

# More Flooding, Fewer Fish: Freshwater Wetland Loss in the Houston Area, 1992–2010

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The greater Houston region is losing freshwater wetlands to the point that the water quality of Galveston Bay and other local water bodies is severely threatened.

Wetlands are areas where water covers the soil, or is either at or near the surface of the soil, all year or for varying periods during the year. Freshwater wetlands are the shallow ponds and marshes that are found throughout the Houston region and include the headwaters of the many bayous flowing into Galveston Bay.

Wetlands clean stormwater runoff and act as a landscape-scale sponge to hold stormwater. Freshwater wetlands in the Lower Galveston Bay watershed are critical to the water quality of Galveston Bay as well as the many bayous that feed into this bay.

Wetlands provide many other benefits to people and wildlife:

- Slowing stormwater flow and decreasing flooding
- Soaking up water to help replenish groundwater supplies
- Reducing erosion
- Protecting coastal areas and shorelines by weakening the force of storms



A prairie pothole wetland, or freshwater marsh, with encroaching development.

- Providing habitats for wildlife—fish, frogs, dragonflies, turtles, and birds
- Giving migratory birds a place to rest and eat
- Providing places for recreation and nature tourism such as boating, fishing, hiking, hunting, and bird watching.
- Offering an intangible sense of beauty and place in our culture

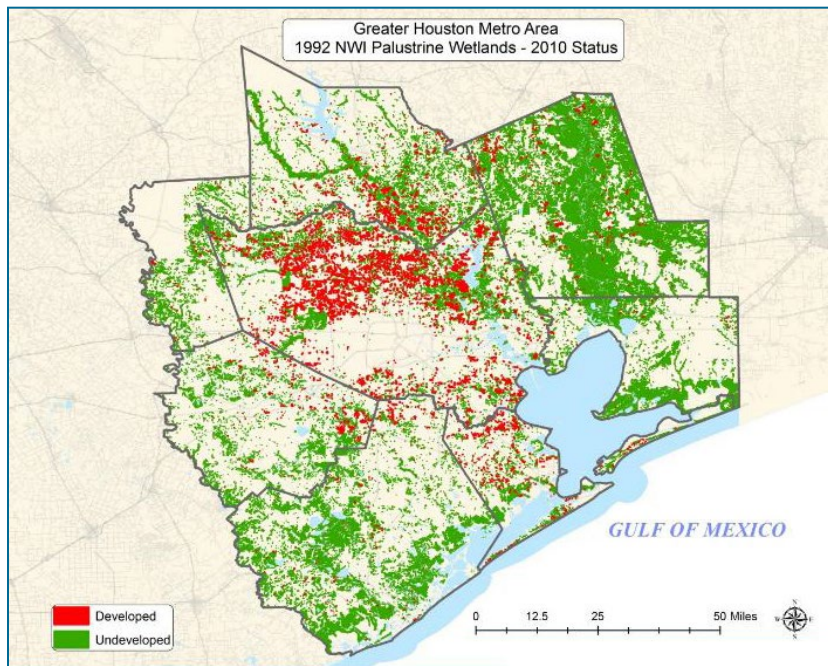
To determine the amount of wetlands lost in recent years, Texas A&M University scientists compared National Wetland Inventory (NWI) maps, created in 1992–93 by the U.S. Fish and Wildlife Service, against high-quality aerial photography from 2010. High-tech geographic information system (GIS) software was used to make the comparison. The scientists marked the wetlands lost to development or fill in the greater Houston area between 1992 and 2010. Only natural wetlands were analyzed, not those that were artificially diked or excavated.

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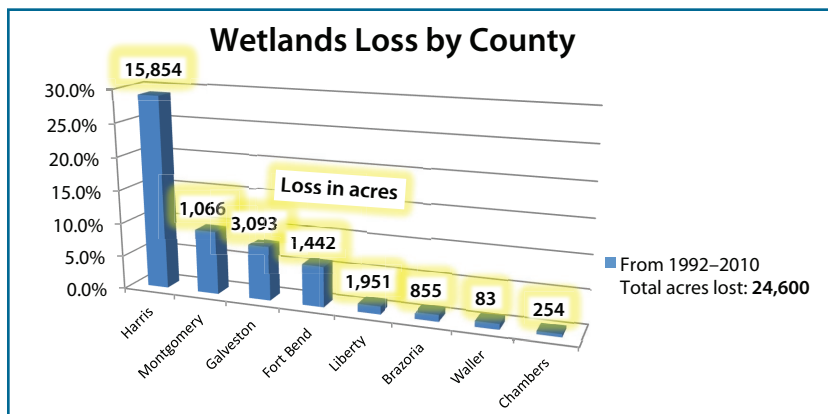
## How does wetland loss affect me?

The study found that since 1992, the eight-county Greater Houston Metro Area lost at least 5.5 percent of its natural freshwater wetlands. Harris County, the highest-growth county in this area, lost an astounding 29 percent of the freshwater wetlands present in 1992.

Loss of wetlands on this scale means a substantial loss in the ability of the landscape to detain and remove pollutants from stormwater. The results are increased flooding and degraded fishing grounds in downstream bayous and marshes.



The areas in red are where wetlands were destroyed in the Houston area from 1992 to 2010. Green areas are undeveloped wetlands.



Acres and percentages of freshwater wetland loss in each Houston-area county from 1992 to 2010.

The value of just the stormwater detention volume for the lost wetlands in the study area is at least \$600 million. This is an estimate of what it would cost to build detention basins of total equivalent volume.

However, unlike single-purpose detention basins, wetlands maintain themselves and offer many other services. They cleanse the water, offer places for wildlife to live, and provide places for many recreational activities. If we include the value of these and other functions of wetlands, the total value would reach several billion dollars.

The freshwater wetlands that remain in the eight-county region are only a fraction of what was there originally. At least half of what was here in pre-settlement times was already gone before 1990. Harris County has lost 70 percent of those wetlands and the functions they once provided.

## What about the Clean Water Act?

The U.S. Clean Water Act (CWA) was established to protect our nation's water bodies, including wetlands that are significantly connected to those water bodies. Under this law, developers must obtain a permit to fill or destroy any such wetlands for development, and they must offset, or mitigate, that loss by preserving or creating wetlands.

In the Houston area, the U.S. Army Corps of Engineers' Galveston District determines which wetlands qualify for CWA protection. It currently recognizes only the wetlands in the 100-year floodplain or those that have a pronounced channel leading to a bayou or river. Less than 20 percent of the wetlands lost to development since 1992 met this requirement, and therefore at least 80 percent of the wetland loss documented in this study was not offset by any kind of mitigation.

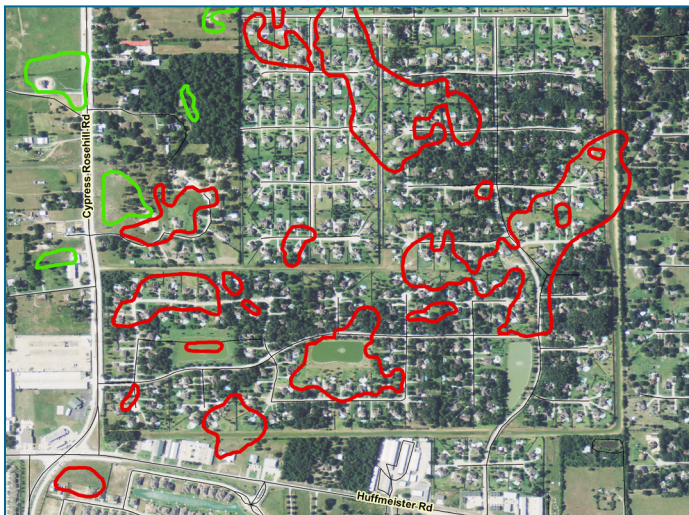
Recent research at Texas A&M University suggests that virtually all of the freshwater wetlands in the study area are significantly connected to our nation's water bodies and should be protected under the CWA. Filling these wetlands directly affects the quality of the receiving water bodies—Galveston Bay in particular—and their loss should be mitigated according to law.

## What can we do?

Freshwater wetlands in the region are being lost primarily to development, much of which occurs without any investigation of the presence of wetlands, much less with a completed Clean Water Act wetland permit. Half or more of all development in this area occurs this way.

Many wetlands would be preserved if cities and counties simply required that developers applying for building permits include evidence that they have a CWA permit or that the U.S. Army Corps of Engineers does not recognize any wetlands on the site.

Cities and other jurisdictions can also require that the mitigation occur in the same watershed as the develop-



**Area of development in northern Harris County, with National Wetland Inventory polygons. Red areas are wetlands that were developed between 1992 and 2010. Green areas are wetlands that were not developed as of 2010. (Source of aerial photo: Google Earth)**

ment, thus enabling more green space in or near the jurisdiction, with no additional costs to the citizens.

Houston is set to gain another 3 million to 4 million people in the next 30 years. New development might cover 700 to 1,000 square miles. If the coastal prairie pothole wetlands, which make up most of the freshwater wetlands in the eight-county region, were fully protected under the CWA, and their development mitigated appropriately, 25,000 to 35,000 acres of wetland habitat—the equivalent of an Anahuac National Wildlife Refuge—could be set aside every year.

Coastal resource managers need to identify the critical habitat that remains and work with residents and conservationists to develop plans for preserving and restoring wetlands. These managers and other conservationists need to consider how wetland mitigation could play a much larger role in ecosystem restoration and maintenance in the region.

Regulators who oversee the CWA permitting process should carefully consider recent scientific studies documenting the hydrologic connection of freshwater wetlands in the study region to Galveston Bay and other water bodies. Their decisions could greatly affect the quality of our coastal waters and ecosystems.

Finally, residents can be involved by reporting unauthorized wetland fill activities directly to the U.S. Army Corps of Engineers Galveston District office. A citizen can ask the Corps whether a permit is needed or has been obtained for development on a specific property.

Citizens can also work with county and municipal governments to require wetland mitigation with their drainage and detention permitting for medium and large developments.

### Acknowledgment

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A more in-depth publication on this study, *Houston-Area Freshwater Wetland Loss, 1992-2010*, is available from the Texas A&M AgriLife Service Bookstore at <https://www.agrilifebookstore.org/>.

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