight at 75 ± 2 C prior to weighing to ± 0.1 mg on an analytical balance.

Results

In the first algal assay, the total dissolved phosphorous concentrations of the secondary sewage effluent, tertiary effluent, and Dickinson Bayou water were 7.65 mg/l, 0.22 mg/l and 0.33 mg/l, respectively; in the second assay these same values were 8.91 mg/l, 0.35 mg/l and 0.14 mg/l. In both assays, the secondary

sewage effluent produced more algal biomass when added to the bayou water than did the bayou water alone. The dilutions of the secondary effluent also produced more algal biomass than did equal dilutions of the tertiary effluent (Fig. 7). The first assay did not give the same "stair-step" reduction in algal growth which was attained in the second assay. The results of the former assay, however, were reported as chlorophyll-*a* rather than as total suspended solids. Considering the small volumes involved and possible bleaching of chlorophyll-*a* during the assay (Shapiro and Ribiero 1965), total suspended solids was considered a more accurate parameter for evaluating the algal biomass. In the second assay the tertiary effluent gave a two- to four-fold reduction in algal growth over similar dilutions of secondary effluent.

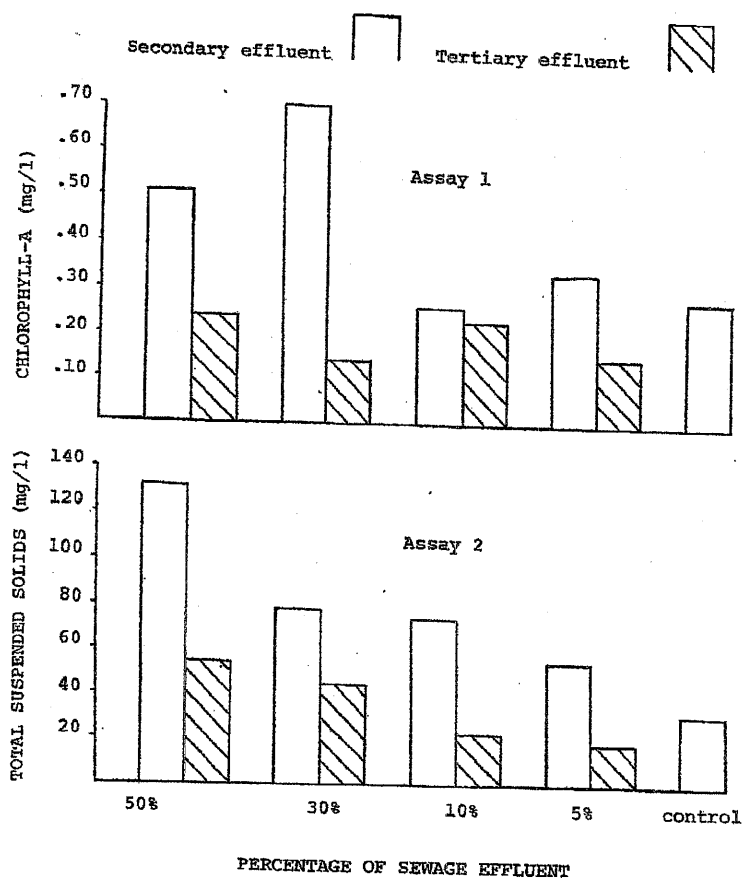

FIG. 7. Results of two laboratory algal assays, which compared the growth of mixed algal populations at equal percentages of secondary sewage effluent versus tertiary sewage effluent, in combinations with Dickinson Bayou water, showing the biomass reductions achieved with the latter treatment.

DISCUSSION AND CONCLUSION

The oxygen balance of Dickinson Bayou is upset by a combination of natural and man-caused influences. The low dissolved oxygen content of bottom waters during salt water intrusion is a characteristic of narrow, vertically stratified estuaries. This natural effect, by itself, is an unlikely cause of fish kills, since most organisms can avoid bottom waters. The intermediate and surface waters of stratified estuaries normally contain sufficient dissolved oxygen concentrations, unless disturbed by man. In Dickinson Bayou the two sewage treatment plants contribute nearly all of the wastes to the bayou during summers; and as determined by the field study, these wastes influence the affected portion of the bayou.

All of the major fish kills in Dickinson Bayou during 1971 and 1972 occurred during the night or early morning, and during significant algal blooms. The physical reaeration potential of the five km section of the bayou directly upstream from the two sewage treatment plants was estimated by Kirkpatrick (1972). He found that the BOD loading by the plants would reduce the dissolved oxygen to levels below 4.0 mg/l on less than 5% of the critical summer days. It therefore appears that the algal-stimulating nutrients in the sewage treatment plant effluents, rather than the oxygen demanding wastes, are the primary cause of the disturbance of the oxygen balance in the bayou from the area of SH 3 to FM 646.

Algal assays demonstrated that, in the critical six kilometers of the bayou above the sewage treatment plants, advanced treatment for phosphorous removal would likely reduced the algal standing crop to a level of one half, and possibly as little as one quarter, of past summer densities. This reduced standing crop would then be equal to, or less than, that which is normally present in summers at stations above and below the area of frequent fish kills. This algal biomass reduction could thus eliminate the extreme diel dissolved oxygen fluctuations in the affected portions of the bayou and greatly reduce the likelihood of summer fish kills.

Considering the algal assay results and the estimate that phosphorous removal to a level of 1.0 mg/l would reduce the phosphorous loading by 70%, it appears that phosphorous removal could alleviate the dissolved oxygen problems in Dickinson Bayou. In fact, the state regulatory agency over domestic waste discharges, the Texas Water Quality Board, has ordered the larger treatment plant to implement phosphorous removal. When the plant begins removing phosphorous from its effluent, another study should be conducted to determine if the conclusions of this study are indeed valid. Such a study would be helpful in determining how similar problems should be approached in the future; and if it is found that phosphorous removal significantly improves the situation, the availability of low cost chemical by-products for the removal of phosphorous would offer a relatively easy and inexpensive means for correcting other eutrophication problems.

Further, Kirkpatrick (1972) concluded that the sewage treatment plants on Dickinson Bayou were poorly located, because the area into which they discharge is "normally stagnant, highly eutrophic, unstable and typically supports no benthic organisms." The results of our field study support this conclusion. When

planning and selecting sites for future sewage treatment plants in tidal streams, the build-up of nutrients, which lead to algal blooms and fish kills, should be considered.

ACKNOWLEDGMENTS

We wish to thank Frances Shepard for her diligent assistance in the laboratory and D. B. Cosby for his help with the field work. We are grateful to J. Mayhew and J. S. Kirkpatrick for their helpful suggestions and comments. Taffy Knudson and Lanelle Hayes are to be commended for volunteering their time to type the manuscript. Special thanks are due to Drs. R. H. Moore and T. J. Bechtel for reviewing the manuscript and offering helpful criticisms and suggestions.

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February 25, 2010

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AT PUBLIC MEETING

Texas Commission on Environmental Quality
12100 Park 35 Circle
Austin, TX 78753

Dear Sir or Madam:

I have lived in Rockport, Texas since 1980. I am a founder and owner of Belaire Environmental, Inc., an environmental consulting firm headquartered in Rockport. We have provided water quality assessment and wetland/seagrass bed evaluation and restoration services to a wide array of clients along the Texas Coast for the past 30 years. As a local resident and an environmental professional, I am concerned with the City's proposal to continue the discharge of treated municipal waste into Little Bay. As you may be aware, Little Bay thrived for decades as a model seagrass habitat that was enjoyed and appreciated by recreational fishermen, bird watchers, boaters, tourists, aquatic scientists and the general public. Then in 2004, most of the seagrass beds in Little Bay disappeared. The cause of seagrass loss has not been definitively determined. However, it is likely that the combination of the continued discharge of treated municipal waste and increased sedimentation from stormwater into Little Bay have contributed significantly a decline in water quality and the subsequent loss of seagrass. The combination of uncontrolled stormwater runoff and the continual discharge of secondary wastewater have very likely led to increased turbidity and eutrophic conditions and the ultimate destruction of the seagrass ecosystem in Little Bay. My company installed experimental seagrass transplant plots in Little Bay in 2007 in an effort to re-establish the seagrass beds. This experiment failed probably due to the unacceptable water column turbidity due to the combination of sediment resuspension and algal production. The National Oceanic and Atmospheric Administration (NOAA) has classified parts of Aransas Bay as "moderately to highly eutrophic"[1]. Of the six eutrophication indicators NOAA used in its evaluation, Little Bay exhibits 4 of them: (1) Macroalgae (as recently as last

[1] Bricker, S.B., C.G. Clement, D.E. Pirhalla, S.P. Orlando, and D.R.G. Farrow. 1999. National Estuarine Eutrophication Assessment: Effects of Nutrient Enrichment in the Nation's Estuaries. NOAA, National Ocean Service, Special Projects Office and the National Centers for Coastal Ocean Science. Silver Spring, MD: 71 pp.

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week dense mats of macroalgae lined the western shoreline of Little Bay – in the midst of winter); (2) seagrass loss (well documented); (3) High Chloraphyll *a* – UTMSI's 2009 testing in Little Bay found Chloryphyll *a* levels in excess of NOAA's thresholds for medium and high eutrophic conditions (10 and 20 μg/l, respectively); and (4) Epiphytes (see attachment). Additionally, NOAA provides guidance for nutrient thresholds. Nitrogen and phosphorous concentrations above 1.0 mg/l and 0.1 mg/l, respectively, are considered high levels in the context of the eutrophic condition of an estuarine water body. The EPA (1986) found that phosphorous concentrations of 0.03 to 0.1 mg/l or higher will trigger algal blooms in systems that are not nitrogen limited[2]. Water samples taken from the treated municipal waste effluent which is eventually discharged into Little Bay indicate that relatively high levels of Phosphorous are being discharged. This being the case, Phosphorous is very likely contributing to the present eutrophic conditions in Little Bay.

The City is giving much attention to nitrogen loading into Little Bay, but virtually no attentions is being given to phosphorous loading and its contributions to eutrophication. NOAA experts noted that "phosphorous may be an important contributor to eutrophication in some Gulf of Mexico estuaries" and that the "relative roles of nitrogen and phosphorous need clarification". In the 1970's, the Texas Parks and Wildlife Department (TPWD) evaluated the roles of nitrogen and phosphorous in the eutrophic estuary of Dickinson Bayou, a tributary of Galveston Bay that suffered chronic dissolved oxygen fish kills (see attachment). TPWD found that phosphorous was the limiting nutrient in Dickinson Bayou and the Texas Water Quality Board required the City of Dickinson to drastically reduce its phosphorous loading into Dickinson Bayou. Little Bay does not yet suffer from chronic fish kills, but the loss of seagrass is a major indicator of eutrophication and a regrettable loss to the ecosystem and to the community. To prevent further degradation of the water quality of Little Bay, I ask that the TCEQ carefully evaluate the effects of and the alternatives to the continued discharge of city wastewater into Little Bay. My recommendations are as follows:

2 Osmond, D.L., D.E. Line, J.A. Gale, R.W. Gannon, C.B. Knott, K.A. Bartenhagen, M.H. Turner, S.W. Coffey, J. Spooner, J. Wells, J.C. Walker, L.L. Hargrove, M.A. Foster, P.D. Robillard, and D.W. Lehning. 1995. *WATERSHEDSS: Water, Soil and Hydro-Environmental Decision Support System*, http://h2osparc.wq.ncsu.edu.

1. Determine the limiting nutrient an the roles of both nitrogen and phosphorous in Little Bay; or
2. Reduce the levels of nitrogen and phosphorous into Little Bay to levels which will not result in excess algal production and excess water column turbidity; and
3. In lieu of 1 and 2, above, determine if means are economically available to reroute the discharge to another receiving body which has a greater capacity to assimilate the nutrient loading in the effluent.

Thank you for your consideration.

Sincerely,

Charlie Belaire

Encl.

CONTRIBUTIONS IN MARINE SCIENCE

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CAUSES AND PROBABLE CORRECTIVES FOR OXYGEN DEPLETION FISH KILLS IN THE DICKINSON BAYOU ESTUARY: A FIELD STUDY AND SIMPLIFIED ALGAL ASSAY

Ken Knudson and Charles E. Belaire

Texas Parks and Wildlife Department, Seabrook Marine Laboratory, P. O. Box 8, Seabrook 77586

ABSTRACT

Frequent oxygen depletion fish kills, caused by dense algal blooms, have occurred during summers in the six-kilometer portion of Dickinson Bayou directly upstream from two sewage treatment plants. These plants are the major contributors of wastes to the bayou. During summer periods of low freshwater inflow, the treatment plant effluents are carried upstream by tidal action, causing dense algal blooms; algal density is much less above tidal influence and downstream from the plant outfalls. Algal assays demonstrated that if the plants employed chemical coagulation to remove phosphorus, the summer algal densities in the critical six-kilometer portion of the bayou would be reduced to concentrations corresponding to, or less than, the levels found in the rest of the bayou. Such treatment would thereby reduce the probability of summer fish kills.

INTRODUCTION

Man's activities, which introduce excess nutrients into bodies of water, can adversely effect the aquatic environment. The artificial addition of nutrients accelerates the process of eutrophication and leads to increased algal growth. The consequences of hyper-eutrophication are usually unpleasant and solutions to the problem are often complex and difficult to attain.

In the coastal areas of Texas, where population and industrial development are increasing at a rapid rate, the problem of eutrophication is becoming a serious one. Our department investigated 48 eutrophication-related fish kills during 1971 and 1972, all in the Houston-Galveston area. Recurring kills were investigated in some of the small, shallow, tidal streams, or bayous, during periods of light rainfall. One such bayou was Dickinson Bayou, located in Galveston and Brazoria counties, Texas, where it meanders some 36 kilometers from its source near Alvin to its confluence with Galveston Bay (Fig. 1).

Dickinson Bayou has a watershed of 106 square miles (275 km^2) which is drained by seventeen small tributaries. Most of the tributaries carry only rainfall runoff. The land in the watershed is used primarily for livestock grazing and for the farming of rice, soy beans, milo, corn and sweet sorghum. The principal

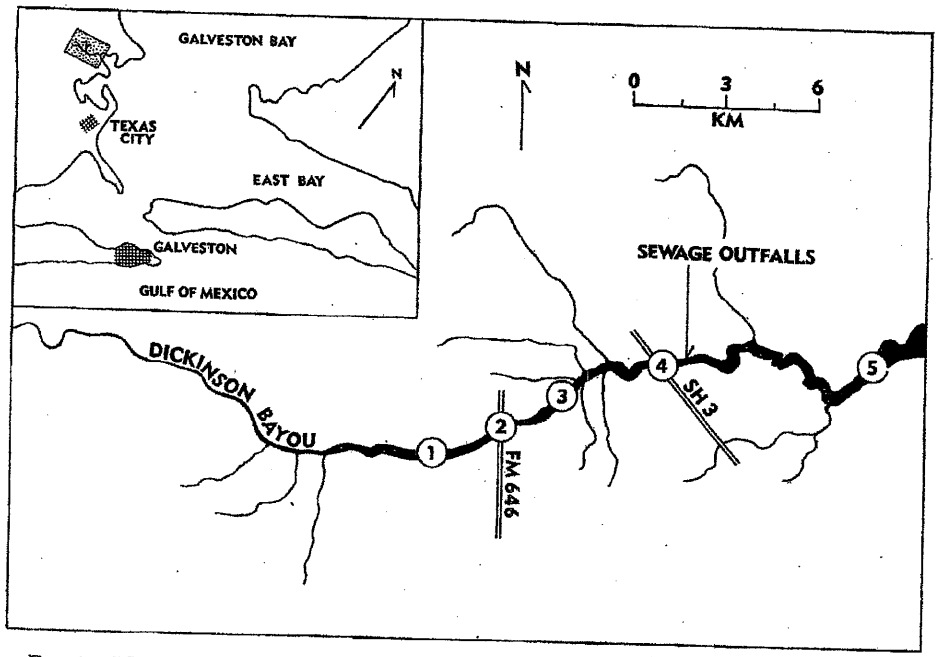

FIG. 1. Map of Dickinson Bayou with the locations of the sewage treatment plant outfalls and sampling stations.

residential and commercial development along the bayou is in and around the unincorporated town of Dickinson, which has a population of 14,000. The area has a mild climate with an average winter temperature of 53 F (11.7 C), an average summer temperature of 83 F (28.3 C) and an annual mean temperature of 69 F (20.6 C). The average annual rainfall in the watershed is 45 to 50 inches (114–127 cm). Kirkpatrick (1972) provides a very detailed description of the area.

Dickinson Bayou is used for recreational fishing, canoeing, swimming and water skiing. Saline water intrudes nearly halfway up the bayou during dry weather, providing salt water fishing, crabbing and shrimping as additional recreation. But, according to long time residents, the aesthetics of Dickinson Bayou have deteriorated in recent years. During the warmer months floating mats of algae are present and fish kills are frequent. In 1971 our department investigated five fish kills in the bayou and estimated that over four million fish were destroyed. These fish kills, and a large kill in July, 1972, were concentrated in the area of Dickinson Bayou between State Highway 3 (SH 3) and Farm to Market Road 646 (FM 646) (Fig. 1). The cause of all these fish kills was attributed to low dissolved oxygen concentrations.

The normal diel fluctuation of dissolved oxygen is disturbed by two principal factors: (1) the addition of industrial, agricultural and domestic wastes which are available for biological and chemical oxidation, and (2) "blooms" of algae, which supersaturate the water with oxygen during the day through photosyn-

thesis and deplete the oxygen at night through respiration. In Dickinson Bayou, the most damaging of man's activities appears to be the introduction of domestic waste. Only two small industries discharge into the bayou, and agricultural runoff usually occurs during periods of heavy rainfall in spring and autumn. In contrast, two domestic treatment plants, located along the bayou within two kilometers of each other, discharge nearly two million gallons (7571 m^3) of wastewater per day. Both plants provide secondary treatment and have no facilities for nutrient removal.

Early in 1972, the larger of the two sewage treatment plants announced plans to increase the volume of its 1.2 million- gallon (4542 m^3) per day discharge. Because of these expansion plans, we conducted a field study of Dickinson Bayou from April through August of 1972 to determine what factors were likely causing a disturbance in the oxygen balance of the stream, particularly between SH 3 and FM 646, where the numerous fish kills have been concentrated. We wanted to determine if the sewage treatment plants' effluents contributed to the algal blooms and fish kills, since they were immediately downstream from this area. Once we suspected that the plants might be an influence, we conducted laboratory algal assays to determine if advanced treatment for phosphorous removal might alleviate the majority of the water quality problems in the bayou.

FIELD STUDY

Methods

Five stations on Dickinson Bayou were sampled weekly from 20 April through 31 August, 1972. Three stations were within the area of frequent fish kills, with one station above and one station below this area (Fig. 1). The sewage treatment plants' effluents were sampled monthly for total phosphorous. Surface and bottom salinity, dissolved oxygen and temperature were measured in the bayou. All samples were collected at mid-stream between 9:00 A.M. and 11:30 A.M. on each date. Surface values for total phosphorous and chlorophyll-*a* were also determined beginning in the first week of July, when saline water became detectable on the botton at all three stations within the area of the fish kills. To estimate the phosphorous content of incoming tidal waters, weekly surface samples for total phosphorous analysis were collected from the mouth of the bayou between 7 July and 31 August, 1972. Salinities were measured with a Goldberg Model TC Refractometer. The azide modification of the Winkler Method was used for dissolved oxygen measurements. Phosphorous samples were separated into dissolved and suspended fractions by filtering the samples through a 0.45 micron Millipore filter. The samples were then digested using persulfate oxidation, followed by the ascorbic acid technique for the final colorimetric determination (Amer. Public Health Ass. 1971.).

Since chlorophyll-*a* limits the rate of photosynthesis (Holmes 1968), and can usually be directly related to plant biomass (Odum 1959), this pigment was measured as a rough index of algal standing crop. Chlorophyll-*a* was determined by the technique of Odum, McConnell and Abbott (1958). After filtering the sample through a 0.45 micron Millipore filter, the filter and residue were dissolved in 90% acetone and kept in the dark at 4 C for twenty-four hours. To determine the chlorophyll-*a* concentration, the optical density of the acetone extract was measured on a Bausch and Lomb Spectronic 20 at a wave length of 665 mμ.

Results

In April and May, due to heavy rainfall, freshwater runoff dominated the bayou's circulation. Salinity values were negligible, while the dissolved oxygen

content of surface and bottom waters was near saturation at all sample stations. As the rain decreased in June, saline water began to intrude upstream, first on the bottom, then on the surface. Only a small amount of mixing occurred between the surface water and the more dense saline layers, resulting in very low dissolved oxygen concentrations on the bottom (Fig. 2). Precipitation and surface runoff into the bayou continued to be negligible in July and August, and tidal action dominated circulation (Fig. 3).

Ketchum (1971) stated that a pollutant is carried upstream in an estuary to the same extent that salt is carried upstream, and by the same mechanism. To show that this type of tidal transport system functions in Dickinson Bayou, surface phosphorous samples were collected weekly in July and August (Fig. 4). The highest phosphorous concentration was found at the station nearest the sewage treatment plants, decreasing upstream in proportion to decreasing salinity ($p < 0.01$, for the product-moment correlation between surface phosphorous and salinity concentrations; $r = 0.76$ with 23 degrees of freedom). The average total phosphorous concentration of incoming tidal waters, found by sampling the mouth of the bayou in July and August, was 0.325 mg/l, with a range from 0.47 mg/l, on August 31, to 0.20 mg/l on July 7. The phosphorous levels at the "affected" stations, stations 2 through 4, differed significantly from those at "unaffected" station 1 ($p < 0.01$, using the *t*-test for paired observations with 7 degrees of freedom) and from those measured at the bayou's mouth ($p < 0.05$,

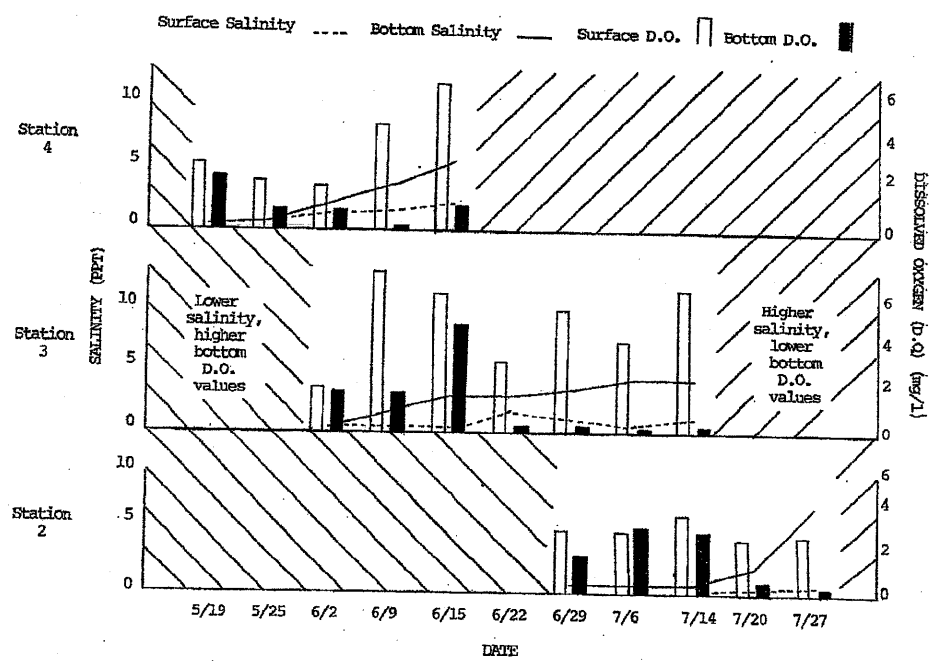

FIG. 2. Salinity and dissolved oxygen values for selected dates at stations 2, 3, and 4, showing the upstream movement of saline water with its low dissolved oxygen content.

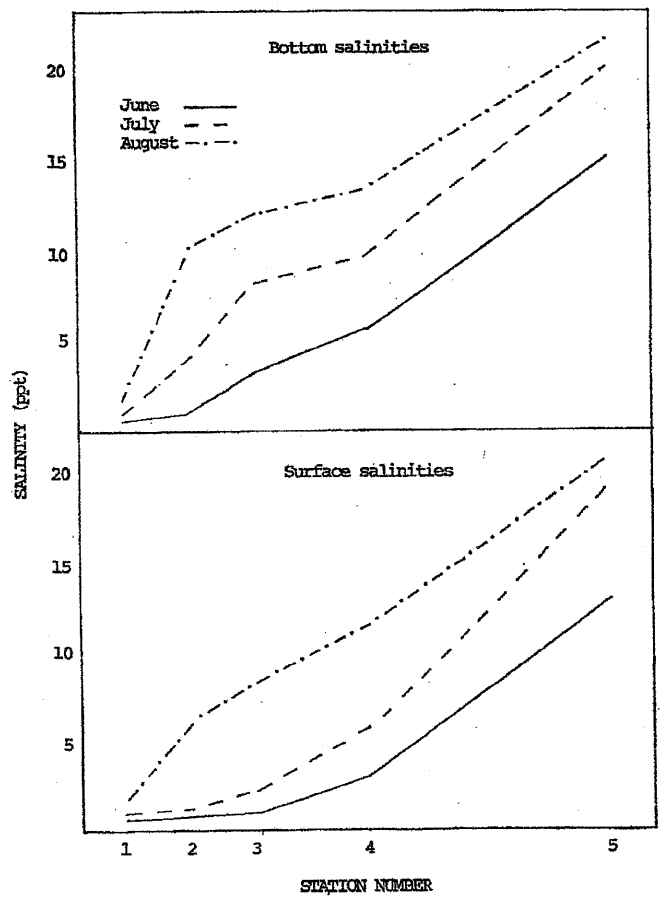

FIG. 3. Monthly station averages for salinity on the surface and the bottom. Distances are to scale along the x-axis.

using the *t*-test for paired observations with 7 degrees of freedom). The highest chlorophyll-*a* concentrations were found in the same segment of the bayou as were the highest total phosphorous concentrations, i.e., stations 2 through 4 (Figure 5). The chlorophyll-*a* levels at stations 1 and 5 were significantly different from those at stations 2, 3 and 4 ($p < 0.05$, using the *t*-test for paired observations with 7 degrees of freedom).

Since the area between stations 2 and 4 was the focal point of frequent fish kills, a cause-and-effect relationship between algal density and oxygen balance was evaluated. On August 17, the chlorophyll-*a* value for stations 4 and 5 were 0.48 mg/l and 0.31 mg/l, respectively. These values represented the densest algal concentrations found at each during the study. Dissolved oxygen concentrations were determined over a twenty-four hour period, at three-hour intervals, beginning at noon on August 17. The dissolved oxygen range fluctuated 13.4 mg/l at station 4 compared to 6.5 mg/l at station 5 (Fig. 6). Extreme diel

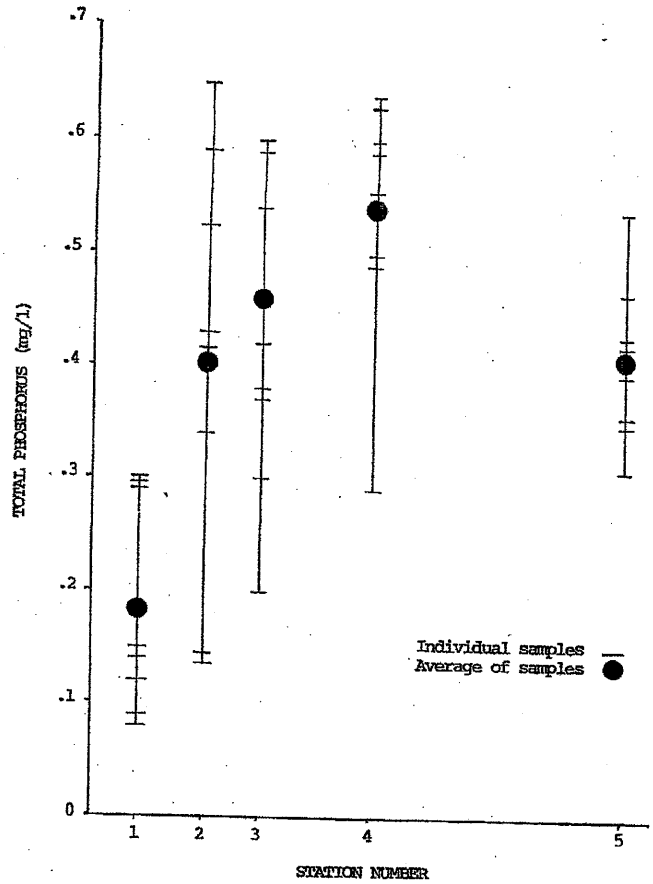

FIG. 4. Individual samples and averages for total surface phosphorus concentrations at each station in July and August, 1972. Distances between stations are to scale along the x-axis.

fluctuations in dissolved oxygen in Dickinson Bayou can be attributed to algal density, since the incident solar radiation, vertical mixing or wind, would be nearly equal throughout all of the stations. As shown by the chlorophyll-*a* data in Figure 5, algal populations capable of producing extreme dissolved oxygen fluctuations, such as occurred at station 4 on August 17, were present on at least five occasions at stations within the area of frequent fish kills, but never at the other "unaffected" stations.

Monthly total phosphorous analyses on the effluents from the sewage treatment plants showed that the average phosphorous concentration at the larger plant was 11.1 mg/l, with levels ranging from 9.6 mg/l in April to 14.2 mg/l in July. The smaller plant's discharge averaged 10.2 mg/l of total phosphorous, with a low value of 8.8 mg/l in April and a high value of 12.7 mg/l in August. Scudday and Nichols (1972) calculated that if the larger treatment plant reduced its effluent's total phosphorous concentration to 1.0 mg/l, then the resulting "dry

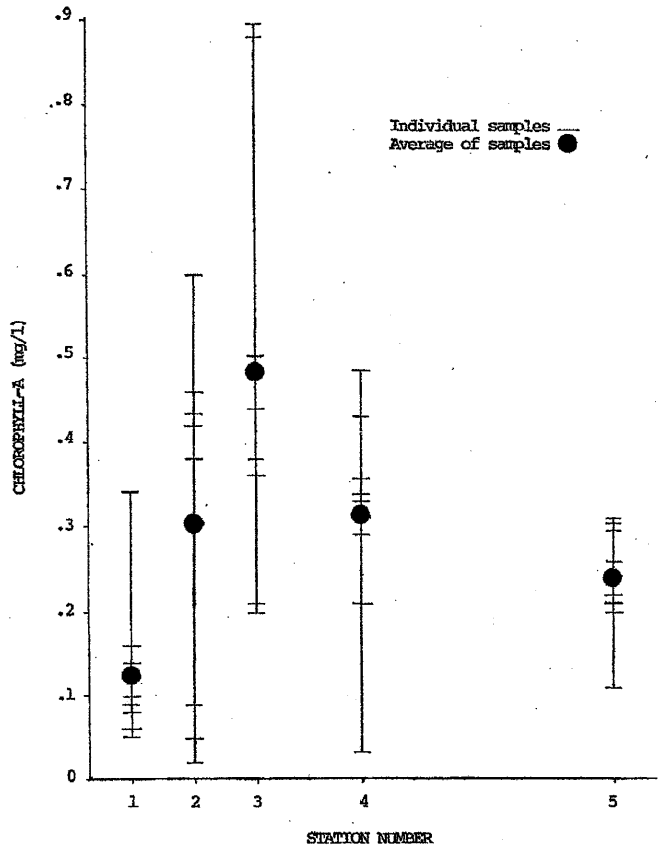

FIG. 5. Individual samples and averages of samples for surface chlorophyll-*a* concentrations at each station in July and August, 1972. Distances between stations are to scale along the x-axis.

weather" phosphorous load in Dickinson Bayou would be reduced by 70%. Their estimate took into account all known phosphorous-containing inflows to the bayou.

ALGAL ASSAYS

Methods

Since enrichment by secondary sewage effluent was shown to contribute to the cause of algal blooms in Dickinson Bayou, it was left to be demonstrated if advanced treatment for phosphorous removal would help reduce algal populations. Phosphorous rather than nitrogen removal was advocated as the preferred form of advanced treatment for several reasons: (1) the algal community in Dickinson Bayou often contained a large percentage of blue-green algae; Thomas (1971) found that the addition of phosphorous alone to water is sufficient to increase the growth of this type of algae, (2) blue-green algae are able to bind gaseous nitrogen organically, thereby producing nitrates and nitrites for green algae; Shapiro and Ribeiro (1965) have shown that the increased growth of blue-gree algae with available phosphorous may even supply enough nutrient nitrogen to produced blooms of green algae, (3) out of the putrified parts of organisms

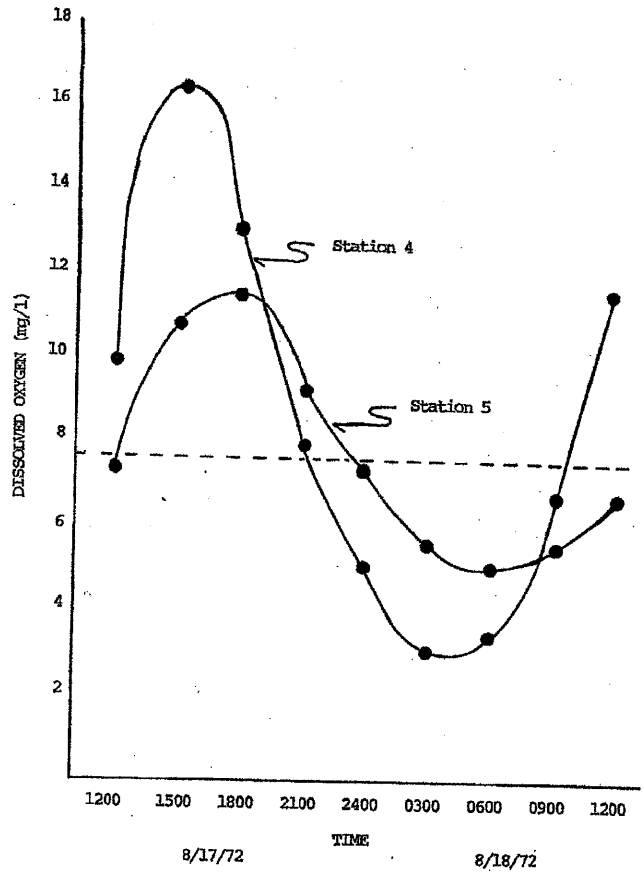

FIG. 6. Diel fluctuations in dissolved oxygen at stations 4 and 5 on August 17 and 18, a time of the highest chlorophyll-*a* concentrations at both stations during the study period. The dashed line indicates the normal saturation value for dissolved oxygen at the temperature and chloride values encountered during the twenty-four hour period.

and sludge, nitrogen compounds return in larger quantities than phosphorous compounds in the biochemical cycle (Thomas 1971), and (4) in the industralized areas of the Texas Gulf Coast, numerous industries produce ferric chloride and alum as by-products, providing a cheap and ample source of these compounds for sewage treatment plants to use for the coagulation of phosphorus.

Algal assays were conducted to demonstrate the benefits of using advanced treatment for phosphorus removal. The use of such algal growth tests has increased in recent years as a tool to help control eutrophication. Most of the assays now in use, including the test developed by the Joint Industry/Government Task Force on Eutrophication (United States Environmental Protection Agency, 1971), employ unialgal cultures, spiked with various combinations of nutrients, with the intent of determining which nutrient or nutrients are limiting to the growth of a specific algal species in a particular body of water. These tests usually require several replicates of each possible limiting nutrient, several culture media preparations, and strict measures to avoid bacteriological and chemical contamination. Even when a waste effluent is to be evaluated, the same procedures and precautions must be followed. In this study we used an assay that does not define a limiting nutrient *per se*, but does indicate how the algal population of a receiving

stream will respond to a particular sewage effluent. Here, the test was used to determine if there were any significant differences in algal growth between solutions of Dickinson Bayou water mixed with secondary sewage and bayou water mixed with actual and simulated tertiary sewage (phosphorous significantly removed by chemical coagulation). This assay procedure does not require elaborate laboratory facilities.

Algal assays were conducted beginning on 30 August, 1972, and again on 9 April, 1973. On the day prior to the tests, bayou water was collected from station 5 and secondary sewage effluent was collected from the larger plant on Dickinson Bayou. All water samples were filtered through Reeve Angel 1934 AH filter paper to remove the suspended solids. A portion of the Bayou water was kept unfiltered for use as a mixed phytoplankton seed. For the first assay, tertiary effluent (phosphorous substantially removed) was collected from the Houston Lighting and Power Company domestic waste treatment plant at Webster, Texas. This plant employs chemical coagulation and filtration and removes over 95% of the total influent phosphorous. For the second assay, phosphorus was removed from the secondary effluent in the laboratory, using the same coagulation process that is used at the Webster plant—$Al_2(SO_4)_3 \cdot 18H_2O$ was added to the secondary effluent and NaOH was used to neutralize the treated effluent.

To begin the assays, 200 ml solutions containing percentages of the sewage effluents with Dickinson Bayou water were placed in 300 ml erlenmeyer flasks. The dilutions of the effluents in the bayou water were chosen in accord with dilutions expected in actual practice. The volume of Dickinson Bayou from the sewage treatment plants upstream to FM 646 is approximately 90 million gallons ($341 \times 10^3 m^3$) (Texas Water Quality Board, unpublished). Assuming that the downstream flow of the bayou is negligible and that the sewage treatment plants discharge 2.0 million gallons (7571 m^3) per day, tidal action, by moving the effluent upstream, could cause this segment of the bayou to become as much as 50% sewage in 45 days. So, dilutions of 50, 30, 10, 5, and 0% sewage in bayou water were evaluated in the assays to represent the more extreme and less extreme conditions. A duplicate of each solution was prepared. Five milliliters of well mixed unfiltered Dickinson Bayou water were added to each solution to provide a mixed phytoplankton population as seed. The flasks were stoppered with cotton and placed on a three square foot surface within a Marsh Instruments Model 805 incubator. Two 15 watt fluorescent lamps with reflectors were placed above the flasks. To simulate summer conditions, the lamps were cycled on and off for 14 hours and 10 hours, respectively, and the temperature of the incubator was kept at 27 ± 1 C. During the assays the flasks were swirled daily to provide adequate CO_2 exchange. The positions of the flasks were altered daily to insure even light distribution.

The maximum standing crop, after a given period of time, was used to evaluate the growth of the algal populations. The first assay was concluded after 21 days. The algal mass in each flask was thoroughly mixed and the chlorophyll-*a* of the suspensions was determined. The second test was concluded after 23 days. For this assay the total suspended solids, rather than chlorophyll-*a* was used to measure algal biomass. This change in procedure was made because total suspended solids provides a more direct measurement of biomass. Microscopic examination of the algal cultures showed that algal forms were the dominant organisms, and that no zooplankters or other animal forms were present. At the beginning of this assay, the initial total suspended solids in each flask was negligible; therefore any weight increase was attributed to algal growth. To measure the suspended solids, a portion of each well mixed algal suspension was filtered through a pre-weighed 0.45 micron Millipore filter and dried overnight at 75 ± 2 C prior to weighing to ± 0.1 mg on an analytical balance.

Results

In the first algal assay, the total dissolved phosphorous concentrations of the secondary sewage effluent, tertiary effluent, and Dickinson Bayou water were 7.65 mg/l, 0.22 mg/l and 0.33 mg/l, respectively; in the second assay these same values were 8.91 mg/l, 0.35 mg/l and 0.14 mg/l. In both assays, the secondary

sewage effluent produced more algal biomass when added to the bayou water than did the bayou water alone. The dilutions of the secondary effluent also produced more algal biomass than did equal dilutions of the tertiary effluent (Fig. 7). The first assay did not give the same "stair-step" reduction in algal growth which was attained in the second assay. The results of the former assay, however, were reported as chlorophyll-*a* rather than as total suspended solids. Considering the small volumes involved and possible bleaching of chlorophyll-*a* during the assay (Shapiro and Ribiero 1965), total suspended solids was considered a more accurate parameter for evaluating the algal biomass. In the second assay the tertiary effluent gave a two- to four-fold reduction in algal growth over similar dilutions of secondary effluent.

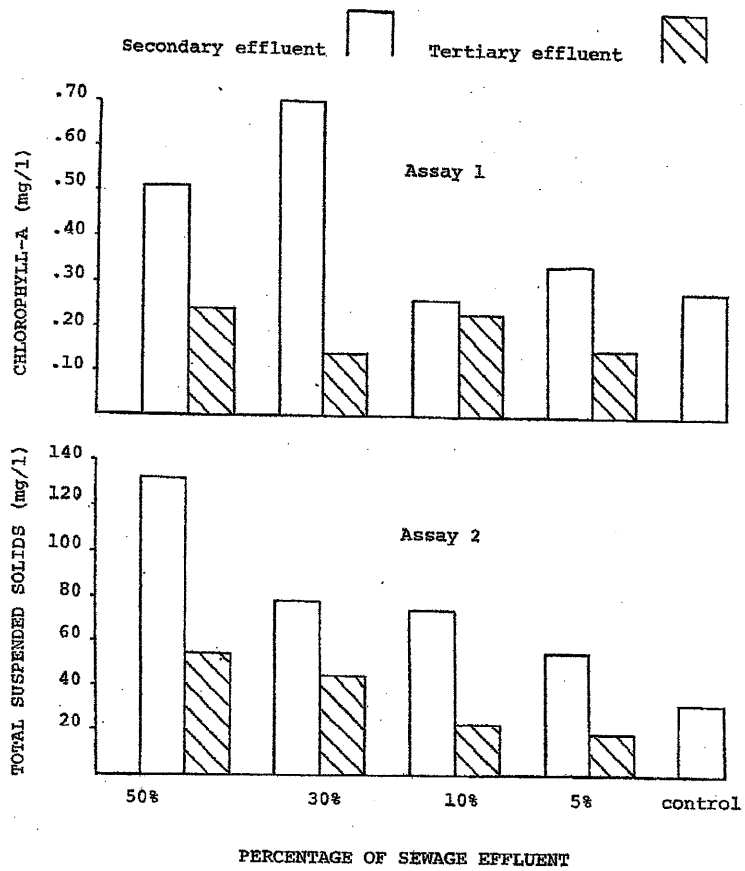

FIG. 7. Results of two laboratory algal assays, which compared the growth of mixed algal populations at equal percentages of secondary sewage effluent versus tertiary sewage effluent, in combinations with Dickinson Bayou water, showing the biomass reductions achieved with the latter treatment.

DISCUSSION AND CONCLUSION

The oxygen balance of Dickinson Bayou is upset by a combination of natural and man-caused influences. The low dissolved oxygen content of bottom waters during salt water intrusion is a characteristic of narrow, vertically stratified estuaries. This natural effect, by itself, is an unlikely cause of fish kills, since most organisms can avoid bottom waters. The intermediate and surface waters of stratified estuaries normally contain sufficient dissolved oxygen concentrations, unless disturbed by man. In Dickinson Bayou the two sewage treatment plants contribute nearly all of the wastes to the bayou during summers; and as determined by the field study, these wastes influence the affected portion of the bayou.

All of the major fish kills in Dickinson Bayou during 1971 and 1972 occurred during the night or early morning, and during significant algal blooms. The physical reaeration potential of the five km section of the bayou directly upstream from the two sewage treatment plants was estimated by Kirkpatrick (1972). He found that the BOD loading by the plants would reduce the dissolved oxygen to levels below 4.0 mg/l on less than 5% of the critical summer days. It therefore appears that the algal-stimulating nutrients in the sewage treatment plant effluents, rather than the oxygen demanding wastes, are the primary cause of the disturbance of the oxygen balance in the bayou from the area of SH 3 to FM 646.

Algal assays demonstrated that, in the critical six kilometers of the bayou above the sewage treatment plants, advanced treatment for phosphorous removal would likely reduced the algal standing crop to a level of one half, and possibly as little as one quarter, of past summer densities. This reduced standing crop would then be equal to, or less than, that which is normally present in summers at stations above and below the area of frequent fish kills. This algal biomass reduction could thus eliminate the extreme diel dissolved oxygen fluctuations in the affected portions of the bayou and greatly reduce the likelihood of summer fish kills.

Considering the algal assay results and the estimate that phosphorous removal to a level of 1.0 mg/l would reduce the phosphorous loading by 70%, it appears that phosphorous removal could alleviate the dissolved oxygen problems in Dickinson Bayou. In fact, the state regulatory agency over domestic waste discharges, the Texas Water Quality Board, has ordered the larger treatment plant to implement phosphorous removal. When the plant begins removing phosphorous from its effluent, another study should be conducted to determine if the conclusions of this study are indeed valid. Such a study would be helpful in determining how similar problems should be approached in the future; and if it is found that phosphorous removal significantly improves the situation, the availability of low cost chemical by-products for the removal of phosphorous would offer a relatively easy and inexpensive means for correcting other eutrophication problems.

Further, Kirkpatrick (1972) concluded that the sewage treatment plants on Dickinson Bayou were poorly located, because the area into which they discharge is "normally stagnant, highly eutrophic, unstable and typically supports no benthic organisms." The results of our field study support this conclusion. When

planning and selecting sites for future sewage treatment plants in tidal streams, the build-up of nutrients, which lead to algal blooms and fish kills, should be considered.

ACKNOWLEDGMENTS

We wish to thank Frances Shepard for her diligent assistance in the laboratory and D. B. Cosby for his help with the field work. We are grateful to J. Mayhew and J. S. Kirkpatrick for their helpful suggestions and comments. Taffy Knudson and Lanelle Hayes are to be commended for volunteering their time to type the manuscript. Special thanks are due to Drs. R. H. Moore and T. J. Bechtel for reviewing the manuscript and offering helpful criticisms and suggestions.

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Little Bay Project Summary

Mike Gill, Kim Jackson, and Sally Morehead
Submitted by Ken Dunton, Professor
UT Marine Science Institute
Port Aransas, TX 78373
30 July 2007

Introduction:

Little Bay is a relatively small and semi-enclosed coastal lagoon on the north side of Aransas Bay in Rockport, Texas. This bay has historically supported lush seagrass beds that provide shelter and nursery areas for a variety of aquatic species. Some of these species are preyed upon by the diverse bird population in the area that has made Little Bay a popular spot for birders around the state. However, recent aerial photography and local surveys show that the shoal grass (*Halodule wrightii*) beds in Little Bay are in decline, having diminished considerably over the past decade (Figure 1). Consequently, the city of Rockport is considering a planting program in an attempt to restore the seagrass beds to their historically healthy status. In support of this effort, a sampling program was designed to assess the abiotic factors that ultimately determine the suitability of the sediments and water column to support shoalgrass establishment and growth. This brief report summarizes the results of measurements made in and around the fringing seagrass beds at four locations in Little Bay.

Methods:

Multiple key parameters were chosen to assess the chemistry and abiotic conditions of each of four study sites at Little Bay (Figure 2) on 26 June 2007. Station locations included a site located just south of a storm water outfall adjacent to Cherry Street (site 1), just south of Tule Creek outfall (site 3), and a station located between sites 1 and 3 in proximity to a nearby storm drain (site 2). A fourth station (Bayside site) was established on the channel that connects Little Bay with Aransas Bay. We used a YSI sonde to take basic water quality measurements of temperature (degrees C), salinity (ppt), dissolved oxygen (% and mg/L), and pH at the surface and at depth from within the seagrass bed and an adjacent unvegetated (barren) area at each of the four locations. A light meter was also employed to measure photosynthetically active radiation (PAR) at surface and bottom depths from within the seagrass bed and barren patch at each location. Additionally, duplicate samples were taken for total suspended solids (TSS), nitrite (NO_2^-) + nitrate (NO_3^-), ammonium (NH_4^+), and chlorophyll *a* content in the water column at the barren patch at each site. We collected replicate benthic sediment samples for porewater ammonium analysis within both the seagrass bed and barren patch at each site. Finally, we constructed a landscape profile of each of the four sites by measuring the distance from the shore to the center of the fringing seagrass bed, the depth in the center of the bed, the distance from the shore to the barren patch sampling location, and the depth at that location. GPS coordinates were used to mark the shore location and barren patch location of each study site.

Water and sediment samples were processed in the lab. Nitrate + nitrite content was measured by first running samples through a cadmium reduction column to reduce nitrate to nitrite, with absorbance measured at a given wavelength to determine concentrations after additional reagents were added on a spectrophometer. Similarly, both the water column and

sediment ammonium (after centrifugation and isolation) samples were oxidized by several chemical reagents to yield a sample that could be run through the spectrometer at a specific wavelength to determine concentrations. Total suspended sediment samples were weighed following filtration; chlorophyll *a* samples were first filtered, extracted with acetone overnight, and then run on a spectrometer to determine concentrations.

Results:

At midday on 26 June, we noted seagrasses at sites 1, 2 and Bayside. At site 1, a *H. wrightii* bed 2.5 in width was located at 0.5 m depths 16 m from the shoreline. No grasses were present at 0.65 m in the adjacent barren area 30 m from shore. At site 2, a bed 12 m in width was located at 0.42 m depths 25 m from the shoreline. No grasses were present at 0.68 m in the adjacent barren area 40 m from shore. We found no grasses at site 3, although water depths were only 0.39 m about 30 m from the shoreline. At the bayside site, a bed 17.5 in width was located at 0.37 m depths 21 m from the shoreline. In comparison to sites 1 and 2, blades of *H. wrightii* were shorter and narrower. No grasses were present at 0.75 m in the adjacent barren area 40 m from shore. The slope of the seabed from shore to barren patch was greatest at the bayside site and least at site 1.

The water quality data from the four study sites at Little Bay were consistent, showing very little horizontal or vertical variation between sites and within each site. Overall, temperature varied slightly from 30.7 to 31.9 °C, and salinity from 15.1 to 15.6 ppt, Dissolved oxygen was slightly higher at the surface than at depth with an overall range of 6.0 to 9.1 mgL^{-1}. PAR data was used to calculate the light attenuation (k_s) coefficients for each respective location. We found the most turbid waters at the bayside site, while all other sites were characterized by slightly higher attenuation coefficients within the seagrass bed compared to the adjacent barren patch (Figure 3). Light attenuation coefficients ranged from 1.8 to 3.0 m^{-1} except at the bayside seagrass site (5.8 m^{-1}). TSS levels were high, ranging from 34 to 40 mgL^{-1} except at the bayside seagrass site, which was 56 m^{-1} (Figure 4). Chlorophyll *a* content ranged from 14-16 μg/L and was quite consistent among all sites, except for site 2, which was nearly half the value of the others (Figure 5). Porewater ammonium concentrations (150-300 μM) were highest at the bayside barren site, though sites 1 and 2 indicated higher values within the seagrass bed (Figure 6). As shown in Figure 7, there were significant amounts of ammonium (1.5-3.0 μM) in the water column at all sites, with the highest concentrations occurring at the barren areas at sites 2 and 3. Only trace amounts of nitrate and nitrite were found in the water column samples, the highest of which (0.3 μM) was recorded in the barren area at site 1 (Figure 8).

Discussion:

The data collected on a single visit to Little Bay in June demonstrated that there are no conditions that in themselves are well outside the tolerances for establishment and growth of shoal grass. However, the water quality conditions in Little Bay are also not conducive for seagrass bed proliferation. Salinities in Little Bay are on the low side (15 ppt) to maintain healthy populations of shoal grass (*Halodule wrightii*), although the brackish waters are ideal for widgeon grass (*Ruppia maritima*). It is important to note that the water quality concentrations, including salinity, were collected on a single day and may not be representative of the average water quality concentrations. In the six days prior to sampling, the area experienced several days of rainfall (2 inches total) (Weather Underground, www.wunderground.com), which combined with the large number of storm water outfalls into Little Bay, could be the cause of the low

salinity values. It is likely that the average salinities in Little Bay are sufficient for the current populations of shoal grass, but additional water quality monitoring would be required to test this hypothesis. Both TSS and PAR data (Figures 3 and 4) verify the field observations that the bayside site in Little Bay is subject to greater light attenuation which may be related to its closer proximity to the centrally-located channel used for recreational boating. The less favorable light conditions at this site is likely the reason for the noticeably less robust seagrass specimens that were present at this site. The light attenuation coefficients at all sites were high; values equal or greater than 2 for k_s are not conducive for seagrass bed expansion into deeper waters. The restriction of shoal grass in Little Bay to relatively very shallow depths (0.5 m) reflect the poor light environment in which these plants must live. The high light attenuation coefficients are clearly associated with elevated TSS vales and chlorophyll. The higher k_s values in the seagrass beds (Figure 3) could be the result of terrestrial runoff that affects the near-shore fringing seagrass patches to a greater extent than the offshore barren areas.

Photosynthetic organisms preferentially take up ammonium over other nitrogen nutrient forms because of its energy-efficient conversion into amino acids. The presence of this nutrient in significant amounts in the water column is likely responsible for the higher chlorophyll concentrations noted at all the sites. Since nitrate levels are low, the source for the water column ammonium is likely the sediments, which were characterized by relatively high ammonium values (150-300 μM). The high porewater ammonium values in seagrass beds in this area are not unusual, but the longer residence time of waters in Little Bay allows for limited dilution by bay waters.

Based on the limited data available, low salinity and high light attenuation of waters in Little Bay are likely responsible for the disappearance of shoal grass. The absence of grasses at site 2 is probably related to the presence of a storm drain which exposes the immediate area to periods of freshwater inundation and higher turbidity. Elevated light attenuation coefficients (>2) are related to both chlorophyll and TSS. Although non-point anthropogenic sources of nitrogen may be responsible for the ammonium present in the water column, this cannot be determined without stable isotopic analyses of the plants and water.

Figures:

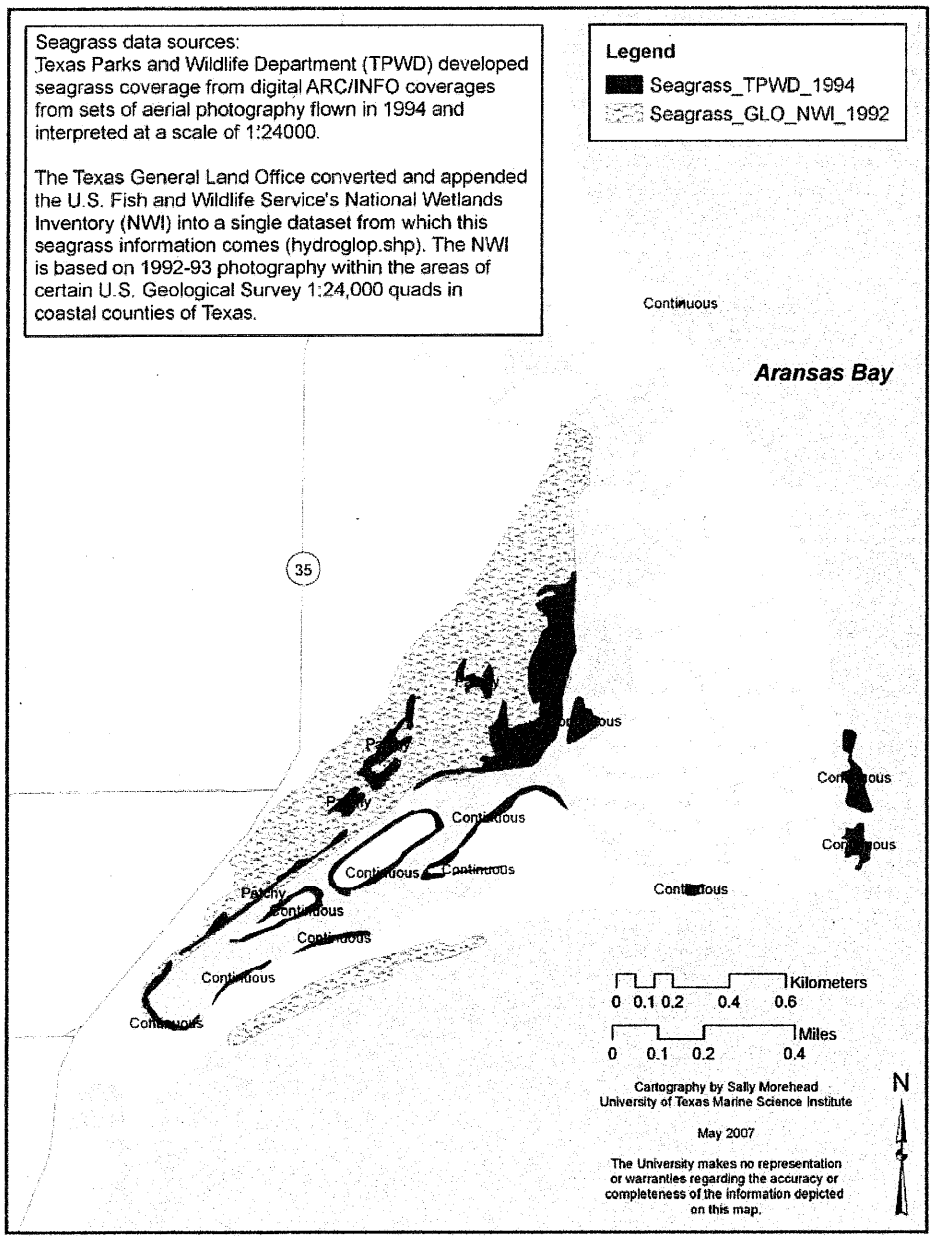

Figure 1: Historical coverage of seagrass beds in Little Bay.

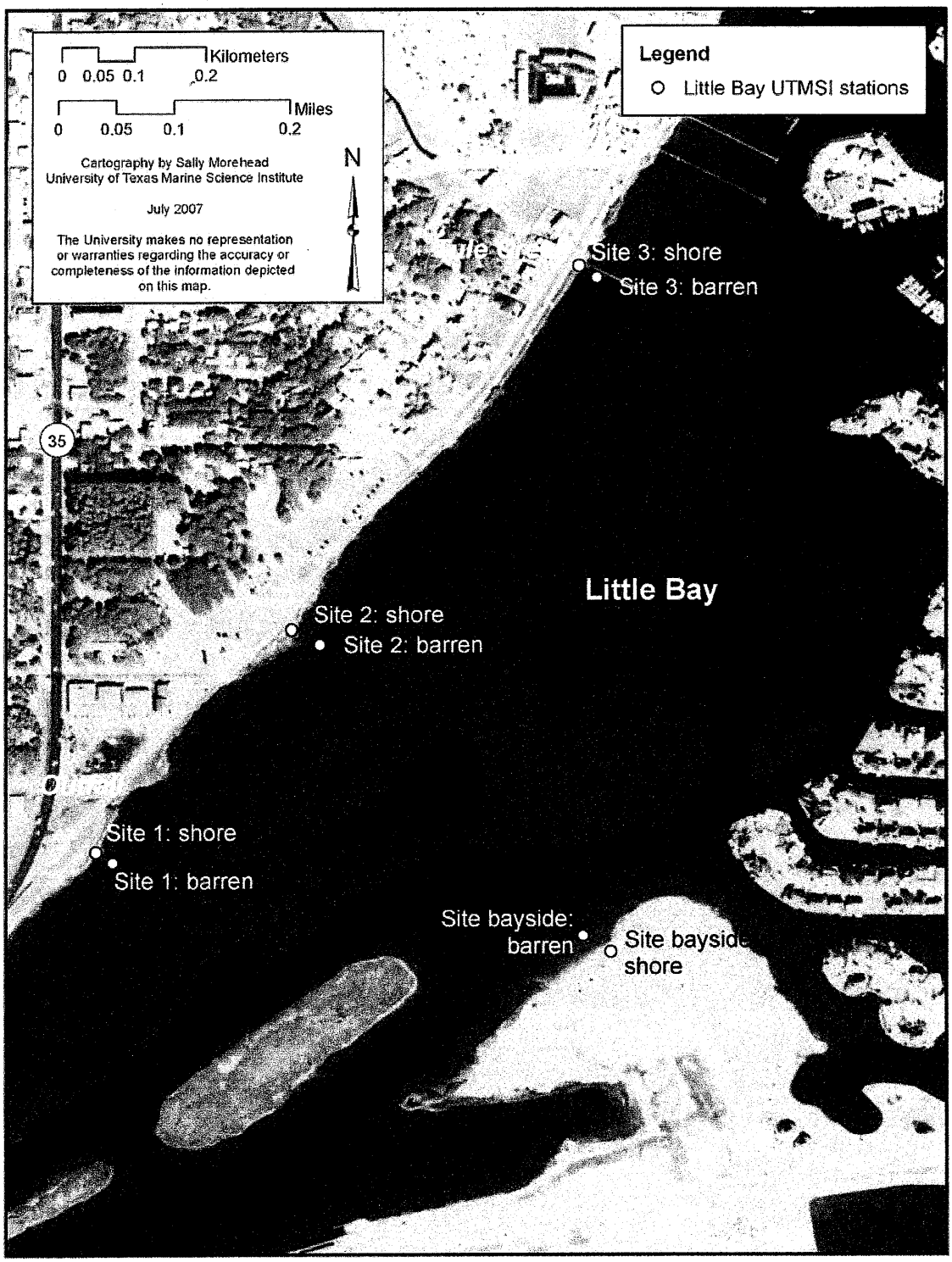

Figure 2: Location of sampling sites in Little Bay, Rockport.

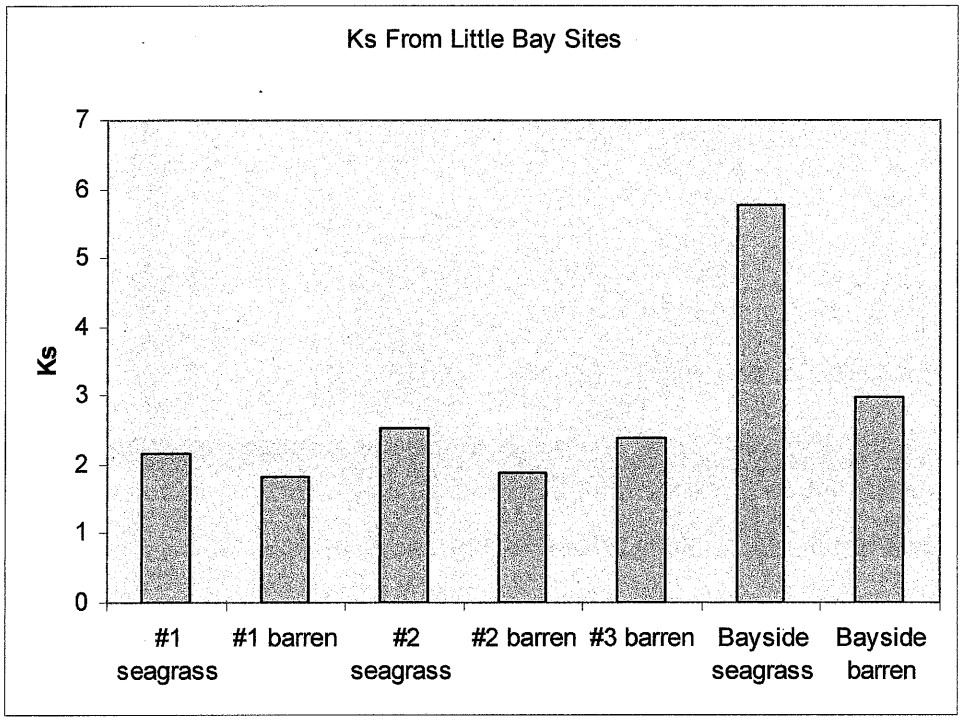

Figure 3: The light attenuating coefficients (K_s) for the seagrass beds and barren patches at each study site.

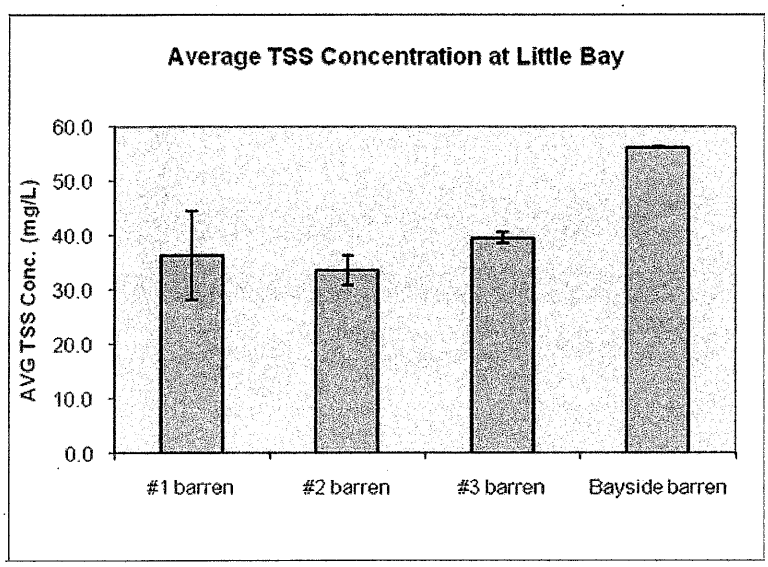

Figure 4: The mean (± SE) total suspended solids (TSS) measured from water column samples taken at the barren areas of each site.

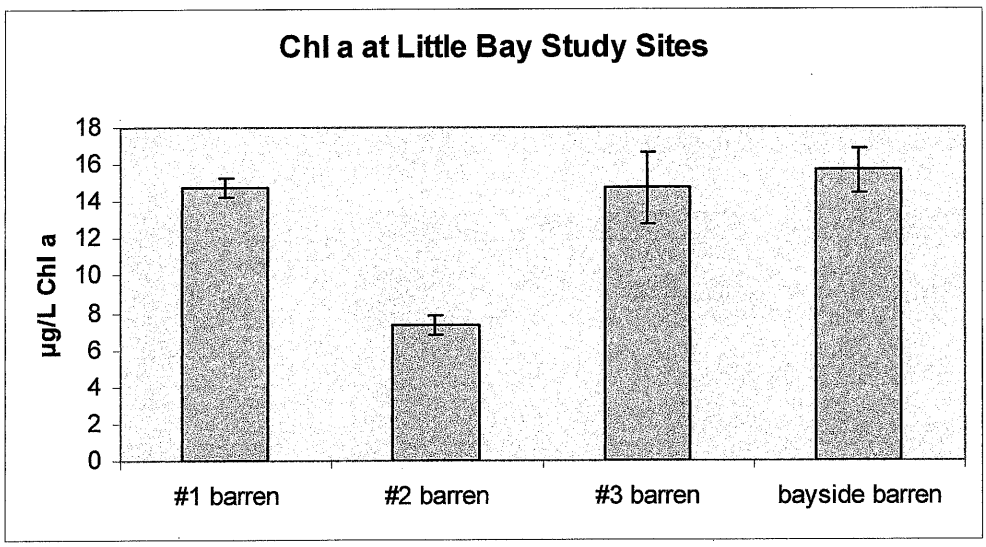

Figure 5: The mean (± SE) chlorophyll *a* concentrations measured from the water column samples taken at the barren areas of each site.

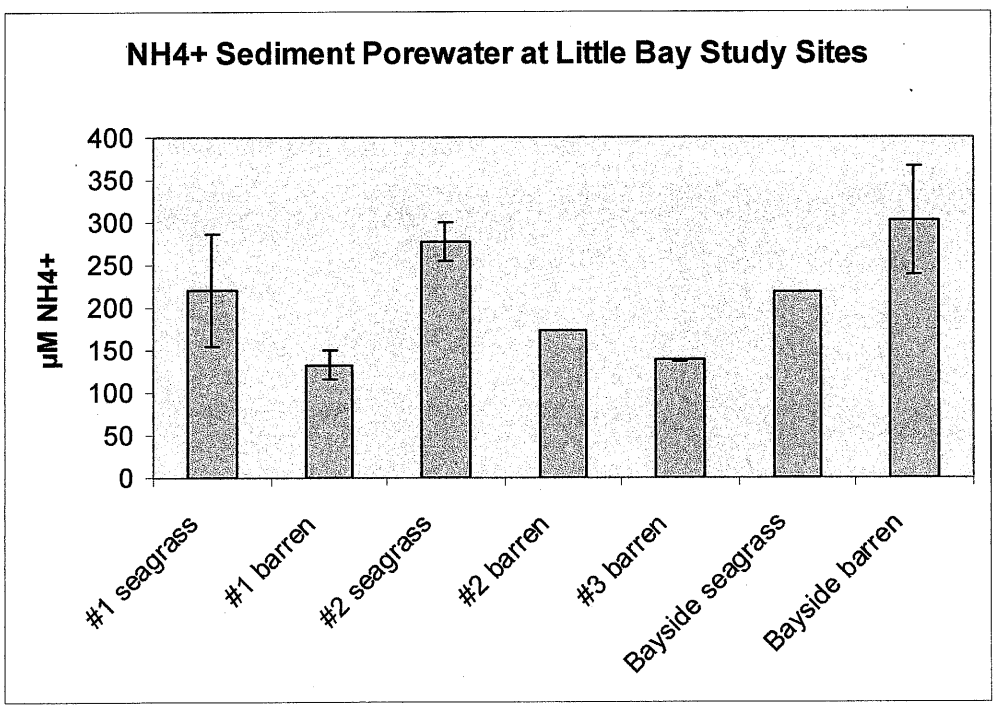

Figure 6: The average NH_4^+ (± SE) concentrations in sediment porewater within the seagrass beds and barren patches at each study site.

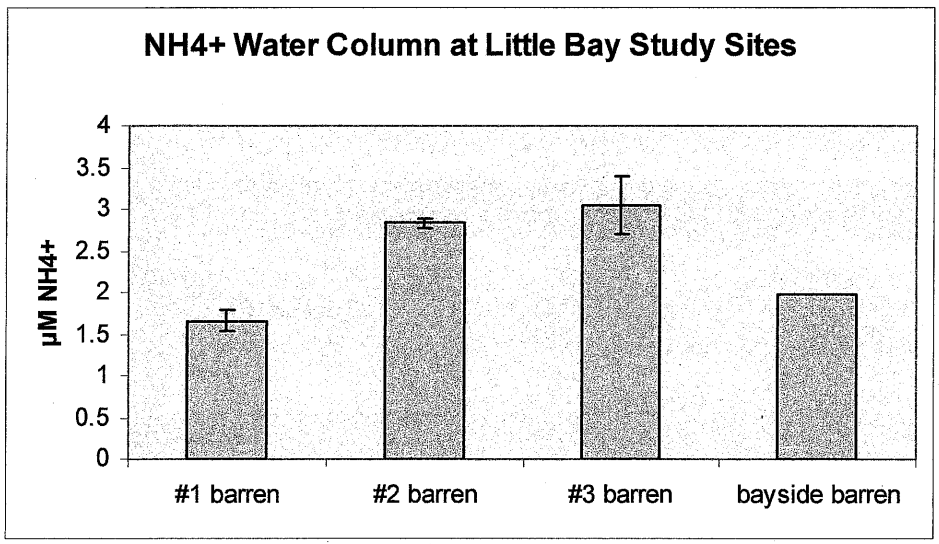

Figure 7: The mean (± SE) NH_4^+ concentrations measured from the water column samples taken at the barren areas of each site.

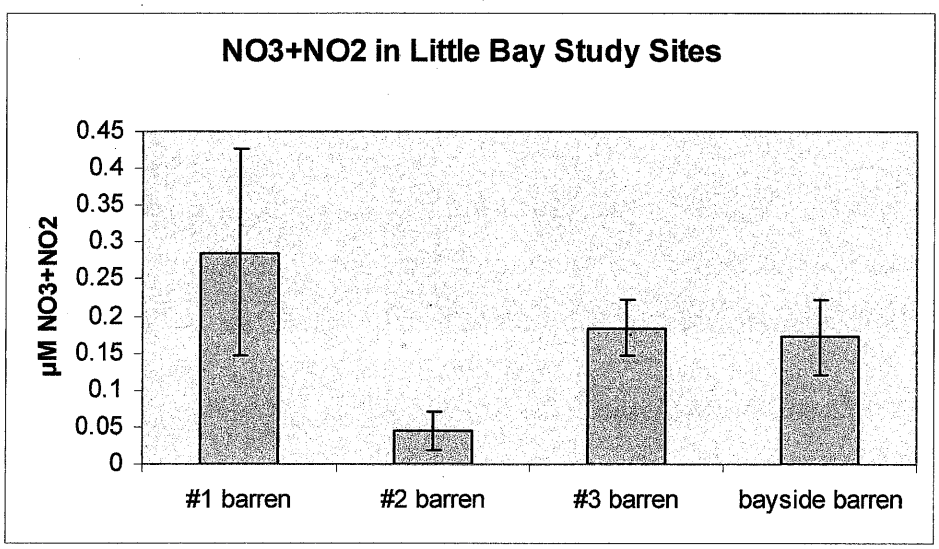

Figure 8: The average (± SE) NO_3^- and NO_2^- concentrations measured from the water column samples taken at the barren areas of each site.

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Date: 12/7/2009 10:47 AM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2
Attachments: Contributions in Marine Science Publication_August 1975.pdf

MWD 69298

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>>> <estuary123@aol.com> 12/4/2009 5:16 PM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
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ADDRESS:PO BOX 741
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PHONE:3617292948
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COMMENTS: Dear Sir or Madam, I have lived in Rockport, Texas since 1980. I am founder and an owner of Belaire Environmental, Inc., an environmental consulting firm headquartered in Rockport. We have provided water quality assessment and wetland/seagrass bed creation services to a wide array of clients along the Texas Coast for the past 30 years. As a local resident and an environmental professional, I am concerned with the City's proposal to continue the discharge of treated municipal waste into Little Bay. As you may be aware, Little Bay thrived for decades as a model seagrass habitat that was enjoyed and appreciated by recreational fishermen, bird watchers, boaters, tourists, aquatic scientists and the general public. Then in 2004, most of the seagrass beds in Little Bay disappeared. The cause of seagrass loss has not been definitively determined. However, my observations indicate that stormwater runoff from major construction projects earlier this decade contributed significant sediment loading to Little Bay during the historically high rainfall years of 2002-2004. Also the daily loading of nutrients from The Citys treatment plant likely have contributed to water quality degradation by delivering a steady nutrient loading which leads to eutrophic conditions. The combination of uncontrolled stormwater runoff and the continual discharge of secondary wastewater have very likely led to the destruction of the seagrass ecosystem in Little Bay. My company installed experimental seagrass transplant plots in Little Bay in 2007 in an effort to re-establish the seagrass beds. This experiment failed probably due to the now unacceptable water column turbidity. For the above reasons, I request that your agency consider requiring the City of Rockport to remove phosphorous and nitrogen in its effluent to levels which will not lead to eutrophic conditions in Little Bay. Scientific methods are available to allow the City to determine the limiting nutrient(s) and to determine acceptable concentrations of these nutrients for discharge into Little Bay (see attached). I also request that TCEQ hold a public hearing on this permit request before a permit decision is made. Thank you for your consideration.

CONTRIBUTIONS IN MARINE SCIENCE

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CAUSES AND PROBABLE CORRECTIVES FOR OXYGEN DEPLETION FISH KILLS IN THE DICKINSON BAYOU ESTUARY: A FIELD STUDY AND SIMPLIFIED ALGAL ASSAY

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Texas Parks and Wildlife Department, Seabrook Marine Laboratory, P. O. Box 8, Seabrook 77586

ABSTRACT

Frequent oxygen depletion fish kills, caused by dense algal blooms, have occurred during summers in the six-kilometer portion of Dickinson Bayou directly upstream from two sewage treatment plants. These plants are the major contributors of wastes to the bayou. During summer periods of low freshwater inflow, the treatment plant effluents are carried upstream by tidal action, causing dense algal blooms; algal density is much less above tidal influence and downstream from the plant outfalls. Algal assays demonstrated that if the plants employed chemical coagulation to remove phosphorus, the summer algal densities in the critical six-kilometer portion of the bayou would be reduced to concentrations corresponding to, or less than, the levels found in the rest of the bayou. Such treatment would thereby reduce the probability of summer fish kills.

INTRODUCTION

Man's activities, which introduce excess nutrients into bodies of water, can adversely effect the aquatic environment. The artificial addition of nutrients accelerates the process of eutrophication and leads to increased algal growth. The consequences of hyper-eutrophication are usually unpleasant and solutions to the problem are often complex and difficult to attain.

In the coastal areas of Texas, where population and industrial development are increasing at a rapid rate, the problem of eutrophication is becoming a serious one. Our department investigated 48 eutrophication-related fish kills during 1971 and 1972, all in the Houston-Galveston area. Recurring kills were investigated in some of the small, shallow, tidal streams, or bayous, during periods of light rainfall. One such bayou was Dickinson Bayou, located in Galveston and Brazoria counties, Texas, where it meanders some 36 kilometers from its source near Alvin to its confluence with Galveston Bay (Fig. 1).

Dickinson Bayou has a watershed of 106 square miles (275 km^2) which is drained by seventeen small tributaries. Most of the tributaries carry only rainfall runoff. The land in the watershed is used primarily for livestock grazing and for the farming of rice, soy beans, milo, corn and sweet sorghum. The principal

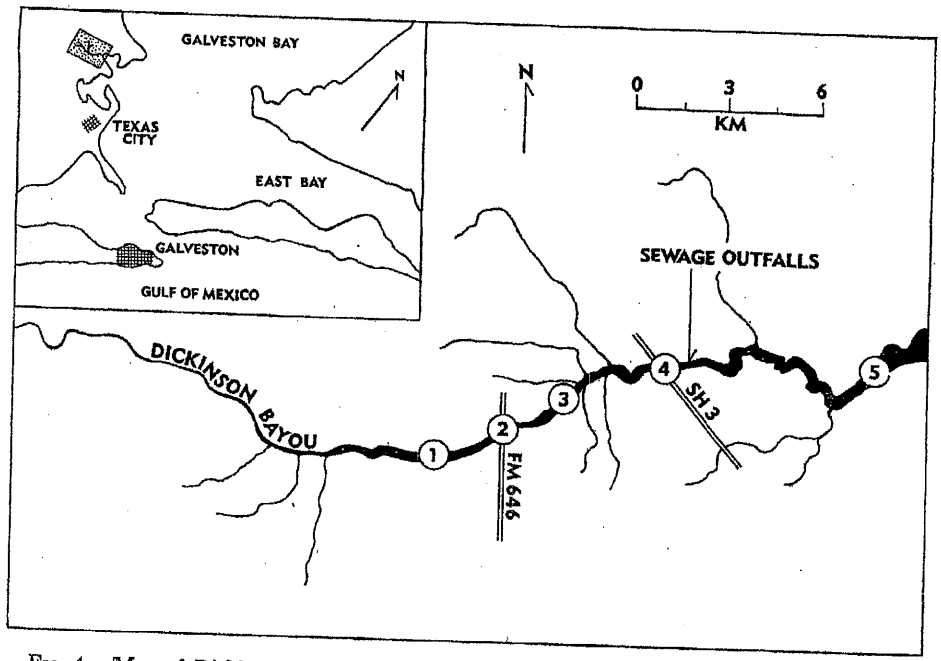

FIG. 1. Map of Dickinson Bayou with the locations of the sewage treatment plant outfalls and sampling stations.

residential and commercial development along the bayou is in and around the unincorporated town of Dickinson, which has a population of 14,000. The area has a mild climate with an average winter temperature of 53 F (11.7 C), an average summer temperature of 83 F (28.3 C) and an annual mean temperature of 69 F (20.6 C). The average annual rainfall in the watershed is 45 to 50 inches (114–127 cm). Kirkpatrick (1972) provides a very detailed description of the area.

Dickinson Bayou is used for recreational fishing, canoeing, swimming and water skiing. Saline water intrudes nearly halfway up the bayou during dry weather, providing salt water fishing, crabbing and shrimping as additional recreation. But, according to long time residents, the aesthetics of Dickinson Bayou have deteriorated in recent years. During the warmer months floating mats of algae are present and fish kills are frequent. In 1971 our department investigated five fish kills in the bayou and estimated that over four million fish were destroyed. These fish kills, and a large kill in July, 1972, were concentrated in the area of Dickinson Bayou between State Highway 3 (SH 3) and Farm to Market Road 646 (FM 646) (Fig. 1). The cause of all these fish kills was attributed to low dissolved oxygen concentrations.

The normal diel fluctuation of dissolved oxygen is disturbed by two principal factors: (1) the addition of industrial, agricultural and domestic wastes which are available for biological and chemical oxidation, and (2) "blooms" of algae, which supersaturate the water with oxygen during the day through photosyn-

thesis and deplete the oxygen at night through respiration. In Dickinson Bayou, the most damaging of man's activities appears to be the introduction of domestic waste. Only two small industries discharge into the bayou, and agricultural runoff usually occurs during periods of heavy rainfall in spring and autumn. In contrast, two domestic treatment plants, located along the bayou within two kilometers of each other, discharge nearly two million gallons (7571 m^3) of wastewater per day. Both plants provide secondary treatment and have no facilities for nutrient removal.

Early in 1972, the larger of the two sewage treatment plants announced plans to increase the volume of its 1.2 million- gallon (4542 m^3) per day discharge. Because of these expansion plans, we conducted a field study of Dickinson Bayou from April through August of 1972 to determine what factors were likely causing a disturbance in the oxygen balance of the stream, particularly between SH 3 and FM 646, where the numerous fish kills have been concentrated. We wanted to determine if the sewage treatment plants' effluents contributed to the algal blooms and fish kills, since they were immediately downstream from this area. Once we suspected that the plants might be an influence, we conducted laboratory algal assays to determine if advanced treatment for phosphorous removal might alleviate the majority of the water quality problems in the bayou.

FIELD STUDY

Methods

Five stations on Dickinson Bayou were sampled weekly from 20 April through 31 August, 1972. Three stations were within the area of frequent fish kills, with one station above and one station below this area (Fig. 1). The sewage treatment plants' effluents were sampled monthly for total phosphorous. Surface and bottom salinity, dissolved oxygen and temperature were measured in the bayou. All samples were collected at mid-stream between 9:00 A.M. and 11:30 A.M. on each date. Surface values for total phosphorous and chlorophyll-*a* were also determined beginning in the first week of July, when saline water became detectable on the botton at all three stations within the area of the fish kills. To estimate the phosphorous content of incoming tidal waters, weekly surface samples for total phosphorous analysis were collected from the mouth of the bayou between 7 July and 31 August, 1972. Salinities were measured with a Goldberg Model TC Refractometer. The azide modification of the Winkler Method was used for dissolved oxygen measurements. Phosphorous samples were separated into dissolved and suspended fractions by filtering the samples through a 0.45 micron Millipore filter. The samples were then digested using persulfate oxidation, followed by the ascorbic acid technique for the final colorimetric determination (Amer. Public Health Ass. 1971.).

Since chlorophyll-*a* limits the rate of photosynthesis (Holmes 1968), and can usually be directly related to plant biomass (Odum 1959), this pigment was measured as a rough index of algal standing crop. Chlorophyll-*a* was determined by the technique of Odum, McConnell and Abbott (1958). After filtering the sample through a 0.45 micron Millipore filter, the filter and residue were dissolved in 90% acetone and kept in the dark at 4 C for twenty-four hours. To determine the chlorophyll-*a* concentration, the optical density of the acetone extract was measured on a Bausch and Lomb Spectronic 20 at a wave length of 665 mμ.

Results

In April and May, due to heavy rainfall, freshwater runoff dominated the bayou's circulation. Salinity values were negligible, while the dissolved oxygen

content of surface and bottom waters was near saturation at all sample stations. As the rain decreased in June, saline water began to intrude upstream, first on the bottom, then on the surface. Only a small amount of mixing occurred between the surface water and the more dense saline layers, resulting in very low dissolved oxygen concentrations on the bottom (Fig. 2). Precipitation and surface runoff into the bayou continued to be negligible in July and August, and tidal action dominated circulation (Fig. 3).

Ketchum (1971) stated that a pollutant is carried upstream in an estuary to the same extent that salt is carried upstream, and by the same mechanism. To show that this type of tidal transport system functions in Dickinson Bayou, surface phosphorous samples were collected weekly in July and August (Fig. 4). The highest phosphorous concentration was found at the station nearest the sewage treatment plants, decreasing upstream in proportion to decreasing salinity ($p < 0.01$, for the product-moment correlation between surface phosphorous and salinity concentrations; $r = 0.76$ with 23 degrees of freedom). The average total phosphorous concentration of incoming tidal waters, found by sampling the mouth of the bayou in July and August, was 0.325 mg/l, with a range from 0.47 mg/l, on August 31, to 0.20 mg/l on July 7. The phosphorous levels at the "affected" stations, stations 2 through 4, differed significantly from those at "unaffected" station 1 ($p < 0.01$, using the *t*-test for paired observations with 7 degrees of freedom) and from those measured at the bayou's mouth ($p < 0.05$,

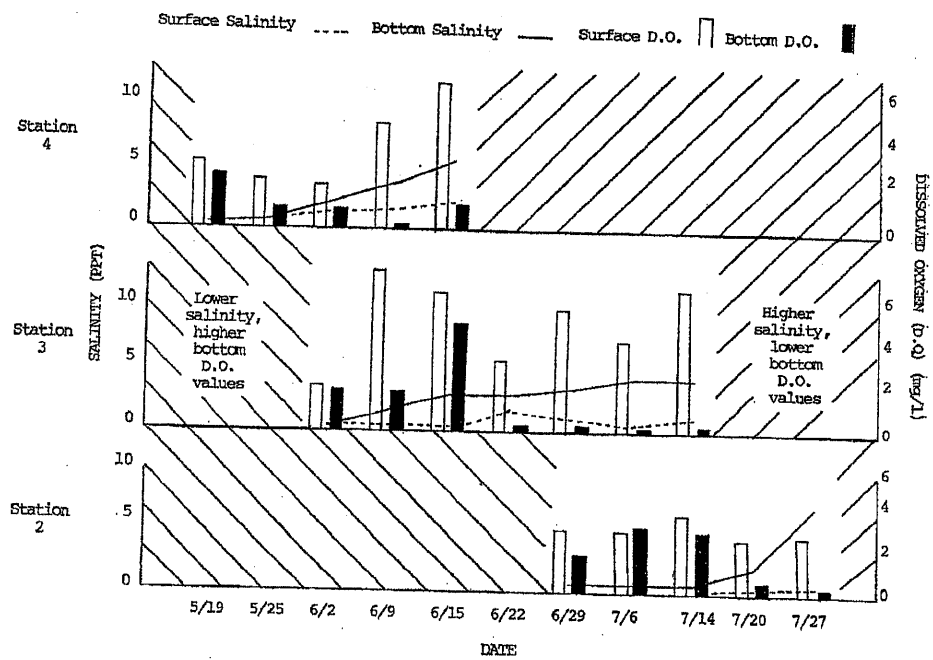

FIG. 2. Salinity and dissolved oxygen values for selected dates at stations 2, 3, and 4, showing the upstream movement of saline water with its low dissolved oxygen content.

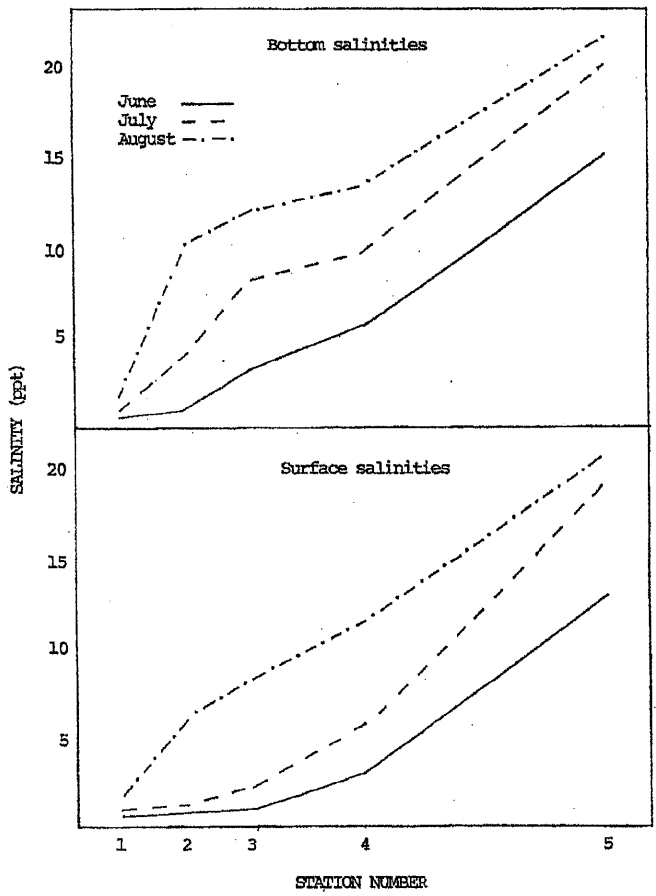

FIG. 3. Monthly station averages for salinity on the surface and the bottom. Distances are to scale along the x-axis.

using the *t*-test for paired observations with 7 degrees of freedom). The highest chlorophyll-*a* concentrations were found in the same segment of the bayou as were the highest total phosphorous concentrations, i.e., stations 2 through 4 (Figure 5). The chlorophyll-*a* levels at stations 1 and 5 were significantly different from those at stations 2, 3 and 4 ($p < 0.05$, using the *t*-test for paired observations with 7 degrees of freedom).

Since the area between stations 2 and 4 was the focal point of frequent fish kills, a cause-and-effect relationship between algal density and oxygen balance was evaluated. On August 17, the chlorophyll-*a* value for stations 4 and 5 were 0.48 mg/l and 0.31 mg/l, respectively. These values represented the densest algal concentrations found at each during the study. Dissolved oxygen concentrations were determined over a twenty-four hour period, at three-hour intervals, beginning at noon on August 17. The dissolved oxygen range fluctuated 13.4 mg/l at station 4 compared to 6.5 mg/l at station 5 (Fig. 6). Extreme diel

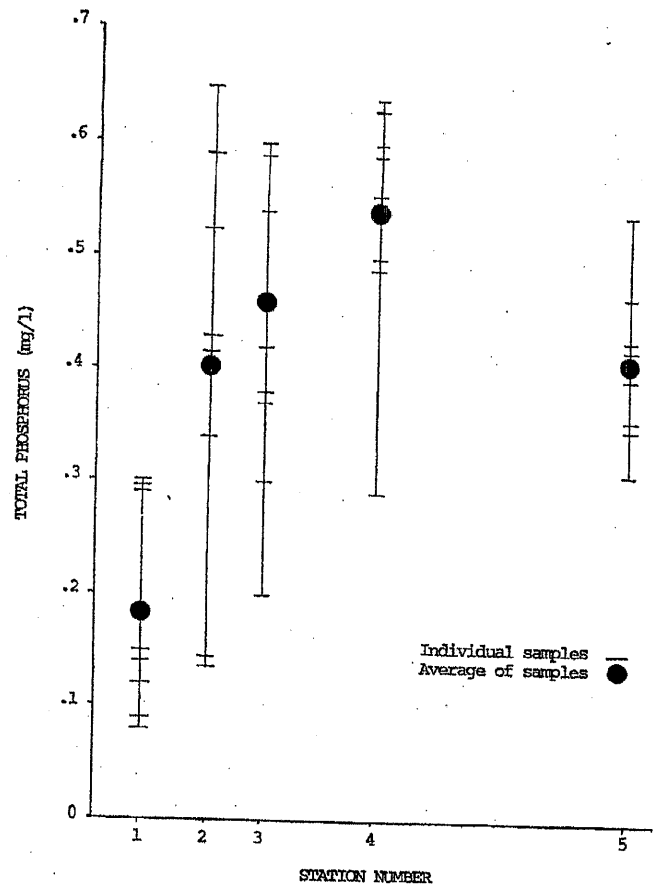

FIG. 4. Individual samples and averages for total surface phosphorus concentrations at each station in July and August, 1972. Distances between stations are to scale along the x-axis.

fluctuations in dissolved oxygen in Dickinson Bayou can be attributed to algal density, since the incident solar radiation, vertical mixing or wind, would be nearly equal throughout all of the stations. As shown by the chlorophyll-*a* data in Figure 5, algal populations capable of producing extreme dissolved oxygen fluctuations, such as occurred at station 4 on August 17, were present on at least five occasions at stations within the area of frequent fish kills, but never at the other "unaffected" stations.

Monthly total phosphorous analyses on the effluents from the sewage treatment plants showed that the average phosphorous concentration at the larger plant was 11.1 mg/l, with levels ranging from 9.6 mg/l in April to 14.2 mg/l in July. The smaller plant's discharge averaged 10.2 mg/l of total phosphorous, with a low value of 8.8 mg/l in April and a high value of 12.7 mg/l in August. Scudday and Nichols (1972) calculated that if the larger treatment plant reduced its effluent's total phosphorous concentration to 1.0 mg/l, then the resulting "dry

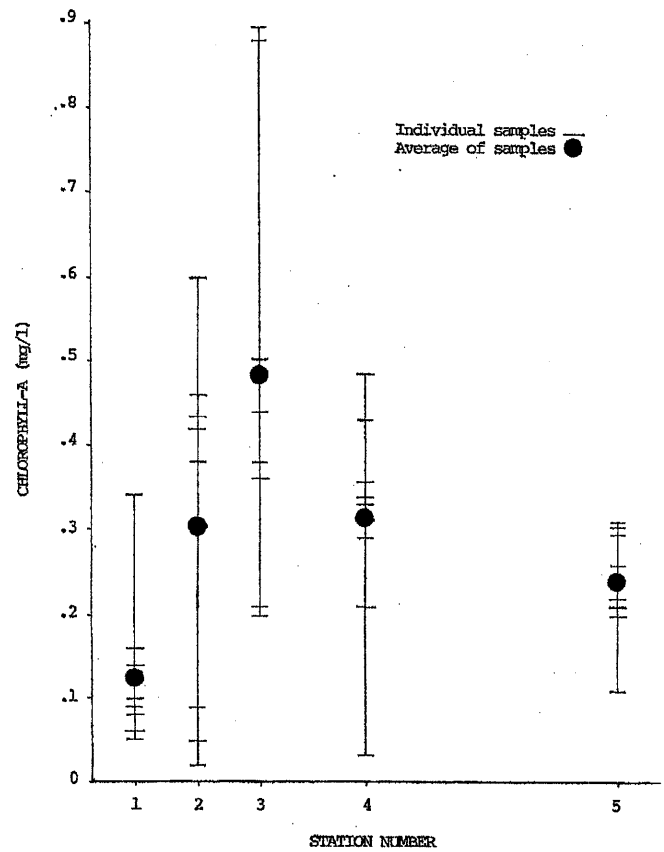

FIG. 5. Individual samples and averages of samples for surface chlorophyll-*a* concentrations at each station in July and August, 1972. Distances between stations are to scale along the x-axis.

weather" phosphorous load in Dickinson Bayou would be reduced by 70%. Their estimate took into account all known phosphorous-containing inflows to the bayou.

ALGAL ASSAYS

Methods

Since enrichment by secondary sewage effluent was shown to contribute to the cause of algal blooms in Dickinson Bayou, it was left to be demonstrated if advanced treatment for phosphorous removal would help reduce algal populations. Phosphorous rather than nitrogen removal was advocated as the preferred form of advanced treatment for several reasons: (1) the algal community in Dickinson Bayou often contained a large percentage of blue-green algae; Thomas (1971) found that the addition of phosphorous alone to water is sufficient to increase the growth of this type of algae, (2) blue-green algae are able to bind gaseous nitrogen organically, thereby producing nitrates and nitrites for green algae; Shapiro and Ribeiro (1965) have shown that the increased growth of blue-gree algae with available phosphorous may even supply enough nutrient nitrogen to produced blooms of green algae, (3) out of the putrified parts of organisms

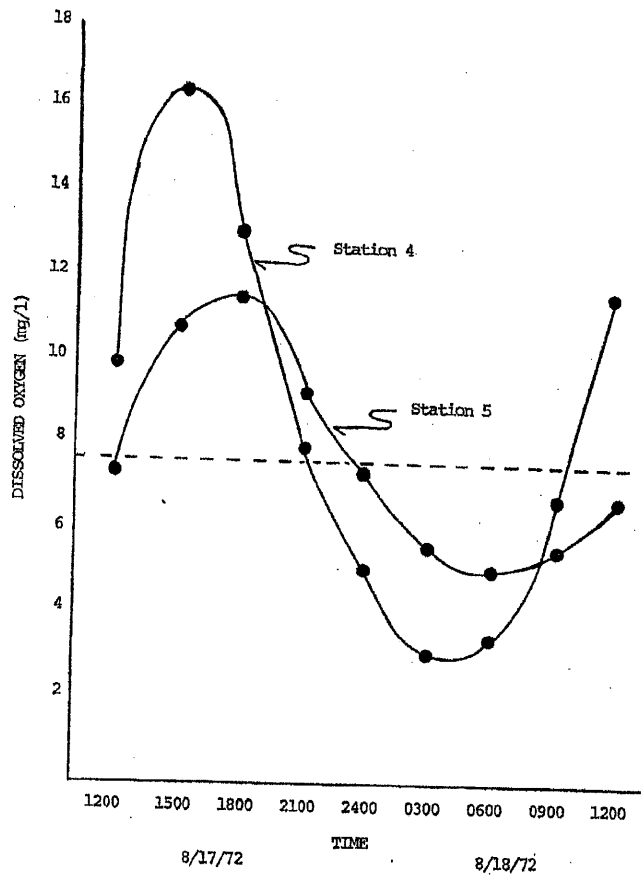

FIG. 6. Diel fluctuations in dissolved oxygen at stations 4 and 5 on August 17 and 18, a time of the highest chlorophyll-*a* concentrations at both stations during the study period. The dashed line indicates the normal saturation value for dissolved oxygen at the temperature and chloride values encountered during the twenty-four hour period.

and sludge, nitrogen compounds return in larger quantities than phosphorous compounds in the biochemical cycle (Thomas 1971), and (4) in the industralized areas of the Texas Gulf Coast, numerous industries produce ferric chloride and alum as by-products, providing a cheap and ample source of these compounds for sewage treatment plants to use for the coagulation of phosphorus.

Algal assays were conducted to demonstrate the benefits of using advanced treatment for phosphorus removal. The use of such algal growth tests has increased in recent years as a tool to help control eutrophication. Most of the assays now in use, including the test developed by the Joint Industry/Government Task Force on Eutrophication (United States Environmental Protection Agency, 1971), employ unialgal cultures, spiked with various combinations of nutrients, with the intent of determining which nutrient or nutrients are limiting to the growth of a specific algal species in a particular body of water. These tests usually require several replicates of each possible limiting nutrient, several culture media preparations, and strict measures to avoid bacteriological and chemical contamination. Even when a waste effluent is to be evaluated, the same procedures and precautions must be followed. In this study we used an assay that does not define a limiting nutrient *per se*, but does indicate how the algal population of a receiving

stream will respond to a particular sewage effluent. Here, the test was used to determine if there were any significant differences in algal growth between solutions of Dickinson Bayou water mixed with secondary sewage and bayou water mixed with actual and simulated tertiary sewage (phosphorous significantly removed by chemical coagulation). This assay procedure does not require elaborate laboratory facilities.

Algal assays were conducted beginning on 30 August, 1972, and again on 9 April, 1973. On the day prior to the tests, bayou water was collected from station 5 and secondary sewage effluent was collected from the larger plant on Dickinson Bayou. All water samples were filtered through Reeve Angel 1934 AH filter paper to remove the suspended solids. A portion of the Bayou water was kept unfiltered for use as a mixed phytoplankton seed. For the first assay, tertiary effluent (phosphorous substantially removed) was collected from the Houston Lighting and Power Company domestic waste treatment plant at Webster, Texas. This plant employs chemical coagulation and filtration and removes over 95% of the total influent phosphorous. For the second assay, phosphorus was removed from the secondary effluent in the laboratory, using the same coagulation process that is used at the Webster plant—$Al_2(SO_4)_3 \cdot 18H_2O$ was added to the secondary effluent and NaOH was used to neutralize the treated effluent.

To begin the assays, 200 ml solutions containing percentages of the sewage effluents with Dickinson Bayou water were placed in 300 ml erlenmeyer flasks. The dilutions of the effluents in the bayou water were chosen in accord with dilutions expected in actual practice. The volume of Dickinson Bayou from the sewage treatment plants upstream to FM 646 is approximately 90 million gallons ($341 \times 10^3 m^3$) (Texas Water Quality Board, unpublished). Assuming that the downstream flow of the bayou is negligible and that the sewage treatment plants discharge 2.0 million gallons (7571 m^3) per day, tidal action, by moving the effluent upstream, could cause this segment of the bayou to become as much as 50% sewage in 45 days. So, dilutions of 50, 30, 10, 5, and 0% sewage in bayou water were evaluated in the assays to represent the more extreme and less extreme conditions. A duplicate of each solution was prepared. Five milliliters of well mixed unfiltered Dickinson Bayou water were added to each solution to provide a mixed phytoplankton population as seed. The flasks were stoppered with cotton and placed on a three square foot surface within a Marsh Instruments Model 805 incubator. Two 15 watt fluorescent lamps with reflectors were placed above the flasks. To simulate summer conditions, the lamps were cycled on and off for 14 hours and 10 hours, respectively, and the temperature of the incubator was kept at 27 ± 1 C. During the assays the flasks were swirled daily to provide adequate CO_2 exchange. The positions of the flasks were altered daily to insure even light distribution.

The maximum standing crop, after a given period of time, was used to evaluate the growth of the algal populations. The first assay was concluded after 21 days. The algal mass in each flask was thoroughly mixed and the chlorophyll-*a* of the suspensions was determined. The second test was concluded after 23 days. For this assay the total suspended solids, rather than chlorophyll-*a* was used to measure algal biomass. This change in procedure was made because total suspended solids provides a more direct measurement of biomass. Microscopic examination of the algal cultures showed that algal forms were the dominant organisms, and that no zooplankters or other animal forms were present. At the beginning of this assay, the initial total suspended solids in each flask was negligible; therefore any weight increase was attributed to algal growth. To measure the suspended solids, a portion of each well mixed algal suspension was filtered through a pre-weighed 0.45 micron Millipore filter and dried overnight at 75 ± 2 C prior to weighing to ± 0.1 mg on an analytical balance.

Results

In the first algal assay, the total dissolved phosphorous concentrations of the secondary sewage effluent, tertiary effluent, and Dickinson Bayou water were 7.65 mg/l, 0.22 mg/l and 0.33 mg/l, respectively; in the second assay these same values were 8.91 mg/l, 0.35 mg/l and 0.14 mg/l. In both assays, the secondary

sewage effluent produced more algal biomass when added to the bayou water than did the bayou water alone. The dilutions of the secondary effluent also produced more algal biomass than did equal dilutions of the tertiary effluent (Fig. 7). The first assay did not give the same "stair-step" reduction in algal growth which was attained in the second assay. The results of the former assay, however, were reported as chlorophyll-*a* rather than as total suspended solids. Considering the small volumes involved and possible bleaching of chlorophyll-*a* during the assay (Shapiro and Ribiero 1965), total suspended solids was considered a more accurate parameter for evaluating the algal biomass. In the second assay the tertiary effluent gave a two- to four-fold reduction in algal growth over similar dilutions of secondary effluent.

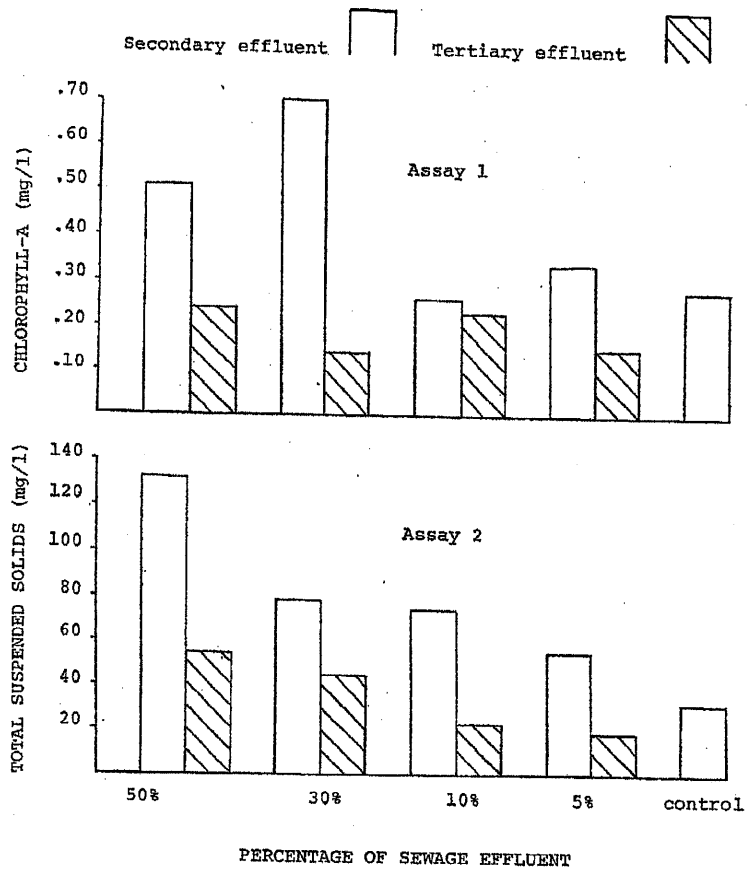

FIG. 7. Results of two laboratory algal assays, which compared the growth of mixed algal populations at equal percentages of secondary sewage effluent versus tertiary sewage effluent, in combinations with Dickinson Bayou water, showing the biomass reductions achieved with the latter treatment.

DISCUSSION AND CONCLUSION

The oxygen balance of Dickinson Bayou is upset by a combination of natural and man-caused influences. The low dissolved oxygen content of bottom waters during salt water intrusion is a characteristic of narrow, vertically stratified estuaries. This natural effect, by itself, is an unlikely cause of fish kills, since most organisms can avoid bottom waters. The intermediate and surface waters of stratified estuaries normally contain sufficient dissolved oxygen concentrations, unless disturbed by man. In Dickinson Bayou the two sewage treatment plants contribute nearly all of the wastes to the bayou during summers; and as determined by the field study, these wastes influence the affected portion of the bayou.

All of the major fish kills in Dickinson Bayou during 1971 and 1972 occurred during the night or early morning, and during significant algal blooms. The physical reaeration potential of the five km section of the bayou directly upstream from the two sewage treatment plants was estimated by Kirkpatrick (1972). He found that the BOD loading by the plants would reduce the dissolved oxygen to levels below 4.0 mg/l on less than 5% of the critical summer days. It therefore appears that the algal-stimulating nutrients in the sewage treatment plant effluents, rather than the oxygen demanding wastes, are the primary cause of the disturbance of the oxygen balance in the bayou from the area of SH 3 to FM 646.

Algal assays demonstrated that, in the critical six kilometers of the bayou above the sewage treatment plants, advanced treatment for phosphorous removal would likely reduced the algal standing crop to a level of one half, and possibly as little as one quarter, of past summer densities. This reduced standing crop would then be equal to, or less than, that which is normally present in summers at stations above and below the area of frequent fish kills. This algal biomass reduction could thus eliminate the extreme diel dissolved oxygen fluctuations in the affected portions of the bayou and greatly reduce the likelihood of summer fish kills.

Considering the algal assay results and the estimate that phosphorous removal to a level of 1.0 mg/l would reduce the phosphorous loading by 70%, it appears that phosphorous removal could alleviate the dissolved oxygen problems in Dickinson Bayou. In fact, the state regulatory agency over domestic waste discharges, the Texas Water Quality Board, has ordered the larger treatment plant to implement phosphorous removal. When the plant begins removing phosphorous from its effluent, another study should be conducted to determine if the conclusions of this study are indeed valid. Such a study would be helpful in determining how similar problems should be approached in the future; and if it is found that phosphorous removal significantly improves the situation, the availability of low cost chemical by-products for the removal of phosphorous would offer a relatively easy and inexpensive means for correcting other eutrophication problems.

Further, Kirkpatrick (1972) concluded that the sewage treatment plants on Dickinson Bayou were poorly located, because the area into which they discharge is "normally stagnant, highly eutrophic, unstable and typically supports no benthic organisms." The results of our field study support this conclusion. When

planning and selecting sites for future sewage treatment plants in tidal streams, the build-up of nutrients, which lead to algal blooms and fish kills, should be considered.

ACKNOWLEDGMENTS

We wish to thank Frances Shepard for her diligent assistance in the laboratory and D. B. Cosby for his help with the field work. We are grateful to J. Mayhew and J. S. Kirkpatrick for their helpful suggestions and comments. Taffy Knudson and Lanelle Hayes are to be commended for volunteering their time to type the manuscript. Special thanks are due to Drs. R. H. Moore and T. J. Bechtel for reviewing the manuscript and offering helpful criticisms and suggestions.

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PUBCOMMENT-OCC2 - Fwd: Public comment on Permit Number WQ0010054001

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 6/1/2010 1:43 PM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Attachments: CCH Request 6-01-10.pdf

HR

MWD
69298

>>> PUBCOMMENT-OCC 6/1/2010 11:34 AM >>>

>>> <jbblaw@blackburncarter.com> 6/1/2010 11:26 AM >>>

REGULATED ENTY NAME CITY OF ROCKPORT
RN NUMBER: RN101916575
PERMIT NUMBER: WQ0010054001
DOCKET NUMBER:
COUNTY: ARANSAS
PRINCIPAL NAME: CITY OF ROCKPORT
CN NUMBER: CN600634810
FROM
NAME: James B. Blackburn, Jr.
E-MAIL: jbblaw@blackburncarter.com
COMPANY: Blackburn Carter, P.C.
ADDRESS: 4709 AUSTIN ST
HOUSTON TX 77004-5004
PHONE: 7135241012
FAX:
COMMENTS: Please see attached comments and request for contested case hearing.

MW

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JAMES B. BLACKBURN, JR
MARY W. CARTER
CHARLES W. IRVINE
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MCNAUGHTON A. DUSON

MARY W. CARTER
Sender's E-Mail: mcarter@blackburncarter.com

June 1, 2010

Via TCEQ's Electronic Filing System
LaDonna Castañuela, Chief Clerk
Chief Clerk's Office, MC-105
Texas Commission on Environmental Quality
P.O. Box 13087
Houston, Texas 78711-3087

RE: City of Rockport TPDES Permit No. WQ0010054001

Dear Ms. Castañuela:

This letter is being submitted on behalf of the Little Bay Foundation, a non-profit corporation organized under the laws of the State of Texas. Little Bay Foundation's ("LBF") temporary address is 61 Blue Heron Drive, Rockport Texas 78382-3711. The purpose of this letter is to request a contested case hearing on the application by the City of Rockport for renewal of its existing TPDES Permit No. WQ0010054001. We are requesting a contested case hearing in accordance with the Executive Director's Response to Comments and opportunity to request a contested case hearing issued by the Chief Clerk's Office on April 30, 2010. LBF is represented in this contested case hearing request by Blackburn Carter, P.C., 4709 Austin Street, Houston, Texas 77004, (713) 524-1012.

This permit authorizes the discharge of treated domestic wastewater at an annual average flow not to exceed 2,500,000 gallons per day. According to the Executive Director's Response to Comments, the current and draft permits also authorize disposal of a portion of the treated domestic wastewater via irrigation on 200 acres. The facility is located on the west side of FM Road 2165, approximately 1200 feet south of the intersection of FM Road 2165 and Enterprise Blvd. in Aransas County, Texas. The treated effluent is discharged to Tulle Ditch, then to an unnamed ditch (nontidal); then to an unnamed ditch (tidal); then to Little Bay; then to Aransas Bay in Segment No. 2471 of the bays and estuaries. The receiving water uses are high aquatic life uses for Little Bay and the designated uses for Segment No. 2471 are exceptional aquatic life uses, oyster waters, and contact recreation.

According to its Certificate of Formation, the purpose of Little Bay Foundation is to protect, restore, maintain and enhance the environmental, ecological, and aesthetic wellbeing of Little Bay in Rockport, Texas. It is also the purpose of LBF to raise community, corporate, and governmental awareness of the importance of and need to protect, restore, maintain and enhance Little Bay. The interests that LBF seeks to protect in a contested case hearing are germane to these purposes.

In accordance with 30 T.A.C. § 55.205, Ed Rainwater, who is a member of LBF, has standing to request a contested case hearing in his own right. Neither the claim asserted nor the relief requested requires the participation of individual members in this case.

Mr. Rainwater's address is 61 Blue Heron Drive, Rockport, Texas 78382-3711, which is on Little Bay. Mr. Rainwater lives at this address with his wife and has owned the property and their house for 15 years. Mr. Rainwater enjoys fishing from his dock on Little Bay, sailing his sailboat on Little Bay up through the canals, and his grandchildren have enjoyed swimming off the deck in Little Bay. However, the continued impact of the wastewater discharge has cut back his enjoyment of these activities. The location of Mr. Rainwater's property is approximately 200 yards from the point where the effluent from the City of Rockport Wastewater Treatment Plant enters Little Bay. Mr. Rainwater is an affected person with a personal justiciable interest related to an economic interest, namely his property interest, which is not common to the general public. In addition, his recreational enjoyment and the recreational interests of his family of Little Bay are also impacted by this application for renewal of the City of Rockport permit. Mr. Rainwater is also concerned about his family's health and safety as a result of the continued discharge into Little Bay.

In accordance with 30 T.A.C. § 55.205, Mr. Thomas Pazera is also a member of LBF and also has standing to request a contested case hearing in his own right. Neither the claim asserted nor the relief requested requires the participation of individual members in this case.

Mr. Pazera owns property located at 1899 N. Live Oak, Rockport Texas, 78382. Mr. Pazera's property backs up to and has frontage on Tule Ditch within one mile of the City of Rockport's WWTP discharge. Mr. Pazera is an affected person with personal justiciable interests that are not common to the general public. Mr. Pazera's justiciable interests include his economic interest in the property he own on Tule Ditch. Mr. Pazera also enjoys the natural beauty of Little Bay and as such is harmed by the decline in Little Bay.

DISPUTED ISSUES OF FACT

In accordance with the notice and the ED's Response to Public Comments issued by the Chief Clerk's office April 30, 2010, the following disputed issues of fact are relevant and material to the Commission's decision on this application.

The Discharge is Violating the Texas Water Code and the Texas Surface Water Quality Standards (Comments 3, 4, 5, 6, 9, 10, 12, 13, 15, 16, 17, and 19)

The basis of this request for a contested case hearing is water quality and the ability of the WWTP and the receiving waters to meet water quality standards. There are several aspects about the proposed discharge that raise water quality issues, including the place of discharge, the level of treatment, and the failure to regulate nutrients and other pollutants in relation to the special sensitivity of the receiving waters. The Texas Surface Water Quality Standards (TSWQS) apply to all surface waters of the state and specifically apply to substances attributable to waste discharges or the activities of man. 30 TEX. ADMIN. CODE § 307.4 (a). The TSWQS require that "surface water shall be maintained in an aesthetically attractive condition," and "waste discharges shall not cause substantial and persistent changes from ambient conditions of turbidity or color." *Id.* at § 307.4(b)(4) and (5). The TSWQS require that "[n]utrients from

permitted discharges or other controllable sources shall not cause excessive growth of aquatic vegetation which impairs an existing, attainable, or designated use." *Id.* at § 307.4 (e).

Since the original permit was issued in 1994, Little Bay has experienced a tremendous increase in turbidity, algae growth, and a corresponding disappearance of seagrass. In fact the shallows of Little Bay adjacent to the western shoreline were a thriving seagrass dominated ecosystem a short while ago. Seagrass beds are essential habitat for shrimp, finfish, crab, and many other aquatic species. Seagrass is an indispensable component of the extremely high quality estuarine ecosystems that are preferred by waterfowl, wading birds, sea turtles, and many important game fish in this area.

The either total or near total loss of seagrass beds in Little Bay, the corresponding increase in turbidity, and the algae blooms are caused or significantly contributed to by the pollutants discharged from the City of Rockport WWTP. This is in clear violation of the TSWQS and the Texas Water Code. Seagrass propagation, likely due to its ecological significance, is specifically and broadly protected under the TSWQS: "seagrass propagation... will be maintained and protected for all water in the state in which these uses can be achieved." 30 TEX. ADMIN. CODE § 307.7(b)(4). The TCEQ must address these various and ongoing violations of the TSWQS before action is taken to approve the renewal of the offending discharge.

New Information Regarding the Receiving Waters Requires Modification of Permit Parameters to Prevent a Violation of TSWQS (Comment 12)

As the ED plainly states, "in some cases, when TCEQ staff obtain new information regarding physical changes to the receiving waters, it may be necessary to modify a TPDES permit's effluent limitation in order to accommodate the receiving waters based on the new information so that a violation of the TSWQS will not occur." ED's Response to Comments at 16. LBF argues that the severe disruption of Little Bay, including the loss of seagrass, increased turbidity, and reoccurring algae blooms represents new information that must be included in any permit renewal. The Texas Water Code and the TSWQS require that these changes to the receiving water be taken into account, especially in a case such as this one where the changes themselves were significantly contributed to be the discharge in question. The original permitting process, for whatever reason, failed to adequately consider what impacts this discharge would have on Little Bay. Now that those impacts are obvious, they should be utilized to develop effluent limits protective of the receiving waters in compliance with the TSWQS. There is more than enough evidence of significant physical changes in Little Bay to require a new analysis of the discharge's impact and the corresponding necessary permit parameters under the TSWQS. Such changes represent a fact issue and a legal issue to be resolved in the contested case hearing process.

Comparison to Neighboring Discharges Designed to Meet TSWQS Expose Obvious Inadequacies (Comments 4, 5, and 10)

In many respects, this application is very similar to the applications of neighboring entities Aransas County MUD No. 1 (for discharge into Aransas Bay) and R&R Development (for discharge into Port Bay). Both of these neighboring entities sought permission to discharge treated effluent into a high quality estuarine area in the immediate vicinity of Rockport, Texas.

Both applications were into water bodies significantly larger than Little Bay and yet the final permits required discharges into wetland polishing ponds and with strict limitations on nutrients. The City of Rockport's discharge, which is much larger than the other discharges and flows into a much smaller body of water, should have similar or stricter requirements to ensure compliance with the Texas Water Code and TSWQS.

The Discharge and the ED's Review are in Violation of the Antidegradation Provisions of the TSWQS (Comment 12)

The TSWQS's antidegradation section states that, "[e]xisting uses and water quality sufficient to protect those existing uses will be maintained." 30 TEX. ADMIN CODE § 307.5(b)(1). The ED argues that the antidegradation provisions of the TSWQS do not apply to the proposed draft permit because the draft permit is merely a renewal of an existing wastewater discharge permit and therefore it does not have the capacity to increase pollution of state waters. The ED's refusal to implement the TSWQS antidegradation section stems from the following requirement that," [t]he antidegradation policy and implementation procedures set forth in this section shall apply to actions regulated under state and federal authority which would increase pollution of the water in the state. Such actions include authorized wastewater discharges." *Id.* at (a). The ED's refusal to implement the antidegradation section is based on the erroneous factual assumption that the proposed permit, because it is a mere renewal, will not increase pollution loading in Little Bay.

For several reasons the ED's assumption with regard to antidegradation implementation is plainly wrong. First and most importantly, the approval of the draft permit without changes will continue to increase the actual amount of total nitrogen and other pollutants that enter Little Bay over time. At present, the actual amount of effluent discharged from the city's WWTP is only half of what is permitted. The City of Rockport has experienced tremendous growth over the last 10 ten years and this growth is expected to continue into the future. Despite the current recession, the City of Rockport has continued to annex neighboring territory and extend its sewer mains to new developments. It is an absolute certainty, that the amount of effluent actually discharged will increase in the near future. At the current level of operation the City of Rockport's WWTP discharges an estimated average of 206 lbs per day of Nitrate nitrogen. This amount will continue to increase and will approach 573 lbs per day (more than double) as the City's discharge increases towards the maximum permitted flow. From a factual standpoint, the approval of this draft permit will result in a measurable and demonstrable increase in pollution loading in the receiving waters and this conflicts directly with the ED's assumptions that no increase in pollution will occur.

Second, the permit itself is subject to the TSWQS's antidegradation requirements. For example, the ED states that, "The TCEQ also requires applicants to comply with all provisions of the draft permit and all applicable regulations in the TWC and TCEQ rules including the antidegradation provision in 30 TEX. ADMIN. CODE § 307.5." *See* ED's Response to Comments at 6. The permit is undoubtedly subject to the TSWQS including the antidegradation provisions. It is factually demonstrable that this discharge has contributed significantly to the degradation of Little Bay. The discharge as it exists is in violation of Texas law and TCEQ regulations and should be analyzed as such by the TCEQ in this permitting process. Antidegradation review is essential to ensure that new permits limitations required to bring this discharge within gambit of legality will be stringent enough to do their job.

The ED's attempt to Compromise on the Issue of Nutrients is not Enough; Full Review and Analysis Under the TSWQS are Required (Comments 3, 4, 5, 6, 12, and 19)

The ED has attempted to compromise on the issue of nutrients and will require additional monitoring of nutrients in the discharge, promising to require permit limits on nutrients if warranted by the results of this additional monitoring. More than enough information exists and is available to create and set appropriate effluent limits to meet the mandates of the Texas Water Code and the TSWQS. The TCEQ has developed and approved more appropriate permit limits for neighboring WWTPs. There is no reason why that cannot be done for the City of Rockport's discharge. New permit limits and a more stringent analysis of the discharge are specifically required by the TSWQS. A compromise is neither necessary or appropriate.

There is a Factual Dispute Concerning Whether the Discharge has Caused the Decline of Little Bay (Comments 3, 4, 5, 6, 12, and 19)

As previously mentioned there is no dispute over whether Little Bay has experienced a significant decline. The ED, however, continues to ignore the City of Rockport's WWTP discharge as the most likely contributor to the bay's decline. For the majority of commenters, including LBF, there is an obvious connection between the city's WWTP discharge and the decline of Little Bay. Little Bay is suffering from an overabundance or nutrients and other pollutants that are known to be present in the city's WWTP discharge in significant quantities. The ED chooses to ignore this obvious connection and instead focuses on a false temporal discrepancy between Little Bay's decline and the TCEQ's issuance of the original permit. The ED for example repeatedly relies on the statement that:

> *Speakers at the Public Meeting on February 25, 2010 indicated increased degradation of Little Bay over the course of the last five years. The City of Rockport has been operating under the same permitted effluent limitations and flow restriction since 1994. This suggests that the recent degradation observed in Little Bay is from another source or sources.*

ED's Response to Comments (*passim*) (emphasis added).

In fact, TCEQ staff members present at the February 25, 2010 meeting informed the hundreds of concern citizens that the TCEQ could only consider changes to Little Bay "in the last five years" in its analysis of the city's renewal application. The citizens naturally seized on this statement and prefaced their remarks with the phrase "in the past five years" to make them relevant. There is evidence that the decline of Little Bay stretches back at least eight years or more. *See* Dr. Ron Outen's Written Comments dated December 4, 2009.

However, there was likely some delay between the initial discharge and the subsequent decline of Little Bay. This should not be a surprise. Impacts take time to be felt and noticed and the City of Rockport's actual discharge has increase significantly over the last 10 years. Even if the ED's five year time-line were accurate for the start of the decline of Little Bay it would not negate the city's WWTP discharge from being the most likely and most significant contributing factor. It is a scientifically demonstrable fact that the now barren murky waters of Little Bay were at the very least significantly contributed to by the nutrients and other pollutants being

discharged by the city's WWTP. The link between pollution discharge and ecological decline, especially with respect to seagrass abundance, is well documented and well understood. We know with certainty that the discharge and the receiving waters of Little Bay are violating the TSWQS. The TSWQS now require appropriate review and permit limits before a renewal permit can be issued.

CONCLUSION AND SUMMARY

Little Bay was once a thriving nursery for juvenile shrimp, finfish, and blue crab. The shallows of Little Bay are now turbid and barren and have become useless for the propagation of these species. Additional permit limits are required for the City of Rockport's discharge and the receiving water to comply with Texas law. Additional review is required in order for the applicant and the ED to meet the requirements of the TSWQS. LBF believes that alternatives exist that can halt and even reverse the deterioration of the water quality and that such alternatives must be considered under the TSWQS.

In addition to the disputed issues of fact detailed above, this contested case hearing is also requested regarding the compliance of TCEQ and this proposed discharge with the rules of the Texas Coastal Management Program. Among other things, important natural resource areas are to be protected under the coastal management regulations and the coastal management plan that is to be implemented by the Texas Commission on Environmental Quality. There is no doubt that Little Bay falls within the Texas coastal zone and that all property owners in the Key Allegro Subdivision have standing under the Texas coastal management program to request a contested case hearing from an agency that is "networked" under the Texas CMP.

In summary, LBF requests a contested case hearing and requests that the hearing be designated to determine compliance with the following issues/regulations: meeting water quality standards, 30 TEX. ADMIN. CODE §§ 307.1 *et seq.* and 309.1 *et seq.*; antidegradation of waters of the state, 30 TEX. ADMIN. CODE § 307.5; existence of less damaging alternative discharge sites; compliance with applicable provisions of the Texas Coastal Management Program, 30 TEX. ADMIN. CODE § 281.40 *et seq.*, Chapter 33, Subchapters C and F, Texas Natural Resources Code, and 31 TEX. ADMIN. CODE §§ 501, 503, and 505; and other important issues. (Comment Nos. 3, 4, 5, 6, 9, 10, 12, 13, 15, 16, 17, and 19)

Thank you for your consideration of these brief comments, and contested case hearing request, as well as LBF's request to be maintained on the mailing list of the above referenced application. Should you have any questions or concerns, I can be reached at (713) 524-1012.

Sincerely,

BLACKBURN CARTER, P.C.

by James B Blackburn Jr
James B. Blackburn, Jr.
by permission
Mary W Carter

c: Ed Rainwater

PUBCOMMENT-OCC2 - Fwd: Public comment on Permit Number WQ0010054001

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 6/1/2010 1:44 PM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Attachments: CCH Request - Outen 6-01-10.pdf

HR

>>> PUBCOMMENT-OCC 6/1/2010 1:15 PM >>>

MWD
69298

>>> <jbblaw@blackburncarter.com> 6/1/2010 12:55 PM >>>

REGULATED ENTY NAME CITY OF ROCKPORT
RN NUMBER: RN101916575
PERMIT NUMBER: WQ0010054001
DOCKET NUMBER:
COUNTY: ARANSAS
PRINCIPAL NAME: CITY OF ROCKPORT
CN NUMBER: CN600634810
FROM
NAME: James B. Blackburn, Jr.
E-MAIL: jbblaw@blackburncarter.com
COMPANY: Blackburn Carter, P.C.
ADDRESS: 4709 AUSTIN ST
HOUSTON TX 77004-5004
PHONE: 7135241012
FAX:
COMMENTS: Please see attached comments and request for contested case hearing on behalf of Dr. Ronald B. Outen.

MW

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JAMES B. BLACKBURN, JR
MARY W. CARTER
CHARLES W. IRVINE
ADAM M. FRIEDMAN
MCNAUGHTON A. DUSON

JAMES B. BLACKBURN, JR.
Sender's E-Mail: jbb@blackburncarter.com

June 1, 2010

Via TCEQ's Electronic Filing System
LaDonna Castañuela, Chief Clerk
Office of the Chief Clerk - MC 105
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711

Re: Request for a Contested Case Hearing on the City of Rockport's Application for Renewal of TPDES Permit No. WQ0010054001.

Dear Ms. Castañuela:

This letter is being submitted on behalf of Dr. Ronald B. Outen. As detailed below, Dr. Outen owns property on and uses Little Bay in Rockport, Texas. The City of Rockport has applied for renewal of its TPDES Permit No. WQ0010054001, which authorizes a discharge of treated wastewater effluent into Tule Ditch which flows to Tule Creek and finally into Little Bay in Rockport Texas. The purpose of this letter is to request a contested case hearing regarding the City of Rockport's Application for Renewal of TPDES Permit No. WQ0010054001. Dr. Outen hereby requests that he be placed on the mailing list so that he may be kept abreast of the status of this application.

CONTESTED CASE HEARING REQUEST

To meet the specific requirements of a request for contested case hearing as detailed by the April 30, 2010 Notice issued by the TCEQ, Dr. Outen offers the following:

Dr. Outen hereby requests a contested case hearing. The applicant is the City of Rockport and the TPDES permit number is WQ0010054001.

For the purpose of this hearing request, Dr. Outen is represented by James B. Blackburn, Jr.. Therefore, all communications should be directed to the undersigned at Blackburn Carter, P.C., 4709 Austin St., Houston, Texas 77004, Tel: 713-524-1012, and/or Facsimile: (713) 524-5165.

Dr. Outen has standing to request a contested case hearing because he owns property located at 31 Flamingo Rd., Rockport, Texas 78382 in the Key Allegro Subdivision, on the Key Allegro Peninsula within approximately 1.6 miles of the existing facility. This property is also Dr. Outen's primary residence. In accordance with 30 TEX. ADMIN. CODE § 55.203, Dr. Outen is an affected person with personal justiciable interests that are not common to the general public. Dr. Outen's justiciable interests include his economic interest in the property he owns on Little Bay. Dr. Outen uses his property for recreational activities such as fishing, swimming, bird watching, and boating.

Dr. Outen also uses Little Bay to fish, swim, kayak, and bird watch. All of these activities have been impacted by the degradation of Little Bay and will continue to be impacted by the proposed renewal.

The City of Rockport's wastewater effluent is discharged into Tule Ditch which flows northeast for approximately 1.2 miles until it merges into Tule Creek, which then flows southeast approximately 0.8 miles where it discharges into Little Bay. Tule Ditch and Tule Creek function as small drainage ditches. As such, they act as open pipes conveying effluent to the tidal waters of Little Bay. For all practical purposes, the actual discharge point is where the effluent flowing down Tule Creek encounters and mixes with the tidal waters of Little Bay. This is the first point where there is mixing of effluent into receiving waters. Dr. Outen's home is within one mile of this actual discharge point.

In recent years, Dr. Outen and others have witnessed significant degradation of Little Bay. Such degradation includes the severe disruption of the ecosystem caused by the eutrophication of Little Bay. Most notably, the once ubiquitous seagrass beds have virtually disappeared from shallows adjacent to the downwind shoreline, water turbidity has increased, and waterfowl and wading birds no longer frequent Little Bay in significant numbers. In fact, historically Little Bay was a favored location for both migratory waterfowl and migratory and non-migratory wading birds. In the past, winters in Little Bay were marked by the presence of thousands upon thousands of migrating waterfowl. Tourist and nature lovers would regularly travel to Little Bay specifically to see this magnificent assemblage of winter birds. Little Bay, with its clear waters and abundance of aquatic life and waterfowl, was once considered the jewel of Rockport. Today, this is no longer the case. The seagrass is virtually gone, the fishing has declined, and waterfowl no longer visit in significant numbers. The once clear waters are now more often than not turbid and murky.

There are serious concerns that Little Bay's ecosystem is in severe dysfunction as a result of an over abundance of nutrients and other pollutants entering the water body. The Executive Director (ED) is well aware of the decline of Little Bay. As the ED stated in his Response to Comments, "The concerns regarding the degradation of Little Bay are valid." ED's Response to Comments at 6. The ED continues commenting that "[o]n February 25, 2010, prior to the public meeting, a mat of algae was observed floating near [the] main outlet from Little Bay to Aransas Bay. It is evident that Little Bay is experiencing a nutrient problem." *Id.* at 11. That Little Bay has degraded since the City of Rockport began discharging treated wastewater effluent under TPDES Permit No. WQ0010054001 is not in dispute.

DISPUTED ISSUES OF FACT

In accordance with the notice and the ED's Response to Public Comments issued by the Chief Clerk's office April 30, 2010, the following disputed issues of fact are relevant and material to the Commission's decision on this application.

The Discharge is Violating the Texas Water Code and the Texas Surface Water Quality Standards (Comments 3, 4, 5, 6, 9, 10, 12, 13, 15, 16, 17, and 19)

The basis of this request for a contested case hearing is water quality and the ability of the WWTP and the receiving waters to meet water quality standards. There are several aspects about the proposed discharge that raise water quality issues, including the place of discharge, the

level of treatment, and the failure to regulate nutrients and other pollutants in relation to the special sensitivity of the receiving waters. The Texas Surface Water Quality Standards (TSWQS) apply to all surface waters of the state and specifically apply to substances attributable to waste discharges or the activities of man. 30 TEX. ADMIN. CODE § 307.4 (a). The TSWQS require that "surface water shall be maintained in an aesthetically attractive condition," and "waste discharges shall not cause substantial and persistent changes from ambient conditions of turbidity or color." *Id.* at § 307.4(b)(4) and (5). The TSWQS require that "[n]utrients from permitted discharges or other controllable sources shall not cause excessive growth of aquatic vegetation which impairs an existing, attainable, or designated use." *Id.* at § 307.4 (e).

Since the original permit was issued in 1994, Little Bay has experienced a tremendous increase in turbidity, algae growth, and a corresponding disappearance of seagrass. In fact the shallows of Little Bay adjacent to the western shoreline were a thriving seagrass dominated ecosystem a short while ago. Seagrass beds are essential habitat for shrimp, finfish, crab, and many other aquatic species. Seagrass is an indispensable component of the extremely high quality estuarine ecosystems that are preferred by waterfowl, wading birds, sea turtles, and many important game fish in this area.

The either total or near total loss of seagrass beds in Little Bay, the corresponding increase in turbidity, and the algae blooms are caused or significantly contributed to by the pollutants discharged from the City of Rockport WWTP. This is in clear violation of the TSWQS and the Texas Water Code. Seagrass propagation, likely due to its ecological significance, is specifically and broadly protected under the TSWQS: "seagrass propagation... will be maintained and protected for all water in the state in which these uses can be achieved." 30 TEX. ADMIN. CODE § 307.7(b)(4). The TCEQ must address these various and ongoing violations of the TSWQS before action is taken to approve the renewal of the offending discharge.

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Comparison to Neighboring Discharges Designed to Meet TSWQS Expose Obvious Inadequacies (Comments 4, 5, and 10)

In many respects, this application is very similar to the applications of neighboring entities Aransas County MUD No. 1 (for discharge into Aransas Bay) and R&R Development (for discharge into Port Bay). Both of these neighboring entities sought permission to discharge treated effluent into a high quality estuarine area in the immediate vicinity of Rockport, Texas. Both applications were into water bodies significantly larger than Little Bay and yet the final permits required discharges into wetland polishing ponds and with strict limitations on nutrients. The City of Rockport's discharge, which is much larger than the other discharges and flows into a much smaller body of water, should have similar or stricter requirements to ensure compliance with the Texas Water Code and TSWQS.

The Discharge and the ED's Review are in Violation of the Antidegradation Provisions of the TSWQS (Comment 12)

The TSWQS's antidegradation section states that, "[e]xisting uses and water quality sufficient to protect those existing uses will be maintained." 30 TEX. ADMIN CODE § 307.5(b)(1). The ED argues that the antidegradation provisions of the TSWQS do not apply to the proposed draft permit because the draft permit is merely a renewal of an existing wastewater discharge permit and therefore it does not have the capacity to increase pollution of state waters. The ED's refusal to implement the TSWQS antidegradation section stems from the following requirement that," [t]he antidegradation policy and implementation procedures set forth in this section shall apply to actions regulated under state and federal authority which would increase pollution of the water in the state. Such actions include authorized wastewater discharges." *Id.* at (a). The ED's refusal to implement the antidegradation section is based on the erroneous factual assumption that the proposed permit, because it is a mere renewal, will not increase pollution loading in Little Bay.

For several reasons the ED's assumption with regard to antidegradation implementation is plainly wrong. First and most importantly, the approval of the draft permit without changes will continue to increase the actual amount of total nitrogen and other pollutants that enter Little Bay over time. At present, the actual amount of effluent discharged from the city's WWTP is only half of what is permitted. The City of Rockport has experienced tremendous growth over the last 10 ten years and this growth is expected to continue into the future. Despite the current recession, the City of Rockport has continued to annex neighboring territory and extend its sewer mains to new developments. It is an absolute certainty, that the amount of effluent actually discharged will increase in the near future. At the current level of operation, the City of Rockport's WWTP discharges an estimated average of 206 lbs per day of Nitrate nitrogen. This amount will continue to increase and will approach 573 lbs per day (more than double) as the City's discharge increases towards the maximum permitted flow. From a factual standpoint, the approval of this draft permit will result in a measurable and demonstrable increase in pollution loading in the receiving waters and this conflicts directly with the ED's assumptions that no increase in pollution will occur.

Second, the permit itself is subject to the TSWQS's antidegradation requirements. For example, the ED states that, "The TCEQ also requires applicants to comply with all provisions of the draft permit and all applicable regulations in the TWC and TCEQ rules including the antidegradation provision in 30 TEX. ADMIN. CODE § 307.5." *See* ED's Response to Comments

at 6. The permit is undoubtedly subject to the TSWQS including the antidegradation provisions. It is factually demonstrable that this discharge has contributed significantly to the degradation of Little Bay. The discharge as it exists is in violation of Texas law and TCEQ regulations and should be analyzed as such by the TCEQ in this permitting process. Antidegradation review is essential to ensure that new permits limitations required to bring this discharge within bounds of legality will be stringent enough to do their job.

The ED's attempt to Compromise on the Issue of Nutrients is not Enough; Full Review and Analysis Under the TSWQS are Required (Comments 3, 4, 5, 6, 12, and 19)

The ED has attempted to compromise on the issue of nutrients and will require additional monitoring of nutrients in the discharge, promising to require permit limits on nutrients if warranted by the results of this additional monitoring. More than enough information exists and is available to create and set appropriate effluent limits to meet the mandates of the Texas Water Code and the TSWQS. In fact, the City of Rockport has just released a monitoring report showing total nitrogen averaging 30mg/L in the effluent. This is the very information that the ED seeks from the required addition monitoring. These results confirm, once again, that Little Bay is receiving too many nutrients and that the City of Rockport WWTP is almost certainly a significant contributing factor.

The TCEQ has developed and approved more appropriate permit limits for neighboring WWTPs. There is no reason why that cannot be done for the City of Rockport's discharge. New permit limits and a more stringent analysis of the discharge are specifically required by the TSWQS. A compromise is neither necessary nor appropriate.

There is a Factual Dispute Concerning Whether the Discharge has Caused the Decline of Little Bay (Comments 3, 4, 5, 6, 12, and 19)

As previously mentioned there is no dispute over whether Little Bay has experienced a significant decline. The ED, however, continues to ignore the City of Rockport's WWTP discharge as the most likely contributor to the bay's decline. For the majority of commenters, including Dr. Outen, there is an obvious connection between the city's WWTP discharge and the decline of Little Bay. Little Bay is suffering from an overabundance of nutrients and other pollutants that are known to be present in the city's WWTP discharge in significant quantities. The ED chooses to ignore this obvious connection and instead focuses on a false temporal discrepancy between Little Bay's decline and the TCEQ's issuance of the original permit. The ED for example repeatedly relies on the statement that:

> *Speakers at the Public Meeting on February 25, 2010 indicated increased degradation of Little Bay over the course of the last five years. The City of Rockport has been operating under the same permitted effluent limitations and flow restriction since 1994. This suggests that the recent degradation observed in Little Bay is from another source or sources.*

ED's Response to Comments (*passim*) (emphasis added).

In fact, TCEQ staff members present at the February 25, 2010 meeting informed the hundreds of concern citizens that the TCEQ could only consider changes to Little Bay "in the last five years" in its analysis of the city's renewal application. The citizens naturally seized on this statement and prefaced their remarks with the phrase "in the past five years" to make them relevant. There is evidence that the decline of Little Bay stretches back at least eight years or more. *See* Dr. Outen's Written Comments dated December 4, 2009.

However, there was likely some delay between the initial discharge and the subsequent decline of Little Bay. This should not be a surprise. Impacts take time to be felt and noticed and the City of Rockport's actual discharge has increase significantly over the last 10 years. Even if the ED's five year time-line were accurate for the start of the decline of Little Bay it would not negate the city's WWTP discharge from being the most likely and most significant contributing factor. It is a scientifically demonstrable fact that the now barren murky waters of Little Bay were at the very least significantly contributed to by the nutrients and other pollutants being discharged by the city's WWTP. The link between pollution discharge and ecological decline, especially with respect to seagrass abundance, is well documented and well understood. We know with certainty that the discharge and the receiving waters of Little Bay are violating the TSWQS. The TSWQS now require appropriate review and permit limits before a renewal permit can be issued.

CONCLUSION AND SUMMARY

Little Bay was once a thriving nursery for juvenile shrimp, finfish, and blue crab. The shallows of Little Bay are now turbid and barren and have become useless for the propagation of these species. Additional permit limits are required for the City of Rockport's discharge and the receiving water to comply with Texas law. Additional review is required in order for the applicant and the ED to meet the requirements of the TSWQS. Dr. Outen believes that alternatives exist that can halt and even reverse the deterioration of the water quality and that such alternatives must be considered under the TSWQS.

In addition to the disputed issues of fact detailed above, this contested case hearing is also requested regarding the compliance of TCEQ and this proposed discharge with the rules of the Texas Coastal Management Program. Among other things, important natural resource areas are to be protected under the coastal management regulations and the coastal management plan that is to be implemented by the Texas Commission on Environmental Quality. There is no doubt that Little Bay falls within the Texas coastal zone and that all property owners in the Key Allegro Subdivision have standing under the Texas coastal management program to request a contested case hearing from an agency that is "networked" under the Texas CMP.

In summary, Dr. Outen requests a contested case hearing and requests that the hearing be designated to determine compliance with the following issues/regulations: meeting water quality standards, 30 TEX. ADMIN. CODE §§ 307.1 *et seq.* and 309.1 *et seq.*; antidegradation of waters of the state, 30 TEX. ADMIN. CODE § 307.5; existence of less damaging alternative discharge sites; compliance with applicable provisions of the Texas Coastal Management Program, 30 TEX. ADMIN. CODE § 281.40 *et seq.*, Chapter 33, Subchapters C and F, Texas Natural Resources Code, and 31 TEX. ADMIN. CODE §§ 501, 503, and 505; and other important issues. (Comment Nos. 3, 4, 5, 6, 9, 10, 12, 13, 15, 16, 17, and 19)

Thank you for your consideration of these brief comments, and contested case hearing request, as well as Dr. Outen's request to be maintained on the mailing list of the above referenced application. Should you have any questions or concerns, I can be reached at (713) 524-1012.

Sincerely,

BLACKBURN CARTER, P.C.

by _____
James B. Blackburn, Jr.

c: Dr. Ronald B. Outen

December 4, 2009

MWD 69298

OPA

DEC 0 8 2009

BY DM

Office of the Chief Clerk, MC 105
TCEQ
PO Box 13087
Austin, TX 78711-3087

Ref: Permit No. WQ0010054001

My name is Ronald B. Outen. I am an elected official (Aransas County Navigation District)and I wish to incorporate the comments of that agency, which I co-authored, by reference in these personal comments. I live adjacent to Little Bay, the body of water that receives treated effluent from the Rockport WWTP. I hold Masters Degrees in Zoology/Ecology and Environmental Sciences, as well as a PhD in Enviromental Sciences. I have worked most of my professional career on issues related to water pollution. I have been a close observer of Little Bay for the past 8 years. By direct observation from the shore and from a kayak, I have observed a marked decline in the abundance and vitality of submerged aquatic vegetation (SAV) in the shallows and the near-disappearance of SAV detritus along the downwind shoreline. Beds that once stippled the water surface in 18" water depth rapidly were reduced to short blades apparently sprouting from rhizomes. I observed by microscopic examination the presence of large numbers of parasol-like epiphityic plants on the upper surfaces of these blades. I also have observed phenomena that I believe reflect eutrophic conditions. These include extended episodes of high turbidity (see attached photograph) and the presence of floating beds of filamentous algae. I recommend that the subject permit be amended to include permit limits for nutrient chemicals, including both phosphate and nitrogenous compounds, that will adequate to protect Little Bay from further degradation. (While most attention is directed to nitrogenous compounds, I am aware that phosphates have been found to be limiting elsewhere on the Texas Coast, and that possibility needs to be considered here.) Additional research and planning may be needed to establish appropriate permit limitations. In this case, the permit should include appropriate conditions to insure continuation and, if necessary, expansion and redirection of the present local research activities to assure attainment of effluent quality consistent with anti-degradation principles at the earliest practicable time.

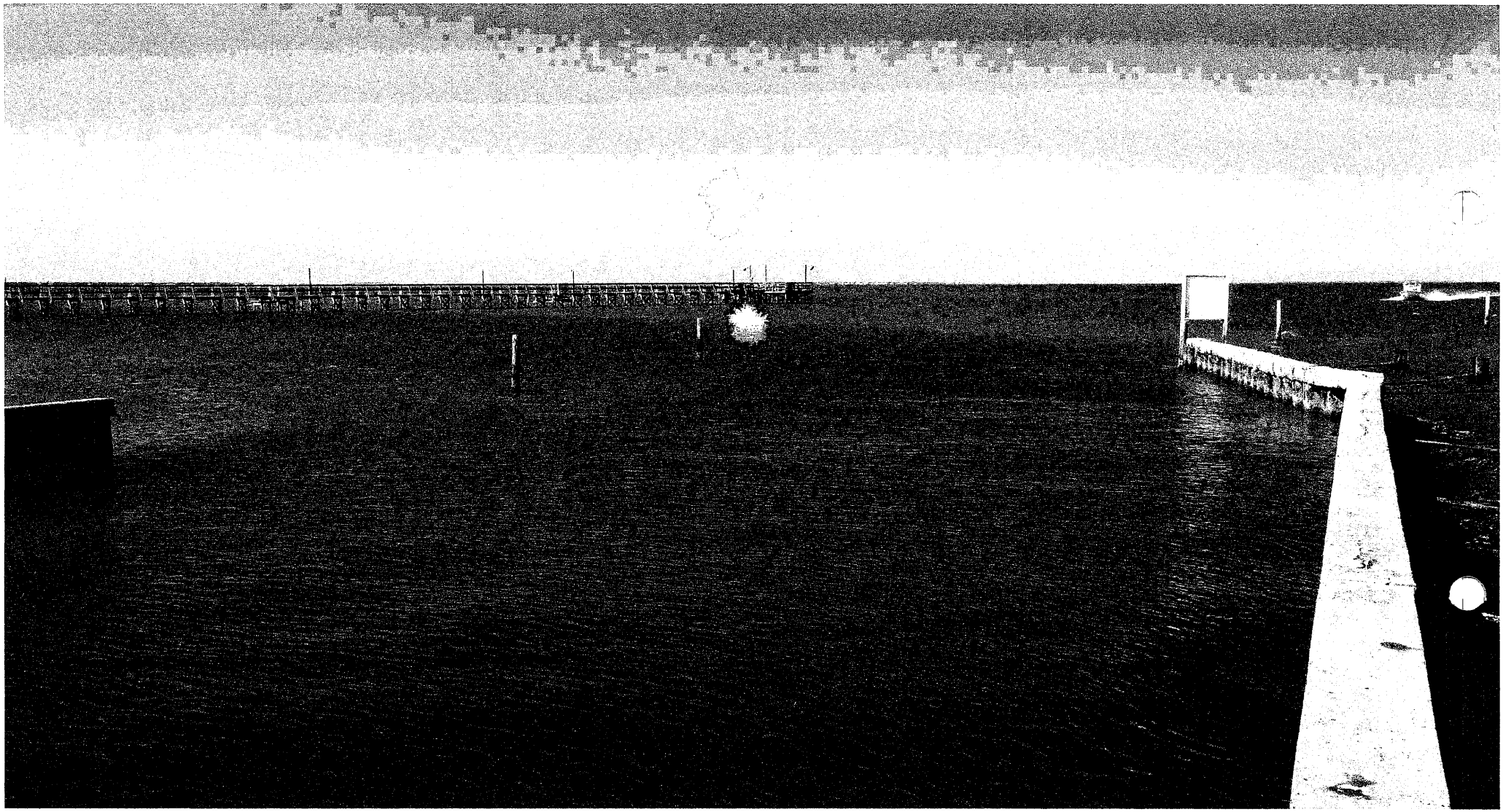
Respectfully submitted,

Ronald B. Outen

Ronald B. Outen, PhD
31 Flamingo Rd
Rockport TX 78382

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2009 DEC -9 AM 9:49
CHIEF CLERKS OFFICE

MW



OUTEN. RE: PERMIT WQ0010054001

R. Outen
31 Flamingo Rd
Rockport TX 78382

NORTH HOUSTON TX 77

USA FIRST-CLASS FOREVER

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DEC 09 2009

TCEQ MAIL CENTER
JR

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
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Office of the Chief Clerk, MC 105
TCEQ
P.O. Box 13087
Austin TX 78711-3087

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MKID 69298

December 4, 2009

OPA

DEC 04 2009

BY

Office of the Chief Clerk, MC 105
TCEQ
PO Box 13087
Austin, TX 78711-3087

2009 DEC -4 AM 10:46
CHIEF CLERKS OFFICE

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

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Respectfully submitted,

Ronald B. Outen

Ronald B. Outen, PhD

No Address

OUTER. RE: PERMIT WQ0010054001

MWD
69298

December 4, 2009

Office of the Chief Clerk, MC 105
TCEQ
PO Box 13087
Austin, TX 78711-3087

OPA
DEC 04 2009
BY

2009 DEC -4 AM 11:30
CHIEF CLERKS OFFICE

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

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Respectfully submitted,

Ronald B. Outen

Ronald B. Outen, PhD

No Address

OUTEN. RE: PERMIT WQ0010054001

Have formal oral comment
Submitted writ w comments

(2)

TCEQ Public Meeting Form

February 25, 2010

came back @ (21) to add a few more comments

City of Rockport
Proposed TPDES Permit Renewal
WQ0010054001

PLEASE PRINT

Name: RONALD B Outen

Mailing Address: 31 FLAMINGO Rd

Physical Address (if different):

City/State: Rockport TX **Zip:** 78382

****This information is *subject to public disclosure under the Texas Public Information Act*****

Email: Ron@ronouten.com ✓

Phone Number: (361) 729-4514

- Are you here today representing a municipality, legislator, agency, or group? ☐ Yes ☑ No

  If yes, which one?

☐ **Please add me to the mailing list.**

☑ **I wish to provide formal *ORAL COMMENTS* at tonight's public meeting.**

☑ **I wish to provide formal *WRITTEN COMMENTS* at tonight's public meeting.**

(Written comments may be submitted at any time during the meeting)

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2010 MAR -1 AM 10:10
CHIEF CLERKS OFFICE

Please give this form to the person at the information table. Thank you.

TCEQ Forma de Reunión Pública

February 25, 2010

City of Rockport
Proposed TPDES Permit Renewal
WQ0010054001

IMPRIMA POR FAVOR

Nombre: _____

Dirección: _____

Dirección local (si diferente): _____

Cuidad/Estado: _____ **Código Postal:** _____

***Esta Información puede ser divulgada de acuerdo con el Acto de Texas de Información Publica ***

Correo Electrónico: _____

Teléfono: ( ) _____

- **¿Esta usted representando a una municipalidad, legislador, agencia, o grupo?** ❒ Si ❒ No

  ¿Como se llama el Grupo?_____

❒ **Por favor inclúyanme en la lista de correo.**

❒ **Yo quiero dar** ***COMETARIOS ORALES*** **formales.**

❒ **Yo deseo hacer** ***COMENTARIOS FORMALES*** **por escrito esta noche durante la reunión pública.**

(Comentarios escritos pueden ser entregados a cualquier momento durante la reunión)

Por favor entregue esta forma a la persona en la mesa de información. Gracias.

Statement of Ronald B. Outen

Public Meeting

TPDES Permit # WQ0010054001

February 25, 2010

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FEB 25 2010

AT PUBLIC MEETING

My name is Ronald B. Outen.

These comments are a supplement to comments I filed during the public comment period. These are my personal comments. I am not speaking on behalf of any organization with which I am affiliated.

The thrust of these comments is that

- the body of water known as Little Bay, which receives effluent from the City of Rockport Wastewater Treatment Plant (WWTP) currently meets applicable criteria for "fishable / swimmable" waters;
- Little Bay has experienced degradation in water quality during the past few years;
- While the WWTP has not been the sole cause of this degradation, it has contributed to it.
- Therefore, TCEQ should review and renew the current permit in accordance with the "Antidegradation" provisions of applicable law.

<u>Little Bay has currently meets applicable criteria for "fishable / swimmable waters".</u>

Little Bay is currently used extensively for primary contact recreation, including swimming, wakeboarding, skiing, tubing, wade fishing by adults and children, and recreational wading. On holiday weekends, several hundred people maybe engaged in primary contact recreation activities at any given time. In addition, children routinely dive and swim from private docks within the waterfront communities of Key Allegro and Harbor Oaks.

Little Bay also is used extensively for fishing. Fishing occurs from private docks and piers, from the shoreline, and by wading throughout the extensive shallow areas within Little Bay. The presence of bait fish is evidenced by the congregation of piscivorous birds such as pelicans, cormorants skimmers, and various species of egrets and herons. Atlantic bottlenose dolphin are frequently seen feeding in Little Bay.

Little Bay contains living oyster beds.

2010 MAR -1 AM 10: 11
CHIEF CLERKS OFFICE
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Little Bay has suffered degradation in water quality and productivity of Little Bay during recent years.

As recently as four years ago, extensive areas of submerged aquatic vegetation (SAV), principally shoal grass, were present in the shallows along the western shore of Little Bay. I personally waded and kayaked that area frequently and observed healthy and luxuriant SAV that stippled the surface of the water at a depth of 12 to 18 inches and more. From a kayak, myriad crustaceans, small fish, and other animals could be seen within these SAV beds.

About 4 years ago, the SAV beds in along this shoreline experienced rapid decline in area, frond length, and robustness. Areas of SAV along the southern shoreline of Little Bay have not declined nearly as much and today appear to be reasonably healthy.

The decline in SAV has been accompanied by a decline in the abundance of small fish in Little Bay. I have observed this decline in two ways. First, like many residents who live in Key Allegro, my wife and I maintained underwater lights in the canal behind our house. We enjoyed washing large schools of fish circling over the lights at night. On some evenings, hundreds to thousands of small fish would be visible at any given moment. Coincident with the general decline of SAV, the schools of small fish have diminished in numbers and frequency. Second, we were accustomed to frequent sitings of mullet in our canal; now, a jumping mullet is a rare event.

Little Bay presently appears to be suffering from eutrophic conditions. For much of the year, the water in Little Bay is brown and light penetration as measured by Secchi disk is greatly reduced. In addition, as recently as last week, Little Bay experienced an eruption of filamentous algae which floated on the surface of the water until blown across the bay to accumulate along the western shoreline, where it is still visible. I am submitting with this statement a document titled "Nitrogen Loading into Little Bay From The City of Rockport Wastewater Treatment Plant: A Quantitative Assessment" by Ron Outen, PhD and Ray Kirkwood, February, 2010. (Hereinafter: "Nitrogen Loading"). Photographs in this document record the events described here.

Additional evidence for eutrophic conditions comes from preliminary data from an ongoing sampling program in Little Bay operated by the Mission-Aransas National Estuarine Research Reserve (NERR). Attachment 2 shows chlorophyll a concentrations that exceed the screening level of 11.6 ug/l in the "DRAFT 2010 Guidance for Assessing Surface Water Quality in Texas "

There also has been a marked decline in the number and variety of water birds that winter on Little Bay. Where flocks of hundreds to thousands of redheads, pintails, and scaup used to occur in winter, these birds are now present in much smaller numbers.

The Rockport WWTP has contributed to this degradation, and continues to contribute

It is undoubtedly the case that numerous factors have contributed to the degradation of Little Bay. It is my belief that one of those factors has been the release into Little Bay of nutrient chemicals from the WWTP. The attached document, "Nitrogen Loading", contains estimates of the quantity of Nitrate-nitrogen released by the WWTP under current conditions and at the full operating capacity authorized by the proposed permit. In summary, the proposed permit would authorize an increase in Nitrate-nitrogen loading from the current level of 37 tons per year to a permitted level of 105 tons per year at maximum permitted flow (2.5 mgd). In relation to the areal extent of Little Bay, these loading factors are equivalent to 211 lbs / acre/ year at current flow to 517 lbs / acre / year at the maximum flow allowed under the proposed permit. While it is not possible with available information to apportion responsibility for observed Eutrophication among the various sources of nutrient sources, one must assume that loadings of this magnitude have caused some portion of the degradation that has already occurred in Little Bay, and that the proposed permit will contribute to continuing degradation.

TCEQ should reissue the permit for the WWTP in accordance with the Antidegradation provision of Texas law (30 TAC Chapter307, Rule 307.5).

Qualitative evidence I have introduced above, as well as similar evidence introduced by other commenters, demonstrates the Little Bay currently exceeds fishable / swimmable standards, but also that it has suffered some degradation in recent years that is consistent with excessive inputs of nutrient pollutants. This degradation threatens existing uses and, on its face, appears to violate Rule 307.4(b)(4) ["Surface waters shall be maintained in an aesthetically attractive condition".] and 307.4(e) ["Nutrients from permitted discharge...shall not cause excessive growth of aquatic vegetation which impairs an existing ...use"]. Specifically, the photographic evidence introduced in the "Nitrogen Loading" attachment documents the existence of aesthetically offensive water discoloration and floating filamentous algae, both excessive relative to historic conditions. In making these statements, I do not assert that the subject discharge is the only contributor to these problems, or even the biggest contributor, but it surely is a contributor and therefore "causes" a share of the observed conditions. Moreover, insofar as the proposed permit would allow an increase in nitrogen loading to Little Bay from the present

I urge the commission to determine that a Tier 2 antidegradation review under Rule 307.5(b)(2) needs to be performed before issuing this permit.

Rule 307.5(c)(2)(B) states: "Tier 2 reviews apply to all pollution which could cause degradation of water where water quality exceeds levels necessary to support propagation of fish, shellfish,

wildlife and recreation in anon the water.....The highest water quality sustained since November 28, 1975 ...defines baseline conditions for determinations of degradation."

Under this standard, Little Bay certainly has experienced degradation, but as noted above Little Bay water quality still supports propagation of fish, shellfish and wildlife and recreation in and on the water." The attached document "Nitrogen Loading" contains estimates of Nitrate nitrogen loading contributed by the WWTP under the current flow conditions and under maximum flow conditions authorized by the proposed permit. Under a Tier 2 antidegradation review, TCEQ should establish present and future loading conditions and determine whether these loading conditions "could cause degradation", which is the Rule 307.5(c)(2)(B) standard. If TCEQ makes a positive finding in this regard, then nutrient limits should be established that will prevent the WWTP from contributing to further degradation of Little Bay. Achieving these limits will take time and require considerable planning and analysis. The permit should be crafted in such a way that it permits adequate time for compliance and establishes a schedule and milestones for achieving compliance at an appropriate future date.

Ronald B Owl

Written Comments

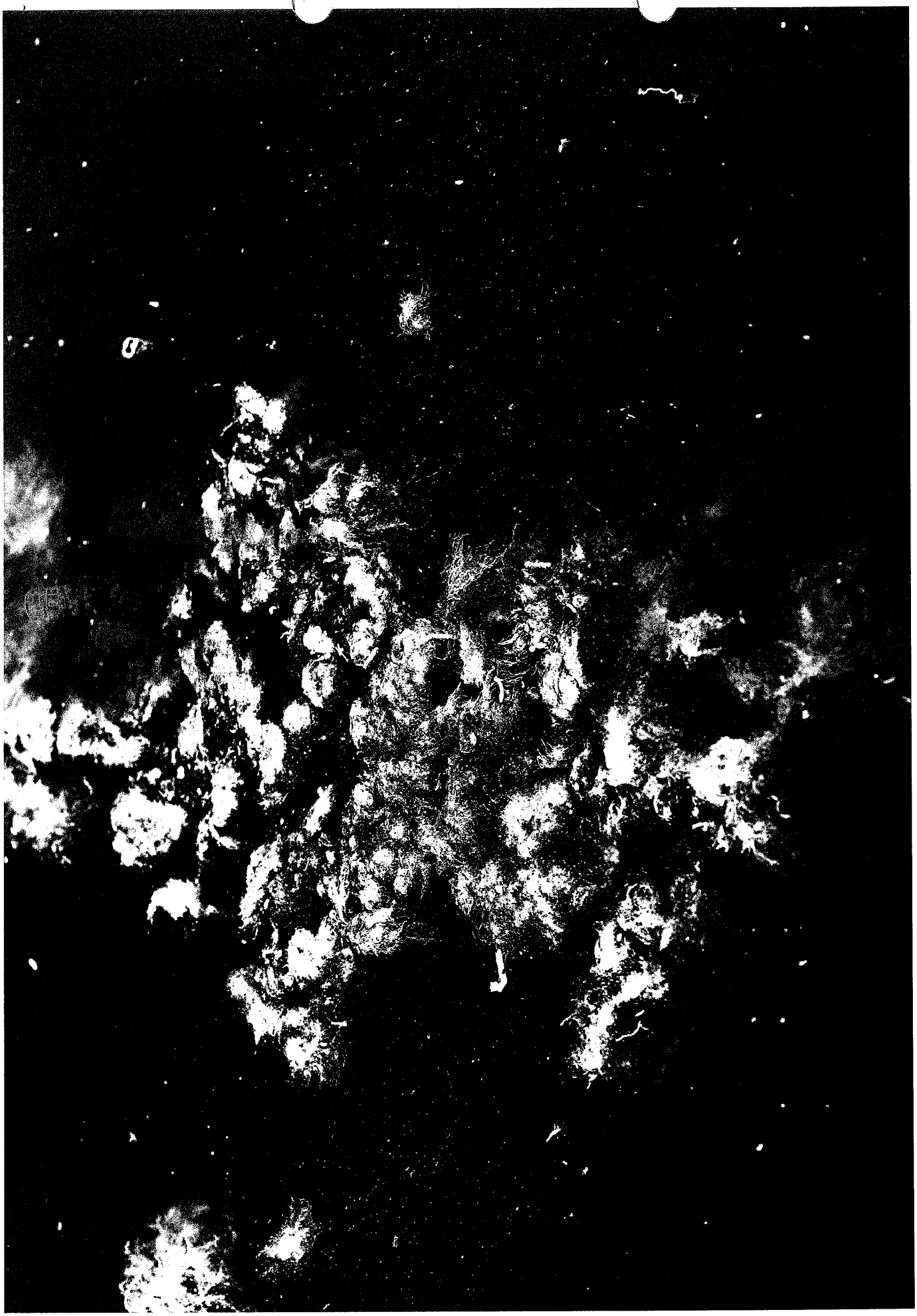
2/25/10

WQ 001 0054001

Floating Algae
Albacore Canal
Little Bay
Photo 2/20/10

OPA RECEIVED

AT PUBLIC MEETING



Outer Comments
2/25/10
WQ001005 4001

Floating Algae
Albacore Canal
Little Bay
Photo 2/25/10

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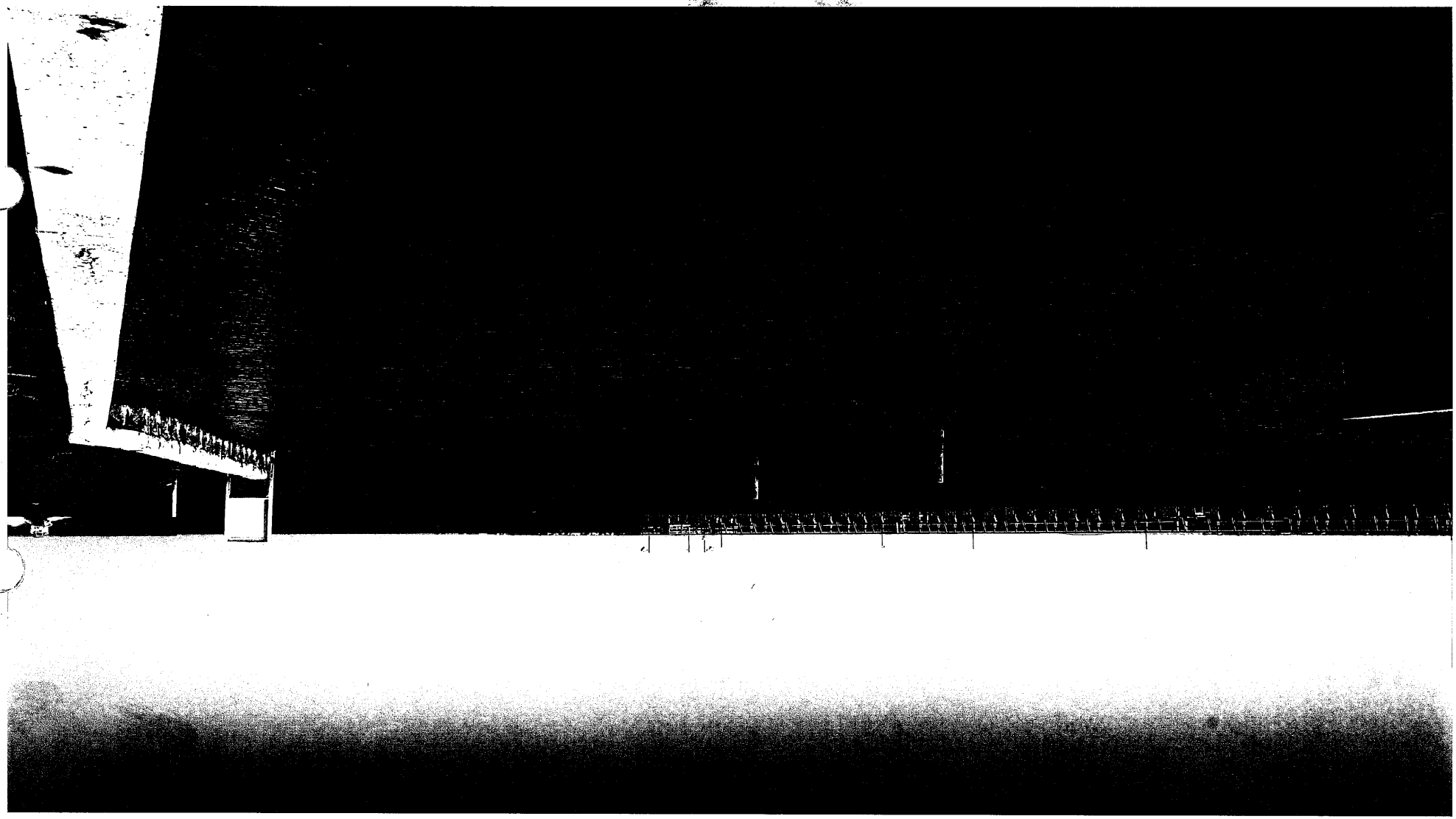
AT PUBLIC MEETING



Oulton Comments
2/25/10
WQ 0010059001

Turbidity Plume exiting
Little Bay
Photo August 2009

OPA RECEIVED
FEB 25 2010
AT PUBLIC MEETING

Outer Comments

WQ0010054001

2/25/10

Fishermen in Little Bay

Nov 22 2009

OPA RECEIVED
FEB 2
AT PUBLIC HEARING

Attachment 1
Outen Comments
TPDES Permit # WQ0010054001

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FEB 25 2010
AT PUBLIC MEETING

Nitrogen Loading into Little Bay

From

The City of Rockport Wastewater Treatment Plant

A Quantitative Assessment

By

Ron Outen, PhD

And

Ray Kirkwood

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2010 MAR -1 AM 10:11
CHIEF CLERKS OFFICE

February, 2010

OPA RECEIVED

FEB 25 2010

AT PUBLIC MEETING

EXECUTIVE SUMMARY

This paper provides an estimate of the quantity of Nitrate-nitrogen released to Little Bay, in treated sewage from the City of Rockport wastewater treatment plant (WWTP), both under current conditions and at the maximum level of effluent flow permitted by the proposed discharge permit. We base our calculations on information in the permit application files, with full citation of sources. Where we have had to make assumptions, we disclose them and discuss alternative assumptions.

In addition, we also provide information on several related topics, which we hope will help place the issue of Nitrate-nitrogen loading into a useful context. These topics include: the role of nitrogen compounds (components of commercial fertilizer) in causing water pollution and damaging aquatic ecosystems, the evidence for current degradation of Little Bay, and the alternative methods regulatory agencies use to establish effluent limits in discharge permits. We also compare the proposed WWTP permit to other discharge permits issued or about to be issued in Aransas County. We do not offer any opinions or make any recommendations; our purpose is to provide information to inform discussion about how best to manage Little Bay.

Based on calculations documented in the Discussion section below, we estimate the following:

At its current level of operation, the WWTP releases an average of 206 lbs per day (= 37 tons per year) of Nitrate nitrogen to Little Bay, not counting the effluent diverted to Rockport Country Club for irrigation.

At the maximum level of operation allowed by the proposed permit, the daily average loading would be 573 lbs of Nitrate-nitrogen per day (=105 tons per year).

It is possible to compare loading rates to local bays of different sizes by expressing the loading rate as "pounds of Nitrate-nitrogen per acre per year". The Texas Commission on Environmental Quality (TCEQ) recently established Total Nitrogen effluent limits for a domestic wastewater discharge to Port Bay at a level the agency deemed necessary to prevent degradation of Port Bay.

Using conversion factors and assumptions described in the Discussion below, we estimate the following Total Nitrogen loading rates:

Port Bay Permit:	4.7 lbs/acre/year
Rockport WWTP (current loading):	211 lbs/acre/year
Proposed Rockport Permit (maximum loading):	587 lbs/acre/year

This means that the current loading into Little Bay is 45 times the allowed loading into Port Bay and that the proposed maximum loading is 125 times that allowed into Port Bay.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2010 MAR -1 AM 10: 11
CHIEF CLERKS OFFICE

DISCUSSION

Background

The City of Rockport operates a wastewater treatment plant (WWTP) on the west side of FM 2165, approximately 1200 feet south of the intersection of FM 2165 and Enterprise Boulevard. The WWTP is operated under Texas Commission on Environmental Quality (TCEQ) Permit No. WQ0010054001, issued May 18, 2005. This permit is scheduled to expire March 1, 2010. The City of Rockport has applied to the TCEQ to renew this permit for an additional 5 years. In response, TCEQ has proposed a draft permit that is identical to the existing permit. If renewed, the new permit would expire on March 1, 2014.

The treated effluent from the Rockport WWTP is discharged into Tule Ditch. Tule Ditch then discharges into Tule Creek. After crossing under Texas Highway Business 35, the effluent reaches sea level and flows through a channelized reach of tidal Tule Creek, enters a culvert at Picton Lane, and then discharges into Little Bay.

The course of the effluent flow is depicted as a red line in the following aerial photograph.

Figure 1—WWTP Flow to Little Bay

The current wastewater discharge permit authorizes land application of up to 2.2 acre feet (ACFT) per acre per year of treated effluent on 200 acres of land. Rockport Country Club (RCC) utilizes this wastewater for irrigation of its golf course. Diversion of effluent for this purpose

occurs before effluent from the plant is discharged to Tule Ditch, and the quantity and timing of diversions is controlled by RCC.

Little Bay is a small, shallow, body of water lying within the boundaries of the Connie Hagar Wildlife Sanctuary and the city limits of Rockport, TX. Little Bay consists of three sections; Little Bay proper, Canoe Lake, and the finger canals within the Key Allegro development area. The surface area of this complex is approximately 405 acres. Little Bay connects with Aransas Bay through two small channels. The mean tidal range at these inlets is approximately 5 inches. Water exchange between Aransas Bay and Little Bay is very limited, with even less water exchange with the "dead-end" areas of Canoe Lake and the Key Allegro canals. Little Bay is extensively used for swimming, boating, fishing (both wade fishing and shore fishing) and wildlife viewing, by both local residents and tourists. Swimming is encouraged by the existence of a designated swimming area and the numerous canal homes that border Little Bay, and boating, skiing, and wakeboarding are encouraged by the presence of a boat ramp and designated Ski Basin area within Little Bay.

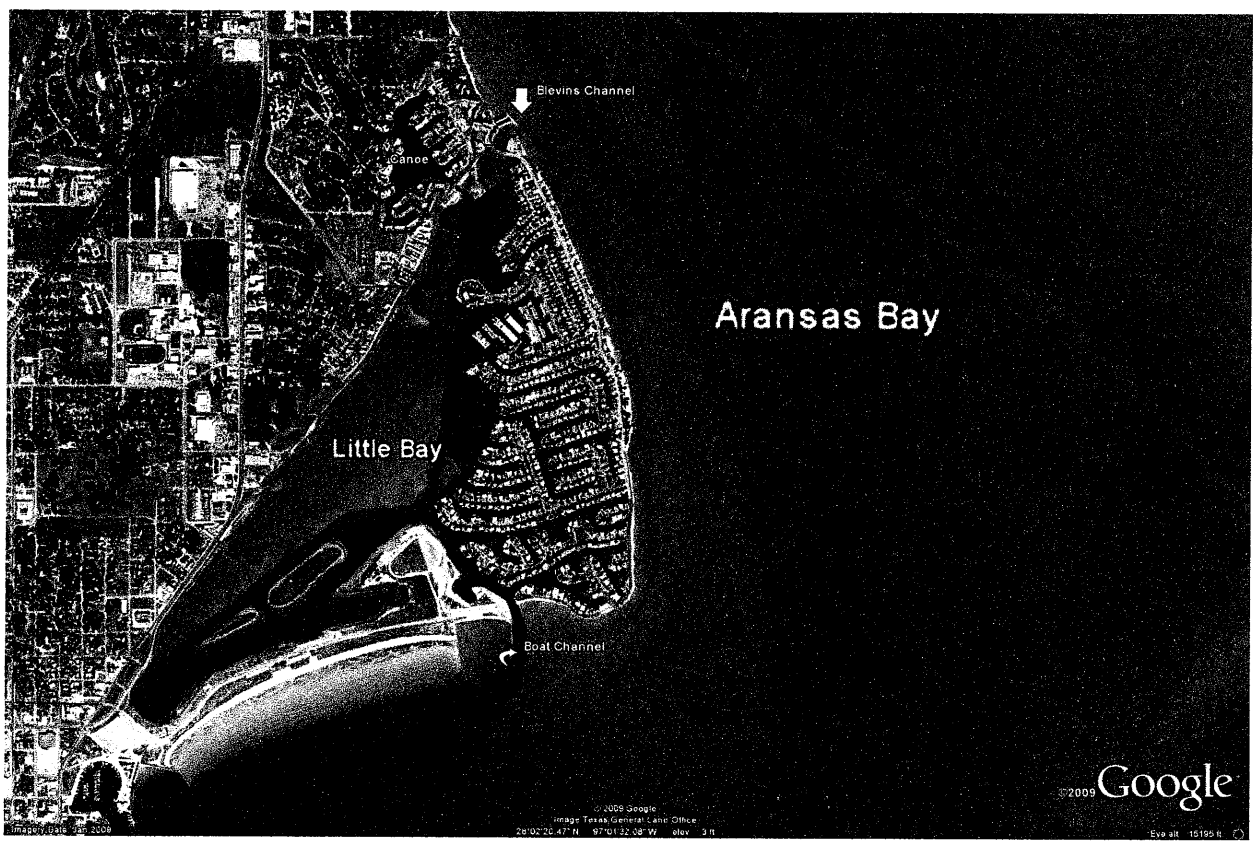


Figure 2—Little Bay

According to the Fact Sheet and Executive Director's Preliminary Findings (Attachment 1) the permit renewal application requests continuation of the existing effluent limits. These limits include annual average daily flow of treated wastewater from the WWTP not to exceed 2.5 million gallons per day (MGD). The existing pollutant limit most relevant to this analysis is the limit for Ammonia-nitrogen (NH3-N), which is a 30-day average of 3 mg/l, a 7-day average of 6

mg/l and a daily maximum of 10 mg/l. Limits for other pollutants are described at Attachment 1, page 2. Discharge Monitoring Reports incorporated within the permit application indicate that the concentration of Ammonia-nitrogen in the effluent is consistently well below these limits.

Neither the existing permit nor the proposed permit place any limits on the discharge of other nitrogen-containing compounds commonly dissolved in domestic wastewater. These include nitrates (NO3-), and nitrites (NO2 -) ammonium (NH4+), various forms of organic nitrogen, and other forms of soluble nitrogen

The main source of nitrogen compounds in the raw sewage entering the treatment plant is human waste, especially urine. Urea, a highly soluble breakdown product of protein metabolism, comprises about 2.5% of the weight of human urine. Urea has the structure shown in Figure 3.

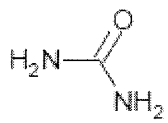


Figure 3—Urea Structure

The two amino groups, (-NH2), are fragments of the amino acids that themselves comprise part of the structure of proteins.

As urea, ammonia, and other nitrogen-containing compounds in human waste pass through sanitary sewer pipes and the WWTP, they are oxidized by exposure to air and the action of bacteria. The result is an array of oxidized nitrogen compounds (principally nitrate) and unoxidized compounds (e.g., residual ammonia), as well as other residual organic nitrogen compounds in small quantities. A well-run WWTP oxidizes organic matter in human waste very efficiently, with the result that most of the urea and other nitrogen-containing compounds entering the plant in raw sewage are converted to nitrate, NO3. Nitrate is highly soluble in water. Data in the permit application indicate that Nitrate-nitrogen comprises 88 percent of the weight of all nitrogen-containing compounds in the treated effluent from the plant, and Ammonia-nitrogen comprises only 2.8 percent.

Nitrogen-containing Nutrients as Water Pollutants

To understand the importance of nitrogen-containing compounds as potential water pollutants, it is important to understand their role in a water body such as Little Bay. Nitrogen is required for the synthesis of amino acids, which are essential building blocks of proteins in the living cells of both plants and animals. Although nitrogen gas comprises about 78 percent of the atmosphere, only some bacteria and cyanobacteria (blue-green algae) are capable of utilizing this nitrogen. Most plants rely on nitrate, ammonia, and other highly soluble nitrogenous compounds dissolved in water and then absorbed into the plants via roots or, in the case of aquatic plants, directly from the surrounding water. In small quantities, nitrogen compounds re

beneficial. Urea, ammonia, and nitrate compounds are standard components of commercial fertilizer. But adding too much nitrogen to a water body can seriously disrupt and change the ecosystem. Excess nitrogen dissolved in the water can fuel a fast and dramatic increase of one-celled algae suspended in the water column and a corresponding depletion of nitrogen compounds dissolved in the surrounding water. The resulting "algal bloom" stimulates the rapid growth of populations of various microscopic animals that feed on the algae. The water becomes turbid (cloudy), restricting light penetration, and when dissolved nutrients or light penetration become limiting, the algae and the animals die. This results in a rain of dead organic matter onto the sediment surface, where it decomposes, removing oxygen from the water in the process and releasing back into the water the nutrients that had been absorbed by the algae at the beginning of the bloom. The release of dissolved nutrients from the decaying organisms sets the stage for another algae bloom, and the cycle of rapid growth and rapid death repeats itself. If the rate of accumulation of organic matter exceeds the rate of degradation, organic matter can build up in the sediments.

These conditions can damage desirable submerged vegetation (e.g., sea grasses) by reducing the amount of light that reaches them. Excess nutrients can also stimulate the growth of epiphytes---tiny plants that "perch" on the leaves and stems of submerged vegetation, intercepting the light that otherwise would reach them, even when the water appears clear. These conditions can also damage the sediments component of the ecosystem. Anaerobic conditions can lead to a buildup of ammonia in the sediment pore water that can reach levels toxic to plants and burrowing animals.

This phenomenon of overstimulation, rapid growth, and decay is referred to as "eutrophication." Eutrophication is a common problem in coastal bays affected by excess nutrient inputs from domestic sewage, agricultural sources, and runoff of storm water from developed areas. Eutrophication appears to be occurring in Little Bay, as evidenced by the periodic darkening of the water as the concentration of one-celled algae and microscopic animals increase. The photograph below captures a mass of dark-green water (turbid) water flowing out of Little Bay through Blevins channel, then turning northward under influence of strong southeast wind, at 5:00 PM on August 23, 2009.

Figure 4—Turbid Flow from Little Bay to Aransas Bay

Excessive nutrients in the water can also produce floating mats of filamentous algae. The photographs below were taken near the mouth of Albacore canal in Key Allegro on February 17, 2010.

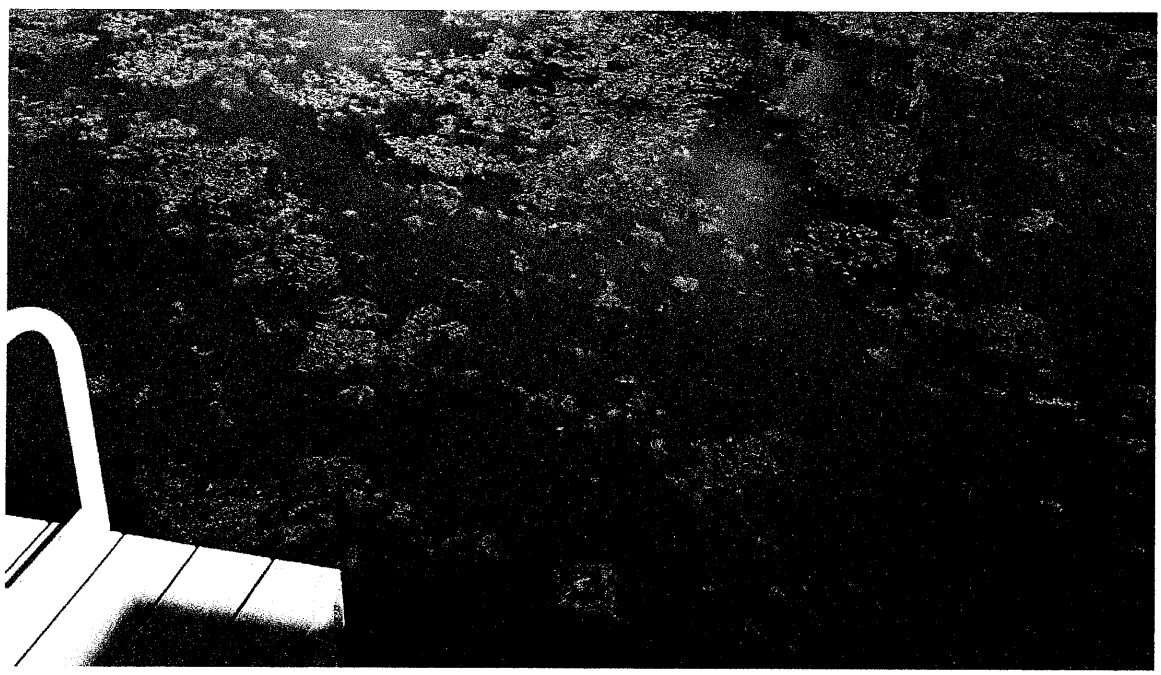


Figure 4—Floating Filamentous Algae Mats in Albacore Canal

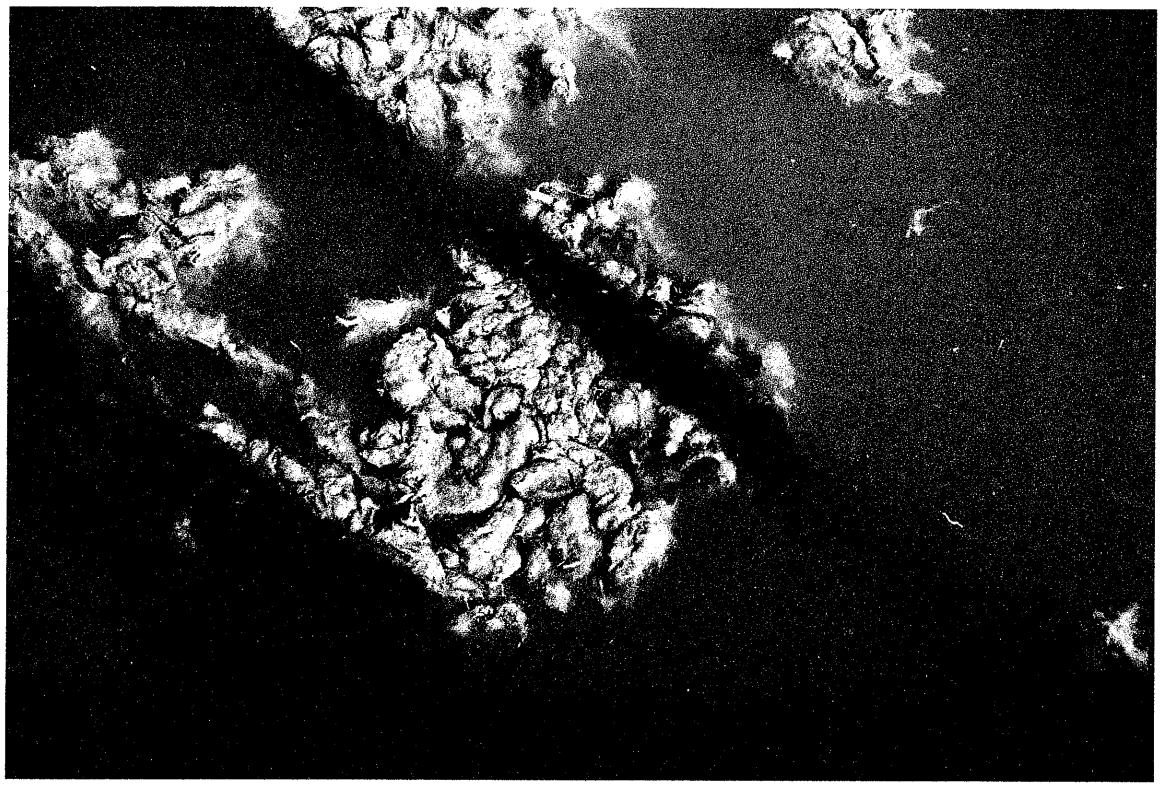


Figure 5—Detail of Filamentous Algae Mat

The discussion above points to the fact that in an ecosystem such as Little Bay, a complex nitrogen cycle exists that involves the absorption of dissolved nitrogen by plants, incorporation into plant and then animal tissue, synthesis and transformation of nitrogen compounds in living cells, excretion, and decomposition in the environment. This cycle involves plants, animals, bacteria and fungi in both the water column and the sediments. The water column and the sediments are two components of one ecosystem, intimately linked by a complex web of nutrient and energy flows.

Because nitrogen can be incorporated into a variety of organic molecules, the amount of nitrogen in wastewater effluent can be expressed in terms of "Nitrate-nitrogen," "Nitrite-nitrogen," "Organic nitrogen" or "Ammonia-nitrogen", depending on the analytical technique used. And, as noted above, these compounds can transform from one to another and back again as they pass through the water, plant, and animal components of the Little Bay ecosystem. In some circumstances, the nitrogen in these compounds can be released as nitrogen gas and escape into the air. This process is call "denitrification".

In order to consider the effects of adding quantities of nitrogen compounds to an ecosystem, therefore, it is useful to think in terms of the Total-nitrogen content of all nitrogen-containing compounds in wastewater. Some wastewater discharge permits place limits on the concentration of Total-nitrogen in the effluent. Total-nitrogen usually is calculated by measuring the amount of various kinds of nitrogen compounds, summing the results, and then correcting for measurement overlaps. Within the past few months, TCEQ has written two domestic wastewater discharge permits for new housing developments in Aransas County, and

both of them incorporate a limit on Total-nitrogen. We will return to one of these permits, issued for a discharge into Port Bay, later in this Discussion.

Three Types of Discharge Permits

The Texas Commission on Environmental Quality, following the federal Clean Water Act, uses three different approaches to writing effluent discharge permits --- technology-based permits, water quality-based permits and anti-degradation permits.

Technology-based permits. Most permits include technology-based effluent limits. That is, if an affordable technology exists to achieve an effluent concentration of X mg/l of a particular pollutant, then the minimum national standard for that pollutant, established by federal regulations, will be X mg/l. Note that a technology-based effluent limit does not consider the nature or quality of the receiving waters. For a given category of discharger and a given pollutant, technology-based permits for a discharge to a fast-moving river, a lake, or bay will have the same end-of-pipe effluent limits, even though the sensitivity of these receiving waters to a particular pollutant may vary greatly..

The effluent limits in the proposed renewal permit for the Rockport WWTP are technology-based limits. They are set according to the pollutant-removal capability of a well-run WTTP of the type we have in this community. They are not, as some have stated, based on a decision that the numerical limits incorporated into the permit are adequate to protect Little Bay. The absence of a limit on Total-nitrogen in the proposed permit, for example, does not derive from a TCEQ determination that nitrogen-containing compounds are not a problem or will not harm Little Bay. On the contrary, there is no Total-nitrogen limit because the waste treatment technology used in the Rockport WWTP is not designed to remove these compounds. Since it is a technology-based permit, it reflects the capability of the technology employed by the WWTP, including the limitations of that technology. The Rockport WWTP will transform nitrogen-containing compounds from one form to another (e.g., urea oxidized to nitrates), but it does not appreciably affect the Total-nitrogen passing through the treatment system.

Water quality-based permits. The second approach to developing permit effluent limits is to base these limits on water quality standards. A water quality standard describes the allowable limits of a pollutant in the environment. These environmental limits may vary according to the uses of the water body (e.g., protection of aquatic life, drinking water supply). Effluent permit limits based on water quality standards are more difficult to calculate, because by their nature they require a site-specific analysis of local water quality and may consider the pollutant contributions from other sources. In its simplest form, a water-quality-based limit is calculated by beginning with a limit on the allowable concentration of a particular pollutant in the receiving water, then calculating how much of that pollutant a particular discharger can add to that receiving water without pushing the allowable environmental concentration above the limit. The total allowable load—mass of pollutant per day—will determine the permitted effluent concentration (milligrams per liter in the effluent), taking into account the quantity of effluent to be discharged (million gallons per day).

Water-quality standards in Texas exist for a variety of pollutants, including for nutrients in lakes, but no water-quality standards exist for nutrients in estuarine waters. This is not because

nutrients are in estuarine ecosystems are not important---(indeed, TCEQ is working on developing such standares)--- but because, for scientific reasons, it is difficult to develop uniform water-quality standards for such nutrients as nitrogen compounds that will be correct across the country or even across regions of the country. Nutrient dynamics vary according to the characteristics of a particular water body, and so it is difficult to establish a universal standard for Total-nitrogen applicable to all bays and other estuaries waters.

Anti-degradation permits. As required by federal law, TCEQ has adopted an "anti-degradation" regulation. This regulation states, in part:

> "Tier 2. No activities subject to regulatory action which would cause degradation of waters which exceed fishable/swimmable quality will be allowed unless it can be shown to the commission's satisfaction that the lowering of water quality is necessary for important economic or social development. Degradation is defined as a lowering of water quality by more than a de minimis extent, but not to the extent that an existing use is impaired. Water quality sufficient to protect existing uses will be maintained. Fishable/swimmable waters are defined as waters which have quality sufficient to support propagation of indigenous fish, shellfish, and wildlife and recreation in and on the water." Texas Administrative Code, Title 30, Part 1, Chapter 307, Rule 307.52(b)(2).

To implement the anti-degradation regulation, TCEQ must establish as the baseline conditions for determination of degradation "[t]he highest quality water sustained since November 28, 1975". The anti-degradation review applies to "all pollution which could cause degradation of water quality where water quality exceeds levels necessary to support propagation of fish, shellfish and wildlife, and recreation in an on the water (fishable/swimmable water quality)". Texas Administrative Code, Title 30, Part 1, Chapter 307, Rule 307.5(c)(2)(B).

We noted above that EPA has included limits on Total-nitrogen and Phosphorus in two recent permits for domestic sewage discharge in Aransas County. These permits were not technology-based permits. Instead, they were written in accordance with the anti-degradation regulation described above. In each case, TCEQ determined that limits on the concentration of nutrients in the effluent were necessary to limit the total loading of nutrients (nitrogen and phosphorus), both needed to avoid degradation of the water body into which the effluent will be discharged.

In the sections below, we will estimate the total loading, into Little Bay, of nitrogen compounds from the City of Rockport WWTP plant under two scenarios: (1) the maximum discharge level allowable under the proposed permit and (2) the current treated wastewater discharge level.

Total-nitrogen Loading to Little Bay

"Total loading" is the concentration of the pollutant in the effluent, multiplied by the amount of effluent discharged during a stated period of time; the result is expressed as a metric such as "pounds of pollutant per day". We began our inquiry by attempting to estimate the total loading of nitrogen to Little Bay, considering all forms of nitrogen compounds present in the

effluent. We began by obtaining all recent available data on the concentration of any nitrogen compound in the WTTP effluent. We found data on Ammonia-nitrogen, which we expected to find because the existing permit requires monthly "grab-sample" monitoring of this compound. (A "grab-sample" is a one- time sample of the effluent at the moment the sample is taken, as opposed to a "composite sample" comprised of multiple samples taken over a period of time.) The monthly grab sample data consistently show a concentration of Ammonia-nitrogen that is well below the permit limit of 3 mg/l in the effluent.

Apart from these monthly monitoring data, we found reports in the files from a small number of effluent samples that included concentration data on at least one nitrogen compound, but we found only one analytical report with enough information to permit direct calculation of Total-nitrogen. Without reliable information about Total-nitrogen, we decided to focus on Nitrate-nitrogen, for three reasons. (1) Due to the oxidative efficiency of the plant, we expected Nitrate-nitrogen to account for the great majority of Total-nitrogen in wastes entering the plant. (2) Nitrate is highly soluble, is readily absorbed into plants, and is therefore is immediately available to stimulate plant growth. Nitrate, not ammonium, is a standard reagent in phytoplankton growth medium, and is the key nitrogen source in ocean upwelling systems. It is therefore very important from an ecosystem perspective. If we could estimate the loading to Little Bay of Nitrate-nitrogen, we expected it would approximate—though underestimate—the loading of Total-nitrogen. (3) We were able to find more than one data set that included Nitrate-nitrogen.

After evaluating the small number of samples for which Nitrate-nitrogen was reported, we ultimately decided to base our loading estimate on sampling data we found in the permit application file. The application file contained reports on two sampling series that included data on Nitrate-nitrogen concentration. These sampling campaigns were attractive for several reasons:

- The samples were taken recently; both in May 2009, two weeks apart. (See Attachment 2)
- The samples were 24-hour composites, rather than one-time "grab" samples, and therefore more likely to represent accurately the quality of the effluent than would a single grab-sample.
- The samples were taken and the analyses were performed by the same company, increasing our confidence in the comparability of the two results.
- The laboratory reports included a complete record of how the samples were handled and analyzed, increasing our confidence in the quality of the data reported.
- The two sample reports appear to have been prepared in the course of preparing the permit application.

We note that the first of these sampling campaigns, in addition to reporting Nitrate-nitrogen, contained enough information to calculate Total-nitrogen. We were thus able to determine that, for that sample, Nitrate-nitrogen comprised 88 percent of Total-nitrogen, while Ammonia-nitrogen comprised only 2.8 percent. These ratios confirmed our expectation that the plant

would oxidize the great majority of nitrogen compounds entering the WWTP to nitrates, which is consistent with what one would expect in an efficiently operating plant.

In terms of Nitrate-nitrogen, the results reported for the two 24 hour composite sampling campaigns in May, 2009 were:

May 14-15, 2009:	23.6 mg/l
May 28-29, 2009	41.5 mg/l

We note that, although both of these analytical reports are present in the application file, only the first (lower) of these values appears to have been incorporated into the submitted permit application form. The analytical results are different in the two samples, but we did not have a basis to conclude that one of these results is more reliable than the other, so we based our loading estimate on the average of the two values rather than the value reported in the application (23.6 mg/l). The average of the two values is 32.6 mg/l.

An even more recent sampling report commissioned by the City (not included with the application) may lend a degree of support to this estimate. This report, by a company named EnviroDyne Laboratories, Inc., reports a July 9, 2009 dry-weather grab-sample from Tule Ditch identified as "Primarily influenced by WWTP." The reported Nitrate-nitrogen value was 32.69 mg/l.

From the meager description and the stated objective of the report, "to characterize the water leaving the Wastewater Treatment Plant," we surmise that this sample comprised effluent taken from Tule Ditch near the plant outfall. If so, and if the analytical method was correct, then the more recent sample is essentially identical to the mean of the samples in the application file. We note this result with great caution, however. The EnviroDyne report is seriously flawed and does not conform to the usual standards of scientific reporting and analysis, and it contains conclusions that far outreach its data. But if we give it the benefit of the doubt with respect to sample integrity and analytical accuracy, then it supports our use of 32.6 mg/l as a basis for subsequent calculations reported below.

We note that City files contain records of effluent, Tule ditch, and RCC pond grab-samples from earlier years that report lower values for Nitrate-nitrogen. Generally, these are in the range of 10-15 mg/l. None of these samples are as well-documented as the two we chose to use, and none of them carry the presumption of validity accorded by their use in the permit application. However, we record their existence here for the sake of completeness. Our loading estimates below are based on linear equations, so they can be scaled against alternative assumptions about Nitrate-nitrogen concentrations in the effluent.

We calculated the nitrogen load discharged to Tule Ditch from the outflow of treated water from the WWTP using the conversion factors and equations in Figure 6.

Sewage Treatment Plant Outfall Nitrogen Calculations

Factors:
32.6 mg/l nitrogen (nitrogen concentration)
2.11E+6 gal/day (maximum permitted flow less the water diverted to the golf course)

Conversion factors:
Gal/liter=0.264172
Lb/mg=2.2E-6

Equations:
(mg{N}/l)/(gal/l)= mg{N}/gal
(mg{N}*lb/mg)/gal=lb{N}/gal
(lb{N}/gal)*(gal/day)=lb{N}/day

Calculations:
32.6/0.264172=123.4 mg{N}/gal
123.4*0.0000022=0.000272 lb{N}/gal
0.000272*2100000=573 pounds of Nitrate-nitrogen per day discharged to Tule ditch at maximum permitted flow.

Figure 6—Nitrate-nitrogen Loading at WWTP Full Capacity

We used the maximum permitted flow from the WWTP—2.5 million gallons per day (MGD)—less the maximum permitted application of WWTP effluent for irrigation—200 acres at a maximum application rate of 2.2 acre-feet per acre per year—to determine the actual minimum flow of effluent to the ditch system that leads to Little Bay when the WWTP operates at maximum capacity. This amount is a daily average of 2.11 MGD. It is the minimum effluent discharge to the environment based on maximum inflow to the plant because it assumes maximum average daily diversion by RCC during the course of a year. On any given day, actual effluent flow to Little Bay might be more or less due to expected irregular need for effluent by RCC.

We assume that the Nitrate-nitrogen concentration value we used, 32.6 mg/l, is representative of WWTP effluent quality throughout the year. This assumed value, as noted, is based on samples taken during May. It is possible that winter temperatures might reduce the oxidation efficiency of the plant. It that is the case, then our use of spring nitrate levels to estimate annual nitrate loading might result in an overestimate of nitrate loading. However, we are using nitrate-loading as a surrogate for Total-nitrogen loading, for which we expect nitrate-nitrogen estimates to be an underestimate for reasons described above. We do not expect seasonal variation in treatment efficiency to lead to an overestimate of Total-nitrogen; that is, while the ratios among the various nitrogen-containing compounds in the effluent may vary, the effluent concentration of Total-nitrogen probably does not vary as much because the characteristics of the raw sewage entering the WWTP is probably fairly constant. We know that the quantity of raw sewage inflow varies over time (weekend versus weekday; winter versus summer), but the quality of raw sewage probably does not.

Since we made our loading calculations based on effluent flow from the WWTP and Nitrate-nitrogen concentration at the point of discharge from the plant, we implicitly assumed in estimating Nitrate loading into Little Bay that all the effluent and all the Nitrate-nitrogen discharged from the WWTP into Tule Ditch reaches Little Bay. We are not aware of any consistent removal of effluent or nitrogen after the discharge to Tule Ditch, although it is possible there is some removal in the form of uptake by tree and shrub roots in some areas. Any such removal capability is reduced by the City's practice of periodically removing streamside vegetation, a practice which also will mobilize any nitrogen compounds sequestered in the sediments.

In addition, some Nitrate-nitrogen flowing through highly vegetated areas, such as wetlands, may be converted by bacterial action into nitrogen gas and released into the atmosphere. We have no data with which to estimate any Nitrate-nitrogen removal by this mechanism; however, there is little vegetation in Tule Ditch and Tule creek because the City periodically removes it. Therefore, we have assumed no removal due to denitirification.

It is also likely that some effluent soaks into the sandy bottom of the drainage way. We do not consider that this fraction has been removed from the Little Bay watershed because flow in the subsurface freshwater lens most likely follows the Tule drainage and eventually reaches Little Bay. A similar logic applies to nitrogen compounds sequestered in the sediments. Unless they are converted to nitrogen gas by bacteria, they will eventually move downsteam.

Using the data and calculations described above, we estimate an annual average loading of Nitrate-nitrogen to the ditch complex of approximately 573 pounds per day at full operating capacity of the WWTP. This is the loading that would result from the 2.5 MGD maximum effluent flow in the current permit, and it is the limit TCEQ proposes for the renewed permit.

To provide a graphic comparison, 573 pounds of Nitrate-nitrogen would be roughly equivalent to a release of 2.5 tons of commercial 10-P-K commercial fertilizer into Little Bay every day.

This loading equates to over 105 tons of Nitrate-nitrogen delivered to Little Bay per year.

Current Nitrate-nitrogen Loading into Little Bay

The current average outflow from the WWTP is stated in the application to be 1.15 MGD, and RCC currently is taking the maximum amount of water for irrigation that the permit allows, so we calculate the diversion at this time to be the same as for the previous scenario. Using the equations of figure 6, we estimate a current average of 206 lbs of Nitrate-nitrogen loading to Little Bay per day. This is roughly equivalent to a release of one ton of commercial 10-P-K fertilizer to Little Bay every day.

This loading equates to about 37 tons of Nitrate-nitrogen delivered to Little Bay per year.

We consider these estimates to be the best estimates possible in light of the paucity of reliable sampling data. The flow data we used are reliable, but the effluent concentration data are more questionable. For these reasons, we chose to use the effluent quality data we found in the files associated with the permit application. Had we assumed lower concentration values, we would have produced proportionally lower loading estimates; had we used the higher of the two May,

2009, sample values, we would have produced proportionally higher value. The fact is, despite the obvious importance of nitrogen-containing compounds as pollutants, we have very little reliable information about the quantity of these compounds being discharged by the WWTP into Little Bay.

Comparision to Recently Issued Port Bay Permit

We have not offered any opinions about the effects of these loading levels on Little Bay. Eutrophication appears to be occurring in Little Bay, but the WWTP is only one avenue of Total-nitrogen loading to Little Bay. Another source is storm water runoff, both via Tule Creek and also via the numerous storm-drains that empty into Little Bay. Surface sheet flow and subsurface flow may also be important.

We noted that TCEQ has not established water-quality standards for Nitrates or Total-nitrogen in estuarine waters. Nonetheless, TCEQ, within the past year, has included a limit on Total-nitrogen in two WWTP permits in Aransas County. In both cases, private developers applied to TCEQ for a domestic sewage discharge permit for WWTPs to be constructed in conjunction with housing developments. One of these permits was for a WWTP discharge into Port Bay. Port Bay is similar to Little Bay in that it is a shallow bay that has restricted water exchange with a larger bay. However, Port Bay is roughly 5 times larger than Little Bay (approximately 2180 acres versus 405 acres); it is not presently degraded.

To develop the permit limits, TCEQ undertook a site-specific evaluation of Port Bay and performed a Tier 2 anti-degradation analysis. From this analysis, TCEQ determined that a daily average of 6 mg/l Total-nitrogen would be the maximum allowable concentration in wastewater discharged from the WWTP. Based on the maximum permitted flow of 0.55 MGD, that concentration limit translates to an average daily Total-nitrogen loading of 28 pounds from the Port Bay WWTP. This enforceable limit is to be applied before the water is dispersed through a so-called Bonus Filtration Feature—actually a 5-acre constructed wetland—prior to release into Port Bay. Therefore, the effluent probably will contain less than 6 mg/l Total-nitrogen by the time it reaches Port Bay.

We can compare the Port Bay permit to the proposed permit for discharge into Little Bay by expressing the Total-nitrogen loading as "lbs per acre per year".

Assuming that Nitrate-nitrogen is 88 % of Total-nitrogen, this comparison produces the following results:

Port Bay Permit:	4.7 lbs/acre/year
Proposed Rockport Permit (maximum loading):	587 lbs/acre/year
Rockport WWTP (current loading):	211 lbs/acre/year

This means that the current loading into Little Bay is 45 times the allowed loading into Port Bay and that the proposed maximum loading is 125 times that allowed into Port Bay.

Attachment 1

Fact Sheet and Executive Director's Preliminary Findings

FACT SHEET AND EXECUTIVE DIRECTOR'S PRELIMINARY DECISION

For proposed Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0010054001, TX0022152 to discharge to waters in the State.

Issuing Office:	Texas Commission on Environmental Quality P.O. Box 13087 Austin, Texas 78711-3087
Applicant:	City of Rockport 622 East Market Street Rockport, Texas 78382-2530
Prepared By:	Bijaya R. Chalise Municipal Permits Team Wastewater Permitting Section (MC 148) Water Quality Division (512) 239-4545
Date:	8/31/09
Permit Action:	Renewal

1. EXECUTIVE DIRECTOR RECOMMENDATION

The Executive Director has made a preliminary decision that this permit, if issued, meets all statutory and regulatory requirements. The proposed permit includes an expiration date of **March 1, 2014** according to 30 TAC § 305.71, Basin Permitting.

2. APPLICANT ACTIVITY

The applicant has applied to the Texas Commission on Environmental Quality (TCEQ) for a renewal of the existing permit that authorizes the discharge of treated domestic wastewater at an annual average flow not to exceed 2.5 million gallons per day.

3. FACILITY AND DISCHARGE LOCATION

The plant site is located on the west side of Farm-to-Market Road 2165, approximately 1,200 feet south of the intersection of Farm-to-Market Road 2165 and Enterprise Boulevard in Aransas County, Texas 78732.

The treated effluent is discharged to Tulle Ditch; thence to unnamed ditch (non-tidal); thence to unnamed ditch (tidal); thence to Little Bay; thence to Aransas Bay in Segment No. 2471 of the Bays and Estuaries. The unclassified receiving water uses are no significant aquatic life uses for Tulle Ditch, limited aquatic life uses for unnamed ditch (non-tidal), and high aquatic life uses for unnamed ditch (tidal) and for Little Bay. The designated uses for Segment No. 2471 are exceptional aquatic life uses, oyster waters, and contact recreation.

4. TREATMENT PROCESS DESCRIPTION AND SEWAGE SLUDGE DISPOSAL

The City of Rockport Wastewater Treatment Facility is an activated sludge process plant operated in the complete mix mode. Treatment units include bar screens, grit chamber, aeration basins, final clarifiers, aerobic sludge digester, pre-thickener, belt filter press, a chlorine contact chamber and dechlorination chamber. The facility is in operation.

The draft permit authorizes the disposal of sludge at a TCEQ authorized land application site or co-disposal landfill.

5. INDUSTRIAL WASTE CONTRIBUTION

The draft permit includes pretreatment requirements that are appropriate for a facility of this size and complexity. The facility does not appear to receive significant industrial wastewater contributions.

6. SUMMARY OF SELF-REPORTED EFFLUENT ANALYSES

The following is a summary of the applicant's Monthly Effluent Report data for the period July 2007 through March 2009. The average of Daily Avg value is computed by averaging of all 30-day average values for the reporting period for each parameter.

Parameter	Average of Daily Avg
Flow, MGD	1.15
$CBOD_5$, mg/l	2.52
TSS, mg/l	3.83
NH_3-N, mg/l	0.32

7. PROPOSED PERMIT CONDITIONS AND MONITORING REQUIREMENTS

The proposed effluent limitations and monitoring requirements for those parameters that are limited in the draft permit are as follows:

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The annual average flow of effluent shall not exceed 2.5 million gallons per day (MGD); nor shall the average discharge during any two-hour period (2-hour peak) exceed 4,403 gallons per minute (gpm).

Parameter	30-Day Average		7-Day Average	Daily Maximum
	mg/1	lbs/day	mg/1	mg/1
$CBOD_5$	10	208	15	25
TSS	15	313	25	40
NH_3-N	3	63	6	10
DO (minimum)	5.0	N/A	N/A	N/A

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored once per week by grab sample. There shall be no discharge of floating solids or visible foam in other than trace amounts and no discharge of visible oil.

The effluent shall contain a chlorine residual of at least 1.0 mg/l after a detention time of at least 20 minutes (based on peak flow) and shall be monitored daily by grab sample. The permittee shall dechlorinate the chlorinated effluent to less than 0.1 mg/l chlorine residual and shall monitor chlorine residual daily by grab sample after the dechlorination process. An equivalent method of disinfection may be substituted only with prior approval of the Executive Director.

Parameter	Monitoring Requirement
Flow, MGD	Continuous
$CBOD_5$	Two/week
TSS	Two/week
NH_3-N	Two/week
DO	Two/week

B. SEWAGE SLUDGE REQUIREMENTS

The draft permit includes Sludge Provisions according to the requirements of 30 TAC Chapter 312, Sludge Use, Disposal and Transportation. The draft permit authorizes the disposal of sludge at a TCEQ authorized land application site or co-disposal landfill.

C. PRETREATMENT REQUIREMENTS

Permit requirements for pretreatment are based on TPDES regulations contained in 30 TAC Chapter 315 which references 40 CFR Part 403, "General Pretreatment Regulations for Existing and New Sources of Pollution." *rev. Federal Register/ Vol. 70/ No. 198/ Friday, October 14, 2005/ Rules and Regulations, pages 60134-60798* The permit includes specific requirements that establish responsibilities of local government, industry, and the public to implement the standards to control pollutants which pass through or interfere with treatment processes in publicly owned treatment works or which may contaminate the sewage sludge. This permit has appropriate pretreatment language for a facility of this size and complexity.

D. WHOLE EFFLUENT TOXICITY (BIOMONITORING) REQUIREMENTS

(1) The draft permit includes 7-day chronic freshwater biomonitoring requirements as follows. The permit requires five dilutions in addition to the control (0% effluent) to be used in the toxicity tests. These additional effluent concentrations shall be 32%, 42%, 56%, 75%, and 100%. The low-flow effluent concentration (critical dilution) is defined as 100% effluent.

(a) Chronic static renewal 7-day survival and reproduction test using the water flea (*Ceriodaphnia dubia*). The frequency of the testing is once per quarter at least the first year of testing, after which the permittee may apply for a testing frequency reduction.

(b) Chronic static renewal 7-day larval survival and growth test using the fathead minnow (*Pimephales promelas*). The frequency of the testing is once per quarter at least the first year of testing, after which the permittee may apply for a testing frequency reduction.

(2) The draft permit includes the following minimum 24-hour acute freshwater biomonitoring requirements at a frequency of once per six months:

(a) Acute 24-hour static toxicity test using the water flea (*Daphnia pulex* or *Ceriodaphnia dubia*).

(b) Acute 24-hour static toxicity test using the fathead minnow (*Pimephales promelas*).

E. IRRIGATION REQUIREMENTS

The draft permit also includes authorization to dispose of a portion of the treated effluent via irrigation of 200 acres at a maximum application rate of 2.2 acre-feet per year per acre irrigated.

F. SUMMARY OF CHANGES FROM APPLICATION

None.

G. SUMMARY OF CHANGES FROM EXISTING PERMIT

Effluent limitations and monitoring requirements in the draft permit remain the same as the existing permit requirements.

The Standard Permit Conditions, Sludge Provisions, Other Requirements, Pretreatment Requirements and Biomonitoring sections of the draft permit have been updated.

Item No. 8 on Page 25 of the Other Requirements Section has been added to the draft permit regarding the Executive Director's intention to initiate rulemaking and/or changes to procedural documents that may result in bacteria effluent limits and monitoring requirements for this facility.

The expiration date of the proposed draft permit is March 1, 2014.

8. DRAFT PERMIT RATIONALE

A. TECHNOLOGY-BASED EFFLUENT LIMITATIONS/CONDITIONS

Regulations promulgated in Title 40 of the Code of Federal Regulations (CFR) require technology-based limitations be placed in wastewater discharge permits based on effluent limitations guidelines, where applicable, and/or on best professional judgment (BPJ) in the absence of guidelines.

Effluent limitations for maximum and minimum pH are in accordance with 40 CFR Part 133.102(c) and 30 TAC § 309.1(b).

B. WATER QUALITY SUMMARY AND COASTAL MANAGEMENT PLAN

(1) WATER QUALITY SUMMARY

The treated effluent is discharged to Tulle Ditch; thence to unnamed ditch (non-tidal); thence to unnamed ditch (tidal); thence to Little Bay; thence to Aransas Bay in Segment No. 2471 of the Bays and Estuaries. The unclassified receiving water uses are no significant aquatic life uses for Tulle Ditch, limited aquatic life uses for unnamed ditch (non-tidal), and high aquatic life uses for unnamed ditch (tidal) and for Little Bay. The designated uses for Segment No. 2471 are exceptional aquatic life uses, oyster waters, and contact recreation. The effluent limitations in the draft permit will maintain and protect the existing instream uses. All determinations are preliminary and subject to additional review and/or revisions.

A watershed of high priority has been identified in Segment No. 2471 in Aransas County. The Piping Plover, *Charadrius melodus* Ord, a threatened aquatic dependent species, is found in the watershed of Segment No. 2471; **however, the facility is not a petroleum facility and its discharge is not expected to have an effect on the piping plover.** A priority watershed of critical concern has been identified in Segment No. 2471 in Aransas County. Therefore the Whooping Crane, *Grus Americana* (Linnaeus an endangered aquatic dependent species, has been determined to occur in the watershed of Segment No. 2471. This determination is based on the United States Fish and Wildlife Service's

(USFWS) biological opinion on the State of Texas authorization of the Texas Pollutant Discharge Elimination System (TPDES; September 14, 1998, October 21, 1998 update). To make this determination for TPDES permits, TCEQ and EPA only considered aquatic or aquatic dependent species occurring in watersheds of critical concern or high priority as listed in Appendix A of the USFWS biological opinion. The determination is subject to reevaluation due to subsequent updates or amendments to the biological opinion. The presence of the endangered Whooping Crane requires EPA review and, if appropriate, consultation with USFWS.

Segment No. 2471 is not currently listed on the State's inventory of impaired and threatened waters (the 2008 CWA §303(d) list).

The effluent limitations and/or conditions in the draft permit comply with the Texas Surface Water Quality Standards, 30 TAC §§ 307.1 - 307.10, effective August 17, 2000.

(2) CONVENTIONAL PARAMETERS

Effluent limitations for the conventional effluent parameters (i.e., Biochemical Oxygen Demand or Carbonaceous Biochemical Oxygen Demand, Ammonia Nitrogen, etc.) are based on stream standards and waste load allocations for water quality limited streams as established in the Texas Water Quality Standards and the water quality management plan.

The effluent limitations in the draft permit have been reviewed for consistency with the State of Texas Water Quality Management Plan (WQMP). The proposed effluent limitations are contained in the approved WQMP. A Waste Load Evaluation has not been completed for this segment.

The effluent limitations in the draft permit meet the requirements for secondary treatment and the requirements for disinfection according to 30 TAC Chapter 309, Subchapter A: Domestic Wastewater Effluent Limitations.

(3) COASTAL MANAGEMENT PLAN

The Executive Director has reviewed this action for consistency with the goals and policies of the Texas Coastal Management Program (CMP) in accordance with the regulations of the Coastal Coordination Council (CCC) and has determined that the action is consistent with the applicable CMP goals and policies.

C. WATER QUALITY-BASED EFFLUENT LIMITATIONS/CONDITIONS

(1) GENERAL COMMENTS

The Texas Surface Water Quality Standards (30 TAC Chapter 307) state that "surface waters will not be toxic to man, or to terrestrial or aquatic life." The methodology outlined in the "Procedures to Implement the Texas Surface Water Quality Standards, January 2003" is designed to ensure compliance with 30 TAC Chapter 307. Specifically, the methodology is designed to ensure that no source will be allowed to discharge any wastewater that: (1) results in instream aquatic toxicity; (2) causes a violation of an applicable narrative or numerical state water quality standard; (3) results in the endangerment of a drinking water supply; or (4) results in aquatic bioaccumulation that threatens human health.

(2) AQUATIC LIFE CRITERIA

(a) SCREENING

Water quality-based effluent limitations are calculated from freshwater aquatic life criteria found in Table 1 of the Texas Surface Water Quality Standards (30 TAC Chapter 307).

There is no mixing zone for this discharge directly to an intermittent stream; acute freshwater criteria apply at the end of pipe. Acute and chronic freshwater criteria apply at Tulle Ditch without perennial pools. The following critical effluent percentages are being used:

Acute Effluent % 100% Chronic Effluent % 100%

Wasteload allocations (WLAs) are calculated using the above estimated effluent percentages, criteria outlined in the Texas Surface Water Quality Standards, and partitioning coefficients for metals (when appropriate and designated in the implementation procedures). The WLA is the end-of-pipe effluent concentration that can be discharged, when after mixing in the receiving stream, instream numerical criteria will not be exceeded. From the WLA, a long term average (LTA) is calculated using a log normal probability distribution, a given coefficient of variation (0.6), and a 99th percentile confidence level. The lower of the two LTAs (acute and chronic) is used to calculate a daily average and daily maximum effluent limitation for the protection of aquatic life using the same statistical considerations with the 99th percentile confidence level and a standard number of monthly effluent samples collected (12). Assumptions used in deriving the effluent limitations include segment values for hardness, chlorides, pH and Total Suspended Solids (TSS) according to the segment-specific values contained in the TCEQ guidance document, "Procedures to Implement the Texas Surface Water Quality Standards, January 2003." The segment values are 1100 mg/l $CaCO_3$ for hardness, 14000 mg/l Chlorides, 7.9 standard units for pH, and 10 mg/l for TSS. For additional details on the calculation of water quality-based effluent limitations, refer to the TCEQ guidance document.

TCEQ practice for determining significant potential is to compare the reported analytical data against percentages of the calculated daily average water quality-based effluent limitation. Permit limitations are required when analytical data reported in the application exceeds 85% of the calculated daily average water quality-based effluent limitation. Monitoring and reporting is required when analytical data reported in the application exceeds 70% of the calculated daily average water quality-based effluent limitation.

(b) PERMIT ACTION

Analytical data reported in the application was screened against calculated water quality-based effluent limitations for the protection of aquatic life. Reported analytical data does not exceed 70% of the calculated daily average water quality-based effluent limitation for aquatic life protection.

(3) AQUATIC ORGANISM BIOACCUMULATION CRITERIA

(a) SCREENING

Water quality-based effluent limitations for the protection of human health are calculated using criteria for the consumption of freshwater fish tissue found in Table 3 of the Texas Surface Water Quality Standards (30 TAC Chapter 307). The discharge point is to an intermittent stream with perennial pools or to an intermittent stream within 3 miles upstream of an intermittent stream with perennial pools. Human health screening using incidental freshwater fish tissue criteria (= 10 × freshwater fish tissue criteria) is applicable due to the perennial pools that support incidental freshwater fisheries. TCEQ uses the mass balance equation to estimate dilution in the intermittent stream with perennial pools during average flow conditions. The estimated dilution for human health protection is calculated using the final permitted flow of 2.5 MGD and the harmonic mean flow of 0.1 cfs for unnamed tributary (nontidal). The following effluent percentage is being used:

Human Health Effluent % 97.48%

Water quality-based effluent limitations for the protection of human health are calculated using criteria for the consumption of marine fish tissue found in Table 3 of the Texas Surface Water Quality Standards (30 TAC Chapter 307). Marine fish tissue bioaccumulation criteria are applied at the edge of the human health mixing zone for discharges into bays, estuaries and wide tidal rivers. The human health mixing zone for this discharge is defined as a 15-foot radius from the point where the discharge enters unnamed ditch (tidal). TCEQ uses the EPA horizontal jet plume model to estimate dilution at the edge of the human health mixing zone for wide tidal rivers that are less than 400 feet wide. General assumptions used in the horizontal jet plume model are: a non-buoyant discharge, a submersed pipe, and no cross flow. Based on this analysis, the following critical effluent percentage is calculated based on the permitted flow of 2.5 MGD:

Human Health Effluent %: 99%

Water quality-based effluent limitations for human health protection against the consumption of fish tissue are calculated using the same procedure as outlined for calculation of water quality-based effluent limitations for aquatic life protection. A 99th percentile confidence level in the long term average calculation is used with only one long term average value being calculated.

Significant potential is again determined by comparing reported analytical data against 70% and 85% of the calculated daily average water quality-based effluent limitation.

(b) PERMIT ACTION

Reported analytical data does not exceed 70% of the calculated daily average water quality-based effluent limitation for human health protection.

(4) DRINKING WATER SUPPLY PROTECTION

(a) SCREENING

Water Quality Segment No. 2471, which receives the discharge from this facility, is not designated as a public water supply. Screening reported analytical data of the effluent against water quality-based effluent limitations calculated for the protection of a drinking water supply is not applicable.

(b) PERMIT ACTION

None.

(5) WHOLE EFFLUENT TOXICITY (BIOMONITORING) CRITERIA

(a) SCREENING

TCEQ has determined that there may be pollutants present in the effluent that may have the potential to cause toxic conditions in the receiving stream. Whole effluent biomonitoring is the most direct measure of potential toxicity that incorporates the effects of synergism of effluent components and receiving stream water quality characteristics. Biomonitoring of the effluent is, therefore, required as a condition of this permit to assess potential toxicity.

The existing permit includes 7-day chronic freshwater biomonitoring requirements. A summary of the biomonitoring testing for the facility indicates in the past five years, the permittee has performed eighteen chronic tests, with no demonstrations of significant toxicity, lethal or sublethal.

(b) PERMIT ACTION

The test species are appropriate to measure the toxicity of the effluent consistent with the requirements of the State water quality standards. The biomonitoring frequency has been established to reflect the likelihood of ambient toxicity and to provide data representative of the toxic potential of the facility's discharge. This permit may be reopened to require effluent limits, additional testing, and/or other appropriate actions to address toxicity if biomonitoring data show actual or potential ambient toxicity to be the result of the permittee's discharge to the receiving stream or water body.

Analytical data submitted with the application does not indicate violation of any numerical water quality-based effluent limitation for aquatic life protection; therefore, minimum biomonitoring conditions required for EPA classified major facilities are proposed in the draft permit.

(6) WHOLE EFFLUENT TOXICITY CRITERIA (24 - HOUR ACUTE)

(a) SCREENING

The existing permit includes 24-hour acute freshwater biomonitoring language. A summary of the biomonitoring testing for the facility indicates in the past five years, the permittee has performed eighteen 24-hour acute tests, with no demonstrations of significant mortality.

(b) PERMIT ACTION

The draft permit includes 24-hour 100% acute biomonitoring tests for the life of the permit.

9. WATER QUALITY VARIANCE REQUESTS

No variance requests have been received.

10. PROCEDURES FOR FINAL DECISION

When an application is declared administratively complete, the Chief Clerk sends a letter to the applicant advising the applicant to publish the Notice of Receipt of Application and Intent to Obtain Permit in the newspaper. In addition, the Chief Clerk instructs the applicant to place a copy of the application in a public place for review and copying in the county where the facility is or will be located. This application will be in a public place throughout the comment period. The Chief Clerk also mails this notice to any interested persons and, if required, to landowners identified in the permit application. This notice informs the public about the application, and provides that an interested person may file comments on the application or request a contested case hearing or a public meeting.

Once a draft permit is completed, it is sent, along with the Executive Director's preliminary decision, as contained in the technical summary or fact sheet, to the Chief Clerk. At that time, Notice of Application and Preliminary Decision will be mailed to the same people and published in the same newspaper as the prior notice. This notice sets a deadline for making public comments. The applicant must place a copy of the Executive Director's preliminary decision and draft permit in the public place with the application. This notice sets a deadline for public comment.

Any interested person may request a public meeting on the application until the deadline for filing public comments. A public meeting is intended for the taking of public comment, and is not a contested case proceeding.

After the public comment deadline, the Executive Director prepares a response to all significant public comments on the application or the draft permit raised during the public comment period. The Chief Clerk then mails the Executive Director's Response to Comments and Final Decision to people who have filed comments, requested a contested case hearing, or requested to be on the mailing list. This notice provides that if a person is not satisfied with the Executive Director's response and decision, they can request a contested case hearing or file a request to reconsider the Executive Director's decision within 30 days after the notice is mailed.

The Executive Director will issue the permit unless a written hearing request or request for reconsideration is filed within 30 days after the Executive Director's Response to Comments and Final Decision is mailed. If a hearing request or request for reconsideration is filed, the Executive Director will not issue the permit and will forward the application and request to the TCEQ Commissioners for their consideration at a scheduled Commission meeting. If a contested case hearing is held, it will be a legal proceeding similar to a civil trial in state district court.

If the Executive Director calls a public meeting or the Commission grants a contested case hearing as described above, the Commission will give notice of the date, time, and place of the meeting or hearing. If a hearing request or request for reconsideration is made, the Commission will consider all public comments in making its decision and shall either adopt the Executive Director's response to public comments or prepare its own response.

For additional information about this application contact Bijaya R. Chalise at (512) 239-4545.

11. ADMINISTRATIVE RECORD

The following items were considered in developing the proposed permit draft:

A. PERMIT(S)

TPDES Permit No. WQ0010054001 issued May 18, 2005.

B. APPLICATION

Application received July 13, 2009.

C. MEMORANDA

Interoffice memoranda from the Water Quality Assessment Section of the TCEQ Water Quality Division. Interoffice memorandum from the Storm Water & Pretreatment Team of the TCEQ Water Quality Division.

D. MISCELLANEOUS

Federal Clean Water Act, § 402; Texas Water Code § 26.027; 30 TAC Chapters 305, 309, 312, 319, 30; Commission policies; and EPA guidelines.

Texas Surface Water Quality Standards, 30 TAC §§ 307.1 - 307.10.

"Procedures to Implement the Texas Surface Water Quality Standards," Texas Commission on Environmental Quality, January 2003.

Texas 2008 Clean Water Act Section 303(d) List, Texas Commission on Environmental Quality, April 1, 2008; approved by the EPA July 9, 2008.

"TNRCC Guidance Document for Establishing Monitoring Frequencies for Domestic and Industrial Wastewater Discharge Permits," Document No. 98-001.000-OWR-WQ, May 1998.

Attachment 2

ChemTex Analysis of 05/14-15/2009 Water Sample

CHEMTEX
Environmental & Industrial Hygiene Services

3082 25th Street, Port Arthur, Texas 77642 • (409) 983-4575 FAX (409) 982-1522
5544 Leopard Street, Corpus Christi, Texas 78408 • (361) 299-9900 FAX (361) 299-1155
138 S. Cities Service Hwy., Sulphur, Louisiana 70663 • (337) 626-2121 FAX (337) 626-2126

Client: *City Of Rockport*
622 E. Market
Rockport, TX 78382

Attn: *Mr. James Dye*
Phone: (361)790-1154; Fax: (361)790-1115

Report Date: 06/10/09
Sample Matrix: Wastewater
Date Collected: See Below
Time Collected: See Below
Collected By: James L. Dye
Date Received: 05/15/09
Time Received: 10:30am
CHEMTEX FILE #: C9050207

RESULTS OF ANALYSIS
PROJECT: Permit Renewal
SITE/LOCATION: 001 A Outfall, WWTP, Rockport

CHEMTEX #	Sample Identification	Parameter	Units	Results	MDL
C9050207A	WW Effluent 05/14-15/09; 08:00am-08:00am	C B O D	mg O_2/l	4	2
		T S S	mg/l	4	4
		Total Dissolved Solids	mg/l	1,643	4
		Conductivity @ 25°C	umhos/cm	3,030	5
C9050207B	WW Effluent 05/14-15/09; 08:00am-08:00am	Nitrate-N	mg/l	23.6	0.50
		Sulfate	mg/l	153.7	1
		Chloride	mg/l	536	5
C9050207C	WW Effluent 05/14-15/09; 08:00am-08:00am	Ammonia-N	mg/l	0.76	0.05
C9050207D	WW Effluent 05/14-15/09; 08:00am-08:00am	T K N*	mg/l	3.92	0.05
C9020207E	WW Effluent 05/14-15/09; 08:00am-08:00am	Total Phosphorus*	mg/l	0.167	0.05
C9050208A	WW Effluent 05/15/09; 08:45am	pH	pH units	6.94	---
		Total Residual Chlorine	mg/l	0.02	0.05
		Dissolved Oxygen	mg O_2/l	8.02	---
C9050208B	WW Effluent 05/15/09; 08:45am	Fecal Coliform	colonies/100ml	< 1	1
C9050208C	WW Effluent 05/15/09; 08:45am	Oil & Grease	mg/l	1.4	1.0

MDL: Method Detection Limit.

* Analysis performed at CHEMTEX, Sulphur, LA 70663.

ATTACHMENT 4

NOTICE/DISCLAIMER: The analytical results, opinions or interpretations contained in this report are based upon information and material supplied by the client for whose exclusive and confidential use this report has been made. No person or entity other than the client may rely on this report. Any such reliance will be unjustified. Any person, other than the client, that reads this report does so at his or her own risk. The analytical results, opinions and/or interpretations expressed herein represent the best judgment of Chemtex, based on the information and instructions received from the client. Chemtex makes no warranty or representation, express or implied, of any type and expressly disclaims same. This report shall not be reproduced, in whole or in part, without the written approval of Chemtex. In no event shall Chemtex be responsible any damage greater than the amount that is received for the analysis performed.

CHEMTEX

Environmental & Industrial Hygiene Services
5544 Leopard Street, Corpus Christi, TX 78408

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL
ANALYTICAL SERVICES REQUEST

PH: (361) 299-9900; FX: (361) 299-1155
E-Mail: chemtexcc@sbcglobal.net
Web Site: www.chemtex.org

CLIENT: CITY OF ROCKPORT ATTN: MR JAMES DYE Cell: 361-463-9711	ADDRESS: 622 E. MARKET ROCKPORT, TX 78382	PHONE: (361) 790-1154 FAX: (361) 790-1115
BILLING CONTACT/ADDRESS: (if different from above)	P. O. #: / PROJECT NO: / PROJECT: PERMIT RENEWAL	SITE/LOCATION: 001 A Outfall, WWTP, ROCKPORT
SAMPLE(S) COLLECTED BY: James L. Dye	Expected Turnaround Time (Working Days) 24 hr ____ 3 Days ____ 7-14 days __X__ 2 Days ____ 4 Days ____ Others ____	REQUESTED ANALYSES

CHEMTEX #	SAMPLE IDENTIFICATION	COLLECTION Date	COLLECTION Time	Sample Matrix Codes: Drinking Water DW, Groundwater GW, Liquid Waste LW, Oil(s) O, Paint Chips PC, Sand Sn, Sludge Sl, Soil/Solid S, Solid Waste SW, Trip Blank TB, Water W, Wipes WP, Wastewater WW	Composite/ Grab	Preservative Added Yes/No	Sample Containers No.	Size (oz.)	Type (Glass/ Plastic)	CBOD, TSS, TDS, EC	NITRATE -N, SULFATE, CHLORIDE,	AMMONIA-N	TKN	Ttl PHOSPHORUS	PH, TRC, DO	FECAL COLIFORM	OIL & GREASE
C9050207A	WW Effluent	05/14-15/09	08:00 Am to 08:00 Am	WW	Comp.	ON ICE	1	32 OZ	P	X							
C9050207B	WW Effluent	05/14-15/09	08:00 Am to 08:00 Am	WW	Comp.	ON ICE	1	32 OZ	P		X						
C9050207C	WW Effluent	05/14-15/09	08:00 Am to 08:00 Am	WW	Comp.	H2SO4	1	32 OZ	P			X					
C9050207D	WW Effluent	05/14-15/09	08:00 Am to 08:00 Am	WW	Comp.	H2SO4	1	32 OZ	P				X				
C9050207E	WW Effluent	05/14-15/09	08:00 Am to 08:00 Am	WW	Comp.	H2SO4	1	32 OZ	P					X			
C9050208A	WW Effluent	05/15/09	8:45 Am	WW	Grab	ON ICE	1	8 oz 300 ml	P						X		
C9050208B	WW Effluent	05/15/09	8:45 Am	WW	Grab	Na2S2O3	1	8 OZ	G							X	
C9050208C	WW Effluent	05/15/09	8:45 Am	WW	Grab	H2SO4	1	32 OZ	G								X

Special Instructions: Samples are preserved on ice after collection and transported in ice chest

Relinquished By:	Date/Time:	Received By:	Date/Time:
[signature]	5/15/09 9:39	Mallik.	5/15/09 9:39 Am
Relinquished By: Mallik.	Date/Time: 5/15/09 10:30 Am	Received By: Mallik.	Date/Time: 5/15/09 10:30 Am

Facilities also available at: 3082 25th St., Port Arthur, TX 77642; (409)983-4575 chemtexpa@sbcglobal.net and 138 S. Cities Service Hwy., Sulphur, LA 78408; (337)626-2121 chemtexlc@sbcglobal.net

NOTICE / DISCLAIMER: Client has asked Chemtex to perform the analyses listed above, on the samples described herein. Any analytical results, opinions or interpretations which may be provided to Client are based upon the information and material supplied by Client, for whose exclusive and confidential use a report will be made. No person or entity other than Client may rely on any such report. Any such reliance will be unjustified. Any person, other than Client, that reads or relies on any such report, does so at his or her own risk. Chemtex makes no warranty or representation, express or implied, of any type, and expressly disclaims same. Any report provided by Chemtex shall not be reproduced, in whole or in part, without the written approval of Chemtex. In no event shall Chemtex be responsible for any damage greater than the amount that it received for performing some or all of the analyses listed above

Attachment 3

ChemTex Analysis of 05/28-29/2009 Water Sample

CHEMTEX
Environmental & Industrial Hygiene Services
3082 25th Street, Port Arthur, Texas 77642 • (409) 983-4575 FAX (409) 982-1522
5544 Leopard Street, Corpus Christi, Texas 78408 • (361) 299-9900 FAX (361) 299-1155
138 S. Cities Service Hwy., Sulphur, Louisiana 70663 • (337) 626-2121 FAX (337) 626-2126

Client: ***City Of Rockport***
622 E. Market
Rockport, Texas 78382

Report Date: 06/23/09
Sample Matrix: Wastewater
Sampling Mode: Composite
Date Collected: 05/28-29/09
Time Collected: 10:00am-10:00am
Collected By: Mr. J Dye
Date Received: 05/29/09
Time Received: 11:50am
CHEMTEX FILE #: C9050419

Attn: ***Mr. James Dye***
Phone: (361)790-1154; Fax: (361)790-1115

RESULTS OF ANALYSIS

PROJECT: WWTP Permit Renewal
SITE/LOCATION: 001 A Outfall, WWTP, Rockport
SAMPLE Identification: WW Effluent
CHEMTEX #: C9050419A-J

TABLE 1

CAS #	COMPOUND NAME	Units	Results	MDL	EPA METHOD
14797-55-8	Nitrate Nitrogen	µg/l	41,500	10	SM 4500-NO3⁻ E
98-95-3	Nitrobenzene	µg/l	< 10	10	625
55-18-5	n-Nitrosodiethylamine	µg/l	< 20	20	625
924-16-3	n-Nitrosod-di-n-Butylamine	µg/l	< 20	20	625
56-38-2	Parathion	µg/l	< 0.1	0.1	625
608-93-5	Pentachlorobenzene	µg/l	< 20	20	625
107-86-5	Pentachlorophenol	µg/l	< 50	50	625
85-01-8	Phenanthrene	µg/l	< 10	10	625
12674-11-2	PCB-1016	µg/l	< 1	1	608
11104-28-2	PCB-1221	µg/l	< 1	1	608
1141-16-5	PCB-1232	µg/l	< 1	1	608
53469-21-9	PCB-1242	µg/l	< 1	1	608
12672-29-6	PCB-1248	µg/l	< 1	1	608
11097-69-1	PCB-1254	µg/l	< 1	1	608
11096-82-5	PCB-1260	µg/l	< 1	1	608
110-86-1	Pyridine	µg/l	< 20	20	625
7782-49-2	Selenium	µg/l	10	10	200.8
7440-22-4	Silver	µg/l	< 2	2	200.8
95-94-3	1,2,4,5-Tetrachlorobenzene	µg/l	< 20	20	625
127-18-4	Tetrachloroethylene	µg/l	< 10	10	624
8001-35-2	Toxaphene	µg/l	< 5	5	608
93-72-1	2,4,5-TP (Silvex)	µg/l	< 2	2	8151
79-01-6	Trichloroethylene	µg/l	< 10	10	624
71-55-6	1,1,1-Trichloroethane	µg/l	< 10	10	624
95-95-4	2,4,5-Trichlorophenol	µg/l	< 50	50	625
	TTHM (Total)	µg/l	91	10	624
67-66-3	Chloroform	µg/l	< 10	10	624
75-25-2	Bromoform	µg/l	46	10	624
75-27-4	Dichlorobromomethane	µg/l	10	10	624
124-48-1	Chlorodibromomethane	µg/l	35	10	624
75-01-4	Vinyl chloride	µg/l	< 5	5	624
7440-66-6	Zinc	µg/l	40	5	200.8

MDL: Method Detection Limit.

NOTICE/DISCLAIMER: The analytical results, opinions or interpretations contained in this report are based upon information and material supplied by the client for whose exclusive and confidential use this report has been made. No person or entity other than the client may rely on this report. Any such reliance will be unjustified. Any person, other than the client, that reads this report does so at his or her own risk. The analytical results, opinions and/or interpretations expressed herein represent the best judgment of Chemtex, based on the information and instructions received from the client. Chemtex makes no warranty or representation, express or implied, of any type, and expressly disclaims same. This report shall not be reproduced, in whole or in part, without the written approval of Chemtex. In no event shall Chemtex be responsible for any damage greater than the amount that it received for the Analysis performed.

Temp: 7.2 C. [illegible]

CHEMTEX

CHAIN OF CUSTODY RECORD

ENVIRONMENTAL

ANALYTICAL SERVICES REQUEST

PH: (361) 299-9900; FX: (361) 299-1155

E-Mail: chemtexcc@sbcglobal.net

Web Site: www.chemtex.org

ıvironmental & Industrial Hygiene Services
44 Leopard Street, Corpus Christi, TX 78408

LIENT: CITY OF ROCKPORT TTN: MR JAMES DYE Cell: 361-463-9711	ADDRESS: 622 E. MARKET ROCKPORT, TX 78382	PHONE: (361) 790-1154 FAX: (361) 790-1115

ILLING CONTACT/ADDRESS: 'different from above)	P. O. #:	PROJECT NO:	PROJECT: PERMIT RENEWAL	SITE/LOCATION: 001 A Outfall, WWTP, ROCKPORT

AMPLE(S) COLLECTED BY: James L Dye

Expected Turnaround Time (Working Days)
24 hr ____ 3 Days_____ 7-14 days__X____
2 Days____ 4 Days_____ Others _____

REQUESTED ANALYSES

CHEMTEX #	SAMPLE IDENTIFICATION	COLLECTION Date	COLLECTION Time	Sample Matrix Codes: Drinking Water DW, Groundwater GW, Liquid Waste LW, Oil(s) O, Paint Chips PC, Sand Sa, Sludge Sl, Soil/Solid S, Solid Waste SW, Trip Blank TB, Water W, Wipes WP, Wastewater WW	Composite/ Grab	Preservative Added Yes/No	Sample Containers No.	Sample Containers Size (oz.)	Sample Containers Type (Glass/ Plastic)	VOLATILES (SEE TABLE I & II)	THM'S (SEE TABLE I & II)	BNA'S (SEE TABLE I & II)	FLUORIDE, NITRATE-N		
9050419G	WW Effluent	05/28-29/09	10:00 AM TO 10:00 AM	WW	Comp.	~~ON ICE~~ HCl	2	40 ML	G	X					
9050419H	WW Effluent	05/28-29/09	10:00 AM TO 10:00 AM	WW	Comp.	~~ON ICE~~ $Na_2S_2O_3$	2	40 ML	G		X				
9050419I	WW Effluent	05/28-29/09	10:00 AM TO 10:00 AM	WW	Comp.	ON ICE	1	32 OZ	G			X			
9050419J	WW EFFLUENT	05/28-29/09	10:00 AM TO 10:00 AM	WW	Comp	ON ICE	1	8oz	P				X		

pecial Instructions: Samples are preserved on ice after collection and transported in ice chest

elinquished By: [signature]	Date/Time: 5/29/09 10:59	Received By: [signature]	Date/Time: 05/29/09 10:59 AM
elinquished By: [signature]	Date/Time: 05/29/09 11:50 AM	Received By: [signature]	Date/Time: 05/29/09 11:50 AM

acilities also available at: 3082 25th St., Port Arthur, TX 77642; (409)983-4575 chemtexpa@sbcglobal.net and 138 S. Cities Service Hwy., Sulphur, LA 78408; (337)626-2121 chemtexlc@sbcglobal.net

OTICE / DISCLAIMER: Client has asked Chemtex to perform the analyses listed above, on the samples described herein. Any analytical results, opinions or interpretations which may be provided to Client are based upon the information and material supplied by Client, for whose exclusive l confidential use a report will be made. No person or entity other than Client may rely on any such report. Any such reliance will be unjustified. Any person, other than Client, that reads or relies on any such report, does so at his or her own risk. Chemtex makes no warranty or representation, press or implied, of any type, and expressly disclaims same. Any report provided by Chemtex shall not be reproduced, in whole or in part, without the written approval of Chemtex. In no event shall Chemtex be responsible for any damage greater than the amount that it received for performing me or all of the analyses listed above

Attachment 4

Envirodyne Laboratories, Inc Environmental Impact Statement

Environmental Impact Statement

October 14, 2009

Objectives

1. To characterize the water leaving the Wastewater Treatment Plant and other Point Sources via Tule Ditch and evaluate the nutrient impact, if any on "Little Bay's" ecology.

Rationale

1. Point sources were selected that typically contribute nutrient loadings into Little Bay. The Wastewater Treatment Plant and Golf Course were chosen. Multiple seasonal dry weather and wet weather sampling events (influence by storm water) will be conducted to determine a baseline characterization. Various Parameters were selected to evaluate the Carbon, Nitrogen, Sulfur and Phosphorus Cycles, as well as, Oxygen Demand.

Findings

1. A dry weather sampling event occurred on July 9, 2009, also a wet weather sampling event was conducted on September 9, 2009. Analyzes was performed by Envirodyne Laboratories, Inc. (ELI) Samples were collected from:
   a. Tule Ditch Primarily Influenced by the WWTP
   b. Tule Ditch non-Point source combined with the Golf Course & WWTP
   c. Tule Ditch Discharge into Little Bay

Results

1. The dry weather analyses indicated no unusual Nutrient or Demand Concentrations that may have an adverse effect on "Little Bay". As anticipated under wet weather conditions most of the parameters indicate a slight dilution; influence by the storm water runoff. There was a slight increase on the phosphorus concentration however not significant enough to impact Bay loadings. This round of testing indicates that the Wastewater Treatment plant is not the contributing influence causing adverse impact on "Little Bay"

Analyses

2. See attached Rockport Summary Nutrient Study Chart: (Dry Weather) AB87730 - WWTP, AB87732 - Golf Course non-point. AB87731 - Discharge into "Little Bay" and (Wet Weather) - AB84651 – WWTP, AB84653 Golf Course non-point, AB84652 - Discharge into "Little Bay", AB84654 Golf Course Point#1 and AB84650 Golf Course Point #2.

Recommendation
Additional random monitoring is suggested (quarterly) to take into consideration seasonal peaks (Summer, Fall, Winter & Spring). A marginal change in temperatures may have significant effect on the Bay's ecosystem to process nutrient loadings effectively.

Enclosures Included with this Report
Rockport Summary Nutrient Study Chart

Tanny O. Busby (REM)
Lab Director

CITY OF ROCKPORT TULE DITCH NUTRIENT STUDY

ANALYTE	DRY WEATHER SAMPLING [illegible]			WET WEATHER SAMPLING September 8, 2009				
	Ditch Property Influenced by WWTP	Ditch at Confluence Gulf Course Pond	Ditch at Discharge into Little Bay	Ditch Property Influenced by WWTP	Ditch at Confluence Gulf Course Pond	Ditch at Discharge into Little Bay	Ditch at Gulf Course Pond #1	Ditch at Gulf Course Pond #2
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total Phosphorus [illegible]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
pH (units)	7.31	7.73	7.85	8.06	8.05	8.05	8.59	8.87
Total [illegible]	8.8	9.7	16.7	21.6	33.0	43.0	43.0	27.3
Total Solids (%)	0.18	0.11	1.52	0.18	0.04	1.31	0.07	0.064
Dissolved Solids (%)	0.03	0.02	0.16	0.03	0.01	0.20	0.00	0.001
Suspended Solids (%)	15.00	11.00	14.28	14.75	25.00	59.28	19.0	18.50
Total Dissolved Solids (mg/l)	1,000.0	1,077.0	14,150.0	1,008.0	532.0	15,545.0	432.0	208.0
Conductivity (umhos/cm)	2,173	3,100	22,877	2,872	807	23,100	349	354
[illegible] (mg/l)	23.1	21.0	[illegible]	3.4	3.9	3.5	16.4	12.3
COD (mg/l)	73.0	28.0	[illegible]	38.0	30.0	140.0	40.0	43.0
[illegible] (mg/l)	0.36	0.06	1.10	0.17	0.02	0.09	<0.10	<0.10
[illegible] (mg/l)	0.06	0.20	1.00	0.18	0.03	0.05	0.12	0.14
[illegible] (mg/l)	34.00	14.00	18.00	<1.0	<1.0	<1.0	1.10	1.20
[illegible] (mg/l)	<0.05	0.18	0.41	<0.05	<0.05	<0.05	<0.05	<0.05
Sulfate (mg/l)	382.0	208.7	576.0	112.0	18.0	131.7	37.3	30.3
Chloride (mg/l)	780.0	780.5	[illegible]	540.0	240.0	7450.0	130.0	180.0
Ortho Phosphate as P (mg/l)	0.40	0.10	0.20	1.31	0.02	1.15	0.06	0.27
Total Phosphorus as P (mg/l)	0.64	0.20	0.71	2.40	0.04	1.25	0.06	0.47

Attachment 2
Permit # WQ0010054001
Outen Comments
Little Bay Seagrass Study: Preliminary Data

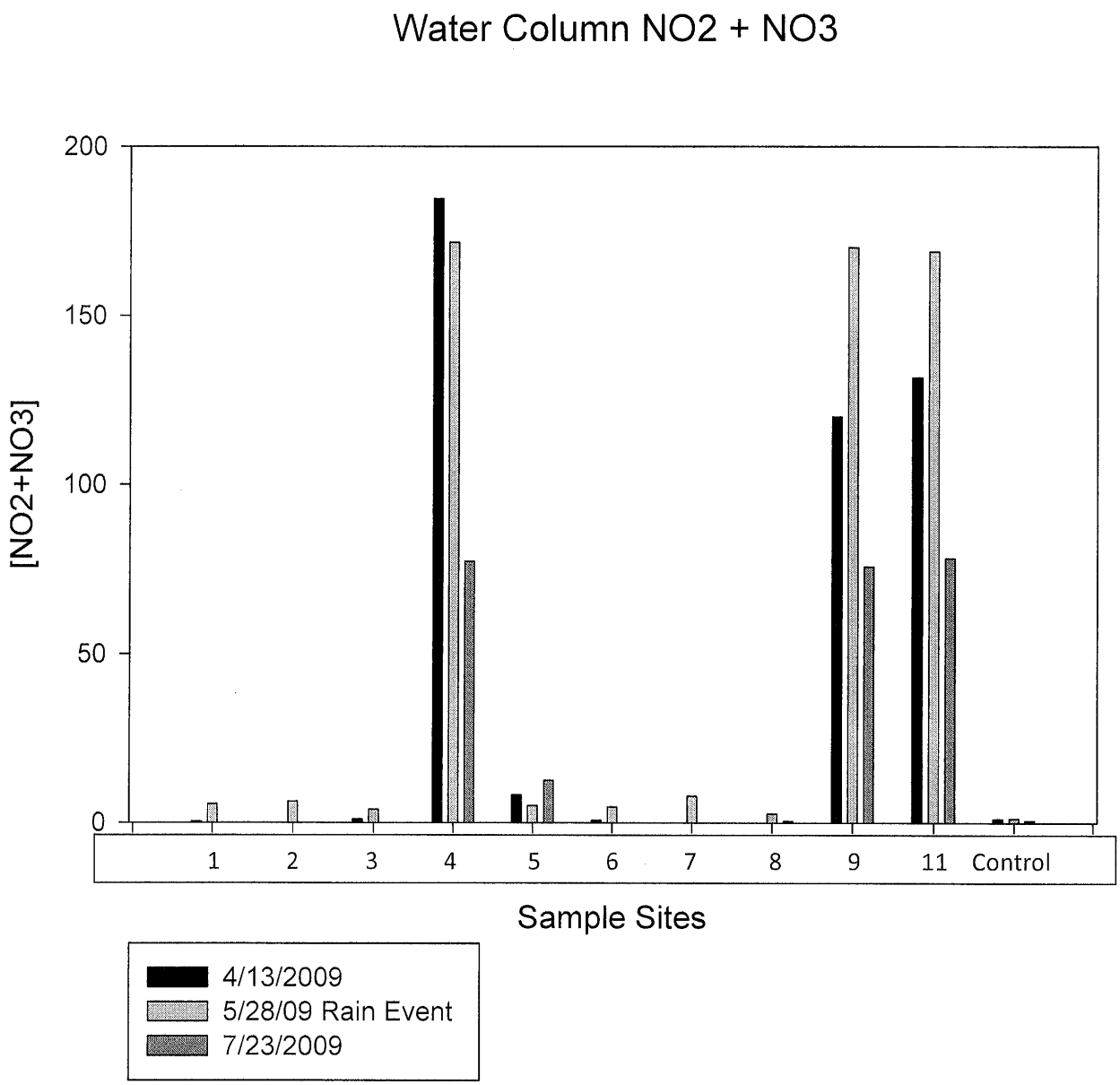
(Source: Mission Aransas NEER)

11/23/2009

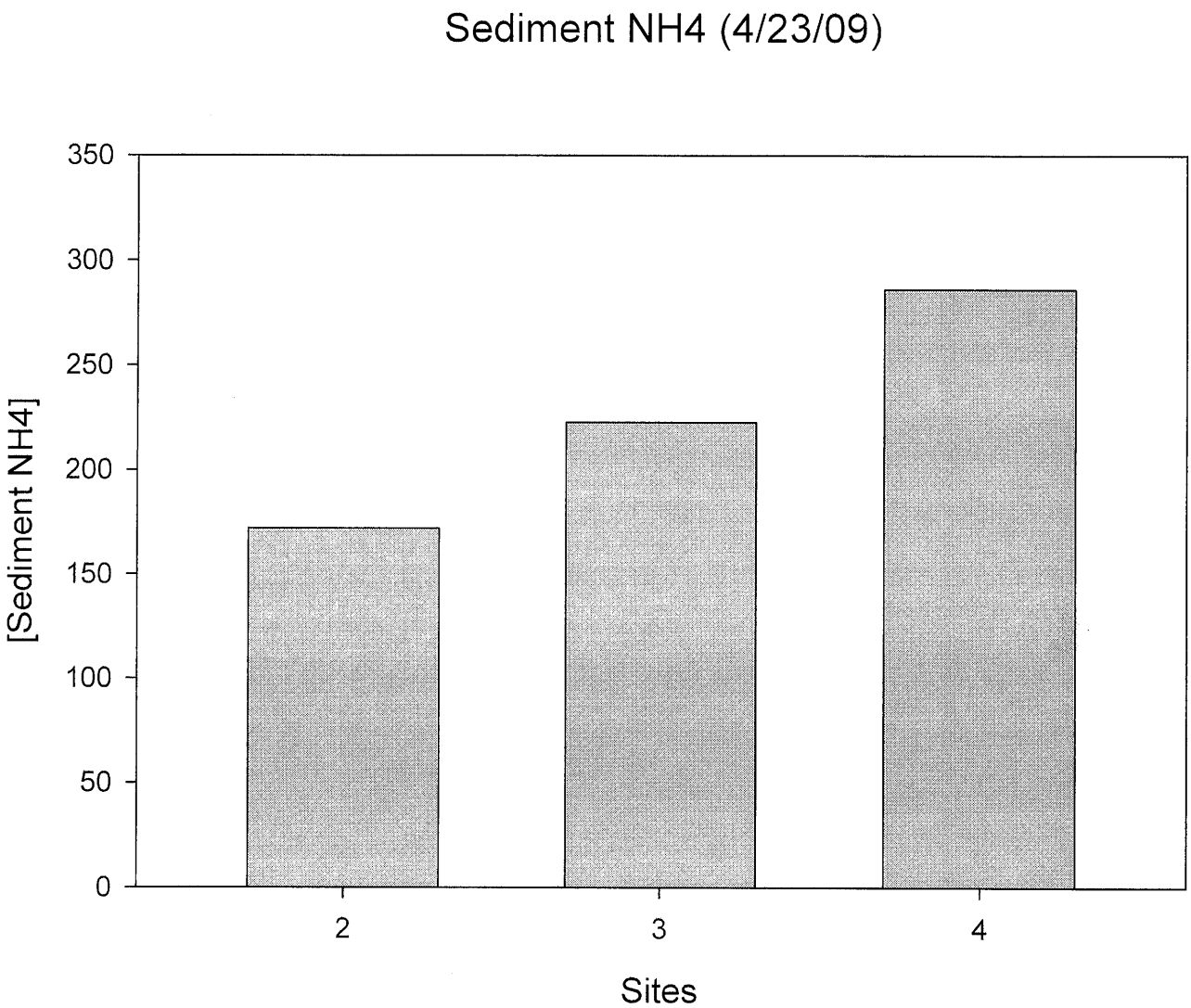
OPA RECEIVED
FEB 25 2010
AT PUBLIC MEETING

Site	Site Description
LB01	Boat Ramp
LB02	Bayside Point
LB03	Connie Hagar
LB04	Tule Ck. Outfall
LB05	Key Allegro Bdg.
LB06	Middle Bay
LB07	Key Allegro Mar.
LB08	Traylor Ave. Bridge
LB09	Tule Park Rd. at Encina Dr.
LB11	Tule Creek Underground Opening
Control	Little Bay Control Site

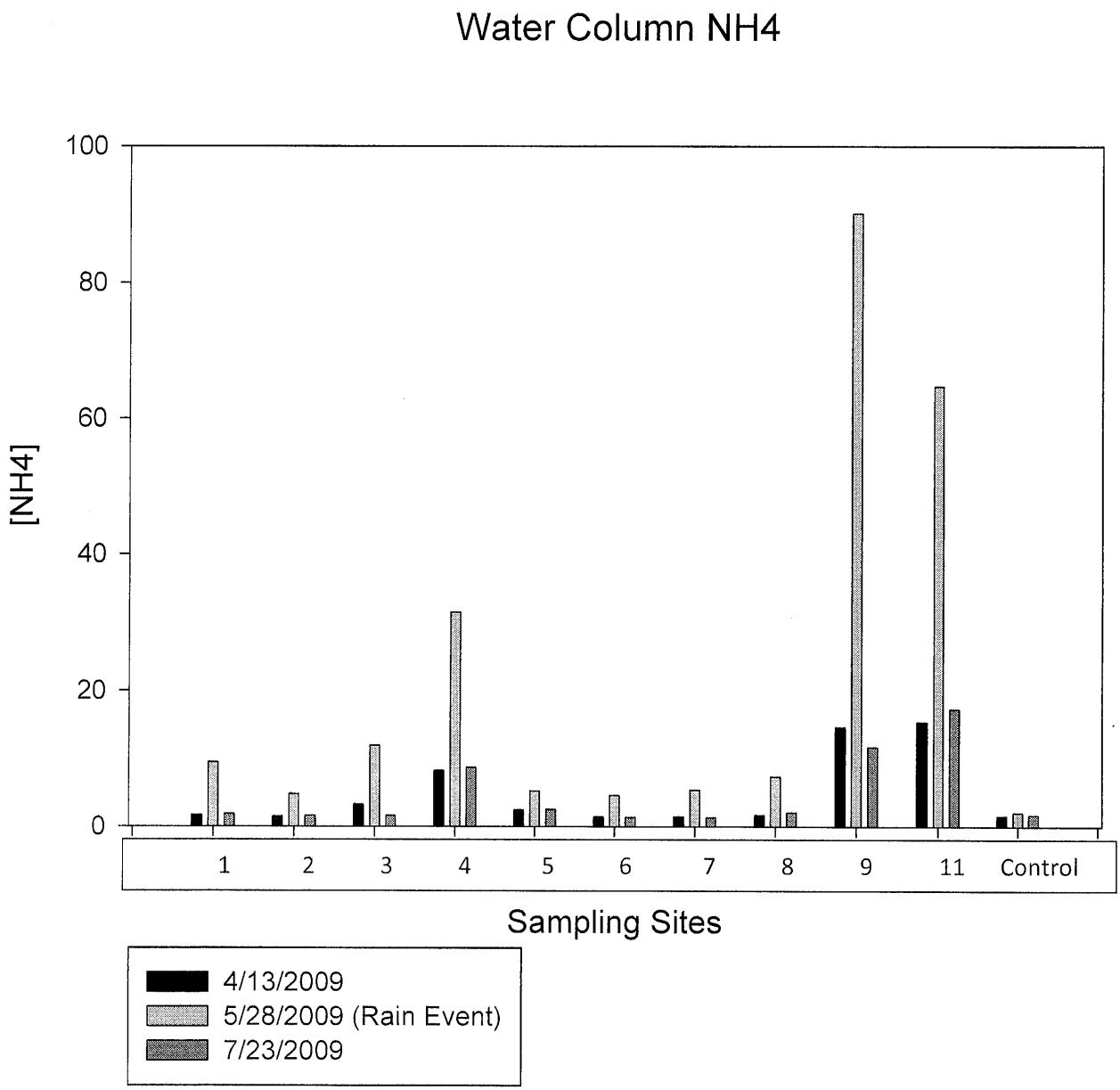
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2010 MAR -1 AM 10: 12
CHIEF CLERKS OFFICE



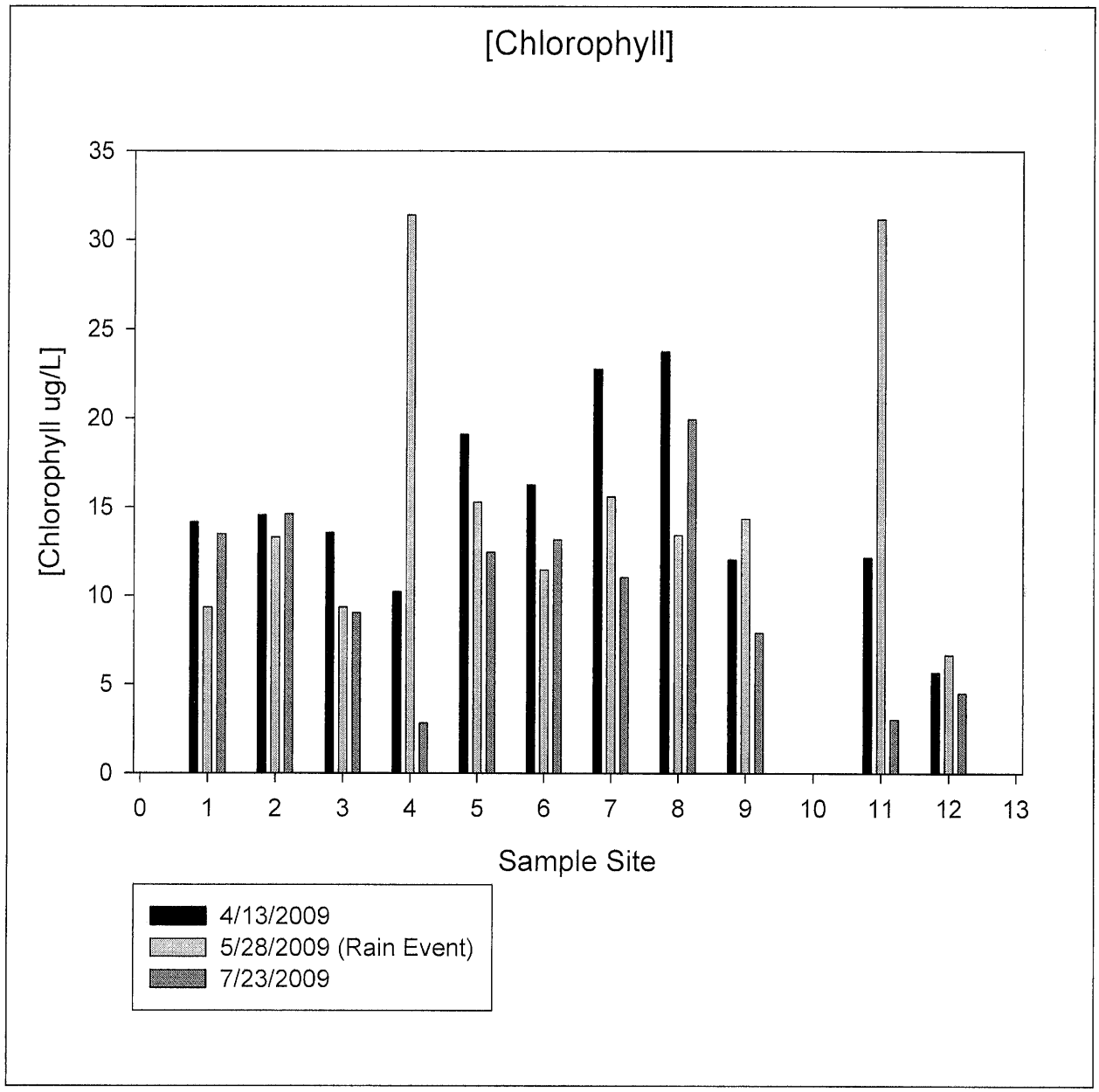
* Average nitrate+nitrite concentrations for three sampling dates in Little Bay.



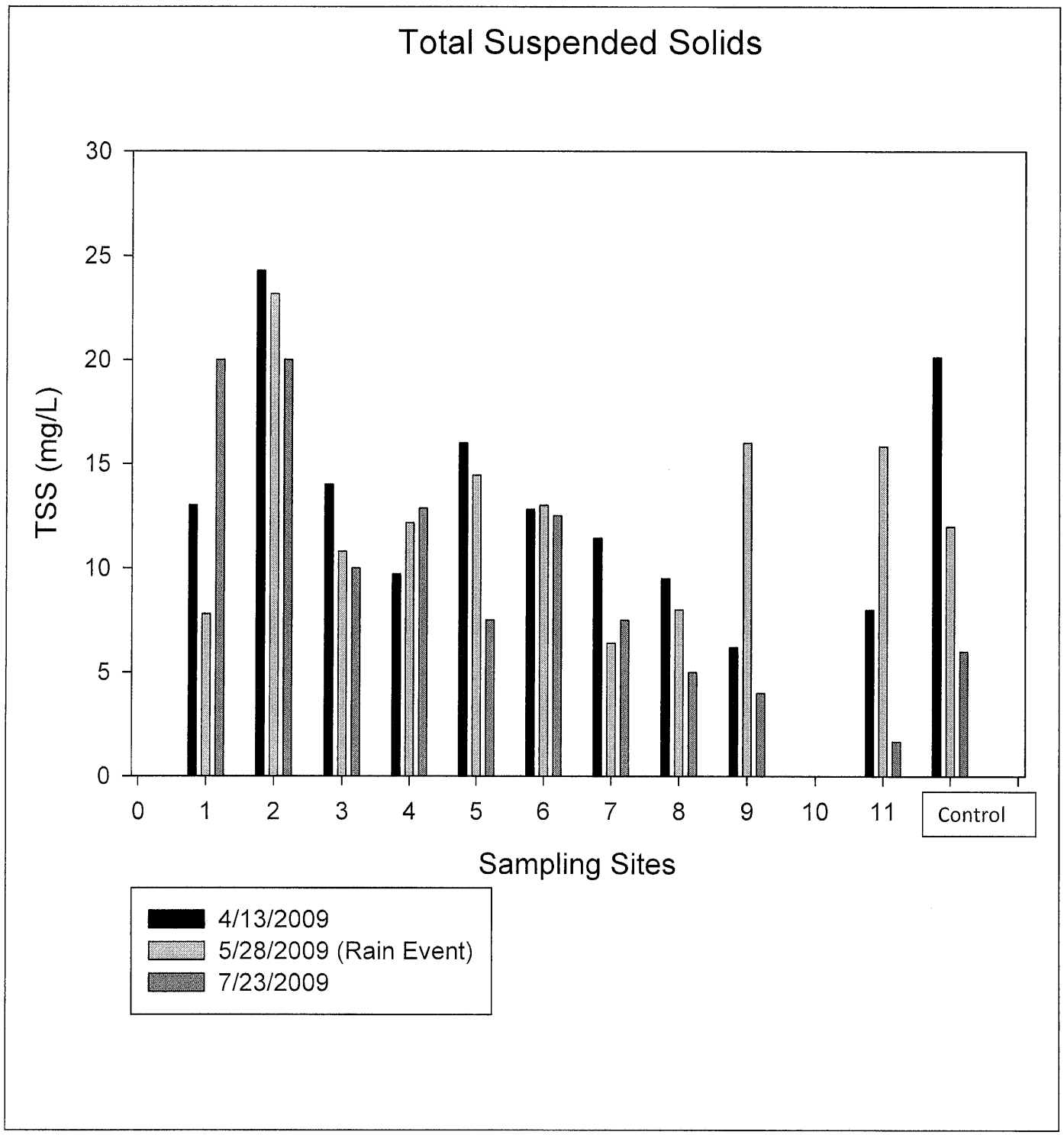
*Average sediment ammonium concentrations for three sites in Little Bay for 4/23/2009.



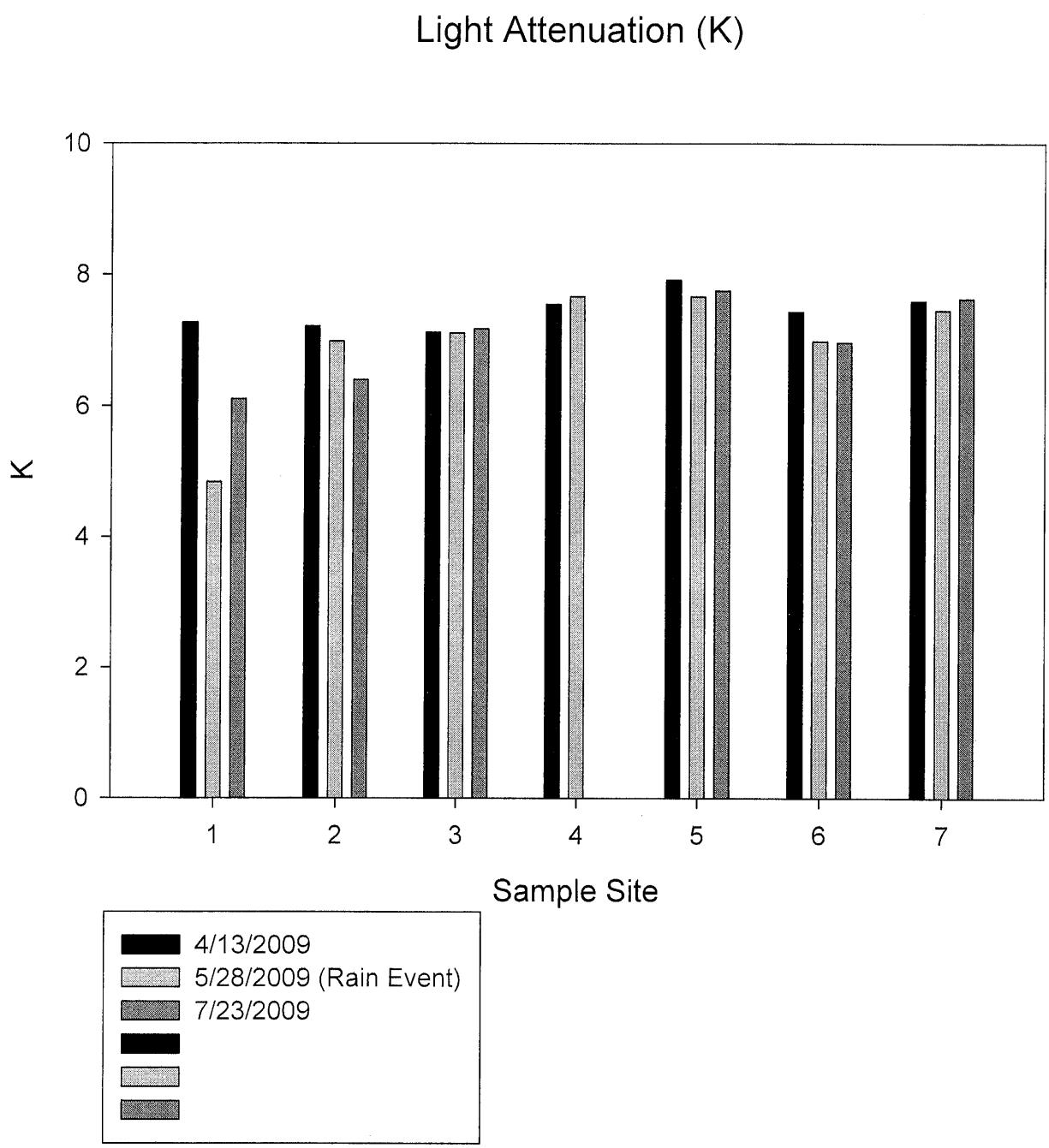
*Average water column ammonium concentrations for three sampling dates in Little Bay.



*Average chlorophyll concentrations for three sampling dates in Little Bay.



*Total suspended solid values for three sampling dates in Little Bay.



*Calculated light attenuation coefficients for three sampling dates in Little Bay based on instantaneous cosine sensor PAR measurements collected at the surface and underwater.

PUBCOMMENT-OCC2 - Fwd: Public comment on Permit Number WQ0010054001

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 6/1/2010 1:45 PM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Attachments: CCH Request- Moore 6-01-10.pdf

HR

MWD
69298

>>> PUBCOMMENT-OCC 6/1/2010 1:15 PM >>>

>>> <jbblaw@blackburncarter.com> 6/1/2010 12:59 PM >>>

REGULATED ENTY NAME CITY OF ROCKPORT
RN NUMBER: RN101916575
PERMIT NUMBER: WQ0010054001
DOCKET NUMBER:
COUNTY: ARANSAS
PRINCIPAL NAME: CITY OF ROCKPORT
CN NUMBER: CN600634810
FROM
NAME: James B. Blackburn, Jr.
E-MAIL: jbblaw@blackburncarter.com
COMPANY: Blackburn Carter, P.C.
ADDRESS: 4709 AUSTIN ST
HOUSTON TX 77004-5004
PHONE: 7135241012
FAX:
COMMENTS: Please see attached request for hearing and comments submitted on behalf of Captain Tommy Moore.

MW

BLACKBURN CARTER
A Professional Corporation - Lawyers

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JAMES B. BLACKBURN, JR
MARY W. CARTER
CHARLES W. IRVINE
ADAM M. FRIEDMAN
MCNAUGHTON A. DUSON

JAMES B. BLACKBURN, JR.
Sender's E-Mail: jbb@blackburncarter.com

June 1, 2010

Via TCEQ's Electronic Filing System
LaDonna Castañuela, Chief Clerk
Office of the Chief Clerk - MC 105
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711

Re: Request for a Contested Case Hearing on the City of Rockport's Application for Renewal of TPDES Permit No. WQ0010054001.

Dear Ms. Castañuela:

This letter is being submitted on behalf of Captain Tommy Moore. As detailed below, Capt. Moore conducts sight-seeing tours of Little Bay in Rockport, Texas. The City of Rockport has applied for renewal of its TPDES Permit No. WQ0010054001, which authorizes a discharge of treated wastewater effluent into Tule Ditch which flows to Tule Creek and finally into Little Bay in Rockport Texas. The purpose of this letter is to request a contested case hearing regarding City of Rockport's Application for Renewal of TPDES Permit No. WQ0010054001. Capt. Moore hereby requests that he be placed on the mailing list so that he may be kept abreast of the status of this application.

CONTESTED CASE HEARING REQUEST

To meet the specific requirements of a request for contested case hearing as detailed by the April 30, 2010 Notice issued by the TCEQ, Capt. Moore offers the following:

Capt. Moore hereby requests a contested case hearing. The applicant is the City of Rockport and the TPDES permit number is WQ0010054001.

For the purpose of this hearing request, Capt. Moore is represented by James B. Blackburn, Jr.. Therefore, all communications should be directed to the undersigned at Blackburn Carter, P.C., 4709 Austin St., Houston, Texas 77004, Tel: 713-524-1012, and/or Facsimile: (713) 524-5165.

Capt. Moore owns Rockport Birding and Kayak Adventures and has standing to request a contested case hearing because he uses Little Bay to conduct sight-seeing tours. In accordance with 30 TEX. ADMIN. CODE § 55.203, Capt. Moore is an affected person with personal justiciable interests that are not common to the general public. Capt. Moore's justiciable interests include his economic interest in the sight-seeing and bird watching business he conducts on Little Bay. Capt. Moore owns three vessels, including the 38 foot *Skimmer* and two approximately 20 foot electric powered craft, which are regularly used for paid sight-seeing and bird watching tours of Little Bay.

Capt. Moore business has been impacted by the degradation of Little Bay and will continue to be impacted by the proposed renewal.

The City of Rockport's wastewater effluent is discharged into Tule Ditch which flows northeast for approximately 1.2 miles until it merges into Tule Creek, which then flows southeast approximately 0.8 miles where it discharges into Little Bay. Tule Ditch and Tule Creek function as small drainage ditches. As such, they act as open pipes conveying effluent to the tidal waters of Little Bay. For all practical purposes, the actual discharge point is where the effluent flowing down Tule Creek encounters and mixes with the tidal waters of Little Bay. This is the first point where there is mixing of effluent into receiving waters.

In recent years, Capt. Moore and others have witnessed significant degradation of Little Bay. Such degradation includes the severe disruption of the ecosystem caused by the eutrophication of Little Bay. Most notably, the once ubiquitous seagrass beds have virtually disappeared from shallows adjacent to the downwind shoreline, water turbidity has increased, and waterfowl and wading birds no longer frequent Little Bay in significant numbers. In fact, historically Little Bay was a favored location for both migratory waterfowl and migratory and non-migratory wading birds. In the past, winters in Little Bay were marked by the presence of thousands upon thousands of migrating waterfowl. Tourist and nature lovers would regularly travel to Little Bay specifically to see this magnificent assemblage of winter birds. Little Bay, with its clear waters and abundance of aquatic life and waterfowl, was once considered the jewel of Rockport. Today, this is no longer the case. The seagrass is virtually gone, the fishing has declined, and waterfowl no longer visit in significant numbers. The once clear waters are now more often than not turbid and murky. These changes to Little Bay have an direct and obvious impact on Capt. Moore's tourism related business.

There are serious concerns that Little Bay's ecosystem is in severe dysfunction as a result of an over abundance of nutrients and other pollutants entering the water body. The Executive Director (ED) is well aware of the decline of Little Bay. As the ED stated in his Response to Comments, "The concerns regarding the degradation of Little Bay are valid." ED's Response to Comments at 6. The ED continues stating that "[o]n February 25, 2010, prior to the public meeting, a mat of algae was observed floating near [the] main outlet from Little Bay to Aransas Bay. It is evident that Little Bay is experiencing a nutrient problem." *Id.* at 11. That Little Bay has degraded since the City of Rockport began discharging treated wastewater effluent under TPDES Permit No. WQ0010054001 is not in dispute.

DISPUTED ISSUES OF FACT

In accordance with the notice and the ED's Response to Public Comments issued by the Chief Clerk's office April 30, 2010, the following disputed issues of fact are relevant and material to the Commission's decision on this application.

The Discharge is Violating the Texas Water Code and the Texas Surface Water Quality Standards (Comments 3, 4, 5, 6, 9, 10, 12, 13, 15, 16, 17, and 19)

The basis of this request for a contested case hearing is water quality and the ability of the WWTP and the receiving waters to meet water quality standards. There are several aspects about the proposed discharge that raise water quality issues, including the place of discharge, the level of treatment, and the failure to regulate nutrients and other pollutants in relation to the

special sensitivity of the receiving waters. The Texas Surface Water Quality Standards (TSWQS) apply to all surface waters of the state and specifically apply to substances attributable to waste discharges or the activities of man. 30 TEX. ADMIN. CODE § 307.4 (a). The TSWQS require that "surface water shall be maintained in an aesthetically attractive condition," and "waste discharges shall not cause substantial and persistent changes from ambient conditions of turbidity or color." *Id.* at § 307.4(b)(4) and (5). The TSWQS require that "[n]utrients from permitted discharges or other controllable sources shall not cause excessive growth of aquatic vegetation which impairs an existing, attainable, or designated use." *Id.* at § 307.4 (e).

Since the original permit was issued in 1994, Little Bay has experienced a tremendous increase in turbidity, algae growth, and a corresponding disappearance of seagrass. In fact the shallows of Little Bay adjacent to the western shoreline were a thriving seagrass dominated ecosystem a short while ago. Seagrass beds are essential habitat for shrimp, finfish, crab, and many other aquatic species. Seagrass is an indispensable component of the extremely high quality estuarine ecosystems that are preferred by waterfowl, wading birds, sea turtles, and many important game fish in this area.

The either total or near total loss of seagrass beds in Little Bay, the corresponding increase in turbidity, and the algae blooms are caused or significantly contributed to by the pollutants discharged from the City of Rockport WWTP. This is in clear violation of the TSWQS and the Texas Water Code. Seagrass propagation, likely due to its ecological significance, is specifically and broadly protected under the TSWQS: "seagrass propagation... will be maintained and protected for all water in the state in which these uses can be achieved." 30 TEX. ADMIN. CODE § 307.7(b)(4). The TCEQ must address these various and ongoing violations of the TSWQS before action is taken to approve the renewal of the offending discharge.

New Information Regarding the Receiving Waters Requires Modification of Permit Parameters to Prevent a Violation of TSWQS (Comment 12)

As the ED plainly states, "in some cases, when TCEQ staff obtain new information regarding physical changes to the receiving waters, it may be necessary to modify a TPDES permit's effluent limitation in order to accommodate the receiving waters based on the new information so that a violation of the TSWQS will not occur." ED's Response to Comments at 16. Capt. Moore argues that the severe disruption of Little Bay, including the loss of seagrass, increased turbidity, and reoccurring algae blooms represents new information that must be considered in any permit renewal. The Texas Water Code and the TSWQS require that these changes to the receiving water be taken into account, especially in a case such as this one where the changes themselves were significantly contributed to by the discharge in question. The original permitting process, for whatever reason, failed to adequately consider what impacts this discharge would have on Little Bay. Now that those impacts are obvious, they should be utilized to develop effluent limits protective of the receiving waters in compliance with the TSWQS. There is more than enough evidence of significant physical changes in Little Bay to require a new analysis of the discharge's impact and the corresponding necessary permit parameters under the TSWQS. Such changes represent a fact issue and a legal issue to be resolved in the contested case hearing process.

Comparison to Neighboring Discharges Designed to Meet TSWQS Expose Obvious Inadequacies (Comments 4, 5, and 10)

In many respects, this application is very similar to the applications of neighboring entities Aransas County MUD No. 1 (for discharge into Aransas Bay) and R&R Development (for discharge into Port Bay). Both of these neighboring entities sought permission to discharge treated effluent into a high quality estuarine area in the immediate vicinity of Rockport, Texas. Both applications were into water bodies significantly larger than Little Bay and yet the final permits required discharges into wetland polishing ponds and with strict limitations on nutrients. The City of Rockport's discharge, which is much larger than the other discharges and flows into a much smaller body of water, should have similar or stricter requirements to ensure compliance with the Texas Water Code and TSWQS.

The Discharge and the ED's Review are in Violation of the Antidegradation Provisions of the TSWQS (Comment 12)

The TSWQS's antidegradation section states that, "[e]xisting uses and water quality sufficient to protect those existing uses will be maintained." 30 TEX. ADMIN CODE § 307.5(b)(1). The ED argues that the antidegradation provisions of the TSWQS do not apply to the proposed draft permit because the draft permit is merely a renewal of an existing wastewater discharge permit and therefore it does not have the capacity to increase pollution of state waters. The ED's refusal to implement the TSWQS antidegradation section stems from the following requirement that," [t]he antidegradation policy and implementation procedures set forth in this section shall apply to actions regulated under state and federal authority which would increase pollution of the water in the state. Such actions include authorized wastewater discharges." *Id.* at (a). The ED's refusal to implement the antidegradation section is based on the erroneous factual assumption that the proposed permit, because it is a mere renewal, will not increase pollution loading in Little Bay.

For several reasons the ED's assumption with regard to antidegradation implementation is plainly wrong. First and most importantly, the approval of the draft permit without changes will continue to increase the actual amount of total nitrogen and other pollutants that enter Little Bay over time. At present, the actual amount of effluent discharged from the city's WWTP is only half of what is permitted. The City of Rockport has experienced tremendous growth over the last 10 ten years and this growth is expected to continue into the future. Despite the current recession, the City of Rockport has continued to annex neighboring territory and extend its sewer mains to new developments. It is an absolute certainty, that the amount of effluent actually discharged will increase in the near future. At the current level of operation, the City of Rockport's WWTP discharges an estimated average of 206 lbs per day of Nitrate nitrogen. This amount will continue to increase and will approach 573 lbs per day (more than double) as the City's discharge increases towards the maximum permitted flow. From a factual standpoint, the approval of this draft permit will result in a measurable and demonstrable increase in pollution loading in the receiving waters and this conflicts directly with the ED's assumptions that no increase in pollution will occur.

Second, the permit itself is subject to the TSWQS's antidegradation requirements. For example, the ED states that, "The TCEQ also requires applicants to comply with all provisions of the draft permit and all applicable regulations in the TWC and TCEQ rules including the antidegradation provision in 30 TEX. ADMIN. CODE § 307.5." *See* ED's Response to Comments

at 6. The permit is undoubtedly subject to the TSWQS including the antidegradation provisions. It is factually demonstrable that this discharge has contributed significantly to the degradation of Little Bay. The discharge as it exists is in violation of Texas law and TCEQ regulations and should be analyzed as such by the TCEQ in this permitting process. Antidegradation review is essential to ensure that new permits limitations required to bring this discharge within bounds of legality will be stringent enough to do their job.

The ED's attempt to Compromise on the Issue of Nutrients is not Enough; Full Review and Analysis Under the TSWQS are Required (Comments 3, 4, 5, 6, 12, and 19)

The ED has attempted to compromise on the issue of nutrients and will require additional monitoring of nutrients in the discharge, promising to require permit limits on nutrients if warranted by the results of this additional monitoring. More than enough information exists and is available to create and set appropriate effluent limits to meet the mandates of the Texas Water Code and the TSWQS. In fact, the City of Rockport has just released a monitoring report showing total nitrogen averaging 30mg/L in the effluent. This is the very information that the ED seeks from the required addition monitoring. These results confirm, once again, that Little Bay is receiving too many nutrients and that the City of Rockport WWTP is almost certainly a significant contributing factor.

The TCEQ has developed and approved more appropriate permit limits for neighboring WWTPs. There is no reason why that cannot be done for the City of Rockport's discharge. New permit limits and a more stringent analysis of the discharge are specifically required by the TSWQS. A compromise is neither necessary nor appropriate.

There is a Factual Dispute Concerning Whether the Discharge has Caused the Decline of Little Bay (Comments 3, 4, 5, 6, 12, and 19)

As previously mentioned there is no dispute over whether Little Bay has experienced a significant decline. The ED, however, continues to ignore the City of Rockport's WWTP discharge as the most likely contributor to the bay's decline. For the majority of commenters, including Capt. Moore, there is an obvious connection between the city's WWTP discharge and the decline of Little Bay. Little Bay is suffering from an overabundance of nutrients and other pollutants that are known to be present in the city's WWTP discharge in significant quantities. The ED chooses to ignore this obvious connection and instead focuses on a false temporal discrepancy between Little Bay's decline and the TCEQ's issuance of the original permit. The ED for example repeatedly relies on the statement that:

> *Speakers at the Public Meeting on February 25, 2010 indicated increased degradation of Little Bay over the course of the last five years. The City of Rockport has been operating under the same permitted effluent limitations and flow restriction since 1994. This suggests that the recent degradation observed in Little Bay is from another source or sources.*

ED's Response to Comments (*passim*) (emphasis added).

In fact, TCEQ staff members present at the February 25, 2010 meeting informed the hundreds of concern citizens that the TCEQ could only consider changes to Little Bay "in the last five years" in its analysis of the city's renewal application. The citizens naturally seized on

this statement and prefaced their remarks with the phrase "in the past five years" to make them relevant. There is evidence that the decline of Little Bay stretches back at least eight years or more.

However, there was likely some delay between the initial discharge and the subsequent decline of Little Bay. This should not be a surprise. Impacts take time to be felt and noticed and the City of Rockport's actual discharge has increase significantly over the last 10 years. Even if the ED's five year time-line were accurate for the start of the decline of Little Bay it would not negate the city's WWTP discharge from being the most likely and most significant contributing factor. It is a scientifically demonstrable fact that the now barren murky waters of Little Bay were at the very least significantly contributed to by the nutrients and other pollutants being discharged by the city's WWTP. The link between pollution discharge and ecological decline, especially with respect to seagrass abundance, is well documented and well understood. We know with certainty that the discharge and the receiving waters of Little Bay are violating the TSWQS. The TSWQS now require appropriate review and permit limits before a renewal permit can be issued.

CONCLUSION AND SUMMARY

Little Bay was once a thriving nursery for juvenile shrimp, finfish, and blue crab. The shallows of Little Bay are now turbid and barren and have become useless for the propagation of these species. Additional permit limits are required for the City of Rockport's discharge and the receiving water to comply with Texas law. Additional review is required in order for the applicant and the ED to meet the requirements of the TSWQS. Capt. Moore believes that alternatives exist that can halt and even reverse the deterioration of the water quality and that such alternatives must be considered under the TSWQS.

In addition to the disputed issues of fact detailed above, this contested case hearing is also requested regarding the compliance of TCEQ and this proposed discharge with the rules of the Texas Coastal Management Program. Among other things, important natural resource areas are to be protected under the coastal management regulations and the coastal management plan that is to be implemented by the Texas Commission on Environmental Quality. There is no doubt that Little Bay falls within the Texas coastal zone and that all commercial users of Little Bay have standing under the Texas coastal management program to request a contested case hearing from an agency that is "networked" under the Texas CMP.

In summary, Capt. Moore requests a contested case hearing and requests that the hearing be designated to determine compliance with the following issues/regulations: meeting water quality standards, 30 TEX. ADMIN. CODE §§ 307.1 *et seq.* and 309.1 *et seq.*; antidegradation of waters of the state, 30 TEX. ADMIN. CODE § 307.5; existence of less damaging alternative discharge sites; compliance with applicable provisions of the Texas Coastal Management Program, 30 TEX. ADMIN. CODE § 281.40 *et seq.*, Chapter 33, Subchapters C and F, Texas Natural Resources Code, and 31 TEX. ADMIN. CODE §§ 501, 503, and 505; and other important issues. (Comment Nos. 3, 4, 5, 6, 9, 10, 12, 13, 15, 16, 17, and 19)

Thank you for your consideration of these brief comments, and contested case hearing request, as well as Capt. Moore's request to be maintained on the mailing list of the above referenced application. Should you have any questions or concerns, I can be reached at (713) 524-1012.

Sincerely,

BLACKBURN CARTER, P.C.

by _____
James B. Blackburn, Jr.

c: Captain Tommy Moore

16

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

2010 MAR -1 AM 10: 17

CHIEF CLERKS OFFICE

TCEQ Public Meeting Form

February 25, 2010

City of Rockport
Proposed TPDES Permit Renewal
WQ0010054001

PLEASE PRINT

Name: Tommy Moore

Mailing Address: PO 2153

Physical Address (if different): 111 N Fulton Beach Rd

City/State: Rockport TX **Zip:** 78381

This information is *subject to public disclosure under the Texas Public Information Act*

Email: TMoore@RockportAdventures.Com ✓

Phone Number: (361) 463-6388

- Are you here today representing a municipality, legislator, agency, or group? ☐ Yes ☐ No

  If yes, which one? _____

☒ **Please add me to the mailing list.**

☒ **I wish to provide formal *ORAL COMMENTS* at tonight's public meeting.**

☐ **I wish to provide formal *WRITTEN COMMENTS* at tonight's public meeting.**

(Written comments may be submitted at any time during the meeting)

Please give this form to the person at the information table. Thank you.

MW

TCEQ Forma de Reunión Pública

February 25, 2010

City of Rockport
Proposed TPDES Permit Renewal
WQ0010054001

IMPRIMA POR FAVOR

Nombre: _____

Dirección: _____

Dirección local (si diferente): _____

Cuidad/Estado: _____ **Código Postal:** _____

***Esta Información puede ser divulgada de acuerdo con el Acto de Texas de Información Publica ***

Correo Electrónico: _____

Teléfono: ( ) _____

- **¿Esta usted representando a una municipalidad, legislador, agencia, o grupo?** ❒ Si ❒ No

  ¿Como se llama el Grupo? _____

❒ **Por favor inclúyanme en la lista de correo.**

❒ **Yo quiero dar** ***COMETARIOS ORALES*** **formales.**

❒ **Yo deseo hacer** ***COMENTARIOS FORMALES*** **por escrito esta noche durante la reunión pública.**

(Comentarios escritos pueden ser entregados a cualquier momento durante la reunión)

Por favor entregue esta forma a la persona en la mesa de información. Gracias.

ARANSAS COUNTY NAVIGATION DISTRICT

PM OPA
DEC 07 2009
BY PM

MWD 692980

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2009 DEC -7 AM 11:00
CHIEF CLERKS OFFICE

December 2, 2009

Texas Commission on Environmental Quality
Office of the Chief Clerk. MC 105
P.O. Box 13087
Austin,Texas 78711-3087

Ref: TPDES permit No. WQ0010054001

Dear Ms. Castanuela:

The Aransas County Navigation District (ACND) is pleased to submit the following comments on the referenced proposed permit.

By virtue of a patent from the State of Texas, ACND owns certain submerged lands and shoreline properties in Aransas County. ANCD owns the submerged lands in Little Bay, the body of water into which treated wastewater from the Rockport WWTP flows, as well as submerged lands in Aransas Bay that are contiguous with the two channels by which the waters of Little Bay connect with the waters of Aransas Bay. In addition, ACND owns land bordering Little Bay that is devoted to use as a public park, including an associated boat ramp and designated swimming area, and ACND maintains navigation channels into and through Little Bay. For all these reasons, ACND's property interests and its ability to perform its public mission is affected by the quality of water in Little Bay.

Little Bay is a recreational resource that is heavily used by both Aransas County residents and visitors to our area. The Aransas County economy depends on tourism, and Little Bay and its associated Beach Park are a prime tourist destination. A designated Ski Basin, a defined swimming area, and extensive highly accessible shallows encourage primary contact recreation. Both shoreline and wade fishing occur daily. Several hundred homes, each with its private dock, abut an extensive canal system in the Key Allegro and Harbor Oaks communities Fishing, swimming, kayaking, tubing and boating from these private docks is common place. The value of these waterfront properties is affected by the quality of water in and available uses of Little Bay, and any decline in property values for these high-value homes would lead to a corresponding reduction in the tax base.

Little Bay is encompassed within the "Connie Hager Wildlife Sanctuary", which is a State-designated sanctuary administered by Texas Parks and Wildlife. Historically, Little Bay has been used extensively by winter waterfowl, most notably by the migratory redheads that winter exclusively along this section of

911 Navigation Circle • Rockport, Texas 78382
361/729-6661 • FAX: 361/729-8037 • Email: aransasnav1@yahoo.com • www.acnd.org

the Texas Coast. A large colony of Black Skimmers nests in the park adjacent to Little Bay and feeds in its sheltered waters. Little Bay is a well known destination site for birding.

The quality of fish and wildlife resources in Little Bay has declined during the past few years. The extensive beds of submerged aquatic vegetation that used to be present have diminished in a real extent and quality. The winter bird populations on Little Bay, which a few years ago numbered in the thousands, have declined in numbers along with the submerged sea grasses. Eutrophication appears to be increasing, as evidenced by algae blooms and the presence of floating mats of filamentous algae in several locations during summer months.

ACND, along with the City of Rockport, the Town of Fulton and Aransas County presently is funding a research program in Little Bay operated by the University of Texas Marine Science Institute. The research is aimed at gaining a better understanding of water quality issues in Little Bay, especially as they relate to the conditions required for submerged sea grasses.

As a public agency identified with Little Bay and managed by elected Commissioners, ACND is very aware of rising concerns within the community about the apparent degradation of Little Bay. Reflecting these concerns, ACND offers the following specific comments on the proposed permit.

1. The proposed permit Fact Sheet observes correctly that the WWTP discharges directly to a ditch that was constructed for the purpose of transporting effluent to Tule Creek, a natural but highly modified drainage channel. ACND does not agree that this ditch is properly classified as having "no significant aquatic life uses". It is not an intermittent stream. Though water flow is sometimes nil, the ditch contains pools that preserve aquatic life. Wading birds and other animals are frequently observed feeding in this ditch, which holds schools of small fish and occasional blue crabs. It also provides the only reliable source of fresh water in the area and is used as a source of drinking water for wildlife, including nocturnal and crepuscular animals that are not observed in a casual daytime survey.
2. The proposed permit Fact Sheet is in error in describing additional unnamed tidal and non-tidal ditches between the aforementioned ditch and Little Bay. The ditch referred to above flows directly into Tule Creek, a natural drainage that has been modified by excavation in some reaches. For the first few hundred yards downstream from the entry of Tule Ditch, Tule Creek is non-tidal. Tidal influence begins approximately at the point where Tule Creek passes under Business 35. Both the tidal and non-tidal reaches of Tule Creek include permanent pools that harbor aquatic life. The non-tidal portion reach of Tule Creek held water throughout the recent record drought, as of course did the tidal portion.
3. Although Little Bay has experienced some degradation of its capacity to support aquatic life, as noted above, it designated use should be exceptional aquatic life uses, oyster waters, and contact recreation. Little Bay remains an exceptional wildlife resource that is used extensively for recreational fishing and for contact recreation, including extensive contact recreation by children. It contains several oyster reefs and, as noted, is a designated Sanctuary within the Texas Parks and Wildlife system.
4. ACND disagrees with the determination stated in Section 8.B.(1) that "The effluent limitations in the draft permit will maintain and protect the existing instream uses." Effluent quality data presented in the permit application or available in files indicate Nitrate-nitrogen concentrations in the effluent ranging up to 41 mg/l. Total nitrogen, of course, would be somewhat higher. The draft permit proposes no Total nitrogen limits. Therefore, at maximum permitted flow it would permit would allow nutrient loading into Little Bay from the WWTP to increase by well over

150% over present levels. Little Bay is shallow, warm and relatively enclosed system with numerous areas that experience poor water exchange with Aransas Bay. Little Bay is already showing signs of stress. It seems very unlikely that such an increase in nutrient loading could be accomplished without further degradation of water quality that would impair existing recreational uses and wildlife uses.

5. The TPDES permit should be amended as soon as practicable to include effluent limitations for Total Nitrogen and Phosphorous. The effluent limitations for these nutrients should be determined in the context of other sources of the same pollutants (most notably nonpoint source runoff from storm events) and consideration of the maximum quantity of nutrient loading into Little Bay that is appropriate in light of the State anti-degradation policy. TCEQ should perform an anti-degradation analysis to support establishment of appropriate nutrient loading limits and associated nutrient concentration limits for the effluent discharge.
6. ACND recognizes that new and more stringent effluent standards cannot be imposed immediately. If an appropriate analysis shows that loading under the proposed permit would be too great, time will be required to decide the best way to reduce loading. Therefore, ACND suggests that the new permit should contain elements related to monitoring, research, analysis and planning processes that will support the implementation of nutrient limitations as soon as practicable.
7. ACND requests that TCEQ hold a public meeting in Rockport in response to public concerns about Little Bay and the effects of nutrient inputs into Little Bay.
8. ACND wishes to recognize the leadership and diligence of City officials, who are aware of the problems in Little Bay and are working to find ways to reduce the concentration of nutrients in the WWTP effluent as well as improve storm water management in the Little Bay watershed. ACND will continue to cooperate with other governmental entities in seeking solutions to these problems.

Respectfully submitted on behalf of the Aransas County Navigation District by:

Tommy Moore, Commissioner

Ronald B. Outen, PhD
Chairman

ARANSAS COUNTY NAVIGATION DISTRICT
911 Navigation Circle • Rockport, Texas 78382

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2009 DEC -7 AM 11:00
CHIEF CLERKS OFFICE

CORPUS CHRISTI TX 78
RIO GRANDE DISTRICT
03 DEC 2009 PM 1

USA FIRST-CLASS FOREVER

RECEIVED
DEC 07 2009
TCEQ MAIL CENTER
DZ

Texas Commission on Environmental Quality
Office of the Chief Clerk MC 105
P.O. Box 13087
Austin, Texas 78711-3087

78711-3087

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 11/30/2009 1:07 PM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

MWD 69298

PM

>>> <tmoore@rockportadventures.com> 11/30/2009 11:48 AM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME: Tommy Moore
E-MAIL:tmoore@rockportadventures.com
COMPANY:
ADDRESS:PO BOX 2153
ROCKPORT TX 78381-2153
PHONE:
FAX:
COMMENTS: Texas Commission on Environmental Quality Office of the Chief Clerk. MC 105 P.O. Box 13087 Austin, Texas 78711 - 3087 Ref: TPDES permit No. WQ0010054001 Please accept this correspondence as public comment and request for a public meeting on the above referenced permit number. I am very concerned and feel that it is very important to stop the further degradation of Little Bay. Regards, Capt Tommy Moore

MW

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 12/3/2009 10:16 AM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

MWD 69298

H

>>> <ajbrash3127@sbcglobal.net> 12/2/2009 2:21 PM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME: Ann Brasher
E-MAIL:ajbrash3127@sbcglobal.net
COMPANY:
ADDRESS:26 SANDPIPER LN
ROCKPORT TX 78382-3739
PHONE:
FAX:
COMMENTS: It is imperative that we have a public hearing concerning the discharge of treated sewage into Little Bay.

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 12/3/2009 10:15 AM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

MWD 69298

H

>>> <mrh1982@yahoo.com> 12/2/2009 8:31 PM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME:monica hudgins
E-MAIL:mrh1982@yahoo.com
COMPANY:
ADDRESS:1915 MALLARD DR
ROCKPORT TX 78382-6355
PHONE:
FAX:
COMMENTS:I am concerned about the renewal of this permit. And request a Public hearing to address these matters. Thank you!

mcd

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 12/14/2009 12:45 PM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

MWD 69298

H

>>> PUBCOMMENT-OCC 12/10/2009 10:17 AM >>>

>>> <djj166@yahoo.com> 12/10/2009 10:08 AM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME: Don Jackson
E-MAIL:djj166@yahoo.com
COMPANY:
ADDRESS:166 FRONT ST
ROCKPORT TX 78382-7800
PHONE:
FAX:
COMMENTS:I am asking that a hearing be held on the permit for the City of Rockport to discharge treated sewage into Little Bay. This permit should not be renewed in my opinion without modifications to improve the discharge levels. The changes to Little Bay are very obvious to me over the years and I feel that the discharge levels by the City of Rockport may be a factor and futher studies are needed before the permit is renewed. Thank you, Don Jackson

MW

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 11/30/2009 1:56 PM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

MWD 69298

H

>>> <ray_kirkwood@wildblue.net> 11/28/2009 11:32 AM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME: Raymond Kirkwood
E-MAIL:ray_kirkwood@wildblue.net
COMPANY:
ADDRESS:PO BOX 1194
ROCKPORT TX 78381-1194
PHONE:
FAX:
COMMENTS:I request a public hearing on this permit request. The City of Rockport Waste Water Treatment Plant is a significant source of nitogen being fed directly into Little Bay. Little Bay is a small bay within the city limits of Rockport and is a frequently used watersports site. It is also a scenic feature of the ambiance of Rockport. Little Bay visibly declined over the last few years. We have seen large algal blooms, eutophication events, and increased turbidity. These events are coupled with a great reduction in the number of waterfowl occupying the bay and reduced fishing success. It is my belief that the Rockport WWTP is a source of pollution (in the form of soluble nitrogen)to Little Bay and is a direct cause of the decline in water quality in Little Bay. We should take the renewal of the City of Rockport Waste Water Teatment Plant as an opportunity to define a path to reducing the level of pollution into Little Bay and restoring it to its former status as a clean, productive, safe place for water sports. Raymond Kirkwood

8

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

TCEQ Public Meeting Form

February 25, 2010

2010 MAR -1 AM 10: 17

CHIEF CLERKS OFFICE

City of Rockport
Proposed TPDES Permit Renewal
WQ0010054001

PLEASE PRINT

Name: Raymond Kirkwood

Mailing Address: PO Box 1194 Rockport, Tx 78381

Physical Address (if different): 331 Club Lake Dr. 78382

City/State: Rockport Tx **Zip:**

****This information is *subject to public disclosure under the Texas Public Information Act*****

Email: ray-kirkwood@wildblue.net

Phone Number: (361) 729-5901

- Are you here today representing a municipality, legislator, agency, or group? ☐ Yes ☒ No

  If yes, which one?

☒ **Please add me to the mailing list.**

☒ **I wish to provide formal *ORAL COMMENTS* at tonight's public meeting.**

☐ **I wish to provide formal *WRITTEN COMMENTS* at tonight's public meeting.**

(Written comments may be submitted at any time during the meeting)

Please give this form to the person at the information table. Thank you.

TCEQ Forma de Reunión Pública

February 25, 2010

City of Rockport
Proposed TPDES Permit Renewal
WQ0010054001

IMPRIMA POR FAVOR

Nombre: _____

Dirección: _____

Dirección local (si diferente): _____

Cuidad/Estado: _____ **Código Postal:** _____

***Esta Información puede ser divulgada de acuerdo con el Acto de Texas de Información Publica ***

Correo Electrónico: _____

Teléfono: ( ) _____

- **¿Esta usted representando a una municipalidad, legislador, agencia, o grupo?** ❒ Si ❒ No

  ¿Como se llama el Grupo?_____

❒ **Por favor inclúyanme en la lista de correo.**

❒ **Yo quiero dar** ***COMETARIOS ORALES*** **formales.**

❒ **Yo deseo hacer** ***COMENTARIOS FORMALES*** **por escrito esta noche durante la reunión pública.**

(Comentarios escritos pueden ser entregados a cualquier momento durante la reunión)

Por favor entregue esta forma a la persona en la mesa de información. Gracias.

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 12/3/2009 10:27 AM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

MWD 69298

H

>>> <fredrlanoue@att.net> 12/1/2009 8:32 PM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME: Fred Lanoue
E-MAIL:fredrlanoue@att.net
COMPANY:
ADDRESS:1751 STATE HIGHWAY 188
ARANSAS PASS TX 78336-6543
PHONE:
FAX:
COMMENTS:I am concerned that the present permit allows far too much nitrogen to be released into little Bay. I think there should be a public hearing so that I may more effectively make my concerns known to public officials.

MWD

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 12/3/2009 10:30 AM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

MWD 69298

H

>>> <lanoueorders@att.net> 12/1/2009 9:34 AM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME: Linda Lanoue
E-MAIL:lanoueorders@att.net
COMPANY:
ADDRESS:1751 STATE HIGHWAY 188
ARANSAS PASS TX 78336-6543
PHONE:
FAX:
COMMENTS: As a resident of Aransas County, I am very concerned about Little Bay & what is being discharged into it. I believe there should be a public hearing on the matter. Little Bay is a valuable asset to our community and its condition should not be allowed to deteriorate any more. thank you for your consideration.

MW

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 11/30/2009 2:01 PM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

MWD 69298

H

>>> <TEXLEEINTAOS@HOTMAIL.COM> 11/25/2009 11:04 AM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME:LYNN LEE
E-MAIL:TEXLEEINTAOS@HOTMAIL.COM
COMPANY:RETIRED
ADDRESS:109 OLYMPIC DR
ROCKPORT TX 78382-6811
PHONE:3617299477
FAX:
COMMENTS: Gentlemen: I am concerned about Little Bay. I understand the City of Rockport wishes to renew their permit to release treated waste water in to Tule Creek, which flows into Little Bay. I would like a public hearing to be held to assure me and other concerned citizens that Little Bay will not be damaged by this discharge. Thank you, Lynn Lee

MWD

Done formal oral comments
Submitted w the comments

(1)

TCEQ Public Meeting Form

February 25, 2010

City of Rockport
Proposed TPDES Permit Renewal
WQ0010054001

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2010 MAR -1 AM 10: 10
CHIEF CLERKS OFFICE

PLEASE PRINT

Name: Lynn M. Lee

Mailing Address: 109 Olympic Drive, ~~Rockport, Tx 78382~~

Physical Address (if different):

City/State: Rockport, Tx **Zip:** 78382-6811

****This information is *subject to public disclosure under the Texas Public Information Act*****

Email: Rockportartis

Phone Number: (361) 729-9477

- Are you here today representing a municipality, legislator, agency, or group? ☐ Yes ☒ No

  If yes, which one?

☒ **Please add me to the mailing list.**

☒ **I wish to provide formal *ORAL COMMENTS* at tonight's public meeting.**

☒ **I wish to provide formal *WRITTEN COMMENTS* at tonight's public meeting.**

(Written comments may be submitted at any time during the meeting)

Please give this form to the person at the information table. Thank you.

CMW

TCEQ Forma de Reunión Pública

February 25, 2010

City of Rockport
Proposed TPDES Permit Renewal
WQ0010054001

IMPRIMA POR FAVOR

Nombre: _____

Dirección: _____

Dirección local (si diferente): _____

Cuidad/Estado: _____ **Código Postal:** _____

***Esta Información puede ser divulgada de acuerdo con el Acto de Texas de Información Publica ***

Correo Electrónico: _____

Teléfono: ( ) _____

- **¿Esta usted representando a una municipalidad, legislador, agencia, o grupo?** ❒ Si ❒ No

  ¿Como se llama el Grupo? _____

❒ **Por favor inclúyanme en la lista de correo.**

❒ **Yo quiero dar** *COMETARIOS ORALES* **formales.**

❒ **Yo deseo hacer** *COMENTARIOS FORMALES* **por escrito esta noche durante la reunión pública.**
(Comentarios escritos pueden ser entregados a cualquier momento durante la reunión)

Por favor entregue esta forma a la persona en la mesa de información. Gracias.

OPA RECEIVED

FEB 25 2010

AT PUBLIC MEETING

Lynn M. Lee
109 Olympic Drive
Rockport, Texas 78382

February 25, 2010

Texas Commission on Environmental Quality
Meeting in Rockport Texas

Dear Commission:

When I moved to Rockport in 1990 one of the attractions was the aquatic life of Little Bay, and particularly an island in the middle on which many birds nested to hatch their young. It was also a place where many fisherman, waders and those in boats, were in seemingly constant attendance.

During the last next few years it appeared that the nesting population of "bird island" was decreasing in small numbers, and a couple of years ago became almost non existent. I have discussed this with many other concerned friends who are also Rockport residents. My friends include knowledgeable people including one who holds a PHD in Environmental Science.

While other factors may contribute to the degradation of Little Bay it seems indisputable that the release of nutrients into the water by the Municipal Sewer System is adding to the problem.

Therefore I ask your commission require a proper reduction of nutrients from the Municipal Sewage System before a permit renewal is issued.

Sincerely yours,

Lynn M. Lee

2010 MAR -1 AM 10: 10
CHIEF CLERKS OFFICE

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

GRAVES DOUGHERTY HEARON & MOODY
A PROFESSIONAL CORPORATION

Robin A. Melvin
512.480.5688
512.480.5888 (fax)
rmelvin@gdhm.com

MAILING ADDRESS:
P.O. Box 98
Austin, TX 78767

May 28, 2010

MWD
69298

VIA TELECOPY AND FIRST CLASS MAIL

LaDonna Castañuela
Office of the Chief Clerk, MC 105
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087

OPA
JUN 01 2010
BY BP

2010 JUN -1 AM 10: 14
CHIEF CLERKS OFFICE
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Re: City of Rockport
TPDES Permit No. WQ0010054001

Dear Chief Clerk:

Contested Case Hearing Request

I represent the Texas Chapter of the Coastal Conservation Association ("CCA Texas"). On behalf of CCA Texas, I request a contested case hearing on the proposed renewal of the City of Rockport's TPDES Permit No. WQ0010054001.

CCA Texas is a non-profit marine conservation organization comprised of tens of thousands of recreational anglers and coastal outdoor enthusiasts. Founded more than a quarter of a century ago, CCA Texas has been instrumental in banning gill nets in state waters, establishing redfish and speckled trout as gamefish, building two of the largest red drum hatcheries in the world, and working to ensure adequate freshwater reaches Texas' bays and estuaries. CCA Texas's objective is to conserve, promote and enhance the present and future availability of these coastal resources for the benefit and enjoyment of the general public.

Edwin L. Rainwater has been a member of CCA Texas since 1987. Mr. Rainwater lives at 61 Blue Heron Drive, Rockport, Texas, in the Key Allegro Subdivision, on the Key Allegro Peninsula, within approximately 1.5 miles from the City of Rockport's existing wastewater treatment plant. Mr. Rainwater uses his property on Little Bay for

recreational activities, including fishing. Mr. Rainwater has fished in Little Bay and Aransas Bay for many years.

Garry and Karen Godwin Wiatrek are members of CCA Texas. Karen Wiatrek is the 2010 President of the Aransas Bay Chapter of CCA Texas. The Wiatreks live at 113 North Santa Clara, Rockport, Texas, approximately 2.5 miles from the City's existing wastewater treatment plant. Garry Wiatrek has fished in Aransas Bay for over 45 years, and Karen Wiatrek has fished in Aransas Bay for over 25 years. Both of them have witnessed the decline in fishing just outside Little Bay on Fulton Beach Road.

Robby Byers is the Executive Director of CCA Texas. He has been a member of CCA Texas since 1989 and is a life member. Mr. Byers owns a house at 1204 South Live Oak St., Rockport, Texas, less than two miles from the City's existing wastewater treatment plant and three blocks from Aransas Bay and approximately 1.5 miles south of Little Bay. Mr. Byers has been fishing in Aransas Bay and Little Bay for 25 years.

Mr. Rainwater, the Wiatreks, and Mr. Byers are affected persons with personal justiciable interests that are not common to the general public under 30 TEX. ADMIN. CODE § 307.7(b)(5). Mr. Rainwater's justiciable interests include his economic interest in the property he owns on Little Bay and the use of that property for recreational purposes, including fishing. Mr. Rainwater, the Wiatreks, and Mr. Byers are users of Little Bay and Aransas Bay, and their aesthetic and recreational use of those two water bodies clearly fall within the zone of interests to be protected by the Texas Water Code and Commission rules. Under the Texas Surface Water Quality Standards, Little Bay is designated for high aquatic life use and Aransas Bay is designated for exceptional aquatic life use, oyster waters, and contact recreation. Commission rules also provide that other "basic uses, such as ... seagrass propagation ... will be maintained and protected for all water in the state in which these uses can be achieved." 30 TEX. ADMIN. CODE § 307.7(b)(5). The legal interest required for purposes of standing may include aesthetic and recreational interests where the interests sought to be protected are within the zone of interest to be protected or regulated by the statute and rules in question. *See Save Our Springs Alliance, Inc. v. City of Dripping Springs*, 304 S.W.3d 871, 881 n.6 (Tex. App. – Austin 2010, pet. filed).

The Executive Director's Response to Public Comment states that concerns regarding the degradation of Little Bay are valid. The City's permitted discharges may contribute to that degradation, which affects Little Bay's high aquatic life uses. The Response also recognizes that seagrass beds in Little Bay have declined. Discharges under TPDES Permit No. WQ0010054001 may have and may continue to contribute to

the decline of the seagrass community. The addition of total suspended solids from the City of Rockport's discharge may increase turbidity in the water column, reducing the amount of light needed for seagrass beds, which may lead to seagrass die off. In addition, increased nutrients from the discharge may cause algae to dominate the system, inhibiting the growth or altogether eliminating the seagrass community. Seagrass beds create a habitat that provides a nursery area for numerous estuarine fish species and function as a direct food source for fish and other marine organisms. The City's application for renewal may, therefore, affect Mr. Rainwater's, the Wiatreks', and Mr. Byers' economic, recreational, and aesthetic interests in Little Bay and Aransas Bay. These interests are directly related to CCA Texas's purpose: to conserve, promote and enhance the present and future availability of these coastal resources for the benefit and enjoyment of its members and the general public.

Disputed issues of fact

CCA Texas raises the following disputed issues of fact:

1. CCA Texas disputes any assertion that the City's discharges are not a cause or a contributor to the recent degradation that has occurred in Little Bay. (*See, e.g.,* ED Responses 3, 4, 6, 12 and 19) Although the City's discharges may not be the sole cause, those discharges are adding total suspended solids and nutrients to Little Bay. In addition, the fact that the City's permitted discharges have not changed since 1994 is not proof that the City's actual discharges have not changed.

2. CCA Texas disputes the assertion that the proposed effluent limitations and discharge route protect the designated uses of Little Bay and Aransas Bay in accordance with the Texas Surface Water Quality Standards. (*See, e.g.,* ED Response 3, 4, 5, 6, 9, 10, 12, 13, 15, 16, 17, and 19) Degradation of Little Bay has occurred and is occurring, and that degradation has already had an impact on seagrass propagation, which is an established use under the Texas Surface Water Quality Standards, which in turn affects the high aquatic life use of Little Bay and the exceptional aquatic life use of Aransas Bay. More stringent effluent limitations in the City's permit could improve the water quality of Little Bay and Aransas Bay.

3. CCA Texas disputes the assertion that the effluent limitations and discharge route requirements recently included in permits issued to Aransas County MUD and RR Development Texas are not appropriate for the City of Rockport's permit. Both of these neighboring entities sought permission to discharge treated effluent into a high quality estuarine area in the immediate vicinity of Rockport, Texas. Both applications were into

water bodies significantly larger than Little Bay and yet the final permits required discharges into wetland polishing ponds and with strict limitations on nutrients. In the Aransas County MUD case, at least, the selection of the effluent limitations included consideration of the effect of discharges on the seagrass community. The City of Rockport's discharge, which is much larger than the other discharges and flows into a much smaller body of water, should have similar or stricter requirements to ensure compliance with the Texas Water Code and Texas Surface Water Quality Standards.

Disputed issue of law/policy

In addition, CCA Texas raises the following issue of law and/or policy: Is it appropriate to include more stringent effluent limitations in a renewal permit?

Conclusion

I am the person who will be responsible for receiving all official communications and documents for CCA Texas. Please do not hesitate to call me if you have any questions.

Sincerely,

Robin A. Melvin

Robin A. Melvin

cc: Robby Byers
Ben F. Vaughan, III

GRAVES DOUGHERTY HEARON & MOODY
A PROFESSIONAL CORPORATION
401 CONGRESS AVENUE
SUITE 2200
AUSTIN, TEXAS 78701-3619

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2010 JUN -1 AM 10:13
CHIEF CLERKS OFFICE

RECEIVED
JUN 01 2010
TCEQ MAIL CENTER
AJ

LaDonna Castañuela
Office of the Chief Clerk, MC 105
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087

GRAVES DOUGHERTY HEARON & MOODY
A PROFESSIONAL CORPORATION

Robin A. Melvin
512.480.5688
512.480.5888 (fax)
rmelvin@gdhm.com

MAILING ADDRESS:
P.O. Box 98
Austin, TX 78767

MWD
69298

May 28, 2010

OPA

JUN 01 2010
BY BP

2010 MAY 28 PM 3:08
CHIEF CLERKS OFFICE
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

VIA TELECOPY AND FIRST CLASS MAIL

LaDonna Castañuela
Office of the Chief Clerk, MC 105
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087

Re: City of Rockport
TPDES Permit No. WQ0010054001

Dear Chief Clerk:

Contested Case Hearing Request

I represent the Texas Chapter of the Coastal Conservation Association ("CCA Texas"). On behalf of CCA Texas, I request a contested case hearing on the proposed renewal of the City of Rockport's TPDES Permit No. WQ0010054001.

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MWD

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3. CCA Texas disputes the assertion that the effluent limitations and discharge route requirements recently included in permits issued to Aransas County MUD and RR Development Texas are not appropriate for the City of Rockport's permit. Both of these neighboring entities sought permission to discharge treated effluent into a high quality estuarine area in the immediate vicinity of Rockport, Texas. Both applications were into

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Disputed issue of law/policy

In addition, CCA Texas raises the following issue of law and/or policy: Is it appropriate to include more stringent effluent limitations in a renewal permit?

Conclusion

I am the person who will be responsible for receiving all official communications and documents for CCA Texas. Please do not hesitate to call me if you have any questions

Sincerely,

Robin A. Melvin

Robin A. Melvin

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2010 MAY 28 PM 3:09
CHIEF CLERKS OFFICE

cc: Robby Byers
Ben F. Vaughan, III

GD HH

GRAVES DOUGHERTY HEARON & MOODY
A Professional Corporation

401 Congress Ave., Suite 2200
Austin, TX 78701
512.480.5600
(Writer's Direct No.)
(Direct Fax)

www.gdhm.com

MAILING ADDRESS:
P.O. Box 98
Austin, TX 78767

FAX TRANSMITTAL

TO: **LADONNA CASTANUELA**
Office of the Chief Clerk
Texas Commission on Environmental Quality
Telephone #:

FAX #: 512-239-3311

File: A10200.2

FROM: **ROBIN A. MELVIN**

RE: Coastal Conservation Association ("CCA")
City of Rockport; TPDES Permit No. WQ0010054001

DATE: 5/28/2010

TIME: 2:45p

TOTAL PAGES INCLUDING COVER: 5

Notes, comments, special instructions:

PLEASE SEE ATTACHED

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2010 MAY 28 PM 3:08
CHIEF CLERKS OFFICE

PLEASE NOTE
THE INFORMATION CONTAINED IN THIS FACSIMILE MESSAGE IS ATTORNEY PRIVILEGED AND CONFIDENTIAL AND IS INTENDED ONLY FOR THE RECIPIENT NAMED ABOVE. YOU ARE HEREBY NOTIFIED THAT ANY DISSEMINATION, DISTRIBUTION OR COPYING OF THIS COMMUNICATION OTHER THAN BY THE INTENDED RECIPIENT IS STRICTLY PROHIBITED. IF YOU HAVE RECEIVED THIS COMMUNICATION IN ERROR, PLEASE IMMEDIATELY NOTIFY US BY TELEPHONE AND PLEASE RETURN THE ORIGINAL MESSAGE TO US AT THE ABOVE ADDRESS VIA THE U.S. POSTAL SERVICE.

If there are problems concerning this fax, please contact _____ at 512.480._____.

CCA Texas

PM OPA
DEC 0 8 2009
BY DM

MWD
69298

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2009 DEC -8 AM 11:08
CHIEF CLERKS OFFICE

TEXAS
Executive Board

Mark W. Ray
Chairman of the Board
Bill Schwarzlose
President
Bruce Arendale
Vice President
Doug Boyd
Vice President
Mitch Brownlee
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Norman Trubee
Peter Turnbull
Ben Vaughan III
Ben Vaughan IV
Jerry Vitek
Forrest Vollentine
Daniel Wagner
Troy Williamson
Jim Wilson
Steve Wilson

Robby Byers
Executive Director

Office of the Chief Clerk, MC 105
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087

Re: TPDES Permit No. WQ0010054001

Dear Chief Clerk:

The Texas Chapter of the Coastal Conservation Association ("CCA Texas") files these comments and requests a public meeting on the above-referenced permit renewal.

CCA Texas is concerned about the impact of total nitrogen discharges into Little Bay and Aransas Bay. In particular, CCA Texas is concerned about the impact that total nitrogen discharges may have on sea grasses in Little Bay and Aransas Bay.

I will be responsible for receiving all official communications and documents for CCA Texas in this matter. Please do not hesitate to contact me if you have any questions.

Sincerely,

Robby Byers
Executive Director CCA Texas

Dedicated to the Conservation and Protection of Marine Life
6919 Portwest Drive, Suite 100 • Houston, Texas 77024 • (713) 626-4222 • Fax (713) 961-3801
T200030v1 12/2/2009

Have formal oral comments (5)

TCEQ Public Meeting Form

February 25, 2010

City of Rockport
Proposed TPDES Permit Renewal
WQ0010054001

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2010 MAR -1 AM 10: 17
CHIEF CLERKS OFFICE

PLEASE PRINT

Name: ED RAINWATER

Mailing Address: 601 Blue Heron

Physical Address (if different):

City/State: Rockport **Zip:** 78382

****This information is *subject to public disclosure under the Texas Public Information Act*****

Email: elrainwater@hotmail.com ✓

Phone Number: (361) 774 3819

- Are you here today representing a municipality, legislator, agency, or group? ☐ Yes ☑ No

  If yes, which one?

☐ **Please add me to the mailing list.**

☑ **I wish to provide formal *ORAL COMMENTS* at tonight's public meeting.**

☐ **I wish to provide formal *WRITTEN COMMENTS* at tonight's public meeting.**

(Written comments may be submitted at any time during the meeting)

Please give this form to the person at the information table. Thank you.

10

TCEQ Public Meeting Form

February 25, 2010

City of Rockport
Proposed TPDES Permit Renewal
WQ0010054001

Submitted written comments as well

PLEASE PRINT

Name: KAREN WIATREK

Mailing Address: P.O. BOX 754 ROCKPORT, TEXAS 78381

Physical Address (if different): —

City/State: ROCKPORT TEXAS Zip: 78381

This information is *subject to public disclosure under the Texas Public Information Act*

Email: karenwiatrek@yahoo.com ✓

Phone Number: (361) 727-1405

- Are you here today representing a municipality, legislator, agency, or group? ☒ Yes ☐ No

  If yes, which one? CCA TEXAS – COASTAL CONSERVATION ASSOCIATION TEXAS

☒ **Please add me to the mailing list.**

☒ **I wish to provide formal *ORAL COMMENTS* at tonight's public meeting.**

☒ **I wish to provide formal *WRITTEN COMMENTS* at tonight's public meeting.**

(Written comments may be submitted at any time during the meeting)

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2010 MAR -1 AM 10:13
CHIEF CLERKS OFFICE

Please give this form to the person at the information table. Thank you.

10

OPA RECEIVED
FEB 25 2010
AT PUBLIC MEETING

Aransas Bay Testimony

My name is KAREN WIATREK, and I am here on behalf of Coastal Conservation Association Texas (CCA Texas) representing 50,000 recreational fishing members. CCA Texas is concerned about the application of permit WQ0010054001 and its impact of total nitrogen discharges into Little Bay and Aransas Bay. In particular, CCA Texas is concerned about the impact that the nitrogen discharges may have on sea grasses in these ecosystems. Therefore, CCA Texas would like to request that an Environmental Impact Study (EIS) be conducted to determine these effects **before** this permit is considered for renewal. Thank you for your time.

KAREN WIATREK
2010 CCA TEXAS ARANSAS BAY CHARTER PRESIDENT
P.O. BOX 754, ROCKPORT, TEXAS 78381

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2010 MAR -1 AM 10:13
CHIEF CLERKS OFFICE

mw

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 12/3/2009 10:17 AM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

MWD 12/2/98

H

>>> <ylmoor@sbcglobal.net> 12/2/2009 1:15 PM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME: Leslie Moor, Jr
E-MAIL:ylmoor@sbcglobal.net
COMPANY:
ADDRESS:4 BIMINI DR
ROCKPORT TX 78382-3709
PHONE:3617905004
FAX:3617908931
COMMENTS: Little Bay is an asset to Rockport and is particularly important to those of us who live immediately adjacent to the Bay. I personally use the Bay for boating, fishing, and for the enjoyment of the wildlife that is attracted by a healthy Bay. I request that a public hearing to explore the options for restoring the Bay's health be held soon. It really appears that we are now headed in the wrong direction.

MW

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 12/3/2009 10:14 AM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

MWD 69298

H

>>> <Desmohr@gmail.com> 12/2/2009 11:11 PM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME: Diane Moore
E-MAIL: Desmohr@gmail.com
COMPANY:
ADDRESS:7605 E 229TH ST
PECULIAR MO 64078-9069
PHONE:
FAX:
COMMENTS: As a person that kayaks on Little Bay and surrounding waters, I am greatly concerned about the above permit number and feel that a public hearing is needed. Thank you.

mw

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 12/3/2009 10:14 AM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

MWP
69298

H

>>> <Desmohr@gmail.com> 12/2/2009 11:06 PM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME: Ronald Moore
E-MAIL: Desmohr@gmail.com
COMPANY:
ADDRESS:1924 W TERRACE BLVD
ROCKPORT TX 78382-6252
PHONE:
FAX:
COMMENTS: Please accept this as my comment and request for a public hearing on the above referenced permit number.

MW

MWD 69298

HR

OPA

DEC 07 2009

BY

JOHN M. NELSON
1819 Bay Shore Drive
Rockport, Texas 78382
(361) 727-1231

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2009 DEC -7 AM 11:11
CHIEF CLERKS OFFICE

December 2, 2009

Texas Commission on Environmental Quality
Office of the Chief Clerk, MC 105
P. O. Box 13087
Austin, Texas 78411-3087

Re: City of Rockport, renewal Permit #WQ0010054001

Dear Sir:

I am writing to you in order to submit my formal comments concerning the above referenced renewal permit which has been submitted by the City of Rockport located in Aransas County, Texas.

Under the present permit, the City of Rockport is allowed to discharge up to 2.5 MM gallons of treated effluent per day from its waste water treatment facility directly into Tule Creek, which flows directly to Little Bay adjacent to Aransas Bay. Little Bay is a relatively shallow protected bay that has reduced water exchange due to its access by only two narrow channels, Leggett and Blevins, from Aransas Bay. Additionally, Little Bay does contain a Texas Parks and Wildlife Sanctuary and is used extensively for recreation purposes.

For the past several years, water quality testing conducted by the Water Quality Committee established by the City of Rockport has seen continuous reductions in the water quality in Little Bay. This is further evidenced by the commonly found algae blooms, significant reduction in the growth of seagrass, increased water turbidity, and apparent reduction in wildlife activity. It is obvious that many factors can contribute to this degradation. However, it is well known that the discharge of effluents that contain increased levels of nitrogen compounds including nitrates and phosphorous will support the growth of algae, which increases turbidity, which reduces seagrass growth, which reduces wildlife activity.

For this reason, I am requesting that the TCEQ under its review of this permit application put in place additional controls on the levels of nitrogen and phosphorous that the City of Rockport discharges into Tule Creek and Little Bay. Furthermore, I would request prior to a final approval, that a Public Hearing be held in the local area, at which time all concerned entities would have the opportunity to present their thoughts and ideas concerning this permit application.

I would like to thank you in advance for your due consideration of these comments.

Very truly yours,

John M. Nelson

MW

John Nelson
1819 Bay Shore Drive
Rockport, Texas 78382

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2009 DEC -7 AM 11:11
CHIEF CLERKS OFFICE

CORPUS CHRISTI TX 78
RIO GRANDE DISTRICT
04 DEC 2009 PM 1

3c USA 2002

USA 41

RECEIVED
DEC 07 2009
TCEQ MAIL CENTER
MM

Texas Commission on Environmental Quality
Office of the Chief Clerk, MC 105
P. O. Box 13087
Austin, Texas 78411-3087

78711-3087

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 12/3/2009 10:26 AM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

MWD
69298

H

>>> <djpaz@sbcglobal.net> 12/2/2009 8:16 AM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME: Donna Pazera
E-MAIL:djpaz@sbcglobal.net
COMPANY:
ADDRESS:508 LAKEWOOD ST
ROCKPORT TX 78382-6958
PHONE:
FAX:
COMMENTS:I am writing to add my voice to those requesting a public hearing before this permit is issued. The amount of nitrogen which will be released into Aransas Bay if this permit is issued is unacceptable for the future of our bay.

mw

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 12/4/2009 9:39 AM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

MWD 69298

H

>>> <fultonbirder@yahoo.com> 12/3/2009 3:21 PM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME: Diana Rushing
E-MAIL:fultonbirder@yahoo.com
COMPANY:NA
ADDRESS:PO BOX 582
FULTON TX 78358-0582
PHONE:
FAX:
COMMENTS: As a taxpayer and resident of Aransas County, I request a public hearing on the above-mentioned wastewater permit which is pending renewal. Since moving to this area full-time 5 years ago, I have personally witnessed the decline in water quality of Little Bay which is a direct recipient of the waste runoff from the City of Rockport. Sea grasses which were formerly present are no longer found, reducing the amount of wildlife, i.e., fish and waterfowl, formerly found in abundance. The citizens of this county deserve a public hearing to discuss what the City of Rockport intends to do to mitigate the harm being done to this body of water. Thank you for your consideration.

mw

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 12/10/2009 8:29 AM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

HR

>>> PUBCOMMENT-OCC 12/9/2009 3:10 PM >>>

>>> <sandy@sandyswanson.com> 12/9/2009 3:03 PM >>>

MWD 69298

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME: Sandy Swanson
E-MAIL:sandy@sandyswanson.com
COMPANY: Key Allegro R/E
ADDRESS:1798 BAY SHORE DR
ROCKPORT TX 78382-3410
PHONE:3614631293
FAX:3617297967
COMMENTS: Please accept this is my effort as one person who is very concerned about the water quality of Little Bay. Currently the City of Rockport discharges a substantial volume of treated sewage effluent into Tule Creek which empties into Little Bay. Sewage effluent is potentially a large source of nitrogen which is partially responsible for the increased algae and turbidity of Little Bay waters. No new permits should be issued without setting limitations on nitrogen & phosphorus in the wsste water effluent discharge which feeds into public recreational waters. I hereby request and respectfully ask that before issuing this permit you first hold a public hearing hopefuly in Rockport so we can voice our concerns. Thank You, Sandy Swanson

MW

12

TCEQ Public Meeting Form

February 25, 2010

City of Rockport
Proposed TPDES Permit Renewal
WQ0010054001

PLEASE PRINT

Name: SANDY SWANSON

Mailing Address: 112 Lee Circle, RKPT

Physical Address (if different): _____

City/State: RKPT, TX **Zip:** 78382

****This information is *subject to public disclosure under the Texas Public Information Act*****

Email: SANDY@SANDYSWANSON.COM ✓

Phone Number: (361) 463-1293

- Are you here today representing a municipality, legislator, agency, or group? ☐ Yes ☒ No

  If yes, which one? _____

☒ **Please add me to the mailing list.**

☒ **I wish to provide formal *ORAL COMMENTS* at tonight's public meeting.**

☐ **I wish to provide formal *WRITTEN COMMENTS* at tonight's public meeting.**

(Written comments may be submitted at any time during the meeting)

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2010 MAR -1 AM 10:16
CHIEF CLERKS OFFICE

Please give this form to the person at the information table. Thank you.

TCEQ Forma de Reunión Pública

February 25, 2010

City of Rockport
Proposed TPDES Permit Renewal
WQ0010054001

IMPRIMA POR FAVOR

Nombre: _____

Dirección: _____

Dirección local (si diferente): _____

Cuidad/Estado: _____ **Código Postal:** _____

***Esta Información puede ser divulgada de acuerdo con el Acto de Texas de Información Publica ***

Correo Electrónico: _____

Teléfono: ( ) _____

- **¿Esta usted representando a una municipalidad, legislador, agencia, o grupo?** ❒ Si ❒ No

  ¿Como se llama el Grupo?_____

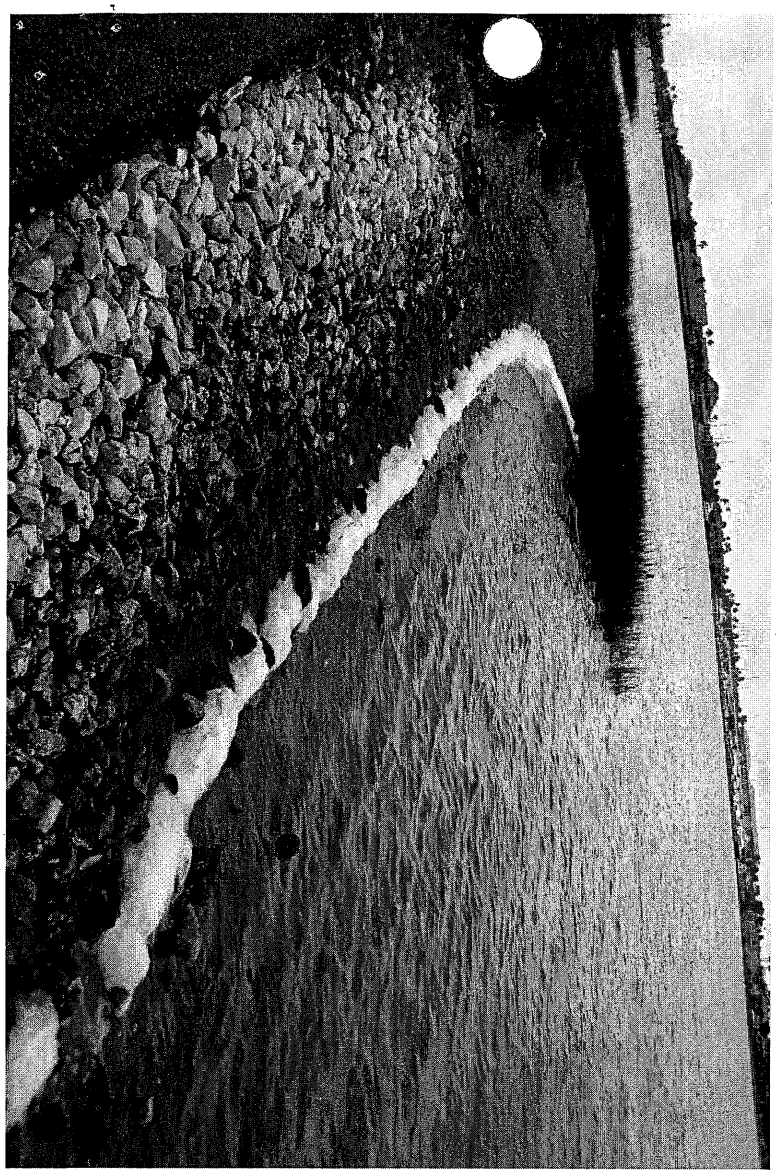
❒ **Por favor inclúyanme en la lista de correo.**

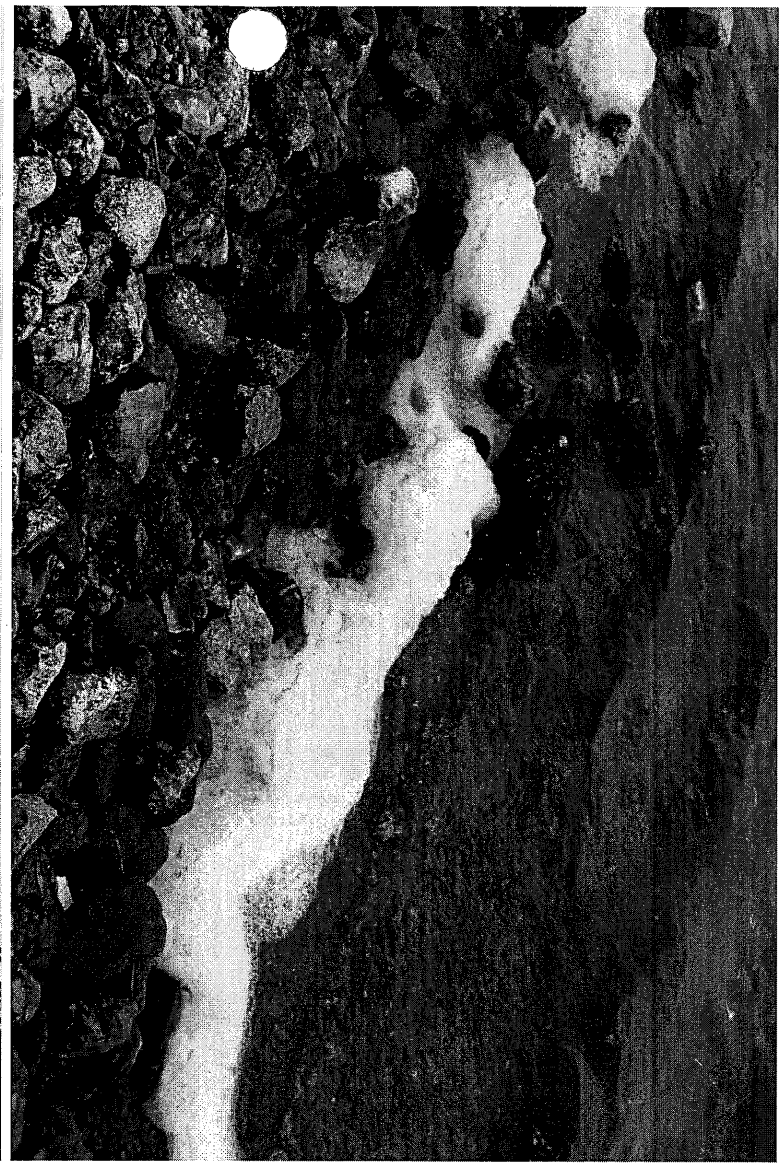
❒ **Yo quiero dar** ***COMETARIOS ORALES*** **formales.**

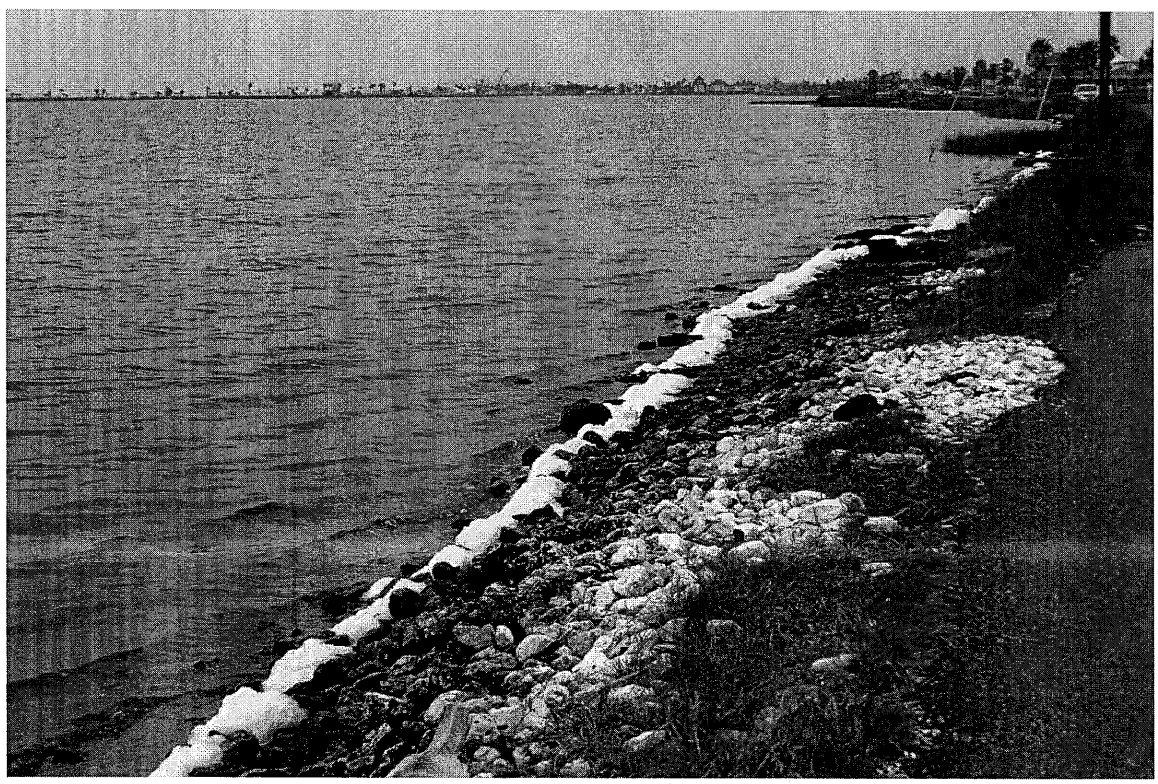
❒ **Yo deseo hacer** ***COMENTARIOS FORMALES*** **por escrito esta noche durante la reunión pública.**

(Comentarios escritos pueden ser entregados a cualquier momento durante la reunión)

Por favor entregue esta forma a la persona en la mesa de información. Gracias.







MW

2/25/10 – pictures shot approx. 10 days ago
on Broadway between glass & Picton

Sandy Swanson
112 Lee Circle
Rkpt, TX 78382
361-463-1293

OPA RECEIVED
FEB 25 2010
AT PUBLIC MEETING

2/25/10 - pictures shot approx. ( ) days ago
on Broadway, between Glass & Picton

Sandy Swanson
112 Lee Circle
Rkpt, Tx 78382
361-463-1293

OPA RECEIVED

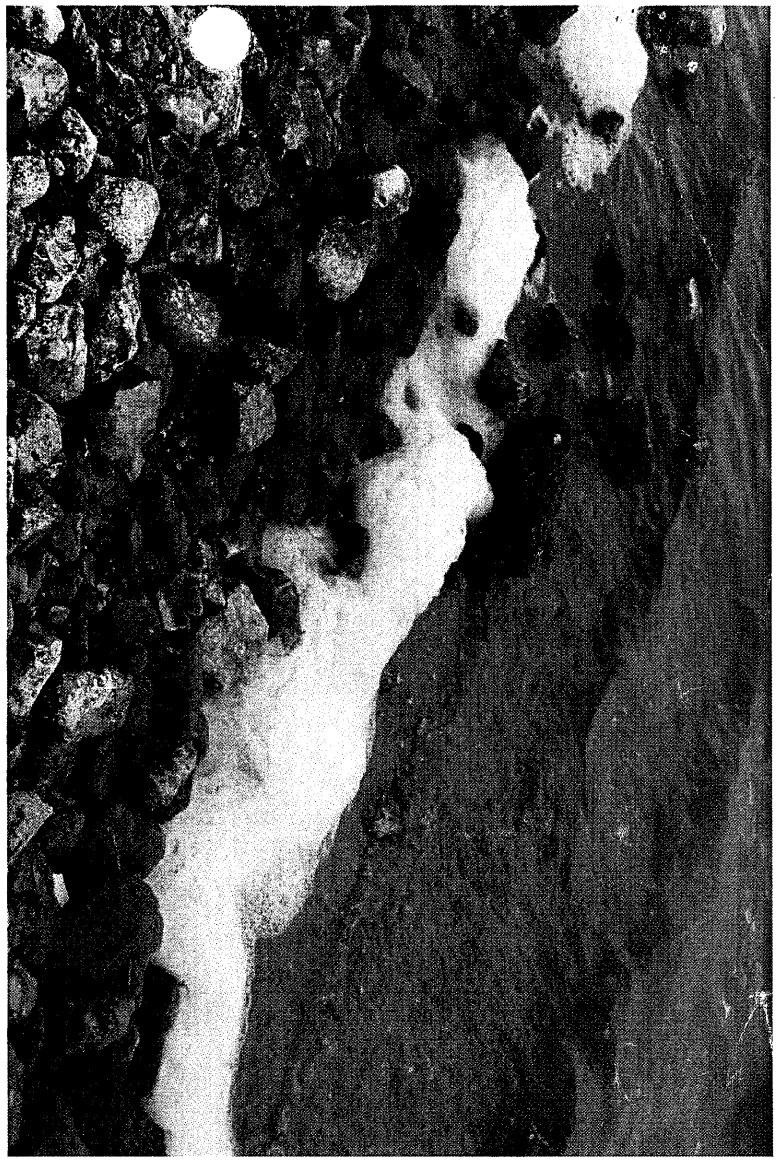
FEB 25 2010

AT PUBLIC MEETING

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

2010 MAR -1 AM 10:16

CHIEF CLERKS OFFICE



sandy swanson

From: sandy@sandyswanson.com
Sent: Wednesday, December 09, 2009 3:03 PM
To: sandy@sandyswanson.com
Subject: TCEQ Confirmation: Your public comment on Permit Number WQ0010054001 was received.

REGULATED ENTITY NAME CITY OF ROCKPORT

RN NUMBER: RN101916575

PERMIT NUMBER: WQ0010054001

DOCKET NUMBER:

COUNTY: ARANSAS

PRINCIPAL NAME: CITY OF ROCKPORT

CN NUMBER: CN600634810

FROM

NAME: Sandy Swanson

E-MAIL: sandy@sandyswanson.com

COMPANY: Key Allegro R/E

ADDRESS: 1798 BAY SHORE DR
ROCKPORT TX 78382-3410

PHONE: 3614631293

FAX: 3617297967

OPA RECEIVED
FEB 25 2010
AT PUBLIC MEETING

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2010 MAR -1 AM 10:16
CHIEF CLERKS OFFICE

COMMENTS: Please accept this is my effort as one person who is very concerned about the water quality of Little Bay. Currently the City of Rockport discharges a substantial volume of treated sewage effluent into Tule Creek which empties into Little Bay. Sewage effluent is potentially a large source of nitrogen which is partially responsible for the increased algae and turbidity of Little Bay waters. No new permits should be issued without setting limitations on nitrogen & phosphorus in the wsste water effluent discharge which feeds into public recreational waters. I hereby request and respectfully ask that before issuing this permit you first hold a public hearing hopefuly in Rockport so we can voice our concerns. Thank You, Sandy Swanson

Based on TCEQ rule Section 1.10(h), the TCEQ General Counsel has waived the filing requirements of Section 1.10(c) to allow the filing of comments, requests, or withdrawals using this online system. The General Counsel also has waived the requirements of Section 1.10(e) so that the time of filing your electronic comments or requests is the time this online system receives your comments or requests. Comments or requests are considered timely if received by 5:00 p.m. CST on the due date.

From: PUBCOMMENT-OPA
To: PUBCOMMENT-OCC2
Date: 12/3/2009 10:23 AM
Subject: Fwd: Public comment on Permit Number WQ0010054001
Place: PUBCOMMENT-OCC2

MWD
69298

PM
H

>>> <fsymank@sbcglobal.net> 12/2/2009 11:04 AM >>>

REGULATED ENTY NAMECITY OF ROCKPORT
RN NUMBER:RN101916575
PERMIT NUMBER:WQ0010054001
DOCKET NUMBER:
COUNTY:ARANSAS
PRINCIPAL NAME:CITY OF ROCKPORT
CN NUMBER:CN600634810
FROM
NAME: Frances Symank
E-MAIL:fsymank@sbcglobal.net
COMPANY:
ADDRESS:462 AUGUSTA DR
ROCKPORT TX 78382-6945
PHONE:
FAX:
COMMENTS: The city of Rockport has a history of taking shortcuts regarding drainage. PLEASE schedule a public meeting/hearing before issuing any new permits.

MW