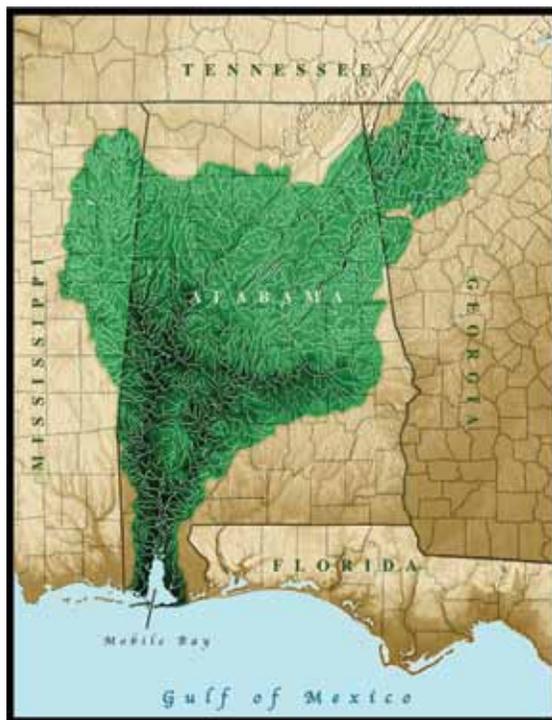


The Mobile Bay Estuary and Coastal Population Growth: The Challenge of Keeping What We've Got

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The Mobile Bay Watershed drains three quarters of the State of Alabama, much of Georgia and Mississippi, and even portions of Tennessee, making it the sixth largest basin by area with the fourth highest freshwater inflow in all of North America. At its southern terminus lies the Mobile-Tensaw Delta where all that fresh water mixes with salt water from the Gulf to form the rich, brackish waters of the Mobile Bay estuary. Its network of habitats supports the greatest diversity of species in any state east of the Mississippi River. Alabama's two coastal counties, Baldwin and Mobile, support 337 species of fish, 126 of reptiles and amphibians, 355 of birds, and 49 of mammals.¹ It also supports thriving shipping, tourism, and seafood industries and an unparalleled quality of life for over 600,000 humans. The influx of people moving to enjoy coastal Alabama's abundant natural resources poses the major threat to their continued existence.

This incredible species diversity is supported by an array of different coastal habitats that include rivers, streams, and the riparian buffers that border them; freshwater wetlands; longleaf



pine forests and pine savannahs; uniquely adapted maritime forests; intertidal marshes and flats; beaches and dunes; submerged aquatic vegetation or sea grasses; and complex oyster reefs. They provide the targets of our recreation, the buffers against our frequent storms, the filters that remove pollutants from our waters, and the nurseries, refuges, and feeding areas for the wildlife, fish, and shellfish that we watch, hunt, catch and eat. As forests are cleared, wetlands filled, waters clouded with turbid sediments, and shorelines armored, these habitats disappear along with the services they provide us and the fish and wildlife that we value.

Several of the more important habitats supporting our great species diversity have suffered the most from human activity. While natural stressors

such as erosion, storms, droughts, fire, and sea level rise underlie some habitat loss, it is what humans do that underlies the greatest losses. Critical coastal habitats that have been largely impacted include the following:





usually occur on the back dunes of barrier islands and always near or adjacent to the sea. They provide unique habitat for highly adapted animals, but their coverage has been greatly reduced by development pressures. Many of the remaining patches of maritime forests exist only under protection, since almost all would otherwise offer lucrative waterfront development opportunities.

- **Submerged aquatic vegetation (SAV)** has been called “the hallmark of healthy estuaries.” Also called seagrass beds, they are highly productive ecosystems which provide food and habitat for abundant fisheries species and help improve water quality by stabilizing sediments and reducing turbidity. A 2002 analysis of SAV coverage funded by the State of Alabama and the Mobile

Bay National Estuary program revealed that 70 percent of mid-20th century SAV beds had disappeared⁴, with an additional 1,340 acres lost by 2009⁵. While excess nutrients, prop scars, dredging, and other stressors are blamed for SAV loss elsewhere, stormwater-borne sediments from construction sites and eroded stream banks are thought to be the major stressor in Alabama, clouding the water and keeping necessary light from penetrating to the SAV.

(Continued on page 18)

- **Wetlands** perform invaluable services such as shoreline stabilization; flood protection; groundwater replenishment; water purification; and provision of breeding, nursery, refuge, and foraging habitat for wildlife and aquatic animals. But half of naturally occurring wetlands have disappeared.² Human stressors include drainage, filling, construction, and tilling for agricultural use. Logging, especially of cypress in the early 20th century, required the construction of canals that decimated wetlands and introduced salt water that prevented regrowth. The rate of wetlands loss has slowed since the 1970s due to regulations, elimination of incentives for draining, monitoring and protection programs, public education, and restoration and creation activities.
- **Longleaf pine forests** support a broad diversity of specially adapted species, are very tolerant to natural stressors such as disease and wind, and actually require occasional fire. When Europeans arrived in North America, these forests covered 92 million acres across the south. The pressures of logging, development, and land conversion for agriculture have decimated them, and today only 4.3 million acres of longleaf pine forests remain, with many of them in poor or degraded condition.³
- **Maritime forests** are wooded stands of hardwood with shortened canopies (caused by exposure to salt-aerosol) that



Mobile Bay Estuary

(Continued from page 17)

With over half (53 percent) of the nation's population drawn to live in coastal counties that make up only 17 percent of its total land area⁶, increasing urbanization and conversion of natural landscapes threaten these ecological treasures, the services and features they provide us, and especially the quality of the waters that are the main attraction on the coast.

Understanding how natural landscapes are changed to accommodate human activities and how those changes affect remaining habitats is necessary if we are to sustain the things we appreciate as we continue to grow. In 1987, Section 320 of the Clean Water Act established the National Estuary Program (NEP) to restore and protect estuaries of national significance. Designed to encourage local communities to take responsibility for managing

their own estuaries, one of the roles of NEP is to build community consensus and collaborative decision-making processes to protect and restore the water quality and ecological integrity of these estuarine systems. After Congressional nomination, the Mobile Bay National Estuary Program (MBNEP) was established in 1995 as one of 28 programs across the U.S. The MBNEP works with citizen groups, industry, academia, as well as federal, state, and local agencies to identify and address local priorities to protect our estuarine resources. These priorities are codified in a Comprehensive Conservation Management Plan (CCMP) that guides collective efforts aimed at protecting water quality, sustaining populations of key living resources, managing vital habitats, ensuring human uses, and building coastal stewardship.

In 2008, the MBNEP joined forces with the National Aeronautics and Space Administration (NASA) to analyze land use/land cover and percentage of impervious surface changes around Mobile Bay dating from 1974. These studies use satellite



Photo by Mark Burkett

imagery from different time periods to determine where and how land is used across our area and the patterns of land conversion that accompany development and urbanization.

Between 1974 and 2008, urban coverage in Baldwin and Mobile counties increased from 5.59 percent to 8.88 percent of the total study area, reflecting an overall 59 percent, or 47,692-acre gain in urban cover. These gains coincided with a decrease in upland forest coverage from 34.05 percent to 28.07 of the total study area, reflecting an overall 17.6 percent, or 86,599-acre loss in forest cover.

The primary feature of development that impacts water quality is the increase in impervious surfaces – such as buildings and pavement – that prevent the infiltration of rain water back into the ground. In a forested landscape, 40 percent of rainwater is lost to evapotranspiration, 25 percent to shallow infiltration and use by plants, 25 percent to deep infiltration to replenish ground water supplies, and only 10 percent to runoff. By contrast, in a typical urban setting with 75 percent impervious surface, 30 percent of rainwater is lost to evapotranspiration, only 10 percent to shallow infiltration, 5 percent to deep infiltration, and over half (55 percent) to runoff. Instead of soaking in, water falling on impervious surfaces accumulates and runs downhill with speed and force that erodes stream banks, causes sedimentation, and carries nonpoint source pollution from developed surfaces into coastal waters. A typical city block generates more than five times more runoff than a woodland area of the same size.

With the Clean Water Act successfully regulating industrial discharge into U.S. waters, the Environmental Protection Agency (EPA) considers runoff from urban areas the primary source of pollution to estuarine waters. Currently, over 70 different water bodies in Alabama's two coastal counties, many estuarine, have been listed as impaired (or polluted) for failing to meet the water quality standards tied to their Alabama Department of Environmental Management (ADEM)-designated uses.

Analyses such as the one performed by NASA reveal the patterns by which the estuary has been urbanized over time. The first area to exceed 25 percent impervious cover, the “tipping point” beyond which a drainage basin's receiving waters are substantially degraded, was the City of Mobile, where by the year 2000, its three major watersheds had each exceeded that threshold. Development is currently spreading south and west from that urban core.

Across the Bay in Baldwin County, areas around Daphne, Spanish Fort, Fairhope, Foley, Gulf Shores, and Orange Beach are the current “hot spots” of impervious cover. A Skylab image taken



in 1974 showing a sediment plume spreading into Mobile Bay from construction of the Lake Forest development – prior to establishment of stormwater regulations – made Mobile Bay the “poster child” nationally for sedimentation. Within the subwatersheds that feed D'Olive and Tiawasee creeks and Joe's Branch in that area, a combination of rolling topography, highly erodible soils, 5 feet 6 inches of average annual rainfall, and impervious cover from residential and commercial development have provided “the perfect storm” of stormwater runoff, stream bank erosion, and sedimentation. Sediment-loading analysis and a comprehensive watershed management plan developed for that area enabled funding to be secured to restore streams and stem sedimentation.

As upstream municipalities such as Saraland and Bay Minette emerge as the new areas of urbanization, planning and managing stormwater where it falls will pay dividends in protecting the habitats and water that make coastal Alabama special. The increased cost of doing things right will be dwarfed by the enormous costs of future retrofitting and repair of damages caused by unmanaged stormwater runoff and non-point source pollution.

The economies and revenues of the Mobile Bay estuary are critical even to Alabamians living outside of the Mobile Bay drainage basin. The State Port and its private terminals, completely dependent upon the Bay, contribute over 92,500 direct and indirect Alabama jobs, directly and indirectly contributing over \$356 million in direct and indirect tax impact to state and local governments, with a total economic impact of over \$10.3

(Continued on page 20)

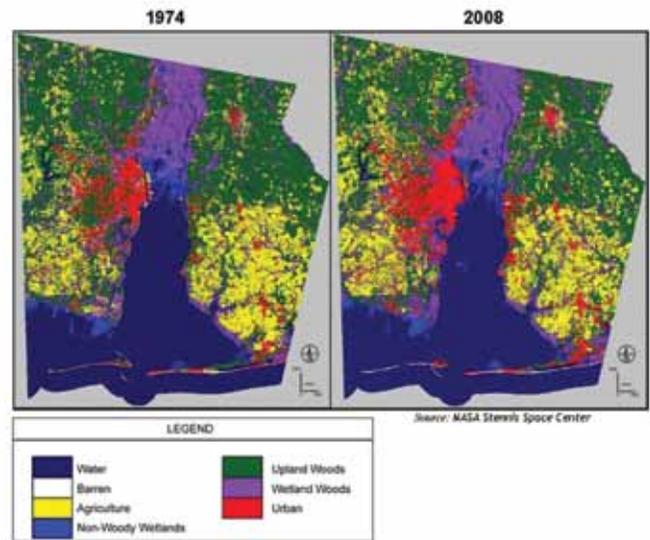


Mobile Bay Estuary

(Continued from page 19)

billion. The two other “cash cows” – tourism and fishing – are more dependent upon clean water and healthy habitats. Across the Gulf coast, tourism and recreation provide an estimated 620,000 jobs and \$9 billion in wages. About one third, or \$2.97 billion, of Alabama’s \$9 billion travel industry comes from Baldwin and Mobile counties. In 2008, an estimated 226 million pounds of seafood, worth about \$88 million, entered Alabama and Mississippi ports. In 2006, approximately 25 million recreational fishing trips were taken in the Gulf, with 929,000 marine anglers coming from out-of-state. Coastal Alabama is carrying the ball, economically.

The natural resources of coastal Alabama provide economic and ecological engines that drive a significant part of the state’s economy in addition to an unparalleled quality of life to anyone that lives or visits. Together, Alabamians can work to protect this nationally significant estuary, its range of extraordinary habitats, and its broad diversity of plants and animals, upon all of which our economic prosperity relies. The community is in the final stages of re-writing the original CCMP to update the priorities to conform to today’s world. This new plan will prescribe watershed-based management of coastal resources, using the models employed in the D’Olive, Tiawasee, and Joe’s Branch watersheds of sediment analyses, comprehensive watershed management plans, and then implementation of projects based in science to effectively address the problems that threaten our estuary and



Alabama’s “cash cow.” By prioritizing our waters and natural resources, our economy can thrive, and future generations can look forward to a coastal Alabama that looks as good as the one that we enjoy today. Theodore Roosevelt said, “The nation behaves well if it treats the natural resources as assets which it must turn over to the next generation, increased, and not impaired, in value.” Good advice.🙏

To learn more about the Mobile Bay National Estuary Program, visit www.mobilebaynep.com.



This Skylab image taken in 1974 showing a sediment plume spreading into Mobile Bay from construction of the Lake Forest development – prior to establishment of storm-water regulations – made Mobile Bay the national “poster child” for sedimentation.

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