National Wetlands Inventory

September 1992

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U.S. DEPARTMENT of the INTERIOR

FISH and WILDLIFE SERVICE

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U.S. Department of the Interior
Fish and Wildlife Service, Region 5

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Prepared for:
Maryland Department of Natural Resources
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Annapolis, MD 21401

September 1992

ACKNOWLEDGMENTS

Funding for this project was provided by the Maryland Department of Natural Resources, Water Resources Administration through an existing cooperative agreement with the U.S. Fish and Wildlife Service. David G. Burke was the project officer and we appreciate his interest in monitoring wetland trends in Maryland.

Several individuals associated with the Service's National Wetlands Inventory Project provided technical support necessary to complete this study. Becky Stanley helped in obtaining necessary aerial photographs and plotted work areas on the mylar overlays. Glenn Smith provided quality control of photo interpretation done by the junior author. Don Woodard coordinated the compilation of acreage statistics. Joanne Gookin helped organize statistical results in a readily useable format. Joan Gilbert entered acreage data for computer analysis and typed the manuscript. We gratefully acknowledge their support.

INTRODUCTION

Wetlands are subjected to a multitude of impacts, both natural and human-induced. Wetlands 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. Most wetlands change more slowly over time. Knowledge of wetland losses and gains is important for evaluating the effect of government programs designed to protect wetlands for developing effective strategies to reverse undesirable trends.

In 1990, the Maryland Department of Natural Resources, Water Resources Administration provided funding to the U.S. Fish and Wildlife Service, Region 5 to initiate county-based wetland trend studies in Maryland. The Department is interested in learning how wetlands have recently changed in the state and how pressures to alter wetlands vary from county to county across the state. The purpose of this report is to present the findings of the wetland trend analysis study for Prince Georges County, the second county to be completed under this agreement.

STUDY AREA

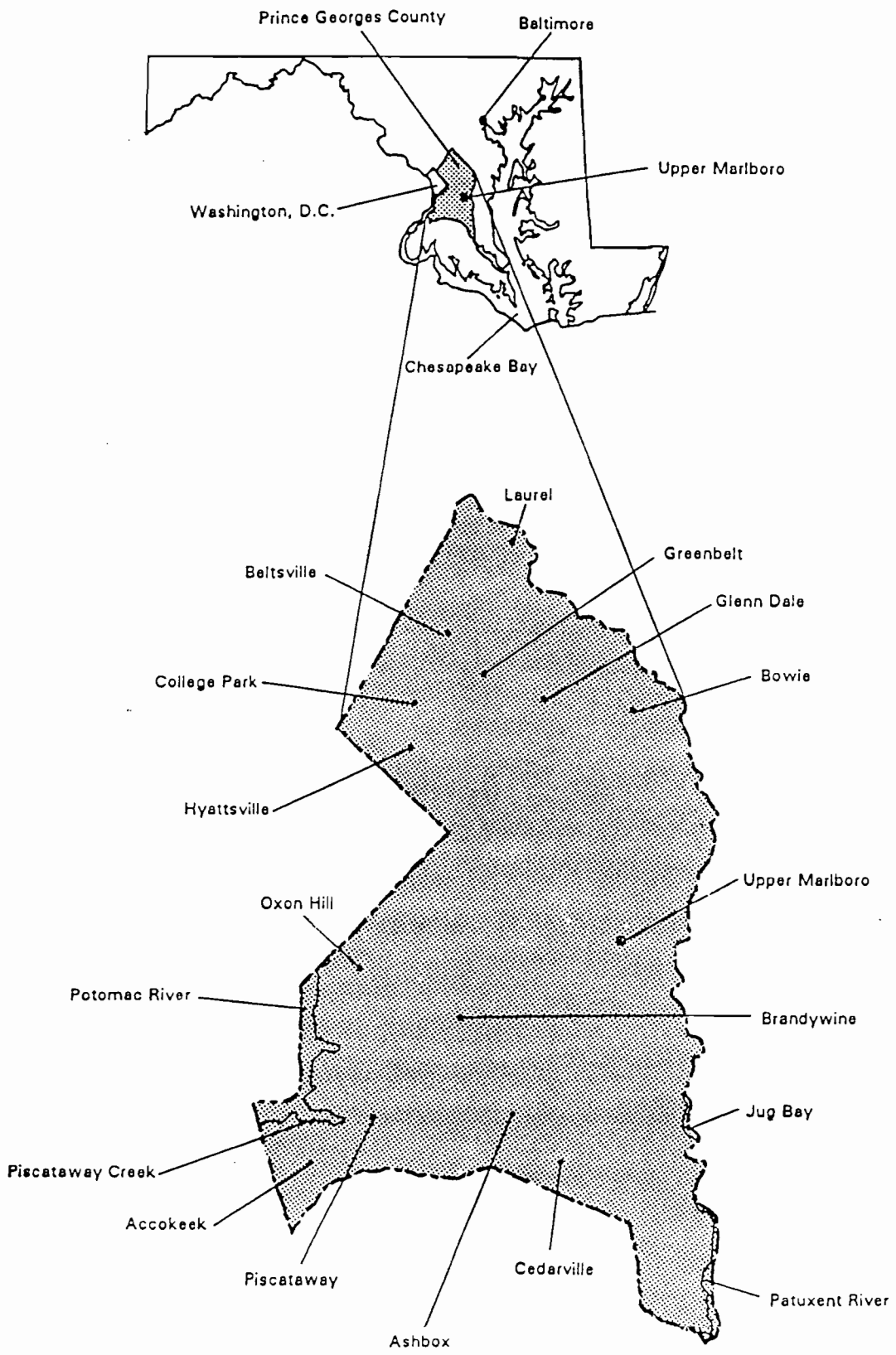
The study area is Prince Georges County, Maryland situated on the Atlantic Coastal Plain, and bordered by the Potomac and Patuxent Rivers (Figure 1). The County has a land surface area of 487 square miles (Hoffman 1992). This area is covered by the following large-scale (1:24,000) U.S. Geological Survey topographic quadrangles: Alexandria, Anacostia, Beltsville, Benedict, Bowie, Brandywine, Bristol, Clarksville, Hughesville, Lanham, Laurel, Lower Marlboro, Mount Vernon, Odenton, Piscataway, Port Tobacco, Upper Marlboro, Washington East, and Washington West.

METHODS

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

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 1988-89 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. Wetlands and deepwater habitats were 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 trends.

Figure 1. Location of Study Area - Prince Georges County, Maryland.



The two sets of photographs were compared using a Bausch and Lomb high power SIS-95 zoom stereoscope. Changes were delineated on mylar overlays attached to the NAPP photographs. Causes of change were recorded for each polygon. The minimum mapping unit for this study 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 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 photo interpretations was performed by another trained photointerpreter. Field work was conducted to verify changes in classification in selected areas with questionable photographic signatures. These results were used to improve wetland delineation for the original time period, especially for temporarily flooded, broad-leaved deciduous forested wetlands, and small wetlands that had not been mapped during the original interpretation.

RESULTS

Current Wetland Acreage

In 1988-89, Prince Georges County possessed about 19,470 acres of wetlands, excluding linear fringing wetlands along narrow streams. This acreage amounts to roughly 6.2 percent of the county's land surface area. Table 1 summarizes the acreage of the different wetland types found in the County.

Palustrine wetlands predominate, being common along most of the rivers and streams that dissect the County's rolling plain landscape. About 17,295 acres of palustrine wetlands exist in the County, representing about 89 percent of the County's wetland total. Nontidal deciduous forested wetlands alone account for 74 percent of the County's palustrine wetlands and about 66 percent of the County's wetland total. Less than 1,800 acres of tidal palustrine wetlands occur in the County and they are most abundant along the Patuxent, Potomac, and Piscataway Rivers. Figure 2 illustrates the extent of tidal and nontidal palustrine wetland types.

Estuarine wetlands represent about one-tenth (10.2 percent) of the County's wetlands. These wetlands are located along tidal rivers and creeks emptying into the large brackish estuaries of the Potomac and Patuxent Rivers. Slightly brackish marshes (oligohaline) are the most common type.

Recent Wetland Trends

The results of the wetland trend analysis study for Prince Georges County are presented in Tables 2 through 8. The following discussion highlights the more significant or interesting findings.

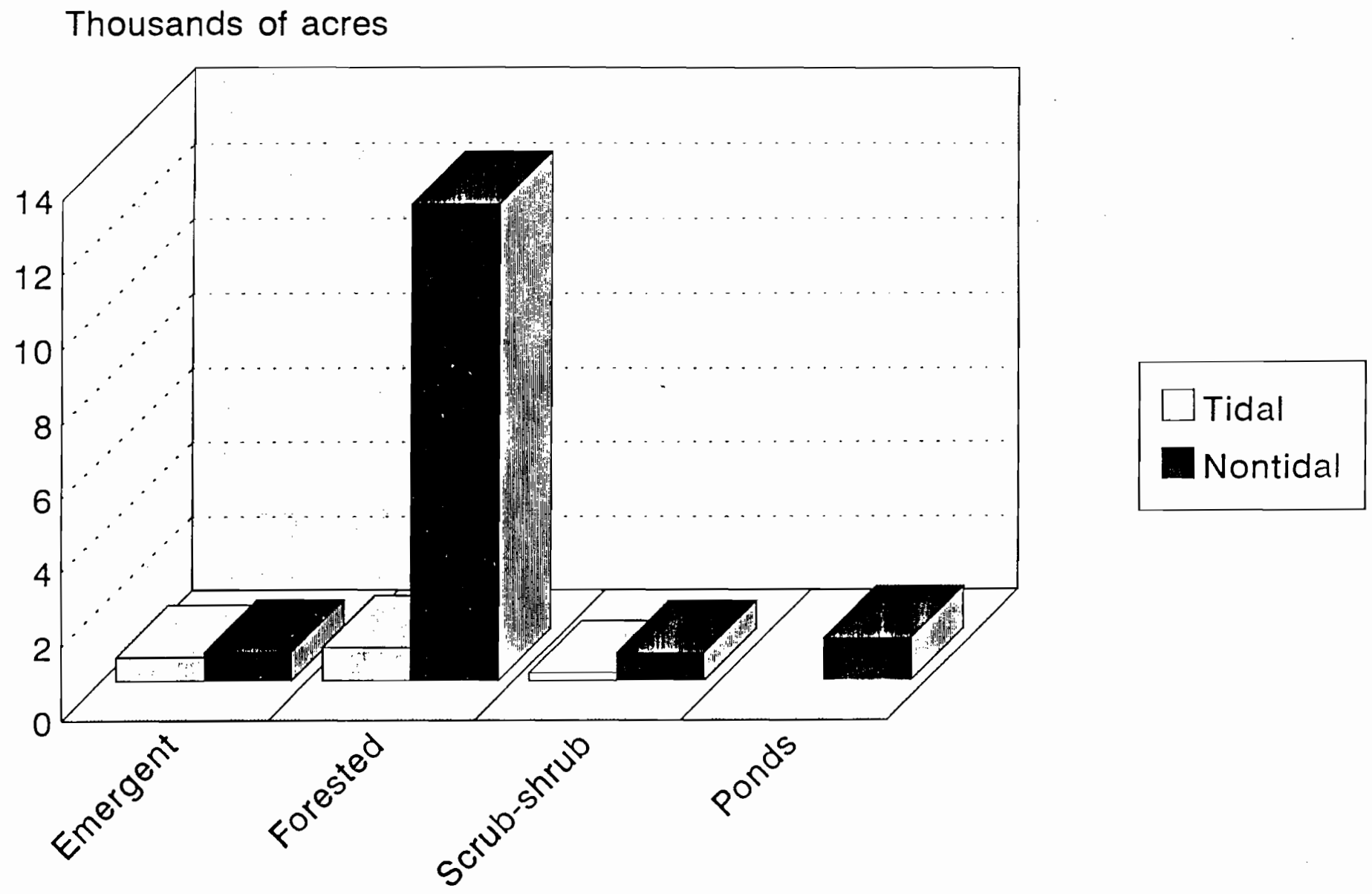
Table 1. 1988-89 acreage of wetland types in Prince Georges County, Maryland.

Wetland Type	Acres
PALUSTRINE WETLANDS	
Tidal Emergent	651.0
Nontidal Emergent	
Seasonally Flooded/Saturated	108.0
Seasonally Flooded	194.0
Temporarily Flooded	335.5
Semipermanently Flooded	137.1
Permanently Flooded	7.7
Subtotal Nontidal	(782.3)
Total Palustrine Emergent Wetlands	1,433.3
Tidal Forested	900.2
Nontidal Forested	
Evergreen	
Temporarily Flooded	10.7
Deciduous	
Seasonally Flooded/Saturated	774.9
Seasonally Flooded	2,033.4
Temporarily Flooded	9,620.3
Dead	133.9
Other	260.8
Subtotal Nontidal	(12,834.0)
Total Palustrine Forested Wetlands	13,734.2
Tidal Scrub-shrub	223.3
Nontidal Scrub-shrub	
Seasonally Flooded/Saturated	204.9
Seasonally Flooded	131.5
Temporarily Flooded	280.4
Other	144.3
Subtotal Nontidal	(761.1)
Total Palustrine Scrub-shrub Wetlands	984.4
Aquatic Beds	110.0
Total Palustrine Vegetated Wetlands	16,261.9
Unconsolidated Bottoms (Ponds)	946.8
Unconsolidated Shores	86.4
Total Palustrine Nonvegetated Wetlands	1,033.2
GRAND TOTAL PALUSTRINE WETLANDS	**17,295.1**

(continued)

ESTUARINE WETLANDS	Acres
Emergent	
Regularly Flooded, Oligohaline	139.5
Irregularly Flooded, Oligohaline	1,833.0
Irregularly Flooded	13.3
Total Estuarine Emergent Wetlands	1,985.8
Total Estuarine Vegetated Wetlands	1,985.8
GRAND TOTAL ESTUARINE WETLANDS	**1,985.8**
RIVERINE WETLANDS	
Tidal Emergent	134.4
Tidal Unconsolidated Shore	12.6
Nontidal Unconsolidated Shore	22.8
GRAND TOTAL RIVERINE WETLANDS	**169.8**
LACUSTRINE WETLANDS	
Unconsolidated Shore	4.0
Emergent	15.5
GRAND TOTAL LACUSTRINE WETLANDS	**19.5**
TOTAL WETLANDS	*19,470.2*

Figure 2. 1988-89 acreage of palustrine wetland types in Prince Georges County, Maryland.



Note: Pond acreage includes unconsolidated shores and aquatic beds.

Vegetated Wetlands

Given the short time period examined (approximately 7.5 years), most of the wetlands in the county remained unchanged. Only 2.0 percent of the vegetated wetlands changed in some way (Table 2). Thirty-two percent of these changes involved filling wetlands to create land for development (upland). Palustrine forested wetlands were the most negatively impacted with about 81 acres converted to upland. The major causes of wetland destruction were road and highway construction, commercial and industrial development, and sand and gravel pit operation (Figure 3). Temporarily flooded wetlands received the brunt of the adverse impacts (Table 3), with 55 percent of the loss of palustrine vegetated wetlands to upland involving temporarily flooded forested wetlands (Table 4). Change from one wetland type to another accounted for 40 percent of the total change in the 1981 wetlands (Table 2).

In addition to the losses of vegetated wetlands, there were some gains (Table 5). Gains from nonvegetated wetlands and from uplands were nearly equal (34.6 acres and 32.2 acres, respectively). Much of the gains from upland involved the creation of palustrine emergent wetlands (freshwater marshes). These new marshes were established in sand and gravel pits or along the shores of newly created ponds. Some marsh creation may have been initiated as mitigation for permitted wetland destruction during this period. Despite slight gains in vegetated wetlands from nonvegetated wetlands and uplands, there was a net loss of about 156 acres of vegetated wetlands between 1981 and 1988-89.

Nonvegetated Wetlands

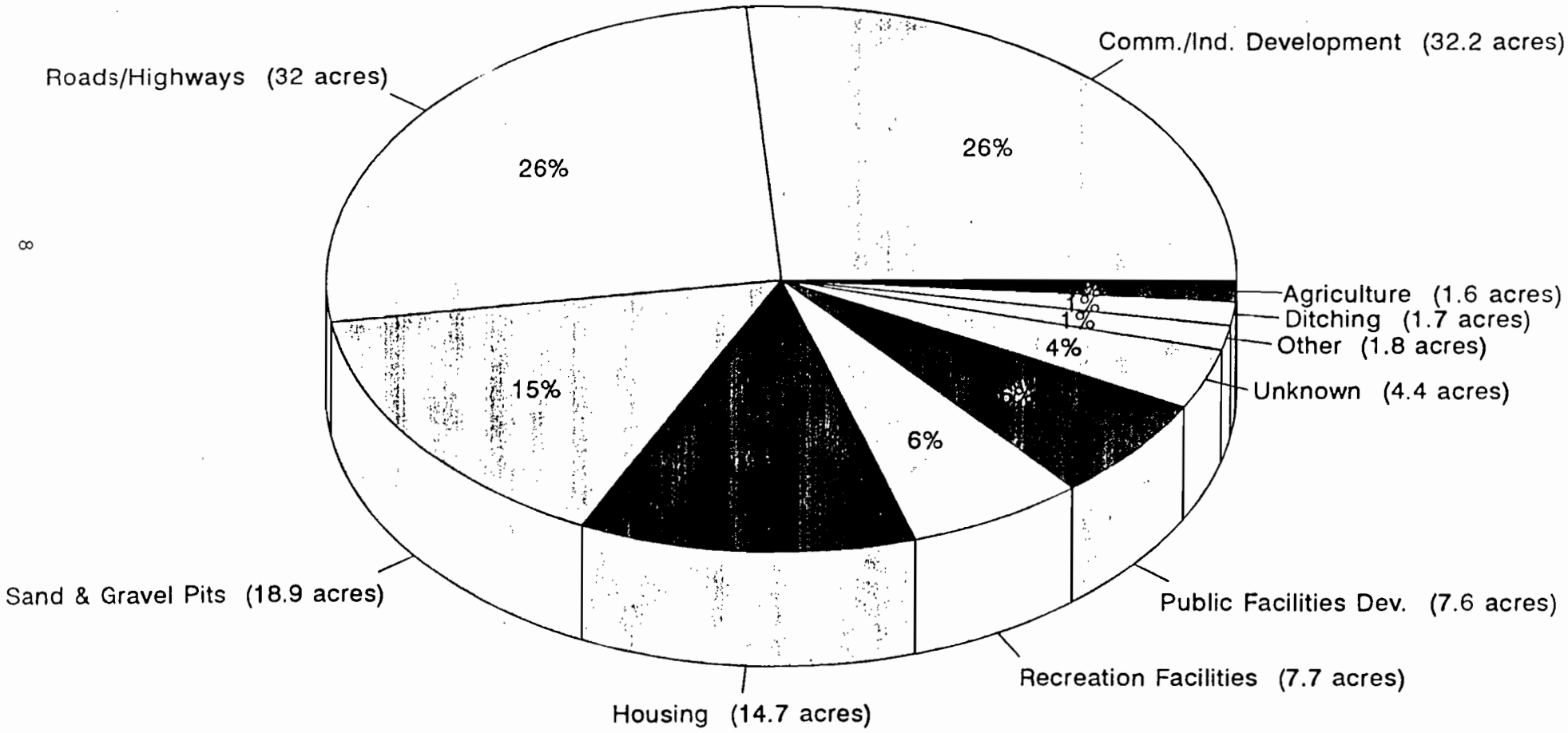
In marked contrast to the downward trend in vegetated wetlands, nonvegetated wetlands are increasing, largely due to pond construction. In Prince Georges County, there was a net gain of about 196 acres in nonvegetated wetlands between 1981 and 1988-89 (Table 6). Nearly all of this gain was attributed to the construction of freshwater ponds. Over 70 percent of these ponds were created in uplands, while the remainder were built in vegetated wetlands, mostly in palustrine emergent wetlands. Almost 39 percent of the new upland ponds were created in sand and gravel pits or on farmland, but most of the ponds were built in other areas (Table 7).

Summary

Prince Georges County has about 6.2 percent of its land area covered by wetlands. A total of 19,470 acres of wetlands was identified in the County by the Service's National Wetlands Inventory (as of 1988-89). Palustrine forested wetland is the dominant wetland type.

Between 1981 and 1988-89, the County lost about 229 acres of vegetated wetlands, with roughly 123 acres converted to upland. Temporarily flooded forested wetland was the type most frequently converted to upland. During the study period,

Figure 3. Causes of vegetated wetland conversion (loss) to upland in Prince Georges County, Maryland (1981 to 1988-89).



Percentages are rounded off

Table 2. Changes of vegetated wetlands in Prince Georges County (1981 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	20.6	49.4	9.6	11.0
Palustrine Scrub-Shrub	19.6	18.2	24.4	25.0
Palustrine Forested	81.2	79.2	35.5	0
Palustrine Aquatic Bed	1.2	7.5	0.7	0
	122.6	154.3	70.2	36.0

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

Table 3. Conversion of hydrologically similar palustrine vegetated wetlands to upland developments in Prince Georges County (1981 to 1988-89).

Palustrine Wetland Type	Acres	% of Total Loss
Temporarily Flooded	93.3	76.1
Seasonally Flooded	12.5	10.2
Seasonally Flooded/Saturated	10.6	8.6
Semipermanently Flooded	5.6	4.6
Permanently Flooded	0.6	0.5
	122.6	100.0

Table 4. Changes in palustrine forested wetlands in Prince Georges County (1981 to 1988-89).

Forested Wetland Type	Converted to Upland (acres)	Changed to Other Wetland Types* (acres)	Total Loss (acres)
Seasonally Flooded/Saturated	5.3	27.7	33.0
Seasonally Flooded	6.2	14.4	20.6
Temporarily Flooded	67.2	96.5	163.7
Semipermanently/Permanently Flooded**	2.4	25.2	27.6
Seasonally Flooded-Tidal	0	10.0	10.0
	81.1	173.8	254.9

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

** Represents dead forested wetlands.

Table 5. Gains in vegetated wetlands in Prince Georges County (1981 to 1988-89).

Wetland Type	Gain from Nonvegetated Wetlands (acres)	Gain from Other Vegetated Wetlands (acres)	Gain from Upland (acres)	Gain from Deepwater Habitat (acres)
Lacustrine Emergent	0	0	0	5.6
Palustrine Emergent	32.1	71.4	11.9	0
Palustrine Scrub-shrub	1.5	79.7	3.9	0
Palustrine Forested	0	2.5	16.4*	0
Palustrine Aquatic Bed	1.0	3.8	0	0
	34.6	157.4	32.2	5.6

* Represents flooded upland forest primarily due to road construction.

Table 6. Gains and losses in nonvegetated wetlands in Prince Georges County (1981 to 1988-89).

	GAINS		LOSSES		
	Created from Upland (acres)	Created in Vegetated Wetlands (acres)	Converted to Upland (acres)	Changed to Vegetated Wetlands (acres)	Changed to Other Non-vegetated Wetlands (acres)
Palustrine Unconsolidated Bottom	167.5	69.9	15.1	28.0	8.7
Palustrine Unconsolidated Shore	19.1	0.3	11.2	6.6	8.0
	186.6	70.2	26.3	34.6	16.7

Table 7. Causes of recently constructed upland ponds in Prince Georges County.

Causes	Pond Acreage Created
Sand and gravel pit ponds	39.1
Farm ponds	25.4
Stormwater detention basins	24.9
Urban ponds	22.3
Ponds of unknown purpose	19.1
Other ponds (on public lands, unintentional impoundments, etc.)	15.0
Ponds constructed for wildlife habitat	8.2
Industrial ponds	5.8
Ponds in undeveloped areas	4.2
Beaver ponds	3.5
	167.5

Table 8. Changes of palustrine wetlands in Prince Georges County (1981 to 1988-89) due to beaver activity.

Palustrine Wetland Type:	Change in water regime only	Change in vegetated class	Gain from Upland
Palustrine Emergent	2.3	0	0
Palustrine Scrub-shrub	1.4	5.2	1.6
Palustrine Forested	56.9	25.2	8.5
Palustrine Unconsolidated Bottom	0	14.2*	3.5
	60.6	44.6	13.6

* Gain from other vegetated wetlands

pond construction increased the acreage of nonvegetated wetlands by 196 acres (this figure includes palustrine unconsolidated shores). The overall trend for the County's wetlands were 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 wetland functions. While this report documents recent trends in the County's wetlands, it does not address changes in the quality of the remaining wetlands. As urban development increases, the quality of wetlands can be expected to deteriorate due to urban 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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