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Wetland Status and Trends in Selected Areas of Maryland's Piedmont Region (1980-81 to 1988-89)

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WETLAND STATUS AND TRENDS IN SELECTED AREAS OF MARYLAND'S PIEDMONT REGION (1980-81 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, largely by human activities (direct or indirect). Most wetlands change more slowly over time. Knowledge of wetland losses and gains is important for evaluating the effect of government programs and policies designed to protect wetlands and for developing effective strategies to reverse undesirable trends.

The U.S. Environmental Protection Agency (EPA) and the U.S. Fish and Wildlife Service (FWS) provided funding to initiate quadrangle-based wetland trends studies for selected areas in the Chesapeake Bay Watershed. These studies identify the extent and nature of small- and large-scale wetland alterations for selected local areas.

The purpose of this report is to present the findings of the wetland trends analysis study for two areas in Maryland's Piedmont Region, one of eighteen Maryland study areas selected by the EPA and FWS for detailed wetland trends analysis. This is the second report completed for this interagency cooperative project.

STUDY AREA

The study sites are located mostly in the Piedmont Region of Maryland (Figure 1) and have a combined land surface area of 345 square miles. In addition, deepwater habitat accounts for 1.6 square miles, with 345 acres belonging to the lacustrine system and 692 acres belonging to the riverine system. The study area encompasses six large-scale (1:24,000) U.S. Geological Survey topographic quadrangles: Buckeystown, Kensington, Libertytown, Rockville, Urbana, and Walkersville.

METHODS

Wetland trends analysis involves comparing aerial photography from at least two time periods. For the present study, aerial photos from 1980-81 and from 1988-89 were examined and compared to determine the extent of the wetland changes (losses, gains, or changes in wetland type) that occurred during that time period in the study area.

The 1980-81 photography was 1:58,000 scale color infrared (CIR) aerial photography acquired by the U.S. Geological Survey's National High-Altitude Photography Program (NHAP). The 1988-89 photography was 1:40,000 scale CIR aerial photography acquired by the National Aerial Photography Program (NAPP). Wetlands and deepwater habitats were initially interpreted on the 1:58,000 photography and classified according to the Service's official wetland classification system (Cowardin, et al. 1979), following standard NWI mapping conventions (National Wetlands Inventory, 1990). These interpretations served as the basis for evaluating current wetland status and recent trends.

The two sets of photographs were compared using an Ottico Meccania Italiana stereo facet plotter. Changes and map refinements were transferred to an NWI map using this device. Causes of change were recorded for each polygon. The minimum mapping unit for wetlands was generally 1/2 acre, except for ponds, which were mapped when 1/10th of an acre or larger in size. Changes as small as 1/10th acre were detected. Wetland boundaries were improved and previously undetected wetlands were added to the original maps because the larger scale and more apparent seasonal signs of wetland hydrology on the NAPP photos improved our ability to detect and classify wetlands. Quality control of all photointerpretation was performed by a second photointerpreter. Field work was conducted to verify changes in classification in selected areas with questionable photographic signatures. These results were used to improve wetland mapping for the original time period, especially for temporarily flooded, broad-leaved deciduous forested wetlands and small wetlands that had been missed during the original interpretation.

Interpreted data were digitized and acreage summaries generated. Tables were then prepared to present the study's findings.

RESULTS

Current Wetland Acreage

In 1988-89, the study area possessed about 4,298 acres of wetlands, excluding linear fringing wetlands along narrow streams. This total amounts to roughly 1.9 percent of the area's land surface. Table 1 summarizes the acreage of the different wetland types found in the study area.

Palustrine wetlands predominate, with about 4,237 acres. This represents about 99 percent of the study area's total wetland acreage. Deciduous forested wetlands alone account for 49 percent of the study area's palustrine wetlands.

Recent Wetland Trends

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

Vegetated Wetlands

Given the short time period examined (approximately 7.5 years), most of the vegetated wetlands in the study area remained unchanged. Only 3.5 percent of these wetlands changed in some way (Table 2). Sixty-seven percent of these changes involved filling wetlands to create land for development (upland). Palustrine emergent wetlands were the most adversely impacted with about 57 acres converted to upland (Table 6). The major causes of wetland destruction were agriculture and road and highway construction (Tables 3 and 6). Temporarily flooded wetlands received the brunt of the adverse impacts (Table 4), with 66 percent of the total loss. Change from one wetland type to another accounted for 33 percent of the total change in the original (1980-81) wetlands (Table 2).

In addition to the losses of vegetated wetlands, there were some gains (Table 7). Gains from nonvegetated wetlands were most common. Much of the gain from nonvegetated wetlands involved the establishment of palustrine emergent wetlands (freshwater marshes) due to succession, both natural and man-induced. Despite some gains in vegetated wetlands from nonvegetated wetlands and uplands, there was a net loss of about 86 acres of vegetated wetlands between 1980-81 and 1988-89 (Tables 2 and 7).

Nonvegetated Wetlands

In marked contrast to the downward trend in vegetated wetlands, nonvegetated wetlands are increasing, largely due to pond construction. There was a net gain of about 56 acres in palustrine nonvegetated wetlands from uplands and vegetated wetlands between 1980-81 and 1988-89 (Table 8). Almost all of this gain was attributed to the construction of freshwater ponds. Over 89 percent of these ponds were created in uplands, while the remainder were built in vegetated wetlands, mostly in palustrine emergent wetlands. Nearly 39 percent of the new upland ponds were created on farmland, but most of the ponds were built in other areas (Table 9).

SUMMARY

The study area has about 1.9 percent of its land mass covered by wetlands. Wetlands totaling 4,298 acres (in 1988-89) were identified in the study area by the Service's National Wetlands Inventory. Palustrine forested wetland is the dominant wetland type, representing 48 percent of the wetlands in the study area. Between 1980-81 and 1988-89, the study area lost about 98 acres of vegetated wetlands, with roughly 89 acres converted to upland. Temporarily flooded emergent wetland was the type most frequently converted to upland. Pond construction added about 85 acres of palustrine nonvegetated wetlands, but this gain was reduced to about 56 acres by pond losses to upland and vegetated wetlands. The overall trend for the study area's wetlands was losses of vegetated wetlands and lesser 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. While this report documents recent trends in the study area's wetlands, it does not address changes in the quality of the remaining wetlands. As agricultural 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.

ACKNOWLEDGMENTS

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National Wetlands Inventory. 1990. Photointerpretation Conventions for the National Wetlands Inventory. U.S. Fish and Wildlife Service, St. Petersburg, FL. 45 pp. plus appendices.

Figure 1. Location of Study Area - Selected NWI Maps in the Piedmont Region of Maryland.

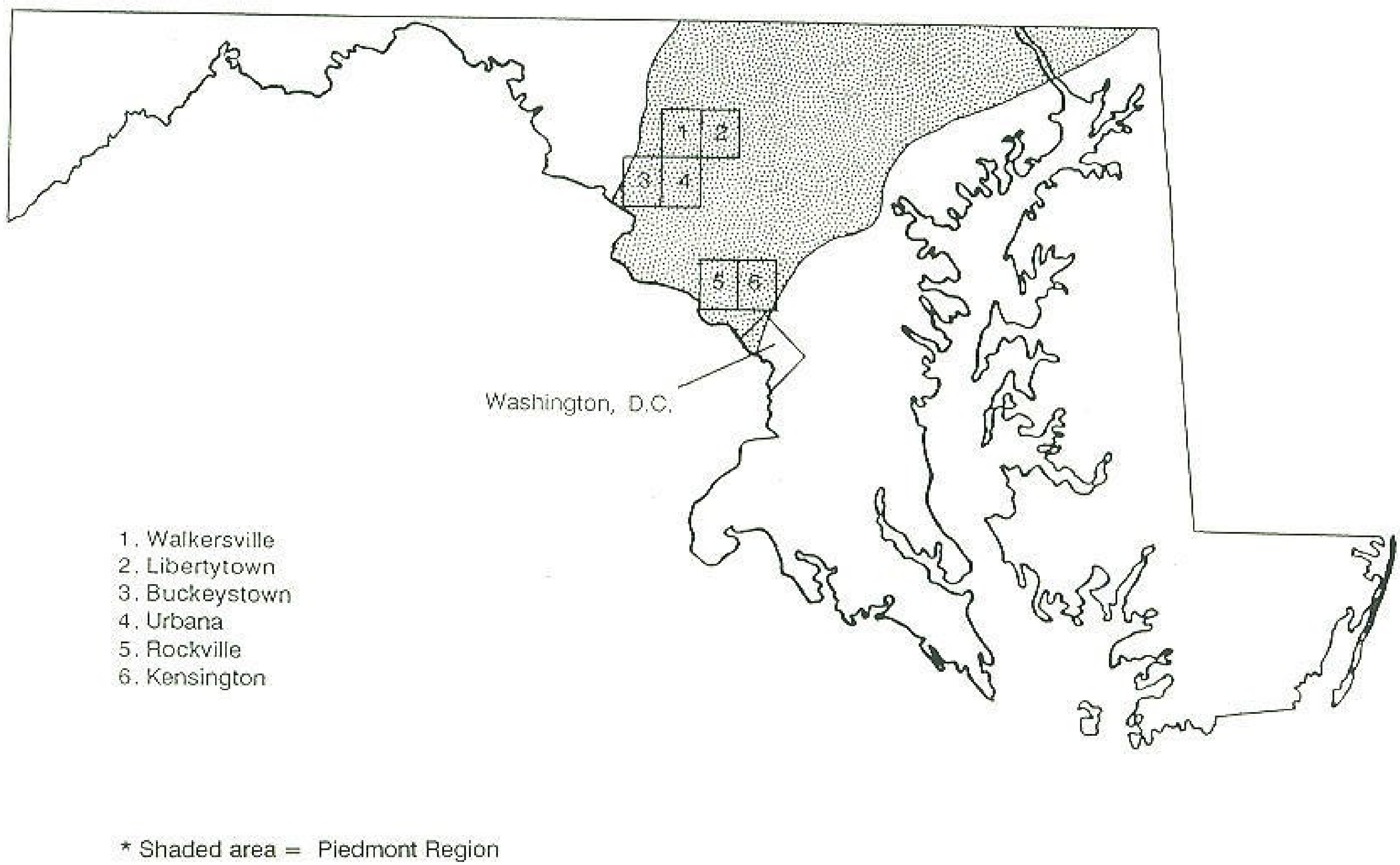

Table 1. 1988-89 acreage of wetland types in selected areas in the Piedmont Region of Maryland.

Wetland Type	Acres
PALUSTRINE WETLANDS	
Emergent	
Seasonally Flooded/Saturated	41.25
Seasonally Flooded	333.47
Temporarily Flooded	785.63
Semipermanently Flooded	4.39
Saturated	9.32
Total Palustrine Emergent Wetlands	1,174.06
Forested	
Deciduous	
Seasonally Flooded/Saturated	84.39
Seasonally Flooded	85.46
Temporarily Flooded	1,904.53
Semipermanently Flooded	4.11
Total Palustrine Forested Wetlands	2,078.49
Scrub-Shrub	
Deciduous	
Seasonally Flooded/Saturated	13.84
Seasonally Flooded	49.15
Temporarily Flooded	202.98
Semipermanently Flooded	5.43
Total Palustrine Scrub-Shrub Wetlands	271.40
Aquatic Bed	197.06
Total Palustrine Vegetated Wetlands	3,721.01
Unconsolidated Bottom (Ponds)	512.83
Unconsolidated Shore	3.06
Total Palustrine Nonvegetated Wetlands	515.89
GRAND TOTAL PALUSTRINE WETLANDS	4,236.90

Wetland Type	**Acres**
RIVERINE WETLANDS	
Nontidal Emergent	2.17
Nontidal Unconsolidated Shore	5.43
GRAND TOTAL RIVERINE WETLANDS	**7.60**
LACUSTRINE WETLANDS	
Littoral, Unconsolidated Bottom	11.80
Unconsolidated Shore	4.61
Emergent	36.98
GRAND TOTAL LACUSTRINE WETLANDS	**53.39**
TOTAL WETLANDS	**4,297.89**

Table 2. Changes of vegetated wetlands in selected areas in the Piedmont Region of Maryland (1980-81 to 1988-89).

Wetland Type	**Converted to Upland (acres)**	**Changed to Other Vegetated Wetlands * (acres)**	**Changed to Nonvegetated Wetlands (acres)**
Palustrine Emergent	56.56	33.47	7.54
Palustrine Forested	28.27	0.82	1.65
Palustrine Scrub-Shrub	3.62	0.00	0.53
Total	88.45	34.29	9.72

* Represents changes in 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 selected areas in the Piedmont Region of Maryland (1980-81 to 1988-89).

Cause of Loss	**Acres**	**% of Total Loss**
Agriculture	44.16	50.00
Roads/Highways	28.76	32.50
Housing	9.14	10.30
Unknown	2.71	3.00
Ditching	2.09	2.40
Commercial/Industrial Development	1.59	1.80
Total	88.45	100.00

Table 4. Conversion of hydrologically similar palustrine vegetated wetlands to upland in selected areas in the Piedmont Region of Maryland (1980-81 to 1988-89).

Palustrine Wetland Type	Acres	% of Total Loss
Temporarily Flooded	58.30	65.90
Seasonally Flooded/Saturated	17.21	19.50
Seasonally Flooded	12.94	14.60
Total	88.45	100.00

Table 5. Changes in palustrine forested wetlands in selected areas in the Piedmont Region of Maryland (1980-81 to 1988-89).

Forested Wetland Type	Converted to Upland (acres)	Changed to Other Wetland Types * (acres)	Total Loss (acres)
Temporarily Flooded	21.87	1.65	23.52
Seasonally Flooded/Saturated	6.40	0.00	6.40
Semipermanently Flooded **	0.00	0.82	0.82
Total	28.27	2.47	30.74

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

** Represents dead forested wetlands.

Table 6. Causes of loss in palustrine emergent wetlands in selected areas in the Piedmont Region of Maryland (1980-81 to 1988-89).

Palustrine Emergent Type	Lost to Upland (acres)	Cause of Loss for PEM
Temporarily Flooded	9.20	Agriculture
	15.84	Farmed Wetland
	1.59	Commercial Business
	1.67	Single Family Housing Construction
	2.42	Road Construction/Improvement
	2.09	Ditching
Seasonally Flooded	5.89	Agriculture
	5.19	Farmed Wetland
	1.86	Road Construction/Improvement
Seasonally Flooded/Saturated	1.65	Agriculture
	2.08	Farmed Wetland
	5.90	Road Construction/Improvement
	1.18	Unknown Cause
Total Palustrine Emergent Loss	56.56	

Loss of All Palustrine Emergent Grouped by Cause		
Subtotals per Cause	16.74	Agriculture
	23.11	Farmed Wetland
	1.59	Commercial Business
	1.67	Single Family Housing Construction
	10.18	Road Construction/Improvement
	2.09	Ditching
	1.18	Unknown Cause
Total Palustrine Emergent Loss	56.56	

Table 7. Gains in vegetated wetlands in selected areas in the Piedmont Region of Maryland (1980-81 to 1988-89).

Wetland Type	Gain from Nonvegetated Wetlands (acres)	Gain from Other Vegetated Wetlands * (acres)	Gain from Upland (acres)
Palustrine Emergent	10.61	0.82	0.71
Palustrine Scrub-Shrub	0.00	0.00	0.00
Palustrine Forested	0.00	1.37	0.00
Palustrine Aquatic Bed	0.65	0.00	0.00
Total	11.26	2.19	0.71

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

Table 8. **Gains and losses in palustrine nonvegetated wetlands in selected areas in the Piedmont Region of Maryland (1980-81 to 1988-89).**

Wetland Type	Gained From Upland (acres)	Gained From Vegetated Wetlands (acres)	Lost to Upland (acres)	Changed to Vegetated Wetlands (acres)
Palustrine Unconsolidated Bottom	75.22	9.72	17.62	9.70
Palustrine Unconsolidated Shore	0.00	0.00	0.00	1.56
Total	75.22	9.72	17.62	11.26

Table 9. **Causes of recently constructed ponds on upland sites in selected areas in the Piedmont Region of Maryland (1980-81 to 1988-89).**

Causes	Pond Acreage Created
Farm Ponds	29.50
Stormwater Detention Basins	27.26
Ponds of Unknown Purpose	8.31
Recreational Facilities	5.20
Ponds in Undeveloped Areas	3.04
Urban Ponds	1.04
Other Ponds (on public lands, unintentional impoundments, etc.)	0.87
Total	75.22