

National Wetlands Inventory

September 1992

**Current Status and Recent
Trends in Wetlands of the Lake Erie
and Delaware Estuary Coastal Zones
of Pennsylvania (1986-1989)**

U.S. DEPARTMENT of the INTERIOR
FISH and WILDLIFE SERVICE



**CURRENT STATUS AND RECENT
TRENDS IN WETLANDS OF THE LAKE ERIE
AND DELAWARE ESTUARY COASTAL ZONES
OF PENNSYLVANIA (1986-1989)**

by

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Harrisburg, PA 17120

September 1992

Introduction

In 1980, the Commonwealth of Pennsylvania established two coastal zone areas: (1) Lake Erie Coastal Zone and (2) Delaware Estuary Coastal Zone. Also, since that year, the Department of Environmental Resources has been regulating uses of wetlands throughout the state under the authority of the Dam Safety and Encroachment Act.

During informal discussions between the U.S. Fish and Wildlife Service (Service) and the Division of Coastal Zone Management (Bureau of Water Resources Management), the concept of developing a comprehensive data base for wetlands in the Pennsylvania coastal zones and developing a monitoring system for identifying wetland changes emerged. In 1985, the Division provided funds to the U.S. Fish and Wildlife Service, Region 5, for its National Wetlands Inventory Program to determine the current status and recent trends in the Lake Erie and Delaware Estuary Coastal Zones and to create a comprehensive coastal zone data base to serve as the basis for future wetland change detection. The results of these studies are found in Tiner and Anderson (1986) and Tiner, *et al.* (1987).

In 1989, additional funding was provided to the U.S. Fish and Wildlife Service, Region 5, for its National Wetlands Inventory Program to complete updated wetland status and trend studies for the Lake Erie Zone and Delaware Estuary Coastal Zone.

The purpose of this report is to present the results of the update of wetland status and trends for both of Pennsylvania's Coastal Zones. Since this report contains an update of the original status and trends information, the detailed methodologies sections found in the previously cited reports (Tiner *et al.*), covering photointerpretation, wetland overlay production, and digital data base construction are not included in this follow-up report, and only an abbreviated Methods section follows.

Methods

The two study areas are described as follows: the Delaware Estuary Coastal Zone contains approximately 50 square miles of land in Delaware and Buck counties and the City of Philadelphia. The Lake Erie Coastal Zone contains approximately 63 square miles of land in Erie County as well as the Pennsylvania portion of Lake Erie. Conventional aerial photo interpretation techniques were used to determine the status and trends of Pennsylvania's Coastal Zone wetlands. Identifying wetland changes and trends requires interpretation of aerial photography from two time periods. For this update, the March 1986 (1:36,000 scale) color infrared photographs from the original project were used as the source for comparison against April 1989 (1:36,000 scale) color infrared photographs. Change overlays were produced from the analysis of the two dates of photography. The change overlays contained special alpha-numeric codes describing the original wetland classification along with the present wetland classification and the apparent cause of the change. For this study, a wetland change is documented when there is change in wetland hydrology, a change in vegetative or substrate type, a conversion of wetland to upland (non-wetland), or when an upland area is altered and creates wetland conditions. These change overlays were cartographically formatted for input into the Service's digital wetland map data base. The digitized information was then processed into statistical summaries of the wetland changes. These changes were incorporated into the geographic information system data base to reflect the present wetland acreage and type changes as of April 1989.

Recent Wetland Trends

During the time period of March 1986 to April 1989 the Lake Erie Coastal Zone lost 49.9 acres of wetland and 2.9 acres of deepwater habitat (Table 1). Housing construction was responsible for nearly 91% or 45.3 acres of total wetland loss in the Lake Erie Coastal Zone (Figure 1). An additional 19 acres of wetland (17.1 acres of palustrine forested wetland and 1.9 acres of palustrine emergent wetland) were being ditched and drained during this time period in preparation for future conversion to housing developments. Total gains during this time period included 8.7 acres of wetlands. The net change for the Lake Erie Coastal Zone including wetlands and deepwater habitats is a loss of 43.9 acres, from March 1986 to April 1989.

The Delaware Estuary Coastal Zone did not suffer the same extent of losses of vegetated wetland as the Lake Erie Coastal Zone. The only vegetated wetland losses occurred with 2.2 acres of palustrine emergent wetlands lost due to industrial development (Table 2). The major losses of wetlands resulted from conversion of small ponds (palustrine unconsolidated bottom) to uplands in industrial developments. However, there were 39.7 acres of new ponds created during this time period, resulting in a net gain of 20.1 acres of palustrine unconsolidated bottom in industrial development areas. The net change of wetlands and deepwater habitats for the Delaware Estuary Coastal Zone is a gain of 16.5 acres, with construction of small ponds in industrial areas comprising over 95% of this increase.

Summary

Between March 1986 and April 1989, Pennsylvania's Coastal Zones suffered a loss of over 77 acres of wetlands and deepwater habitats with essentially all the losses occurring in the Lake Erie Coastal Zone. Destruction of palustrine vegetated wetlands accounted for nearly 63% (over 48 acres) of the total losses. Ninety-five percent of these losses to palustrine vegetated wetlands were due to construction of single family homes and housing developments in the Lake Erie Coastal Zone (Table 1, Figure 1). Another 19 acres of palustrine forested and emergent wetlands were being drained in preparation for likely construction of houses contiguous to wetlands destroyed for housing development during this time period. Industrial development was responsible for over 99% of the changes occurring in the Delaware Estuary Coastal Zone (Table 2). The major changes occurred in numerous, small man-made palustrine unconsolidated bottom wetlands (ponds). Almost 20 acres of these ponds were destroyed during this time period, while nearly 40 acres of new ponds were created, yielding a net gain of over 20 acres. However, when assessing the values of these "ponds" and the importance of this gain to fish and wildlife species, it is important to note that in this area of heavy industrial development, these small ponds are apparently created (excavated and impounded) and destroyed (filled) on a regular basis for industrial purposes.

References

Tiner, R.W. and J.C. Anderson. 1986. Current Status and Recent Trends in Wetlands of the Lake Erie Coastal Zone of Pennsylvania. U.S. Fish and Wildlife Service, Newton Corner, MA. 12 pp.

Tiner, R.W., J.C. Anderson, and W. Zinni. 1987. Current Status and Recent Trends in Wetlands of the Delaware Estuary Coastal Zone of Pennsylvania. U.S. Fish and Wildlife Service, Newton Corner, MA. 6 pp.

Table 1. Wetland changes in the Lake Erie Coastal Zone (1986 to 1989).

<u>TYPE OF CHANGE</u>	<u>WETLANDS AFFECTED</u>	<u>CAUSE OF CHANGE</u>	<u>NUMBER OF AREAS AFFECTED</u>	<u>TOTAL ACREAGE OF CHANGE</u>	
LOSS (Converted to Upland)	Palustrine Emergent Wetland	Agriculture	1	0.3	
	Palustrine Unconsolidated Shore	Gravel Pit	3	1.2	
	Palustrine Forested Wetland	Urban (Housing)	4	12.9	
	Palustrine Scrub-Shrub Wetland	Urban (Housing)	4	9.0	
	Palustrine Forested/Emergent Wetland	Urban (Housing)	1	1.3	
	Palustrine Forested/Scrub-Shrub Wetland	Urban (Housing)	1	22.1	
	Palustrine Unconsolidated Bottom	Urban (Industrial)	2	0.6	
	Lacustrine Limnetic Unconsolidated Bottom*	Urban (Marina)	2	0.4	
	Palustrine Emergent Wetland	--	1	0.6	
	Palustrine Unconsolidated Bottom	--	5	0.9	
	Lacustrine Limnetic Unconsolidated Bottom*	--	1	2.5	
	Lacustrine Littoral Unconsolidated Bottom	--	1	1.0	
	GAIN (From Upland)	Palustrine Unconsolidated Bottom	Agriculture	2	1.6
		Palustrine Unconsolidated Bottom	Gravel Pit	2	1.8
Palustrine Unconsolidated Shore		Gravel Pit	2	0.8	
Palustrine Scrub-Shrub Wetland		Urban (Industrial)	1	0.4	
Palustrine Emergent Wetland		Urban (Sewage)	1	0.1	
Palustrine Aquatic Bed		--	1	0.3	
Palustrine Scrub-Shrub Wetland		--	2	0.7	
Palustrine Unconsolidated Bottom		--	7	2.7	
Lacustrine Limnetic Unconsolidated Bottom*		--	1	0.2	
Lacustrine Littoral Unconsolidated Bottom		--	1	0.3	
CHANGES IN WETLAND TYPE		Palustrine Forested Wetland to Palustrine Unconsolidated Bottom	Gravel Pit	1	0.7
		Palustrine Forested Wetland to Palustrine Forested Ditched Wetland	Urban (Housing)	2	17.1
		Palustrine Emergent Wetland to Palustrine Emergent Ditched Wetland	Urban (Housing)	2	1.9
		Palustrine Unconsolidated Bottom to Palustrine Unconsolidated Shore	Urban (Industrial)	1	0.8
	Lacustrine Limnetic Unconsolidated Bottom* to Lacustrine Littoral Unconsolidated Shore	Urban (Marina)	2	0.6	

(cont'd)

<u>TYPE OF CHANGE</u>	<u>WETLANDS AFFECTED</u>	<u>CAUSE OF CHANGE</u>	<u>NUMBER OF AREAS AFFECTED</u>	<u>TOTAL ACREAGE OF CHANGE</u>
CHANGES IN WETLAND TYPE	Palustrine Emergent Wetland (Seasonally Flooded) to Palustrine Emergent Wetland (Seasonally Flooded/Saturated)	--	1	0.7
	Palustrine Emergent Wetland to Palustrine Unconsolidated Bottom	--	2	1.0
	Palustrine Scrub-Shrub Wetland (Seasonally Flooded) to Palustrine Scrub-Shrub Wetland (Seasonally Flooded/Saturated)	--	1	1.4
	Palustrine Unconsolidated Bottom to Palustrine Emergent Wetland	--	4	1.0
	Palustrine Unconsolidated Bottom to Palustrine Scrub-Shrub Wetland	--	2	1.4
	Palustrine Unconsolidated Bottom to Palustrine Unconsolidated Shore	--	2	1.7
	Palustrine Unconsolidated Shore to Palustrine Unconsolidated Bottom	--	1	0.5
	Lacustrine Littoral Unconsolidated Bottom to Lacustrine Littoral Unconsolidated Shore	--	3	1.6
	Lacustrine Littoral Unconsolidated Shore to Lacustrine Littoral Unconsolidated Bottom	--	1	0.2
	Lacustrine Littoral Unconsolidated Bottom to Palustrine Emergent Wetland	--	2	0.6

* Deepwater Habitat

Table 2. Wetland changes in the Delaware Estuary Coastal Zone (1986 to 1989).

<u>TYPE OF CHANGE</u>	<u>WETLANDS AFFECTED</u>	<u>CAUSE OF CHANGE</u>	<u>NUMBER OF AREAS AFFECTED</u>	<u>TOTAL ACREAGE OF CHANGE</u>
LOSS (Converted to Upland)	Palustrine Emergent Wetland	Urban (Industrial)	1	2.2
	Palustrine Unconsolidated Bottom	Urban (Industrial)	17	19.6
	Lacustrine Limnetic Unconsolidated Bottom*	Urban (Industrial)	6	3.4
GAIN (From Upland)	Palustrine Unconsolidated Bottom	Urban (Commercial)	1	0.2
	Palustrine Emergent Wetland	Urban (Industrial)	2	1.4
	Palustrine Unconsolidated Bottom	Urban (Industrial)	17	39.7
	Lacustrine Limnetic Unconsolidated Bottom*	Urban (Industrial)	2	0.4

* Deepwater Habitat

Figure 1. Vegetated wetland conversion (loss) to upland in the Lake Erie Coastal Zone of Pennsylvania (1986-1989)

