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WETLAND STATUS AND TRENDS FOR THE PLEASANT VALLEY QUADRANGLE DUTCHESS COUNTY, NEW YORK (1958 -1988)

U.S. Department of the Interior
Fish and Wildlife Service

Wetland Status and Trends for the Pleasant Valley Quadrangle Dutchess County, New York (1958 - 1988)

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INTRODUCTION

In 1992, the Dutchess County Environmental Management Council (EMC) provided funding through a cooperative agreement with the U.S. Fish and Wildlife Service's New York Field Office and National Wetlands Inventory (NWI) Region 5, to initiate a wetland trend study for the Pleasant Valley Quadrangle in Dutchess County, New York. The EMC is interested in learning how wetlands have changed over the past thirty years and what types of activities have caused alterations of wetlands in the area. The purpose of this report is to present the findings of the wetland trend analysis study for the Pleasant Valley Quadrangle.

Wetlands are subjected to a multitude of impacts, both natural and human-induced. Wetlands may change slowly from one type to another, e.g., emergent wetland to scrub-shrub wetland, due to natural succession or to minor filling or alteration of hydrology. Some wetlands undergo almost immediate change and or destruction at the hands of man. Other wetlands are subject to a dymamic existence driven by the forces of nature. Most wetlands, however, change more slowly over time. Knowledge of wetland losses and gains is important for evaluating the effect of government programs designed to protect them and for developing effective strategies to reverse undesirable trends. Understanding the many values of wetlands is necessary to promote public support of wetland conservation and protection. The following section adapted from *Mid-Atlantic Wetlands - A Disappearing Natural Treasure* (Tiner, 1985) addresses the diverse values of wetlands and the benefits derived from the conservation of these precious resources.

VALUES OF WETLANDS

Wetlands are important natural resources. In their natural condition, wetlands provide many benefits including: (1) fish and wildlife habitat, (2) aquatic productivity, (3) water quality improvement, (4) flood damage protection, (5) erosion control, (6) natural products for human use, and (7) opportunities for recreation and aesthetic appreciation. Each wetland works in combination with other wetlands as part of a complex, integrated system that delivers these benefits and others to society. An assessment of the value of a particular wetland must take this critical interrelationship into account.

FISH AND WILDLIFE HABITAT

Wetlands are required by many types of animals and plants for survival. For many, like the wood duck and muskrat or cattail and swamp rose, wetlands are their primary homes or habitats- the only places they can live. For other animals, such as the endangered peregrine falcon, or white-tailed deer, wetlands provide food, water, or cover that are important to their well-being, but wetlands are not their primary residences. It is interesting to note that the majority of rare and endangered plants in many states depend on wetlands for survival.

Most freshwater fishes feed in wetlands or upon wetland-produced food and use wetlands as nursery grounds. Interestingly enough, almost all important recreational fishes spawn in the aquatic portions of wetlands. A variety of birdlife is also associated with inland wetlands. Ducks, geese, redwinged blackbirds, and a large number of songbirds feed, nest and raise their young in

these wetlands. Muskrat and beaver are the most familiar wetland mammals. White-tailed deer (a traditional upland game mammal) use wetlands for food and shelter, especially evergreen forested wetlands in winter. The mighty black bear finds refuge and food in forested and shrub swamps of the Northeast.

AQUATIC PRODUCTIVITY

Wetlands are among the most productive natural ecosystems in the world and certain types of wetlands may be the highest, rivaling our best cornfields. Wetlands can be regarded as the farmlands of the aquatic environment since great volumes of food (plant material) are produced by them annually. Although direct grazing of most wetland plants is generally limited, their major food value comes from dead leaves and stems that break down in the water to form small particles of organic material called ''detritus''. This enriched detritus serves as the principal food for many small aquatic invertebrates and forage fishes that are food for larger predatory fishes. These larger fishes are, in turn, consumed by people. Thus, wetlands provide an important source of food for people as well as for aquatic animals.

WATER QUALITY IMPROVEMENT

One of the most important values of wetlands is their ability to help maintain good water quality in our nation's rivers and other waterbodies and to improve degraded waters. Wetlands do this in several ways: (1) removing and retaining nutrients, (2) processing chemical and organic wastes, and (3) reducing sediment loads to receiving waters. Wetlands are particularly good water filters. Due to their position between upland and deep water, wetlands can both intercept surface-water runoff from land before it reaches open water and help filter nutrients, wastes, and sediment from flooding waters. This function is important in both urban and agricultural areas. Clean waters are important to people as well as to aquatic and other wildlife.

FLOOD DAMAGE PROTECTION

Wetlands have often been referred to as natural sponges that absorb flooding waters, yet they actually function more like natural tubs, storing flood waters that overflow riverbanks or surface water that collects in isolated depressions. By temporarily storing flood waters, wetlands help protect adjacent and downstream property owners from flood damage. Trees and other wetland plants help slow the speed of flood waters. This action combined with water storage allows wetlands to lower flood heights and reduce the water's erosive potential. Wetlands in and upstream of urban areas are especially valuable for flood protection, since urban development increases the rate and volume of surface-water runoff, thereby increasing the risk of flood damage. In agricultural areas, wetlands help to reduce the likelihood of flood damage to crops.

EROSION CONTROL

Wetlands are often located between rivers and high ground and are, therefore, in a good position to buffer the land against erosion. Wetland plants are most important in this regard, since they increase the durability of the sediment through binding soil with their roots, dampen wave action by friction, and reduce current velocity through friction.

NATURAL PRODUCTS

A wealth of natural products are produced by wetlands. Products that are available for human use include timber, fish and shell fish, wildlife, blueberries and peat moss. Wetland grasses are hayed in many places for winter livestock feed and during the spring and summer, livestock graze in many freshwater marshes. In certain areas of the Northeast, wetlands are being mined for peat moss which is used for horticultural purposes. Harvest of peat moss requires excavation of natural wetlands which unfortunately eliminates most of the wetland's values, especially as wildlife habitat.

RECREATION AND AESTHETICS

Many recreational activities take place in and around wetlands. Waterfowl hunting and fishing are popular sports. Other recreation is largely nonconsumptive and involves activities like hiking, nature observation and photography, swimming, boating, and ice skating. Many people simply enjoy the beauty and sounds of nature and spend their leisure time walking or boating in or near wetlands observing plant and animal life. Through the centuries, wetlands have also captured the attention of artists who have painted wetland scenes or have written about wetlands. Thus, wetlands are without question an important part of the natural heritage of America - one of our most valuable natural treasures.

STUDY AREA

The study area is the Pleasant Valley Quadrangle located in Dutchess County in southeastern New York. The Quadrangle has a land surface area of 55.4 square miles.

METHODS

Wetland trend analysis involves comparing aerial photography from at least two time periods. For the present study, aerial photos from three time periods were examined and compared to determine the extent of wetland changes (losses, gains, or changes in wetland type) that occurred between 1958 and 1988.

The original NWI map for the Pleasant Valley Quadrangle was produced from 1:58,000 scale, color infrared photography acquired by the U.S. Geological Survey's National High-Altitude Photography Program in March of 1985. Wetlands were delineated and classified according to the Service's official wetland classificaion system (Cowardin, et al. 1979), following standard NWI mapping conventions (National Wetlands Inventory, 1990). For this project, two additional dates of photography were acquired and evaluated to update the original NWI map and to conduct the trend analyses. The most recent photography used was 1:40,000 scale, black and white aerial photography acquired by the New York State Department of Transportation in May of 1988. The oldest set of photography used was 1:60,000 scale, black and white photography acquired by the U. S. Air Force in July of 1958. These interpretations served as the basis for evaluating current wetland status and trends.

The three sets of photographs were compared using a Bausch and Lomb high power SIS-95 zoom stereoscope. In the first phase of the analysis, the 1985 "original" or "base" photos were compared to the more recent 1988 photos. Initially, these 1988 photos were used as collateral data to verify and "enhance" the original interpretations and base map, resulting in the addition of approximately 13 previously undetected wetlands to the base map. Subsequently, all changes occurring during that time period were delineated on mylar overlays attached to the 1988 photographs and observable causes of change were recorded for each polygon delineated. This overlay represents changes that occurred between March of 1985 and May of 1988. In the next phase of the analysis, the 1958, 1:60,000 photos were compared to the "enhanced" 1985 photos. Again, all changes and observable causes were delineated and recorded on mylar overlays attached to the 1958 photos, representing changes that occurred between 1958 and 1985.

The minimum mapping unit of detectable changes for this project was less than one acre. Changes as small as 0.4 acre were detected. All changes delineated on the 1988 and 1958 photo overlays were transferred to separate 1:24,000 scale overlays using an Ottico Meccanica Italiana Stereo Facet Plotter. Quality control of all photo interpretations was performed by another trained photointerpreter. The 1:24,000 scale "change" overlays were digitized to produce wetland acreage and change analysis summaries.

RESULTS

Current Wetland Acreage

In 1988, the Pleasant Valley Quadrangle possessed just over 2,099 acres of wetlands, excluding extremely narrow streamside wetlands and streams. This acreage amounts to roughly 6 percent of the land surface of the quadrangle. In addition to these wetlands, the study area contains 130.7 acres of deepwater habitats including 129.3 acres of upper perennial rivers. Also there are 1.4 acres of lacustrine unconsolidated bottom (lake) in the extreme northeast corner of the quadrangle. Table 1 and Figure 1 summarize the acreage of the different wetland types found in the County.

Palustrine forested wetlands predominate with over 1,396 acres, representing nearly 67 percent of the wetlands on the Pleasant Valley quadrangle. Palustrine emergent wetlands and ponds having nearly equal acreages of 246.7 and 246.2 respectively, each account for another 12 percent of the quadrangle's wetlands. Palustrine scrub-shrub wetlands account for the remaining 9.4 percent of the wetlands.

Wetland Trends

The results of the wetland trend analysis study for the Pleasant Valley quadrangle are presented in Tables 2, 3 and Figures 1-3. The following discussion highlights the more significant or interesting findings.

Between the years of 1958 and 1985, the study area experienced a number of activities which affected wetlands. Sixty-five sites recorded changes in wetlands and uplands affecting over 135 acres, resulting in a net gain of 35.5 acres of wetlands. However, 99% (44 acres) of these

Table 1. 1988 acreage of wetland types in the Pleasant Valley Quadrangle - Dutchess County, New York.

Wetland Type	Acres
EMERGENT WETLANDS	
Temporarily Flooded	11.9
Saturated	0.2
Seasonally Flooded	60.9
Seasonally Flooded/Saturated	78.7
Semipermantly Flooded	94.9
Total Emergent Wetlands	246.7
SCRUB-SHRUB WETLANDS	
Temporarily Flooded	2.7
Seasonally Flooded	51.7
Seasonally Flooded/Saturated	140.6
Semipermantly Flooded	2.4
Total Scrub-shrub Wetlands	197.4
FORESTED WETLANDS	
Temporarily Flooded	47.8
Saturated	1.3
Seasonally Flooded	447.5
Seasonally Flooded/Saturated	897.6
Semipermantly Flooded	2.2
Total Forested Wetlands	1396.4
Aquatic Bed Wetlands	13.0
Total Vegetated Wetlands	1859.7
Unconsolidated Bottoms (Ponds)	246.2
TOTAL WETLANDS	***2099.8***

newly created wetlands were small ponds. Other activities were responsible for the loss of approximately 8.8 acres of forested and scrub-shrub wetlands in the Pleasant Valley quadrangle. The causes of all of these changes are grouped into 8 catagories and are discussed below.

Only 0.6 acre of new vegetated (emergent) wetlands was created as a result of sand and/or gravel excavation, which also created 6.7 acres of ponds. Agricultural activities, including pond construction for agricultural use, created 19.8 acres of new ponds including the conversion of over 2 acres of scrub-shrub and emergent wetlands into unvegetated ponds.Over 50.6 acres of emergent wetlands were converted to other wetland types between 1958 and 1985. Most of these areas were converted by man-made impoundents and/or excavations of ponds within the emergent wetland area. Approximately 5.5 acres of scrub-shrub wetlands were destroyed due to road construction and commercial developments. Forested wetlands lost 3.2 acres to additional road construction which also caused the conversion of 0.4 acre of forested wetland to emergent wetland during this 1958 to 1985 period. Transmission line corridor development converted 6.4 acres of forested wetland to scrub-shrub and emergent types, while 4.2 acres of forested wetlands were converted to pond due to impoundment. Pond construction for unknown reasons created nearly 17 acres of new ponds from uplands and converted 5.7 acres of forested and emergent wetlands into unvegetated ponds. In addition to these changes initiated by human activities, natural succession accounted for over 19 acres of emergent wetland converting to forested wetland.

During the more recent time period of 1985 to1988, several more changes occurred to wetlands as a result of several of the previously mentioned activities as well as some new activities affecting changes in 33 sites, resulting in the loss of 8.3 acres of emergent, forested and scrub-shrub wetlands and ponds. These activities causing the changes are grouped into 7 categories and are discussed below. Housing construction caused the loss of 1.9 acres of emergent, scrub-shrub and forested wetlands and unvegetated ponds. Recreational development destroyed 0.9 acre of emergent and forested wetland, while over 3.2 acres of ponds and forested wetlands were lost to sand and gravel operations. Forested and scrub-shrub wetlands lost over 0.5 acre due to road construction. Pond construction by excavation created 0.6 acre of unvegetated pond while 0.4 acre of emergent and scrub-shrub wetlands were also converted to ponds. Just over 0.1 acre of pond was lost due to agricultural activities. Approximately 1.6 acres of forested wetland and pond were lost due to unknown causes.

SUMMARY

During the time period between 1958 and 1988, a number of activities caused changes in 98 sites, affecting approximately 145 acres in the Pleasant Valley Quadrangle. These changes resulted in the loss of roughly 14 acres of vegetated wetland, and conversion of an additional 18 acres of vegetated wetlands to ponds. While pond acreage increased by over 58 acres between 1958 and 1985, the significance of these 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 wetland habitat for fish and wildlife as well as the loss of other functions and values provided by these areas.

While the actual acreages of wetlands lost over the entire 30 year time span of the trend analysis are not large compared to the total acreage of wetlands in the study area (about 0.08 % loss), it appears that the rate of wetland destruction is on the rise, with relatively small acreages lost (8.8 acres) in the 27-year period between 1958 and 1985, and nearly the same acreage of wetland lost (8.3 acres) in only a three-year period following 1985. Further investigation may be warranted to determine the extent of activities that have affected wetlands since 1988.

Figure 1. Abundance of wetlands by type (1988).

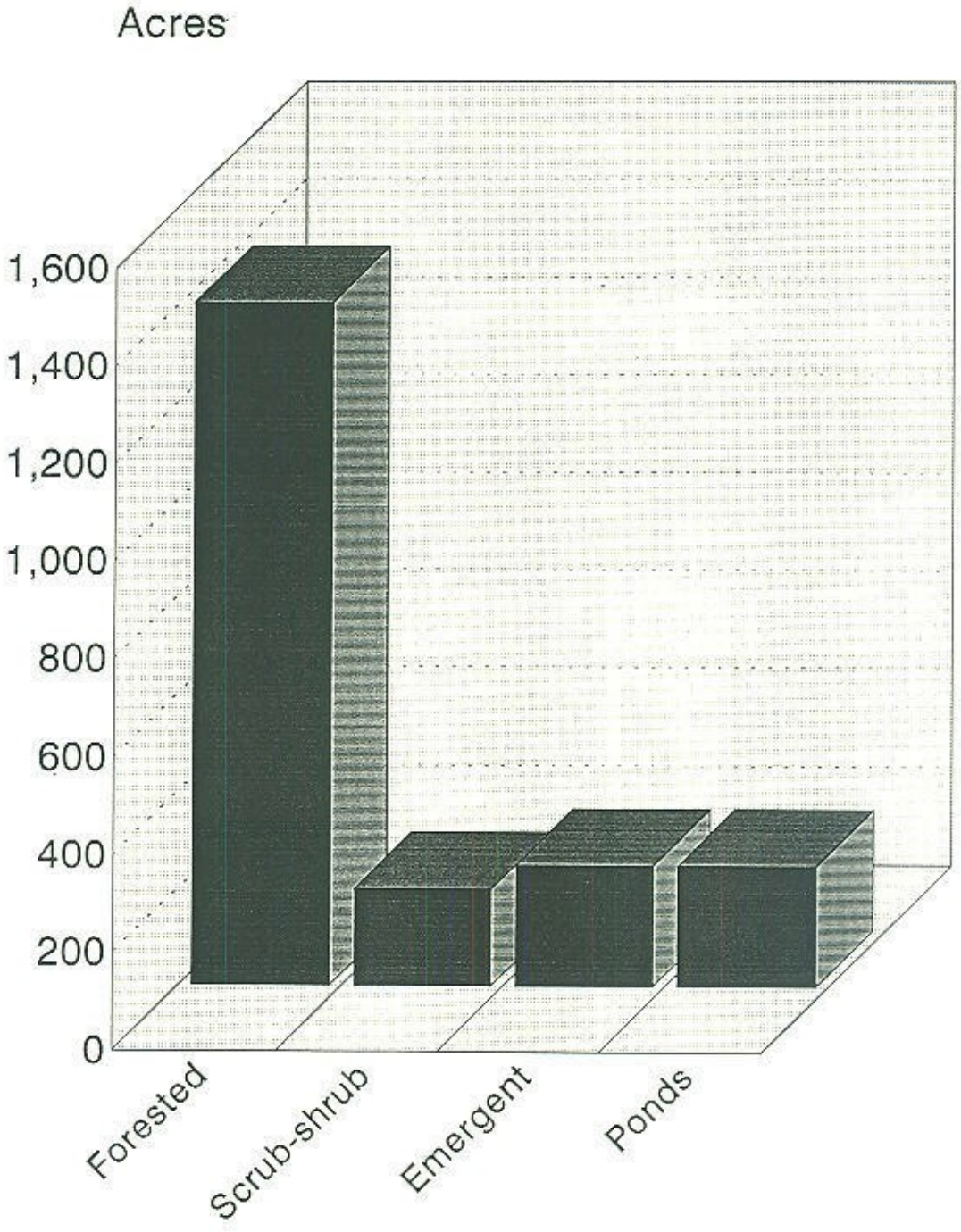


Figure 2. Losses to upland by wetland type between 1958-1988.

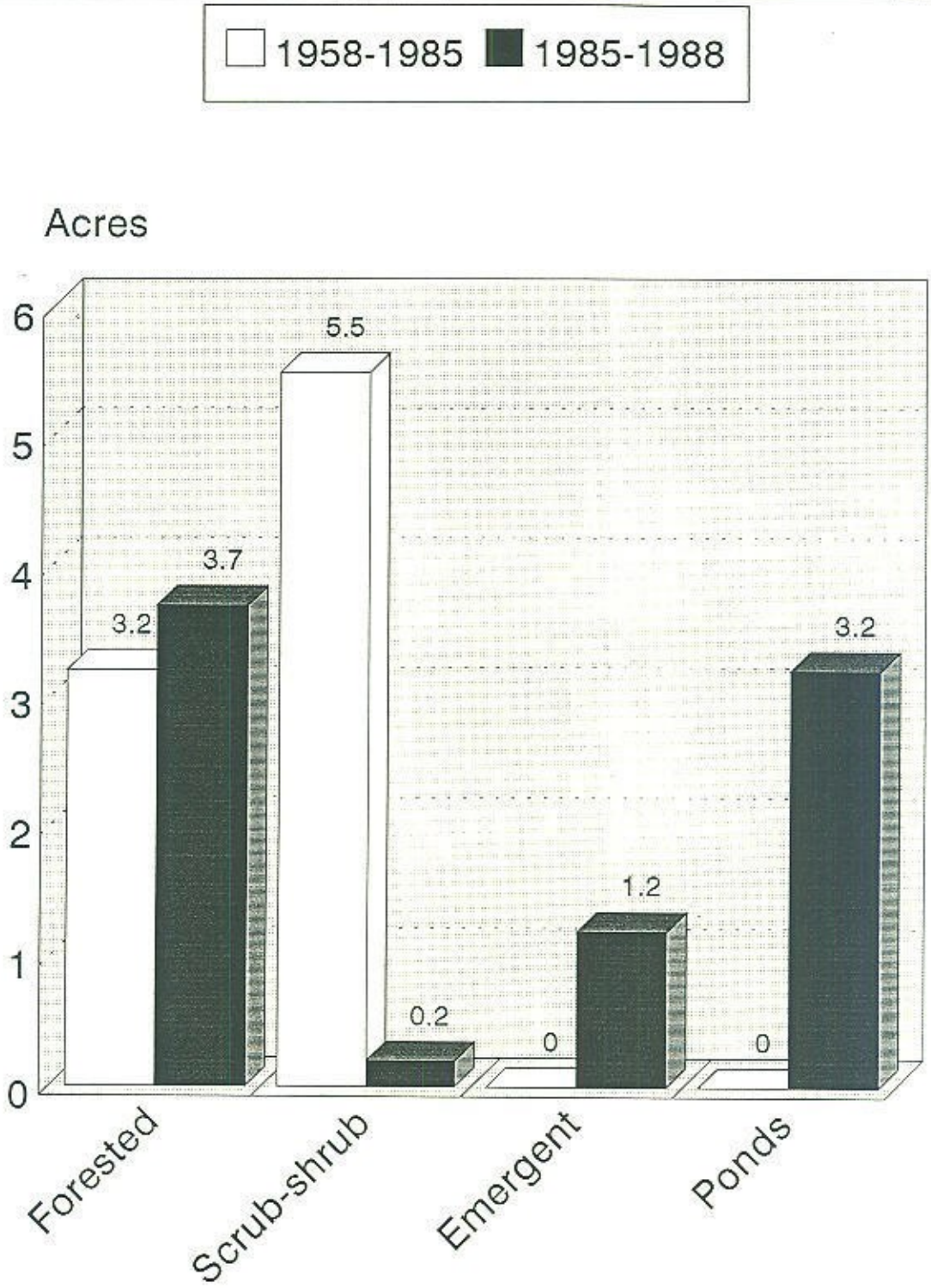
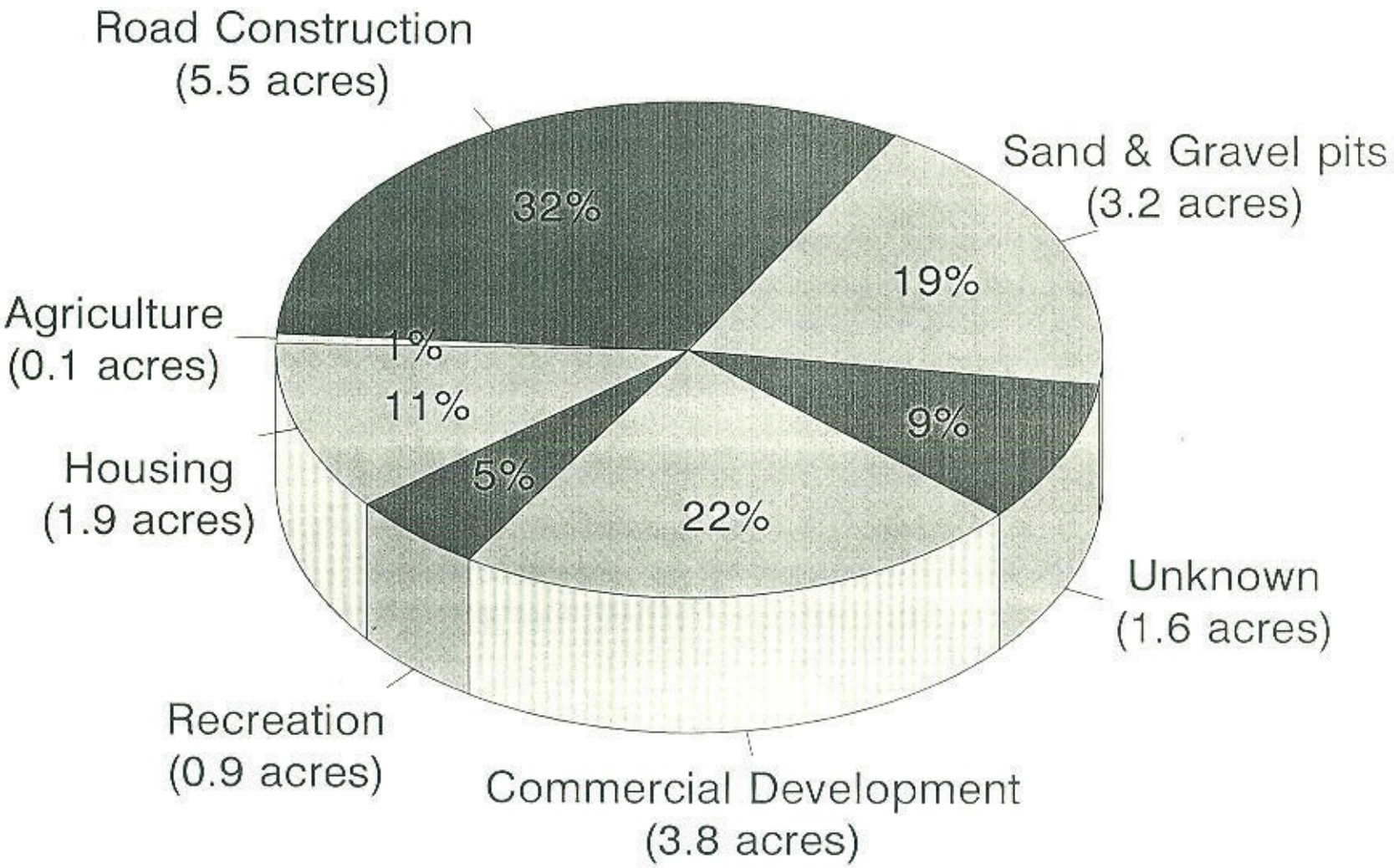


Figure 3. Causes of wetland conversion (loss) to upland.
(1958 - 1988)



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