



ACTION PLAN 1 OF 3

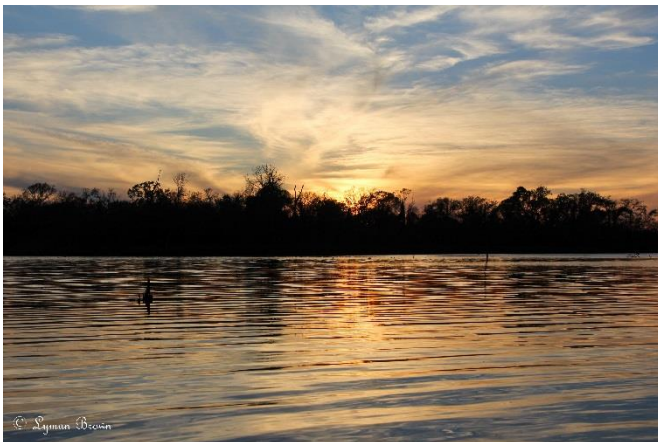
SUPPORT HABITAT CONSERVATION (HC)

The Galveston Bay watershed provides significant recreational opportunities and economic benefits to the region (EPA, 2004, p. 248). Local economies benefit from the bounty of the bay's fisheries and oyster reefs. Wetlands improve water quality and augment resilience during storms. Coastal prairies absorb floodwaters and sequester carbon. These and other component ecosystems work to support the biodiversity of the bay. The binding element that serves as the framework for the productivity of the Galveston Bay estuary is habitat.

Habitat is generally defined as the natural environment of an organism. The bay's health is dependent on the balance of physical, biological, and chemical conditions necessary to maintain the habitats that support its robust ecosystems. The overall health of the bay and the services it provides depend on the health of the habitats that create them.

All of Galveston Bay's principal commercial and recreational fishery species rely on estuarine wetlands during at least some part of their life cycle (Lester, 2011b, p. 3).

Crucial habitats in the estuarine environment of Galveston Bay and the terrestrial environment of its upland watershed include those most significantly affected over the past decades. Wetland loss, changes to oyster reefs, declines of SAV, loss of tidal flats, conversion of coastal prairies to developed areas, and loss of riparian forests along bay tributaries threaten the strength of Galveston Bay. The *2017 Galveston Bay Report Card* indicates many of the bay's crucial habitats (freshwater wetlands, SAV, and oyster beds) remain threatened and in need of intervention (p. 44). The ability of the bay to support its abundant bird life, native plant communities, and other living systems depends on high-functioning habitat.



Armand Bayou Nature Center (photo credit: Lyman Brown).

Acquisition of high-value habitat is a focus of *GBP'18*. Regional conservation efforts, as evidenced by the Texas Farm and Ranch Land Program, the CAP, and community-driven Greenprints by the Trust for Public Land, focus on acquisition of land or acquisition of development rights through conservation easements. Restoration of existing degraded habitat provides another important avenue to increasing habitat function and capacity. A final tool is enhancement and protection of native habitats. Establishing breakwaters to prevent wetland shoreline erosion and fragmentation, which often leads to the wetlands conversion to open water, and managing lands (fencing, mowing, prescribed burns, etc.) in conservation to preserve habitat values, is an effective tool for protecting habitats.

Status of Habitat Conservation Implementation

Per *GBP'95*, the Galveston Bay system lost a net of nearly 35,000 acres of wetlands and 1,800 acres of SAV between the 1950s and 1989 primarily due to human-induced subsidence, the conversion of wetlands to agricultural land, regional dredge-and-fill activities, and habitat fragmentation.

The loss of estuarine wetlands slowed since 1996, while loss of freshwater wetlands remains a concern. Much of this loss is attributed to the development of freshwater isolated wetlands and agricultural land from the expansion of the Houston metropolitan area. Two U.S. Supreme Court decisions (*Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* in 2001 and *Rapanos v. United States* in 2006) and subsequent federal guidance coincide with the continued loss of freshwater wetlands to residential and commercial development in the watershed in the 2000s.

Other plant communities, like emergent intertidal wetlands and SAV, are affected by subsidence, increased water turbidity, and development encroachment. Encroaching development disturbs riparian areas along tributaries and converts prairie wetland complexes.

FIGURE 19
HABITAT TRENDS

Wetland Classification	1996	2005	Total Change 1996 to 2005	Annual Change 1996 to 2005	Percent Change 1996 to 2005
Estuarine Emergent	163,029	163,228	+199	+20	0%
Freshwater Emergent	169,746	168,068	-1,678	-168	-1%
Freshwater Forested	564,715	546,541	-18,264	-1,826	-3%
Freshwater Scrub/Shrub	75,061	69,016	-6,045	-605	-3%
Total	972,551	946,764	-25,787	-2,579	-3%

Acreeage of estuarine and freshwater wetland in the five counties of the lower portion of the Galveston Bay watershed from 1996 to 2005 (Lester, 2011b, p. 11).

Since 2015, the *Galveston Bay Report Card* assessed trends in saltwater wetlands, oyster reefs, freshwater wetlands, and SAV. Habitats in Galveston Bay received an overall letter grade of D on the *2017 Galveston Bay Report Card*, indicating many of the habitats in Galveston Bay and its watershed are under stress. Freshwater wetlands, oyster reefs, and SAV have seen significant declines over the years, though some habitats, like fringing saltwater wetlands, are beginning to benefit from the successes of regulatory protection and restoration efforts (GBF & HARC, 2017, p. 44). In 2017, saltwater wetlands, freshwater wetlands, and oyster reefs received an incomplete grade, pending updated data. The remaining habitat assessed, SAV, was found to be “adequate for now.”

The continued health and biodiversity of the Galveston Bay estuary depends on the conservation of varied and abundant high-quality habitat. Since the development of *GBP'95*, habitat conservation continues to be identified as the most critical need in protecting the Galveston Bay watershed.

Action Plan Overview

The HC Action Plan includes three Actions to conserve, restore, and enhance habitats. To support habitat conservation in Galveston Bay, land acquisition will be a primary focus (**HC-1**), as high-value habitat can rarely be acquired retroactively after conversion to other uses.

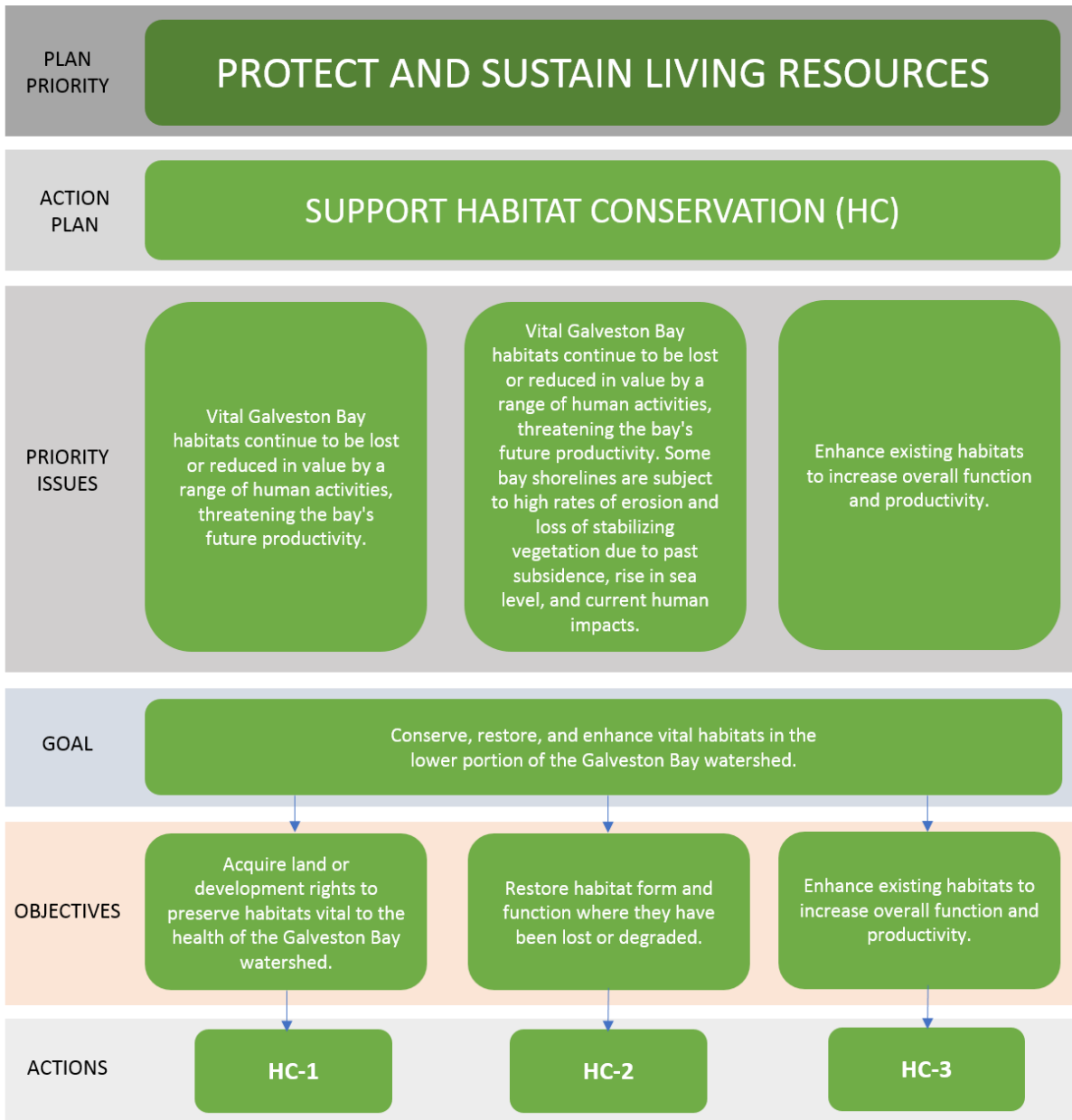
FIGURE 20
HC ACTION PLAN MATRIX

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 Habitat Conservation (HC)					
HC-1	Land Acquisition	x	x		
HC-2	Habitat Restoration	x	x		
HC-3	Habitat Enhancement	x	x		

Restoring habitat is another means to improve the overall function of Galveston Bay (**HC-2**). While restoration may require more effort than acquisition and the full function of natural habitat may not be fully achievable, it allows for the flexibility to address coastal habitat in areas where acquisition is not feasible. Enhancing habitat provides a third approach to promoting the bay's ecosystems, by increasing the function of existing habitat (**HC-3**). Because habitat can be thought of in size and quality, increasing quality allows for flexibility when increasing the size of habitat is not feasible. In addition, land acquired for conservation may be maintained and enhanced to protect the quality of habitat and conservation value.

Successful implementation of all three Actions requires coordination with the WSQ subcommittee of the Council.

**FIGURE 21
HABITAT CONSERVATION ACTION PLAN**



HC-1



Land Acquisition

Objective: Acquire land or development rights to preserve habitats vital to the health of the Galveston Bay watershed.

Priority Issue: Vital Galveston Bay habitats continue to be lost or reduced in value by a range of human activities, threatening the bay's future productivity.

Description: To address this, the GBEP and its partners have developed the CAP to define regional conservation priorities and facilitate land acquisition efforts in the lower Galveston Bay watershed. The GBEP and its partners are funding acquisition projects that leverage the GBEP's monies for additional funds, where possible, to conserve, restore, and enhance coastal habitats in the lower Galveston Bay watershed.

Implementation location: Lower Galveston Bay watershed.

ACTIVITIES	TIMEFRAME AND OUTPUT(S)	IMPLEMENTATION COST
Active CAP initiatives in each sub-bay watershed of Galveston Bay	Within 2-5 years, create and maintain list of acquisition projects to submit for funding.	\$0 - \$200,000
Adapt acquisition projects for submission to multiple funding opportunities.	Within 5-10 years, develop conservation initiative white papers for targeted sub-bay watersheds.	\$200,000 - \$1 Million
	Within 5-10 years, continue the GBEP programmatic support for the CAP in the watershed.	\$200,000 - \$1 Million
	Within 5-10 years, develop grant proposals and funding strategies for acquisition projects.	\$200,000 - \$1 Million
	Within 10-plus years, place 5,000 acres of important coastal habitat under long-term conservation through fee-simple acquisition, conservation easements, and other mechanisms.	\$5 Million - \$50 Million

POTENTIAL IMPLEMENTERS

Ducks Unlimited
Galveston Bay Foundation
Houston Audubon
Houston Wilderness
National Fish and Wildlife Foundation
Scenic Galveston
Texas General Land Office Texas Parks and Wildlife Department

The Artist Boat
The Conservation Fund
The Nature Conservancy
Trust for Public Land
U.S. Department of Agriculture Natural Resource Conservation Service
U.S. Fish and Wildlife Service

PERFORMANCE MEASURES

1. List of acquisition projects.
2. Number of conservation initiative white papers completed.
3. Number of acres of habitat under permanent conservation.

REFERENCES

GBP'95: HP-1, HP-2

SAP Reference: Ecosystem and Human Health - Habitat and Landscape Level Conservation: Goal 1 / Objective A / Objective B

HC-2



Habitat Restoration

Objective: Restore habitat form and function where they have been lost or degraded.

Priority Issue: Vital Galveston Bay habitats continue to be lost or reduced in value by a range of human activities, threatening the bay's future productivity. Some bay shorelines are subject to high rates of erosion and loss of stabilizing vegetation due to past subsidence, rise in sea level, and current human impacts.

Description: To address this, the GBEP and its partners are funding projects that restore lost or degraded coastal habitat(s) and conserve adjacent coastal habitat(s), leveraging the GBEP's monies for additional funds, when applicable.

Implementation location: Lower Galveston Bay watershed.

ACTIVITIES	TIMEFRAME AND OUTPUT(S)	IMPLEMENTATION COST
Active restoration plan in each sub-bay watershed of Galveston Bay.	Within 2-5 years, identify coastal areas to target for restoration of lost or degraded coastal habitats, using 1950s aerial imagery as a benchmark.	\$200,000 - \$1 Million
Adapt restoration projects for submission to multiple funding opportunities.	Within 5-10 years, develop funding strategies for restoration projects that can be adapted to multiple funding sources.	\$0 - \$200,000
	Within 10-plus years, restore 2,500 acres of lost or degraded coastal habitats.	\$5Million – \$50 Million

POTENTIAL IMPLEMENTERS

Ducks Unlimited
 Galveston Bay Foundation
 Houston Wilderness
 National Oceanic and Atmospheric Administration Restoration
 NRG Energy
 Port Houston
 Texas A&M AgriLife Extension Service

Texas Community Watershed Partners
 Texas General Land Office
 Texas Parks and Wildlife Department
 Texas Sea Grant
 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 acres of restored land.

REFERENCES

GBP'95: HP-1, HP-2

SAP Reference: Ecosystem and Human Health - Habitat and Landscape Level Conservation: Goal 2 / Objective A / Objective B

HC-3



Habitat Enhancement

Objective: Enhance existing habitats to increase overall function and productivity.

Priority Issue: Vital Galveston Bay habitats continue to be lost or reduced in value by a range of human activities, threatening the bay's future productivity. Shoreline management practices do not address negative environmental consequences to the bay or the need for environmentally compatible public access to its resources. Invasive species threaten native species, habitats, and ecological relationships.

Description: To address this, the GBEP and its partners are supporting and funding projects that enhance coastal habitat(s), leveraging the GBEP's monies for additional funds, when applicable.

Implementation location: Lower Galveston Bay watershed.

ACTIVITIES	TIMEFRAME AND OUTPUT(S)	IMPLEMENTATION COST
Active enhancement plan in each sub-bay watershed of Galveston Bay.	Within 2-5 years, identify important coastal areas to target for enhancement of degraded coastal habitats.	\$200,000 - \$1 Million
Adapt enhancement projects for submission to multiple funding opportunities.	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.	\$1 Million - \$10 Million

POTENTIAL IMPLEMENTERS

Armand Bayou Nature Center
Galveston Bay Foundation
Houston Audubon
Houston Wilderness
Houston Parks and Recreation Department
NOAA Restoration
NRG Energy
Port Houston

Scenic Galveston
Texas Parks and Wildlife Department
Texas Sea Grant
The Artist Boat
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 acres of enhanced land.

REFERENCES

GBP'95: HP-1

SAP Reference: Ecosystem and Human Health - Habitat and Landscape Level Conservation: Goal 2 / Objective A / Objective B