



## ACTION PLAN 2 OF 3

### SUPPORT SPECIES CONSERVATION (SC)

Fish and wildlife resources are an important gauge of the health of Galveston Bay. These resources are a significant driver of human interactions via economic, recreation, and aesthetic pursuits. The conservation of the bay's native species in the watershed is dependent on adequate habitat, freshwater inflows, and water quality. Resource managers seek to protect certain species and, in some cases, return them to sustainable levels. Species management in the Galveston Bay watershed is primarily implemented by supporting habitat conservation projects that sustain or restore native species populations and reduce invasive species.

Invasive species are defined as plants, animals, and other organisms that are “non-native (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health” (USDA National Agricultural Library, Executive Order 13112). Invasive species compete with native species for resources such as food, light, water, and shelter. They often reproduce faster than native species and are difficult to eradicate. In addition to resource competition, invasive species can be destructive to infrastructure affecting boating, fishing, and hunting and can be devastating to crops, fisheries, forests, and other natural resources. Prevention is crucial to stopping the spread of invasive species (GBF & HARC, 2017, p. 40). Resource managers typically manage invasive species on small scales and work through regulations to prevent future infestations (Gonzalez, 2011, p. 34).

There are many factors that determine population size of a given species; important among them are habitat quality and quantity, fishing pressure, and numerous natural processes such as reproductive rates, predation, competition and disease (Gonzalez, 2011, p.1).

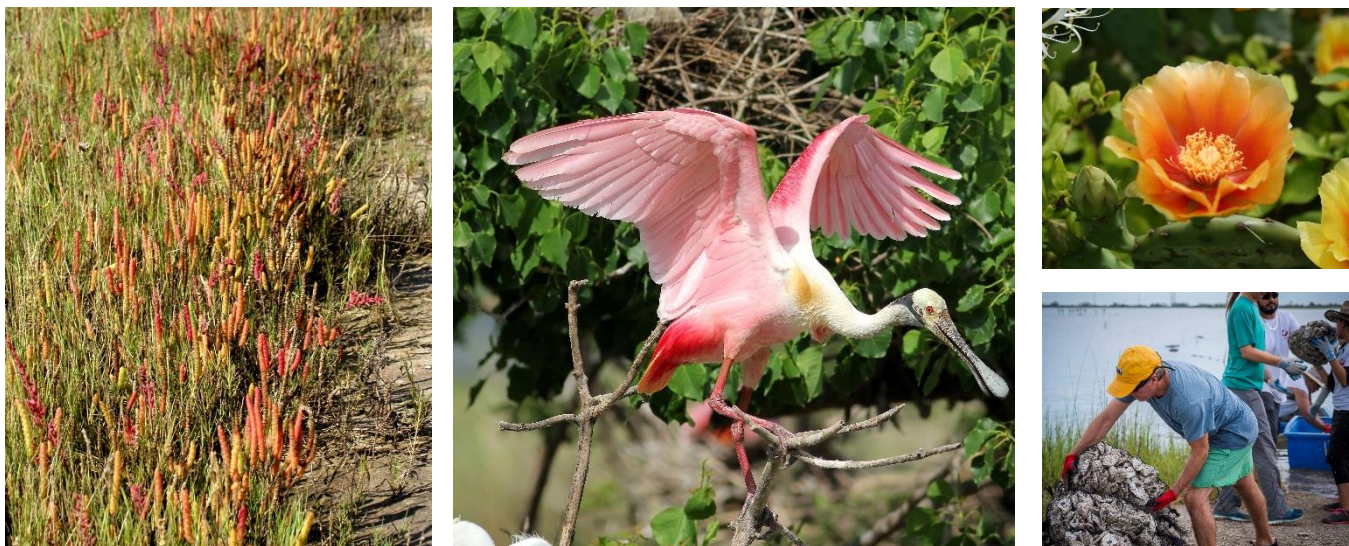
### Status of Species Conservation Implementation

Long-term data suggest most species that reside permanently or periodically in Galveston Bay are doing well, though there are some exceptions. Since 2015, the *Galveston Bay Report Card* assessed trends in shellfish, finfish, colonial waterbirds, and invasive species.

Wildlife in Galveston Bay received an overall letter grade of C on the *2017 Galveston Bay Report Card* which stated that finfish and bird populations are considered adequate and maintaining, while some shellfish populations are deteriorating and require action.



*SAV in West Galveston Bay  
(photo credit: Sarah Bernhardt).*



*Salicornia mosaic* (far left) (photo credit: U.S. Fish and Wildlife Service). Roseate spoonbill (center) (photo credit: Jason Leifester). Blooming cacti at the TAMUG Wetlands Center (top right) (photo credit: Sarah Bernhardt). Oyster reef restoration project (bottom right) (photo credit: Port Houston).

## SHELLFISH

Using data collected by the TPWD Coastal Fisheries Division since 2002, the *2017 Galveston Bay Report Card* analyzed blue crabs and two species of shrimp to develop a shellfish grade. While the white shrimp appear to be maintaining their population levels and brown shrimp appear to be recovering, the blue crab population saw a significant decline since 2002. Increased recreational and commercial use of the bay stemming from regional population increases, decreased habitat, and more stress placed system-wide on Galveston Bay influence shellfish populations.

Oysters received an incomplete grade and are addressed separately from other shellfish. Oysters are not only an important fishery, but they also improve water quality and serve as habitat for a variety of other animals. The bay's oyster reefs have significantly declined over time due to the historical overharvesting of oyster shells, the damaging storm surge of Hurricane Ike in 2008, drought, fishing pressure, and disease. Map data describing the distribution of oyster reefs in Galveston Bay were created by the Texas A&M University in 1994 and are out of date. TPWD is in the process of finalizing new oyster reef mapping information.

## FINFISH

The *2017 Galveston Bay Report Card* analyzed 12 species of finfish using the same TPWD data. Finfish populations in Galveston Bay maintained levels since 2002, except for gafftopsail catfish and Atlantic croaker, whose populations increased.

### **COLONIAL WATERBIRDS**

Separate from other bird populations in the Galveston Bay watershed, colonial waterbirds appear stable. The *2016 Galveston Bay Report Card* analyzed 16 species of waterbirds, including herons, egrets, gulls, terns, and ibises using Texas Colonial Waterbird Surveys collected over the past 15 years. Per the report, most species analyzed “have not shown either increases or decreases since 2002. Notable exceptions include a moderate increase in royal tern populations and significant increases in populations of tri-colored heron, brown pelican, and laughing gull.”

### **INVASIVE SPECIES**

The rivers and bayous flowing into the Galveston Bay watershed are home to established invasive species, causing problems in waterways. Documented invasive species in the watershed include water hyacinth, Chinese tallow, grass carp, armored catfish, fire ants, and zebra mussel (GBF & HARC, 2017, p. 40). There is no designated monitoring program for invasive species in Texas; however, many resource managers and citizen scientists around the state report and track the spread of invasive plants and animals. Per the *2017 Galveston Bay Report Card*, aquatic invasive species are reported to a national database maintained by the U.S. Geological Survey.

The Ladybird Johnson Wildflower Center’s Texas Invasives Program also maintains a database of invasive plants and pests reported in Texas. The TPWD and the Texas Department of Agriculture oversee invasive species regulation in Texas, with both agencies maintaining lists of prohibited species. Within the watershed, the NRU subcommittee established a work group to directly address the issue of invasive and non-native species. More information about the Invasive Species Work Group and its efforts is given on page 138.

Species conservation is directly linked to habitat conservation, as all species are dependent on the maintenance of their essential habitats. However, even if habitats are maintained, pressure can be applied to populations from a variety of sources, including climate variability such as extreme flooding and drought, overfishing, or the introduction of invasive species that outcompete native species for their essential habitat.

### **Other Species Trends**

Trends in colonial waterbirds suggest stable populations (GBF & HARC, 2016, p. 33), including some shorebirds that are rare or endangered. Houston Audubon and other bay managers created a system of bird sanctuaries in and around the bay to protect important foraging and nesting areas.

Other wildlife, including reptiles and marine mammals, can be found in the bay. Bottlenose dolphins and three species of sea turtles are increasingly reported. Research intensified to track the habits of these large predators and to collect biological samples to evaluate biomagnification of toxins in the food chain. Sea turtles found in the bay and nesting on the beach appear to respond to conservation efforts (Gonzalez, 2011, p. 48).

### Action Plan Overview

The SC Action Plan includes two Actions to restore and sustain native species: **SC-1** will sustain native populations by conserving, protecting, and restoring key terrestrial and aquatic habitats, and directly correlates with **HC-1**, **HC-2**, and **HC-3**. **SC-2** targets habitats affected by invasive species for restoration and application of best land management practices, and directly correlates with **HC-3**.

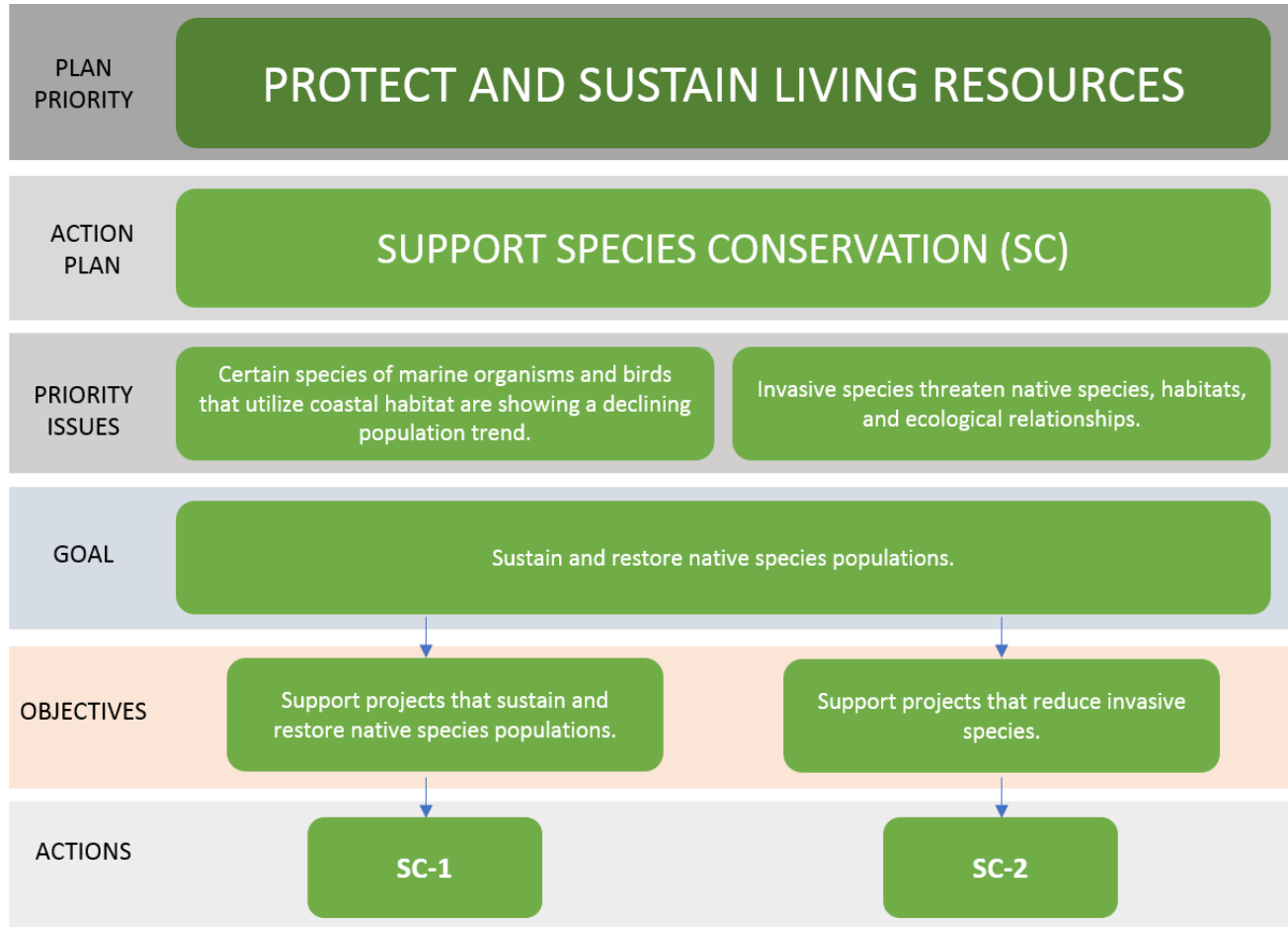
**FIGURE 22**  
**SC ACTION PLAN MATRIX**

ACTION PLANS AND CORRESPONDING ACTIONS		PLAN PRIORITIES			
		Ensure Safe Human and Aquatic Life Use	Protect and Sustain Living Resources	Engage Communities	Inform Science-Based Decision Making
Action Plan: Support Species Conservation (SC)					
SC-1	Native Species Management		x	x	x
SC-2	Invasive Species Control		x	x	x

Successful implementation of **SC-1** and **SC-2** requires coordination with the M&R subcommittee of the Council on multiple Actions outlined under Plan Priority Four: Inform Science-Based Decision Making. Those Actions address research on biological, chemical, and physical stressors on aquatic and terrestrial species. Information learned from future research will be applied in decisions made to protect native species and address invasive species control.

Successful implementation of both Actions requires coordination with the M&R and PPE subcommittees of the Council.

**FIGURE 23**  
**SPECIES CONSERVATION ACTION PLAN**



# SC-1

## Native Species Management\*

Objective: Support projects that sustain and restore native species populations.



Priority Issue: Certain species of marine organisms and birds that utilize coastal habitat are showing a declining population trend.

Description: To address this, the GBEP and its partners are seeking to support and fund projects that enhance coastal habitat(s), leveraging the GBEP’s monies for additional funds, when applicable, to sustain and restore native species populations.

Implementation location: Lower Galveston Bay watershed.

ACTIVITIES	TIMEFRAME AND OUTPUT(S)	IMPLEMENTATION COST
Support native species conservation projects on public and private lands.	Within 2-5 years, develop habitat conservation projects based on species needs.	\$200,000 - \$1 Million
	Within 5-10 years, continue to develop habitat conservation projects based on species needs.	\$200,000 - \$1 Million
	Within 10-plus years, continue to develop habitat conservation projects based on species needs.	\$200,000 - \$1 Million

### POTENTIAL IMPLEMENTERS

American Bird Conservancy  
 Armand Bayou Nature Center  
 Audubon Texas  
 Bayou Preservation Association  
 Ducks Unlimited  
 Galveston Bay Foundation  
 Gulf Coast Bird Observatory  
 Houston Audubon  
 Houston Wilderness

National Oceanic and Atmospheric Administration Restoration  
 NRG Energy  
 Texas A&M AgriLife Extension Service  
 Texas Community Watershed Partners  
 Texas General Land Office  
 Texas Parks and Wildlife Department  
 The Nature Conservancy  
 U.S. Department of Agriculture Natural Resource Conservation Service  
 U.S. Fish and Wildlife Service

### PERFORMANCE MEASURES

1. Habitat Conservation Blueprint (HC-2 and HC-3) updated.
2. Number of projects with native species managed and enhanced.

### REFERENCES

GBP’95: SP-1

SAP Reference: Ecosystem and Human Health - Sustaining Species Populations: Goal 1 / Objective D

*\*This Action and its corresponding Activities, represent a holistic approach to habitat conservation and are a part of a larger effort.*

# SC-2

## Invasive Species Management\*

Objective: Support projects that reduce invasive species.



Priority Issue: Invasive species threaten native species, habitats, and ecological relationships.

Description: To address this, the GBEP and its partners are seeking to support and fund projects that enhance coastal habitat(s) by reducing invasive species, leveraging the GBEP’s monies for additional funds, when applicable.

Implementation location: Lower Galveston Bay watershed.

ACTIVITIES	TIMEFRAME AND OUTPUT(S)	IMPLEMENTATION COST
Support invasive species management on public and private lands.	Within 2-5 years, identify important coastal areas to target for enhancement of degraded coastal habitats.	\$0 - \$200,000
	Within 5-10 years, develop funding strategies for enhancement projects that can be adapted to multiple funding sources.	\$0 - \$200,000
	Within 10-plus years, enhance 5,000 acres of lost or degraded coastal habitats (please see <b>HC-3</b> ).	\$1 Million - \$500 Million

### POTENTIAL IMPLEMENTERS

Armand Bayou Nature Center  
 Ducks Unlimited  
 Galveston Bay Foundation  
 Houston Audubon  
 HARC  
 Houston Parks and Recreation Department  
 Houston Wilderness  
 NOAA Restoration

NRG Energy  
 Texas A&M AgriLife Extension Service  
 Texas Community Watershed Partners  
 Texas General Land Office  
 Texas Parks and Wildlife Department  
 The Nature Conservancy  
 U.S. Department of Agriculture Natural Resource Conservation Service  
 U.S. Fish and Wildlife Service

### PERFORMANCE MEASURES

1. Habitat Conservation Blueprint (HC-2 and HC-3) updated.
2. Number of projects with invasive species managed, including the type and amount of invasives completed.

### REFERENCES

**GBP’95:** SP-10

**SAP Reference:** Ecosystem and Human Health - Sustaining Species Populations: Goal 2 / Objective A / Objective B

*\*This Action and its corresponding Activities, represent a holistic approach to habitat conservation and are a part of a larger effort.*