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Wetland Trends in the Williamsport Area of Pennsylvania (1977 to 1988/90)

U.S. Department of the Interior
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WETLAND TRENDS IN THE WILLIAMSPORT AREA OF PENNSYLVANIA
(1977 to 1988/90)

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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 the Muncy and Montoursville North Quadrangles in the Williamsport region of Pennsylvania, one of numerous study areas selected by the EPA and FWS for detailed wetland trends analysis.

STUDY AREA

The study sites are located in selected areas of the Williamsport region of Pennsylvania (Figure 1) and have a combined land surface area of approximately 112 square miles. The study area encompasses two large-scale (1:24,000) U.S. Geological Survey topographic quadrangles: Muncy and Montoursville North.

METHODS

Wetland trends analysis involves comparing aerial photography from at least two time periods. For the present study, aerial photos from 1977 and from 1988/90 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 1977 photography was 1:80,000 scale black and white. The 1988/90 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 1:80,000 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.

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

RESULTS

Current Status

In 1988/90, the study area possessed about 433 acres of wetlands, excluding linear fringing wetlands along narrow streams. This total amounts to just over .5 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 359 acres. This represents 83 percent of the study area's total wetland acreage. Forested areas alone account for 52 percent of the palustrine wetlands. About 73 acres of riverine wetlands are present, and classified as unconsolidated shore. This represents 17 percent of the study area's 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

Between 1977 and 1988/90, over 4 acres of vegetated wetlands were converted to upland (Table 2). Agriculture and ditching were the most significant causes of vegetated wetland loss (Table 3). Over 2 acres of emergent wetland changed to another wetland type. Upland conversion impacted the temporarily flooded palustrine wetland type the most (Table 4). Table 5 shows changes in different types of forested wetlands, while Table 6 shows the causes behind upland conversion. Over 2 acres of vegetated wetland were created in nonvegetated wetland, and over 2 additional acres of vegetated wetland changed to another type of vegetated wetland (Table 7).

Nonvegetated Wetlands

Nearly 11 1/2 acres of new ponds were created from upland, while over an acre was constructed in vegetated wetland (Table 8). About 5 acres of ponds were filled in, while over 2 acres changed to vegetated wetlands. Most of the new ponds were a result of agriculture and sand and gravel mining operations (Table 9).

SUMMARY

The study area has about .5 percent of its land mass covered by wetlands. Wetlands totaling 433 acres in 1988/90 were identified in the study area by the Service's National Wetlands Inventory. Palustrine forested wetland is the dominant wetland type, representing 43 percent of the wetlands in the study area. Between 1977 and 1988/90, the study area lost about 5 acres of vegetated wetlands, with roughly 4 acres converted to upland. Temporarily flooded emergent wetland was the type most frequently converted to upland. Pond construction added about 12 acres of palustrine nonvegetated wetlands, but this gain was essentially nullified by pond losses to upland and vegetated wetlands. The overall trend for the study area's wetlands was losses of vegetated wetlands and slight 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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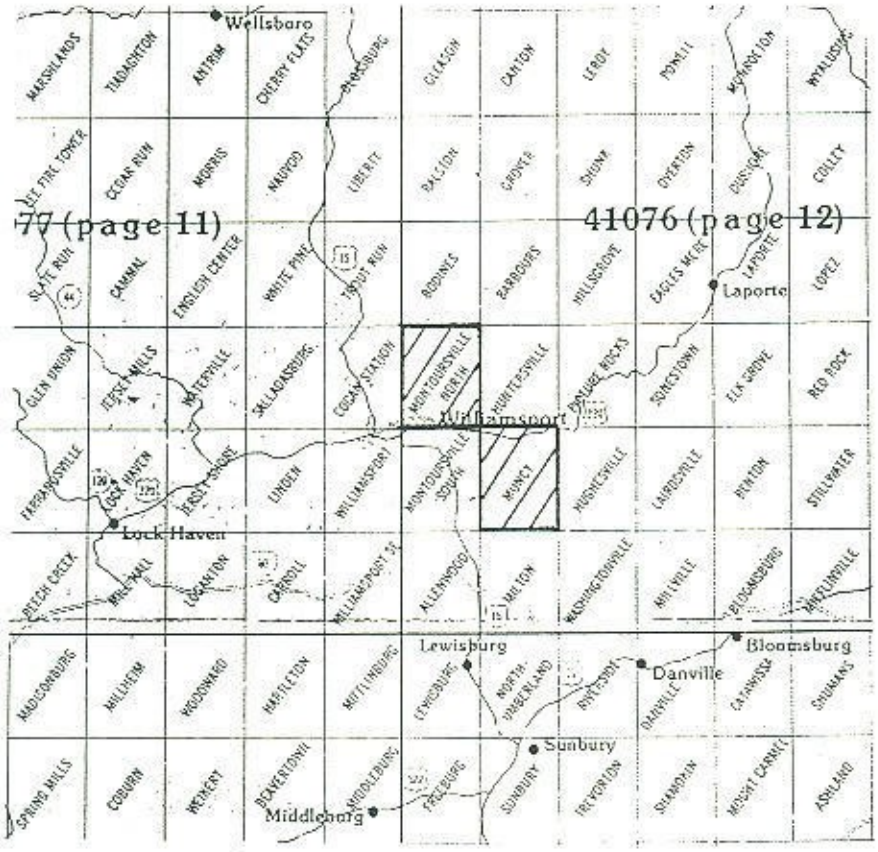
National Wetlands Inventory. 1990. Photointerpretation Conventions for the National Wetlands Inventory. U.S. Fish and Wildlife Service, St. Petersburg, FL. 45 pp. plus appendices.

Figure 1. Location of Study Area - Selected Quadrangles in the Williamsport Area of Pennsylvania.



1. Muncy
2. Montoursville North

Table 1. Acreage of wetland types for the Williamsport Area of Pennsylvania (1988/90).

Wetland Type	Acres
PALUSTRINE WETLANDS	
Emergent	21.23
Forested	186.67
Scrub-Shrub	59.64
Aquatic Bed	.48
Total Palustrine Vegetated Wetlands	**268.02**
Unconsolidated Bottom (Ponds)	91.79
Total Palustrine Nonvegetated Wetlands	**91.79**
GRAND TOTAL PALUSTRINE WETLANDS	**359.81**
RIVERINE WETLANDS	
Unconsolidated Shore	73.53
Total Riverine Nonvegetated Wetlands	**73.53**
GRAND TOTAL RIVERINE WETLANDS	**73.53**
LACUSTRINE WETLANDS	
Aquatic Bed	.21
Total Lacustrine Vegetated Wetlands	**.21**
GRAND TOTAL LACUSTRINE WETLANDS	**.21**
TOTAL WETLANDS	**433.55**

Table 2. **Changes of vegetated wetlands in selected areas of the Williamsport region of Pennsylvania (1977 to 1988/90).**

Wetland Type	Converted to Upland (acres)	Changed to Other Vegetated Wetlands * (acres)	Changed to Non -Vegetated Wetlands (acres)
Palustrine Emergent	1.77	2.07	0.00
Palustrine Forested	2.58	0.00	1.11
Total	4.35	2.07	1.11

* 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 Williamsport region of Pennsylvania (1977 to 1988/90).**

Cause of Loss	Acres
Agriculture	2.00
Ditching	1.04
Recreational Facility	0.79
Unknown	0.52
Total	4.35

Table 4. **Conversion of hydrologically similar palustrine vegetated wetlands to upland in selected areas of the Williamsport region of Pennsylvania (1977 to 1988/90).**

Palustrine Wetland Type	Acres
Temporarily Flooded	2.06
Seasonally Flooded/Saturated	1.04
Saturated	0.73
Seasonally Flooded	0.52
Total	4.35

Table 5. **Changes in palustrine forested wetlands in selected areas of the Williamsport region of Pennsylvania (1977 to 1988/90).**

Forested Wetland Type	Converted to Upland (acres)	Changed to Other Wetland Types* (acres)	Total Loss (acres)
Temporarily Flooded	2.06	1.11	3.17
Seasonally Flooded	0.52	0.00	0.52
Total	2.58	1.11	3.69

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

Table 6. **Causes of loss in palustrine forested wetlands in selected areas of the Williamsport region of Pennsylvania (1977 to 1988/90).**

Palustrine Forested Type	Converted to Upland (acres)	Cause of Loss for PFO
Temporarily Flooded	1.27	Agriculture
Temporarily Flooded	0.79	Recreational Facility
Seasonally Flooded	0.52	Unknown Cause
Total Palustrine Forested Loss	2.58	

Table 7. **Gains in vegetated wetlands in selected areas of the Williamsport region of Pennsylvania (1977 to 1988/90).**

Wetland Type	Gain from Nonvegetated Wetlands (acres)	Gain from Other Vegetated Wetlands* (acres)
Palustrine Emergent	1.67	0.00
Palustrine Scrub-Shrub	0.00	2.07
Palustrine Aquatic Bed	0.48	0.00
Total	2.15	2.07

* 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 of the Williamsport region of Pennsylvania (1977 to 1988/90).**

Wetland Type	Gained From Upland (acres)	Created in Vegetated Wetlands (acres)	Lost to Upland (acres)	Changed to Vegetated Wetlands (acres)
Palustrine Unconsolidated Bottom	11.49	1.11	4.96	2.15
Total	11.49	1.11	4.96	2.15

Table 9. **Causes of recently constructed ponds on upland sites in selected areas of the Williamsport region of Pennsylvania (1977 to 1988/90).**

Causes	Pond Acreage Created
Farm Ponds	6.56
Sand and Gravel Pits	3.94
Ponds in Undeveloped Areas	0.53
Impoundments	0.46
Total	11.49