Coastal Wetland Reviews: Highlights

United States Environmental Protection Agency

Coastal wetland review regions with focal watersheds highlighted. Source: NOAA.

The U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) conducted Coastal Wetland Reviews along the Atlantic and Gulf of Mexico coasts to better understand regional stressors on wetlands in coastal watersheds, local protection strategies, and key gaps, that if addressed, could help reverse the trend of wetland loss.

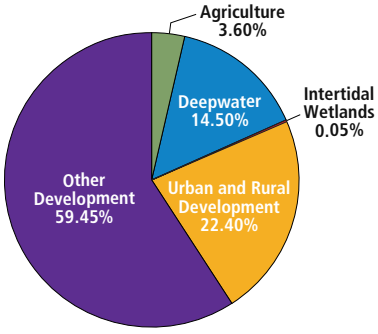
The Coastal Wetland Reviews, organized in collaboration with the federal Interagency Coastal Wetlands Workgroup, had two main components: 1) gathering available data about wetland loss in each review area and 2) convening local stakeholder discussions.

The information and data collected were combined with input from stakeholder discussions in seven focal watersheds and will be presented in four regional reports: **North Atlantic**, **Mid-Atlantic**, **South Atlantic**, and **Gulf of Mexico**. These can be found on EPA's website at **http://water.epa.gov/type/wetlands/cwt.cfm**.

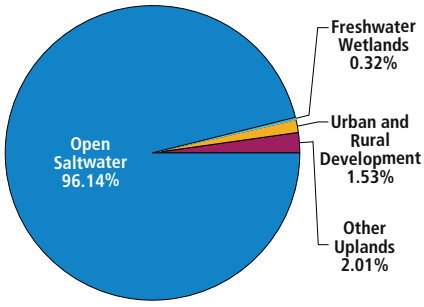
These Coastal Wetland Reviews were initiated in response to a 2008 report, published by the U.S. Fish and Wildlife Service and NOAA, entitled *Status and Trends of Wetlands in the Coastal Watersheds of the Eastern United States: 1998–2004*. This report indicated a net loss of approximately 361,000 acres of coastal wetlands in the eastern United States between 1998 and 2004—an average net decrease of 59,000 acres each year.[1] The vast majority of these losses occurred in freshwater wetlands.

Wetland loss and changes in land cover, 1998–2004: Atlantic, Gulf of Mexico, and Great Lakes[1]

Freshwater Wetlands (299,540 Acres Lost)



Saltwater Wetlands (61,560 Acres Lost)



Stakeholder Discussions

The following questions were posed in each dialogue session held with local stakeholders (e.g., state and local agencies, watershed groups, academics):

1. What are the root causes of coastal wetland loss in your area?
2. What are the current regulatory and non-regulatory protection and restoration tools being used to adapt to or mitigate wetland loss in your area?
3. What are the successful strategies being employed to protect and restore coastal wetlands in your area?
4. What information gaps would be most helpful to address loss, and how can these gaps be addressed?

[1] Stedman, S., and T.E. Dahl (2008). *Status and Trends of Wetlands in the Coastal Watersheds of the Eastern United States: 1998–2004*.

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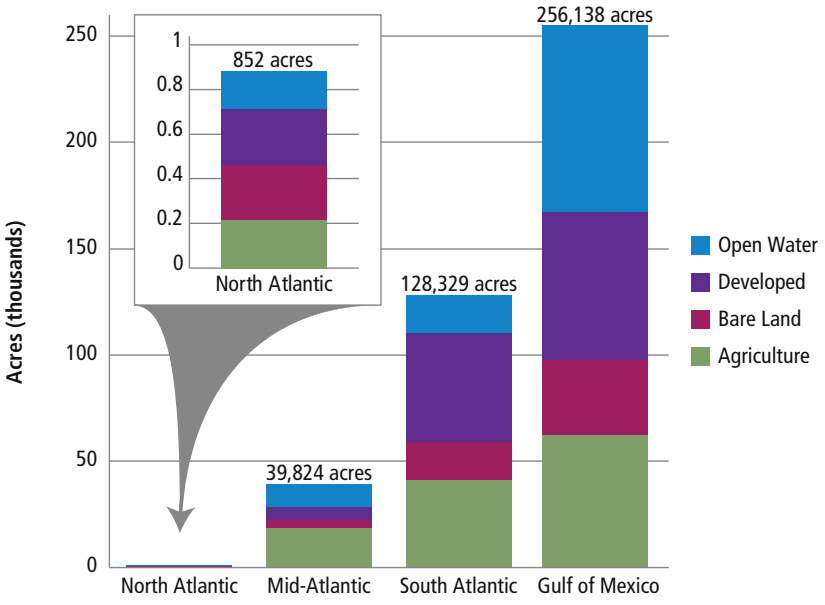
Regional Wetland Loss Data

In addition to the Eastern U.S. loss data provided by the *Status and Trends* report,[1] data from NOAA's Coastal Change Analysis Program (C-CAP) was used to estimate losses of coastal wetland acres on a regional basis. C-CAP examines changes in wetland acres by looking at changes in overall land use including wetlands (excluding submerged aquatic vegetation). Based on C-CAP estimates for each of the four Review regions:

- The Gulf of Mexico had the highest amount of total acreage loss, the greatest percentage of which was attributed to open water (typically associated with storms, erosion, subsidence, and sea level rise).
- Coastal wetland loss in the South Atlantic region was due in the largest part to development.
- The Mid-Atlantic region's coastal wetlands were lost primarily to agricultural activities.
- The North Atlantic region had very low coastal wetland acreage loss compared to the other regions. Its losses were fairly evenly distributed between the four categories (note that "bare land" is often a precursor to development).

The chart below displays total wetland acreage loss and resulting changes in land use in all four regions between 1996 and 2006.



Source: NOAA C-CAP. 1996-2006

Stressors

Common stressors identified across the review areas include:

- Development
- Hydrologic modifications
- Climate change and sea level rise
- Agriculture and silviculture activities
- Cumulative impacts from "minor" alterations
- Shoreline hardening
- Subsidence

While stressors are traditionally limited to "physical, chemical, or biological entities, or processes that adversely affect the ecological condition of a natural ecosystem," stakeholders in every review also identified programmatic issues as stressors related to loss of coastal wetlands.

Consistent with other federal agencies, EPA is defining "coastal wetlands" as saltwater and freshwater wetlands* within HUC-8 watersheds that drain to the Atlantic, Pacific, or Gulf of Mexico. "Coastal wetland loss" is defined as "a decline in the areal extent and/or ecological integrity** of wetlands in coastal watersheds."

* For the purposes of this initiative, "wetlands" means those areas meeting the definition of wetlands in: Cowardin, L. M., Carter, V., Golet, F.C., and E.T. LaRoe (1979). Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79-31. 131 pp.

** EPA recognizes that there is limited quantifiable data currently available regarding loss of wetland ecologic integrity.

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Successful Tools and Strategies

North Atlantic Region

- **State and Local Regulations:** The Massachusetts Wetlands Protection Act protects inland and coastal wetlands as well as 100-year floodplains, isolated wetlands, beaches, dunes, and banks. Additionally, about one-third of municipalities have adopted local bylaws that are more stringent than state regulations.
- **Enforcement:** A major component of Massachusetts' state program is its Wetlands Loss Mapping and Enforcement effort, which crosswalks a permit-tracking database to wetland losses observed on aerial photographs. Losses observed in aerial photographs that are not associated with permitted activities are flagged as potential violations, which are then investigated.

Mid-Atlantic Region

- **Monitoring and Assessment Program:** The Partnership for the Delaware Estuary led a collaborative effort to design a three-tiered monitoring and assessment program to track the extent and health of tidal wetlands.
- **Wetland Data Tools:** The Virginia Institute of Marine Science (VIMS), working in collaboration with the Virginia Department of Environmental Quality, has developed a number of tools to support wetland management decisions. Under development is a new wetland condition assessment tool, which includes a wetland data viewer and data layers to identify sensitive wetland areas and cumulative impacts. The tool will be used to prioritize restoration sites, evaluate performance of compensatory mitigation to replace function, and steer development away from highest value wetlands.

Newly planted marsh with fiber logs allowing plants to establish root system and stabilize shoreline. Source: VIMS.

- **Living Shorelines:** "Living shorelines" is a method used to allow landward migration of coastal wetlands, which can help them adapt to sea level rise. The Maryland Department of Natural Resources has completed shoreline management plans for its entire Chesapeake Bay shoreline using the living shorelines model, and other states are beginning to use this strategy as well.

South Atlantic Region

- **Watershed Planning and Wetlands Assessment:** North Carolina, a leader in watershed planning, implements a watershed approach to wetland protection. The North Carolina Coastal Region Evaluation of Wetland Significance (NC-CREWS) is a functional wetland assessment model. It works in conjunction with North Carolina's in-lieu fee mitigation program (the Ecosystem Enhancement Program), which is also watershed-based, and has a very high rate of compliance.
- **Volunteer Efforts:** In Florida, the Indian River Lagoon National Estuary Program—as well as other entities—are conducting a wide range of volunteer efforts. Volunteers participate in invasive species removal, water quality sampling, and public education.

Gulf of Mexico Region

- **Beneficial Use of Dredge Material:** In both Texas and Mississippi, material dredged from federal navigation projects is being beneficially used for wetland restoration and beach nourishment. Since 1995, navigational dredge material from Galveston Bay has been used to restore over 2,000 acres of wetlands. Dredged sediment from Biloxi Harbor was used to restore Deer Island (a Mississippi Coastal Preserves site) in 2005 and additional fill will be placed on the island as part of the Mississippi Coastal Improvement Program.
- **Conservation:** The Land Trust for the Mississippi Coastal Plain (LTMCP), a non-profit organization based in Biloxi, works to establish a long-term conservation program that reflects regional priorities. Working with almost two dozen state agencies, federal agencies, and non-profit organizations, LTMCP is developing a GIS-based tool to rank land based on established conservation priorities. The tool is used to support their funding requests and to inform mitigation efforts.

Deer Island restoration.
Source: Susan Rees, U.S. Army Corps of Engineers.

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Gaps and Needs

Although participants identified different gaps for each watershed, the following represents some of the most commonly expressed views across all of the regions in which reviews were conducted:

- Improved collaboration between local, state, and federal agencies and non-profit organizations
- Increased use of watershed planning, land use planning, zoning, and low impact development at the local scale to reduce the impact of development on coastal watersheds
- Permit streamlining for restoration projects such as living shorelines and removal of tidal restrictions
- Education and increased awareness of local officials and the public regarding coastal wetlands
- Greater understanding of ecosystem services provided by coastal wetlands
- Additional resources (e.g., funding, staff) to support regulatory and non-regulatory programs
- Stronger and greater publicity of enforcement actions to deter violators and to increase compliance
- Evaluation of the effectiveness of wetland mitigation to offset losses of wetland acreage and function
- Centralized and accessible database documenting authorized (permitted) wetland losses, mitigation, exempt activities, spatial data, and where available, monitoring data on wetland function
- More accurate wetland mapping including greater use of LiDAR

Next Steps and More Information

EPA will disseminate information about the Reviews to increase understanding of the factors contributing to wetland loss and to share transferable tools and practices that wetland resource managers can apply in their own coastal watersheds. EPA will work to encourage the greater adoption of successful approaches through demonstration projects, capacity building, communication vehicles, and collaborative partnership activities. EPA and NOAA will continue to work with the federal Interagency Coastal Wetlands Workgroup and seek opportunities to collaborate with state, tribal, and local partners to address gaps and needs identified in the reviews.

We hope you will use the information from these reviews to help inform the management of your coastal wetlands. Please visit EPA's Coastal Wetlands webpage, which contains further information about coastal wetlands, the Coastal Wetland Reviews, and the Interagency Coastal Wetlands Workgroup efforts to address wetland loss:

http://water.epa.gov/type/wetlands/cwt.cfm