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Wetland Trends in Selected Areas of the Western Shore Region of Maryland (1981 to 1988)

U.S. Department of the Interior
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WETLAND TRENDS IN SELECTED AREAS OF THE WESTERN SHORE REGION OF MARYLAND (1981 to 1988)

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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 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 selected areas in the Western Shore Region of Maryland, one of numerous study areas selected by the EPA and FWS for detailed wetland trends analysis.

STUDY AREA

The study sites are located in the Western Shore Region of Maryland (Figure 1) and have a combined land surface area of approximately 464 square miles. The study area encompasses eight large-scale (1:24,000) U.S. Geological Survey topographic quadrangles: Odenton, Deale, Upper Marlboro, Brandywine, Piscataway, Hughesville, La Plata and Popes Creek.

METHODS

Wetland trends analysis involves comparing aerial photography from at least two time periods. For the present study, aerial photos from 1981 and from 1988 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 1981 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 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 recent wetland trends.

The two sets of photographs were compared using an Ottico Meccanica 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

Field work was conducted in selected areas to verify changes in classification. 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 Status

In 1988, the study area possessed about 24,236 acres of wetlands, excluding linear fringing wetlands along narrow streams. This total amounts to roughly 8 percent of the study area's land surface. Table 1 summarizes the acreage of the different wetland types found in the study area. Palustrine wetlands are predominant with about 21,658 acres. This represents 89 percent of the study area's total wetland acreage. Forested areas alone account for 89 percent of the palustrine wetlands. About 2,233 acres of estuarine wetlands were present, mostly emergent marshes. This represents 9 percent of the study area's wetlands.

Recent Wetland Trends

The results of the wetland trends analysis study are presented in Tables 2 through 10. The following discussion highlights the more significant or interesting findings.

Vegetated Wetlands

Between 1981 and 1988, over 140 acres of vegetated wetland were converted to upland (Table 2). Most of these losses affected palustrine forested wetland. Housing developments were the most significant cause of vegetated wetland loss (Table 3), with sand and gravel pits and commercial development also significant. Nearly 100 acres of vegetated wetland changed from one type to another, with palustrine forested and emergent wetlands

being most affected. Upland conversion impacted the temporarily flooded palustrine wetland type significantly more than other types (Table 4). Table 5 shows changes in different types of forested wetlands, while Tables 6a and 6b show the causes behind upland conversion. About 29 acres of vegetated wetland were created from upland (Table 7), whereas most of the gains in particular types of vegetated wetlands came from other vegetated wetland types. Beaver played an important role in wetland changes (Table 8).

Nonvegetated Wetlands

Over 130 acres of new ponds were created from upland, and nearly 35 acres were constructed in vegetated wetlands (Table 9). About 30 acres of ponds were filled in, while over 6 acres changed to vegetated wetlands. Most of the new ponds were the result of sand and gravel mining operations and farm pond construction (Table 10).

SUMMARY

The study area has about 8 percent of its land mass covered by wetlands. Wetlands totaling 24,236 acres in 1988, were identified in the study area by the Service's National Wetlands Inventory. Palustrine forested wetland is the dominant wetland type, representing 80 percent of the wetlands in the study area. Between 1981 and 1988, the study area lost about 178 acres of vegetated wetlands, with roughly 143 acres converted to upland. Temporarily flooded forested wetland was the type most frequently converted to upland. Pond construction added about 167 acres of palustrine nonvegetated wetlands. The overall trend for the study area's wetlands was losses of vegetated wetlands and significant 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 development increases, the quality of wetlands can be expected to deteriorate due to 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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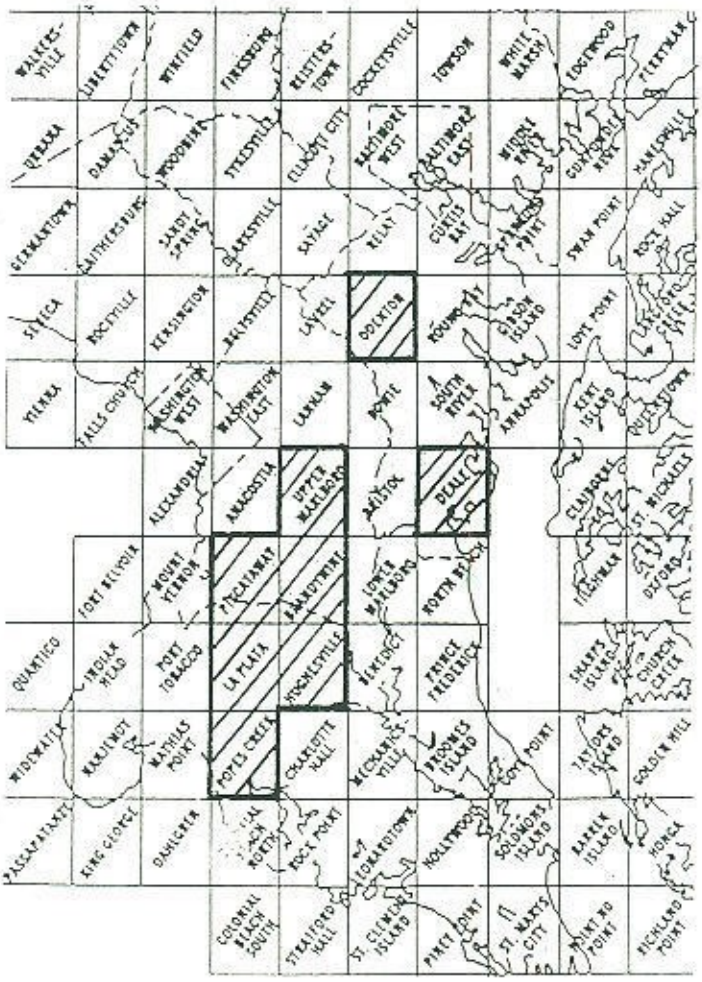
Cowardin, L.M., V. Carter, F.C. Golet, and T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service, Washington, DC. FWS/OBS-79/31. 103 pp.

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 Areas of the Western Shore region of Maryland.



1. Piscataway
2. La Plata
3. Popes Creek
4. Upper Marlboro
5. Brandywine
6. Hughesville
7. Odenton
8. Deale

Table 1. **Acreage of wetland types in selected areas of the Western Shore Region of Maryland (1988).**

Wetland Type	Acres
PALUSTRINE WETLANDS	
Emergent	653.94
Forested	19,391.64
Scrub-Shrub	598.22
Aquatic Bed	12.45
Total Palustrine Vegetated Wetlands	**20,656.25**
Unconsolidated Bottom	965.32
Unconsolidated Shore	36.44
Total Palustrine Nonvegetated Wetlands	**1,001.76**
GRAND TOTAL PALUSTRINE WETLANDS	**21,658.01**
ESTUARINE WETLANDS	
Emergent	2,233.59
Total Estuarine Vegetated Wetlands	**2,233.59**
Unconsolidated Shore	319.60
Total Estuarine Nonvegetated Wetlands	**319.60**
GRAND TOTAL ESTUARINE WETLANDS	**2,553.19**
RIVERINE WETLANDS	
Emergent	3.02
Total Riverine Vegetated Wetlands	**3.02**
GRAND TOTAL RIVERINE WETLANDS	**3.02**

Wetland Type	Acres
LACUSTRINE WETLANDS	
Emergent	22.66
Total Lacustrine Vegetated Wetlands	**22.66**
GRAND TOTAL LACUSTRINE WETLANDS	**22.66**
TOTAL WETLANDS	**24,236.88**

Table 2. Changes of vegetated wetlands in selected areas of the Western Shore Region of Maryland (1981 to 1988).

Wetland Type	Converted to Upland (acres)	Changed to Other Vegetated Wetlands* (acres)	Changed to Nonvegetated Wetlands (acres)
Palustrine Emergent	21.91	34.14	3.52
Palustrine Forested	115.42	52.74	22.40
Palustrine Scrub-Shrub	5.83	5.87	8.74
Estuarine Emergent	0.24	0.00	0.00
Total	143.40	92.75	34.66

* 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 of the Western Shore Region of Maryland (1981 to 1988).

Cause of Loss	Acres
Housing	51.28
Unknown Cause	31.83
Sand and Gravel Pits	22.78
Commercial Development	17.40
Road Construction	11.51
Agriculture	5.78
Federal Installation	2.82
Total	143.40

Table 4. **Conversion of hydrologically similar palustrine vegetated wetlands to upland in selected areas of the Western Shore Region of Maryland (1981 to 1988).**

Palustrine Wetland Type	Acres
Temporarily Flooded	102.14
Seasonally Flooded	26.40
Seasonally Flooded/Saturated	5.64
Permanently Flooded	4.87
Semipermanently Flooded	4.11
Total	143.16

Table 5. **Changes in palustrine forested wetlands in selected areas of the Western Shore Region of Maryland (1981 to 1988).**

Forested Wetland Type	Converted to Upland (acres)	Changed to Other Wetland Types* (acres)	Total Loss (acres)
Temporarily Flooded	81.31	50.77	132.08
Seasonally Flooded	23.80	20.73	44.53
Seasonally Flooded/Saturated	3.00	0.53	3.53
Semipermanently Flooded**	2.44	21.24	23.68
Permanently Flooded**	4.87	2.45	7.32
Total	115.42	95.72	211.14

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

** Represents dead forested wetlands.

Table 6a. Causes of upland conversion in different types of palustrine forested wetlands in selected areas of the Western Shore Region of Maryland (1981 to 1988).

Palustrine Forested Type	Converted to Upland (acres)	Cause of Loss
Temporarily Flooded	3.18	Agriculture
	2.45	Commercial Shopping
	6.60	Sand and Gravel Pits
	48.27	Housing Development
	10.28	Road Construction
	10.53	Unknown Cause
Seasonally Flooded	2.07	Housing
	3.62	Commercial
	18.11	Unknown Cause
Seasonally Flooded/Saturated	3.00	Sand and Gravel Pits
Semipermanently Flooded	2.44	Sand and Gravel Pits
Permanently Flooded	1.88	Sand and Gravel Pits
	2.99	Unknown Cause
Total Palustrine Forested Loss	115.42	

Table 6b. Causes of upland conversion in different types of palustrine forested wetlands in selected areas of the Western Shore Region of Maryland (1981 to 1988).

Cause of Loss	Converted to Upland (acres)
Housing Development	50.34
Unknown Causes	31.63
Sand and Gravel Pits	13.92
Road Construction	10.28
Commercial Shopping	6.07
Agriculture	3.18
Total Palustrine Forested Loss	115.42

Table 7. **Gains in vegetated wetlands in selected areas of the Western Shore Region of Maryland (1981 to 1988).**

Wetland Type	Gain from Nonvegetated Wetlands (acres)	Gain from Other Vegetated Wetlands* (acres)	Gain From Upland (acres)
Palustrine Emergent	6.15	31.63	7.21
Palustrine Scrub-Shrub	0.31	57.80	0.00
Palustrine Forested	0.00	0.00	21.66
Palustrine Aquatic Bed	0.00	3.32	0.00
Total	6.46	92.75	28.87

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

Table 8. **Changes in palustrine wetlands in selected areas of the Western Shore Region of Maryland due to beaver activity (1981 to 1988).**

Palustrine Wetland Type	Change in Water Regime only (acres)	Change in Vegetated Class (acres)	Gain from Upland (acres)
Palustrine Emergent	5.71	0.00	0.00
Palustrine Forested	20.58	9.44	10.97
Palustrine Unconsolidated Bottom	0.00	0.00	3.54
Total	26.29	9.44	14.51

Table 9. **Gains and losses in palustrine nonvegetated wetlands in selected areas of the Western Shore Region of Maryland (1981 to 1988).**

Wetland Type	Gained from Upland (acres)	Gain in Vegetated Wetlands (acres)	Lost to Upland (acres)	Changed to Vegetated Wetlands (acres)
Palustrine Unconsolidated Bottom	125.54	34.33	27.62	6.46
Palustrine Unconsolidated Shore	6.99	0.33	1.57	0.00
Total	132.53	34.66	29.19	6.46

Table 10. **Causes of recently constructed ponds on upland sites in selected areas of the Western Shore Region of Maryland (1981 to 1988).**

Causes	Pond Acreage Created
Sand and Gravel Pits	31.79
Farm Ponds	28.84
Urban Ponds	16.34
Excavated Ponds	15.15
Unknown Cause	14.79
Detention Basin	11.86
Ponds in Undeveloped Areas	7.20
Beaver Ponds	3.54
Pond Construction	1.58
Impoundments	1.44
Total	132.53