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RECENT WETLAND TRENDS IN SOUTHEASTERN MASSACHUSETTS

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Recent Wetland Trends in Southeastern Massachusetts

by

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INTRODUCTION

The Federal government regulates various activities in wetlands under Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act as amended in 1977. The U.S. Army Corps of Engineers (Corps) is responsible for issuing permits for dredge and fill activities under Section 10 and for fill activities under Section 404 which is jointly administered with the U.S. Environmental Protection Agency. The U.S. Fish and Wildlife Service (Service) provides comments on the environmental impacts of proposed wetland alteration activities in accordance with the Fish and Wildlife Coordination Act of 1934 as amended. In addition, the Service is conducting an inventory of the Nation's wetlands that includes preparation of wetland maps and the study of national wetland trends.

In 1985, the New England Division of the Corps of Engineers during aerial reconnaissance flights detected numerous wetland alteration activities in southeastern Massachusetts. The Corps became interested in determining the magnitude of these activities and approached the Service about conducting a wetland trends analysis study for that area. A study was designed to examine recent changes in wetlands between 1977 and 1985/86. Since July 1977 represents the effective starting date of wetland permitting under Section 404, wetland filling activities detected by the study could represent unauthorized or illegal activities, that are, violations of Federal law, unless required permits were secured by developers.

STUDY AREA

The study area covers about 641 square miles of land in southeastern Massachusetts (Figure 1). It represents about three-quarters of Plymouth County. The area is defined by the following large-scale U.S. Geological Survey topographic map quadrangles: Assawompsett Pond, Bridgewater, Brockton, Duxbury, Hanover, Manomet, Plymouth, Plympton, Sagamore, Snipatuit Pond, Wareham, and Whitman as well as the southern parts of Cohasset and Scituate.

METHODS

Wetland trends analysis involves analyzing aerial photography from at least two time periods. For the present study, aerial photos from 1977 and from 1985/86 were examined to determine the extent of wetlands by type at each time period and to detect changes (i.e., losses, gains, and changes in wetland type) during the study interval - 1977 to 1985/86.

The 1977 photography was 1:80,000-scale black and white (panchromatic) aerial photography which was used to prepare the original National Wetlands Inventory (NWI) maps. The 1985/86 photography was 1:58,000-scale color infrared aerial photography acquired by the Federal High-altitude Photography Program.

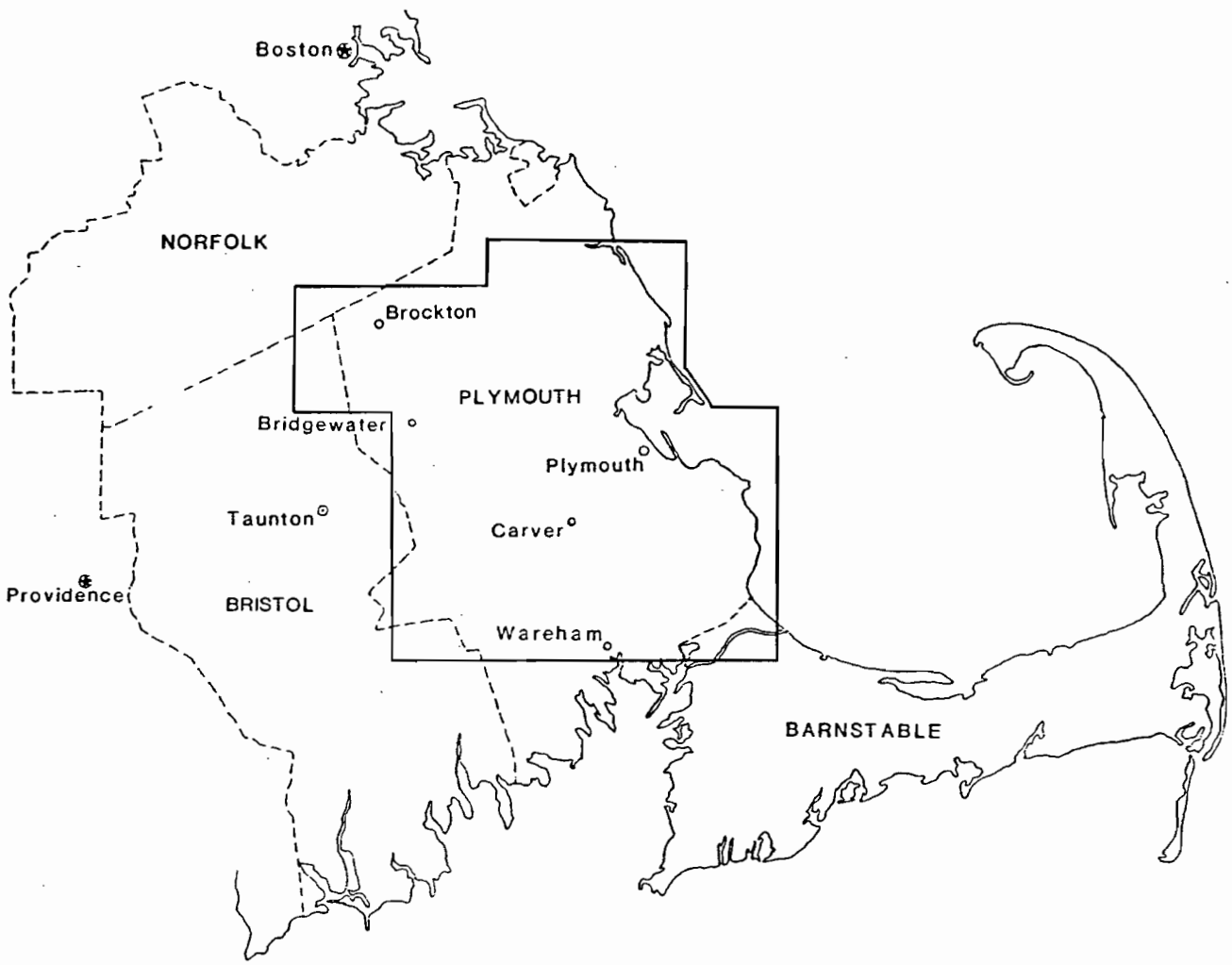

Figure 1. Southeastern Massachusetts study area.

Wetlands and deepwater habitats were interpreted stereoscopically on the 1985/86 photography in accordance with standard NWI procedures. Wetland overlays showing wetland location, configuration, and type were prepared for appropriate photographs covering the study area. This effort resulted in a 1:58,000 overlay for each work photo. This overlay was then photographically reduced to a scale of 1:80,000 for use with the 1977 photography.

The 1977 photography, with the 1985/86 wetland overlay on it, was then viewed stereoscopically to identify changes in wetlands, such as new ponds, changes in the vegetation type of wetland, and losses of wetlands. These changes were marked on the overlay. As changes were detected, the 1985/86 photography was re-examined to determine the cause of the change.

After completing wetland delineation and trends analysis work on photo overlays, the overlays were photographically enlarged to 1:24,000 scale for area measurement. Acreage of each polygon on the overlay was measured by an electronic planimeter. Wetland acreage data were then tabulated for the project area.

RESULTS

Current Status of Wetlands

In 1985/86, the study area contained 80,734 acres of wetlands. Thus, roughly 20 percent of the area was wetland. Deepwater habitats (excluding marine waters) totaled 20,231 acres representing 5 percent of the study area. Upland areas predominated throughout the study area, accounting for 75 percent of the region.

Palustrine or freshwater wetlands were most abundant as shown in Table 1. They comprised 81 percent of the region's wetlands. Forested wetlands represented slightly more than half of the palustrine wetlands. Cranberry bogs ("farmed" wetlands) made up about 16 percent of these wetlands. Only 16 percent of the area's wetlands were estuarine wetlands, i.e., salt/brackish water tidal wetlands. Of these, tidal flats and emergent wetlands were most common, comprising 60 percent and 37 percent of the estuarine wetlands, respectively.

Vegetated wetlands (65,705 acres) predominated in the study area. They accounted for about 81 percent of the wetlands. Nonvegetated wetlands (15,029 acres - mostly tidal flats and freshwater ponds) represented only 19 percent of the area's wetlands.

Table 1. Extent of wetlands in the study area in 1985/86.

Wetland Type	Acreage
MARINE WETLANDS	
Intertidal Flats	620
Intertidal Beaches/Bars	1,118
Intertidal Rocky Shores	211
Subtotal	1,949
ESTUARINE WETLANDS	
Intertidal Flats	7,818
Intertidal Beaches/Bars	235
Intertidal Rocky Shores	70
Intertidal Emergent Wetlands	4,848
Subtotal	12,971
PALUSTRINE WETLANDS	
Fresh Tidal Wetlands	269
Nontidal Emergent Wetlands	5,594
Deciduous Scrub-shrub Wetlands *	4,606
Evergreen Scrub-shrub Wetlands *	177
Mixed Scrub-shrub Wetlands *	929
Mixed Shrub/Emergent Wetlands *	2,749
Deciduous Forested Wetlands *	16,460
Evergreen Forested Wetlands *	5,154
Mixed Forested Wetlands *	13,841
Ponds *	4,843
Farmed Cranberry Bogs	10,756
Subtotal	65,378
LACUSTRINE WETLANDS	
Littoral Aquatic Beds	183
Littoral Emergent Wetlands	139
Littoral Open Waters	114
Subtotal	436
ALL WETLANDS GRAND TOTAL	80,734

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* Nontidal

Recent Wetland Trends

Changes in wetlands between 1977 and 1985/86 are outlined in Table 2. Over 1,800 acres of wetlands changed vegetatively from one wetland type to another due to natural succession or human-induced succession (e.g., timber harvest). A total of 1,307 acres of wetlands were converted to other uses. Nearly half of this total were converted to various upland developments, while about a third were changed to cranberry bogs and about 18 percent made into ponds or lakes. Non-cranberry agricultural conversion of wetlands was the main factor changing wetland to nonwetland (upland) - a total of 392 acres of wetlands were converted to farmland. Table 3 summarizes the causes of wetland loss to upland developments. When cranberry bog construction in wetlands is added to the other agricultural losses of wetland, a grand total of 821 acres of wetlands were recently converted to agricultural lands. Thus, agricultural activities accounted for 63 percent of the recent wetland losses in the study area.

During the study period, nearly 2.5 percent (or 1,245 acres) of the area's palustrine vegetated wetlands were destroyed. This total included 647 acres of forested wetlands, 365 acres of scrub-shrub wetlands, and 233 acres of emergent wetlands. On average, the annual loss rate of palustrine vegetated wetlands approached 150 acres. Only 1 acre of estuarine vegetated wetland was destroyed during the 8- to 9-year period.

In marked contrast to the vegetated wetland losses, pond acreage experienced a net increase of about 3 percent (or 154 acres). Actually, a total of 256 acres of new ponds were created, but 74 acres of the pre-existing ponds became vegetated wetlands and 28 acres were filled, for a net gain of 154 pond acres. About three-quarters of the new pond acreage was created at the expense of wetlands, while only one-fourth were built in upland. Impoundment construction related to cranberry farming was responsible for 71 percent (or 182 acres) of the new pond acreage. Of these 182 acres, 85 percent was constructed in wetlands and 15 percent in uplands. The other 74 acres of new ponds were constructed in nearly equal amounts in wetlands and uplands (39 acres and 35 acres, respectively). On average, about 30 acres of new ponds were constructed annually during the study period.

Cranberry bogs were created in both wetlands and uplands. During the study period, a total of 1,124 acres of cranberry bogs were built. Sixty-two percent of the new bogs came from upland areas, primarily upland forests (Table 4), while the remaining 38 percent came from various wetland types.

Table 2. Changes in wetlands between 1977 and 1985/86.

Wetland Type *	Changed to Other Vegetated Wetlands (Acres)	Converted to Cranberry Bogs (Acres)	Converted to Upland (Acres)	Converted to Ponds & Lakes (Acres)
PEM	54	55	133	45
PSS1	78	116	80	60
PSS1/EM	120	4	68	19
PSS4/1 and PSS3	82	15	2	1
PFO1	890	150	89	91
PFO1/SS1	82	f	209	2
PFO1/4	165	21	17	--
PFO4	166	57	3	--
POW	74	--	28	--
PAB	88	--	--	--
Pf	17	--	19	--
Other Wetlands	11	3	2	10
TOTAL	1,827	429	650	228

* Symbology: P - palustrine, EM - emergent wetland, SS1 - broad-leaved deciduous scrub-shrub wetland, SS4 - needle-leaved evergreen scrub-shrub wetland, SS3 - broad-leaved evergreen scrub-shrub wetland, FO1 - broad-leaved deciduous forested wetland, FO4 - needle-leaved evergreen forested wetland, OW - open water (pond), AB - aquatic bed, f - farmed wetland (cranberry bog), and "/" indicates mixed wetland complex.

Table 3. Causes of wetland loss to upland.

Cause	Wetland Acreage Lost 1977 to 1985/86
Agriculture	392
Commercial Development	48
Recreation	46
Housing	35
Highways/Roads	15
Public Facilities	11
Other Development	103
TOTAL	650

Table 4. The origin of new cranberry bogs during 1977 to 1985/86.

Upland or Wetland Type	Acres of New Bogs Created
Upland Deciduous Forest	179
Upland Evergreen Forest	390
Sand and Gravel Pit	46
Other Upland	80
Total Upland	695
Emergent Wetland	55
Scrub-shrub Wetland	135
Deciduous Forested Wetland	179
Evergreen Forested Wetland	57
Other Wetland	3
Total Wetland	429
GRAND TOTAL - New Cranberry Bogs	1,124

SUMMARY

n 1985/86, the southeastern Massachusetts study area possessed 0,734 acres of wetlands. About one-fifth of the land surface is ccupied by wetland. Palustrine forested wetlands were the ominant wetland types in this area.

etween 1977 and 1985/86, over 1,300 acres of wetlands were estroyed. Agricultural conversion of wetlands was the principal ause of wetland loss, converting 821 acres to farmland and ranberry bogs. The annual loss of palustrine vegetated wetlands as about 150 acres. Pond acreage had a net gain of 154 acres, ith an average of 30 acres of new ponds were created annually.

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