FINAL REPORT

MAY 15, 1995 - AUGUST 4, 1995

TITLE: 1995 Heron Lake Colonial Waterbird Survey

LOCATION: Windom Wetland Management District

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Abstract

Heron Lake was once a nationally known waterfowl lake. Due to a decline in the habitat of the lake's watershed and other factors, Heron Lake has declined in quality. The result of this decline is a reduction in the number of waterfowl and non-game birds that use the lake. This report presents the causes and effects of the decline of Heron Lake.

Colony nesting waterbirds have been identified as an indicator species for Heron Lake. An indicator species can be used to determine the status of the lake. In the early 1900's an abundant number of colony nesting water birds, including Franklin's Gulls and Forster Terns, were found nesting on Heron Lake. As many as 50,000 Franklin Gulls have been reported nesting on the lake in one season. Franklin's Gull and Forster's Tern have been identified as good indicator species for the lake.

Each year fewer colony birds are using Heron Lake as a nesting site. For example, in 1992 there were two colony nesting sites on North Marsh for Franklin's Gulls with 500 total nests and Forster's Terns with 300 total nests. In 1995 there was no nesting activity by either species. There are many causes for the reduction of nests.

Due to the decline in vegetation on lake there is little cover for nesting or protection for the birds. Many colony nesting waterbirds use old vegetation for nests on top of the water. In many years a high bounce in the water level occurs, anywhere from one to four feet in a day depending upon the amount of precipitation received. The high water level floods the nests of these birds and has destroyed many nests in past years. When the nests are destroyed renesting has not often occurred. Franklin's Gulls and Forster's Terns often return to the location in which they fledged at. With fewer gulls and terns fledged at the colony locations fewer birds are returning to the breeding grounds. Less vegetation also means that there is a smaller food source available to the birds and since the water is in poor quality in addition to high wave action the vegetation does not grow well.

Study Area

Heron Lake

Heron Lake is the second largest lake south of the Twin Cities. It is ten miles long and is made up of four sub-basins: South Lake, North Lake, North Marsh and Duck Lake. See figure 1. The lake is in the Middle Des Moines Watershed District which covers 472 square miles, extends 30 miles east to west and is located within four counties. See figure 2. There are 45+ acres of watershed for each surface acre in Heron Lake. Before intense agricultural use, the lake contained 8,251 surface acres. Currently, the lake contains about 6,400 surface acres.

Heron Lake was named by Native Americans for the large numbers of Black-crowned Night Herons that resided around the lake. However, the lake is better known for the large number of waterfowl especially canvasbacks that use the lake during migration. In 1906 it was reported that an estimated 700,000 canvasbacks used the lake during the fall migration.

South Heron Lake (2,645 acres) which is six miles long with a maximum depth of 6 feet flows into North Heron Lake via Division Creek. North Heron Lake (3,426 acres) which is shallower than South Lake flows into North Marsh through an unnamed channel. Duck Lake also flows south into North Marsh.

Water flow on Heron Lake has eight major inlets and one outlet. Two of the inlets are creeks which makeup 90% of the flow. Okabena Creek flows into South Lake and Jack Creek flows into North Lake. The 6 other inlets are man-made ditches. There are two dams that control water flow on the lake: the privately owned Dalziel Dam is located in the channel between North Lake and North Marsh and a state built dam on North Marsh controls the water flow out of the lake. See figure 1.

Factors Attributing to Decline of Lake Habitat

Due to a number of interacting factors the value of Heron Lake for waterfowl and non-game species has declined. These factors encompass 1. Drainage of 90% of watershed's wetlands 2. Intense agricultural practices 3. Pollution and sedimentation 4. The population of rough fish in the lake.

Drainage of the watershed's wetlands is detrimental to the whole system. Wetlands serve many purposes including flood control, erosion control and water purification. A wetland holds water and allows it to slowly enter the watershed. A decrease in the number of wetlands permits water to flow at a faster rate. A high degree of precipitation facilitates flooding which increases erosion and runoff, i.e., the increase in sediment is carried into Heron Lake. The vegetation in a wetland will filter and hold sediments thereby decreasing the amount that enters the

lake. Fast flowing water does not have time to purify itself therefore, more chemicals and other nutrients increase in quantity and further damage the watershed.

Intense agricultural practices over the watershed have also contributed to the decline of the lake. Increased spraying has added harmful chemicals to the system. Drainage, diking, tiling and ditching have affected water flow into the lake. Since the land is flat, these practices do little to stop fast water flow during times of heavy precipitation.

Water that enters the lake has poor quality. The water contains a considerable amount of chemicals which are harmful to the ecological system. Pollution, including municipal discharge, in and around the system has affected the water quality of the lake.

The rough fish population of the lake is a substantial problem. Detrimental effects of rough fish include direct uprooting of plants and increasing the turbulence of the water through their rooting habits. The rooting action of carp keeps sediments suspended thereby decreasing the light penetration for aquatic plant photosynthesis. Because of the destructive habits by the high carp population the number of aquatic plants used for food and cover by waterfowl and non-game birds has been reduced.

Lake vegetation

The decline of vegetative habitat is profound on the lake. In the earlier 1900's the vegetation was so thick that hunters had to pole their boats through it and cut channels in it for boat routes. This vegetation, including wild celery and sago pondweed, a favorite food of waterfowl and non-game birds: cattails and other aquatic plants provide cover and nesting sites. Today there is very little cover on the lake for waterfowl, non-game birds and lakeshore protection.

High wave action destroys parts of the shoreline surrounding the lake. Wave action also keeps the sediments suspended so vegetation has a difficult time growing in a turbulent foundation. Vegetation on the lake slows wave action caused by wind thus minimizing the resuspension of sedimentation. If sediment resuspension is decreased, more light can penetrate the water and create a more stable foundation allowing for better aquatic plant growth. If more plants can grow, oxygenation of the system improves due to an increase in photosynthesis. This increase in oxygen helps the filter-feeding organisms which may help maintain good water quality.

The combination of drainage of wetlands, intense agricultural practices, pollution and the rough fish population has contributed to the decline of the lake. Reduced non-game bird populations reflect this decline.

Methods

The survey routes were along the lake shores, through the three creeks and the channel between North Lake and North Marsh using a flat bottom boat powered by an outboard or electric motor. Materials used for the survey include, aerial photos of the lake and creeks, binoculars, bird identification book, oars, push-pole and two-way radio.

Nongame Bird Survey Results

During the non-game waterbird surveys far fewer numbers of birds were observed than in past years. No nesting activities were observed for Forster's Terns and Franklin's Gulls. However, successful nesting was observed for the Western Grebes. The young were observed riding on the parent's back and swimming behind. See table #1.

On one survey route Ruddy Turnstones and Black-bellied plovers were observed. These birds were probably migrating through and stopped to rest on the lake. Other non-game birds observed were Black Tern, Ring-billed Gull, Black-crowned Night Heron, Double-crested Comorant, Pied-billed Grebe, Great Blue Heron, Great Egret, White Pelican, Sora, Least Bittern, Greater Yellow Legs and Lesser Yellow Legs. Waterfowl observed includes Mallards, Wood Ducks, Teal, and Canada Geese.

Conclusions

In order to improve nesting habitat for nongame birds, water quality must be improved and water flow reduced. Wetland restorations and no-till farming would slow water flow into the lake and reduce the frequency of large bounces that occur in the lake's water level. Water nesting birds would have a better chance of success without the bouncing water level.

By drawing down the water level at least two things can be accomplished. The lower water would lessen the wave action: aquatic plants would grow better and lakeshores would be protected. Also with the lower water level hopefully the rough fish population would be further reduced through winter-kill. An electric fish barrier on the outlet has already reduced the rough fish population.

An improvement in the water quality would benefit the aquatic plants and organisms. The runoff of farm chemicals and fertilizer would help the water quality to improve. Fewer chemicals in the lake would help the lake and microorganisms to rejuvenate.

Wild celery tubers (Vallisneria americana) have been planted in the lake. This is an attempt to improve the habitat of the lake. The celery would provide food for the waterfowl and non-game birds. The vegetation may also help to improve the water quality of the lake. The increase in vegetation would slow down the wave action on the lake thereby minimizing the amount of suspended sediment. The vegetation would also help increase the amount of oxygen in the lake due to an increase in photosynthesis.

The colonial nesting waterbird surveys should continue since the birds are good indicator species. When nesting occurs, care should be taken to get as much information as possible with a low disturbance to the colony. A standardized route in a year of nesting activity should be developed to keep consistent data techniques from year to year.

The standardized route on Duck Lake should be from the south end of the lake, around the east side and ending at the northwest end of the lake. The standardized route on North Marsh should be from the state dam to the north end of the marsh, along the west side and then through the North Heron Lake outlet channel to the Jack Creek inlet. The North Heron Lake route starts from Dave Pohlman's boat landing along the southeast side of the lake, through Division Creek to South Heron Lake. The South Heron Lake route should start north of Pelican Point (west side) and extend down the west shore to the southwest corner of the lake.

The counting technique can be improved using a ground/aerial correction factor. This can be done by visually counting/estimating the number of birds observed at a location on the ground. At the same location pictures should be taken in a radius of 360^0 around the point of the observer. These can be viewed to provide a more accurate ground estimate.

Photography/videography should also be used for an aerial view of key nesting areas. By counting the birds/nests in the aerial photos, a ground/aerial correction factor can be determined to improve the accuracy of population estimates from future ground counts.

When counting the birds it helps to have two people in the boat. One person can maneuver the boat while the other person counts the birds.

Items of Interest

Eight Trumpeter swans have been released on the lake. Swans previously nested on Heron Lake. This species is being reintroduced on the lake to try and establish a breeding population. The swans were raised in captivity at the Minnesota Zoo. The swans are approximately 2 years old. The wings were previously clipped so the swans could not fly. The swans will be able to fly this fall and have hopefully imprinted on the lake so they would return to this area next spring to nest.

Four osprey chicks have also been released on the lake. Two chicks were approximately 5 weeks old and the other two were approximately 6 weeks old when they were obtained. The chicks were hand fed in a hacking box on North Marsh until they were able to fly and fish for themselves. The ospreys have hopefully imprinted on the area to return after they are 18 months old to establish nesting sites. Nest platforms have been erected around the lake for this purpose.

Figure 1.

HERON LAKE BASINS

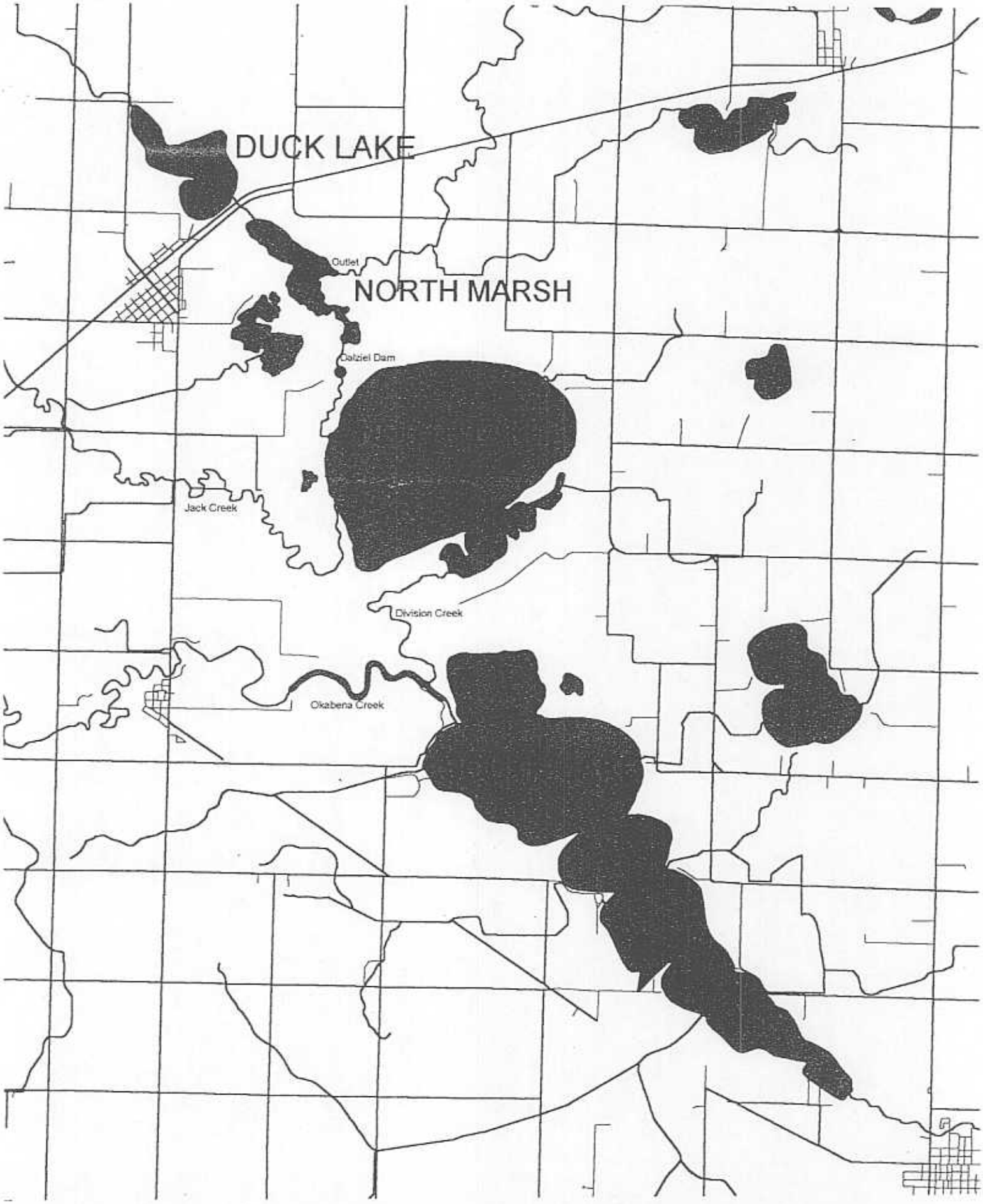
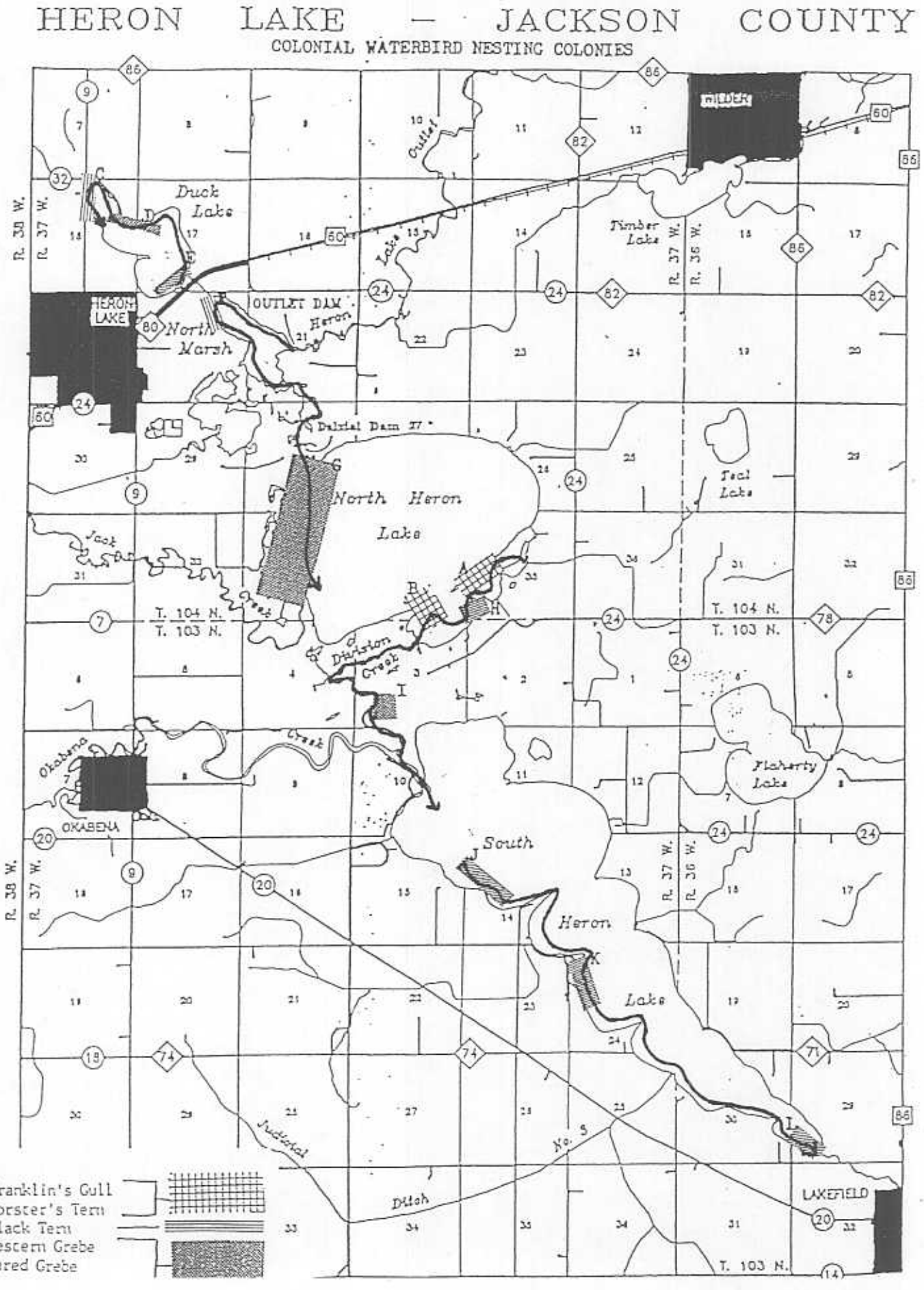


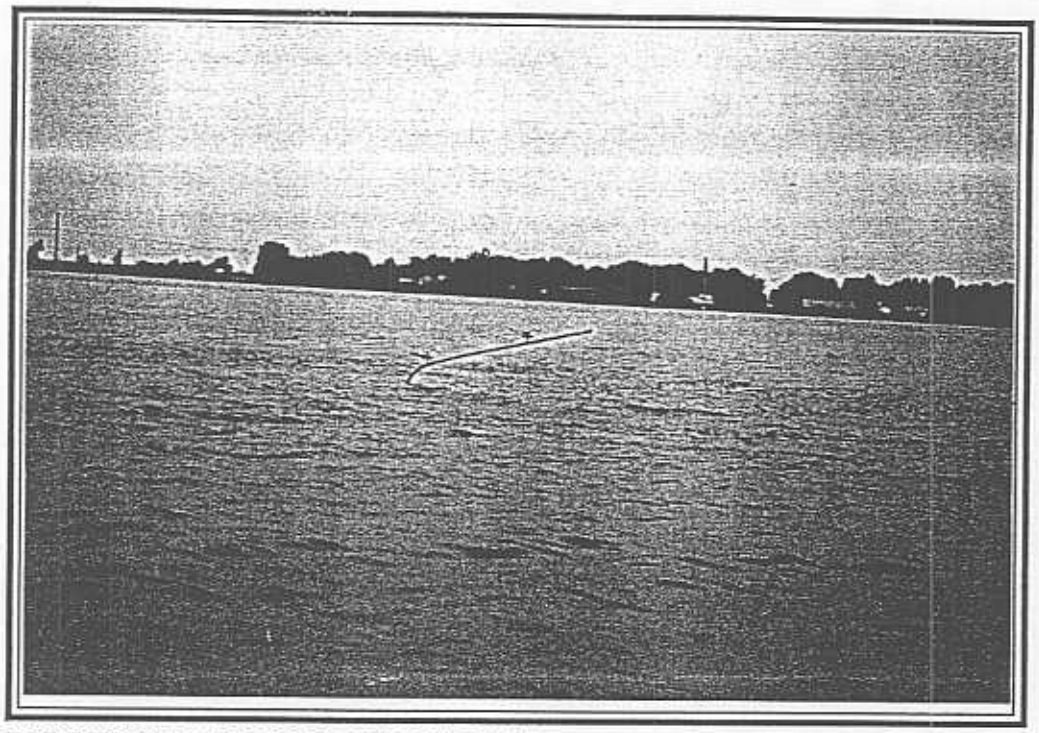
Figure 2. HERON LAKE WATERSHED

TABLE 1. 1992-1995 ADULT BIRD CENSUS SUMMARY

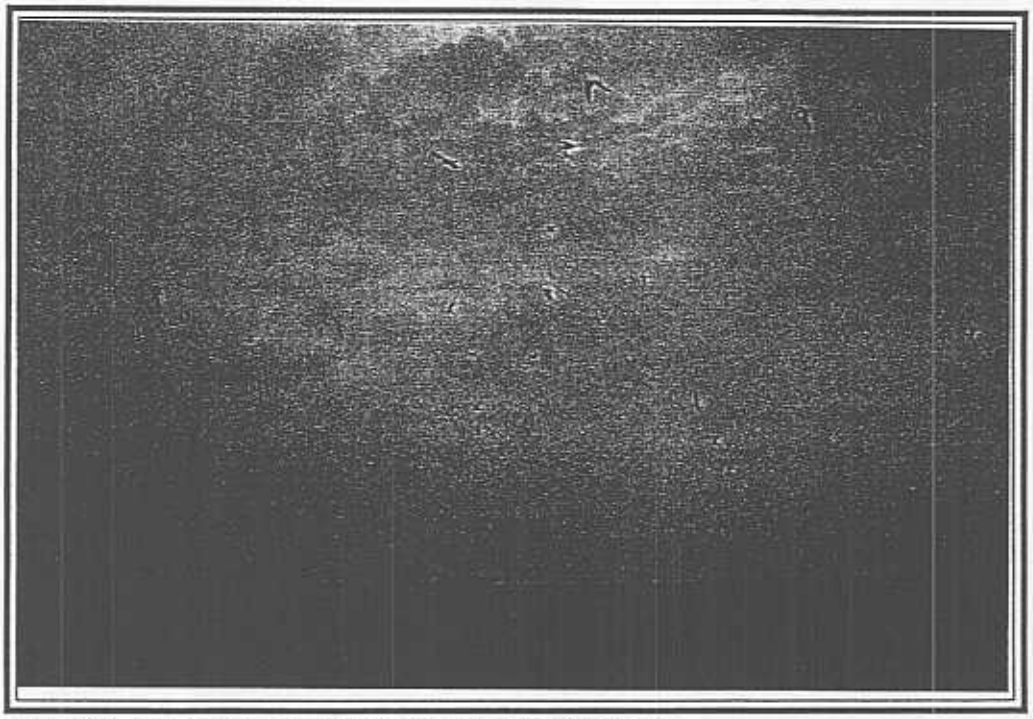
Species	1992	1993	1994	1995
Black Tern			120	
Pied-billed Grebe		30		
Western Grebe	140	50	11	60
Franklin's Gull	2000	4260	160	150
Forster's Tern	1000	645	115	200
Cormorants	250		720	40
Black Crowned Night Heron	150	1000	40	5

Figure 3. Stadardized Routes for Bird Census

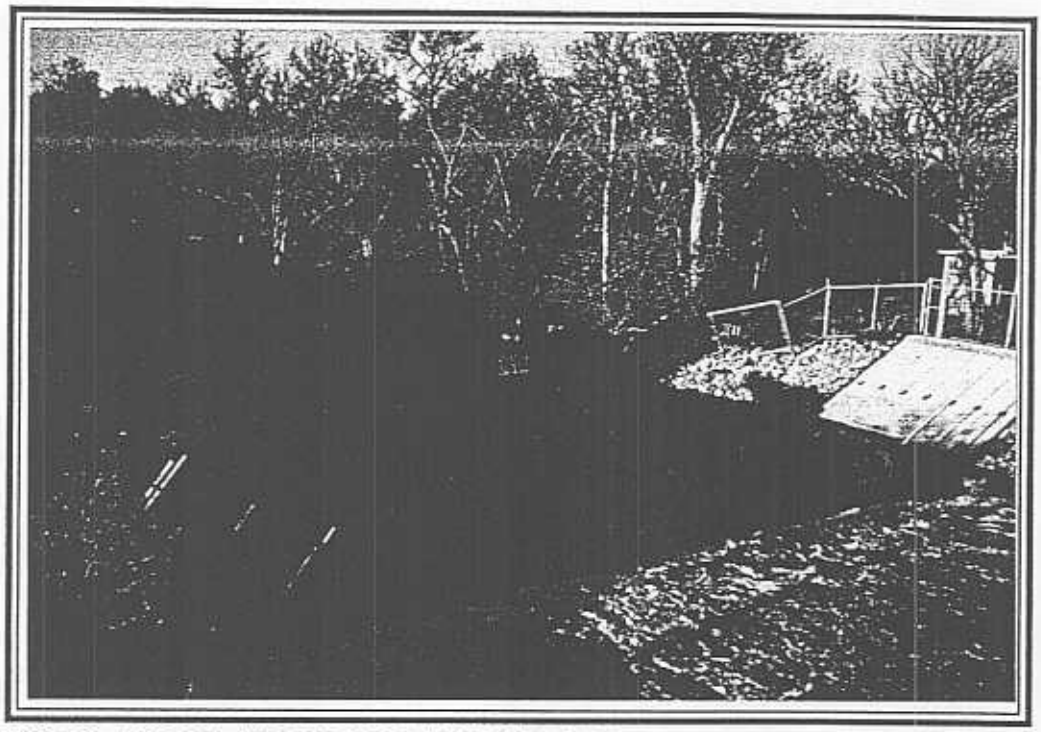




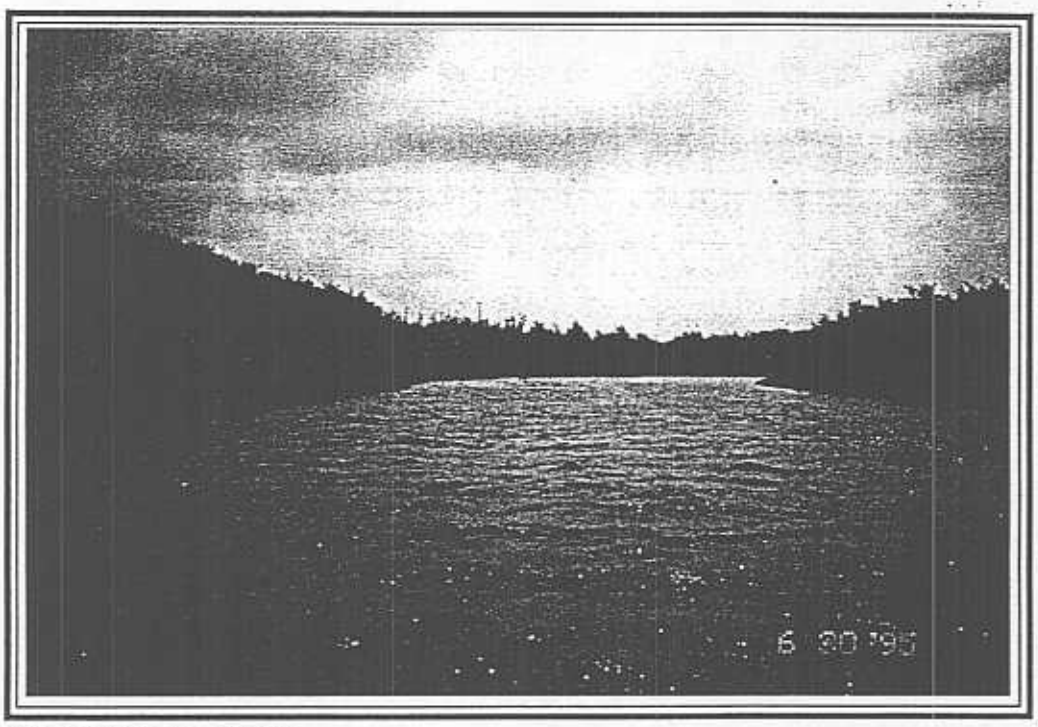
FORSTER'S TERNS-NORTH MARSH



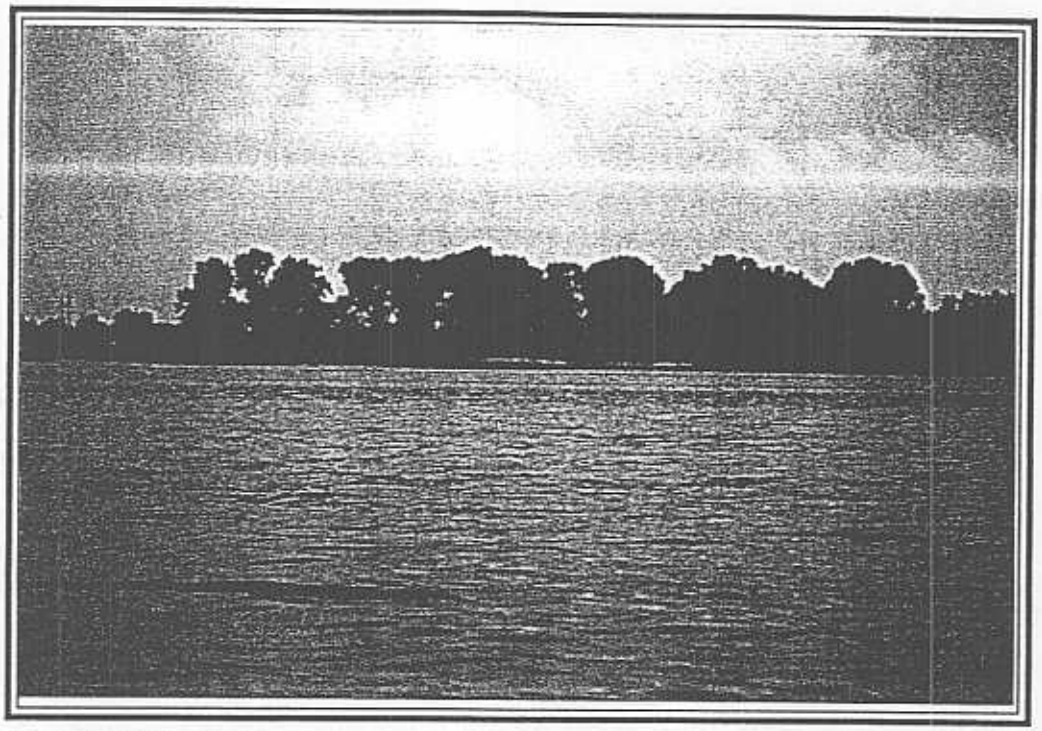
FRANKLIN'S GULLS AND FORSTER'S TERNS



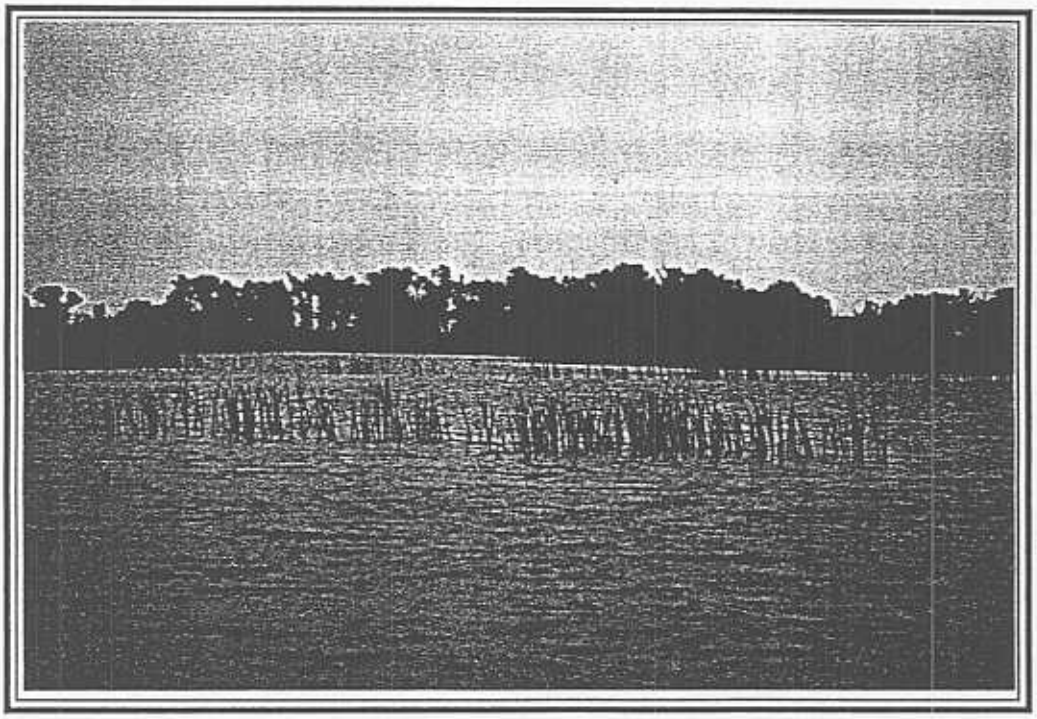
FISH BARRIER AT HERON LAKE OUTLET



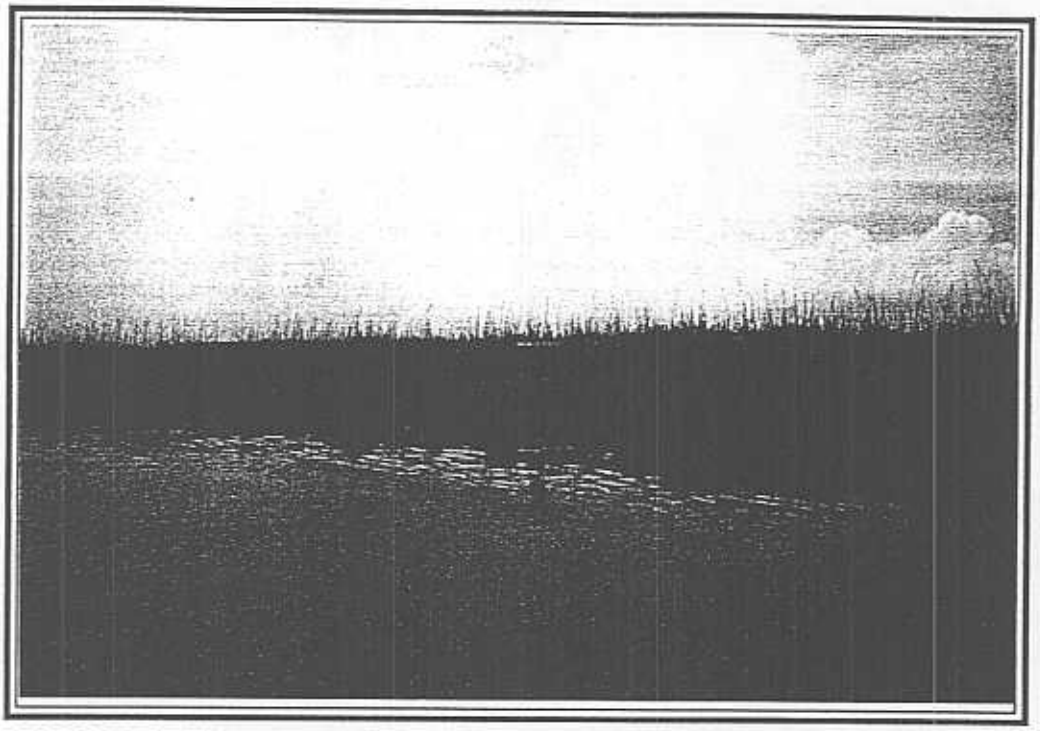
JACK CREEK INLET



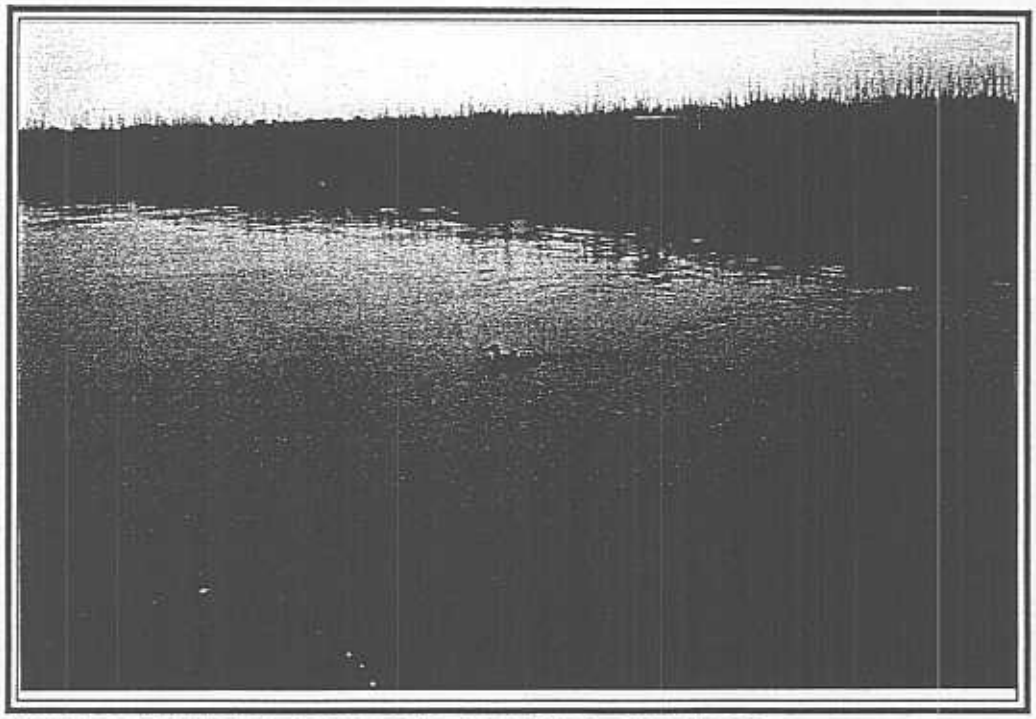
WESTERN GREBE



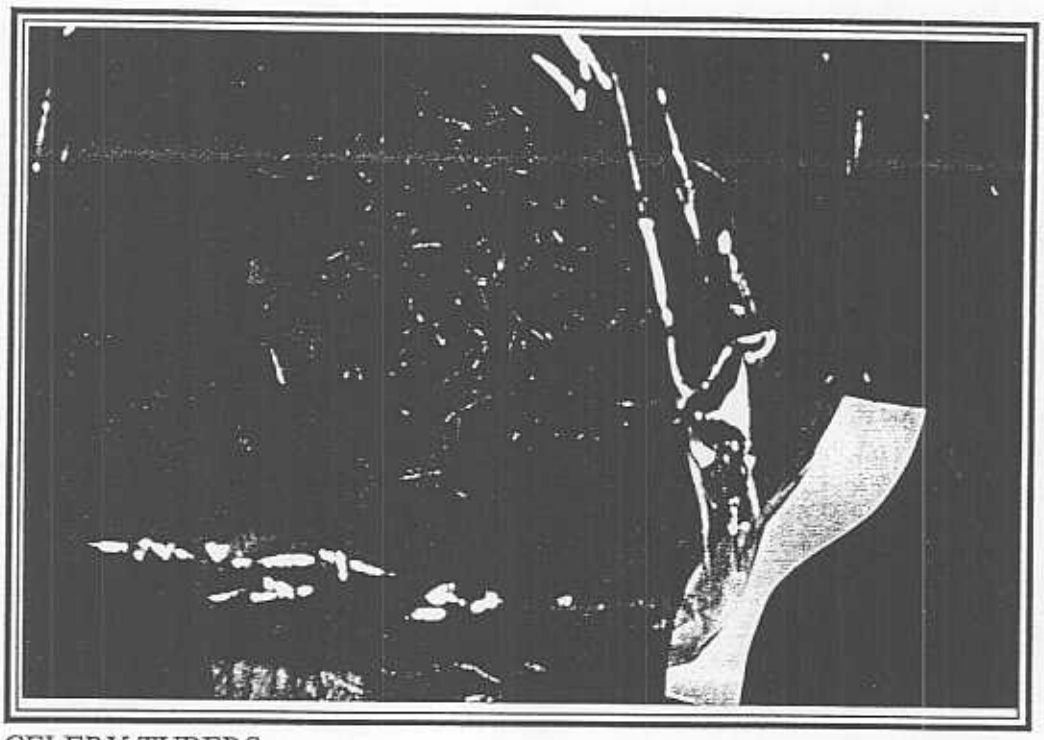
WESTERN GREBE IN A CHANNEL ON NORTH MARSH



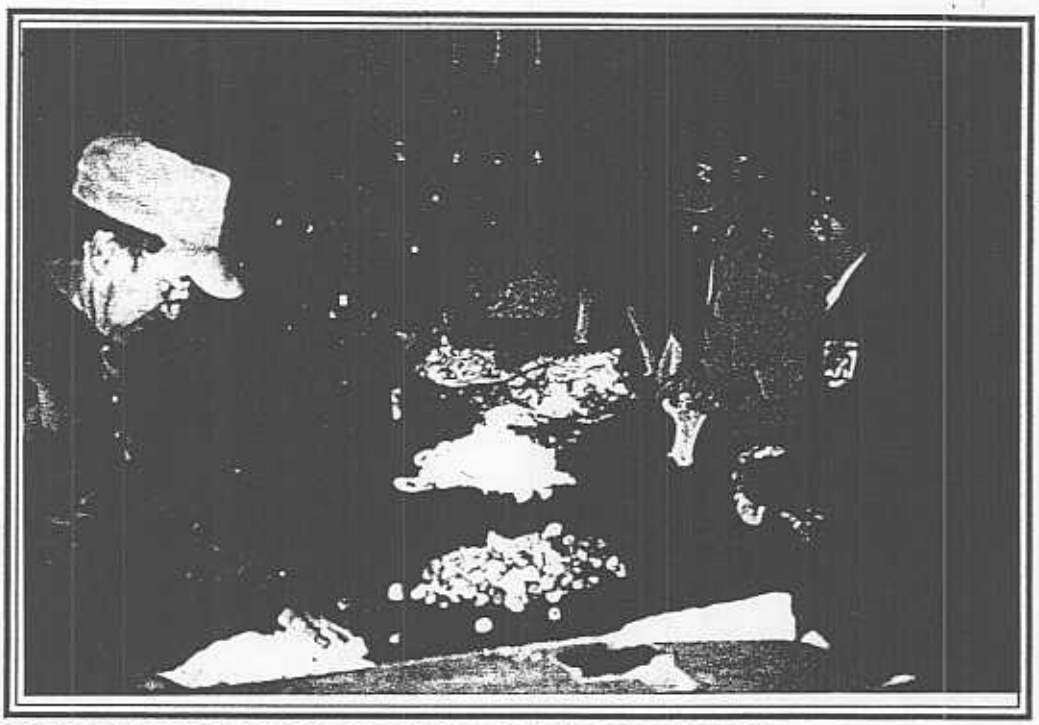
CANADA GOOSE NESTING STRUCTURE ALONG DIVISION CREEK



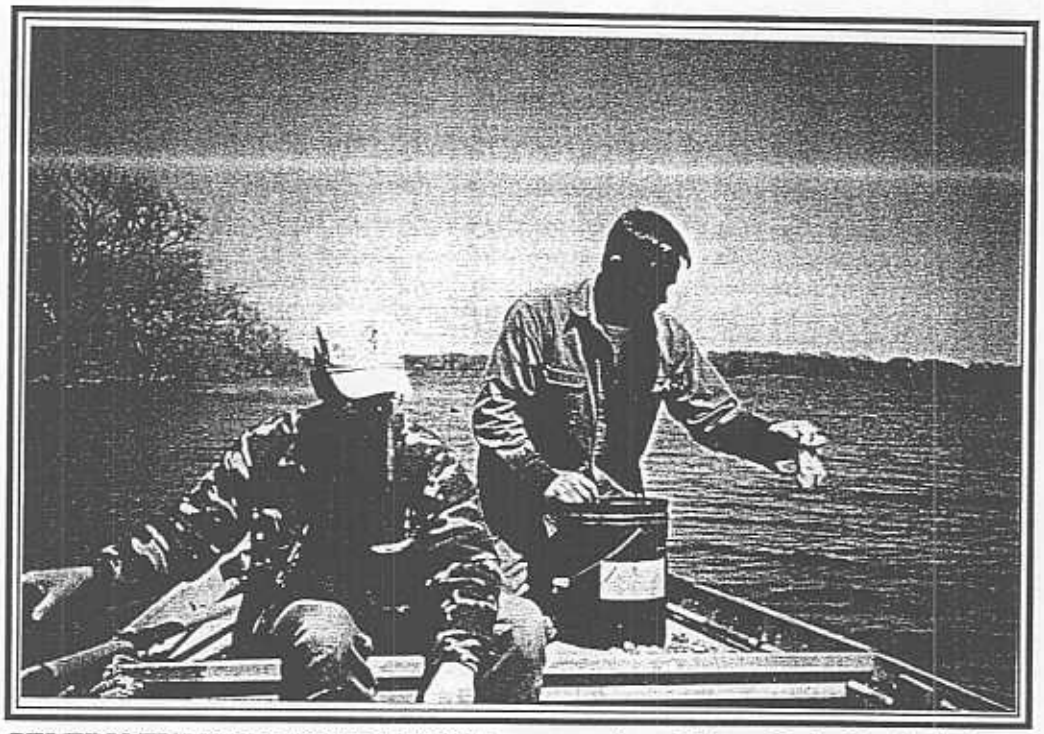
GOSLINGS HATCHED FROM NESTING STRUCTURE



CELERY TUBERS

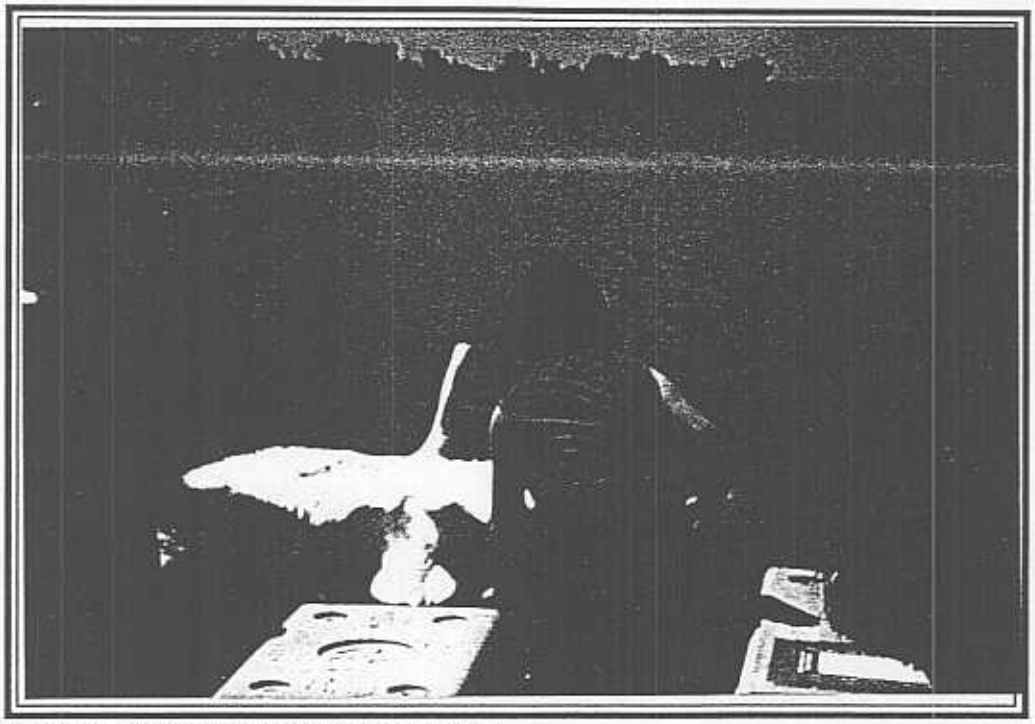


PREPARATION OF CELERY TUBERS FOR PLANTING

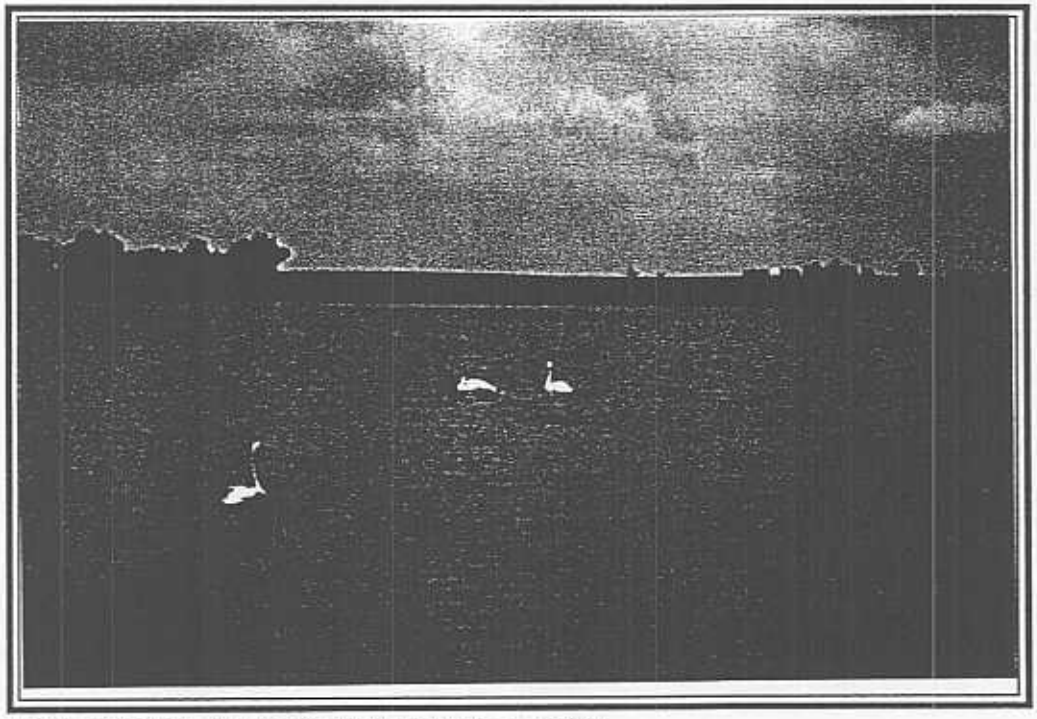


CELERY TUBER PLANTING (DNR personnel and Heron Lake Ecologist)

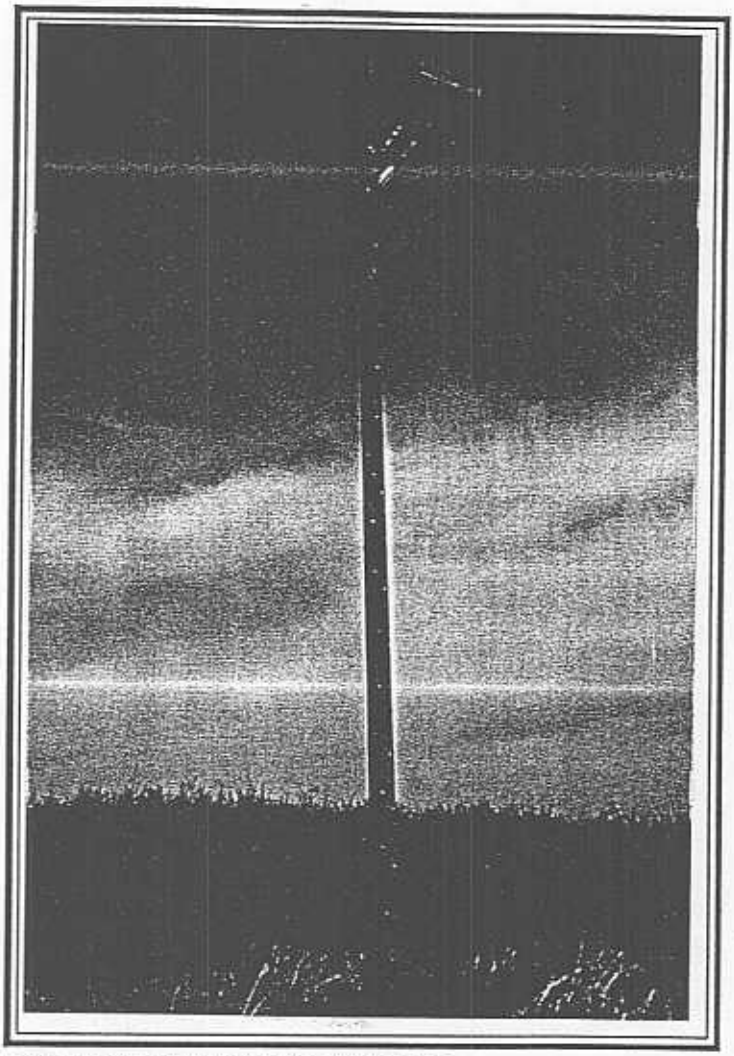
TRUMPETER SWAN



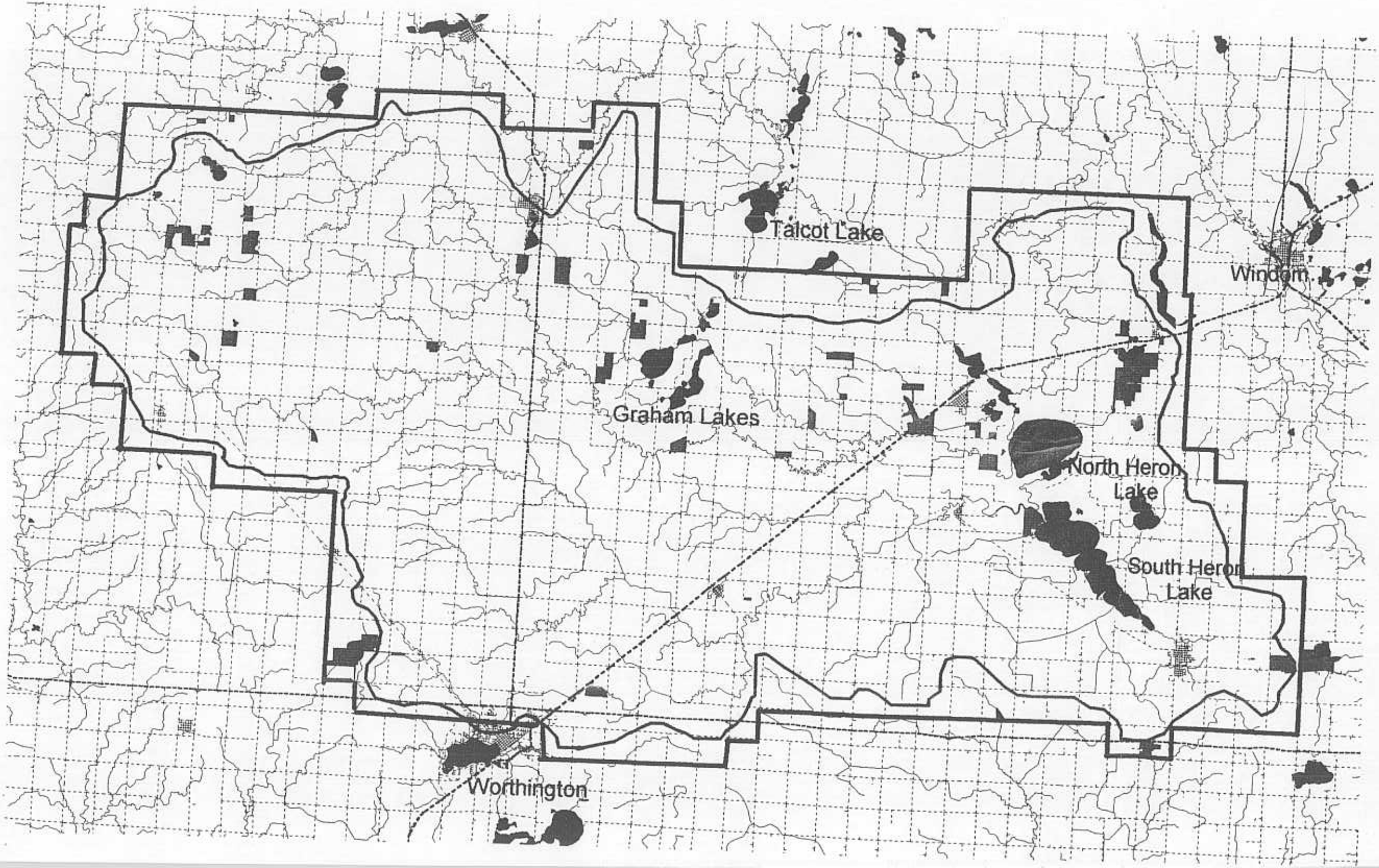
RELEASE OF TRUMPETER SWAN



TRUMPETER SWANS ON NORTH MARSH



OSPREY NESTING PLATFORM


Talcot Lake
Windom
Graham Lakes
North Heron Lake
South Heron Lake
Worthington