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Wetland Status and Trends in Calvert County, Maryland (1981-82 to 1988-89)

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INTRODUCTION

Wetlands are subjected to multiple impacts, both natural and human-induced. They may change from one type to another, e.g., emergent wetland to scrub-shrub wetland, due to natural succession or to minor filling or drainage. Wetlands are also destroyed directly or indirectly by human activities. Most wetlands, however, change gradually over long periods of time. Knowledge of wetland losses and gains is important for evaluating the effectiveness of government programs and policies designed to protect wetlands, and for developing strategies to reverse undesirable trends.

The Maryland Department of Natural Resources, Water Resources Administration provided funding to initiate county-based wetland trends studies in Maryland. These studies identify the extent and nature of wetland alterations for designated local areas.

The purpose of this report is to present the findings of the wetland trends analysis study for Calvert County, Maryland.

STUDY AREA

The study area is Calvert County, Maryland, situated on the Atlantic Coastal Plain and bordering Chesapeake Bay (Figure 1). The County has a land surface area of approximately 213 square miles (Hoffman 1992). The study area encompasses 15 large-scale (1:24,000) U.S. Geological Survey topographic quadrangles: Barren Island, Benedict, Bristol, Broomes Island, Cove Point, Deale, East North Beach, Hollywood, Lower Marlboro, Mechanicsville, North Beach, Prince Frederick, Prince Frederick East, Solomons Island, and Taylors Island.

METHODS

Wetland trends analysis involves comparing aerial photography from at least two time periods. For the present study, aerial photos from 1981-82 and from 1988-89 were examined and compared to determine the extent of the wetland changes (losses, gains, or changes in type) that occurred during that time period in Calvert County.

The 1981-82 photography was 1:58,000 scale color infrared aerial photography acquired by the National High Altitude Photography Program (NHAP). The 1988-89 photography was 1:40,000 scale color infrared aerial photography acquired by the National Aerial Photography Program (NAPP). Wetlands and deepwater habitats were interpreted on the NHAP photography and classified according to the Service's official wetland classification system (Cowardin, et. al. 1979) following standard National Wetlands Inventory (NWI)

mapping conventions (National Wetlands Inventory, 1990). These interpretations served as the basis for evaluating recent wetland trends.

The two sets of photographs were compared using a Bausch and Lomb SIS-95 zoom stereoscope. Changes were delineated on mylar overlays attached to the NAPP photographs. Cause of change was recorded for each polygon. The minimum mapping unit for wetlands was generally 0.5 acre, except for ponds, which were mapped when 0.1 acre or larger in size. Changes as small as 0.1 acre were detected. Wetland boundaries were improved and previously undetected wetlands were added to the original maps because the larger scale and more apparent signs of wetland hydrology of the NAPP photos improved our ability to detect and classify wetlands. Delineated changes and map refinements were then transferred to an NWI map using an Ottico Meccanica Italiana stereo facet plotter. Quality control of all photointerpretation was performed by a second photointerpreter. Tables were then prepared to present the study's findings.

RESULTS

Current Status

In 1988-89, Calvert County contained about 10,734 acres of wetlands (roughly 7.8% of the County's land surface), excluding linear fringing wetlands along narrow streams. Table 1 summarizes the acreage of the different wetland types found in the County. Palustrine wetlands predominated with 7,102 acres, representing 66% of the County's total wetland acreage. Nontidal deciduous forested wetlands accounted for 73% (5,159 acres) of all palustrine wetlands, and about 48% of the County's wetland total. Tidal palustrine wetlands totaled 1,179 acres, representing 17% of the County's freshwater wetlands.

Estuarine wetlands comprised about 33.8% (3,632 acres) of the County's wetlands. Emergent wetlands (e.g., salt and brackish marshes) were the predominant type, accounting for almost 82% (2,973 acres) of the County's estuarine wetlands. These wetlands are located along tidal rivers and creeks emptying into Chesapeake Bay. Slightly brackish marshes (oligohaline) are most common along the Patuxent River, and its tributaries north of Buzzard Island Creek.

Recent Wetland Trends

Wetland trends results are presented in Tables 2 through 9. The following discussion highlights the more significant or interesting findings.

Vegetated Wetlands

Between 1981-82 and 1988-89, approximately 29 acres of vegetated wetlands were converted to upland (Table 2). Most of these losses affected palustrine emergent wetlands, and to a lesser extent, palustrine forested and estuarine emergent wetlands. Agriculture and

road and highway construction were the most significant causes of vegetated wetland loss, with recreational facilities development also significant (Table 3). About 127 acres of vegetated wetland changed from one type to another. Upland conversion impacted the temporarily flooded palustrine wetland type more than others (Table 4). Approximately 141 acres of palustrine forested wetlands were converted to upland or changed to other wetland types (Table 5). Vegetated wetland gain from upland was limited to approximately 0.4 acres (Table 6). Most gains in particular types of vegetated wetlands came from other vegetated wetland types (Table 6). Beaver activity affected 57 acres of vegetated wetlands (Table 7).

Nonvegetated Wetlands

About 28 acres of new ponds were created from upland, and over 42 acres were constructed in vegetated wetlands (Table 8). Less than 1 acre of ponds were converted to upland, while roughly 12 acres changed to vegetated wetlands. Approximately 43% of the new ponds built in uplands were the result of farm pond construction (Table 9).

CONCLUSION

The County had approximately 7.8% of its land mass covered by wetlands. Wetlands totaling 10,734 acres (in 1988-89) were identified in the County by the Service's National Wetlands Inventory. Palustrine wetland was the dominant type, representing 66.2% of the wetlands in the County.

Between 1981-82 and 1988-89, the County lost about 74 acres of vegetated wetlands, with roughly 29 acres converted to upland. Temporarily flooded wetland was the type most frequently converted to upland. Pond construction added about 70 acres of palustrine nonvegetated wetlands, but this gain was reduced to about 58 acres by pond losses to upland and vegetated wetlands.

The overall trend for the County 's wetlands was losses of vegetated wetlands and gains in nonvegetated wetlands (mostly ponds). The significance of the increase in ponds to fish and wildlife species has not been assessed and remains a point for discussion. The losses of vegetated wetlands, however, represent known losses of valuable fish and wildlife habitats and areas providing other valued functions, including flood water storage, water quality enhancement, and local water supply.

While this report documents recent trends in the County's wetlands, it does not address changes in the quality of the remaining wetlands. As development increases, the quality of wetlands can be expected to deteriorate due to agricultural runoff, increased sedimentation, groundwater withdrawals, increased water pollution, and other factors, unless adequate safeguards are taken to protect not only the existence of wetlands, but their quality.

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Figure 1. Location of Study Area - Calvert County, Maryland.

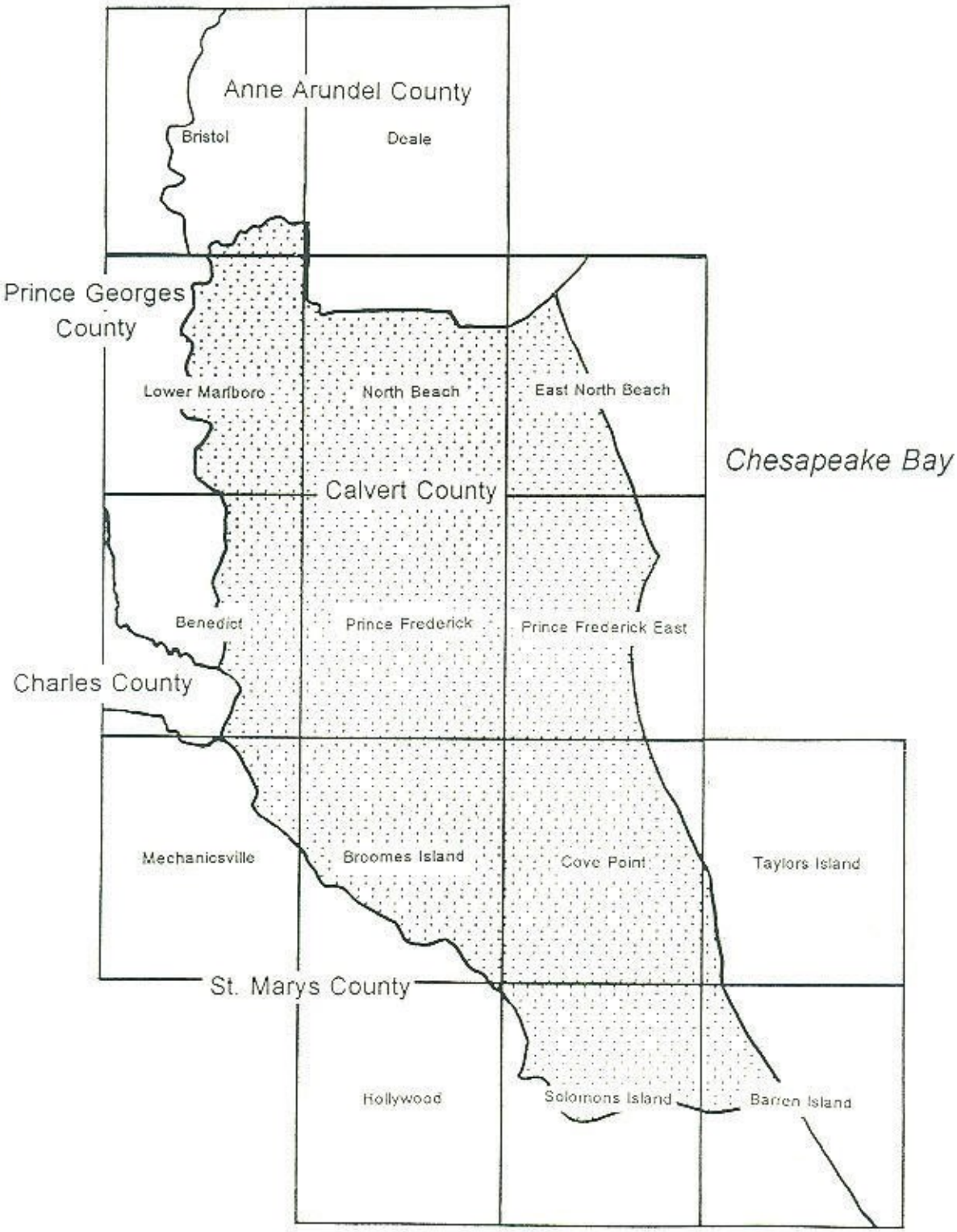

Table 1. Acreage of wetland types in Calvert County, Maryland (1988-89).

Wetland Type	Acres	% of Total
PALUSTRINE WETLANDS		
Tidal Emergent	166.8	
Nontidal Emergent		
Semipermanently Flooded	32.9	
Seasonally Flooded/Saturated	72.0	
Seasonally Flooded	28.0	
Saturated	4.9	
Temporarily Flooded	28.0	
(Subtotal Nontidal)	*(186.6)*	1.7
Total Palustrine Emergent Wetlands	**353.4**	3.3
Tidal Forested		
Deciduous, Broad-leaved	901.0	
Evergreen, Needle-leaved	5.1	
(Subtotal Tidal)	*(906.1)*	8.4
Nontidal Forested		
Evergreen, Needle-leaved		
Temporarily Flooded	54.3	
Deciduous, Broad-leaved		
Seasonally Flooded/Saturated	417.7	
Seasonally Flooded	1,057.6	
Temporarily Flooded	3,501.3	
Semipermanently Flooded	21.2	
Dead	106.3	
(Subtotal Nontidal)	*(5,159.0)*	48.1
Total Palustrine Forested Wetlands	**6,065.1**	56.5
Tidal Scrub-Shrub	106.4	

Table 1, continued

Wetland Type	Acres	% of Total
Nontidal Scrub-Shrub		
Deciduous, Broad-leaved		
Seasonally Flooded/Saturated	33.8	
Seasonally Flooded	34.5	
Temporarily Flooded	92.6	
Semipermanently Flooded	17.5	
Permanently Flooded	5.8	
(Subtotal Nontidal)	*(184.2)*	1.7
Total Palustrine Scrub-Shrub Wetlands	**290.6**	2.7
Aquatic Bed	12.4	
Total Palustrine Vegetated Wetlands	**6,721.5**	62.6
Unconsolidated Bottom (Ponds)	373.3	
Unconsolidated Shore	6.8	
Total Palustrine Nonvegetated Wetlands	**380.1**	3.5
GRAND TOTAL PALUSTRINE WETLANDS	**7,101.6**	66.2
ESTUARINE WETLANDS		
Emergent		
Irregularly Flooded	1,145.6	
Regularly Flooded, Oligohaline	7.4	
Irregularly Flooded, Oligohaline	1,820.4	
Total Estuarine Emergent Wetlands	**2,973.4**	27.7
Scrub-Shrub		
Irregularly Flooded	3.1	
Irregularly Flooded, Oligohaline	8.3	
Total Estuarine Scrub-Shrub Wetlands	**11.4**	0.1

Table 1, continued

Wetland Type	Acres	% of Total
Forested, Irregularly Flooded	13.9	
Total Estuarine Forested Wetlands	**13.9**	0.1
Total Estuarine Vegetated Wetlands	**2,998.7**	27.9
Total Estuarine Unconsolidated Shore	**633.3**	5.9
GRAND TOTAL ESTUARINE WETLANDS	**3,632.0**	33.8
TOTAL WETLANDS	**10,733.6**	**100.0**

Table 2. Changes of vegetated wetlands in Calvert County, Maryland (1981-82 to 1988-89).

Wetland Type	Converted to Upland (acres)	Changed to Other Vegetated Wetlands* (acres)	Changed to Nonvegetated Wetlands (acres)	Converted to Deepwater Habitat (acres)
Palustrine Emergent	10.2	23.8	9.8	0.0
Palustrine Scrub-Shrub	0.4	22.6	3.8	0.0
Palustrine Forested	9.6	68.7	28.2	0.0
Palustrine Aquatic Bed	0.0	1.2	0.0	0.0
Estuarine Emergent	8.4	7.4	0.9	2.6
Estuarine Scrub-Shrub	0.0	3.5	0.0	0.0
Total	**28.6**	**127.2**	**42.7**	**2.6**

*Represents changes in wetland class (e.g., emergent to scrub-shrub) but not changes in water regime within a given wetland class.

Table 3. Causes of vegetated wetland loss to upland in Calvert County, Maryland (1981-82 to 1988-89).

Cause of Loss	Acres
Agriculture	8.7
Road/Highway Construction	8.6
Recreational Facilities Construction	8.4
Public Facilities Construction	2.5
Unknown Cause	0.3
Total	**28.6**

Table 4. **Conversion of hydrologically similar palustrine vegetated wetlands to upland in Calvert County, Maryland (1981-82 to 1988-89).**

Palustrine Wetland Type	Acres	% Total Loss
Temporarily Flooded	13.3	66.0
Seasonally Flooded	5.8	29.0
Seasonally Flooded/Saturated	0.4	2.0
Seasonally Flooded-Tidal	0.6	3.0
Total	**20.1**	**100.0%**

Table 5. **Changes in palustrine forested wetlands in Calvert County, Maryland (1981-82 to 1988-89).**

Forested Wetland Type	Converted to Upland (acres)	Changed to Other Wetland Types* (acres)	Total Loss (acres)
Seasonally Flooded/Saturated	0.0	24.3	24.3
Seasonally Flooded	3.3	17.1	20.4
Temporarily Flooded	5.7	4.5	10.2
Semipermanently Flooded**	0.0	63.7	63.7
Seasonally Flooded-Tidal	0.6	22.2	22.8
Total	**9.6**	**131.8**	**141.4**

*Includes both changes in wetland class (e.g., forested to emergent) and changes in water regime within a given wetland class.

**Represents dead forested wetlands.

Table 6. Gains in vegetated wetlands in Calvert County, Maryland (1981-82 to 1988-89).

Wetland Type	Gain from Nonvegetated Wetlands (acres)	Gain from Upland (acres)	Gain from Other Vegetated Wetlands (acres)*
Palustrine Emergent	10.2	0.4	80.6
Palustrine Scrub-Shrub	0.7	0.0	28.2
Palustrine Aquatic Bed	0.5	0.0	7.4
Estuarine Scrub-Shrub	0.0	0.0	10.9
Total	**11.4**	**0.4**	**127.1**

*Represents changes in wetland class (e.g., emergent to scrub-shrub) but not changes in water regime within a given wetland class.

Table 7. Changes of wetlands in Calvert County, Maryland due to beaver activity (1981-82 to 1988-89).

Wetland Type	Change in Water Regime Only (acres)	Change in Vegetated Class (acres)
Palustrine Emergent	0.0	0.6
Palustrine Scrub-Shrub	0.0	3.8
Palustrine Forested	32.0	20.2
Total	**32.0**	**24.6**

Table 8. Gains and losses in nonvegetated wetlands in Calvert County, Maryland (1981-82 to 1988-89).

	GAINS		LOSSES		
Wetland Type	Created from Upland (acres)	Created in Vegetated Wetlands (acres)	Converted to Upland (acres)	Changed to Vegetated Wetlands (acres)	Changed to Other Nonvegetated Wetlands (acres)
Palustrine Unconsolidated Bottom	27.6	42.8	0.8	10.2	0.2
Palustrine Unconsolidated Shore	0.0	0.0	0.0	1.3	0.0
Estuarine Unconsolidated Bottom	0.0	0.0	0.0	0.0	3.2
Estuarine Unconsolidated Shore	0.0	0.0	0.0	0.0	3.9
Total	**27.6**	**42.8**	**0.8**	**11.5**	**7.3**

Table 9. **Causes of recently constructed upland ponds in Calvert County, Maryland (1981-82 to 1988-89).**

Causes	Pond Acreage
Farm Ponds	11.8
Urban Ponds	8.6
Ponds in Undeveloped Areas	6.7
Stormwater Detention Basins	0.3
Ponds of Unkown Purpose	0.2
Total	**27.6**