Gulf of Mexico Regional Land Cover Change Report

1996–2010

About This Report

The *Gulf of Mexico Regional Land Cover Change Report, 1996–2010,* is one in a series of regional reports that summarize the land cover status of the coastal United States in 2010 and land cover changes over the previous decade and a half. This report provides an overview of key findings using reader-friendly maps and graphics.

About the Coastal Change Analysis Program

Satellite imagery is a great way to get a big-picture view of the cumulative impacts of changes along our nation's coasts. The Coastal Change Analysis Program (C-CAP) within the National Oceanic and Atmospheric Administration (NOAA) Office for Coastal Management produces nationally standardized land cover and land cover change information for coastal regions of the United States, including the Great Lakes, using multiple dates of satellite imagery. C-CAP's data products provide inventories of coastal intertidal areas, wetlands, and adjacent uplands at approximately five-year intervals. This information helps to support decision-making about coastal resources and communities. The raster-based maps generated by C-CAP serve as a baseline for studies of coastal changes and evaluations of past or future management actions.

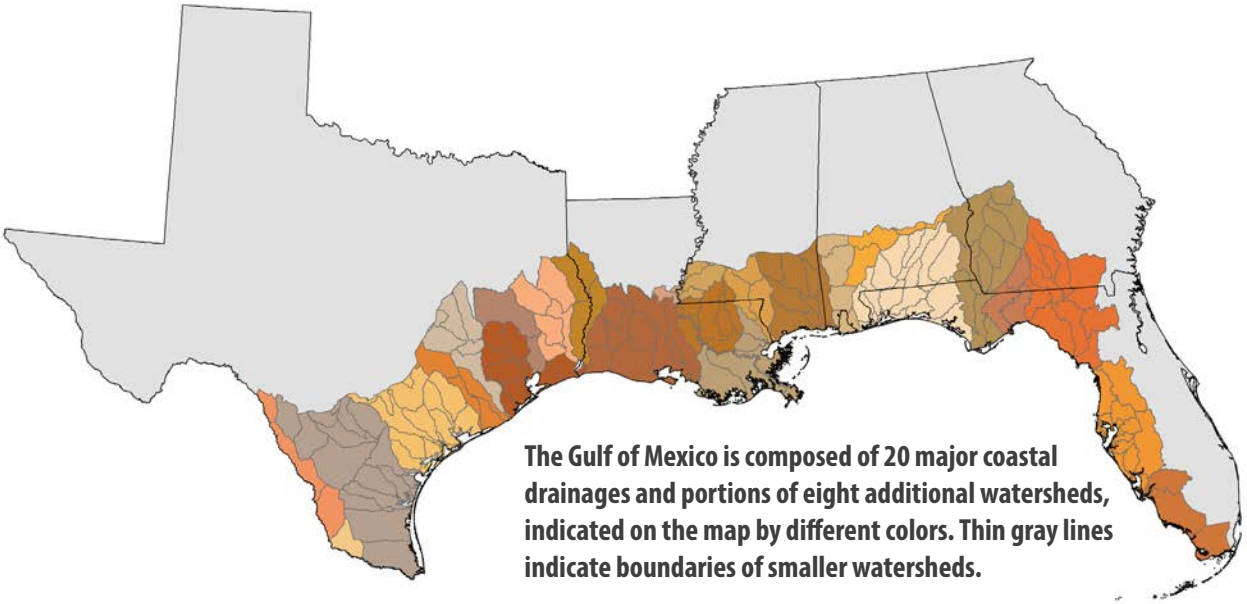
To learn more about the C-CAP data products used in this report and to access the data sets, please visit *www.coast.noaa.gov/digitalcoast/data/ccapregional*.

About the NOAA Office for Coastal Management

NOAA's Office for Coastal Management works at the center of the nation's coastal management efforts. From implementing the National Coastal Zone Management Program to providing technical assistance to coastal communities through the Digital Coast, the organization strives to help the nation's coastal communities prosper in the face of numerous natural and man-made challenges. To learn more, visit the website at *www.coast.noaa.gov*.

INTRODUCTION

Location of the Gulf Coast region (red) within the Coastal Change Analysis Program's mapping coverage area (dark gray) in the contiguous United States.



The Gulf of Mexico is composed of 20 major coastal drainages and portions of eight additional watersheds, indicated on the map by different colors. Thin gray lines indicate boundaries of smaller watersheds.

THE GULF OF MEXICO REGION covers over 200,400 square miles and extends from Texas' border with Mexico in the west to the tip of Florida in the east. The region includes all the coastal portions of Texas, Louisiana, Mississippi, Alabama, the Gulf shore of Florida, and a portion of southwestern Georgia that drains away from the Atlantic Coast. The Gulf of Mexico is the ninth largest water body in the world and supports extensive sea life, from shrimp in the estuaries to deepwater corals.

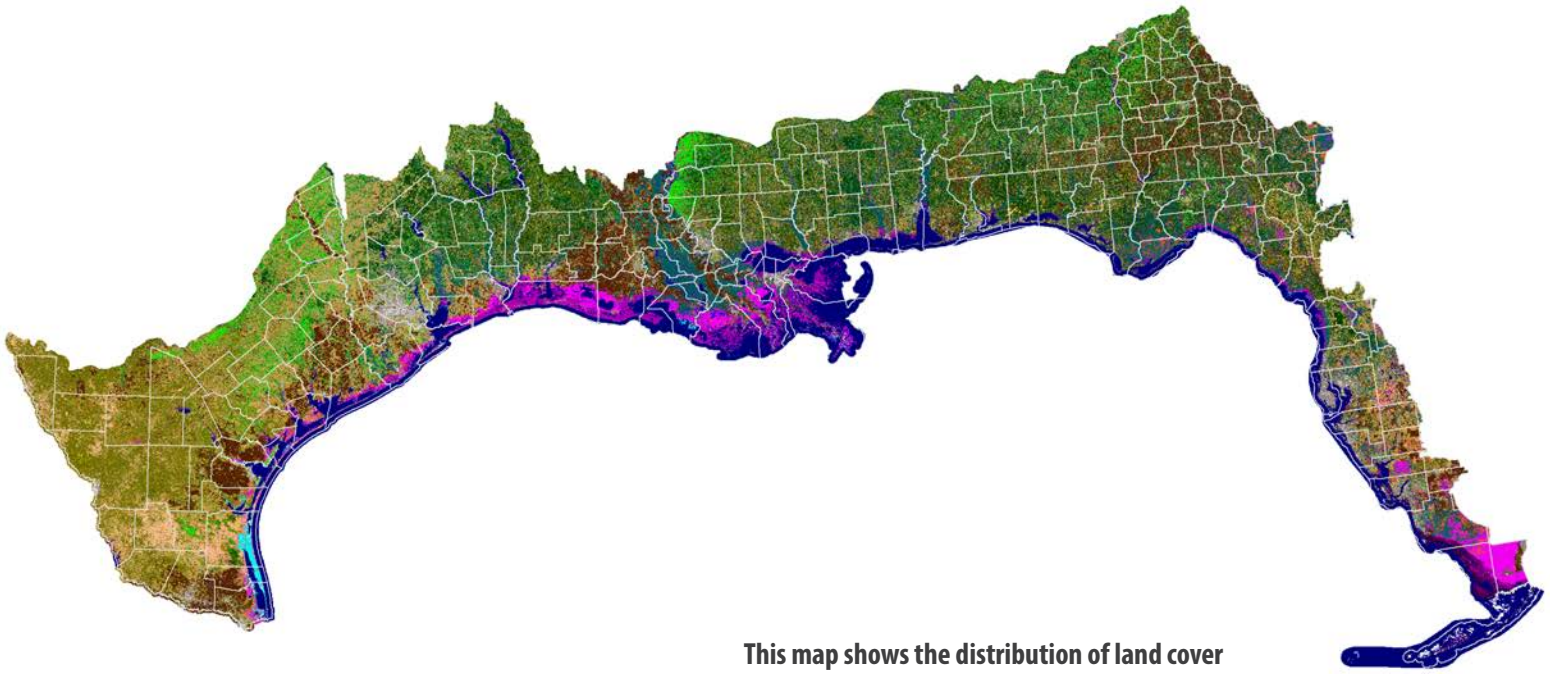
Abundant natural and living resources provide the basis for a thriving Gulf Coast economy. The nearly 30,000 miles of coastal tidal shoreline provide many recreational and ecotourism opportunities for millions of tourists, who are a major economic driver. In addition, over 90 percent of U.S. oil and gas production occurs in the Gulf of Mexico, providing billions of dollars to the regional economy. Shipping and ship building are multi-billion dollar industries as well, supported by some of the nation's top ports (by tonnage). Commercial seafood is a major marine industry, providing livelihoods and supplying the nation with abundant seafood. Many of these industries are dependent on healthy ecosystems.

However, Gulf ecosystems and local communities do face numerous threats. One of the world's largest areas of hypoxia, a "dead zone," is found in the Gulf of Mexico. The region experiences some of the most severe weather in the world, including major hurricanes, tornadoes, and thunderstorms. With the disaster of the *Deepwater Horizon* oil spill, the challenges and drivers in the Gulf of Mexico have been magnified, stressing the region's ecosystems and economy.

Many types of land cover, such as forest, grasslands, and shrub/scrub, occur in the Gulf of Mexico, and the amount of each land cover type changes over time. Using images and data collected by satellites, NOAA's Coastal Change Analysis Program (C-CAP) measured the area of each land cover type gained or lost from 1996 to 2010. In this report, 22 land cover classes are grouped into eight general categories: developed, agriculture, grass, shrub, upland forest, wetland, barren, and water.

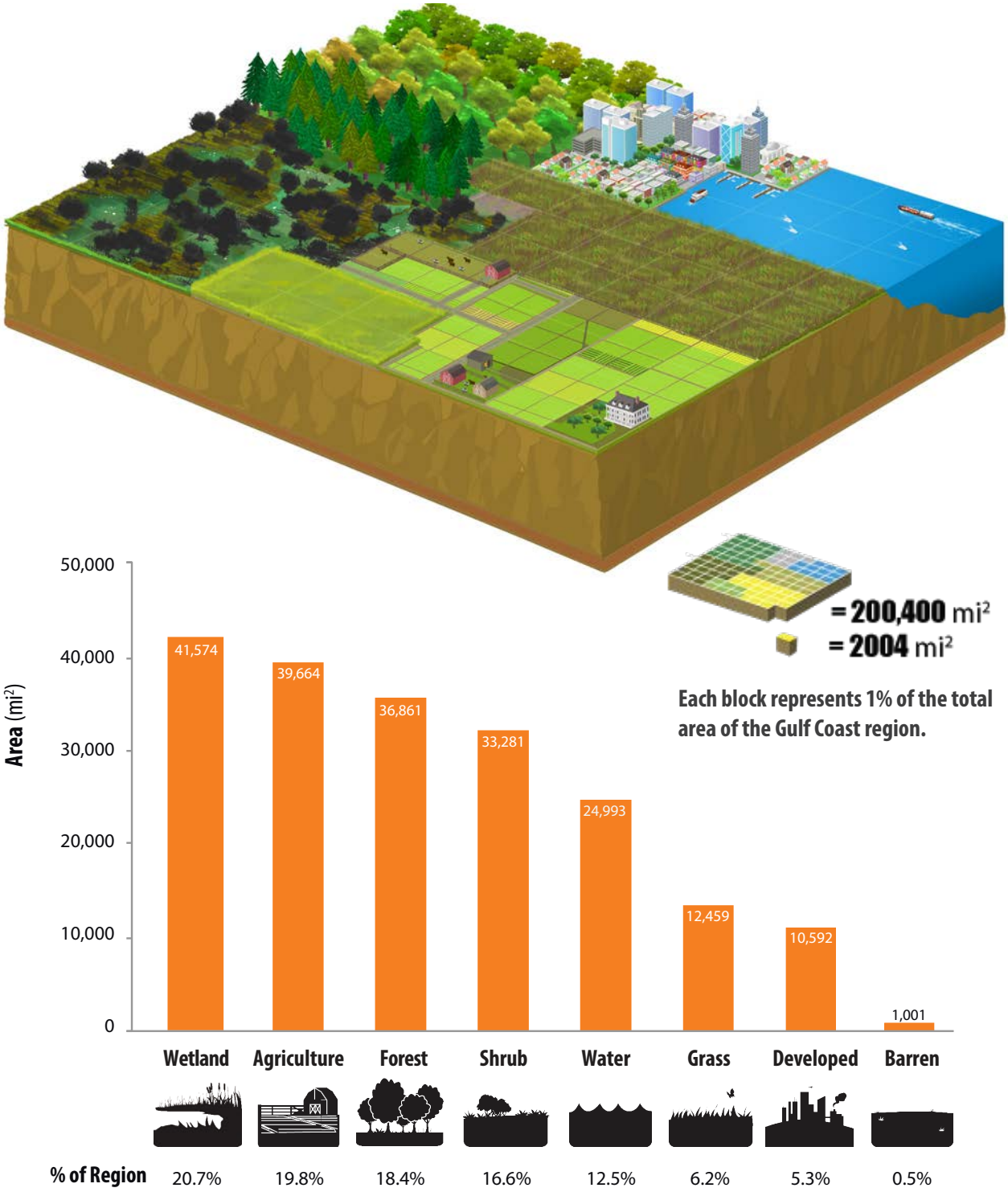
LAND COVER

- Developed, High Intensity
- Developed, Medium Intensity
- Developed, Low Intensity
- Developed, Open Space
- Cultivated Crops
- Pasture/Hay
- Grassland/Herbaceous
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Palustrine Forested Wetland
- Palustrine Shrub/Scrub Wetland
- Palustrine Emergent Wetland
- Estuarine Forested Wetland
- Estuarine Shrub/Shrub Wetland
- Estuarine Emergent Wetland
- Unconsolidated Shore
- Bare Land
- Open Water
- Palustrine Aquatic Bed
- Estuarine Aquatic Bed



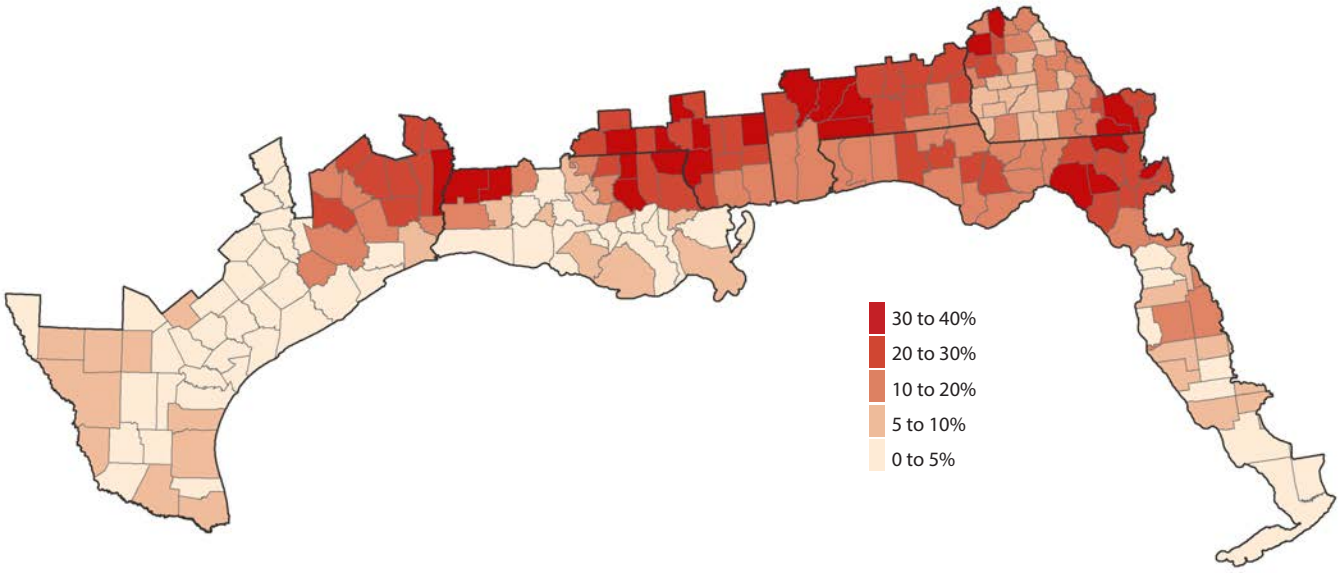
This map shows the distribution of land cover types in the Gulf of Mexico in 2010.

IN 2010, WETLANDS (21%), AGRICULTURE (20%), UPLAND FOREST (18%), AND SHRUB (17%) were the most common categories of land cover in the region, accounting for approximately 75% of the area. The next most common cover types were water (12%), grass (6%), and development (5%). Barren land makes up less than 1% of the total area.



The 22 land cover classes in the Gulf of Mexico region have been grouped into eight major categories that are displayed in the map graphic to highlight their relative distribution in 2010. More detailed information about these eight categories is displayed in the bar chart.

TOTAL CHANGE IN LAND COVER



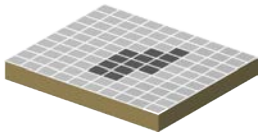
FROM 1996 TO 2010, LAND COVER changed on 26,516 square miles, or more than 13%, of the Gulf of Mexico region. Areas of change were most common between Houston, Texas, and Orlando, Florida, and were somewhat more prevalent in the counties not immediately along the coast. Much of this change is associated with timber management activities, but a significant amount of development also occurred in the region.

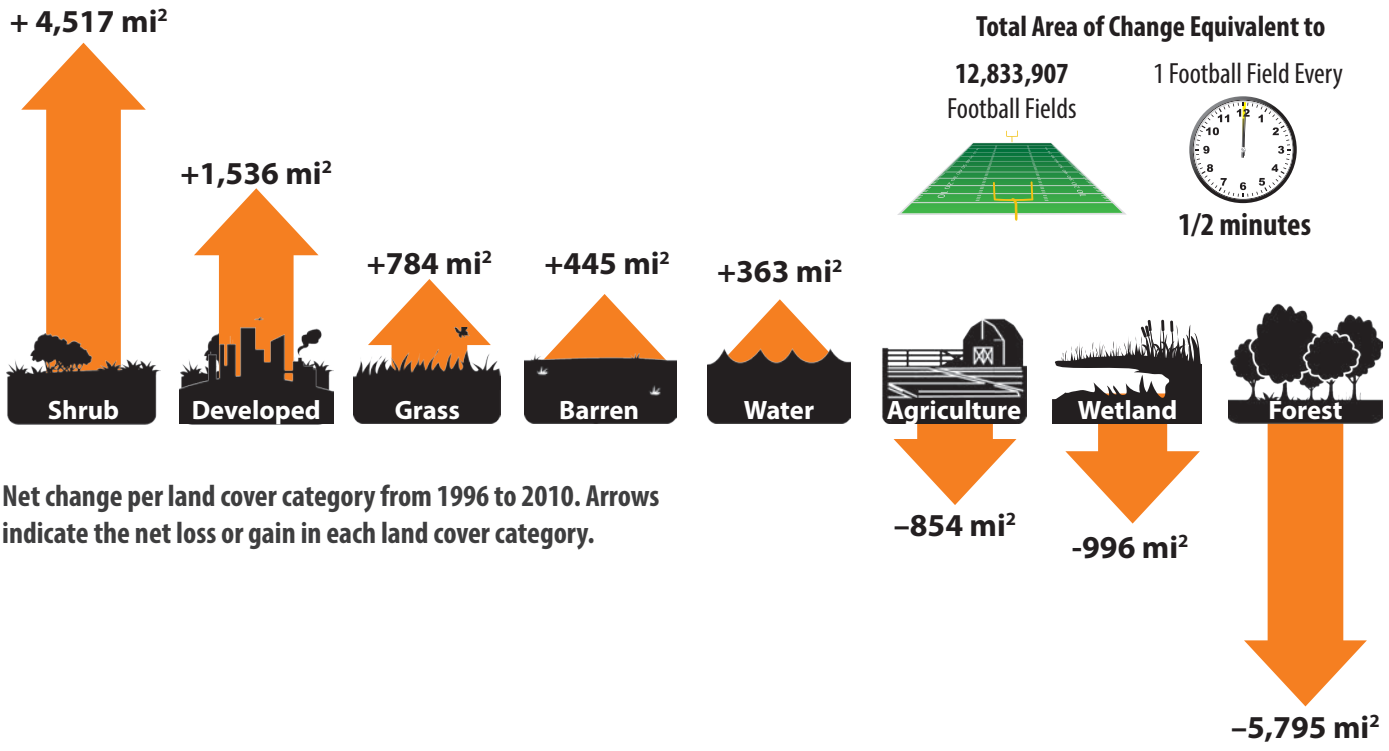
With gains of 4,517 and 1,536 square miles, respectively, shrub/scrub and developed were the two land covers with the greatest net increases in area. Upland forest had the largest net decrease with a loss of 5,795 square miles.

AREA OF CHANGE

26,516 square miles

13% OF REGION





Total Area of Change Equivalent to

12,833,907 Football Fields

1 Football Field Every

1/2 minutes

Net change per land cover category from 1996 to 2010. Arrows indicate the net loss or gain in each land cover category.

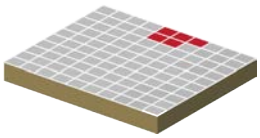
DEVELOPED

IN 2010, DEVELOPMENT accounted for 5% of the Gulf of Mexico. This development is concentrated in the northern Gulf along interstate 10 from Houston, Texas, to Panama City, Florida, and along the central Florida coastal areas of Tampa and Fort Meyers.

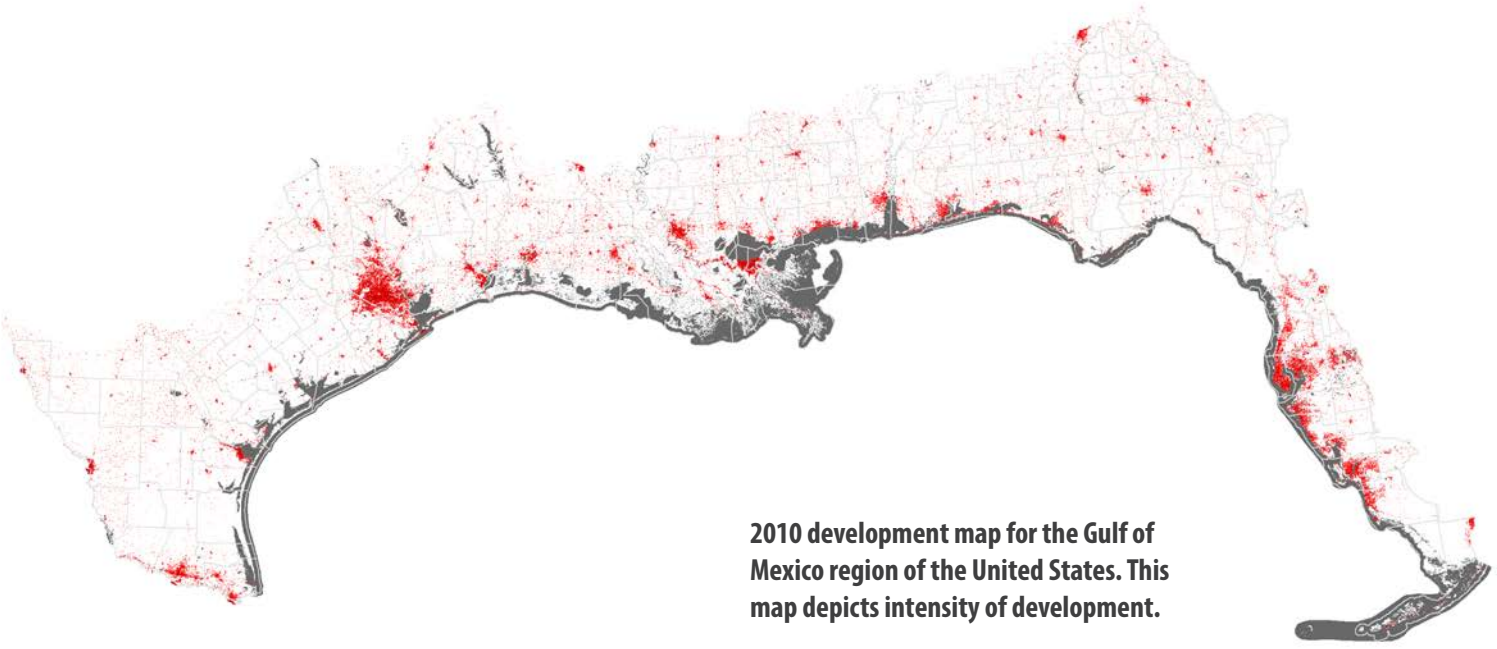
DEVELOPED AREA

10,592 square miles

5% OF REGION

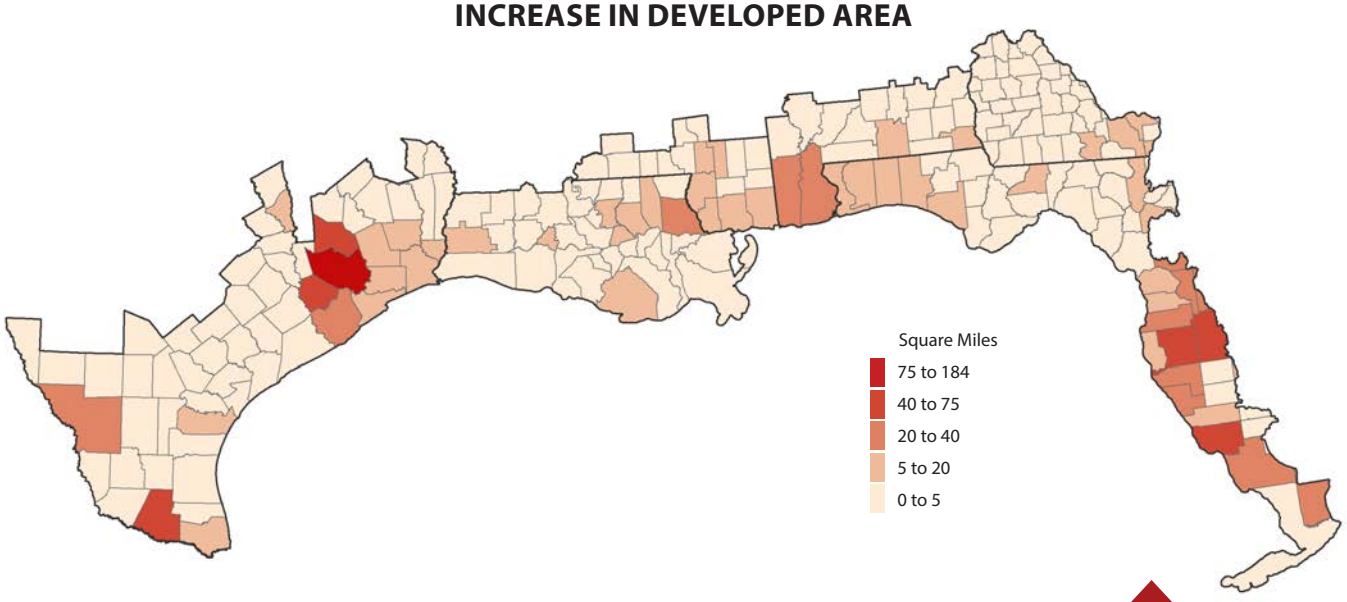


- Developed, High Intensity
- Developed, Medium Intensity
- Developed, Low Intensity
- Developed, Open Space



2010 development map for the Gulf of Mexico region of the United States. This map depicts intensity of development.

INCREASE IN DEVELOPED AREA

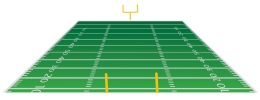


FROM 1996 TO 2010, THE AMOUNT OF DEVELOPED AREA increased in the region by 1,536 square miles, which represents a 17% rate of growth. Approximately two-thirds of this new development was classified as low intensity or open space developed, which typically includes the suburban and rural neighborhoods surrounding metropolitan areas, and the associated parks, golf courses, and housing with large lawns. The counties surrounding Houston, Texas; Orlando and Fort Meyers, Florida; and McAllen, Texas (along the Mexican border), are all areas of high increasing growth.

New development across the Gulf of Mexico during the 14-year time period came from lands previously categorized as agriculture (31%), upland forest (25%), wetlands (17%), shrub (14%), and grass (9%). An additional 3% came from barren land and water features. Development intensity increased on 176 square miles of already developed land; this type of change is commonly associated with increasing density of housing or infill development within city limits.

Increase in Developed Area Equivalent to

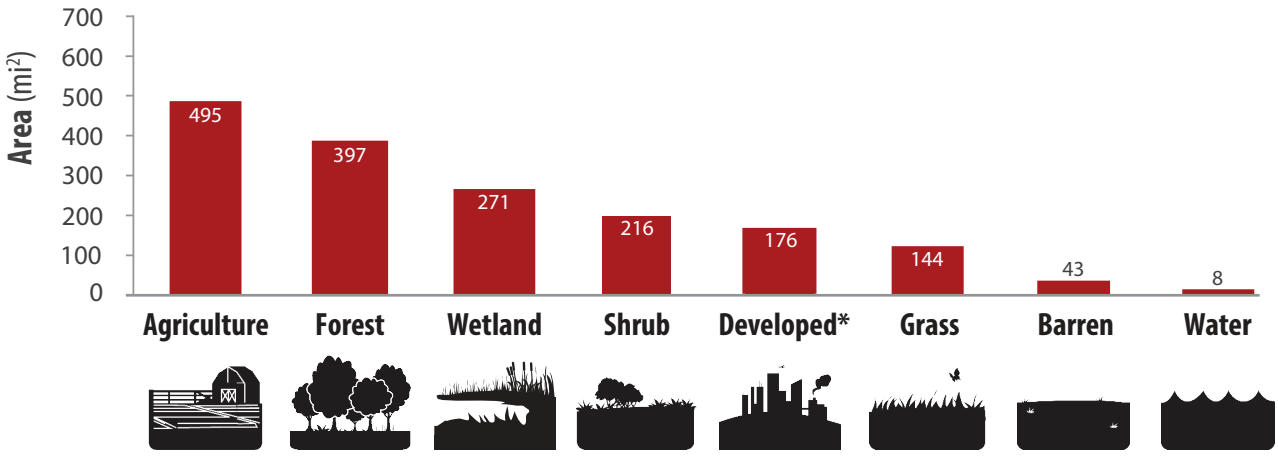
743,375
Football Fields



1 Football Field Every

10 minutes

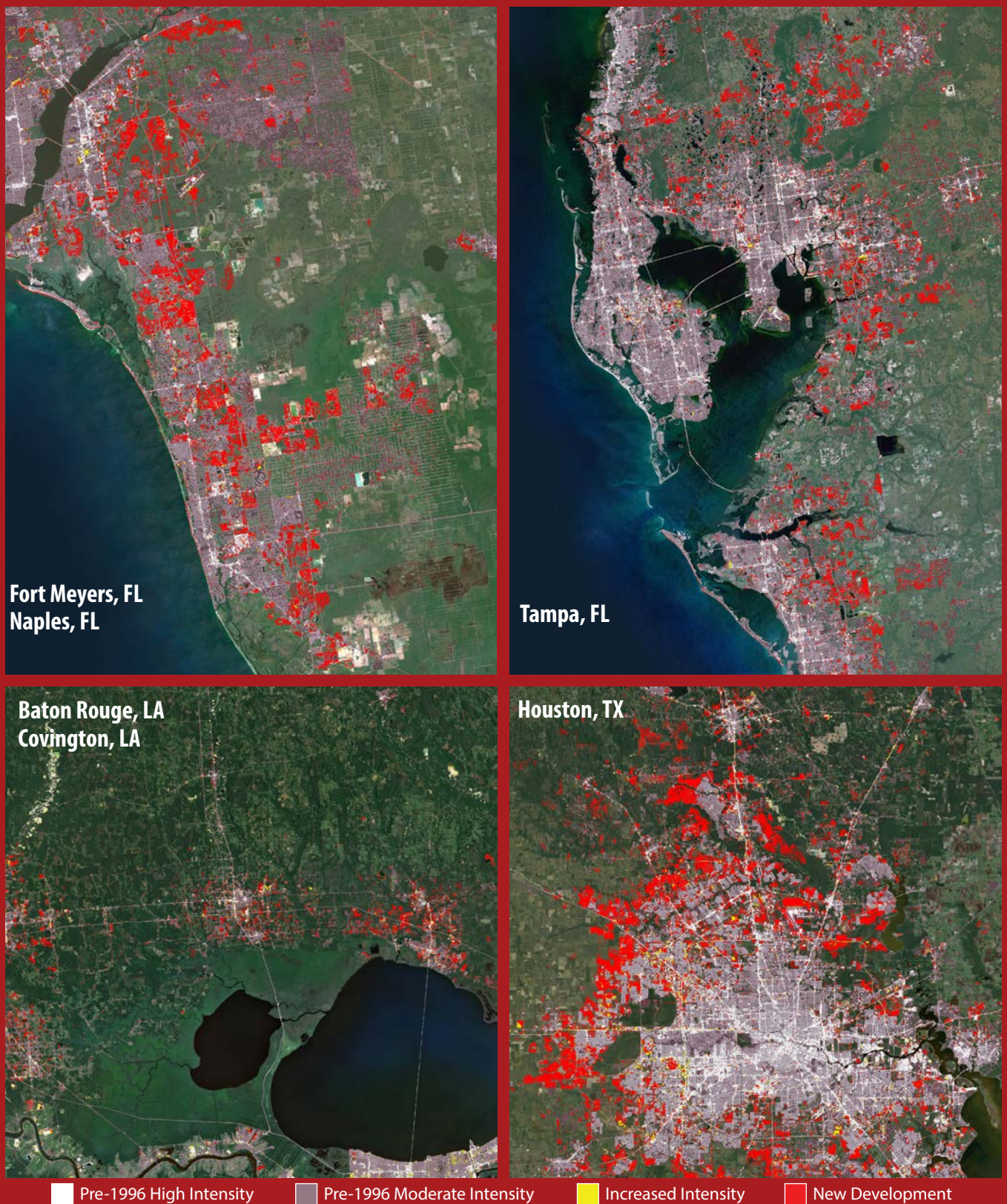
LAND COVER CONVERTED TO DEVELOPED AREA



This bar graph shows the area of each land cover that was converted to development between 1996 and 2010.

* Increases in development intensity

HIGHLIGHT: METROPOLITAN DEVELOPMENT TRENDS



These images of large metropolitan areas within the Gulf of Mexico region show patterns of new development (red) and increased density or infill development (yellow). This development often forms a halo pattern around a preexisting city core, reflecting the expansion of major roads and population growth away from the downtown. Background images: Esri

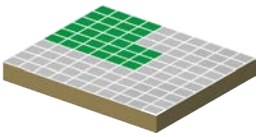
FOREST

IN 2010, FOREST covered 30% of the Gulf of Mexico region, including 18% upland forest and 12% wetland forest. While this report thus far has placed wetland forest types in the wetlands category, this section considers upland and wetland forests together for a more comprehensive view. Forest is clearly the dominant cover type for the region, with greater densities of forested areas in the northern Gulf and away from the large metropolitan areas and the drier regions of southwestern Texas. Evergreen and freshwater wetland forests are the dominant forest types, each accounting for 40% of all forested areas.

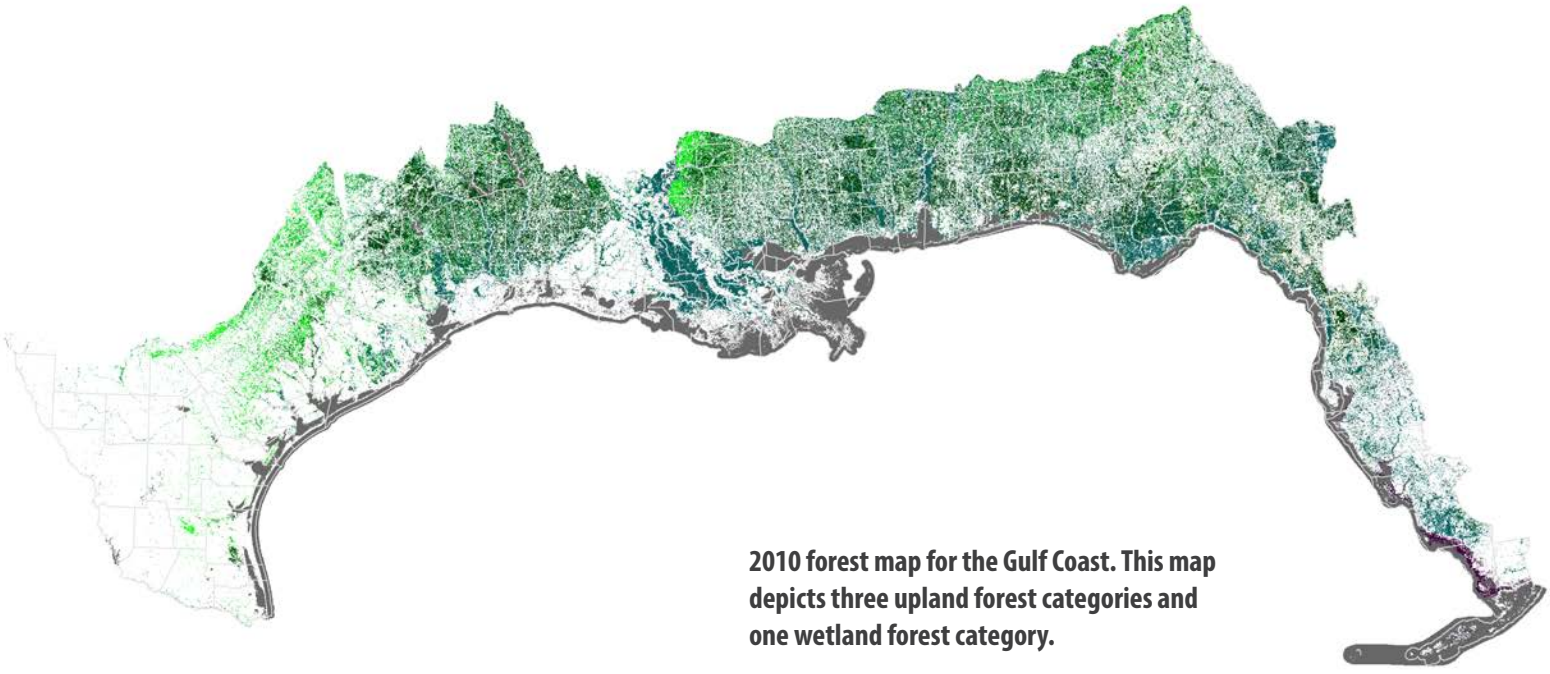
FORESTED AREA

61,441 square miles

30% OF REGION



- Deciduous Forest
- Evergreen Forest
- Estuarine Forest
- Mixed Forest
- Palustrine Forested Wetland

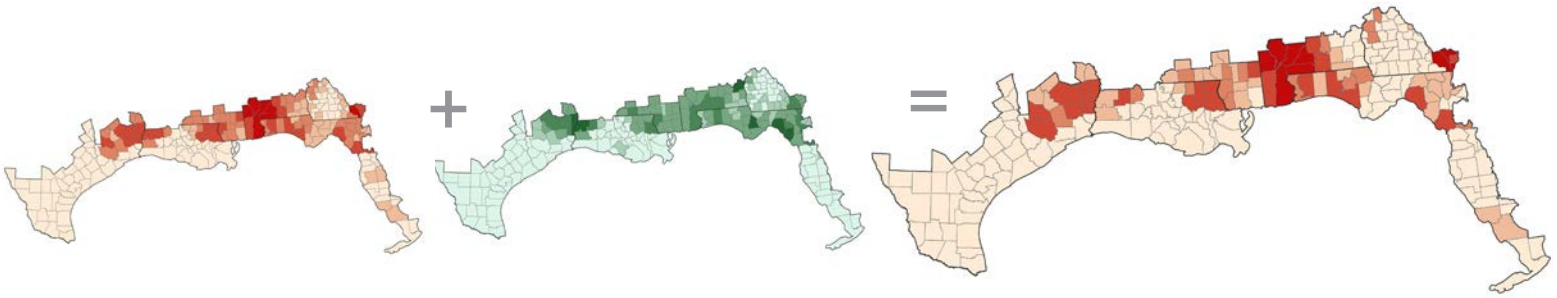


2010 forest map for the Gulf Coast. This map depicts three upland forest categories and one wetland forest category.

FOREST AREA LOST
13,225 square miles

FOREST AREA GAINED
4,519 square miles

NET CHANGE IN FOREST AREA

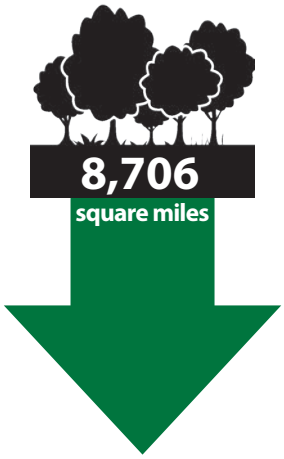


Square Miles
- 200 to 324
- 120 to 200
- 60 to 120
- 25 to 60
- 0 to 25

Square Miles
- 75 to 160
- 50 to 75
- 25 to 50
- 10 to 25
- 0 to 10

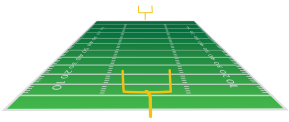
Square Miles
- -150 to -275
- -75 to -150
- -50 to -75
- -25 to -50
- +39 to -25

FROM 1996 TO 2010, 13,225 SQUARE MILES OF FOREST changed to other types of land cover (above left), and 4,519 square miles of other land cover changed to forest (above center). The result was a net loss of 8,706 square miles of forest. Most of these changes occurred in areas away from the immediate coast that are dominated by upland forest types, and away from the largest urban centers.



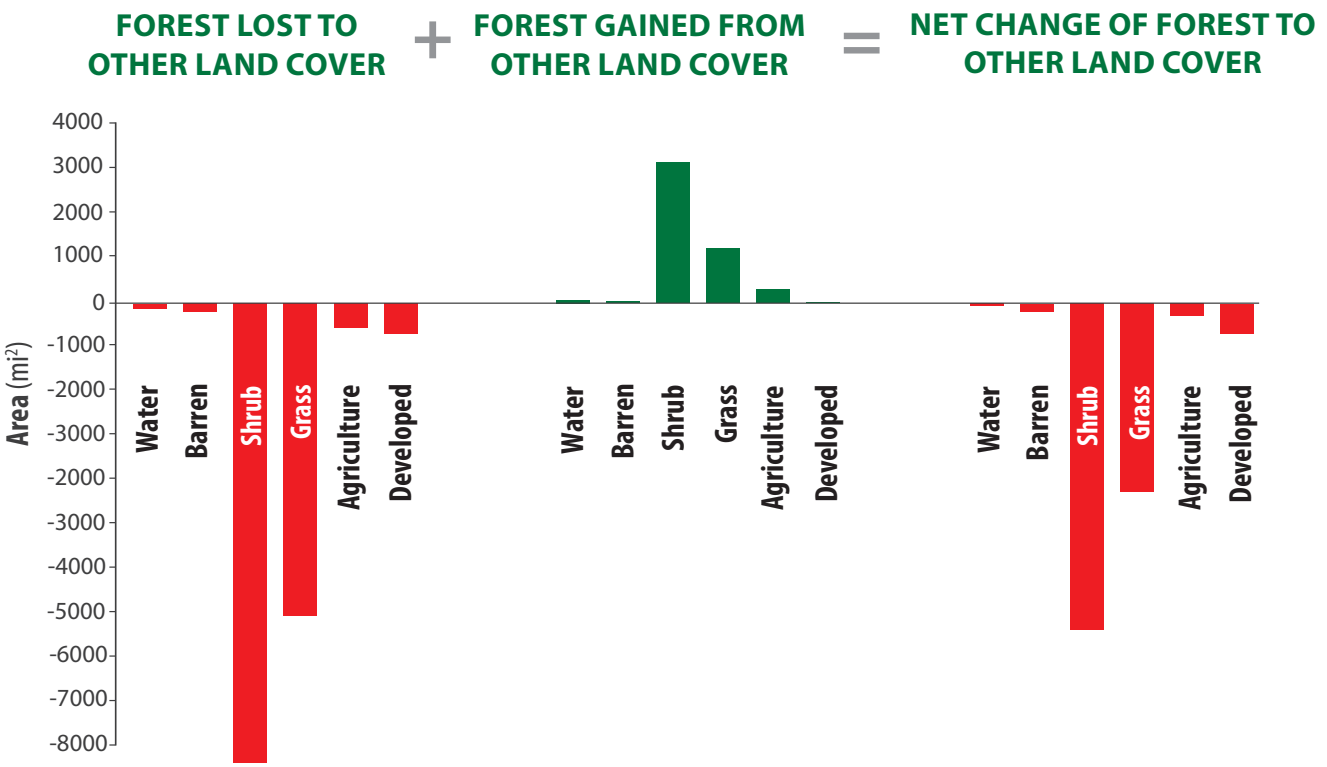
Decrease in Forest Area Equivalent to

4,213,704
Football Fields



1 Football Field Every

2 minutes

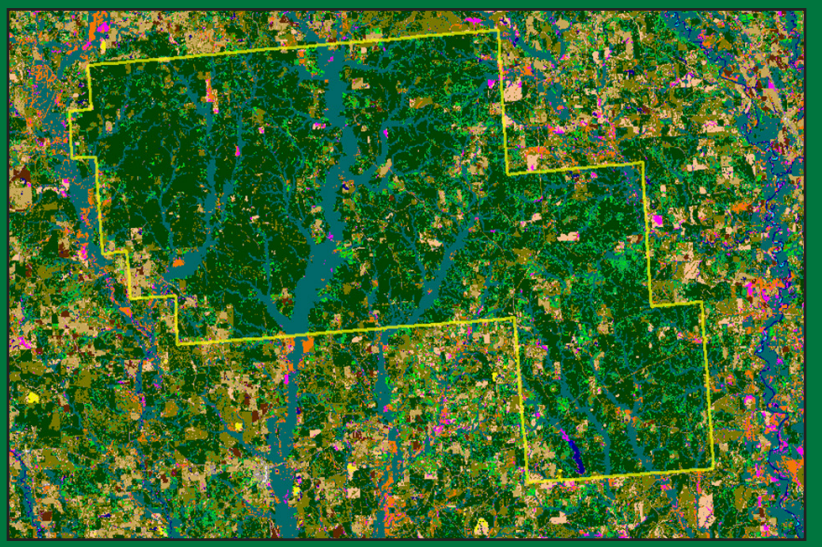


These graphs show the categories of land cover that forests were lost to or gained from, along with the resulting net change between each of these categories and forests between 1996 and 2010.

MOST OF THE LOSSES IN FOREST LAND COVER consisted of changes from forest to grass or shrub (90% of all forest losses, combined). At the same time, most forest gains came from these same two classes (95% of all gains). This pattern suggests that many of the region's forested areas are undergoing transitions that do not result in permanent loss. However, losses of forest to development are more likely to be permanent. Approximately 584 square miles of forest were lost to development during the study period, accounting for 4% of the net losses. Of these losses, 397 square miles were upland forests and 187 square miles were wetland forests.

HIGHLIGHT: FOREST MANAGEMENT AND PROTECTED AREAS

The Desoto National Forest, in Mississippi, is just one example of an area that has been established to conserve areas of natural forest. Thick stands of evergreen forest (dark green) can be seen within the boundary of the forest. Forest cutting and regrowth has occurred around, and up to the edge of, the forest but has been limited within the property boundary. The result of this cutting is a much more fragmented landscape in the surrounding area.



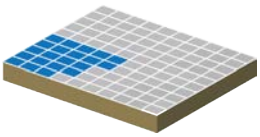
WETLAND

APPROXIMATELY 21% OF THE GULF OF MEXICO REGION was covered by wetlands in 2010. These wetlands are mainly freshwater (86%). Freshwater forested wetlands account for 57% of the total, while freshwater emergent and shrub wetlands account for 15% and 13%, respectively. Estuarine wetlands account for approximately 12% of the total, and unconsolidated shore features along the coasts, lakes, and rivers made up less than 2% of the area.

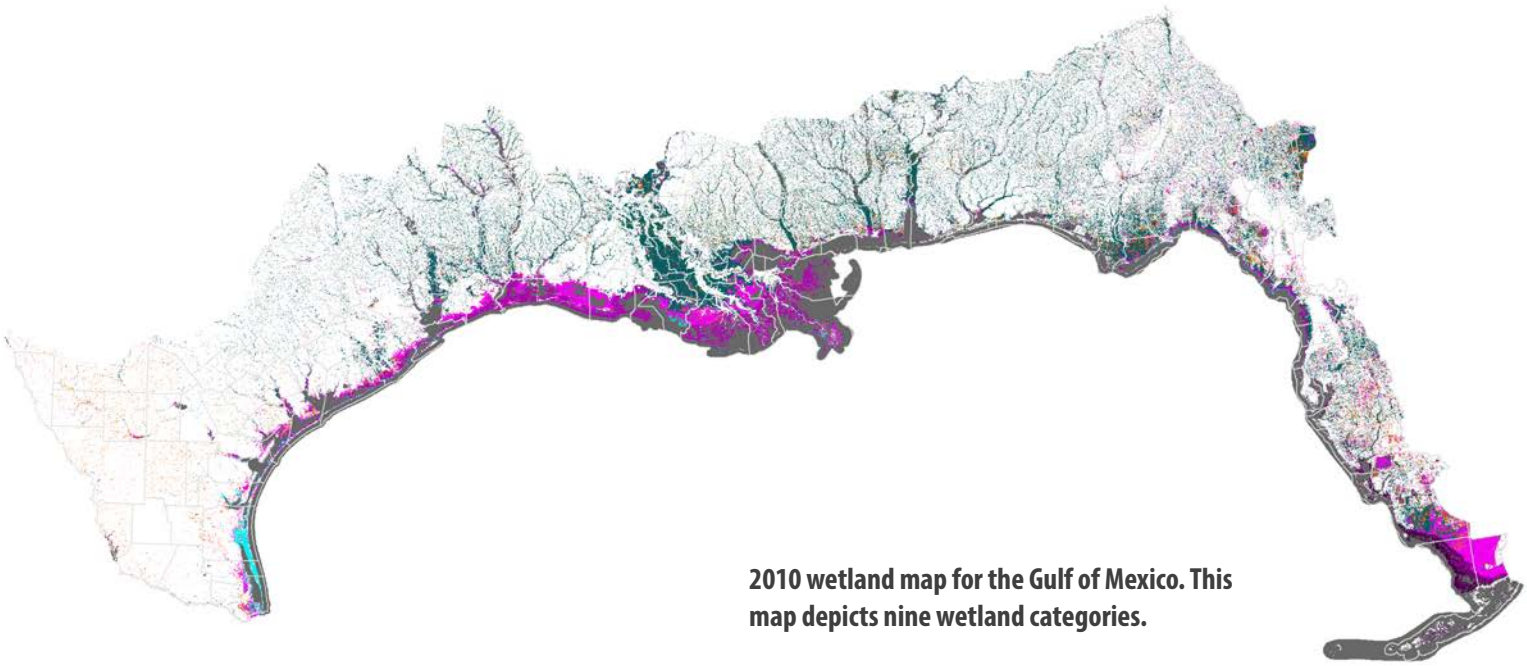
WETLAND AREA

41,574 square miles

21% OF REGION



- Palustrine Forested
- Palustrine Emergent
- Palustrine Shrub/Scrub
- Unconsolidated Shore
- Estuarine Forest
- Estuarine Shrub/Scrub
- Estuarine Emergent

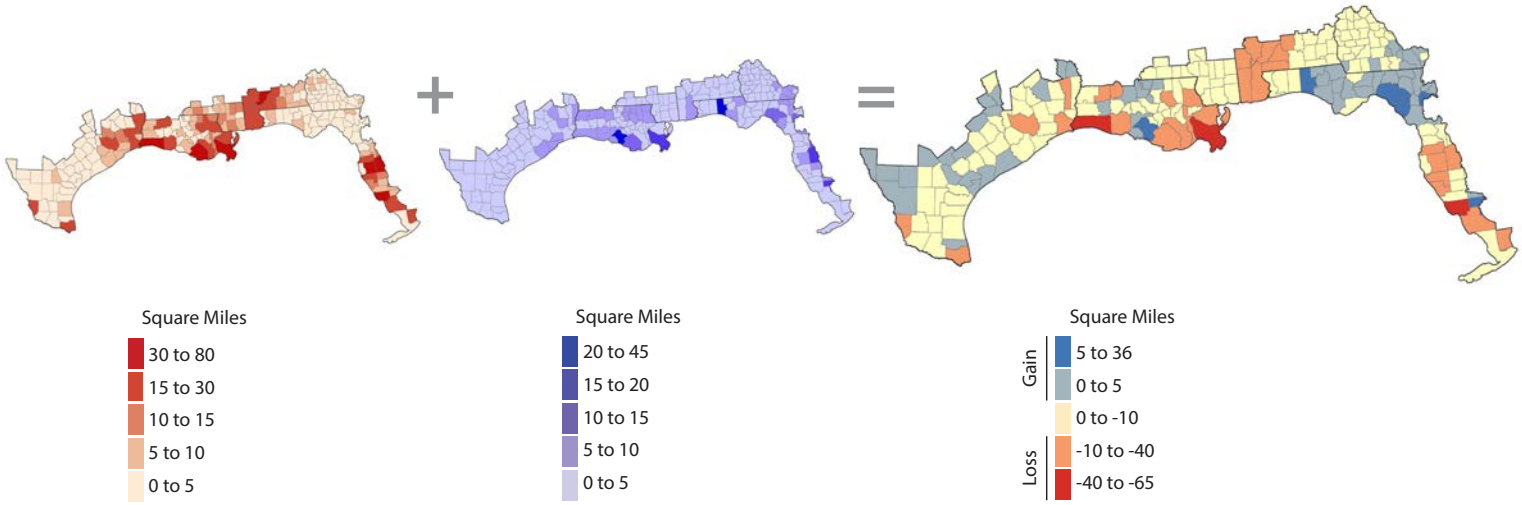


2010 wetland map for the Gulf of Mexico. This map depicts nine wetland categories.

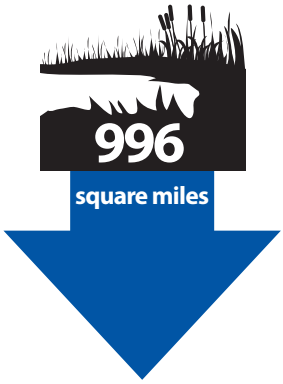
WETLAND AREA LOST
1,794 square miles

WETLAND AREA GAINED
798 square miles

NET CHANGE IN WETLAND AREA

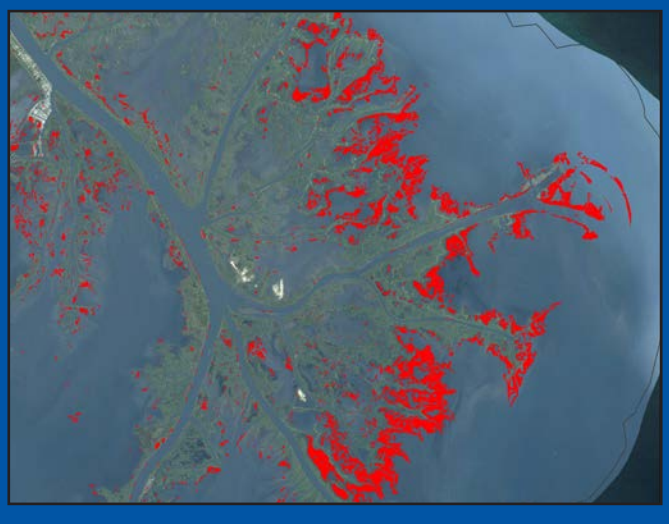


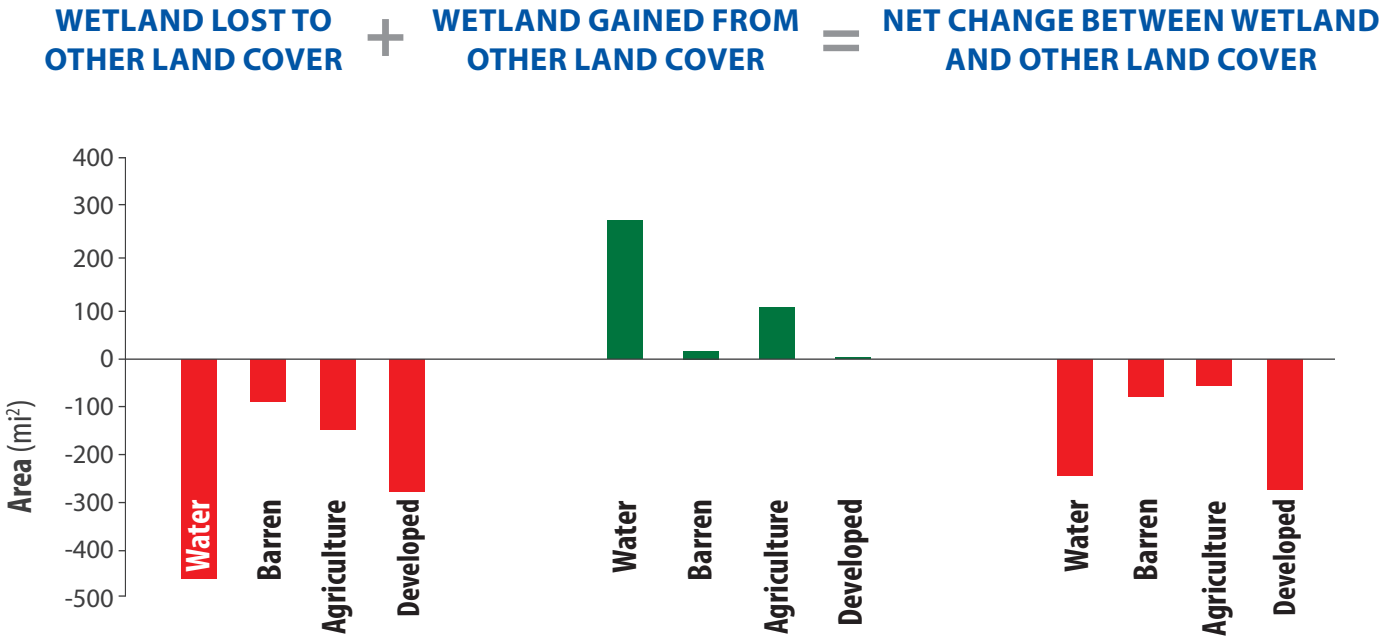
THE NET WETLAND AREA ACROSS THE REGION decreased by 996 square miles from 1996 to 2010. Total wetlands losses were 1,794 square miles (above left) but offsetting gains amounted to 798 square miles (above center). While some areas had a net gain and others had a net loss, the magnitude of losses generally dominated the gains. Coastal areas in Louisiana, western Alabama, the Orlando–Tampa corridor in Florida, and Lee County (Fort Meyers), Florida, were all areas with noted losses.



HIGHLIGHT: KATRINA IMPACTS

Long-term wetland losses and lasting impacts from Hurricane Katrina can be seen (in red) in the examples highlighted. Wetland losses in the Breton Sound and other marshes surrounding New Orleans can be seen in the map on the left. Many of these areas were flooded during Katrina and have not recovered. Similar losses can be seen in the map on the right in the area around the Bird's-Foot Delta in Louisiana. This area has suffered wetland losses from storm impacts, subsidence, erosion, and the lack of sediment to replenish the marsh surface.



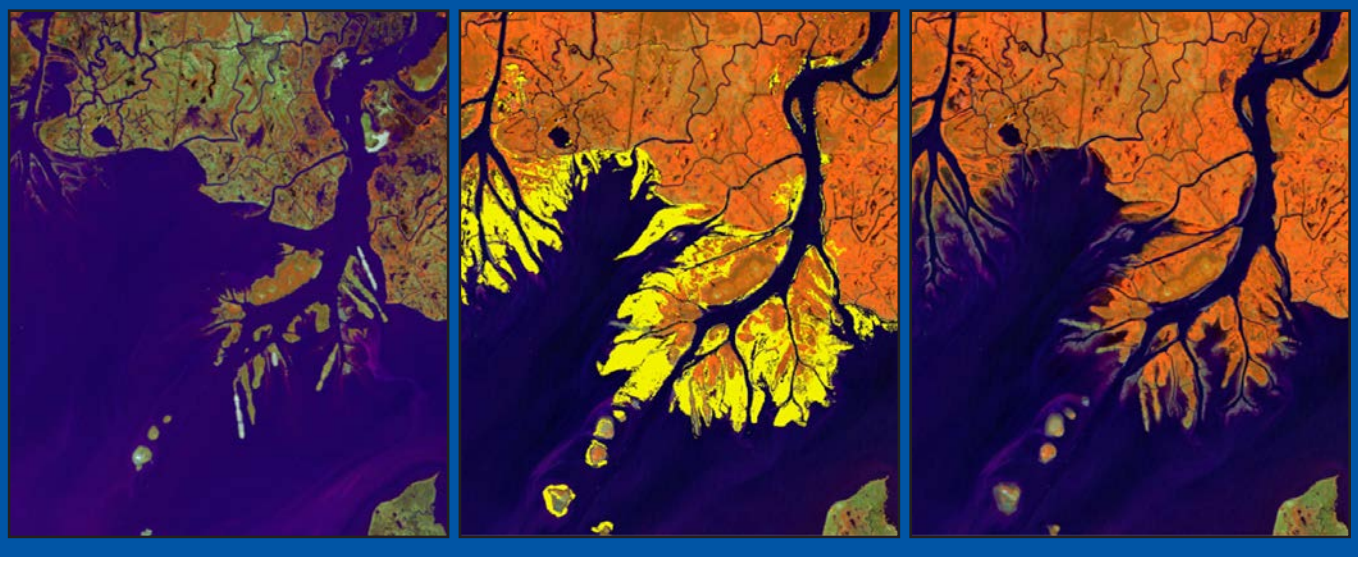


These graphs show the categories of land cover that wetlands were lost to or gained from, along with the resulting net change between each of these categories and wetlands between 1996 and 2010.

WETLANDS IN THE GULF OF MEXICO were primarily lost to water (48%) and development (28%). Most of the gains were from former water features (63% of all gains).

HIGHLIGHT: IMPACTS OF SEDIMENT

The man-made Wax Lake outlet and the natural Atchafalaya River outlet are two examples of active delta formation within Atchafalaya Bay, Louisiana. The left and right images show the area in 1996 and 2010, respectively. New unconsolidated shore formed through sediment deposition is shown in yellow in the center image.

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE