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Wetland Trends in Dorchester County, Maryland (1981-82 to 1988-89)

U.S. Department of the Interior
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Region 5

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(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 selected counties of Maryland. These studies identify the extent and nature of wetland alterations for designated local areas. To date, reports have been published for five counties: Anne Arundel, Calvert, Charles, Prince Georges, and St. Marys.

The purpose of this report is to present the findings of the wetland trends analysis study for Dorchester County, Maryland. This is the last county evaluated with current funding.

STUDY AREA

The study area is Dorchester County, situated on Maryland's Eastern Shore, which falls within the Atlantic Coastal Plain. The County is bordered by Chesapeake Bay, the Nanticoke River, the Choptank River, Caroline County, and the State of Delaware (Figure 1). Dorchester County has a land surface area of approximately 593 square miles (Hoffman 1992). The study area encompasses portions of 25 large-scale (1:24,000) U.S. Geological Survey topographic quadrangles: Barren Island, Blackwater River, Bloodsworth Island, Cambridge, Chicamacomico River, Church Creek, Deal Island, East New Market, Federalsburg, Golden Hill, Honga, Kedges Straits, Mardela Springs, Nanticoke, Oxford, Preston, Rhodesdale, Richland Point, Seaford West, Sharps Island, Sharptown, Taylors Island, Tilghman, Wetipquin, and Wingate. Due to available photo coverage, a small area less than one square mile in size was not evaluated. This area bordered the Chicamacomico River.

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 Dorchester 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 U.S. Fish and Wildlife Service's (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. Delineated changes were then transferred to an NWI map using an Ottico Meccanica Italiana stereo facet plotter, or a Bausch and Lomb stereo zoom transfer scope. The majority of change polygons were area measured using an electronic planimeter and data was processed into an RBase system. Change data from six NWI maps was derived from an earlier digital data base produced for another wetland trends analysis project (Tiner *et. al.* 1994). Quality control of all photointerpretation was performed by a second photointerpreter. Acreage summaries were generated, and then tables were prepared to present the study's findings.

RESULTS

Recent Wetland Trends

Wetland trends results are presented in Tables 1 through 7. The following discussion highlights the more significant or interesting findings.

Vegetated Wetlands

Between 1981-82 and 1988-89, approximately 1,438 acres of vegetated wetlands were converted to upland (Table 1). Most of these losses affected palustrine forested wetlands. Agriculture was the most significant cause of vegetated wetland loss, however, losses due to timber harvest, and road/highway construction were also significant (Table 2). About 4,286 acres of vegetated wetland changed from one type to another, of which 3,690 acres were forested wetlands (Table 1). Ninety-six percent of the changes to these forested wetlands were a result of timber harvesting. Upland conversion impacted the temporarily flooded palustrine wetland type more than others (Table 3). Approximately 4,810 acres of palustrine forested wetlands were converted to upland or changed to other wetland types (Table 4). Relative sea level rise impacted nearly 1,280 acres of wetlands. Of this total, approximately 1,000 acres were loblolly pine (*Pinus taeda*) dominated estuarine forested wetlands that were replaced by one of the following: deadwood marshes, mixed, broken canopies of chlorotic and dead pines, or salt marsh (Table 5). Over 204 acres of unclassified forest was clearcut and prepared for loblolly pine culture in areas that could have been wetland at the earlier date of photography; but due to poor photo quality and the complex nature of these sites, no positive determination could be made. This acreage does not appear in the tables. Additionally, just over two acres of emergent wetlands were created from upland during the study period (not reported in the tables).

Nonvegetated Wetlands

About 141 acres of new ponds and pond shores were created from upland, and close to 171 acres were constructed in vegetated wetlands (Table 6). More than 8 acres of ponds were converted to upland, while roughly 23 acres succeeded to vegetated wetlands. Approximately 66% of the new ponds built in uplands were farm ponds, with the remainder attributed to other causes (Table 7).

CONCLUSION

Between 1981-82 and 1988-89, the County lost about 1,605 acres of vegetated wetlands, with roughly 1,438 acres converted to upland. Annual losses to upland were roughly 200 acres per year. Temporarily flooded wetland was the type most frequently converted to upland. Pond construction added about 312 acres of palustrine nonvegetated wetlands, but this gain was reduced to a net total increase of about 268 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.

ACKNOWLEDGMENTS

Funding for this project was provided by the Maryland Department of Natural Resources, Water Resources Administration, through an existing cooperative agreement with the Service. This work was undertaken due to the support of David G. Burke. At the time of this project's initiation, Denise Clearwater served as the project officer. We appreciate their interest and the State's support in monitoring wetland trends in Maryland. This type of information should be invaluable to anyone interested in wetlands conservation.

Wetland maps were compiled by the Service's NWI Center at St. Petersburg, Florida. Special appreciation is extended to Don Woodard, Becky Stanley, and Linda Shaffer for their assistance. Photointerpretation was performed by David Foulis and Todd Nuerminger and quality controlled by Glenn Smith. Zoom transfer scope work was performed by Todd Nuerminger, David Foulis, Glenn Smith, and Irene Kenenski. Chris Nichols area-measured all change polygons, and compiled trends statistics and tables for this report, and Kortidious Moreland entered all raw data into an RBase data system. Kenneth Miller of the Geographic Information Services Division, Water Resources Administration, Maryland Department of Natural Resources provided some of the NAPP photos used in this project. We appreciate everyone's help with this project.

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Figure 1. Location of Study Area - Dorchester County, Maryland, shaded, below.

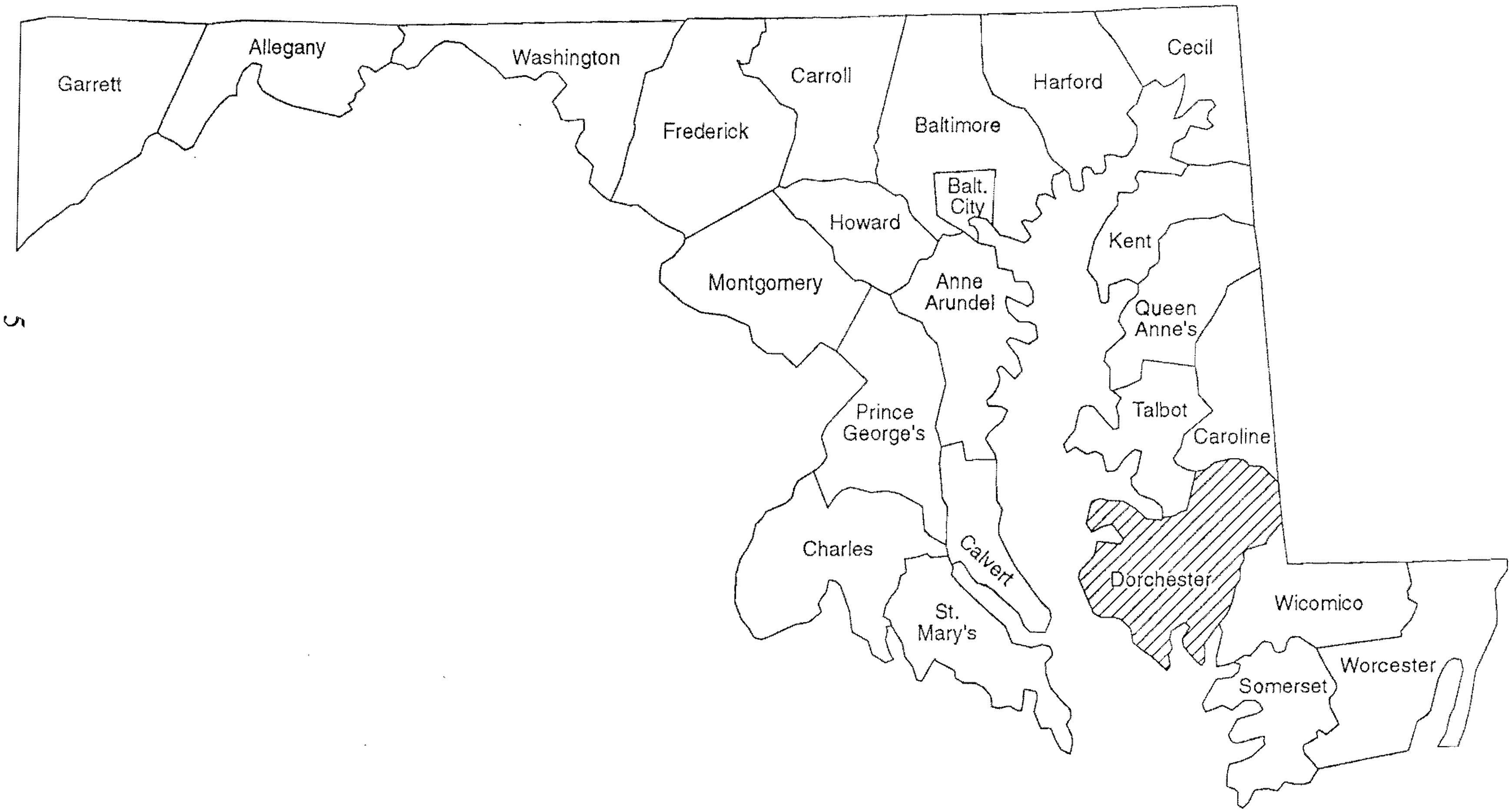

Table 1. **Changes of vegetated wetlands in Dorchester County, Maryland (1981-82 to 1988-89).**

Wetland Type	Converted to Upland (acres)	Changed to Other Vegetated Wetlands* (acres)	Changed to Nonvegetated Wetlands (acres)
Palustrine Emergent	140.83	179.74	54.00
Palustrine Scrub-Shrub	122.84	39.25	1.73
Palustrine Forested	1,029.13	3,689.93**	68.28
Estuarine Forested	99.08	345.11	12.28
Estuarine Emergent	43.61	32.27	29.91
Estuarine Scrub-Shrub	2.94	0.00	0.00
Total	**1,438.43**	**4,286.30**	**166.20**

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

**Ninety-six percent of this figure changed due to timber harvest.

Table 2. **Causes of vegetated wetland loss to upland in Dorchester County, Maryland (1981-82 to 1988-89).**

Cause of Loss	Acres
Agriculture	1,031.05
Timber Harvest*	173.57
Road/Highway Construction	84.74
Dredge Material Deposition	35.54
Conversion to "Farmed Wetland"	28.01
Junkyard Expansion	14.22
Housing	14.01
Wildlife Improvement Project	13.21
Ditching	13.10
Commercial Development	9.79
Pond Dam Construction	6.57
Marina Construction	5.06
Sand and Gravel Pits	5.00
Airport	4.07
Recreational Facilities Construction	0.44
Total	**1,438.38**

*Areas cleared of trees, but not yet put to any indentifiable land use.

Note: Over 204 acres of unclassified forest was clearcut and prepared for loblolly pine (*Pinus taeda*) culture in areas that could have been wetland at the earlier date of photography; but due to poor photo quality and the complex nature of these sites, no positive determination could be made. This acreage does not appear in the above table, or any other.

Table 3. Conversion of hydrologically similar palustrine vegetated wetlands to upland in Dorchester County, Maryland (1981-82 to 1988-89).

Palustrine Wetland Type	Acres	% Total Loss
Temporarily Flooded	885.37	68.49
Seasonally Flooded	279.26	21.60
Seasonally Flooded/Saturated	9.32	0.72
Seasonally Saturated	40.66	3.15
Temporarily Flooded-Tidal	68.01	5.26
Seasonally Flooded-Tidal	10.09	0.78
Total	**1,292.71**	**100.0%**

Table 4. Changes in palustrine forested wetlands in Dorchester 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	8.68	34.47	43.15
Seasonally Flooded	249.87	872.25	1,122.12
Temporarily Flooded	700.87	2,724.27	3,425.14
Semipermanently Flooded**	0.00	7.51	7.51
Intermittently Flooded	0.00	25.89	25.89
Temporarily Flooded-Tidal	68.01	58.63	126.64
Seasonally Flooded-Tidal	1.70	57.63	59.33
Total	**1,029.13**	**3,780.65**	**4,809.78**

*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 5. Changes in vegetated wetlands due to relative sea level rise in Dorchester County, Maryland (1981-82 to 1988-89).

To: / From:	E2FO4/5	E2FO5	E2EM	E2FO4	E1	**Total**
E2FO4	299.35	666.66	34.01	---	---	**1,000.02**
E2FO5	---	33.43*	11.89	---	1.64	**46.96**
E2EM	---	---	1.34*	---	16.58	**17.92**
PFO4/1C	---	---	---	82.57	---	**82.57**
PFO4B	---	---	---	38.65	---	**38.65**
PFO4A	---	---	---	86.63	6.30	**92.93**
Total	**299.35**	**700.09**	**47.24**	**207.85**	**24.52**	**1,279.05**

*Represents wetlands that were observed to be increasingly affected by relative sea level rise, as evidenced by changes in species composition and hydrology.

Table 6. Gains and losses in nonvegetated wetlands in Dorchester 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	125.47	134.62	8.30	10.04	0.00
Palustrine Unconsolidated Shore	15.60	12.26	0.00	0.00	0.00
Estuarine Unconsolidated Shore	0.00	23.68	0.00	12.64	12.39
Total	**141.07**	**170.56**	**8.30**	**22.68**	**12.39**

Table 7. Causes of recently constructed upland ponds in Dorchester County, Maryland (1981-82 to 1988-89).

Causes	Pond Acreage
Farm Ponds	82.74
Sand and Gravel Pit Ponds*	15.84
Aquaculture Ponds	14.46
Ponds of Unkown Purpose	6.68
Ponds in Undeveloped Areas	5.75
Total	**125.47**

*These are often ephemeral, dynamic landscape features subject to rapid change in active pits.