

CHAPTER

11

Water and Sediment Quality



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Introduction

Maintaining the quality of water and sediment in the face of expanding population and growing industry is important to human health, aquatic life, and the economic vitality of the Coastal Bend. Fortunately, overall bay water quality has significantly improved during the past 45 years. The advent of the Clean Water Act in 1972, and the subsequent control of point source discharges, has brought steady improvement to several conventional water quality parameters in certain, previously impaired segments. Industries and municipalities have invested and worked hard to do their part to achieve coastal water quality standards. Today, point source discharges are frequently utilized to offset freshwater supply demands, including beneficial return flows to the estuaries. In addition to discharges from municipal and industrial wastewater treatment plants (point sources, Figure 17), we must also consider the diffuse runoff from urban and rural areas (nonpoint sources).

The most productive estuarine ecosystems thrive in areas with clean water and an optimal level of suspended solids. Many factors contribute to water and sediment quality. Increasing the amount of contaminants or turbidity in the water can decrease productivity, or even human health. Human activities, such as agriculture, dredging, and trawling can increase water turbidity, which limits photosynthesis. Limiting the flow of water in an estuary or limiting freshwater inflow can inhibit the natural properties that wetlands have to filter contaminants from water. Many human activities have the potential to contaminate water, from oil spills to runoff from streets following a storm.

Sediment quality is important because sediments are a 'sink' or repository for pollutants such as metals and pesticides. Sediments accumulate and concentrate pollutants over a long period of time. When activities such as dredging disturb contaminated sediments the result can be a reintroduction of pollutants into the water column.

Water and sediment quality are important to estuarine productivity, wildlife habitats, and the aesthetic appeal of bays and shorelines. Maintaining the water quality improvements made during the past 45 years will be a challenge in the years ahead as the regional population increases, industrial growth continues, and the climate

changes. However, it is possible to enhance water and sediment quality through pollution prevention and other Best Management Practices.

Water and Sediment Quality

The federal Clean Water Act gives states the primary responsibility for implementing programs to protect and restore water quality, including monitoring/assessing and reporting on their quality. In Texas, the Texas Commission on Environmental Quality is the agency with primary responsibility for implementing the monitoring, assessment, and reporting requirements of the Clean Water Act. The TCEQ Surface Water Quality Monitoring (SWQM) program provides for an integrated evaluation of physical, chemical, and biological characteristics of aquatic systems in relation to human health concerns, ecological condition, and designated uses. SWQM data provide the basis for establishing effective TCEQ water quality management policies that promote the protection, restoration, and responsible use of Texas surface-water resources.

Under section 303(d) of the Clean Water Act, the TCEQ is required to submit lists of impaired waters. These are waters that are too polluted or otherwise degraded to meet water quality standards. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads (TMDL) for these waters. A TMDL is a pollution budget and includes a calculation of the maximum amount of a pollutant that can occur in a waterbody and allocates the necessary reductions to one or more pollutant sources. A TMDL serves as a planning tool and potential starting point for restoration or protection activities with the ultimate goal of attaining or maintaining water quality standards.

The 2017 Bays Plan calls for the CBBEP to support the development and implementation of plans designed to maintain and improve water and sediment quality in segments that do not meet standards. It also calls for the development of TMDL allocations for priority 303(d) listed segments, evaluation of new data, and collaboration on revisions (additions or deletions) to the 303(d) list. In addition, the Bays Plan recognizes that problematic areas may exist that are not included on the 303(d) list. Therefore, closer investigation of the sources of water and sediment quality problems (e.g., elevated levels of heavy metals, low dissolved oxygen concentrations, bio-markers of fecal pollution, etc.) in specific portions of the project area may be needed in the future.

Understanding the contribution of 'total loadings' to the bay system is a fundamental goal of the Water and

RESEARCHERS FROM TEXAS A&M UNIVERSITY
- **CORPUS CHRISTI** collect water quality data near Ropes Park as part of a study to identify sources of bacteria. (Photo by CBBEP)

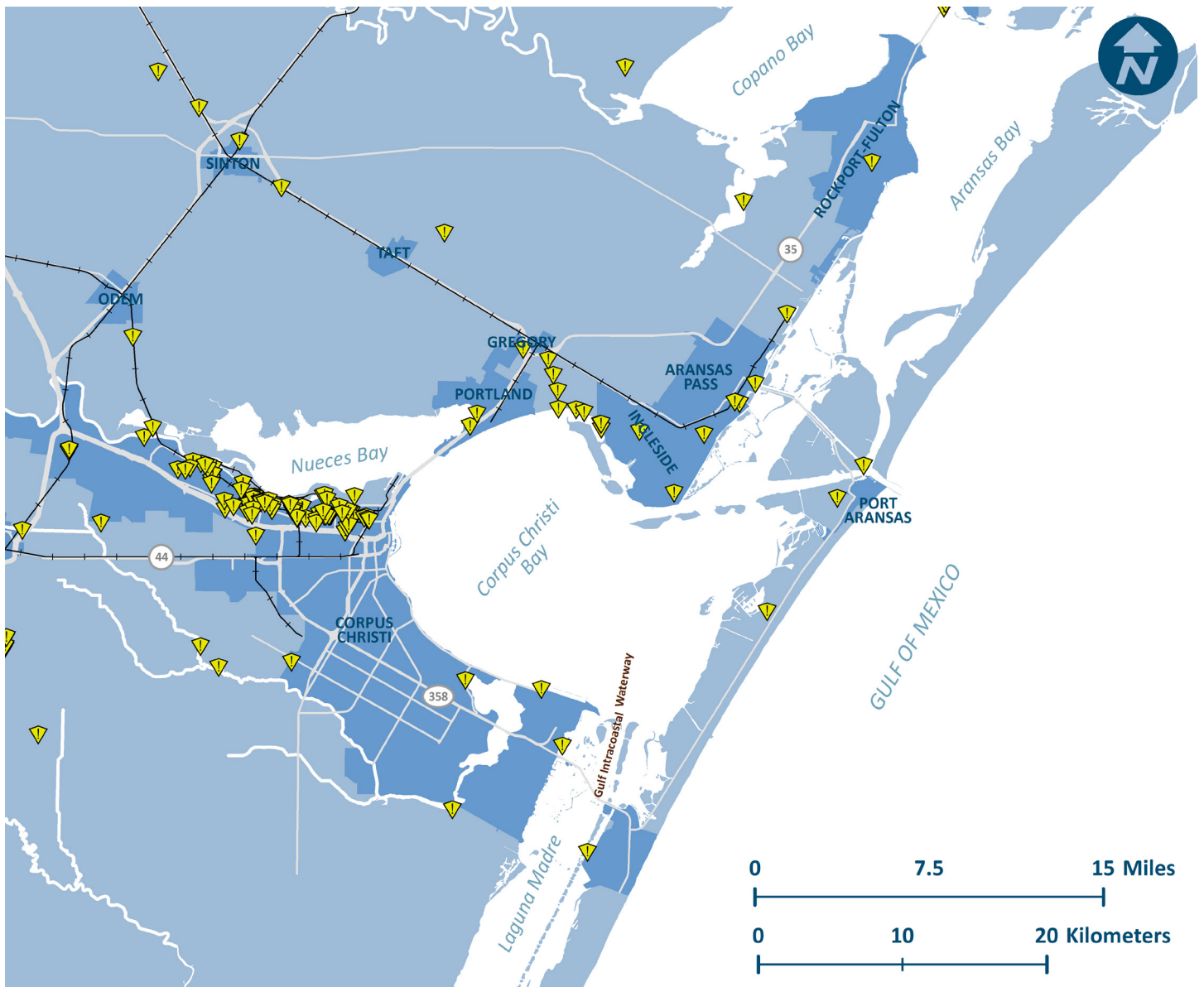


FIGURE 17. MAP OF TCEQ-PERMITTED WASTEWATER OUTFALLS.

Sediment Quality Action Plan. To accomplish this, the CBBEP will support efforts to identify data needs and coordinate additional data acquisitions that will help determine the relative contributions and loadings of point and nonpoint sources. Efforts will also focus on identifying transport pathways, sources, and fates of constituents. New data acquisitions will support the refinement of existing models and/or the development of new models that enhance our understanding of total constituent loadings.

The approach of the Bays Plan is to develop ways to get ahead and stay ahead of water and sediment quality problems before they pose risk to people or the environment. Knowing more about the quality, volume,

and biological effects of loadings will allow stakeholders to provide educated input during the State’s review of water quality standards. Such knowledge may also drive the development of sediment quality and/or biological criteria guidelines as additional tools to assess ecosystem health. It will also allow stakeholders to participate in a variety of important water quality management programs, including the development of basin watershed management plans, identification of priority water bodies, and the development and implementation of TMDL allocations for impaired water segments.

Although aquaculture and mariculture are not yet major industries in the Coastal Bend, they are showing signs of growth. Discharges from these operations have

the potential to generate water and sediment quality concerns and could lead to possible introductions of non-native species or disease to the bay system. Various permitting and licensing programs are in place to control for impacts from aquaculture and mariculture operations. The Bays Plan supports the implementation of the existing aquaculture regulations and also calls for additional research on water quality and invasive species issues associated with aquaculture and mariculture techniques and procedures.

Nonpoint Source Management

When chemicals in rainwater runoff exceed certain concentrations they become pollutants and result in reduced water and sediment quality. Stormwater runoff picks up and carries not only pollutants (e.g., oil and grease from vehicles, lawn and garden chemicals, animal wastes, and street litter), but also ecologically important nutrients, sediments, and freshwater. Excessive nutrients or other chemicals not fully utilized by the ecosystem become pollutants. Unless prudent management actions are taken, these pollutant loadings will increase in the Coastal Bend as populations grow and urban areas expand.

Urban runoff is an important factor in bay water and sediment quality. In addition to the populated areas within city limits, urban runoff is generated by rural subdivisions, highways, industrial and military activities, and construction sites throughout the region. Urbanized areas have impervious surfaces and drainage systems that increase the volume of runoff and deliver loads faster to the bays. In some cases, stormwater drainage ditches can create linear freshwater wetlands, vegetated with marsh plants that can function to help slow water movement, trapping sediment and contaminants, and filtering some of the constituents before they reach the estuaries, while providing habitat for some wildlife species.

The City of Corpus Christi operates under a Texas Pollutant Discharge Elimination System (TPDES) permit. Under the permit, the City implements programs to monitor discharges, identify sources of contamination, establish and enforce ordinances aimed at reducing pollution, and educate residents, construction site managers, and others on how to improve stormwater quality. Additional programs - such as street sweeping, maintenance of marsh vegetation and erosion control in drainage ditches, cleaning of catch basins and storm sewers, litter abatement, household hazardous waste collection, and curbside recycling - assist in the management of urban runoff.



ACCOMPLISHMENT: Baffin Bay Study Group

The Baffin Bay Study Group (BBSG) was formed by the local community to bring together scientists, natural resource managers, fishing guides, and other bay users to support interests in resolving Baffin Bay's water quality and biological productivity concerns. The first meeting of the group was held on August 2, 2012, in response to fish kills that occurred around the mouth of Baffin Bay where it meets the Upper Laguna Madre. The CBBEP, TPWD, Texas A&M University – Corpus Christi, and the Harte Research Institute for Gulf of Mexico Studies met to discuss the fish kills, water quality problems, and food web changes in the bay.

The BBSG has grown to include not only researchers and state agencies, but commercial fisherman, recreational fisherman, hotel owners, citizens living on Baffin Bay, ranchers, business owners, federal and local agencies, and other interested stakeholders. The BBSG's charge is to identify the issues in Baffin Bay, characterize the problems, and develop solutions. The group focuses on collaboration and keeping everyone on the same page as research and management decisions are made.

The BBSG also established the Baffin Bay Community-based Water Quality Monitoring Program. Since 2013, volunteers and scientists have been collecting monthly water samples from nine sites within the bay and analyzing them for concentrations of chlorophyll a, inorganic nutrients, dissolved organic carbon, and total dissolved nitrogen. The group has made what they believe to be a critical finding when it comes to potential causes of brown tide - concentrations of dissolved organic nitrogen in Baffin Bay are three-fold higher, on average, than in other bay systems of the Texas coast. An important next step will be to determine the main sources of the organic nitrogen.



ACCOMPLISHMENT: Cole and Ropes Park Coordination Committee

In 2010, Cole and Ropes Parks beaches, located along Ocean Drive in Corpus Christi, Texas, were listed on the TCEQ 303(d) List of Impaired Waters for bacteria. Data from the Texas Beach Watch Program showed that bacteria concentrations were higher than the criteria for protecting contact recreation activities, such as swimming or windsurfing. To address these concerns, the TCEQ developed a total maximum daily load (TMDL) for Cole and Ropes Parks beaches. The goal of a TMDL is to determine the amount (or load) of a pollutant that a body of water can receive and still support its assigned uses.

Following the establishment of the TMDL, the local community and stakeholders worked together to develop a voluntary action plan for reducing bacteria loadings to these beaches - the plan is known as the Cole and Ropes Parks Bacteria Reduction Implementation Plan (I-Plan). The ultimate goal of the I-Plan is to reduce bacteria levels at the beaches in order to protect people who use these areas for contact recreation. The Plan details voluntary management measures and control actions that government and citizens can take to reduce bacteria entering the bay at these sites, such as placing additional pet waste centers around town and educating the public.

The Cole and Ropes Park Coordination Committee (or CARP for short), was formed in 2012 to lead the development of the I-Plan. The CARP is a community elected group that consists of 12 members representing various stakeholder groups. The CBBEP has been an active member of the CARP since it was established, serving in the Environmental Stakeholder position and chairing the Science and Technology Workgroup. After four years, numerous meetings, and countless volunteer hours, the CARP released the I-Plan in 2016.

Water and sediment quality issues may also result from On-site Sewage Facilities (OSSF), or septic systems as they are more commonly known. OSSFs can contribute to fecal coliform contamination and nutrient enrichment of receiving waters. Many septic systems are improperly installed or maintained and the clay and sand soils in a large part of the project area are not well-suited to efficient septic system operation.

The Bays Plan calls for the CBBEP and its partners to support efforts to distribute existing information and resources about nonpoint source BMPs (e.g., City of Corpus Christi Stormwater Master Plan; Guidance for Sustainable Stormwater Drainage on the Texas Coast) to local communities, businesses, and industries through workshops and brochures and to provide a central repository for this information. In response to the recent growth in the Corpus Christi Metropolitan area, the Plan specifically highlights the need to focus on projects that lead to the implementation of urban stormwater BMPs and improved understanding of the quality of urban stormwater runoff. In addition, the CBBEP will support TCEQ's efforts to provide compliance assistance to small businesses and industries on ways to help achieve urban runoff objectives through the 'TexasEnviroHelp' program. Finally, the CBBEP will assist local communities and organizations with their efforts to seek funding for OSSF programs and projects and will utilize existing education and outreach sources to educate local landowners about proper OSSF installation and maintenance.

Agricultural lands can be another major source of nonpoint source runoff. Agricultural uses, ranging from cattle grazing to row-crop farming, are the leading landcover in most of the watersheds draining into the Coastal Bend bays and estuaries. Nutrients, pesticides, organic matter, and animal wastes can be carried to the bays by agricultural runoff. However, a combination of flat terrain and the use of improved chemicals and application techniques are already at work to minimize the amount of material carried away. Management programs implemented for many years in the region include erosion control and integrated crop management. These and other programs have helped to reduce agricultural runoff and improve water quality. While many of these practices were developed for economic reasons, they have had the effect of reducing the amount of sediment, organic material, and chemicals that are washed into the bay system.

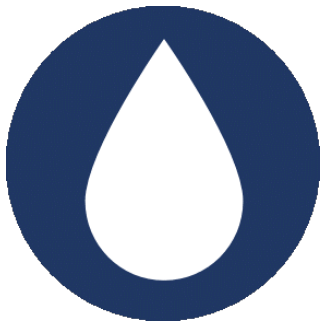
The 2017 Bays Plan calls for the continued and expanded implementation of agricultural conservation assistance programs as authorized and funded by state and federal

law. Specifically, the CBBEP will work with partners to identify landowners within the project area that could be potential participants in agricultural conservation programs and will seek funding for projects demonstrating agricultural BMPs that are practicable, economically achievable, and enhance water quality. Finally, the

Plan recognizes the need for implementing partners to continue to assist Soil and Water Conservation Districts and other conservation partners in their efforts to provide educational workshops on BMPs and other data pertaining to water quality management and agricultural runoff.

BACTERIAL SOURCE TRACKING is a method used to identify potential sources of fecal pollution. The CBBEP is currently working with researchers at Texas A&M University - Corpus Christi to identify fecal pollution sources at Cole and Ropes Parks in Corpus Christi Bay. Impairment of water quality in these areas is thought to stem from unknown point and nonpoint sources of fecal pollution. Researchers will quantify the abundance of human, gull and dog fecal pollution. The results will help determine if any of these groups are a significant source of fecal pollution, which will help local officials develop better, targeted management strategies to reduce bacteria inputs to the bay.





WATER AND SEDIMENT QUALITY Action Plan

GOALS

Maintain and/or enhance water and sediment quality.

Understand total loadings, transport pathways, and biological and ecological effects of loadings to the bay system.

OBJECTIVES

WSQ 1: Improve the quality of ambient water and sediment in impaired or stressed segments to attain standards and criteria.

WSQ 2: Assess total loadings, transport pathways, sources, and fates of constituents.

WSQ 3: Evaluate and assess segment-specific water and sediment quality standards.

ACTIONS

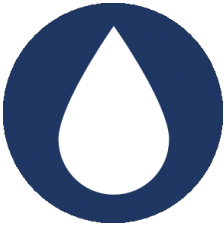
WSQ 1.1: Support the implementation of plans and projects to improve water and sediment quality in identified segments.

WSQ 1.2: Continue to support permitting rules for mariculture and aquaculture.

WSQ 2.1: Support efforts to quantify total constituent loadings and identify possible transport pathways, sources, and fates.

WSQ 2.2: Support analyses of the biological and ecological effects of constituents.

WSQ 3.1: Ensure that water and sediment quality standards and criteria are adequate and appropriate.



Water and Sediment Quality 1.1

Support the implementation of plans and projects to improve water and sediment quality in identified segments.

Program reports and the state 303(d) list have identified water segments that exceed state water quality standards and do not support designated uses. Identifying the cause of the problems and restricting migration of pollutants are critical. Of equal importance is understanding the environmental and human health effects of contaminants. In each case, steps need to be taken to reduce pollutant levels through a watershed management approach that coordinates with Watershed Protection Plans and Implementation Plans developed for Total Maximum Daily Loads (TMDLs) under Section 303(d) of the Clean Water Act, Municipal Water Pollution Control and Abatement Programs developed under Section 26.177 of the Texas Water Code, the state’s Coastal Nonpoint Source Program developed under Section 6217 of the Coastal Management Act, and the state’s Nonpoint Source Management Program developed under Section 319 of the Clean Water Act.

STEP 1:

Support the development and implementation of plans (i.e., Watershed Protection Plans, Implementation Plans) and projects to maintain and improve water and sediment quality in segments that do not meet TCEQ or EPA standards (e.g., the state 303(d) list). Support the development of TMDL allocations for priority 303(d) listed segments, evaluation of new data, and collaboration on revisions (additions or deletions) to the 303(d) list.

STEP 2:

Support assessments and planning that address problematic levels of heavy metals, dissolved oxygen, bio-markers of fecal pollution, and other water quality issues identified by stakeholders for specific portions of the project area that are of concern (e.g., low dissolved oxygen in Corpus Christi Bay).

STATUS



UNDERWAY: CBBEP is currently participating in the Cole and Ropes Park Coordination Committee (CARP) for the bacteria impairment at Corpus Christi Bay recreational beaches. The Implementation Plan (I-Plan) is completed and is in the process of reaching approval. CBBEP is also currently participating in the Oso Creek and Bay Coordination Committee. This process is in the early stages and the Committee hopes to have a draft I-Plan submitted to the TCEQ by the end of fiscal year 2018.

TIMEFRAME



2017-2037: Steps will be implemented, as needed and as funding becomes available, throughout the applicable life of this plan.

COST



ESTIMATED COST: \$\$\$

POTENTIAL FUNDING: CBBEP Programmatic funds (EPA 320 funds, TCEQ, and Local partners); EPA; TCEQ; TSSWCB

PARTNERS



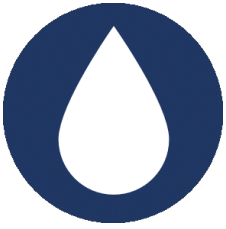
LEAD: CBBEP; TCEQ; TSSWCB

POTENTIAL PARTNERS: Conservation organizations (e.g., CBBF; Sierra Club); EPA; Local governments; MANERR; Private industry; TPWD; Universities (e.g., CCS, HRI, UTMSI); USFWS; USGS

PERFORMANCE METRICS



1. Number of segments in program area listed on 303(d) list.
2. Number of water and sediment quality improvement projects occurring in segments listed on the 303(d) list within the project area.
3. Number of Watershed Protection Plans and Implementation Plans developed through the TMDL process for segments listed on the 303(d) list in the project area.
4. Number of assessments and plans developed to address specific water quality issues outside of the TMDL process.



Water and Sediment Quality 1.2

Continue to support permitting rules for mariculture and aquaculture.

Aquaculture and mariculture are growing industries in Texas. However, potential discharges from aquaculture/ mariculture operations may generate water and sediment quality problems and could lead to the introduction of invasive species and disease. Such introductions could have catastrophic consequences on native species. Various aquaculture management activities require permits or licenses from state agencies, such as the Texas Parks and Wildlife Department (TPWD), Texas Department of Agriculture (TDA), and Texas Commission on Environmental Quality (TCEQ). Examples of permits and licenses required include: TDA Aquaculture Facility License, TCEQ Wastewater Discharge Permit, and TPWD Exotic Species Permit.

<p>STEP 1:</p> <p>Review and comment, as needed, on regulations and permitting/licensing issues related to mariculture and aquaculture.</p>	<p>STEP 2:</p> <p>Support research on water quality and invasive species issues associated with aquaculture and mariculture techniques and procedures.</p>
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STATUS



UNDERWAY: CBBEP maintains active partnerships with licensing and permitting agencies, and staff will work with these partners to review and provide comments on aquaculture/mariculture issues as they arise.

TIMEFRAME



2017-2037: Steps will be implemented, as needed and as funding becomes available, throughout the applicable life of this plan.

COST



ESTIMATED COST: Step 1 = \$; Step 2 = \$\$ - \$\$\$ (varies by project type)
POTENTIAL FUNDING: CBBEP Programmatic funds (EPA 320 funds, TCEQ, Local funds); CMP; NMFS

PARTNERS

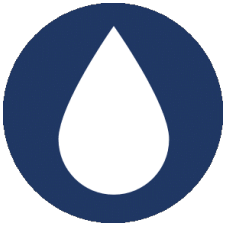


LEAD: CBBEP
POTENTIAL PARTNERS: Step 1 = EPA; NMFS; TCEQ; TDA; TGLO; TPWD; USACE; USCG; USFWS; Step 2 = MANERR; Texas Sea Grant; Universities (e.g., CCS, HRI, UTMSI)

PERFORMANCE METRICS



1. Number of comments submitted by CBBEP regarding mariculture and aquaculture policies and permits/licenses.
2. Number of reports and publications produced from aquaculture and mariculture research projects supported by CBBEP resources.



Water and Sediment Quality 2.1

Support efforts to quantify total constituent loadings and identify possible transport pathways, sources, and fates.

An understanding of the relative contributions, total loadings, transport pathways, sources, and fates of constituents entering the bay system allows for continued refinement of resource management strategies. Management actions should be based on studies that include data collection during different environmental conditions (e.g., winter, summer, dry, wet), and examination of changes associated with land use/land cover and land management practices are critical for understanding future changes. In 1996, the CBBEP completed an investigation of nonpoint source pollution and loading into the study area. This study provided a broad overview of the study area and includes recommendations for additional data needs and more detailed studies. Since that report was completed, the CBBEP has completed studies in the Mission-Aransas Estuary, Oso Creek, and at the Corpus Christi Bay recreational beaches to understand the sources of bacteria loading, but as technology improves, future studies will be able to refine the sources with greater accuracy.

STEP 1:

Support efforts to identify needs and coordinate additional data acquisition, including citizen science programs, to determine relative contributions and loadings from point and nonpoint sources.

STEP 2:

Support efforts to identify needs and coordinate additional data acquisition to determine transport pathways, sources, and fates of constituents.

STEP 3:

Support the refinement of existing models and the development of new models related to constituent loadings, transport pathways, sources, and fates.

STATUS



UNDERWAY: The CBBEP has recently funded studies related to constituent loadings (e.g., Oso Creek, Mission-Aransas Estuary, and Corpus Christi recreational beaches) and continues to work with partners to identify opportunities for implementation of additional studies that would improve our understanding of loadings. Projects are often related to impaired water bodies listed on the 303(d) list, but they can also occur in water bodies of concern that are not considered impaired.

TIMEFRAME



2017-2037: Steps will be implemented, as needed and as funding becomes available, throughout the applicable life of this plan.

COST



ESTIMATED COST: \$\$\$

POTENTIAL FUNDING: CBBEP Programmatic funds (EPA 320 funds, TCEQ, Local funds); CMP; EPA; NOAA; TCEQ; Texas Sea Grant; TSSWCB

PARTNERS



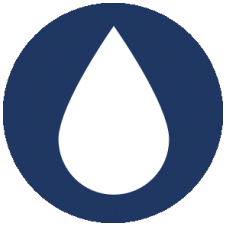
LEAD: CBBEP

POTENTIAL PARTNERS: EPA; MANERR; TCEQ; Texas Stream Teams; TPWD; TSSWCB; TMN; Universities (e.g., CCS, HRI, UTMSI)

PERFORMANCE METRICS



1. Number of reports and publications supported by CBBEP resources that provide new data and information about constituent loading.
2. Number of reports and publications supported by CBBEP resources that provide new data and information about constituent transport pathways, sources, and fates.
3. Number of models refined and/or developed for constituent loadings, transport pathways, sources, and fates that were supported by CBBEP resources.



Water and Sediment Quality 2.2

Support analyses of the biological and ecological effects of constituents.

Information is limited regarding the biological and ecological effects of the thousands of constituents that enter the bay system. An understanding of the effects of constituent loadings is necessary for the continued refinement of water and sediment quality standards. There is also very little information about how constituents interact within one another and how constituents are affected by environmental parameters like temperature, dissolved oxygen, and salinity. A better understanding of the biological and ecological effects of constituents will assist in the development of management strategies that improve the quality of Coastal Bend estuaries.

STEP 1:

Support studies and projects that determine the responses of flora/fauna (i.e., biological, chemical, and physiological changes) and ecological effects to varying levels of constituents entering the bays.

STEP 2:

Support studies and projects that examine the potential interactions among constituents, as well as the interaction between constituents and environmental parameters (e.g., temperature, dissolved oxygen, salinity).

STATUS



UNDERWAY: As issues arise within the program area, the CBBEP works with partners to understand the biological and ecological effects of constituent loadings. For example, the CBBEP recently funded studies to examine the ecological impacts (e.g., benthic macrofaunal, fisheries) of loadings and water quality changes in Baffin Bay. This research was in response to fish kills, water quality problems, and food web changes in the bay. Several projects are ongoing, as researchers attempt to understand the long-term responses.

TIMEFRAME



2017-2037: Steps will be implemented, as needed and as funding becomes available, throughout the applicable life of this plan.

COST



ESTIMATED COST: \$\$ - \$\$\$ (varies by project type)

POTENTIAL FUNDING: CBBEP Programmatic funds (EPA 320 funds, TCEQ, Local funds); CMP; EPA Gulf of Mexico Program; NMFS

PARTNERS



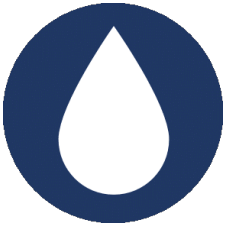
LEAD: CBBEP

POTENTIAL PARTNERS: EPA; MANERR; TCEQ; TPWD; TSSWCB; Universities (e.g., CCS, HRI, UTMSI)

PERFORMANCE METRICS



1. Number of CBBEP-supported reports and publications that address the biological and ecological effects of constituents and were supported by CBBEP resources.
2. Number of CBBEP-supported reports and publications that address interactions among constituents and interactions between constituents and environmental parameters.
3. Number of CBBEP-supported reports and publications that address the response of coastal flora and fauna to varying levels of constituents.



Water and Sediment Quality 3.1

Ensure that water and sediment quality standards and criteria are adequate and appropriate.

Established water quality and sediment standards and criteria do not in all cases account for natural variability with measured parameters (e.g., dissolved oxygen levels are naturally low in some segments during the summer months). In some cases, this may result in overly strict wastewater discharge limits, or misidentification of segments as being impaired. A look at the health of biological communities - through the use of biological criteria - is another useful analytical tool to assess if water and sediment quality standards and criteria are effective in the long-term.

STEP 1:

Support studies that examine water and sediment quality standards and criteria, as well as biological criteria, for various portions of the project area to coincide with the State’s review process or as needed.

STEP 2:

Review and develop recommended changes to water, sediment, and biological criteria and standards as needed.

STATUS



UNDERWAY: The TCEQ sets and implements water quality standards and sediment benchmarks. These standards are reviewed at least every three years, and revisions address new information about pollutants, additional data about water quality conditions in specific segments, and new state and federal regulatory requirements. Stakeholders in the review and revision process include the TCEQ, EPA, the general public, other governmental agencies, industries, municipalities, environmental groups, and others. CBBEP works with its partners to ensure that standards used in the Coastal Bend region are appropriate and that proposed revisions are based on quality research results (e.g., proposed lowering of dissolved oxygen criteria for Oso Bay and Laguna Madre).

TIMEFRAME



2017-2037: Steps will be implemented as TCEQ undergoes the review process for water and sediment standards.

COST



ESTIMATED COST: Step 1 = \$\$ - \$\$\$ (varies by project type); Step 2 = \$

POTENTIAL FUNDING: CBBEP Programmatic funds (EPA 320 funds, TCEQ, Local funds); CMP; EPA; TCEQ; TSSWCB

PARTNERS



LEAD: CBBEP; TSSWCB; TCEQ

POTENTIAL PARTNERS: GBRA; MANERR; NRA; SARA; TPWD; USGS; Local governments; Universities (e.g., CCS, HRI, UTMSI)

PERFORMANCE METRICS



1. Number of recommendations provided for water, sediment, and biological criteria and standards.
2. Number of CBBEP-supported reports and publications related to water, sediment, and biological criteria and standards.



NONPOINT SOURCE MANAGEMENT Action Plan

GOAL

Improve management of all loadings to the bay system.

OBJECTIVE

NPS 1: Assess and improve nonpoint source management throughout the region.

ACTIONS

- NPS 1.1: Assist local governments, small businesses, industries, and organizations in their efforts to reduce loadings.
- NPS 1.2: Provide assistance to small businesses and industries in the region that are subject to the TPDES permit program or have point or nonpoint source control needs.
- NPS 1.3: Assist local governments and organizations to implement On-Site Sewage Facility (OSSF) programs and projects.
- NPS 1.4: Support agricultural water quality management plans, programs, and projects.
- NPS 1.5: Support efforts to improve the quality of urban stormwater runoff.



Nonpoint-Source Management 1.1

Assist local governments, small businesses, industries, and organizations in their efforts to reduce loadings.

Urban nonpoint source runoff can have detrimental effects on rivers, lakes, bays, and estuaries. Urban nonpoint source pollutants may include oil and grease, pathogenic microorganisms, pesticides, nutrients, trash, and heavy metals. Unless prudent management actions are taken, these pollutant loadings will increase in the Coastal Bend as populations grow and urban areas expand. The voluntary implementation of prudent, low cost nonpoint source Best Management Practices (BMPs) by coastal communities will help protect bay resources and could help business/industries avoid future costly remediation. CBBEP and its partners support the efforts of local communities to implement nonpoint source BMPs, which are outlined in several existing local planning documents (e.g., City of Corpus Christi Stormwater Master Plan; Guidance for Sustainable Stormwater Drainage on the Texas Coast).

STEP 1:

Support efforts to distribute information and resources related to nonpoint source BMPs to local communities (e.g., workshops, brochures).

STEP 2:

Identify a central repository for nonpoint source BMP information and resources (e.g., plans, brochures, presentations) and update as needed.

STATUS

NEW



TIMEFRAME



2017-2037: Step 1 will be implemented, as needed and as funding becomes available, throughout the applicable life of this plan.

2017-2022: Step 2 will be implemented over the course of the next five years.

COST

ESTIMATED COST: \$



POTENTIAL FUNDING: CBBEP Programmatic funds (EPA 320 funds, TCEQ, or Local funds); CMP; EPA; Local governments

PARTNERS

LEAD: CBBEP



POTENTIAL PARTNERS: City of Corpus Christi; Local governments; MANERR; NRA; TSSWCB

PERFORMANCE METRICS



1. Number of nonpoint source BMPs workshops that were supported by CBBEP resources.
2. Number of nonpoint source brochures and other educational materials distributed to local communities.
3. Central repository for information and resources related to BMPs.



Nonpoint-Source Management 1.2

Provide assistance to small businesses and industries in the region that are subject to the TPDES permit program or have point or nonpoint source control needs.

The state of Texas assumed the authority to administer the National Pollutant Discharge Elimination System (NPDES) program in Texas on Sept. 14, 1998. NPDES is a federal regulatory program to control discharges of pollutants to surface waters of the United States. The Texas Commission on Environmental Quality (TCEQ) Texas Pollutant Discharge Elimination System (TPDES) program now has federal regulatory authority over discharges of pollutants to Texas surface water, with the exception of discharges associated with oil, gas, and geothermal exploration and development activities, which are regulated by the Railroad Commission of Texas. Many small businesses and industries in the Coastal Bend are subject to TPDES regulation and may require assistance with compliance in order to avoid enforcement action. TCEQ administers the “TexasEnviroHelp” program which provides resources specifically tailored to help small businesses and local governments comply with environmental regulations.

STEP 1:

Support TCEQ’s efforts to assist local businesses/industries through the “TexasEnviroHelp” program.

STATUS



UNDERWAY: The CBBEP frequently provides assistance to partners, including local businesses and industries, by recommending various programs and grant opportunities that would help reduce nonpoint source pollution.

TIMEFRAME



2017-2037: Ongoing support is anticipated throughout the applicable life of this plan.

COST



ESTIMATED COST: \$

POTENTIAL FUNDING: CBBEP Programmatic funds (EPA 320 funds, TCEQ, or Local funds); Private industry

PARTNERS



LEAD: CBBEP; TCEQ

POTENTIAL PARTNERS: CBBF; Local businesses/industries

PERFORMANCE METRICS



1. Number of businesses/industries within the Coastal Bend that successfully come into compliance with the help of compliance assistance program.



Nonpoint-Source Management 1.3

Assist local governments and organizations to implement On-Site Sewage Facility (OSSF) programs and projects.

Rural and outlying urban areas rely primarily on “on-site sewage facilities” (OSSFs) for waste treatment, and septic tank systems are the most common OSSFs in the project area. Problems associated with septic tank systems include the following: soils that are unsuited for conventional septic systems; lot sizes that are too small, resulting in soil saturation; and sites that are located in floodplain areas where the water table is too shallow to allow for proper drainage. As populations increase in the Coastal Bend region, there is a greater demand for programs and projects that ensure the proper installation, maintenance, and regulation of approved septic systems. Examples of OSSF programs and projects include: (1) identify and inspect existing OSSFs; (2) promote the availability of technical and financial assistance to homeowners; (3) provide technical and financial assistance to homeowners for the repair, replacement, or removal of OSSFs; (4) educate the homeowners on proper OSSF maintenance; (5) educate inspectors, installers, and maintenance providers on proper installation, inspection, operation, and maintenance of OSSFs.

STEP 1:

Provide grant application assistance to local communities and organizations wishing to implement OSSF programs and projects.

STEP 2:

Utilize existing education and outreach resources to educate local communities and landowners about proper OSSF installation and maintenance.

STATUS



UNDERWAY: The Texas AgriLife Extension is currently working on a pilot project in the Oso Creek Watershed to provide information on leaky septic tanks, free inspections of septic systems, and free pumping of septic tanks for eligible homes. The CBBEP will work with Texas AgriLife Extension and other partners to ensure that OSSF improvement projects are implemented as needed.

TIMEFRAME



2017-2037: Steps will be implemented, as needed and as funding becomes available, throughout the applicable life of this plan.

COST



ESTIMATED COST: \$

POTENTIAL FUNDING: CBBEP Programmatic funds (EPA 320 funds, TCEQ, or Local funds); County governments; EPA; TCEQ; RESTORE Act

PARTNERS



LEAD: CBBEP; TCEQ

POTENTIAL PARTNERS: CBBEP; Coastal Bend COG; County governments; MANERR; SWCDs; TAES; TSSWCB, South Texas Colonias Initiative, Inc.

PERFORMANCE METRICS



1. Number of grant applications for OSSF projects and programs submitted with CBBEP assistance.
2. Amount of funds received for OSSF projects and programs from grant applications submitted with CBBEP assistance.
3. Number of local communities and landowners that received OSSF education and outreach materials (e.g., brochures).



Nonpoint-Source Management 1.4

Support agricultural water quality management plans, programs, and projects.

Agricultural production significantly influences the economy and environment of the project area. Rangeland, pastureland, and row crop agriculture comprise a large percent of total land area within the Coastal Bend. For many years, ranchers and farmers in the region have utilized Best Management Practices (BMPs) for erosion control and integrated crop management. These and other BMPs have helped to improve agricultural runoff water quality. While many of these practices were developed for economic reasons, they have had the effect of reducing the amount of sediment, organic material, and chemicals that are washed into the bay system. Continued support for the implementation of agricultural conservation assistance programs, projects, and plans as authorized and funded by state and federal law is needed.

STEP 1:

Identify landowners within the project area that could be potential participants in agricultural conservation programs provided by partners like TSSWCB, SWCDs, and NRCS.

STEP 2:

Assist SWCDs and other conservation partners with educational workshops on BMPs and other data pertaining to water quality management and agricultural runoff.

STEP 3:

Support efforts to seek Section 319 funds and other funds for demonstration projects, or other water quality implementation projects, on agricultural BMPs that are practicable, economically achievable, and enhance water quality.

STATUS



UNDERWAY: The CBBEP is currently collaborating with local partners to secure funding to work with private landowners to restore and/or secure conservation easements in riparian areas. In addition, the CBBEP frequently provides assistance to partners, including local landowners, by recommending various programs and grant opportunities that provide assistance to landowners interested in implementing agricultural BMPs.

TIMEFRAME



2017-2037: Steps will be implemented, as needed and as funding becomes available, throughout the applicable life of this plan.

COST



ESTIMATED COST: \$

POTENTIAL FUNDING: CBBEP Programmatic funds (EPA 320 funds, TCEQ, or Local funds); NRDA; TSSWCB

PARTNERS



LEAD: Steps 1 and 3 = CBBEP; Step 2 = TSSWCB

POTENTIAL PARTNERS: GBRA; MANERR; NRA; NRCS; SARA; SWCDs; TAES; TNC; TPWD; TAMU - Texas Water Resources Institute

PERFORMANCE METRICS



1. Number of landowners voluntarily participating in agricultural water quality management programs.
2. Number of agriculture BMP workshops hosted in project area.
3. Amount of 319 funding received for implementation of agricultural BMPs with CBBEP assistance.



Nonpoint-Source Management 1.5

Support efforts to improve the quality of urban stormwater runoff.

Urban stormwater runoff is generated from rain events that flow over land or impervious surfaces, such as paved streets, parking lots, and building rooftops. The runoff that does not soak into the ground picks up pollutants like trash, chemicals, oils, and dirt/sediment that can harm our rivers, streams, lakes, and coastal waters. As populations grow and urban areas continue to expand in the Coastal Bend, there will be an increase in the amount of pollutants in the runoff as well as the volume and rate of runoff from impervious surfaces. This can cause changes in hydrology and water quality that result in habitat modification and loss, increased flooding, decreased biological diversity, and increased sedimentation and erosion. To protect our coastal resources, communities, construction companies, industries, and others use stormwater controls known as Best Management Practices (BMPs). These BMPs are designed to filter out pollutants and/or prevent pollution by controlling it at its source. The benefits of stormwater BMPs can include: protection of wetlands and aquatic ecosystems, improved quality of receiving waterbodies, conservation of water resources, protection of public health, and flood control.

STEP 1:

Support the implementation of existing plans, programs, and projects that promote the use of urban stormwater BMPs (e.g., Low-Impact Development; City of Corpus Christi Stormwater Master Plan; Guidance for Sustainable Stormwater Drainage on the Texas Coast, Slow the Flow; TPDES Permit Program).

STEP 2:

Support the development of new plans, programs, and projects that promote the use of urban stormwater BMPs.

STEP 3:

Support studies and assessments that improve the quality of urban stormwater runoff.

STEP 4:

Develop a central repository for Coastal Bend urban stormwater information and resources (e.g., brochures, plans, and presentations).

STATUS



UNDERWAY: The CBBEP is currently working with the City of Corpus Christi on a pilot study to purchase and install catch basins to capture floating trash in stormwater. In addition, funding was recently provided to TAMUCC to quantify the amount of plastic pollution entering Corpus Christi Bay, primarily from stormwater. The results of these projects will help guide future projects related to trash in stormwater.

TIMEFRAME



2017-2037: Steps 1-3 will be implemented, as needed and as funding becomes available, throughout the applicable life of this plan.

2017-2022: Steps 4 will be implemented over the course of the next five years.

COST



ESTIMATED COST: \$ - \$\$ (varies by project type)

POTENTIAL FUNDING: CBBEP Programmatic funds (EPA 320 funds, TCEQ, or Local funds); Coastal Bend COG; EPA; Local government; NOAA; TCEQ

PARTNERS



LEAD: CBBEP

POTENTIAL PARTNERS: City of Corpus Christi; Conservation organizations (e.g., CBBF, Surfrider Foundation, Sierra Club); Local governments; EPA; MANERR; NOAA; TCEQ; TGLO; Universities (e.g., CCS, HRI, UTMSI)

PERFORMANCE METRICS



1. Number of existing urban stormwater plans, programs, and projects implemented through support from CBBEP resources.
2. Number of new urban stormwater plans, programs, and projects implemented through support from CBBEP resources.
3. Central repository for urban stormwater information and resources is developed.
4. Number of reports and publications from urban stormwater studies and assessments that were supported by CBBEP resources.