

CHAPTER

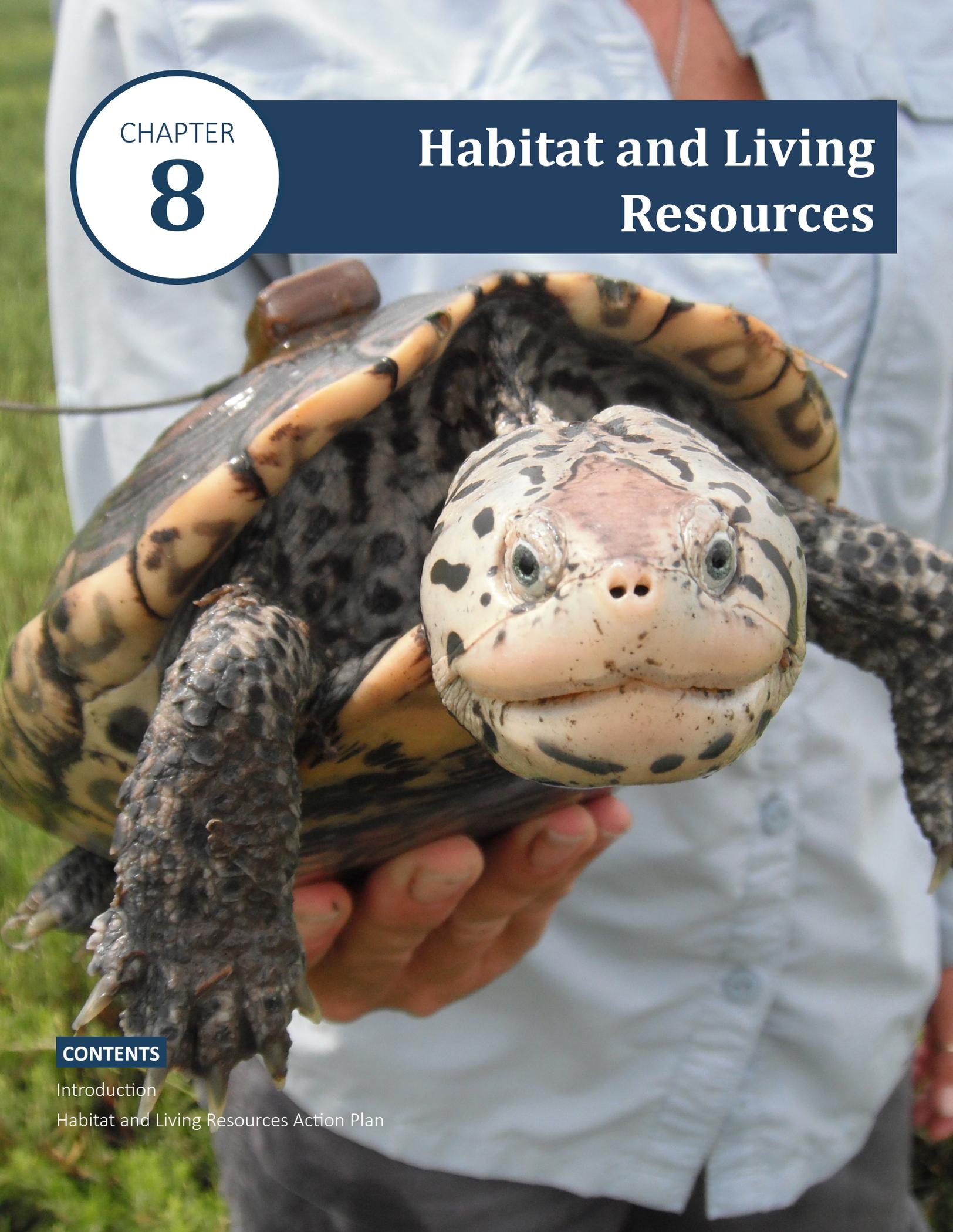
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Habitat and Living Resources

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Introduction

A diversity of tidally-influenced habitats is found within and adjacent to Coastal Bend bays and estuaries (Figure 14). These habitats and their populations of fauna and flora comprise ecosystems that are unique to South Texas. Recognizing that high quality, functional habitat is the foundation for a healthy bay system, the Bays Plan adopts an ‘ecosystems approach’ to evaluate and implement the various conservation and management measures necessary to ensure long-term productivity of these resources.

High-Quality & Functional Habitats

The Coastal Bend is comprised of eight major tidally-influenced habitat types essential to native living resources and a productive estuarine ecosystem. These habitats are: (1) coastal marshes, (2) wind tidal flats, (3) seagrass meadows, (4) open bays, (5) oyster reefs, (6) serpulid worm reefs, (7) barrier islands, and (8) freshwater marshes. The CBBEP has worked to assess the status and trends of selected habitats and living resources and to evaluate strategies to ensure continued productivity for the three estuaries.

Although losses have been incurred by every type of habitat, offsetting gains have also taken place in some cases. For example, seagrass communities appear to be increasing in the Coastal Bend. Estuarine marshes are also increasing due to relative sea-level rise, where estuarine marshes spread into areas previously occupied by tidal flats. However, Coastal Bend palustrine (freshwater) marshes are decreasing due to barrier island development, agricultural practices on barrier islands, drier conditions and the landward movement of the salt/freshwater boundary. Wind tidal flats have suffered the most significant losses due to the expansion of seagrass beds and estuarine marshes as sea level rises.

Despite relatively small changes in the total acreage of most habitats, there is some evidence that stressors could affect the quality and functionality of certain habitat types. Changes in circulation patterns from freshwater inflow alteration, dredging and filling, shoreline alteration, sea level rise, and road construction have altered the hydrology of some areas. In addition, point and nonpoint source discharges can degrade habitat, as can activities associated with industrial activities and operations. For

example, past (point source) brine discharges have degraded habitat at White’s Point in Nueces Bay, and nonpoint source pollution from some urban stormwater outfalls has altered the chemistry of bay sediments and may have affected their biological communities. The Bays Plan calls for efforts to identify habitat types that are most at risk and to work with landowners and local and state governments on ways to preserve sufficient, functional acreage of those habitats. Various tools can be employed to attain this goal, including the use of conservation easements, tax abatements, or land acquisition.

Habitat destruction, degradation, and fragmentation have been documented by various CBBEP-funded studies. Factors contributing to the loss of habitats include conversion to other land uses, dredge and fill activities, natural erosion, altered freshwater inflow, sea level rise, and degraded water quality. Declines in living resource populations relate to the loss, degradation, or fragmentation of essential habitats and, at times, over-exploitation. The development and implementation of site-specific plans for habitat enhancement, restoration, or creation will be pursued, again through cooperative efforts of landowners, local governments, and resource agencies with available technical and/or financial assistance. The following species of concern have been identified that would potentially benefit from the restoration, enhancement, creation, or better management of habitats: Whooping Cranes, neotropical migratory birds, colonial waterbirds, snowy and piping plovers, Texas diamondback terrapins, blue crabs, larval fish, and many others.

Survivability of Species

There are some cases where providing sufficient, high-quality habitat is not enough to ensure the survivability of a species. Other impacts, such as over-harvesting, invasion by non-native species, or decreased reproductive rates due to the persistence of a certain chemical in the environment, can be equally or more threatening to a given species. In such cases, a targeted species recovery or adaptive management plan is needed, and its actions put into full implementation throughout the species’ range.

The 2017 Bays Plan calls for a vigilant and continuing look at such species of concern (i.e., birds, aquatic species (including marine mammals and reptiles), and plants), and the development and implementation of adaptive management plans as necessary. Coupled with this action, stakeholders will work to improve the existing network of animal rescue and rehabilitation programs by supporting projects that maintain and improve existing programs in the Coastal Bend. Projects should focus on improving the survival of native animal species.

DIAMONDBACK TERRAPINS are a species of concern within Texas, and the CBBEP has funded several projects aimed at understanding the cause of their decline. (Photo by CBBEP)

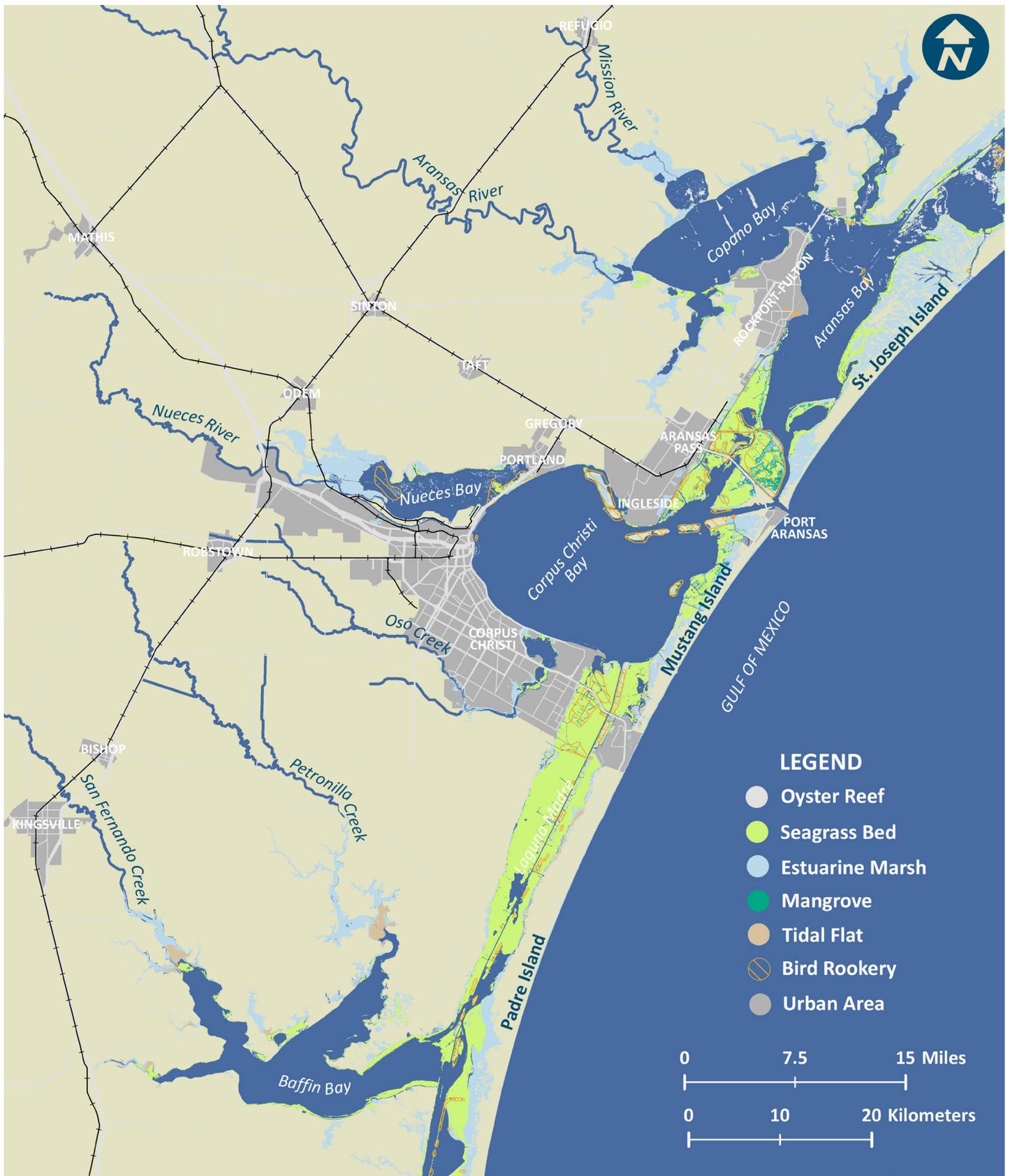


FIGURE 14. MAP OF ESTUARINE HABITATS AND BIRD ROOKERIES IN THE COASTAL BEND.

Other Management Issues & Needs

Catching and eating fish is fun and rewarding, but can also have a negative effect on fisheries resources. Fortunately, fish populations have a remarkable ability to replenish themselves, so that, within limits, they can be harvested on a continuing basis without being eliminated. However, as demands placed on our fisheries resources continue to increase, effective management strategies are needed to maintain their long-term stability and sustainability. Therefore, the 2017 Bays Plan calls for the periodic evaluation of the major fisheries management issues within the Coastal Bend and the development of effective management strategies, such as acquisition of additional scientific research and monitoring data to evaluate population trends and development of appropriate fishing regulations.

There are numerous activities and operations that take place within the Coastal Bend bays and estuaries, generating major economic impacts both locally and outside the region. However, these activities and operations have the potential to affect coastal habitats adversely and the species they support, and they deserve at least some continued assessment and possible management action. In the Coastal Bend, seismic activity associated with oil and gas exploration, brine discharges linked to desalinization, wind farms, and expansion of liquid natural gas export and transportation have all prompted concern over their potential impacts to coastal resources. The Bays Plan calls for the CBBEP and its partners to evaluate and characterize the impacts of these activities and operations and to recommend appropriate Best Management Practices (BMPs) for avoiding, minimizing, and mitigating impacts to natural resources.

Algal blooms are considered harmful if they threaten human health, cause economic loss, or result in detrimental changes to an ecosystem. Unfortunately, scientists and resource managers have not yet solved all the mysteries of harmful algal blooms (HABs). Knowing with certainty their cause and reasons for perpetuation is a prerequisite to developing effective management strategies. Therefore, the 2017 Bays Plan recognizes the need for continued experimental research to better understand the factors that trigger and sustain bloom development, and it also calls for additional research to determine the effects of toxins and secondary impacts on living coastal resources. Monitoring and public education programs also play a key role in managing public health and safety related to HABs, and Plan calls for continued efforts to monitor for the presence of HABs and to educate and inform the public.



ACCOMPLISHMENT:

Nueces Bay Marsh Restoration

The Nueces Bay Marsh was once a thriving bay ecosystem and essential habitat for juvenile fish, shrimp and crabs, as well as feeding grounds for bigger fish and birds. However, in the late 1940s, causeway construction and related dredging resulted in the loss of about 180 acres of marsh. Since then, studies show an additional 160 marsh acres have been lost due to erosion and subsidence. To restore the loss of marsh, the CBBEP began planning in 2005, and since that time, has been working to secure multiple funding partners for this major restoration effort. A project of this scale would not be possible without the support of multiple funding partners.

Constructing the marsh involved dredging bay sediment to form mounds, or terraces, at elevations suitable to grow smooth cordgrass. Smooth cordgrass marshes are typically inundated at high tide and remain partially wet at low tide.

Restoration was completed in four phases. The first phase created terraces and an outer berm. The second phase created additional marsh complex in the middle, and the third phase consisted of the outermost berm, placed with a rock revetment, to protect the project site and infrastructure. The fourth and final phase of the project involved putting the finishing touches on previous efforts, as well as building foundations in stewardship by inviting the public to get involved with volunteer plantings. An observation deck and educational signs will complete the project by providing public access and information about the marsh restoration project and restoring essential fish habitat, marsh communities, and the benefits to the surrounding infrastructure from the functions and values the marsh provides.



ACCOMPLISHMENT: Matagorda Island Restoration

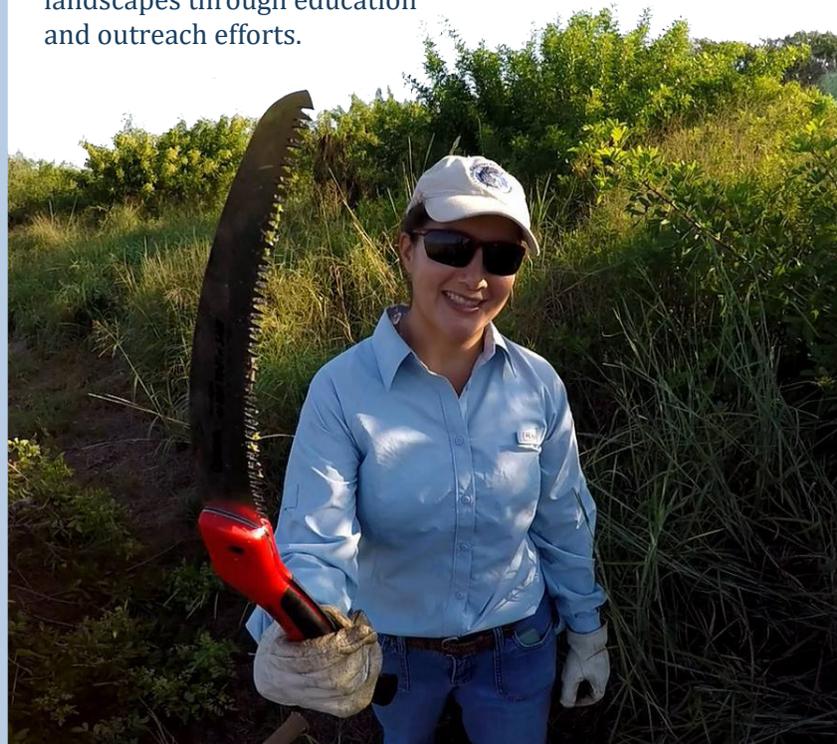
In 2016, the CBBEP completed the Matagorda Island Restoration Project. The project was funded by the U.S. Fish and Wildlife Service through a General Land Office Coastal Impact Assistance Program grant and by the Coastal Conservation Association of Texas. This five-year project involved four levee removals, two culvert repairs, and one new culvert, and was designed to restore water flow and circulation, improving water quality and increasing wildlife abundance and diversity to 2,300 acres of emergent estuarine marsh.

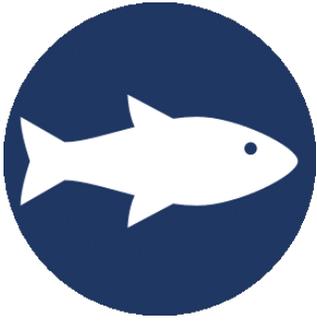
In the 1950's, thousands of acres of estuarine marsh on Matagorda Island were negatively impacted when large portions of the marsh were sectioned off with constructed levees so they could be drained for cattle production. The area remained in this condition until the late 1970's, when several dozen culverts were installed to restore the natural hydrology. Many of these culverts have collapsed or become clogged, to the point where tidal exchange in the marsh was severely restricted or eliminated, impairing water quality and negatively impacting habitats.

Removal of the levees and culvert repairs began in 2011. Restoration projects in remote reaches like this one have many challenges, but thanks to the vigilant efforts of contractors and partners, 2,300 acres of marsh are benefiting from this five-year effort. Visits to the site have shown that it is now teeming with fish and wildlife, Whooping cranes use the area to feed, and the water was flowing freely.

Finally, the invasion of non-native species into native habitats can alter both habitat structure/function and disrupt or displace native species. Species that become invasive succeed due to favorable environmental conditions and a lack of natural predators, competitors, and diseases that normally regulate their populations. Invasive species are also costly, with major economic losses from damage to crops, fisheries, forests, and other resources being common. Numerous types of terrestrial and aquatic invasive species have been documented in the Coastal Bend, and there are several programs and organizations that are dedicated to preventing, monitoring, and controlling the spread of these species. The 2017 Bays Plan calls for support of these existing programs and organizations and their efforts to document the distribution and ecological impacts of invasive species. It also recognizes the need to identify techniques and practices to control invasive species and implement demonstration projects as appropriate.

THE TEXAS GULF REGION COOPERATIVE WEED MANAGEMENT AREA was formed to address invasive Brazilian peppertree (*Schinus terebinthifolius*) from Port O'Connor to Packery Channel on the Texas Gulf Coast. The CBBEP has joined local, state, and federal partners in their efforts to prevent the spread and movement of the species by advocating for cooperative control amongst willing landowners and managers. Beyond removal efforts, the group is focused on establishing baseline distribution data, and raising awareness of Brazilian peppertree impacts to our landscapes through education and outreach efforts.





HABITAT AND LIVING RESOURCES

Action Plan

GOAL

Increase and preserve the quantity, quality, and diversity of habitats and living resources.

OBJECTIVES

HLR 1: Preserve, restore, enhance, and create coastal habitats.

HLR 2: Ensure long-term sustainability of native living resources.

ACTIONS

HLR 1.1: Preserve functional, natural habitats of all major types.

HLR 1.2: Restore and enhance degraded habitats and create new habitats where feasible.

HLR 1.3: Support efforts to identify and minimize adverse impacts of activities and operations on coastal habitats.

HLR 2.1: Develop and implement adaptive management plans to ensure sustainability for species of concern.

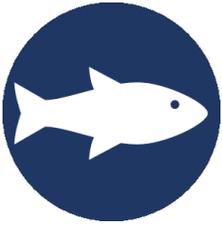
HLR 2.2: Support rescue and rehabilitation programs of native animal species.

HLR 2.3: Support effective commercial and recreational fisheries management.

HLR 2.4: Support efforts to identify and minimize adverse impacts of activities and operations on coastal living resources.

HLR 2.5: Improve understanding of harmful algal blooms and their impact on living resources.

HLR 2.6: Develop and support adaptive management plans to minimize introductions and impacts from invasive species.



Habitat and Living Resources 1.1

Preserve functional, natural habitats of all major types.

The Coastal Bend is comprised of eight major tidally-influenced habitat types essential to native living resources and a productive estuarine ecosystem. These habitats are coastal marshes, wind tidal flats, seagrass meadows, open bays, oyster reefs, serpulid worm reefs, barrier islands, and freshwater marshes. Estuaries and their associated habitats offer numerous and diverse benefits to society and natural systems. Some of these benefits include: storm buffers to protect from hurricanes and storms; nurseries and habitat for commercially important marine species; and stopover or wintering habitats for migratory species such as the endangered Whooping Crane. However, human growth and development has significantly eliminated or degraded the habitats that provide these important values. The continued preservation of these habitats is fundamental to the health and productivity of the native flora and fauna. CBBEP and its partners will work to identify habitat types and areas that are most at risk and work with landowners and local and state governments on ways to preserve sufficient, functional acreage of those habitats. Various tools can be employed to attain this goal, including the use of conservation easements, tax abatements, or land acquisition.

STEP 1:

Use publicly available mapping platforms to identify and inventory the current location and protection status of all natural habitat types within the project area.

STEP 2:

Prioritize habitat types and geographic areas based on needs, stressors, and threats, taking into account current and future impacts such as climate change and coastal development.

STEP 3:

Support efforts and activities to preserve priority habitats and areas through conservation easements, acquisition, or other preservation techniques.

STEP 4:

Conduct annual update of progress made towards preserving natural habitat and review prioritization based on current conditions.

STATUS



UNDERWAY: Land acquisition for protection is one of the most economical methods of conservation. Currently, the CBBEP owns approximately 13,000 acres (in fee title ownership and conservation easements) of freshwater marsh, forested wetlands, mudflats, riparian corridors, and native upland habitat for conservation management in the Coastal Bend.

TIMEFRAME



2017-2037: Steps are considered on-going and will be implemented on a regular basis throughout the applicable life of this plan.

COST



ESTIMATED COST: \$

POTENTIAL FUNDING: CBBEP Programmatic Funds (EPA 320 funds, TCEQ, Local funds); RESTORE Act; TGLO; TSSWCB; USFWS

PARTNERS



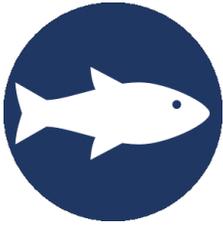
LEAD: CBBEP

POTENTIAL PARTNERS: Audubon Texas; CBBF; DU; Landowners; Land trusts (e.g., CBLT, GBRT); Local governments; MANERR; NRCS; PCCA; SABP; SWCDs; TGLO; TNC; TPWD; TSSWCB; Universities (e.g., CCS, HRI, UTMSI); USGS; USFWS

PERFORMANCE METRICS



1. Percentage of total acres protected by habitat in project area.



Habitat and Living Resources 1.2

Restore and enhance degraded habitats and create new habitats where feasible.

Estuarine habitat destruction, degradation, and fragmentation have been documented within the Coastal Bend. This habitat loss has resulted in the decline of several living resources. Factors contributing to the loss of habitats include conversion to other land uses, dredge and fill activities, natural erosion, altered freshwater inflow, degraded water quality, and sea level rise. Species of concern that would potentially benefit from the restoration, enhancement, creation, or better management of estuarine habitats include: Whooping Cranes, neotropical migratory birds, colonial waterbirds, shrimp, blue crabs, larval fish, and many others. By working cooperatively with landowners, local governments, and resource agencies, CBBEP and its partners can identify and pursue opportunities that will create additional habitat for these species of concern.

STEP 1:

Identify habitat types and geographic areas for potential restoration, enhancement, and creation projects.

STEP 2:

Prioritize habitat types and geographic areas based on needs, stressors, and threats, taking into account current and future impacts such as climate change and coastal development.

STEP 3:

Support efforts and activities to implement site-specific plans for restoration and enhancement of degraded habitats and/or creation of new habitats.

STEP 4:

Conduct annual update of progress made towards restoring, enhancing, and creating habitat and review prioritization based on current conditions.

STATUS



UNDERWAY: The CBBEP has recently acquired an individual USACE permit to provide shoreline protection and preserve coastal habitat along the western shoreline of Nueces Bay. The CBBEP is also working on protecting Causeway Island, an important rookery island in Nueces Bay. The final design will protect the island from wind and wave erosion. The CBBEP continues to restore and enhance habitat where feasible.

TIMEFRAME



2017-2037: Steps are considered on-going and will be implemented on a regular basis throughout the applicable life of this plan.

COST



ESTIMATED COST: \$

POTENTIAL FUNDING: CBBEP Programmatic Funds (EPA 320 funds, TCEQ, Local funds); RESTORE Act; TGLO; USFWS

PARTNERS



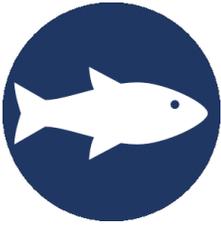
LEAD: CBBEP

POTENTIAL PARTNERS: Audubon Texas; CBBF; CCA; DU; Landowners; Land trusts (e.g., CBLT, GBRT); Local governments; MANERR; NRCS; PCCA; SABP; SWCDs; TGLO; TNC; TPWD; TSSWCB; Universities (e.g., CCS, HRI, UTMSI); USGS; USFWS

PERFORMANCE METRICS



1. Percentage of total acres restored, enhanced, and created by habitat in project area.



Habitat and Living Resources 1.3

Support efforts to identify and minimize adverse impacts of activities and operations on coastal habitats.

Coastal Bend bays and estuaries directly support numerous activities and operations that generate economic impacts, including navigation, transportation, extraction, and recreation. These activities and operations have a major impact on the local economy as well as economic impacts outside the region. However, these activities and operations also have the potential to adversely affect coastal habitats and the species they support. In the Coastal Bend, seismic activity associated with oil and gas exploration, brine discharges linked to desalinization, wind farms, and expansion of liquid natural gas export and transportation have all prompted concern over potential impacts to coastal resources. To avoid, minimize, and mitigate impacts to natural resources from these and other activities/operations, resource agencies must be able to effectively evaluate/characterize impacts and recommend appropriate Best Management Practices (BMPs).

STEP 1:

Develop a working group to identify and prioritize adverse impacts on coastal habitats from proposed and existing activities and operations.

STEP 2:

Establish a baseline for determining habitat impacts from activities/operations by quantifying and characterizing the key components of coastal habitats.

STEP 3:

Identify stakeholders impacted by loss and/or degradation of habitat.

STEP 4:

Examine alternative strategies and mitigation options to reduce adverse impacts.

STEP 5:

Develop BMPs that can provide guidance for minimizing habitat impacts from activities and operations.

STEP 6:

Conduct outreach and education to stakeholders on BMPs, targeting groups that are potentially involved in impacts.

STATUS



NEW: Implementation of new actions will take place following the adoption of the revised plan during the time period identified.

TIMEFRAME



2017-2037

COST



ESTIMATED COST: \$

POTENTIAL FUNDING: CMP; NRDA; RESTORE Act; USFWS

PARTNERS



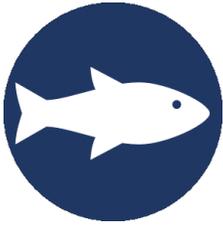
LEAD: Steps 1-3 = CBBEP; Steps 4-5 = TGLO; TPWD

POTENTIAL PARTNERS: Audubon Texas; CCS; EPA; HRI; MANERR; NMFS; PCCA; PICC; TCEQ; TNC; USACE; USFWS; USGS; UTMSI

PERFORMANCE METRICS



1. Number of adverse actions and operations permitted.
2. Permit modifications to minimize negative impacts to coastal habitats.



Habitat and Living Resources 2.1

Develop and implement adaptive management plans to ensure sustainability for species of concern.

A number of species within the Coastal Bend exhibit declining population trends. The cause for these declines varies by species, but may be due to such factors as habitat loss, human disturbance, predation, and over-harvesting. In such cases, a targeted recovery or management plan for each species of concern is needed, and whenever possible, its actions should be put into full implementation throughout the species' range.

STEP 1:

Establish working group to develop criteria for defining "species of concern."

STEP 2:

Develop management plans for species of concerns.

STEP 3:

Determine methods to support implementation of management plans developed for species of concern.

STATUS



UNDERWAY: The CBBEP seeks to maintain viable populations of native species. Effective species management is largely sustained through preserving and restoring habitat, protecting water quality, along with other actions. Yet, special attention should be given to declining species of concern. The CBBEP has recently funded studies to identify Texas diamondback terrapin (*Malaclemys terrapin littoralis*) nesting sites in the Nueces and Mission-Aransas estuaries. The Texas diamondback terrapin is listed as a Species of Greatest Conservation Need by TPWD. The results of these studies will be incorporated into a comprehensive management plan for the species in Texas. The CBBEP is also working with the American Bird Conservancy to determine breeding and nesting patterns for Wilson's and Snowy Plovers on Mustang Island, both species of concern. The CBBEP has also partnered with USFWS's Monarch Conservation Strategy to restore and enhance habitat in the eastern population's central flyway.

TIMEFRAME



2017-2037: Step 1 will be completed in 2017-2022 and will be re-implemented every five years. Steps 2 and 3 will be implemented following the completion of Step 1 and will continue to be implemented annually throughout the applicable life of this plan.

COST



ESTIMATED COST: Step 1 = \$; Step 2 = \$ - \$\$ (varies by project type); Step 3 = \$\$ - \$\$\$ (varies by project type)

POTENTIAL FUNDING: American Bird Conservancy; CBBEP Programmatic funds (EPA 320 funds, TCEQ, Local funds); Private industry; State and federal grants; Private industry

PARTNERS



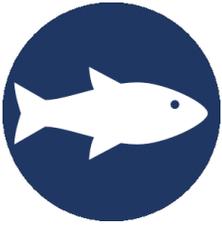
LEAD: Step 1 = CBBEP, TPWD, USFWS; Step 2 = CBBEP, Universities (e.g., CCS, HRI, UTMSI); Step 3 = CBBEP

POTENTIAL PARTNERS: Conservation organizations (e.g., Audubon Texas, CCA, DU, ICF); MANERR; NMFS; NPS; TGLO; TNC

PERFORMANCE METRICS



1. Number of species management plans developed.
2. Number of management actions implemented from species management plans.
3. TBD based on recommendations made in species management plans.



Habitat and Living Resources 2.2

Support rescue and rehabilitation programs of native animal species.

Animal rescue and rehabilitation programs decrease animal mortality, provide important information on species of concern, and increase public awareness about the estuarine and marine environment. However, these programs are often poorly funded and must rely on the use of volunteers and borrowed facilities. As a result, continued support for these programs and their facilities is needed.

STEP 1:

Support the implementation of projects that maintain and improve existing animal rescue and rehabilitation programs in the Coastal Bend. Projects should focus on improving the survival of native animal species.

STATUS



UNDERWAY: The CBBEP is currently working with the MANERR to create public access and educational trails and signage for portions of the Animal Rehabilitation Keep (ARK) located on the campus of the University of Texas Marine Science Institute in Port Aransas, Texas. The CBBEP will continue to support rehabilitation efforts.

TIMEFRAME



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

COST



ESTIMATED COST: TBD

POTENTIAL FUNDING: CBBEP Programmatic funds (EPA 320 funds, TCEQ, Local funds); NRDA; Private industry; RESTORE Act; State and federal grants

PARTNERS



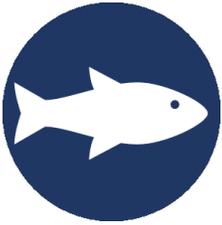
LEAD: CBBEP

POTENTIAL PARTNERS: ARK; Conservation groups; MANERR; NMFS; NPS; PINS; STSSN; TMMSN; TPWD; TSA; USFWS; UTMSI

PERFORMANCE METRICS



1. Number of CBBEP-supported projects at animal rescue and rehabilitation programs.
2. Mortality rate for species of concern.



Habitat and Living Resources 2.3

Support effective commercial and recreational fisheries management.

Many people once believed that fisheries resources were unlimited and could not be impacted by commercial or recreational harvest. As recreational fishing pressure and demands for commercial fisheries resources increased, it became increasingly clear that these resources could be affected. As demands placed on our fisheries resources continue to increase, effective management strategies are needed to maintain the long-term stability and sustainability of our fisheries. Coastal fisheries management strategies should strive (1) to maintain fisheries harvest at levels that are necessary to ensure replenishable stocks of commercially and recreationally important species and (2) to provide for balanced food webs within ecosystems. Management strategies should not remain static and must evolve as social and ecological conditions change. Development of effective management strategies requires scientific research and monitoring data to evaluate population trends and develop appropriate fishing regulations.

STEP 1:

Form a working group to periodically identify the major fisheries management issues in coastal bays (e.g., bycatch, overfishing, and habitat degradation).

STEP 2:

Examine TPWD fisheries monitoring data to better understand major management issues identified in previous step.

STEP 3:

Examine current TPWD and NMFS regulations to determine if there is a need to change regulations or gather additional data.

STEP 4:

Determine if additional research, outreach, strategic plan, or regulation changes are needed based on the management issue.

STATUS



NEW: Implementation of new actions will take place following the adoption of the revised plan during the time period identified.

TIMEFRAME



2017-2037: Step 1 will be completed every two years. Steps 2-4 will be implemented sequentially following the completion of Step 1.

COST



ESTIMATED COST: TBD

POTENTIAL FUNDING: CBBEP Programmatic funds (EPA 320 funds, TCEQ, Local funds); CCA; CMP; NMFS; TPWD; Texas Sea Grant; SEA

PARTNERS



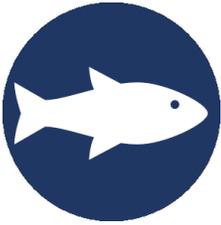
LEAD: Steps 1 and 4 = CBBEP; Steps 2 and 3 = TPWD

POTENTIAL PARTNERS: CCA; Commercial fishing industry (e.g., blue crab, oysters, black drum); NMFS; Recreational fishing guides; SEA; Texas Sea Grant; Universities (e.g., CCS, HRI, TAMUCC, UTMSI)

PERFORMANCE METRICS



1. Number of fisheries management issues in Coastal Bend are reduced over time.
2. TBD based on fisheries management issues identified.



Habitat and Living Resources 2.4

Support efforts to identify and minimize adverse impacts of activities and operations on coastal living resources.

Coastal Bend bays and estuaries directly support numerous activities and operations that generate economic impacts, including navigation, transportation, extraction, and recreation. These activities and operations have a major impact on the local economy as well as economic impacts outside the region. However, these activities and operations also have the potential to adversely affect coastal species. In the Coastal Bend, seismic activity associated with oil and gas exploration, brine discharges linked to desalinization, wind farms, expansion of liquid natural gas export and transportation, and impingement/entrainment of organisms by cooling water intakes have all prompted concern over their potential impacts to coastal resources. To avoid, minimize, and mitigate impacts to natural resources from these and other activities and operations, resource agencies must be able to effectively evaluate and characterize impacts and recommend appropriate Best Management Practices (BMPs).

<p>STEP 1:</p> <p>Develop a working group to identify and prioritize adverse impacts on coastal living resources from proposed and existing activities and operations.</p>	<p>STEP 2:</p> <p>Establish a baseline for determining impacts by quantifying species abundance.</p>	<p>STEP 3:</p> <p>Identify stakeholders impacted by loss and/or degradation of species.</p>
<p>STEP 4:</p> <p>Examine alternative strategies and mitigation options to reduce adverse impacts.</p>	<p>STEP 5:</p> <p>Develop BMPs that can provide guidance for minimizing species impacts from activities and operations.</p>	<p>STEP 6:</p> <p>Conduct outreach and education to stakeholders on BMPs, targeting groups that are potentially involved in impacts.</p>

STATUS



NEW: Implementation of new actions will take place following the adoption of the revised plan during the time period identified.

TIMEFRAME



2017-2037

COST



ESTIMATED COST: \$
POTENTIAL FUNDING: CMP; NRDA; RESTORE Act; USFWS

PARTNERS

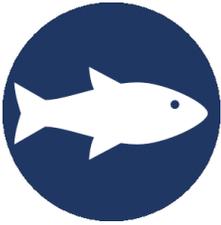


LEAD: Steps 1-3 = CBBEP; Steps 4-5 = TGLO, TPWD
POTENTIAL PARTNERS: Audubon Texas; CCA; CCS; HRI; EPA; MANERR; NMFS; PCCA; PICC; TCEQ; TNC; SEA; USACE; USFWS; USGS; UTMSI

PERFORMANCE METRICS



1. Number of adverse actions and operations permitted.
2. Permit modifications to minimize negative impacts to coastal species.



Habitat and Living Resources 2.5

Improve understanding of harmful algal blooms and their impact on living resources.

Harmful Algal Bloom (HAB) is a term that refers to the bloom phenomenon of a few microscopic algae that often produce potent toxins which can threaten human health, cause economic loss, and result in detrimental changes in an ecosystem. Although much scientific attention has been given to HABs, effective management measures are as yet unknown. Additional research is needed to develop a better understanding of the population dynamics and trophic impacts of harmful algal species, which can then be used as a basis for management strategies that help to minimize adverse effects on the economy, public health, and estuarine/marine ecosystems. Monitoring programs also play a key role in managing public health and safety related to HABs. These programs provide the information resource managers need to issue timely health advisories to the public and require continued support.

STEP 1:

Support the HAB Working Group's efforts to notify the public about the occurrence of HABs in a timely manner in order to minimize human health risks.

STEP 2:

Support efforts to monitor coastal waters to assess critical concentrations of HAB bloom activity.

STEP 3:

Conduct experimental research to better understand the factors that trigger and sustain HAB bloom development. In addition, determine the effects of toxins and secondary impacts on living coastal resources.

STEP 4:

Support efforts to inform and educate the public on HAB ecology and impacts to the coastal ecosystem/human health.

STATUS



UNDERWAY: The CBBEP participates with the HAB Working Group and receives information regarding current Harmful Algal Blooms from the TPWD Kills and Spills Team. CBBEP staff provides information to the public 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: Steps 1, 2, and 4 = \$; Step 3 = \$\$ - \$\$\$ (varies by project)

POTENTIAL FUNDING: CBBEP Programmatic funds (EPA 320 funds, TCEQ, Local funds); CCA; CMP; NMFS; TPWD; Texas Sea Grant; SEA

PARTNERS



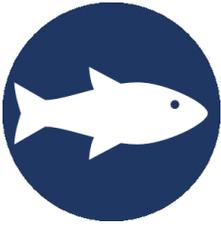
LEAD: Step 1 = TPWD; Step 2 = TAMU, UTMSI; Step 3 = Universities; Step 4 = MANERR, TPWD

POTENTIAL PARTNERS: CBBEP Programmatic funds (EPA 320 funds, TCEQ, Local funds); CMP; EPA Gulf of Mexico Program; NOAA; NSF; TCEQ; TPWD

PERFORMANCE METRICS



1. Number of studies focused on HAB dynamics, long-term associations with regional climate, and human health risks.
2. Implementation of measures to reduce anthropogenic factors that contribute to blooms.
3. Number of brochures and presentations created that include information about HABs.



Habitat and Living Resources 2.6

Develop and support adaptive management plans to minimize introductions and impacts from invasive species.

An invasive species grows, reproduces, and spreads rapidly; establishes itself over large areas; and persists for long periods of time. Species that become invasive succeed due to favorable environmental conditions and a lack of natural predators, competitors, and diseases that normally regulate their populations. This includes a wide variety of plants, insects, and animals from exotic places. Invasion of non-native species can alter both habitat structure and function, resulting in the displacement of native flora and fauna. In addition to negatively impacting ecosystems, invasive species are also costly. It is very expensive to prevent, monitor, and control the spread of invasive species, and economic losses from damage to crops, fisheries, forests, and other resources are common. Invasive species are present in many of the terrestrial and aquatic habitats of the Texas Coastal Bend. Efforts by CBBEP and its partners to treat and control the spread of these invasive species are underway and continued support is needed.

STEP 1:

Identify the distribution and ecological impacts associated with existing invasive and nuisance species.

STEP 2:

Identify techniques for the treatment and control of current and potential invasive/nuisance species, and conduct demonstration projects to determine the effectiveness of these techniques.

STEP 3:

Implement treatment and control methods (including public education) through existing programs and organizations.

STATUS



UNDERWAY: The CBBEP and its partners seek to maintain viable populations of native species and to manage invasive species effectively. The CBBEP is an active member of the Texas Gulf Region Cooperative Weed Management Area and works with the CWMA stakeholders to prevent the spread and movement of Brazilian Peppertree by advocating for cooperative control amongst willing landowners and managers. The CBBEP Coastal Bird Program staff also manage invasive species on rookery islands in the bays and waterways along the Texas coast. Many of the colonial waterbird species in Texas have seen dramatic declines, partly because of the loss and degradation of vital nesting habitat.

TIMEFRAME



2017-2037: Steps 1 and 2 will be implemented sequentially once funding is available. Step 3 is considered on-going and will be implemented throughout the life of this plan.

COST



ESTIMATED COST: Steps 1 and 2 = \$\$; Step 3 = \$\$ - \$\$\$ (varies by project type)

POTENTIAL FUNDING: CBBEP Programmatic funds (EPA 320 funds, TCEQ, Local funds); CMP; Local governments; NFWF; RESTORE Act; TFS; TPWD; USFWS

PARTNERS



LEAD: Step 1 = Lady Bird Johnson Wildflower Center; Step 2 = Land owners, Universities; Step 3 = Land owners, Local governments

POTENTIAL PARTNERS: CBBEP; CCS; Conservation groups; MANERR; NMFS; TAES; TAMUCC; TFS; TGLO; TGR-CWMA; TPWD; USFWS; UTMSI

**PERFORMANCE
METRICS**



1. Species list and distribution maps of invasive species in the program area.
2. Report containing impacts and treatment and control options for each species identified.
3. Number of acres treated.
4. Number of people involved in education and outreach activities.
5. Number and distribution of invasive and nuisance species reduced over time.