



TEXAS COASTAL RESILIENCY MASTER PLAN OVERVIEW

MARCH 2023



Commissioner
Dawn Buckingham, M.D.
Texas General Land Office



The Continued Need for Coastal Resiliency

Leonabelle Turnbull Birding Center in Port Aransas (Photo Credit: Texas General Land Office)

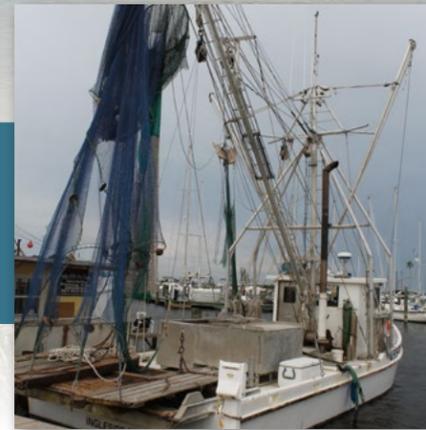
The Texas General Land Office (GLO) is pleased to present the 2023 Texas Coastal Resiliency Master Plan (Plan)—the third installment of its statewide plan to protect and promote a vibrant and resilient Texas coast that supports and sustains a strong economy and healthy environment for all who live, work, play or otherwise benefit from the natural resources and infrastructure along the Texas coast.

The Texas coast is made up of more than 3,300 miles of bay shorelines and vast expanses of tallgrass prairie uplands, saltmarsh wetlands, beaches and dunes, estuaries, and other ecosystems that contribute priceless natural and aesthetic resources to humans. Moreover, nearly 6.92 million people in 18 counties call the Texas coast their home, and industries contributing to the coastal economy employ upwards of 400,000 people in coastal counties and over 1.55 million people statewide.^{1,2} To protect the livelihoods, communities, safety, and security of our people, Texans need a Texas-sized plan to protect our coast.

The Plan proposes to do just that. With an estimated \$1.87 billion in 121 proposed Tier 1 coastal resiliency projects, spanning 10 priority statewide actions that range from Managing Coastal Habitats to Enhancing Emergency Preparation and Response, the GLO is prepared to manage the public coastline, steward its natural resources, protect its ecosystems, and defend its businesses and people from hurricanes and natural disasters, now and into the future. Enacting these Tier 1 projects will help the GLO be successful in ensuring that the state’s investment in coastal resiliency will return benefits to the state’s economy, environments, and communities.



(Photo Credit: Texas General Land Office)



(Photo Credit: Texas General Land Office)



(Photo Credit: City of South Padre Island)



(Photo Credit: Port of Beaumont)

The 121 Tier 1 projects presented in the Plan reflect a careful consideration of the complex characteristics of the Texas coastal zone by the GLO and the Plan’s Technical Advisory Committee (TAC), including coastal pressures and vulnerabilities, updated flood and storm surge modeling, socioeconomics, and the needs of coastal communities. Moving forward, the GLO will continue to be proactive by using the Plan as part of an adaptable process that considers the changing conditions, needs, and preferences of coastal communities and their coastal environments. To carry out the Plan, the GLO will continue to rely on best-available scientific research, local expertise, and monitoring data available from completed projects, as well as strong partnerships to progress projects through implementation.

The prioritized projects that have been identified within the Plan allow comprehensive coverage for the entire Texas coast. Additionally, the GLO is working alongside the Federal government through its ongoing support of the U.S. Army Corps of Engineer’s Sabine-to-Galveston Coastal Storm Risk Management Program and Coastal Texas Program so that resiliency needs are addressed at state, federal, and local levels.

The vision embraced by the GLO for the future of the Texas coast is ambitious, but Texans have a history of overcoming difficult odds to achieve the unthinkable. Advancing our coastline to be more resilient in the face of future, unknown storms, and continued land change is a challenge that is being accepted by coastal stakeholders up, down, and across the great coastal state of Texas.



(Photo Credit: Rusty Feagin)



Resiliency for Texas's Coastal Economy

The economic importance of the Texas coast cannot be understated. The Texas coast is home to a thriving coastal economy built on waterborne commerce, energy and chemical industries, military, commercial and recreational fishing, marine transportation, ship building, and tourism and ecotourism sectors. Throughout Texas's four coastal regions (shown to the left) in 2020, annual wages supported by the coastal economy exceeded \$25.6 billion over nearly 20,000 businesses.² Texas's ports include three of the top five fastest growing ports in the nation by export revenue from 2010 to 2020 and the ports system as a whole provides, collectively, \$450 billion in economic value to the state on an annual basis.³ Texas, the largest energy producing state in the nation, accounted for 43% of the nation's crude oil production and 26% of its marketed natural gas production in 2020.⁴ These are just some of the metrics that emphasize the critical role coastal resiliency plays to support the state's economic backbone and allow it to continue to provide the resources, benefits, and protections Texans need.

A Data-Driven and Stakeholder-Informed Plan

Understanding that coastal resiliency can come with important, but competing priorities, the GLO has worked diligently to craft a Plan that is data-driven and stakeholder-informed. Its recommendations reflect updated sea level rise and storm surge models, best available shoreline and landcover change data, and the latest socioeconomic statistics.

Over the past 4 years of the planning cycle for the Plan, the GLO has engaged coastal planners, community leaders and decision-makers, coastal scientists and engineers, ports and navigation professionals, private industry leaders, technical experts, resource agency and regulatory staff members, and individual citizens as part of a Technical Advisory Committee to hear more about what is working well and where improvements could be made.

Texas's Coastal Vulnerabilities

The Plan identifies eight vulnerabilities that can arise from coastal drivers and pressures and negatively impact the Texas coast. The assessment of these vulnerabilities is a crucial way that the GLO evaluates regional or coastwide concerns that negatively impact the coast and identifies the need for resiliency projects in specific coastal locations. The coastal vulnerabilities are described in three overarching categories: land change, flooding, and degraded water resources and are listed to the right with a corresponding vulnerability icon.

2023 Actions and Tier 1 Projects

Implementing the Plan requires coordinated responses at multiple scales, requiring significant collaboration of funding and information sharing at the statewide and local levels. The Plan defines 10 actions as a series of coordinated approaches that show where Texas's coastal resiliency needs now intersect with the vision that the GLO and its partners share to improve the future of the coast. The GLO hopes to champion future resiliency projects that align with one or more of the proposed actions, which can and often do accomplish more than one resiliency goal. Through an actions-based approach, the GLO and present and future project stakeholders will be equipped to alleviate coastal vulnerabilities and further enhance coastal resiliency in a targeted and effective manner.

The 10 actions to address coastal vulnerabilities include:

- | | |
|---|--|
|  Managing Coastal Habitats |  Managing Watersheds |
|  Managing Gulf Shorelines |  Growing Key Knowledge and Experience |
|  Managing Bay Shorelines |  Enhancing Emergency Preparation and Response |
|  Improving Community Resilience |  Addressing Under-Represented Needs |
|  Adapting to Changing Conditions |  Maintaining Coastal Economic Growth |

The Tier 1 projects recommended within the Plan are presented by region, including coastwide and multi-region projects, on the following pages. The total cost of the 121 proposed projects is \$1.87 billion.

Land Change

-  Degraded or Lost Habitat
-  Bay Shoreline Change
-  Gulf Shoreline Change

Flooding

-  Storm Surge
-  Inland Flooding
-  Tidal Flooding

Degraded Water Resources

-  Degraded Water Quality
-  Degraded Water Quantity

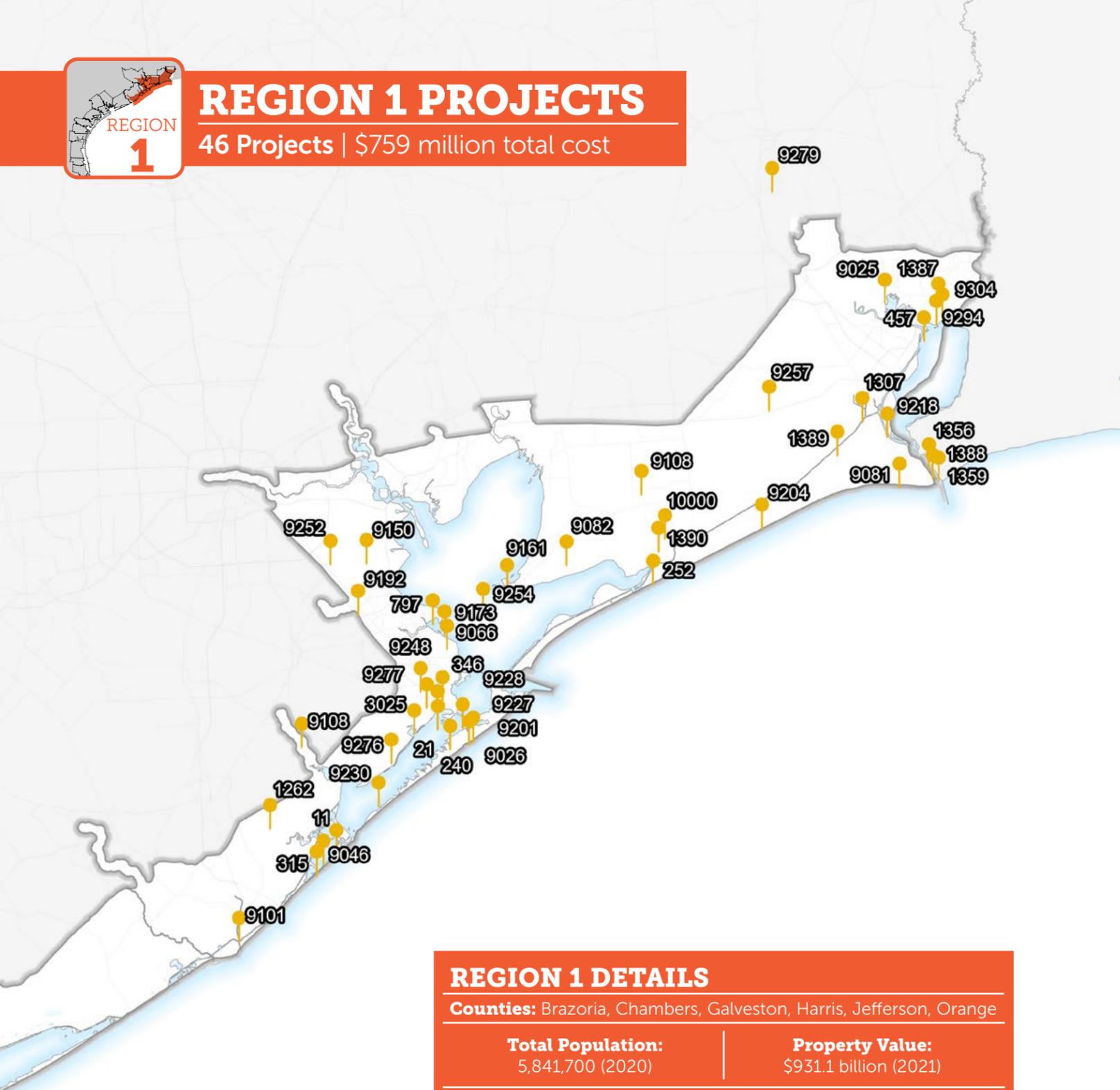


(Photo Credit: Texas General Land Office)



REGION 1 PROJECTS

46 Projects | \$759 million total cost



REGION 1 DETAILS

Counties: Brazoria, Chambers, Galveston, Harris, Jefferson, Orange

Total Population:
5,841,700 (2020)

Property Value:
\$931.1 billion (2021)

Total Annual Average Wages: \$165.1 billion (2020)

Political Districts:

Texas House: 21-25, 29, 128, 129, 134, 142-145, 147

Texas Senate: 3, 4, 6, 11, 13, 15, 17

US Congress: 2, 7, 14, 18, 29, 36, 38

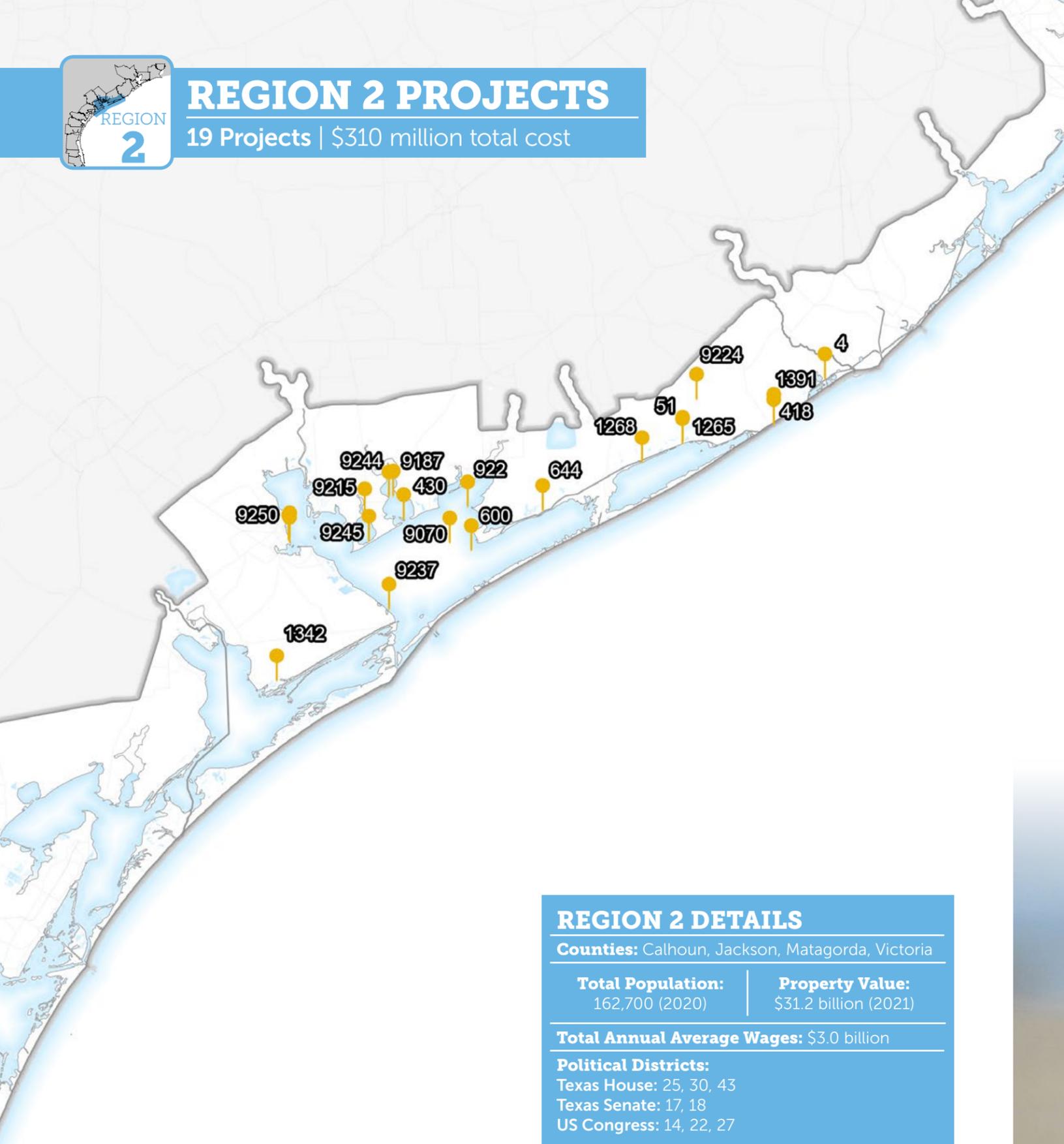
No.	Project Name	Cost
10000	Anahuac NWR Conservation and Restoration	\$25,000,000
1390	Anahuac NWR East Unit Beneficial Use	\$16,000,000
1262	Bastrop Bayou Marsh Acquisition	\$10,000,000
9230	Bay Harbor Island Stabilization	\$2,300,000
9025	Bessie Heights Wetland Restoration	\$7,700,000
252	Bolivar Peninsula Beach and Dune Restoration	\$97,500,000
9101	Brazos River and San Bernard River Restoration Strategy and Management Plan	\$2,000,000
9276	Chocolate Bay Preserve Shoreline Protection and Marsh Restoration	\$8,500,000
240	Coastal Heritage Preserve	\$24,000,000
797	Dickinson Bay Rookery Island Restoration – Phase 3	\$6,400,000
9066	Dollar Bay Wetland Protection, Restoration, and Acquisition	\$9,700,000
9108	East and West Galveston Bay Watershed, Wetland, and Habitat Conservation	\$15,600,000
9161	East Bay Living Shorelines and Wetland Restoration	\$26,900,000
9046	Follet’s Island Conservation Initiative	\$7,600,000
315	Follet’s Island Nourishment and Erosion Control	\$127,700,000
21	Galveston Bay Rookery Island Restoration	\$37,500,000
9201	Galveston Island Nourishment and Stabilization	\$31,000,000
9026	Galveston Island West of Seawall to 13 Mile Road Beach Nourishment - Phase 1	\$12,600,000
9254	Going to Scale: Expanding Oyster Restoration in Galveston Bay	\$14,000,000
3025	Greens Lake Shoreline Protection and Wetland Restoration - Phase 2	\$5,400,000
9304	Hickory Cove Marsh Restoration	\$21,000,000
9248	Highland Bayou Shoreline and Marsh Restoration Project	\$1,700,000
9252	Houston Parks and Recreation Department’s Riparian Restoration Initiative	\$4,000,000

No.	Project Name	Cost
1307	J.D. Murphree WMA Shoreline Protection	\$13,000,000
9228	Jones Bay Oystercatcher Habitat Restoration	\$3,200,000
9218	Keith Lake Fish Pass and Baffle Repairs and Upgrades	\$3,800,000
9192	Lower Clear Creek and Dickinson Bayou Watershed Flood Risk Reduction Program	\$3,000,000
1387	Lower Neches WMA Lake Street Drive Beneficial Use	\$6,000,000
11	Management of the Christmas Bay System	\$5,000,000
9204	McFaddin NWR Gulf Shoreline Stabilization	\$38,500,000
1389	McFaddin NWR Willow Lake Marsh Beneficial Use	\$8,600,000
9150	Middle Armand Bayou Protection Project	\$3,000,000
9082	Moody NWR Conservation and Restoration	\$10,000,000
9279	Neches River Forested Floodplain	\$30,000,000
457	North Pleasure Island Shoreline Protection and Restoration	\$4,400,000
320	Old River Cove Restoration	\$9,200,000
346	O’Quinn I-45 Estuary Shoreline Protection and Marsh Restoration	\$11,000,000
9277	Pierce Marsh Wetland Restoration and Shoreline Protection	\$6,500,000
9257	Southeast Texas Flood Coordination Study - Regional Flood Sensor System	\$900,000
9294	Sydney Island Restoration	\$10,000,000
1356	Texas Bayou Water Control Structure	\$6,000,000
9173	Texas City Levee Erosion Control and Marsh Restoration	\$7,000,000
9081	Texas Point NWR Beach Nourishment Project	\$43,400,000
1388	Texas Point NWR Beneficial Use	\$11,400,000
1359	Texas Point NWR Shoreline Protection Sabine Neches Waterway and Oyster Habitat Creation	\$5,000,000
9227	West Bay Living Shorelines at Sweetwater Preserve and Maggie’s Cove	\$6,100,000



REGION 2 PROJECTS

19 Projects | \$310 million total cost



No.	Project Name	Cost
1265	Big Boggy Marsh Protection Project	\$6,000,000
1268	Bird Island Restoration and Creation of Gulf Cut Island Complex	\$4,000,000
51	Boggy Cut GIWW Stabilization	\$18,500,000
9237	Boggy Nature Park Shoreline Stabilization	\$5,000,000
9187	Carancahua Bay Community Reefing Project	\$125,000
430	Carancahua Bay Habitat Preservation and Enhancement	\$9,000,000
600	Half Moon Oyster Reef Restoration - Phase 3	\$2,800,000
9250	Harbor of Refuge Protection and Restoration	\$6,700,000
1342	Hydrologic Restoration of Welder Flats	\$4,300,000
9224	Lake Austin Coastal Prairie Conservation	\$60,000,000
644	Mad Island Marsh Preserve Shoreline Protection and Coastal Ecosystem Restoration - Phase 1	\$8,900,000
9070	Matagorda Bay Regional Inflow Study	\$250,000
922	Oliver Point Shoreline Protection and Reef Restoration	\$1,600,000
9244	Port Alto County Park Shoreline Protection and Restoration - Phase 2	\$1,800,000
4	San Bernard NWR Shoreline Protection	\$80,500,000
1391	San Bernard NWR Sargent Unit Beneficial Use	\$11,000,000
9245	Sand Point Peninsula Living Shoreline	\$5,800,000
418	Sargent Beach and Dune Restoration	\$79,600,000
9215	Shoreline Protection and Restoration at Olivia Haterius County Park	\$4,600,000

(Photo Credit: Patty Alexander)

REGION 2 DETAILS

Counties: Calhoun, Jackson, Matagorda, Victoria

Total Population: 162,700 (2020)	Property Value: \$31.2 billion (2021)
--	---

Total Annual Average Wages: \$3.0 billion

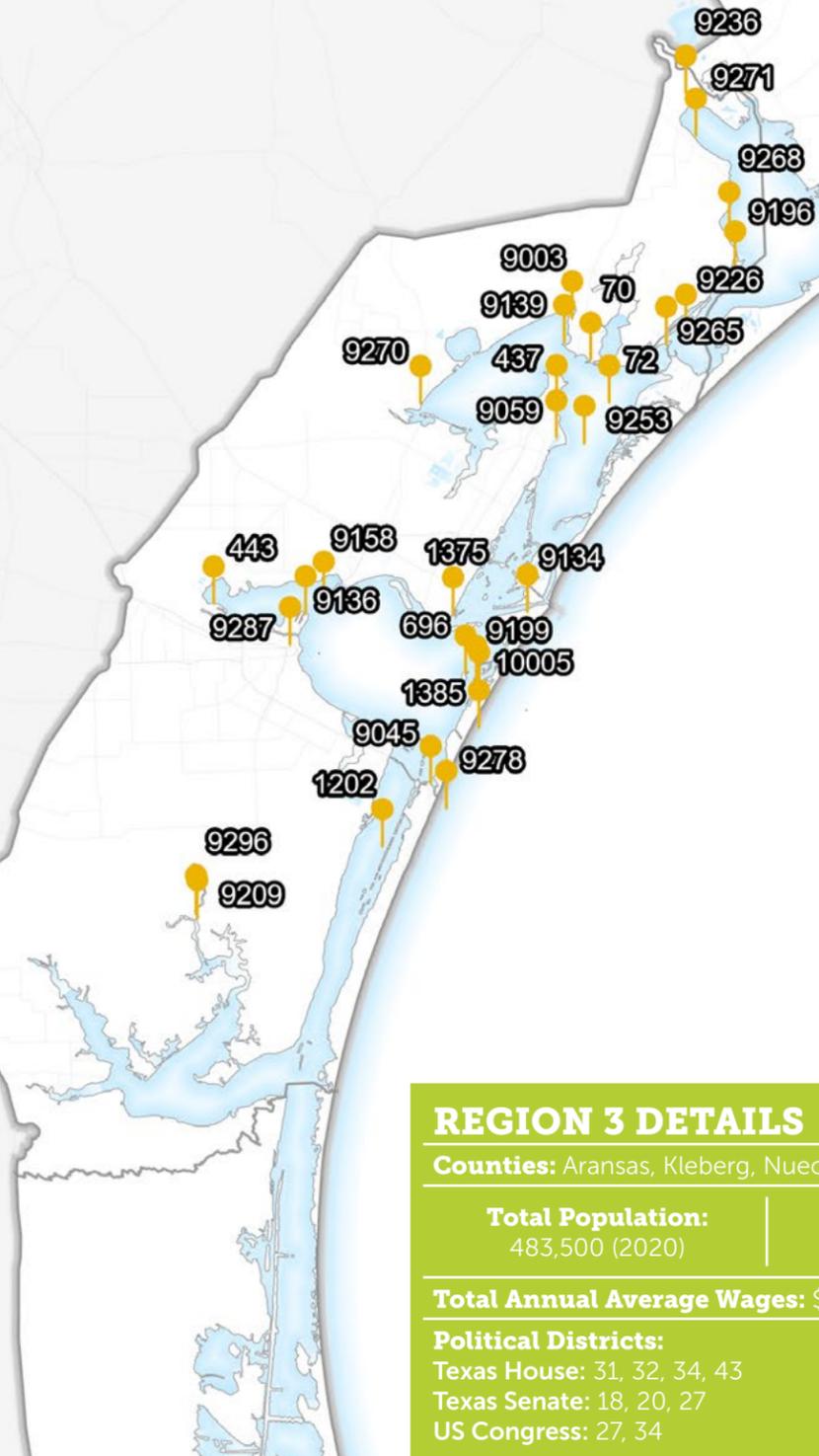
Political Districts:
 Texas House: 25, 30, 43
 Texas Senate: 17, 18
 US Congress: 14, 22, 27





REGION 3 PROJECTS

29 Projects | \$254 million total cost



REGION 3 DETAILS

Counties: Aransas, Kleberg, Nueces, Refugio, San Patricio

Total Population: 483,500 (2020)	Property Value: \$80.5 billion (2021)
--	---

Total Annual Average Wages: \$7.6 billion (2020)

Political Districts:
Texas House: 31, 32, 34, 43
Texas Senate: 18, 20, 27
US Congress: 27, 34

No.	Project Name	Cost
9271	Austwell Water Quality and Erosion Mitigation	\$1,600,000
9270	Bayside Public Access and Habitat Creation	\$6,800,000
9199	Bayside Wetland Resilience Study on Mustang Island	\$1,000,000
9136	Corpus Christi Bay Wastewater, Stormwater Quality, and Pollution Management Improvements	\$1,000,000
1375	Dagger Island Buckeye Beneficial Use	\$5,500,000
9268	Dagger Point Stabilization	\$30,000,000
9209	Farming Out Pollutants in Petronila Creek	\$20,000,000
1385	Feeder Berm North of Fish Pass Beneficial Use	\$3,700,000
437	Fulton Beach Road Protection	\$9,600,000
9253	Going to Scale: Expanding Oyster Restoration in Aransas Bay	\$14,000,000
70	Goose Island State Park Habitat Restoration and Protection	\$2,600,000
9158	Indian Point Marsh Area Living Shoreline	\$3,400,000
9059	Little Bay Restoration Initiative	\$14,000,000
9265	Living Shorelines and Wetland Enhancements at the Aransas NWR	\$6,000,000
72	Long Reef and Deadman Island Shoreline Stabilization and Habitat Protection	\$5,300,000
9139	Newcomb Point Shoreline Stabilization	\$4,500,000
9278	Nueces County Gulf Beach Renourishment and Protection - Phase 1	\$850,000
443	Nueces County Hydrologic Restoration Study	\$240,000
9226	Oyster Reef Restoration in Mesquite-Carlos-Ayres Complex	\$10,000,000
9045	Packery Channel Nature Park Habitat Restoration - Phase 3	\$3,000,000
9296	Petronila Creek and Oso Creek Watershed Improvements	\$25,600,000
9134	Port Aransas Nature Preserve Stabilization and Restoration - Phase 2	\$5,280,000
9196	Protection of the GIWW Shoreline at the Aransas NWR	\$22,300,000
9236	Restoration of Freshwater Inflow to Townsend Bayou	\$180,000
9287	Rincon Reef Breakwater	\$31,000,000
696	Shamrock Island Restoration - Phase 2	\$5,900,000
9003	Shell Point Ranch Wetlands Protection	\$5,000,000
10005	Shoreline and Wetland Protection on Mustang Island – Phase 1: Cohn Preserve	\$10,100,000
1202	Tern Island and Triangle Tree Island Rookery Habitat Protection	\$5,900,000



REGION 4 PROJECTS

14 Projects | \$472 million total cost

REGION 4 DETAILS

Counties: Cameron, Kenedy, Willacy

Total Population:
441,500 (2020)

Property Value:
\$31.7 billion (2021)

Total Annual Average Wages: \$3.7 billion (2020)

Political Districts:

Texas House: 31, 37, 38

Texas Senate: 27

US Congress: 34

No.	Project Name	Cost
9229	Adolph Thoma, Jr. Park Living Shoreline Restoration - Phase 5	\$5,000,000
9042	Bahia Grande Living Shoreline	\$6,000,000
9298	Beach and Dune System Monitoring Program for Willacy and Cameron Counties	\$850,000
9232	Cameron County Beach Nourishment	\$285,000,000
9123	City of South Padre Island Living Shoreline	\$12,500,000
9247	Developing a Comprehensive Conservation and Resiliency Management Plan for the Lower Laguna Madre	\$1,200,000
1393	Protection and Restoration of Benny's Shack Islands	\$4,700,000
1394	Protection and Restoration of Rabbit Island South	\$3,300,000
9235	Resaca System Restoration Project - Phase 1	\$1,000,000
1341	Restoration of Sea Turtle Nesting Beach at Padre Island National Seashore	\$3,800,000
9063	Restore Barrier Island Bayside Wetlands on South Padre Island	\$20,000,000
9062	Restore Laguna Madre Rookery Islands	\$14,400,000
145	South Padre Island Beach and Dune Management and Restoration	\$89,000,000
9051	South Padre Island Coastal Beach Protection	\$25,000,000



COASTWIDE PROJECTS

10 Projects | \$43 million total cost

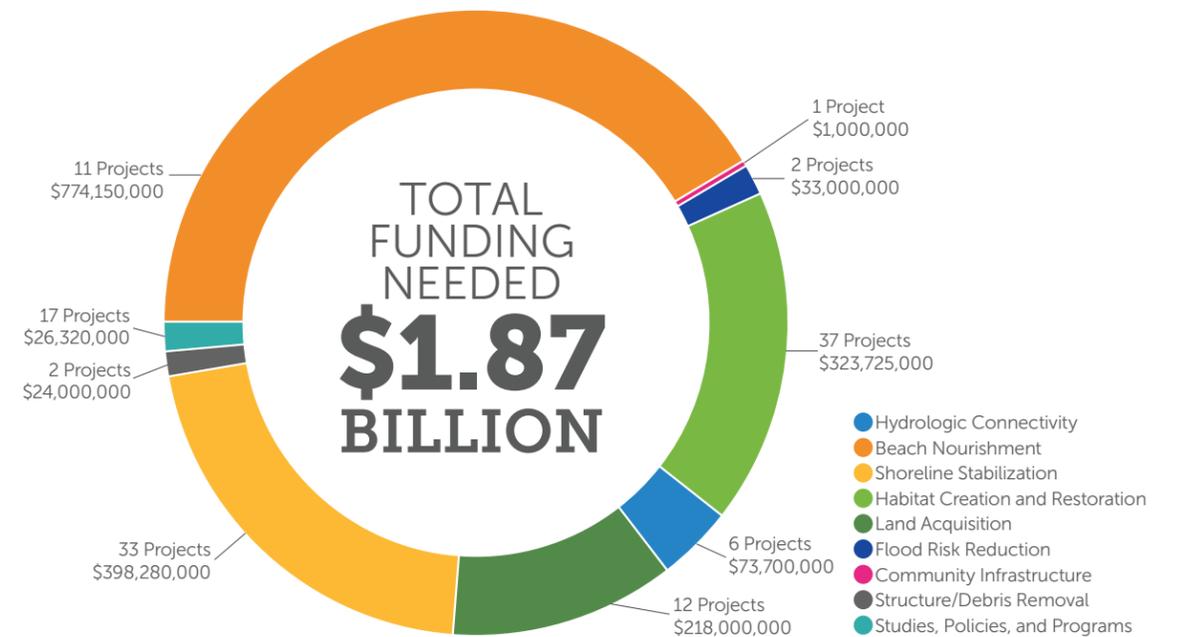
No.	Project Name	Cost
1237	Abandoned and Derelict Structure Removal Program	\$20,000,000
2	Abandoned Vessel Removal Program	\$4,000,000
2311	Beach Monitoring and Maintenance Program	\$4,000,000
1392	Beneficial Use Master Plan Continuation	\$1,500,000
9183	Clean Coast Texas Program	\$2,000,000
10013	Data Collection to Support Continual Updates to the National Wetlands Inventory Dataset	\$1,800,000
9180	Development of Optimal Coastwide Bathymetric and Topographic Models	\$1,000,000
9097	Longshore Transport Modeling	\$2,400,000
9118	Long-Term Hydrologic Monitoring Program	\$2,000,000
1	Texas Coastal Resiliency Master Plan	\$4,000,000

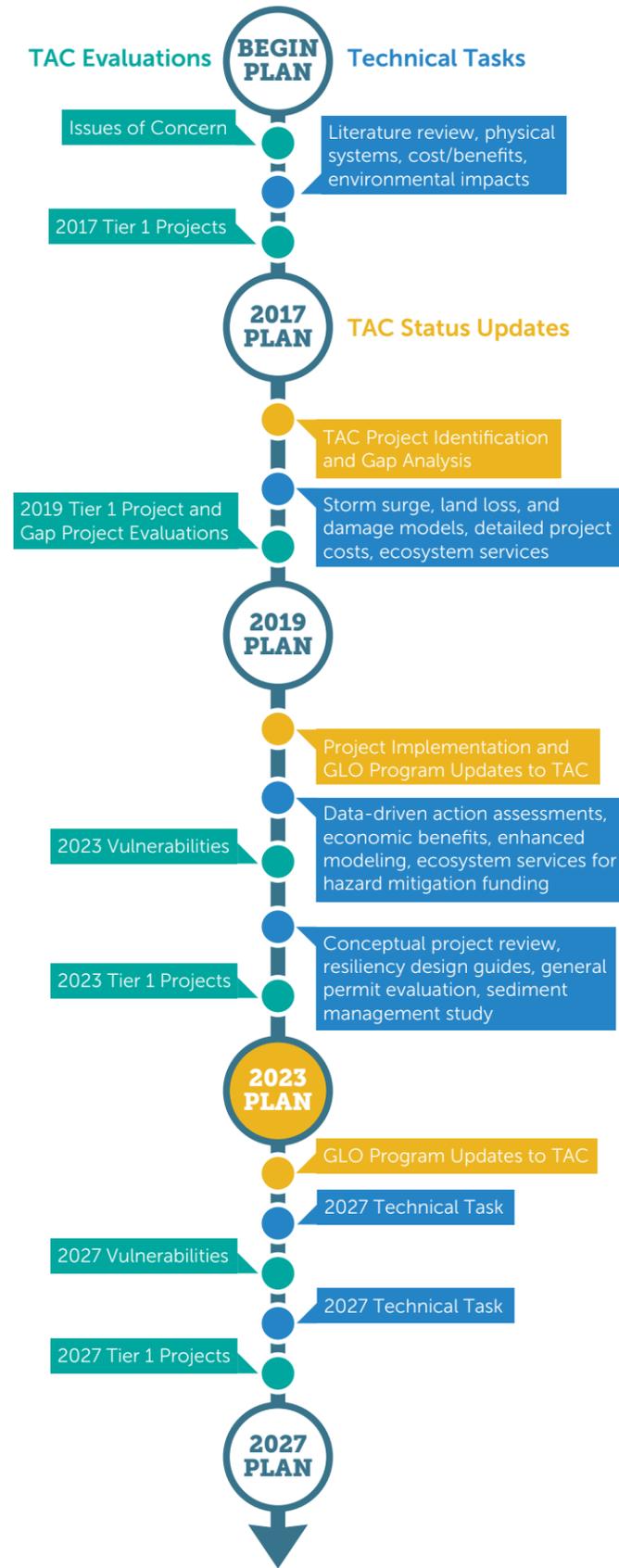


MULTIREGION PROJECTS

3 Projects | \$34 million total cost

No.	Project Name	Counties	Cost
1284	Columbia Bottomlands Ecosystem Preservation	Calhoun	\$18,800,000
1332	Paired Subtidal and Intertidal Oyster Reef Restoration in Texas Bays	Calhoun	\$1,000,000
9216	Texas Coastal Prairie Initiative	Brazoria, Chambers, Galveston, Harris, Calhoun, Jackson, Matagorda, Victoria	\$14,000,000





Kemps ridley sea turtle hatchling (Photo Credit: Patty Alexander)

Texas's Progress Toward Coastal Resiliency Since the 2019 Plan

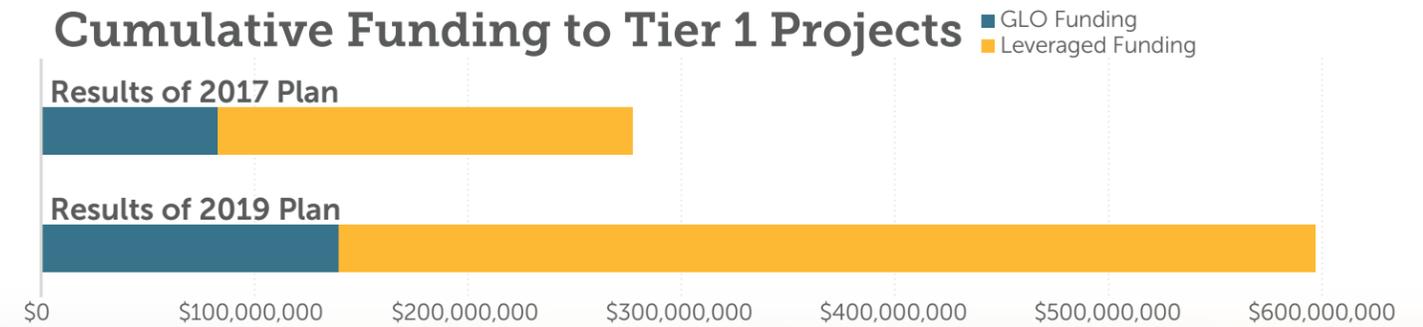
This 2023 Plan marks the third issuance of the Texas Coastal Resiliency Master Plan, and the first since moving from a 2-year to a 4-year process. The GLO's decision to transition to a 4-year planning cycle leaves more time to fund, design, and implement projects in the Plan after a new version is released.

The Plan has resulted in Tier 1 projects receiving a cumulative \$597 million in total funding from the GLO and other funding partners, of which \$457 million has been leveraged from local and other funding sources. Thirty-five projects in the 2019 Plan have been either fully funded and completed or are fully funded and still working toward completion, including several major coastal infrastructure projects.

The completed projects span 3 of 4 coastal regions:

- Baffin Bay Watershed Monitoring and Management Plan (Region 3)
- Causeway Island Rookery Habitat Protection (Region 3)
- Development of the Lower Laguna Madre and Brownsville Ship Channel Watershed Protection Plan (Region 4)
- Galveston Island State Park Wetland Restoration & Shoreline Protection - Phase 3 (Region 1)
- Mansfield Rookery Island Shoreline Protection (Region 4)
- Salt Bayou Siphons (Region 1)
- State Flood Assessment and Flood Risk Management (Coastwide)

Cumulative Funding to Tier 1 Projects



Moving Forward to 2027

Resiliency is a guiding principle for how the GLO plans for the future of the Texas coast. The Tier 1 projects and new innovations and ideas described throughout the Plan are the result of 4 years of data-driven and stakeholder-informed strategic planning for the future of Texas's coastal resiliency. Continued progress is possible by working together to learn from both past successes and failures, understanding vulnerabilities, and investing in our coast today for the benefit of all Texans tomorrow.



(Photo Credit: Lee von Gynz-Guethle)



References

1. US Census Bureau. n.d. "County Population Totals: 2020-2021." Census.Gov. Accessed April 2022. <https://www.census.gov/data/datasets/time-series/demo/popest/2020s-counties-total.html>.
2. US Bureau of Labor Statistics. 2022. "Employment and Wages Data Viewer." Quarterly Census of Employment and Wages. Accessed April 2022. https://data.bls.gov/cew/apps/data_views/data_views.htm#tab=Tables.
3. Texas Department of Transportation Maritime Division. 2022. "2024-2025 Texas Port Mission Plan." Port Authority Advisory Committee. 88th Legislative Session. <https://ftp.txdot.gov/pub/txdot-info/mrt/mission-plan-2024-2025.pdf>.
4. US Energy Information Administration. Texas State Energy Profiles. 2022. <https://www.eia.gov/beta/states/states/TX/rankings>.

Front cover photo credits (clockwise from top): Lee von Gynz-Guethle, Galveston Bay Foundation, City of South Padre Island, Patty Alexander, Patty Alexander, Texas General Land Office, Lee von Gynz-Guethle

Back cover photo credit: Freese and Nichols, Inc.

A publication of the
Texas General Land Office

