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Accelerated Wetland Losses in Coastal Watersheds

In a study published in late 2013, the US Department of the Interior Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's (NOAA's) National Marine Fisheries Service updated and expanded earlier work (Stedman & Dahl, 2008) documenting wetland trends in the coastal watersheds of the Atlantic Ocean, Gulf of Mexico, and Great Lakes. The current study, titled Status and Trends of Wetlands in the Coastal Watersheds of the Conterminous United States 2004–2009 (Dahl & Stedman, 2013), revisits the same watersheds included in the 2008 study but expands the study to include wetlands in the coastal watersheds along the Pacific Coast. The two principal federal agencies have been supported in their work by the federal Interagency Coastal Wetlands Work Group (ICWWG), a multi-agency group composed of members from the US Environmental Protection Agency (USEPA), NOAA, USFWS, US Army Corps of Engineers (USACE), the National Resources Conservation Service, the Federal Highway Administration, and the US Geological Survey.

Findings from the 2008 study indicated a net loss of approximately 261,000 acres of

wetlands in the coastal watersheds of the eastern United States between 1998 and 2004. The Atlantic and Gulf Coast watersheds lost approximately 60,180 acres of wetlands annually during that period. The study attributed the losses to a variety of causes including inundation, human activities, and saltwater intrusion. The release of that study prompted discussion at the federal level about the need for increased wetlands protection and restoration of the coastal watersheds, along with discussion of the role of local, state, and federal actions for protection of these resources. The stated focus of the updated study and data is to document the more recent trend in these watersheds. Other purposes stated in the study are “to help prioritize conservation planning efforts for coastal wetland resources and contribute additional information to the ICWWG to facilitate strategy and policy development.”

STUDY DESCRIPTION

Coastal wetlands ecosystems—the subject of the study—are, generally speaking, all wetlands in each eight-digit hydrological unit-code watershed that drain directly to the ocean coast

wetlands. Typical wetland types captured by this designation include salt marshes, mangrove swamps, freshwater forested swamps, flatwoods, freshwater marshes, shrub depressions, and wetlands adjacent to tidal rivers. They are distinguished by tidal influence and the hydrologic connection of the watershed to the ocean or Great Lakes. The report contains mapping of the coastal watersheds involved and a quantification for each. It ascribes losses and degradation of wetlands directly to population pressures and conversion of wetlands to developed or agricultural uses. These changes result in changes to water flow, increased pollution, and habitat fragmentation. These wetland systems exist in coastal counties where population density is increasing at a greater rate than that of noncoastal counties.

The study area consists of approximately 247 million acres of coastal watersheds, which involve more than 10,000 miles of coastline and almost 54,000 miles of tidal shoreline. The study was conducted by taking randomly selected plots from the study area for assessment by digital high-resolution imagery to identify changes. This included digital high-resolution multispectral or infrared satellite imagery as well as true-color photography with 1-metre resolution. The sample plots covered four square miles; 2,614 plots were selected for sampling. The wetland and habitat changes were determined from analysis of the aerial imagery, determination of the wetland types, and identification of changes among the reference dates. The aerial imagery used was dated 2004 and 2009. Following imagery analysis, 380 sample plots (representing 14.5% of the total) were selected for ground verification. This field verification was used to confirm that the plot information was accurate.

WETLAND DEFINITIONS

The definition of a wetland and the nomenclature for the classification of wetland types used in the study are those developed by Cowardin et al (1979). This definition has been adopted as a standard by USFWS and subsequently was adopted as the Federal Geographic Data Committee standard for mapping, monitoring, and reporting on wetlands. The Cowardin definition has two parts:

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water.

For purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the

under the Cowardin methodology. The Clean Water Act definition of wetlands, by contrast, is "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas" (CWA, 1972). It is important to note that under this definition, without the presence of all three indicators (hydrology, vegetation, and soils), an area is not defined as a wetland.

There are significant distinctions between the Clean Water Act's definition of wetlands and the Cowardin definition. The Cowardin definition encompasses many areas that are not defined as a wetland under

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the Clean Water Act and are not regulated under Clean Water Act jurisdiction. That distinction should be kept in mind when reviewing the study because it is intended to help "prioritize conservation planning efforts for coastal wetlands resources and contribute additional information to the ICWWG to facilitate strategy and policy development."

WETLAND LOSSES

The study reports that there were an estimated 41.4 million acres of wetlands in the coastal watersheds of the United States in 2009. This area represents approximately 37% of the total wetland area in the conterminous United States. Compared with the previous period, the Atlantic, Gulf of Mexico, and Pacific coastal regions experienced net wetland losses of 111,960, 257,150, and 5,220 acres, respectively. The Great Lakes region experienced a net gain of wetland area. This represents an average annual rate of loss of 80,160 acres, a 25% increase in the rate of loss compared with the previous reporting period. More than 70% of the wetland losses between 2004 and 2009 were in the coastal watersheds of the Gulf of Mexico. The majority of losses of saltwater wetlands were to open water. For the period 2004 to 2009 a 35% increase in the rate of saltwater wetland

saltwater wetlands were lost between 2004 and 2009. This represented 99% of all saltwater wetland losses to open deep water in the reporting period. These losses are attributed to the effects of severe coastal storms such as Hurricanes Katrina, Rita, and Ike, high tides, increased rainfall, and erosion.

The study documented a net loss of 265,720 acres of freshwater wetlands over the study period. Although there were mild gains in the areas of freshwater shrub wetlands, emergent wetlands, and ponds, these gains were offset by large losses of freshwater forested wetlands. The study documented the decline of approximately 405,000 acres of forested wetlands over the study period. The forested wetlands declined in each of the study areas except the Great Lakes. The greatest amount of change in forested wetlands occurred in the watersheds from North Carolina to Florida on the Atlantic and from Florida to Texas on the Gulf of Mexico. Most of this change (63%) involved clearing and conversion to other wetland types and approximately 36% of the change represented loss to upland land uses. The loss of forested wetlands in the coastal watersheds made up 64% of all forested wetland losses in the United States over the study period. The study charted the land use changes associated with forested wetland loss. Of these the greatest change was in silviculture (44.3%) and development (39.1%).

According to the study, approximately 37% of the freshwater wetland losses were to upland urban and rural development. The Clean Water Act is identified as an existing method of avoiding and minimizing impact on wetlands, but the study noted that development can and does occur without authorization or in wetlands not under Clean Water Act jurisdiction. The study also documented the loss of forested wetlands resulting from upland land uses including silviculture, and the study expressed concern over the silviculture exemption from the Clean Water Act. Contrasting the normal silvicultural activity exemption and the Clean Water Act mandate that any activity that converts waters of the United States to uplands requires authorization, the study concludes that it is unclear whether silvicultural practices that caused the loss of wetlands are fully understood or addressed in a consistent manner under the existing regulatory provisions. The authors observed that under a 1995 Memorandum to the Field issued by USEPA and USACE, no Clean Water Act permit is required for silviculture activities on approximately 6.5 million acres of forested wetlands.

CONCLUSION

With these observations and the authors' conclusion that "at the federal level there is recognition that more

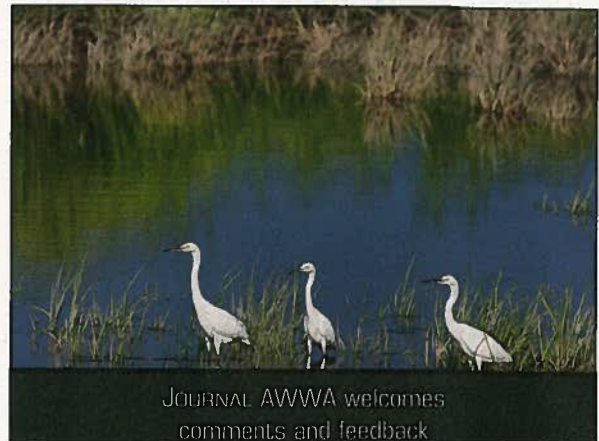
emerge in future regulatory activity at the federal level. Indeed, the authors conclude that the data and the report "may be instrumental in further formulation of recommendations to improve the management of wetlands and coastal watersheds, reduce losses and ensure that coastal infrastructure and resources are protected."

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