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Wetland Trends for the Kent Island and Queenstown Quadrangles in Eastern Maryland (1982 to 1989)

U.S. Department of the Interior
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WETLAND TRENDS FOR THE KENT ISLAND AND QUEENSTOWN QUADRANGLES IN EASTERN MARYLAND (1982 to 1989)

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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 of the Kent Island region, 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 Kent Island region of Maryland (Figure 1) and have a combined land surface area of approximately 116 sq. mi. The study area encompasses 2 large-scale (1:24,000) U.S. Geological Survey topographic quadrangles: Kent Island and Queenstown.

METHODS

Wetland trends analysis involves comparing aerial photography from at least two time periods. For the present study, aerial photos from 1982 and from 1989 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 1982 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 1989 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.

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

RESULTS

Current Status

In 1989, the study area possessed about 6,700 acres of wetlands, excluding linear fringing wetlands along narrow streams. This total amounts to roughly 2 percent of the study area's land surface. Table 1 summarizes the acreage of the different wetland types found in the study area. Estuarine wetlands predominate with about 5,100 acres. This represents 76 percent of the study area's total wetland acreage. Emergent areas alone account for 44 percent of the estuarine wetlands. About 1,600 acres of palustrine wetlands were present, mostly forested areas. This represents 24 percent of the study area's wetlands.

Recent Wetlands Trends

The results of the wetland trends analysis study are presented in Tables 2 through 8. The following discussion highlights the more significant or interesting findings.

Vegetated Wetlands

Between 1982 and 1989, about 88 acres of vegetated wetlands were converted to upland. Over 60 acres of this total were estuarine emergent wetlands, while close to 12 acres were palustrine forested wetlands (Table 2). Housing developments were the most significant cause of vegetated wetland loss, accounting for over 43 acres (Table 3). More than 37 of these acres were estuarine emergent wetlands that were filled for housing development (Table 5b); and commercial development and road or highway construction each caused more than 10 acres of wetland loss (Table 3). Upland conversion impacted the temporarily flooded palustrine wetland type significantly more than other palustrine types (Table 4). Approximately 3 acres of palustrine vegetated wetlands were created in uplands, while nearly 2 acres of estuarine emergent wetlands developed in what were previously deepwater habitats (Table 6).

Nonvegetated Wetlands

Over 44 acres of new ponds were created from upland, and over 7 acres were constructed in vegetated wetlands. Over 6 acres of ponds were filled in, and more than 1 acre changed to vegetated wetland (Table 7). Most of the new ponds were farm ponds, and ponds built in urban and undeveloped areas (Table 8).

SUMMARY

The study area has about 2 percent of its land mass covered by wetlands. Wetlands totaling 6,700 acres in 1989 were identified in the study area by the Service's National Wetlands Inventory. Estuarine emergent wetland is the dominant vegetated wetland type, representing 33 percent of the wetlands in the study area. Between 1982 and 1989, the study area lost about 93 acres of vegetated wetlands, with roughly 88 acres converted to upland. Estuarine emergent wetland was the type most frequently converted to upland. This was primarily due to housing development. Pond construction added about 52 acres of palustrine nonvegetated wetlands, but this gain was slightly offset by pond losses of 17 acres to upland and vegetated wetlands. The overall trend for the study area's wetlands was losses of vegetated wetlands with 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.

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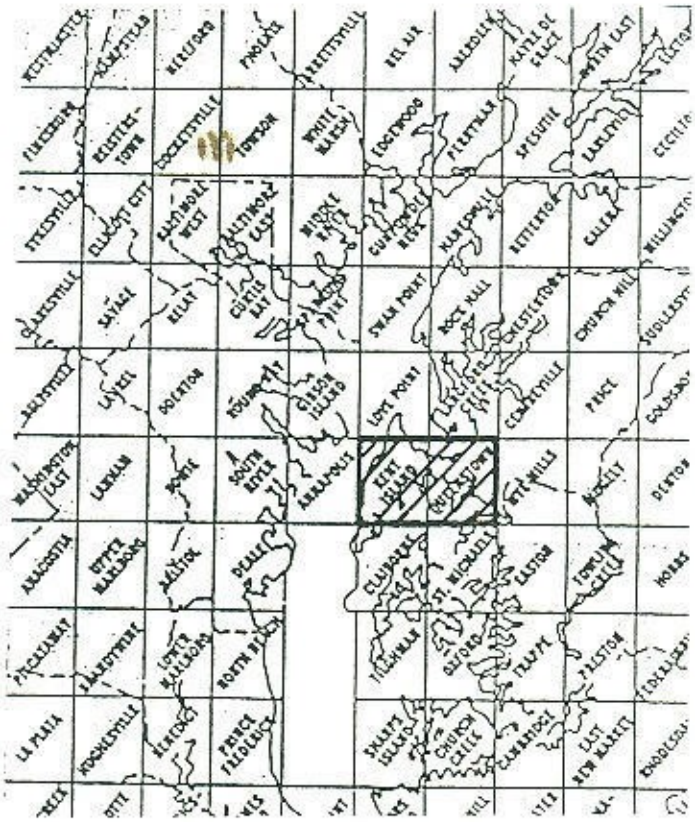
National Wetlands Inventory. 1990. Photointerpretation Conventions for the National Wetlands Inventory. U.S. Fish and Wildlife Service, St. Petersburg, FL. 45 pp. plus appendices.

Figure 1. **Location of Study Area - Selected Quadrangles in the Kent Island region of Eastern Maryland.**



1. Kent Island
2. Queenstown

Table 1. **Acreage of wetland types for the Kent Island and Queenstown Quadrangles in Eastern Maryland (1989).**

Wetland Type	Acres
PALUSTRINE WETLANDS	
Emergent	57.69
Forested	1,294.87
Scrub-Shrub	91.94
Total Palustrine Vegetated Wetlands	**1,444.50**
Unconsolidated Bottom (Ponds)	169.50
Unconsolidated Shore	10.13
Total Palustrine Nonvegetated Wetlands	**179.66**
GRAND TOTAL PALUSTRINE WETLANDS	**1,624.16**
ESTUARINE WETLANDS	
Emergent	2,243.73
Scrub-Shrub	88.83
Total Estuarine Vegetated Wetland	**2,332.56**
Unconsolidated Shore	2,782.14
GRAND TOTAL ESTUARINE WETLANDS	**5,114.70**
TOTAL WETLANDS	**6,739.43**

Table 2. **Changes of vegetated wetlands in selected areas of the Kent Island region of eastern Maryland (1982 to 1989).**

Wetland Type	Converted to Upland (acres)	Changed to Non-Vegetated Wetlands (acres)	Converted to Deepwater Habitat (acres)
Palustrine Emergent	3.67	3.50	0
Palustrine Forested	11.84	0.91	0
Palustrine Scrub-Shrub	7.93	0	0
Estuarine Emergent	60.81	2.80	5.41
Estuarine Scrub-Shrub	3.73	0.	0.
Total	87.98	7.21	5.41

Table 3. **Causes of vegetated wetland loss to upland in selected areas of the Kent Island region of eastern Maryland (1982 to 1989).**

Cause of Loss	Acres
Housing	43.34
Agriculture	13.32
Commercial Development	12.72
Road/Highway Construction	10.02
Marina	6.68
Activities related to pond construction	1.17
Airport	0.73
Total	87.98

Table 4. **Conversion of hydrologically similar palustrine vegetated wetlands to upland in selected areas of the Kent Island region of eastern Maryland (1982 to 1989).**

Palustrine Wetland Type	Acres	% of Total Loss
Temporarily Flooded	22.31	95
Seasonally Flooded	1.13	5
Total	23.44	100

Table 5. **Causes of loss to upland in palustrine forested wetlands in selected areas of the Kent Island region of eastern Maryland (1982 to 1989).**

Cause	Acreage
Road/Highway Construction	8.14
Housing Development	1.64
Commercial Business	1.33
Airport	0.73
Total	11.84

Table 5a. **Changes in Estuarine vegetated wetlands in selected areas of the Kent Island region of eastern Maryland (1982 to 1989).**

Wetland Type	Converted to Upland (acres)	Changed to Other Wetland (acres)	Total Loss (acres)
Estuarine Emergent	60.81	2.80	63.61
Estuarine Scrub-Shrub	3.73	0.	3.73
Total	64.54	2.80	67.34

Table 5b. **Causes of loss for estuarine emergent wetland to upland grouped by cause in selected areas of the Kent Island region of eastern Maryland (1982 to 1989).**

Cause	Acreage
Housing Development	37.59
Agriculture	8.84
Marinas	6.68
Commercial Business	6.53
Pond Construction	1.17
Total	60.81

Table 6. **Gains in vegetated wetlands in selected areas in the Kent Island region of eastern Maryland (1982 to 1989).**

Wetland Type	Gain from Nonvegetated Wetlands	Gain from Uplands	Gain from Deepwater Habitat
Estuarine Emergent	1.18	0	1.95
Palustrine Emergent	0	1.54	0
Palustrine Forested	0	1.47	0
Total	1.18	3.01	1.95

Table 7. Gains and losses in nonvegetated wetlands in selected areas of the Kent Island region of eastern Maryland (1982 to 1989).

Wetland Type	Gained from Upland	Created in Vegetated Wetland	Lost to Upland	Changed to Vegetated Wetland	Changed to other Non-Vegetated Wetlands
Palustrine Unconsolidated Bottom	44.77	7.21	2.60	1.18	10.18
Palustrine Unconsolidated Shore	0	0	3.46	0	0
Estuarine Unconsolidated Shore	0.34	0	0	1.18	10.18
Total	45.11	7.21	6.06	1.18	10.18

Table 8. **Causes of recently constructed ponds on upland sites in selected areas of the Kent Island region of eastern Maryland (1982 to 1989).**

Causes	Pond Acreage Created
Farm Ponds	13.69
Ponds in Undeveloped Areas	10.77
Urban Ponds	10.60
Impoundments	3.87
Agriculture	3.17
Excavated Ponds	1.77
Ponds in Recreational Areas	0.90
Total	44.77