Chapter 6.4

Status of wetlands in the Maryland Coastal Bays

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Abstract

Current wetland acreageWetlands in the Coastal Bays have decreased substantially, especially in the northern segments. Wetlands drained for agriculture, development, and other human uses decrease habitat for wildlife and adversely affect the land's nutrient and sediment absorbing potential (e.g., buffering capability). Although slowed considerably by federal and state laws restricting impacts to wetlands, losses still occur from human-induced changes in land use, sea level rise and natural processes (erosion). The Coastal Bays watershed has lost an estimated 54,778 acres of wetlands since European settlement. Wetland loss and alteration has occurred from various activities. A network of ditches has drained many tidal and non-tidal wetlands. Tidal wetlands have also been lost due to construction of canals and bulkheads or other hard shoreline stabilization projects. Conversion of wetland to agriculture and development has also resulted in extensive wetland loss. The most recent mitigation guidelines place high weight on restoring wetlands according to needs of the watershed. Attention needs to be paid to the condition of existing wetlands, not just to their supposed existence on a map.

Introduction

There are different estimates of the extent of wetlands in the Coastal Bays, due to differences in accuracy in wetland maps, wetland definitions, and inventories over the past century. Wetland maps still fail to show all wetlands that exist in the watershed, and determinations of wetland extent, connections to other water bodies, or condition are best determined in the field.

Comparing the wetland amount (between surveys) should be done with extreme caution due to differences in methods employed by each survey. Comparisons of wetland acreage based on these surveys should not be used to determine wetland gain/loss for this reason; however, it is reasonable to use this data to characterize general changes/trends. Standard wetland classification scheme based on Cowardin et al. (1979) (excluding deepwater habitats as defined above) is presented below.

Marine wetlands

Marine wetlands encompass ocean area above the continental shelf and the high-energy coastline, including sandy beaches along the Atlantic Ocean. These are most common on Assateague Island and have only sparse amounts of vegetation. These are not directly within the Coastal Bays watershed.

Estuarine wetlands

Estuarine wetlands are tidally influenced and contain salt or brackish water, with amounts of salinity and flooding heavily impacting wetland function. They occur in areas where ocean water is at least partially diluted with freshwater and extend upstream to the zone of freshwater. Subtidal wetlands are permanently inundated with tidal water (see chapter 6.1 for seagrass abundance) while intertidal wetlands alternate between flooded and non-flooded conditions. Estuarine emergent subtidal wetlands occur along the west coast of Fenwick and Assateague Islands. These wetlands have the potential to provide valuable habitat for wildfowl (USACE, 1998). Estuarine intertidal emergent wetlands are common on the mainland shorelines. In the Assawoman Bay Watershed, there are extensive sections of emergent wetland. Other emergent wetlands are in the Isle of Wight Bay Watershed at the wider parts of Turville Creek and Herring Creek, and a few areas in the Northern shorelines of St. Martins River. There are also extensive emergent wetlands along Trappe Creek, at Brockanorton Bay, Martin Bay, Johnson Bay, and on small islands within the Chincoteague Bay. Aquatic beds occur in shallow water areas and often support submerged aquatic vegetation. See chapter 6.1

Palustrine wetlands

Palustrine wetlands are tidal and non-tidal freshwater wetlands located on floodplains associated with streams and rivers, upland depressions, and in flats between drainage systems. The headwaters within the Coastal Bays contain few wetlands, especially in Newport Bay watershed (near Berlin) and Isle of Wight Bay watershed, likely due to historic draining and filling of wetlands for agriculture, upland forest or urban development. In the Coastal Bays, forested wetlands are the most common palustrine type, with many being connected to inland freshwater portions of streams and rivers. Palustrine emergent and shrub wetlands are also present in small amounts.

Table 6.4.1 Estimated Acres of Wetlands in the Coastal Bay watershed. The National Wetland Inventory (NWI) used data collected between 1981-1982. MD Department of Natural Resources (DNR) used data from 1988-1989 and US Fish and Wildlife Service (Tiner et. al. 2000) used data from 1998.

Wetland Classification	GIS data source (acres)		
	NWI	DNR	Tiner et al. 2000
Marine	717.8	369.9	525.2
Estuarine			
Aquatic beds, unconsolidated shore, flat, beaches and bars, unconsolidated bottom	1,086.0	6,404.2	1,085.8
Emergent, scrub-shrub, forested	16,762.5	16,893.1	17,092.8
Palustrine			
Flat, open water, aquatic bed, unconsolidated bottom, unconsolidated shore	369.1	555.3	614.7
Emergent, scrub-shrub, forested	5,488.4	9,989.9	17,109.9
Farmed		443.1	47.2
Total wetlands	**24,424**	**34,730**	**36,805**

NWI data was based on digital ortho quads from 1981-1982 infrared photographs. DNR data was largely based on digital ortho quarter quads from 1988-1989 infrared photographs. Tiner et al. (2000) was based on the DNR GIS wetlands data, 1998 black and white photography, VIMS SAV data, and digitized hydric soils data (Figure 7.4.1). In this document, they acknowledge that forested wetlands may be overestimated due to difficultly in distinguishing between forests that are currently wetlands and ones that were drained but still have hydric soils (Tiner et. al. 2000).

Tidal wetlands in the Coastal Bays were classified in the Coastal Wetlands of Maryland as saline high marsh or saline low marshes (McCormick and Somes 1982). Plant species diversity is typically low, except at the high marsh to the upland border where effects of salinity are diminished (McCormick and Somes 1982). Saline high marshes were dominated by either Meadow cordgrass (*Spartina patens)* and/or Spikegrass *(Distichlis spicata),* Marshelder/Groundselbush (*Iva frutescens/Baccharis hamifolia*) and Needlerush *(Juncus roemerianus.)* Saline low marshes were dominated by Smooth cordgrass (*Spartina alterniflora*) in its tall or short growth forms. These tidal wetlands have the highest salinities of any tidal wetlands in Maryland. Smaller acreage of tidal freshwater forested wetlands were also found. Acreage distributions based on major wetland type, from 1976-77 field work and photo interpretation from McCormick and Somes (1982), was as follows:

- Saline High Marsh
    - Meadow cordgrass/Spikegrass: 2,304 acres
    - Marshelder/Groundselbush: 1,780 acres
    - Needlerush: 121 acres
- Saline Low Marsh
    - Smooth cordgrass, tall growth form: 95 acres
    - Smooth cordgrass, short growth form: 9,449 acres

There has been some encroachment from *Phragmites australis* in the Coastal Bay tidal wetlands, but it is not extensive (Dawson, pers. comm.).

According to **US Army Corp of Engineers**, there are approximately 16,600 acres of salt marsh along the Coastal Bays, with most being in Chincoteague Bay and about 2,500 acres in the Northern Coastal Bays and 5,300 acres of forest and shrub wetland on the mainland (USACE, 1998). The true wetland amount is probably somewhere between these (various estimates). Spaur et al. (2001) gave consideration to landscape position and used the HGM method for functional assessments.

Based on the **DNR wetland GIS** data, watershed acreage is as follows:
- Assawoman Bay: 2,746 wetland acres (including 20 acres farmed palustrine wetlands).
- Isle of Wight Bay: 5,648 wetland acres (including 193 acres farmed palustrine wetlands) in watershed.
- Newport Bay: 6,546 wetland acres (including 120 acres farmed palustrine wetlands) and 422 meters additional linear wetlands.
- Sinepuxent Bay: 4,023 wetland acres (including 23 acres farmed palustrine wetlands).
- Chincoteague Bay: 15,530 wetland acres (including 87 acres farmed palustrine wetlands) and 6,212 meters additional linear wetlands in watershed."

There are twelve sites designated as nontidal wetlands of special State concern in the Coastal Bays: Hancock Creek Swamp, Little Mill run, Pawpaw Creek, Pikes Creek, Stockton Powerlines, Porter Neck Bog, Powell Creek, Riley Creek and Swamp, Scarboro Creek Woods, Scott's Landing Pond, Tanhouse Creek, and West Ocean City Pond. Wetlands were designated based on presence of rare species and/or being of an unusual or unique natural community.

Data Sets
No real monitoring of wetlands.

Current wetland resources are based on fairly old information (1989 MD. DOQQ and even older NWIs).

The Maryland Department of the Environment keeps records on the extent of wetlands lost or altered through regulatory programs, gains and compensatory mitigation through regulatory programs. Information is also collected on voluntary wetland restoration efforts. A strategy for monitoring wetland condition will be developed within the next several years. Formal functional assessments of wetlands are sometimes conducted for activities proposed for extensive wetland impacts

Management Objectives: No net loss of wetlands
Restoration of 10,000 acres.

Management objectives of various agencies and programs are compiled in "Priority Areas for Wetland Restoration, Preservation, and Mitigation in Maryland's Coastal Bays," 2003 (draft) by the Maryland Department of the Environment. Restoration is listed as a particularly high priority in the Isle of Wight, Assawoman Bay, and Newport Bay because of high wetland losses and water quality concerns. Wetland restoration and siting should also be weighed against other needs, including maintenance of wellhead protection areas, prime farmland, and forests. Enhancement of existing wetlands was also recommended. Creation, restoration and enhancement priorities focus on habitat, water quality improvement, stormwater management, and shoreline stabilization. Specific areas recommended for protection include nontidal wetlands of special State concern.

Wetland Indicator: wetland loss

Data Analyses

Tracking of permitted losses and gains. Estimates of historic losses using two methods: Tiner hydric soils and ACOE Natural Soils GIS data.

Results

Permitted Losses: Little attention was paid to wetlands during the settlement of Maryland. Land which held water or was saturated and soggy during the growing season was regarded as a nuisance or an impediment to agriculture and was altered and drained wherever feasible. In the intervening centuries since settlement the value of wetlands for habitat and for water quality has been studied and increasingly recognized to the point where protection of remaining wetlands and consideration of restoration of altered wetlands is now considered. Lack of record keeping makes it difficult to know exactly how much of the area's wetlands have been altered or where they were prior to settlement. Current regulations require a permit for impacts to wetlands above a size threshold. If a permit to impact a wetland is applied for and granted the area of wetland impacted by the permitted activity is tabulated as permitted loss. Permitted losses are required to be offset by wetland creation elsewhere or by other acceptable mitigation. The difference between permitted losses and mitigation is reported as net loss. Maryland Department of the Environment tracks and reports on net loss (or gain) of wetlands in watershed. Table 7.4.2 shows the permitted wetland gains and losses collected by the Department of the Environment.

Table 6.4.2 Permitted wetlands gains and losses in the Coastal Bays.

	Wetland Gains and Losses in Coastal Bays						
Nontidal Wetlands							
1991-2003							
	Assawoman Bay	Isle of Wight	Sinepuxent Bay	Newport Bay	Chincoteague Bay	Unknown	Total
Permanent Impacts,							
regulatory	-0.71	-67.61	-4.47	-5.62	-2.04		-80.45
Permittee Mitigation		46.85	3.47	3.45			53.77
Programmatic Mitigation							
(MDE)		5	3	0.5	11.4		19.9
Other Gains		1.16	0.09	0.8	3.92		5.97
Net change, regulatory							
program	-0.71	-14.6	2.09	-0.87	13.28		-0.81
Tidal Wetlands	-0.0357	-0.3382	-0.2172	-0.165	0		-0.7561
1996-2003 incl. SAV							
open water, mudflat,							
veg. Wetland							
Tidal wetland 1996-2003							
mitigation		0.4508	0.092				0.5428
Voluntary restoration	92.15	143.3	39.1	213.6	565	823.4	1876.55
1998-*							
****2003,2004 records***							
incomplete							
						3/31/2004	
	Voluntary restoration may be in tidal or nontidal wetlands						

Historic Losses

The technique for estimating the loss of wetlands by type was developed by Ralph Tiner of the U.S. Fish and Wildlife Service, National Wetland Inventory, Hadley MA. Because saturated soils have different chemical processes from aerated soils, they develop distinctive properties which can be identified and mapped. Collectively these soils are known as hydric soils and the hydric signature can be observed even after the land has been drained and disturbed somewhat. Mapping soils classified as hydric which are not within a wetland as determined by the National Wetland Inventory or the Maryland Department of Natural Resources is the usual way of estimating historic wetland loss within a region.

Using this fact, Ralph Tiner examined the soils maps of the Nanticoke River Watershed and produced an estimate of historic loss of wetlands in that watershed. (Tiner et al. 2001). Different hydric soils classifications are associated with different wetland types so it is possible to estimate the type of wetland which occurred there before the wetland was altered. Five separate classes of historic wetland are distinguishable using this method. They are: saturated forest wetland, flooded forest wetlands, flood plain wetlands, depression wetlands and emergent marsh wetlands. In saturated forest wetlands, the Winter and Spring water table is at or just below the soil surface. These areas do not look wet when you are standing in them, but the saturated soils require that the plant roots be adapted to a lack of oxygen in the soil and the presence of precipitated metals. Only plant species able to tolerate these conditions can grow there, so the hydrology drives a plant selection function. Additionally, loblolly pine are one of the commercially important plants which can tolerate these conditions (although they do best in mesic soils). In flooded forest wetlands the water actually ponds above the surface for a substantial portion of the growing season. These wetlands are very important for the maintenance of amphibian populations (frog and salamanders) which need the standing water to complete their life cycle (temporary water bodies in wetlands without regular connection to streams are critical for reproduction). Flooded woods have essentially flat topography and the water accumulates because there is no slope to drain it away. Depression wetlands occupy a low spot in the local topography and collect surface runoff from the surrounding area but have no outlet. The water is evaporated or transpirated by vegetation or eventually recharges the groundwater. Depressions may dry out by the end of the growing season or they may maintain a permanent pool of water. Depressional wetlands can be locations of rare or unusual plant species adapted to long periods of standing water (e.g. DELMARVA Bays). Flood plain wetlands have flowing water associated with them. Flood plain wetlands may receive overland flow from streams during floods and recharge the stream through groundwater base flow during seasonal lower flows. Emergent marshes are fringing wetlands in streams or ponds in the non-tidal areas and are the predominant wetland type in the coastal tidal areas. Emergent marshes are characterized by little or no woody vegetation and a predominance of grass like plants or floating leaved plants. These wetlands are either permanently or episodically flooded.

Wetland loss and alteration has occurred from various activities. Many tidal and nontidal wetlands have been drained by a network of ditches. Tidal wetlands have also been lost due to construction of canals and bulkheads or other hard shoreline stabilization projects.

Conversion of wetland to agriculture and development has also resulted in extensive wetland losses.

Using the soil and land form information, the Coastal Bays have lost 9,845.3 hectares (24,324 acres) of saturated forested wetlands, the largest category of loss. This is to be expected because these are the easiest category of wetlands to drain with ditches. The local water table is lowered to the level of the bottom of the ditch and the soil can then be dried out and tilled. The second highest category of loss is the 7,086.9 hectares (17,512 acres) of flooded forested wetlands. Although larger amounts of water must be removed, it stall can be removed with a ditch.

Losses for flood plain wetlands and emergent wetlands are similar in the extent of impacts, 2,495 hectares (6,165.5 acres) of flood plain wetlands lost and 2,475.6 hectares (6,117.4 acres) of emergent marsh lost since European settlement. These wetlands may be lost due to either dredging or filling. The smallest loss by category are the isolated depressions, 265 hectares (655 acres) of former depressional wetlands can be identified from the soils and landform analysis. These are small wetlands and easy to fill. They may be under counted by this method. Total estimated wetland loss since settlement amounts to 22,168 hectares (54,778 acres).

The Army Corps of Engineers (ACOE Baltimore Dist. Feb. 1998) estimated a loss of Salt marsh (tidal emergent wetlands) of 6,700 hectares which is a larger loss than estimated by the Tiner method. The Corps estimated that 20,700 hectares of nontidal wetlands of all types (mostly forested) have been lost since settlement. This compares with 22,168 hectares lost using the Tiner method. These seem reasonably close for estimates made with two different data sources. The Corps estimates were made using the Natural Soils Groups GIS data prepared in 1990 by the MD Department of Planning. The new estimates done by the Tiner method use the newer NRCS SSURGO GIS data set which has higher resolution soils mapping. The increase in precision of soils mapping is a key to improving the ability to locate lost wetlands and to determine the type of wetland that should be restored at that site.

Historically, restoration has been most successful with the wetter range of wetlands while it is the drier range of wetlands, which have shown the greatest loss. The National Research Council's publication Compensating for Wetland Losses under the Clean Water Act (Natl. Academy Press, 2001) recommends that more attention be focused on recreating wetlands of the type which previously existed rather than focusing on acreage of wetlands restored. This in turn will provide the range of wetland function which previously existed because different classes of wetland provide different mixtures of function to the landscape. However, there have been more recent projects that restore wetlands in the "drier" range in the Coastal Bays watershed. New guidance on mitigation places high weight on restoring wetlands according to needs of the watershed although the resulting wetland composition may differ from historic distribution according to this approach.

In addition to outright loss of wetlands through drainage and conversion to other land use there has been degradation of the biological condition of existing forested wetlands through conversion to Loblolly pine (*Pinus taedeus*) sylvaculture for fiber production. Loblolly pine can grow under wetland condition so there is no need to disturb the hydrology of a wetland. However, forestry practices often create microsite mesic conditions by bedding and drainage practices. Furthermore, the soil and the biota are adversely impacted by the operation of the harvesting and replanting equipment and by the removal of diverse species that may compete with the pine for light and nutrition. Although such forests are still considered a wetland, they do not have the full suite of wetland functions found in an unimpacted forested wetland. Attention needs to be paid to the condition of existing wetlands, not just to their continued existence on a map.

Summary

Attention needs to be paid to the condition of existing wetlands, not just to their continued existence on a map. Wetland areas should be prioritized for restoration and protection.

Current wetland resources are based on fairly old information (1989 MD. DOQQ and even older NWIs). In order to better track the abundance and function of Coastal Bays wetlands need initiate a more comprehensive monitoring program..

There may well be continued losses of tidal marsh from shoreline erosion even with protection of existing wetlands through regulation (these are not currently made up by natural processes due to incompatibility with humanity's needs).

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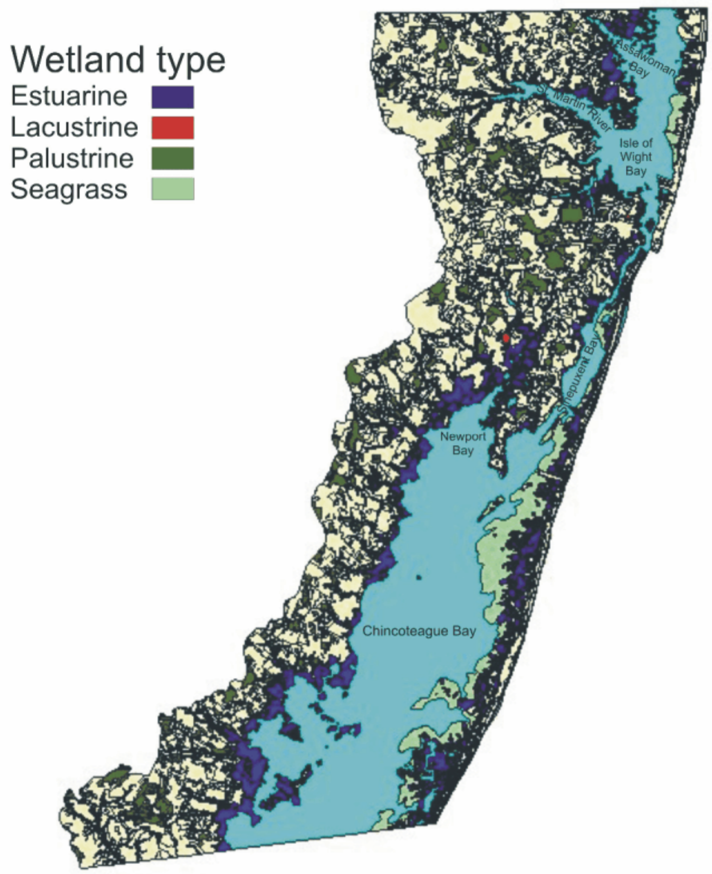

Figure 6.4.1: Map showing existing wetlands as of 2000. Estuarine wetlands are tidally influenced and contain salt or brackish water. Lacustrine wetlands are lakes or deep ponds. Palustrine wetlands are tidal and non-tidal freshwater wetlands located on floodplains associated with rivers and streams, upland depressions, and in flats between drainage systems. Seagrass beds were considered wetlands for the purposes of this report. Map reproduced from Tiner et al. 2000.