

**Restoring Colonial Waterbird Populations on the Texas Coast
GLO Contract No. 21-155-004-C876**

**Final Report
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Project Background:

Texas colonial waterbirds typically nest in spring/summer months in dense groups on small islands in the bays. Today, threats such as development, habitat loss, and human disturbance are taking their toll. Long-term data shows that the majority of colonial waterbirds in Texas are declining, some by as much as 60-70%. The 2023 Texas Coastal Resiliency Master Plan (TCRMP) identifies “Rookery Island Protection, Restoration, and Creation” as a priority issue in every region of the Texas Coast.

The Coastal Bend Bays & Estuaries Program (CBBEP) utilized Coastal Management Program Cycle 26 Gulf of Mexico Energy Security Act (GOMESA) funds to work on three components related to rookery island enhancement: (1) management, (2) monitoring, and (3) restoration. CBBEP directed their management actions toward optimizing available nesting habitat and reducing factors associated with nest failure or abandonment. CBBEP monitored islands during nesting season to ensure nesting activities are proceeding as expected and to assess and resolve problems that may be impeding nesting. To prepare rookery islands for restoration, CBBEP conducted an alternatives analysis, preliminary engineering, 70% construction design, and permitting in three bay systems.

Task 1 Summary: Rookery Island Management

The vast majority of colonial waterbirds breeding along the Texas coast utilize spoil islands for nesting activities. Most of these islands were created decades ago from dredging activities to create or expand channels for boat passage, so the spoil material was placed into piles along the edges of these channels. Many of these islands eventually go through vegetational succession with grasses and forbs first covering bare areas before woody trees, shrubs, and cactus eventually begin to grow in and create more diverse nesting opportunities for colonial waterbirds. CBBEP’s efforts on both spoil-based and natural rookery islands focuses on creating healthy and diverse nesting habitats through a variety of habitat management actions including removing invasive grasses that inhibit native brush growth; planting new cactus, tree, and brush species that larger wading birds may eventually use as nesting structure; installing nest platforms where there is little to no vegetative nesting structure; installing informational signs targeting boaters at all active rookeries; and monitoring/removing invasive fire ants or other predators of waterbird eggs and chicks.

By performing habitat management activities in the fall and winter and then observing how birds respond with their nesting habits in the spring and summer, CBBEP is able to continually evolve and form dynamic strategies to improve nesting habitat. In situations where vegetation appears to be crowding out bare ground nesters like Black Skimmers and other terns, CBBEP has removed invasive grasses and other herbaceous vegetation to increase available nesting habitat. When herons have been observed nesting on or near the ground it is logical that the birds recognize the safety of the island from predators but lack available nesting structure to construct nests in raised areas that are safe from tropical weather, so CBBEP has focused on either increasing nesting structure in these areas or building artificial nest platforms to temporarily help get waterbirds off the ground. While CBBEP performs some sort of management action on every rookery in our range, we aim to recognize and utilize the importance and potential of the best rookery islands in every bay system by focusing on these priority islands for our management activities.

In addition to considering management actions, CBBEP also closely monitors rookery island erosion due to seasonal tides, tropical weather systems, and wave action from boat traffic. Spoil islands in particular are more susceptible to erosion due to their poor soil structure and quality, lack of deep vegetative root support, and location in the middle of open tidal waters. The back-to-back tropical weather systems in the summer of 2024 (Tropical Storm Alberto and Hurricane Beryl) provided an opportunity for CBBEP and collaborators to closely inspect damage to vegetation structure, loss of active waterbirds nests, and island acreage loss through erosion of these systems. These data and inferences were compiled in a report titled “A rapid assessment of the effects of Tropical Storm Alberto and Hurricane Beryl on colonial waterbirds nesting on the Texas coast” (www.birdislands.org/news-and-updates). Loss of nesting habitat through spoil island erosion is clearly one of the most serious threats consistently facing colonial waterbirds in Texas. Securing and improving quality waterbird nesting habitat on priority islands is crucially important to help offset the loss of islands through erosion.

Significant progress has been made to improve nesting habitat for colonial waterbirds through management activities over the last four years since the inception of this agreement across rookeries throughout the mid and lower Texas coast. Number of waterbird nesting islands managed by CBBEP during the period of this project within each bay system (from north to south) includes:

- San Antonio Bay – 6 islands
- Aransas Bay – 10 islands
- Copano Bay – 8 islands
- Redfish Bay – 20 islands
- Corpus Christi Bay – 8 islands
- Nueces Bay – 11 islands
- Upper Laguna Madre – 62 islands
- Lower Laguna Madre – 68 islands

Priority rookery islands with notable improvements through habitat management activities include the Little Bay North in Little Bay; West Nueces Bay and Causeway islands in Nueces Bay; Tern, Zigzag, Pita, and Triangle Tree in the Upper Laguna Madre; and Green Hill Spoils/Benny Shack, Arroyo Y, Laguna Vista spoil, and Bahia Grande islands in the Lower Laguna Madre. Some notable statistics from management on rookery islands over the last four management seasons include:

- Performed at least basic management such as debris removal, fire ant control, or informational sign monitoring on a minimum of 130 distinct active waterbird colonies
- A total of 3767 native seedlings have been grown at CBBEP's plant nursery and planted on at least 18 different priority colonial waterbird nesting islands
- Treated and removed more than 1500 red imported fire ant colonies
- Installed 15 informational signs and performed regular repairs or removed hundreds more
- Installed 8 nest platforms and performed regular repairs or remove to dozens more
- Cleared, treated, and in some cases eliminated acres of invasive guinea grass and buffelgrass patches spread across dozens of rookery islands using controlled fires, weed trimmers and mowers, and at least 360 gallons of herbicide
- Hosted an annual cleanup every year in October, the Laguna Madre Rookery Island Cleanup, with dozens of volunteers from the public to remove fishing line, trash, and other debris from colonial waterbird nesting islands and adjacent foraging areas while also serving as a source of outreach to the public and providing a way for them to connect to this important habitat and its conservation
- Engaged the public in numerous volunteer workdays and other opportunities for outreach totaling more than 1600 volunteer hours from at least 323 unique members of the public including students, professionals, members from organizations like Texas Master Naturalists and Audubon, and many more (includes volunteers utilized during rookery island monitoring)

A selection of photographs of various rookery islands, management actions, and volunteer events can be found in the appendix at the end of this report.

Task 2 Summary: Rookery Island Monitoring

CBBEP staff performed regular visits to colonial waterbird rookeries throughout our focal region during the nesting season to monitor the nesting success or lack thereof for each colony. In doing so, we are able to develop effective strategies for improving nesting success in future years. Typically this is best done through habitat management actions but our field observations can also be utilized for island restoration or protection projects, consultation with local agencies and law enforcement officials, and to perform targeted outreach with members of the public.

Waterbird monitoring typically involves utilizing a boat to access remote areas of bay systems where birds are nesting on islands, however in some instances a land-based approach is preferred. CBBEP has observed 22 different species of waterbirds utilizing rookery islands during the four years of this project period (Table 1). Nearly all of these species may be found nesting on the same rookery island, however they may utilize very different micro-habitats depending on their nesting preferences and adaptations. For instance, Black Skimmers, terns, and gulls prefer to nest on bare ground and very

short herbaceous vegetation that is typically found on the lowest elevation of an island. This means these species are the most at risk of being washed over by tidal surges or from heavy rain events. Most small and medium-size waterbirds like Snowy Egret and Roseate Spoonbill prefer to nest within moderately dense woody brush and will regularly utilize the mid-canopy within patches of taller trees on islands. Reddish Egrets, one of our least numerous waterbirds, also prefers nesting within short dense brush, however they frequently will utilize thick patches of prickly pear more often than other waterbirds. Great Blue Herons and Great Egrets, some of our largest waterbirds in Texas, typically prefer to be at or near the top of the canopy on any island they utilize, though the former is somewhat adaptable and have been regularly found nesting in prickly pear as well as directly on short grass when suitable nesting structure is not available.

In addition to regular monitoring of all waterbird rookery islands within our region, CBBEP has taken a large role in surveying the majority of rookeries along the mid and lower Texas coast for the annual Texas Colonial Waterbird Survey (TCWS) organized by the Texas Waterbird Society. These surveys have been conducted during the peak of the breeding season each year since 1973 and serve as a vital long-term dataset on waterbird population fluctuations throughout the state. In each of the last three breeding seasons that this agreement has covered, CBBEP has surveyed at least 120 waterbird colonies for the TCWS and performed regular monitoring of more than 230 islands outside of the TCWS window.

A selection of photographs of various colonial waterbird rookeries can be found in the appendix at the end of this report.

Task 3 Summary: Contractual Agreement with Engineering Firm

The CBBEP developed a Request for Proposals for a contractual agreement with an engineering firm to develop protection and restoration options for rookery islands in three bay systems: (1) Long Reef/Deadman Island in Aransas Bay, (2) Benny Shack Island in the Lower Laguna Madre, and (3) TBD in the Upper Laguna Madre.

The CBBEP invited 3 engineering firms to develop protection and restoration options for rookery islands in three bay systems. Ultimately, HDR was the selected engineering firm. A work order was executed on September 10, 2021. The work order included the tasks of Desktop Data Collection, Kickoff Meeting, PAC meeting, and Preliminary Reconnaissance Assessment, the Upper Laguna Madre Assessment, and HDR Project Management.

An additional work order between HDR and CBBEP was executed on January 19, 2022, which included tasks for Field Data Collection, Conceptual Design, Permitting Support, and 70% Design for the rookery islands. HDR indicated that the alternative analysis reports were taking longer to complete than expected. A work order with HDR was executed on March 2, 2023, granting HDR an additional year on completion of the tasks. A work order between HDR and CBBEP was executed on March 28, 2024, which included tasks for additional permitting and a revision to the 70% Design task. A final work order amendment was executed on November 8, 2024, allowing for additional time for the 70% Design task.

Task 4 Summary: Develop Design and Engineering Specifications

Site visits to the rookery islands took place on October 6, 2021, to Benny Shack Island in the Lower Laguna Madre, on October 8, 2021, to Long Reef/Deadman Islands in Aransas Bay, and on October 13, 2021, to Rabbit Island, Pita Chain, and Zig Zag in the Upper Laguna Madre. A meeting also took place on December 20, 2021, to discuss the draft reconnaissance reports and the scope of work. The final reconnaissance reports were submitted to the CBBEP in March 2022.

Field data collection and surveys took place on Benny Shack Island in the Lower Laguna Madre, Deadman/Long Reef in Aransas Bay, and Pita Chain in the Upper Laguna Madre. Data collection included topographic surveys, bathymetric surveys, seagrass surveys, and oyster surveys (Aransas Bay). A contract was executed with TAMUCC and CBBEP to perform an oyster survey in Aransas Bay. The contract was executed on February 15, 2022. TAMUCC performed the oyster survey for Deadman/Long Reef Island area during March 2022. The final report was completed in April 2022.

HDR and CBBEP conducted a meeting on May 3, 2022, at the CBBEP office to discuss the results of the data collection and alternatives to be considered in the analysis. The alternatives were then discussed at the first Project Advisory Committee which took place on June 9, 2022.

HDR continued to work on the design concepts for each island. HDR completed and submitted the draft Alternative Analysis Report for Benny Shack Islands (submitted to the GLO on Dec 29, 2022), Long Reef/Deadman (submitted to the GLO on January 27, 2023) and Pita Chain (submitted to the GLO on March 8, 2023). Communication with HDR continued on the alternatives for each island. A 2nd PAC meeting took place on March 29, 2023. Representatives from CBBEP, TPWD, USFWS, MANERR, and HDR attended the meeting.

HDR finalized the Alternative Analysis Reports for Benny Shack Islands and Long Reef/Deadman (submitted to the GLO on May 30, 2023). HDR completed the Alternative Analysis Report for Pita Chain (submitted to the GLO on August 1, 2023). Upon the CBBEP's request, HDR submitted a memo documenting the next steps for the three Islands on August 18, 2023. The memo stated that Benny Shack and Deadman Island would move forward while Pita Chain would not. During the PAC meetings and other coordination, it was determined that USACE and NMFS were unlikely to authorize a permit without compensatory mitigation for seagrass. It was also noted that permitting would be difficult due to seagrass and other jurisdictional wetlands. For these reasons, the project team decided to place this rookery island on hold until a more effective avenue is determined for permitting the project.

HDR began working on the 70% design work for Benny Shack and Deadman Island. The draft 70% design Plans and Specifications and Opinion of Probable Costs were completed in December 2024. The final versions were received in February 2025.

Task 5 Summary: Submit Application for US Army Corps of Engineering Permits

Both Benny Shack and Deadman Island were pursued as NWP 27s (Aquatic Habitat Restoration, Enhancement, and Establishment Activities) with Pre-Construction Notifications. The Deadman Island Nationwide 27 Permit Application was submitted to the USACE on September 13, 2023 and the Benny Shack Island Nationwide 27 Permit Application was submitted to the USACE on September 20, 2023.

On October 20, 2023, an email was received from the USACE with comments regarding the Benny Shack NWP 27 application. HDR provided additional information to the USACE. On Nov 1, 2023, USACE indicated (via email) that the Benny Shack project does not meet the NWP 27 and should be evaluated under an individual permit.

A meeting took place on November 9, 2023, that served as a permitting coordination meeting between the USACE, HDR, and the CBBEP for Deadman Island Restoration Project. It was determined that Deadman would need to move forward with an individual permit application.

An Individual Permit was submitted to the USACE for Benny Shack Island on January 8, 2024. A USACE Request for Additional Information (RAI) Letter was received for SWG-2023-00653 (Benny's Shack Island) on January 24, 2024. HDR submitted the Response to RAI Letter on February 19, 2024. The Permit was posted on Public Notice on March 20, 2024.

An Individual Permit was submitted to the USACE for Deadman Island on January 22, 2024. A USACE Request for Additional Information (RAI) Letter was received for SWG-2023-00652 (Deadman Island) on February 5, 2024. HDR submitted the Response to RAI Letter on February 26, 2024. The Permit was posted on Public Notice on March 27, 2024.

The USACE sent NMFS the ESA Section 7 informal consultation letter on April 1, 2024, for Benny Shack. The USACE sent an email on April 3, 2024, to USFWS requesting informal consultation. The concurrence letter from USFWS was received on April 15, 2024. The CBBEP received the Benny Shack public comments letter from the USACE on May 8, 2024. The response to comments letter was submitted on June 4, 2024. A 401 Water

Quality Certification request form was submitted to the TCEQ on May 21, 2024, for the restoration of Benny's Shack Island (SWG-2023-00653).

The USACE sent NMFS the ESA Section 7 informal consultation letter on April 1, 2024, for Deadman Island. The CBBEP received the Deadman Island public comments letter from the USACE on May 8, 2024. The response to comments letter was submitted on June 5, 2024. Based on the comments received from the Public Notice, the CBBEP is scheduling a meeting with NMFS for EFH and TPWD to discuss oyster habitat/clutch impacts. A 401 Water Quality Certification request form was submitted to the TCEQ on May 21, 2024 for the restoration of Deadman Island (SWG-2023-00562).

NMFS Project Manager was assigned to the ESA informal consultation on June 10, 2024, for Benny Shack. USACE sent NMFS letter on September 3, 2024, for Endangered Species Act. TCEQ 401 Water Quality Certification requirement waived on September 5, 2024.

A meeting took place on July 19, 2024, with the USACE, NMFS, and TPWD concerning Deadman Island and oyster impacts. USACE sent NMFS Essential Fish Habitat on September 16, 2024. NMFS EFH concurrence letter was received on September 17, 2024. Deadman Island USACE permit was issued on September 26, 2024. The USACE permit for Benny Shack was issued on November 5, 2024. The time limit for completing the work authorized ends on 31 December 2029 for Deadman Island and Benny Shack.

Task 6 Summary: Support the Annual Texas Colonial Waterbird Society Symposium (TCWS)

The 2021 annual meeting was held virtually on November 17 and 18, 2021.

The Texas Colonial Waterbird Society conducted its annual meeting in conjunction with the meeting of the Waterbird Society (the international group) in Corpus Christi on October 31, 2022. Regional compilers for the Texas Colonial Waterbird Census provided summary data from the 2022 nesting season, and the Society discussed a range of issues affecting waterbirds as well as topics related to the coverage and methodology of waterbird surveys moving forward.

Task 7 Summary: Project Monitoring and Reporting

During the project duration, fifteen quarterly reports were submitted to the GLO. The draft final report was submitted to the GLO on March 1, 2025. The final report with revisions was submitted to the GLO by March 31, 2025. GOMESA Performance Measures Report was also submitted by March 31, 2025.

Appendix

Table 1. Scientific and common names of all waterbird species identified and monitored along the Texas coast from 2021-2025.

Scientific Name	Common Name
<i>Haematopus palliatus</i>	American Oystercatcher
<i>Leucophaeus atricilla</i>	Laughing Gull
<i>Onychoprion fuscatus</i>	Sooty Tern
<i>Sternula antillarum</i>	Least Tern
<i>Gelochelidon nilotica</i>	Gull-billed Tern
<i>Hydroprogne caspia</i>	Caspian Tern
<i>Sterna forsteri</i>	Forster's Tern
<i>Thalasseus maximus</i>	Royal Tern
<i>Thalasseus sandvicensis</i>	Sandwich Tern
<i>Rynchops niger</i>	Black Skimmer
<i>Phalacrocorax brasilianus</i>	Neotropic Cormorant
<i>Pelecanus occidentalis</i>	Brown Pelican
<i>Pelecanus erythrorhynchos</i>	American White Pelican
<i>Ardea herodias</i>	Great Blue Heron
<i>Ardea alba</i>	Great Egret
<i>Egretta thula</i>	Snowy Egret
<i>Egretta tricolor</i>	Tricolored Heron
<i>Egretta rufescens</i>	Reddish Egret
<i>Bubulcus ibis</i>	Cattle Egret
<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron
<i>Eudocimus albus</i>	White Ibis
<i>Platalea ajaja</i>	Roseate Spoonbill

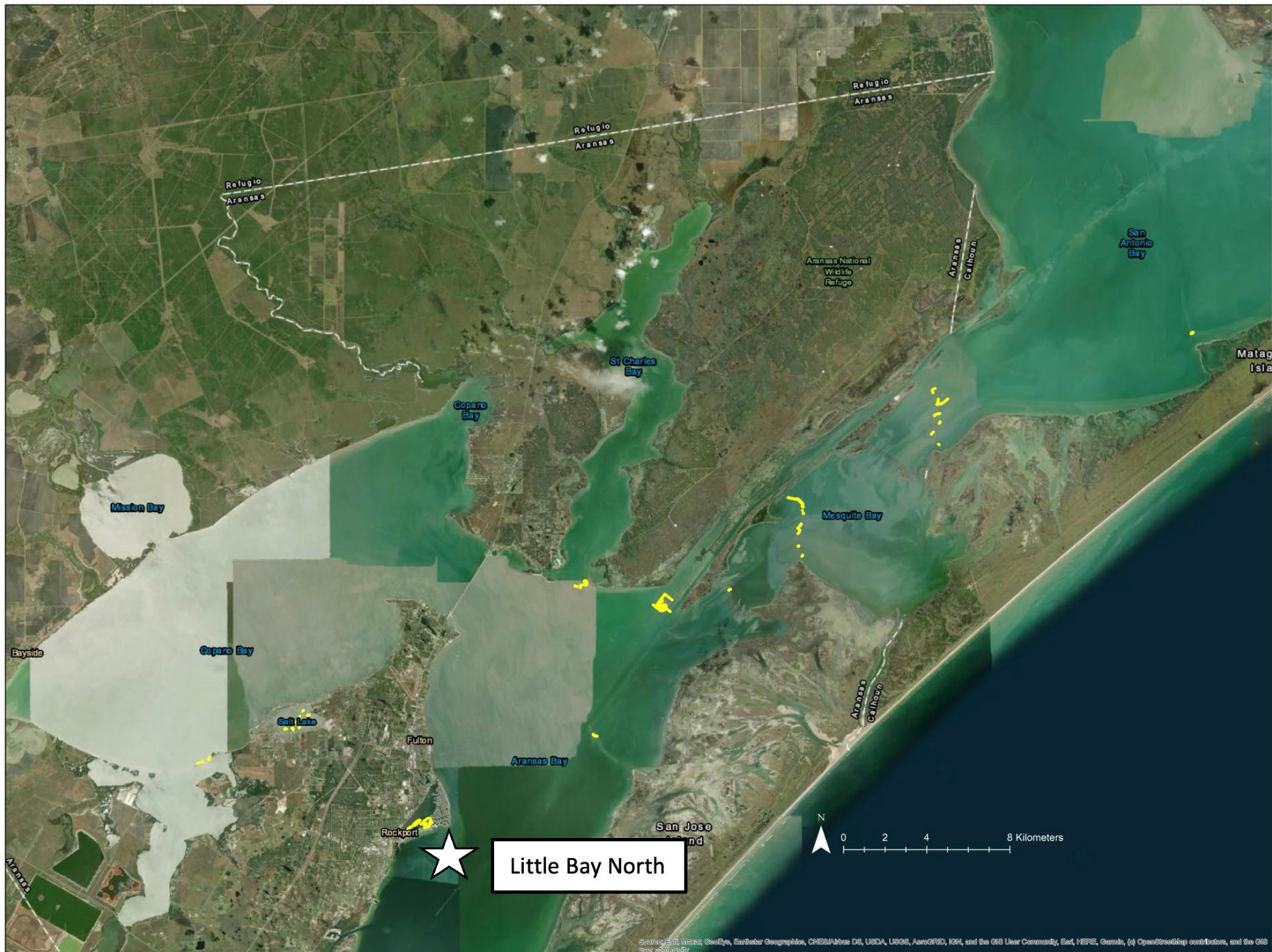


Figure 1. Satellite imagery of islands monitored and managed by CBBEP located in San Antonio, Aransas, and Copano Bay system.



Figure 2. Satellite imagery of islands monitored and managed by CBBEP located in Redfish, Corpus Christi, and Nueces Bay systems.



Figure 3. Satellite imagery of islands monitored and managed by CBBEP located in Corpus Christi Bay and the northern portion of the Upper Laguna Madre.

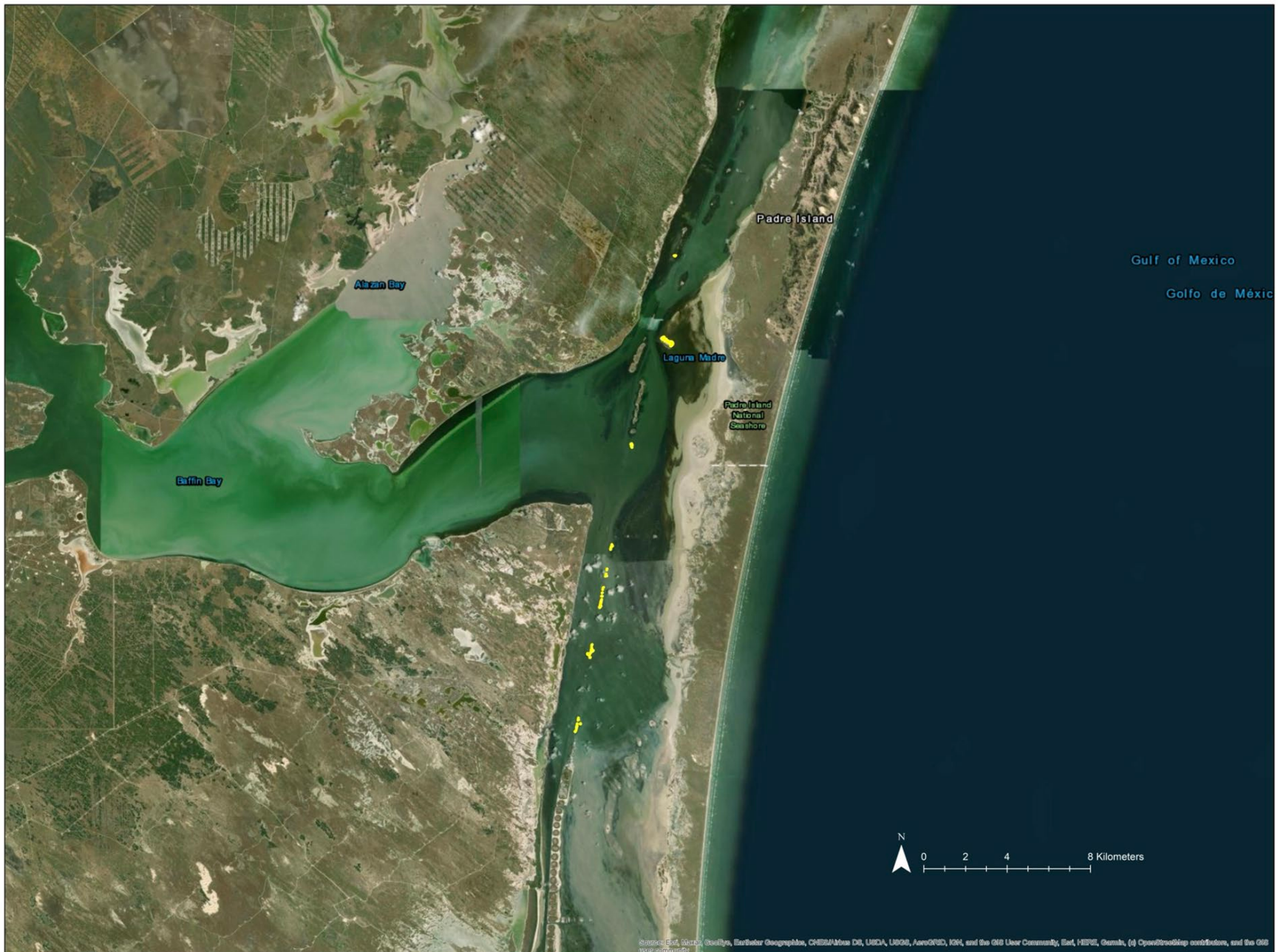


Figure 4. Satellite imagery of islands monitored and managed by CBBEP located in the southern portion of the Upper Laguna Madre.



Figure 5. Satellite imagery of islands monitored and managed by CBBEP located in the northern portion of the Lower Laguna Madre.

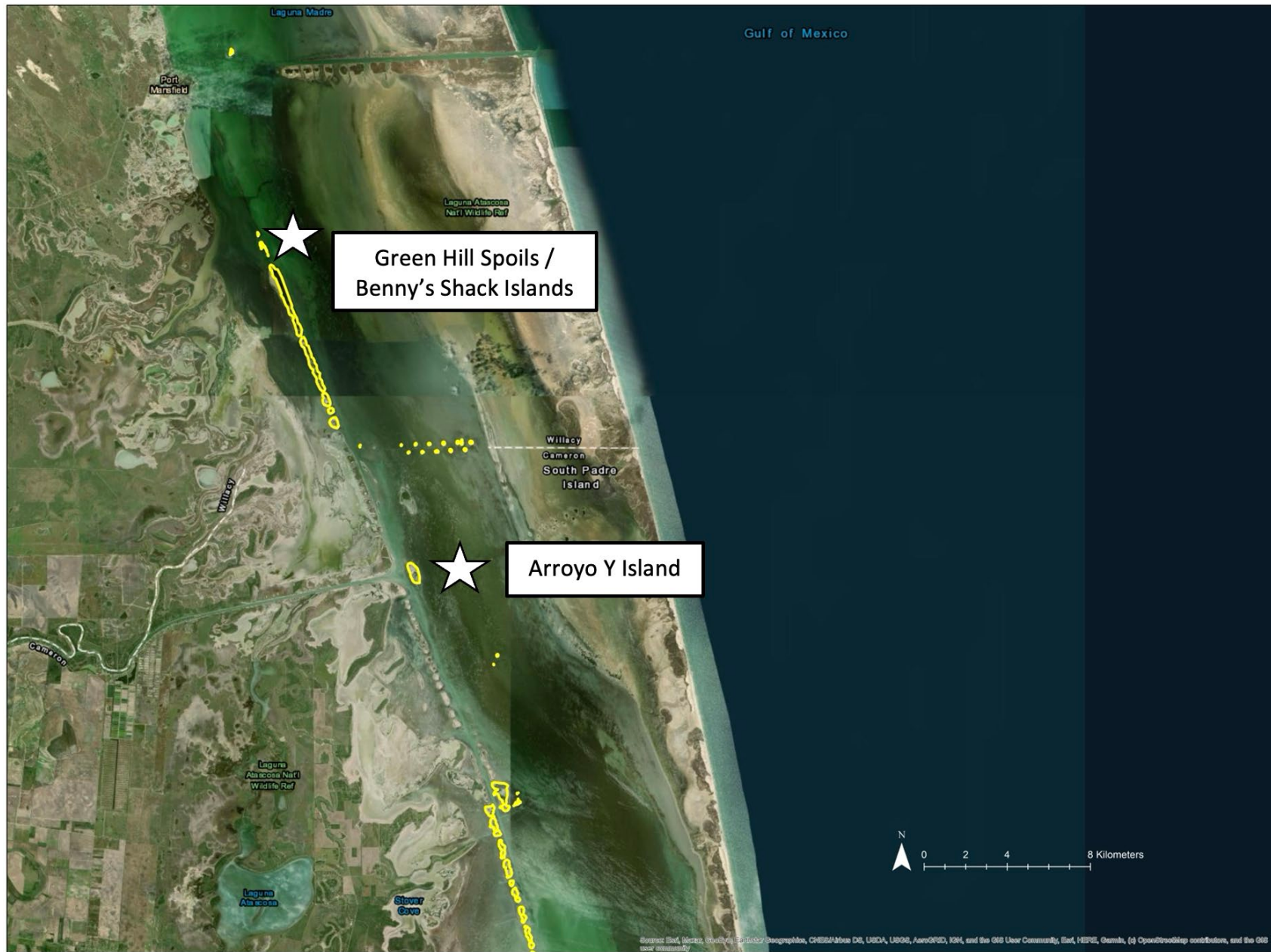


Figure 6. Satellite imagery of islands monitored and managed by CBBEP located in the central portion of the Lower Laguna Madre.



Figure 7. Satellite imagery of islands monitored and managed by CBBEP located in the southern portion of the Lower Laguna Madre.



Figure 8. The largest remaining Second Chain spoil island with an eroding northern edge but with most platforms safely within vegetation in November 2021.



Figure 9. The largest Second Chain spoil island in February 2025 after being overwashed by tropical weather systems during the summer of 2024.



Figure 10. Little Bay North island filled with tall guinea grass that was completely choking out all other vegetation in December 2021.



Figure 11. Little Bay North island after near eradication of guinea grass along with older native plantings and more than 100 new seedlings within tree tubes in December 2024.



Figure 12. Island 1 in Nueces Bay with only short vegetation growth in November 2021, less than two years after island restoration.



Figure 13. Island 1 with brushy natural vegetation growth and limited invasives grasses alongside previously planted woody seedlings in December 2023.



Figure 14. Island 2 in Nueces Bay with overgrown herbaceous vegetation on the limestone cap of the island that was meant to remain open for ground nesting Black Skimmers and terns in March 2023.



Figure 15. Island 2 in Nueces Bay in March 2024 with limited herbaceous cover remaining after being sprayed with herbicide previously and then a saltwater pump now helping to keep the limestone cap free of vegetation.



Figure 16. Open grass on Causeway Island immediately after prickly pear cactus was transplanted on a patch on the north end of the island in November 2021.



Figure 17. Prickly pear patches growing in on the north end of Causeway Island in September 2023, less than two years after being transplanted on the island.



Figure 18. Causeway Island in December 2025 after well over 100 native seedlings were planted throughout open grassy habitat on the highest elevation areas of the island.



Figure 19. A large colony of invasive red imported fire ants being removed with a fire ant-specific food treatment on Zigzag island in December 2021.



Figure 20. Extensive guinea grass on the south ridge at Pita Island being removed with a rake after being cut by a weed trimmer in December 2021.



Figure 21. Newly planted seedlings on the south ridge at Pita Island in December 2021 after guinea grass removal, followed by spot treating grass clumps with herbicide to prevent regrowth in this area.



Figure 22. Extensive woody vegetation growth from CBBEP's past planting events on the south ridge at Pita Island in September 2024.



Figure 23. Newly cleared parts of the north ridge at Pita Island with new native seedlings freshly planted in November 2024.



Figure 24. One toppled nest platform along with other damaged ones on Rabbit Island in November 2024 after tropical weather systems and seasonal high tides eroded away most of what was left of the island earlier in 2024.



Figure 25. Nest platform installation on East Flats Spoil where vegetation for nesting structure is lacking in January 2025.



Figure 26. Recently cleared guinea grass and new native plantings in tree tubes on North Benny Shack in December 2021.



Figure 27. North Benny Shack in November 2024 with grown woody trees from past planting events.



Figure 28. Heavy erosion and scarping occurring on the north end of Benny Shack island in November 2024.



Figure 29. Extensive guinea grass coverage on the south side of Laguna Vista spoil island in October 2021.



Figure 30. Large native seedlings popping out of tree tubes from recent plantings and minimal guinea grass coverage on the south side of Laguna Vista spoil island in November 2024.



Figure 31. Approximately 1000 native seedlings of various species growing at one of CBBEP's nursery grow out tables in August 2024.



Figure 32. Dozens of large bags of trash and other debris removed from spoil islands during CBBEP's Laguna Madre Rookery Island Cleanup based in Arroyo City in October 2024.



Figure 33. American White Pelicans setting up nests in the Upper Laguna Madre in April 2022 on the last island known for this species to breed on in the entire Gulf Coast.



Figure 34. Nesting Great Egrets on a mangrove-covered island in the Lower Laguna Madre in April 2023.



Figure 35. A large Gull-billed Tern colony on the Bahia Grande Railroad Islands in May 2023.



Figure 36. A large mixed-species colony of waterbird chicks, fledglings, and adults in the Lower Laguna Madre in July 2023.



Figure 37. A Brown Pelican adult feeds two chicks at Laguna Vista spoil island in July 2024.



Figure 38. One of the largest nesting colonies of Black Skimmers on the Texas coast incubating eggs on Northeast Mansfield Island in the Lower Laguna Madre in July 2024.



Figure 39. Reddish Egret chicks are guarded by a parent in the Nueces Marsh Restoration islands in Nueces Bay in June 2022.



Figure 40. Great Blue Herons with chicks on nest platforms installed by CBBEP on New Island in Nueces Bay in May 2022.



Figure 41. Great Blue Herons nesting on Tern Island in the Upper Laguna Madre with a CBBEP-installed informative sign in the foreground in March 2022.