

FINAL REPORT  
COVERING THE PERIOD 5/15/60 - 8/09/92

Title: Heron Lake Colonial Waterbird Nesting Survey and  
Sago Pondweed Study

Refuge: Windom-Wetland Management District

Investigator: Cindy Chaffee, Biological Science Technician

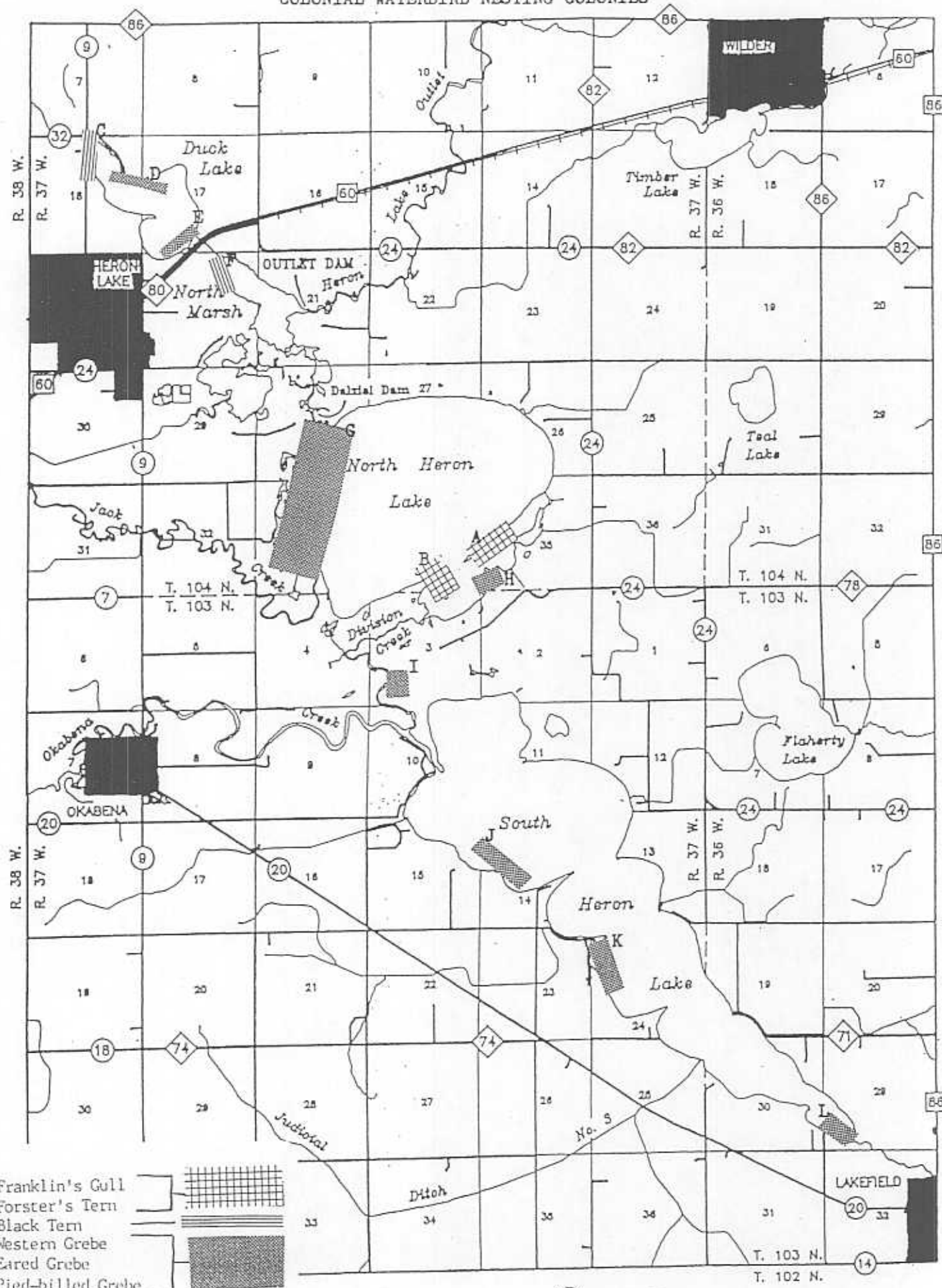
Date submitted: 8/14/92

Submitted by: Cindy Chaffee



# HERON LAKE — JACKSON COUNTY

## COLONIAL WATERBIRD NESTING COLONIES





### ABSTRACT

This paper provides a summary of surveys taken place on the Heron Lakes System from 5/15/92 to 9/09/92. Surveys were conducted to do comparisons of colonial waterbirds' nesting habits from previous years. There has been concern of declining numbers of nesting Franklin's gulls and Forester's terns on Heron Lake. Flooding of breeding colonies has been a continual problem since inception of extensive agricultural drainage into the lake system. There were two breeding colonies of Franklin's Gull and Forester's Tern on Heron Lake early in the season (see Nesting Colonies Map). One of these colonies was completely abandoned and the other had severe losses in population due to nest failure from flooding. Black Terns have begun to establish colonies in remote areas and their numbers have improved from previous years. The western grebe, eared grebe, and pied-billed grebe have had continued and improved nesting success on Heron Lake since the surveys began in 1989. Two unusual sightings occurred this year, one of Wilson's phalaropes, and the other of a red-necked grebe, both with possibilities of nesting on Heron Lake.

Also researched this summer was light penetration and its effect on Sago Pondweed (*Potamogeton Pectinatus* L.) Sago Pondweed growth is effected by turbidity and wind fetch on the Heron Lakes. Some Sago vegetation was lost during a time of increased water levels and wave action, much of this has rejuvenated. Sago pondweed is again covering much of the surface of the North Lake and patches are distributed throughout South Lake which is less protected and more susceptible to wind fetch. As of this writing, the Sago Pondweed has not senesced for the season.

### INTRODUCTION

The definition of species of special concern is: extremely uncommon in Minnesota or has unique or highly specific habitat requirements and deserves careful monitoring; a species whose breeding biology is affected by human disturbances. Species of special interest that could be effected by the habitat conditions on Heron Lake are the black tern, American blittern, yellow rail, American white pelican, king rail, Forester's tern, and common tern.

Colonial waterbird nesting has historically taken place on the Heron Lakes. In recent years the numbers of Franklin's gulls and Forester's terns have declined. One major contributor to the decline in nesting successes of the colonial breeders is extreme water fluctuations in the lake system which continually flood nests. Pertinent to successful nesting is controlling or managing the excessive water fluctuations. Increased introduction of nesting platforms would be an immediate enhancement for waterbird breeding successes. Gulls fledged at a colony usually return to their natal site to breed and having established a breeding site, remain faithful to it.



The red-necked, horned eared, western, and pied-billed grebes were all recorded nesting on Heron Lake in the early 1900's according to Dr. Thomas Roberts, author of "Birds of Minnesota". There are recent records of nesting grebes on Heron Lake of all species but the horned grebe. Western, eared, and pied-billed grebes all nested successfully in the emergent peripheries on Heron Lake this summer. (see colonial nesting map). In 1990 because of low water conditions, western grebe were nesting between 100 and 750 yards from shore, this is unusual but documented behavior for them. During this 1991 season there were no successful nests found from either of these colonies, they were likely flooded by wave action, and there was also a problem of disturbance by Forester's terns using the nests as loafing platforms and disturbing the eggs. This was not the case this year on Heron Lake. There was sufficient water levels all spring and summer to allow nesting in the emergent vegetation. All grebes, especially western grebe were very successful in their nesting.

Unusual bird sightings this year included a pair of Wilson's phalaropes and a red-necked grebe. Wilson's Phalaropes rarely nest in this area but there are nesting records on Heron Lake for these unusual birds from 1906. The Red-necked Grebe is very uncommon during the summer months in southern Minnesota. However, Heron Lake offers the red-necked grebe the nesting that it most prefers: fresh water marshes and edges of shallow lakes. There is a nesting record for the red-necked grebe from Heron Lake in the 1930's.

Sago Pondweed is highly tolerant of eutrophic water and the dominant submersed vegetation in Heron Lake. It is valued as one of the most important waterfowl food sources in North America. Sago beds also support complex systems of invertebrates, another important food source for young waterfowl. Sago reproduces both sexually by seeds or fruit and asexually by tubers with most reproduction being by tubers. There is concern that sago distribution and abundance may be good at times, but individual plants may not be producing tubers which is the part of the plant that is most important as a food source for migratory waterfowl.

Turbidity is the factor most frequently limiting Sago Pondweed growth. Tubers compete with above-ground biomass for photosynthate. At the highest level of shading, the photosynthetic tissue is unable to sustain tuber growth and, as a consequence, net growth of the vegetation will cease. Rather small differences in tuber biomass can cause considerable and long-lasting (4-5 years) differences in plant biomass.

Kemp and Boynton discuss moderate to high nutrient loadings resulted in significant increases in growth of epiphytic and planktonic algae and decreases in submersed aquatic vegetation production as well as premature seasonal senescence. Results of their experiments demonstrated the



relative potential contribution of submersed vegetation declines, were nutrients > sediments > herbicides.

Increased turbidity caused by planktonic algae is often responsible for lowered Sago production. Nutrients, particularly phosphorous occurs in extremely large concentrations in Heron Lake and it's watershed.

Phosphorous in the soluble form becomes food for algae and causes algal blooms which can spread and dominate the whole lake and reduce beneficial wildlife plant growth, such as Sago. Sago Pondweed, however, is a luxury consumer of phosphorous, making it less available to algae. If sago is abundant it ties up excess nutrients, stabilizes the bottom sediments from wave action, and provides food for wetland wildlife.

## METHODS

### Equipment Used

Flat bottom boat and Go-Devil outboard motor.  
Light Photometer LI-185 Quantum/Radiometer/Photometer  
LI-1925 Underwater Sensors

### Data Collection

Colonial bird data was collected using standard survey forms with colony sites located on reverse side of form on aerial photograph. Populations surveyed include: white pelican, double-crested cormorant, great blue heron, great egret, black-crowned night heron, horned, eared, and western grebe, ring-billed gull, herring gull, common tern, Franklin's gull, and Forester's tern. Colonies were visited and populations and nesting estimated for comparisons.

A shoreline survey was done by boating the periphery of the complete shoreline of North Marsh, North Heron Lake, and South Heron Lake.

A rail survey was conducted by walking a dike by Pohlman's and using rail recordings.

Light penetration data was collected along transects using a light photometer with underwater and atmospheric sensors and recorded on standardized forms with sites marked on aerial photograph on back side of form. Secchi disk readings were also taken to coincide with the photometer readings.

### Calculations and Data Analysis

Photometric readings: All readings were recorded in microeinsteins. All atmospheric sensor readings required a correction factor of 1.394. All underwater sensor readings required a correction factor of 1.554 X 1.34 (immersion correction factor). Calculations for percentage of light penetration:

$$\frac{UR \times 1.554 \times 1.34}{AR \times 1.394} \times 100 = \% \text{ Light penetration}$$

UR = Underwater Reading



AR = Atmospheric Reading

For data information in photons, all readings are multiplied  
by  $6.023 \times 10^{17}$

1 microeinstein =  $6.023 \times 10^{17}$

## RESULTS AND DISCUSSIONS

TABLE I.  
Observed Colonial Waterbird Nesting on Heron Lake  
1992  
(See Nesting Colonies Map for colony locations)

Species	Colony	Adults	Numbers	
			Nests	Young
Black-crowned Night Heron	B	150	0	0
Black Tern	C,F	150ad	6	40
		50imm		
Double-crested Cormorant	-	250	0	0
Eared Grebe	all	60	12	60
Forester's Tern	A,B	1000	300	50
Franklin's Gull	A,B	2000	500	35
Great Blue Heron	-	70		
Great Egret	-	35		
Herring Gull	-	1imm		
Pied-billed Grebe	D,E,F,G	50	20	10
	H,I,J,K,L			
Ring-billed Gull		150		
Western Grebe	G,K	140	9	120
White Pelican		1500	0	0

Colony A: 2000 Franklin's gulls and Forester's tern occupied this colony on 5/15/92, with about one-third of these being Forester's tern and this was the largest colony on the lake. (see figure 1) Nine days later on 5/24 numbers had declined to about 1/4 of the population of the previous visit. Water fluctuations in the lake caused flooding of nests. (see figure 2) Dramatic water fluctuations continued and numbers declined until 6/18 when there were no birds left in the colony. Franklin's Gulls prefer colony locations within sparse stands of aquatic vegetation near open water and will avoid dense stands of vegetation. The vegetation became very dense here, and may have deterred renesting. Colony "B" was more heavily populated than "A" after the first storm event and remained so for the remaining of the season. Renesting activities took place through 6/25 at colony "B".

Recordings of Colony A:

5/15/92 - 1:30 P.M. 2000 Franklin's gull and Forester's tern, 1/3 are Forester's tern. Found 3 eared



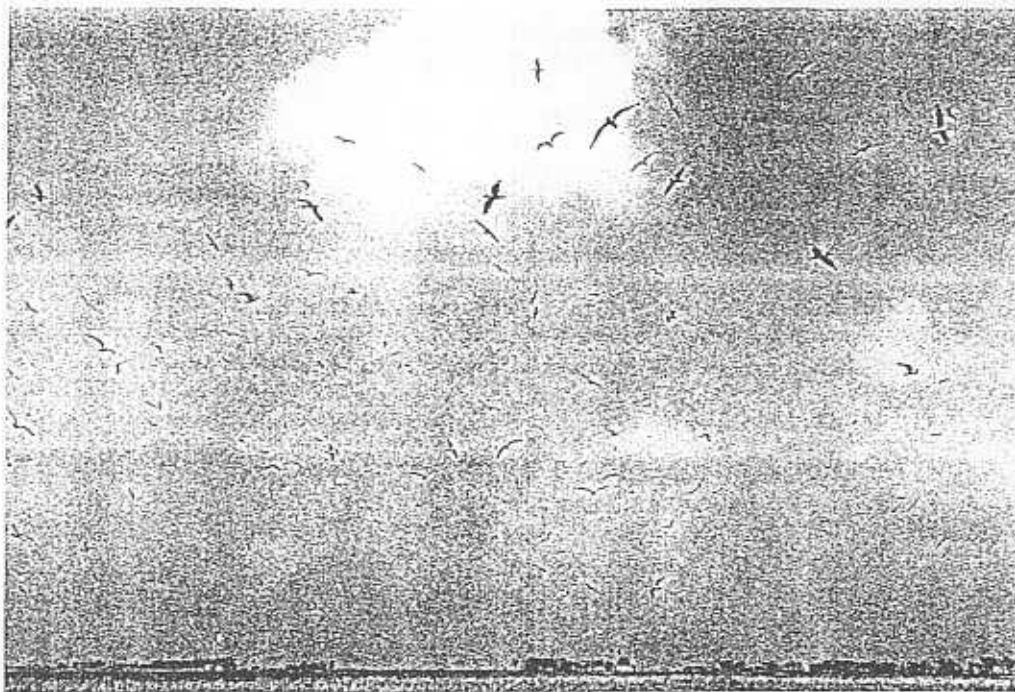


Figure 1. Franklin's gulls and Forester's terns in flight and mobbing boat at first visit to colony "A" on 5/15/92. Estimated 2000 gulls and terns.

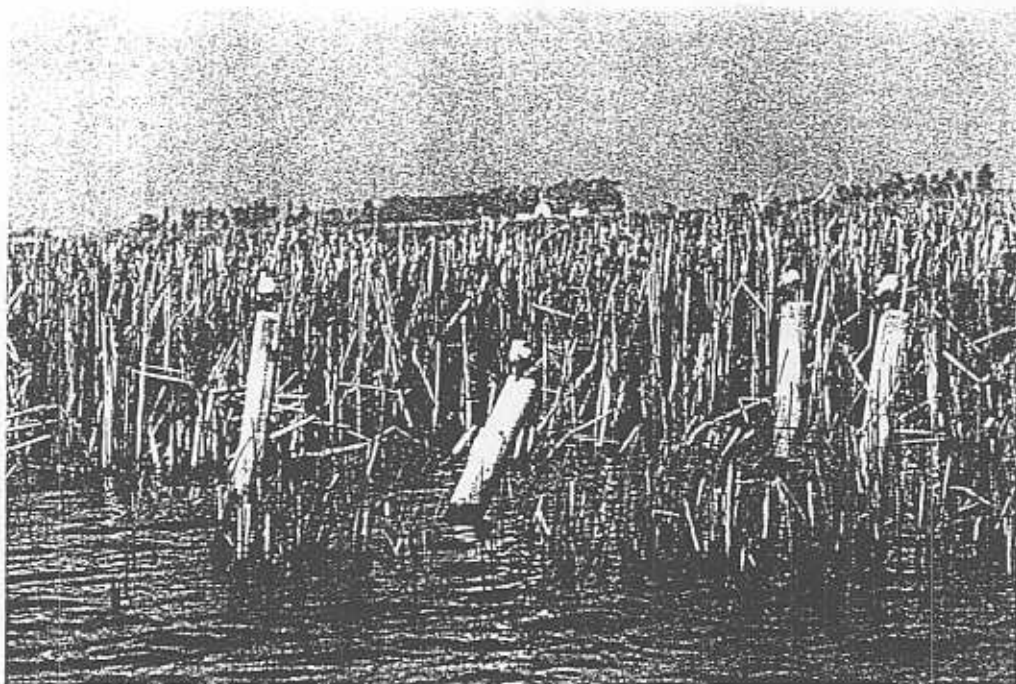


Figure 2. Forester's terns resting at colony "A". These posts were later under water due to increased water levels.



grebe nests, with 1 egg, 4 eggs, and 0 eggs. There are records from early 1900's of eared grebes nesting inside Franklin's gull colonies on Heron Lake. (See figure 3)

5/24/92 - 7:30 P.M. 500 Franklin's gull and 175 Forester's tern. Nests were flooded. Gulls and terns much less aggressive. Heard an American blittern. There are about the same amount of birds at both colonies now. Gulls and terns carrying nesting material. Four pair western grebe sighted.

6/05/92 - 2:15 P.M. 400 Franklin's gull and 150 Forester's tern. Birds seem to be more aggressive again, reestablishing nesting after last flood.

6/18/92 - 7:30 A.M. to noon - Birds have abandoned colony site A. Water level is very high.

Colony B This colony is the most traditionally used colony and was the predominant colony for Franklin's gulls and Forester's terns this year. On 5/15/92, (the first visit) we estimated 1000 Franklin's gull and Forester's tern establishing colonies in this area. Extreme water fluctuations and storms caused problems with nesting. There are wooden floating platforms that were used at this site, but even these were affected by flooding. Water levels were reported fluctuating 4 feet. After this increase in the water level, I could no longer wade into the colony and the boat could not get through the vegetation. Numbers of birds using the colony steadily declined during the summer. Predation may have also been a problem here, as there were normally 3 to 6 Black-crowned night heron in the area. By 6/25/92 there were an estimated 150 Franklin's gulls and Forester's terns remaining, and on this date renesting was still trying to occur as Franklin's were observed carrying nesting material. There was some successful nesting however, Forester's tern adults were seen carrying food into the colony 6/25/92, and young Franklin's gulls and Forester's terns were seen throughout the lake later in the summer.

Colony C: Black Terns were establishing a colony here. No nests were found but this was a remote area and these terns were very aggressive towards the boat. The largest threat to this colony would be predation.

Colony D & E: (Duck Lake) Visited 6/16/92 - 1:00 P.M. to 2:30 P.M. There was extensive American coot nesting here as well as grebe nesting. We found 13 coot nests with a total of 75 eggs. I'm confident that there were many nests and birds that we did not see. Large areas of sparse emergent vegetation around periphery of entire lake makes this an excellent nesting area with very little disturbances.

Colony F: This was a remote area where black terns had established a colony. Nests were found, but no evidence of eggs. Terns were some what aggressive. Young were seen on the lake later in the summer, so I believe that this was a





Figure 3. Eared grebe nest at Colony A, on 5/15/92.



Figure 4. Franklin's gulls at colony B. 6/25/92 after continued flooding problems. Gulls are still carrying nesting materials on this date. Estimating 150 Franklin's gulls and Forester's terns.



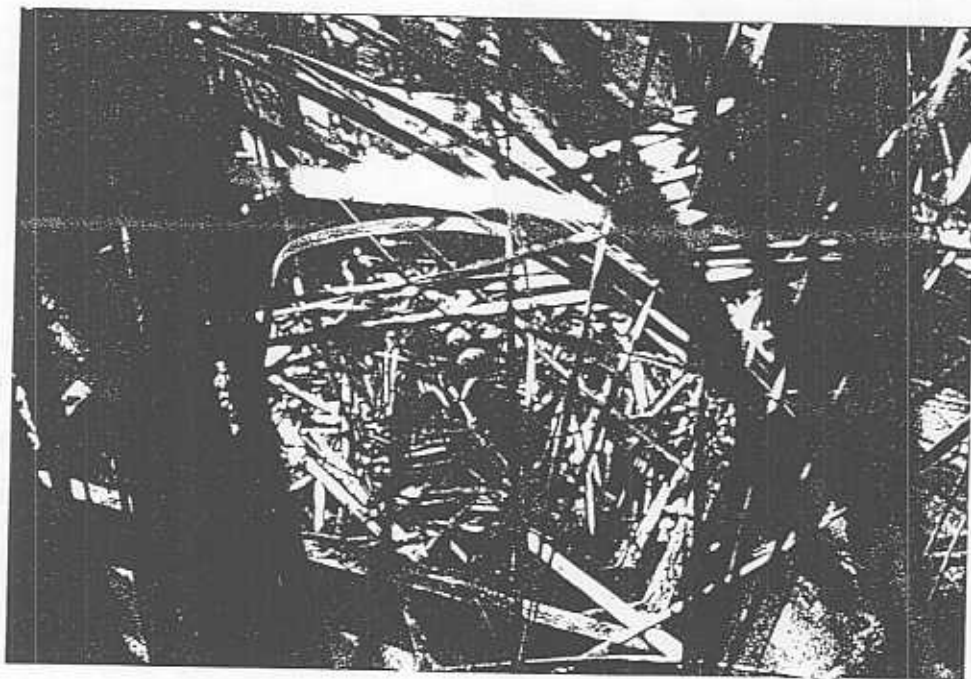


Figure 5. Nesting platform being utilized by Franklin's gulls at colony "B". Picture taken 6/18/92.

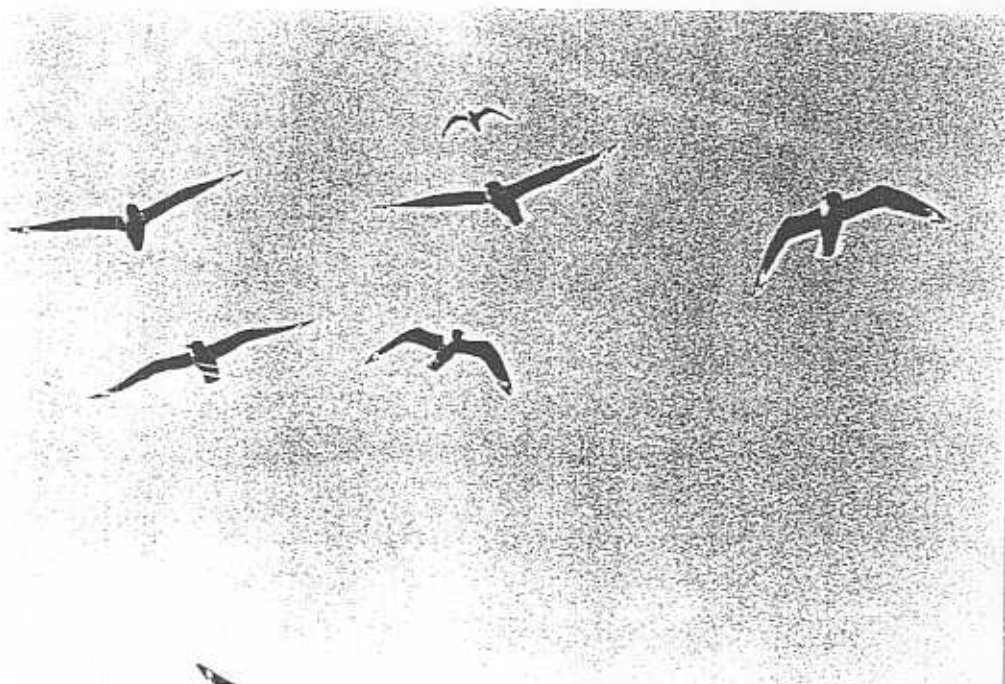


Figure 6. Franklin's Gulls mobbing boat.



successful colony, and that this area will be used next year as well.

Colony G: This colony was inhabited by western grebe. I estimated 100 adults and 120 young were fledged from this colony.

Site H,I,J,K, and L: These were prime areas for grebe nesting. All three species of grebe were seen in these areas with nesting likely.

American Bitterns: One sighting on Division Creek and were heard several times at colony A and B, Duck Lake, and Redhead Bay during breeding season and may have been nesting.

American Coot: Abundance of adults, nests and young. Estimate 500 adults and young on lake this summer.

Black-crowned Night Heron: Using entire lake system. No nesting colony found. Estimating 150 adults on lake.

Black Tern: Colony established at "C" on north end of Duck Lake. They were very aggressive towards the boat. No nests were found, however, this was a very remote area to get to by canoe, and I don't think we were close enough to the colony to see nests. Another black tern colony was established at "F". This was also a very remote area to get to. Nests were found at this location on 6/25, although there was no signs of eggs. I believe that these colonies were successful, as there were approximately 150 adults, 50 immature, and 40 young seen on the lake later in the summer. (see figure 9) Preservation of habitat and minimal disturbances is important to the continued nesting success for this species on Heron Lake.

Double-crested Cormorant: Estimating 250 nonbreeders using lake for resting and feeding.

Eared Grebe: Eared Grebe numbers have remained fairly constant over the survey years. Numerous nests were located in colonies throughout the lake system. (colonies D,E,G,H,I,J,K,L). Nesting was successful as young have been seen on the lake. Estimating 60 adults and 60 young using the lake later this summer.

Franklin's Gull and Forester's Tern: Franklin gulls and Forester's terns have been recorded nesting here since the late 1800's. In 1937 and 1939 100,000 nests were estimated on the lake, by 1986 this number had declined to 8-10,000 nests. No nests nor any indication of nesting was found in 1989. In 1990 no nests or young were found, Kelly McDowell blames water conditions. In 1991 Kelly McDowell notes probable displacement of gull nests due to 2.2 foot bounce in water levels. (North Heron Lake Game Producers Association, 1990)

This year on 5/15 there were two large Franklin's gull and Forester's tern nesting colonies beginning on North Heron Lake, size estimations were 2000 birds on the point on the north east side of Windsor bay and 1000 on the northwest side where Division Creek comes into the lake.



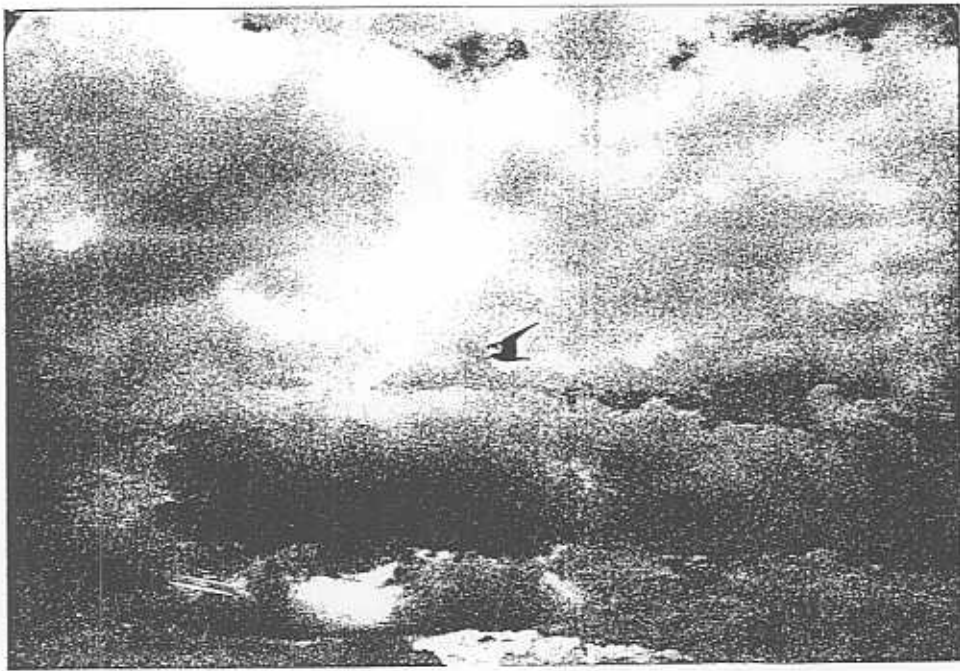


Figure 7. Black Tern



Figure 8. Pied-billed grebe nest on Duck Lake. 6/16/92



On 5/24 due to significant bounces in water levels about 1/4 of these remained, and by 6/18 one colony was abandoned and the other colony's numbers had declined to about 200, with a larger proportion of Forester's tern than at the beginning of the season.

Great Blue Heron: Estimated 70 adults using the lake. Nesting was undetermined.

Great Egret: Estimating 35 using the lake. Largely concentrated at potholes between North and South Heron Lake. Nesting undetermined. These numbers are up greatly from 8 in 1989, 1 in 1990, and 14 in 1991.

Green Heron: 2 sightings. One at colony B, and one on Division Creek. Nesting undetermined.

Least Bitterns: Several were observed and heard on Heron Lake. I did not find any nests, but I do suspect nesting in North Marsh, Winzer Bay, south end of South Lake, and along Division Creek.

Pied-billed Grebe: Nesting was abundant and successful throughout the lake system. (all grebe nesting areas on colonial map). Estimating 50 adults and 20 nests on the lake. (see figure 8) This estimate is up significantly from previous survey years.

Red-necked Grebe: Male sighted 6/05 east end of Winzer Bay. This is a very unusual sighting in summer in southern Minnesota. This was the only sighting but I am hopeful for nesting somewhere on the lake, as there is a nesting record from 1906.

Ring-billed Gull: Estimating 150 using the lake for resting. No nesting takes place here.

Sora: Fairly common throughout lake system. Nine were heard within a distance of about one mile on the dike by Pohlman's, one was sighted by Jack Creek on Jim Thompson's property.

Western Grebe: Nesting was very successful for the western grebe this year. A large colony was established at "G". An estimated 120 young were fledged from this colony. (see figure 9) Approximately 30 adults also nested on South Heron at "J", "K", and "L". Numbers of western grebe using Heron Lake has steadily increased since these surveys began in 1989.

White Pelican: Estimating a total of 1500 nonbreeding adults and immatures using Heron Lake for resting and feeding. (see figure 10) No nesting takes place here.

Wilson Phalarope: One pair sighted on May 22nd in a flooded field on the south side of the dike between the two lakes while doing a rail survey. This is about 5 weeks late for migration. This was the only sighting, but I am hopeful for nesting somewhere in the area. Wilson's Phalaropes were recorded nesting on Heron Lake in the early 1900's.

Waterfowl breeding was very successful this year on Heron Lake. With the time I spent on Heron Lake this season and the concentration of waterfowl sited on the North side of South Heron Lake towards the end of June, I would



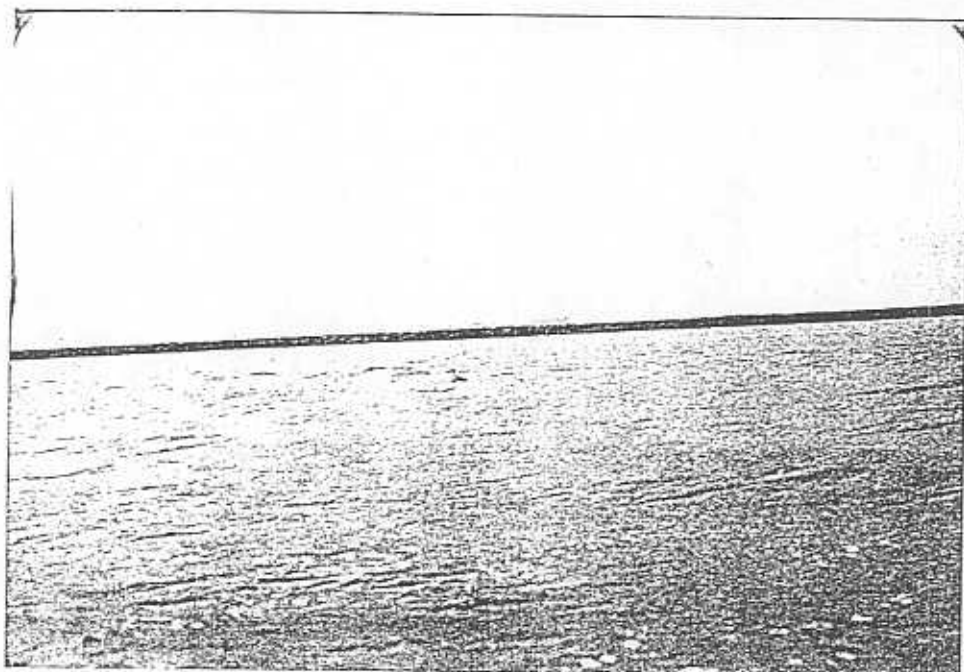


Figure 9. Western Grebe with young on back and swimming behind. 7/09/92

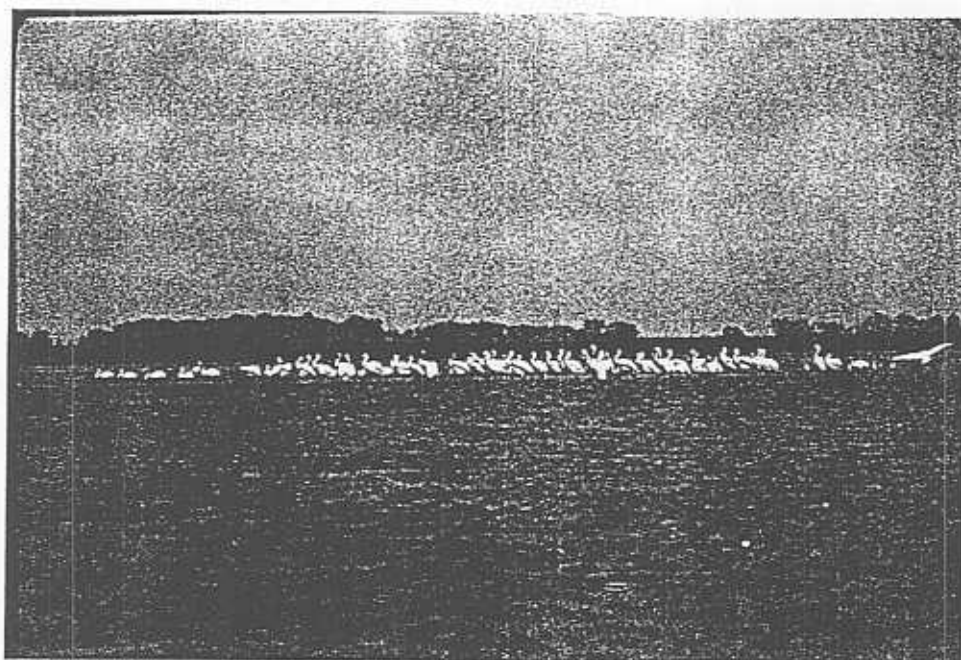


Figure 10. White pelican resting on Heron Lake.



estimate 700 mallard, 1000 Canadian Geese, 600 Wood Duck, 20 Ruddy Duck, 30 Redhead, and at least one brood of Pintall and American Wigeon hatched there this year. The North Heron Lake Game Producer Association reported 72% usage of their artificial nests.

Shoreline survey conducted throughout periphery of North Marsh, North Heron and South Heron Lakes: 6/25/92 - 6:30 A.M. to 1:00 P.M.; 7/09/92 - 7:00AM to 12:00 noon; 7/13/92 - 8:00AM to 12:30PM

American Bittern ( <i>Botarus lentiginosus</i> ).....	1
American Wigeon ( <i>Mareca americana</i> ).....	2
American Coot ( <i>Fulica americana</i> ).....	* 73
Barn Swallow ( <i>Hirundo rustica</i> ).....	common
Belted Kingfisher ( <i>Megasceryle alcyon</i> ).....	2
Black-crowned Night Heron ( <i>Nycticorax nycticlorax</i> ).....	14
Black Tern ( <i>Chlidonias niger</i> ).....	57
Blue-winged Teal ( <i>Anas discors</i> ).....	4
Canadian Goose ( <i>Branta canadensis</i> ).....	*692
Common Grackle ( <i>Quiscalus quiscula</i> ) .....	several
Common Yellowthroat ( <i>Geothlypis trichas</i> ).....	several
Double-crested Cormorant ( <i>phalacrocorax auritus</i> ).....	174
Forester's Tern ( <i>Sterna forsteri</i> ).....	*112
Franklin's Gull ( <i>Larus pipixcan</i> ).....	*242
Great Blue Heron ( <i>Ardeus herodius</i> ).....	26
Great Egret ( <i>Casmerodius albus</i> ).....	16
Great Horned Owl ( <i>Bubo virginianus</i> ).....	1
Green-winged Teal ( <i>Anas crecca</i> ).....	1
Herring Gull ( <i>Larus argentatus</i> )(imm).....	1
Killdeer ( <i>Charadrius vociferus</i> ).....	11
Least Bittern ( <i>Ixobrychus exilis</i> ).....	2
Mallard ( <i>Anas crecca</i> ).....	239
Marsh Wren ( <i>Cistothorus palustris</i> ).....	common
Northern Pintall ( <i>Anas acuta</i> ).....	3
Pied-billed Grebe ( <i>Podilymbus podiceps</i> ).....	3
Redhead ( <i>Aythya collaris</i> ).....	7
Red-winged Blackbird ( <i>Agelaius phoeniceus</i> ).....	abundant
Ring-billed Gull ( <i>Larus delawarensis</i> ).....	44
Ruddy Duck ( <i>oxyura jamaicensis</i> ).....	15
Sora ( <i>Porzana carolina</i> ).....	2
Tree Swallow ( <i>Tachycineta bicolor</i> ).....	common
Upland Sandpiper ( <i>Bartramia longicauda</i> ).....	12
Western Grebe ( <i>Aechmophorus occidentalis</i> ).....	17
White Pelican ( <i>Pelecanus Erythrorhynchus</i> ).....	*653
Wood Duck ( <i>Aix spinosa</i> ).....	10
Yellow-headed blackbird ( <i>Xanthociphalus xanthocephalus</i> )	many



# HERON LAKE — JACKSON COUNTY

Clean Water Partnership water quality and Sago Pondweed Study Transects

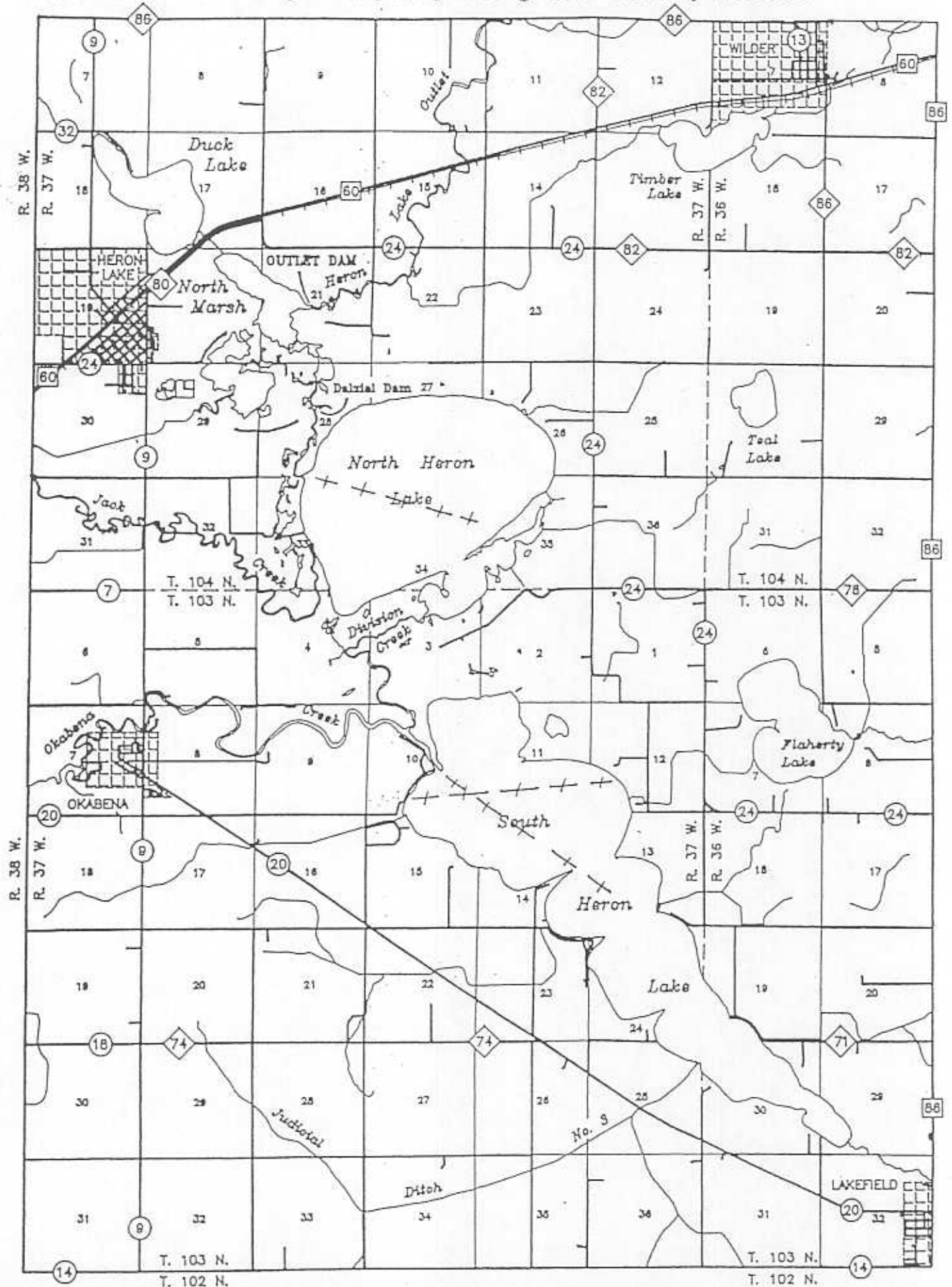




Table II shows light penetration readings taken on North and South Heron Lake this summer. All light penetration readings were conducted along transects set and used by the Clean Water Partnership Groups to study water quality and Sago Pondweed. (See Water Quality Transect Map - Page 15)

TABLE II

Light Intensity Readings

Part 1

- Reading "A": Date: 7/08/92 Location: NH1 Time: 3:10PM Weather  
Conditions: cloudy/pt cloudy, wind 5-15 mph Sechl Disk  
Reading: 0.53 Comments: Water level is about 2 ft high.  
Sago was washed out by storm, washed into south and west shore.
- Reading "B": Date: 7/08/92 Location: NH2 Time: 4:55PM Weather  
Conditions: cloudy/pt cloudy, wind 5-10 mph Sechl Disk  
Reading: 0.32M
- Reading "C": Date: 7/08/92 Location: NH3 Time: 5:15PM Weather  
Conditions: partly cloudy, wind 5-10mph Sechl Disk Reading:  
0.39M
- Reading "D": Date: 7/09/92 Location: SH Time: 10:15AM Weather  
Conditions: cloudy-partly cloudy Sechl Disk Reading: 0.32M  
Comments: Water appears green. Green algae seems to be  
outcompeting Sago after high water and wind. Division Creek  
very turbid, large sediment load coming off bean field and cow  
pasture along division creek, from flood.
- Reading "E": Date: 7/26/92 Location: NH1 Time: 10:45AM Weather  
Conditions: Mostly sunny, wind 5-10mph Sechl Disk Reading:  
0.32 M Comments: Sago is at surface again. Fairly Homogeneous  
throughout lake, little or no matts formed yet.
- Reading "F": Date: 7/26/92 Location: NH2 Time: 11:30AM Weather  
Conditions: Mostly sunny, wind 5-10mph Sechl Disk Reading:  
0.21M Comments: Sago more spotty here on N part of lake,  
more wind effect.
- Reading "G": Date: 7/26/92 Location: SH1 Time: 1:05PM Weather  
Conditions: Mostly sunny, wind 5-10mph Sechl Disk  
Reading: 0.29M Comments: no Sago at surface, water is green.
- Reading "H": Date: 7/26/92 Location: SH2 Time: 3:15PM Weather  
Conditions: Mostly sunny, wind 5-10mph Sechl Disk  
Reading: 0.32M Comments: Some sago reaching surface.
- Reading "I": Date: 8/05/92 Location: NH1 Time: 2:40PM Weather  
Conditions: Partly cloudy, wind 5-15mph Sechl Disk  
Readings: 0.29M Comments: Water is green. Some scum  
forming as it catches on surface Sago. Sago fairly constant  
here. Less Sago around north shore.
- Reading "J": Date: 8/05/92 Location: NH2 Time: 3:15PM Weather  
Conditions: Partly cloudy, wind 5-15mph Sechl Disk  
Readings: 0.33M
- Reading "K": Date: 8/05/92 Location: SH Time: 4:45PM Weather  
Conditions: cloudy, wind 5-15mph Sechl Disk Reading:  
0.21M Comments: Water appears green.



TABLE II  
Part 2

Depth	A	B	C	D	E	F	G	H	I	J	K
0.1	48.90	46.98	45.29	38.63	73.05	32.56	89.27	75.50	26.84	23.55	23.70
0.2	25.43	27.46	23.56	15.20	56.40	11.76	8.40	8.37	3.69	15.19	14.94
0.3	24.74	16.91	15.34	11.59	3.41	11.02	11.73	9.28	2.56	14.22	4.30
0.4	18.55	10.34	12.71	8.90	1.65	10.14	7.85	10.47	1.60	13.73	2.58
0.5	17.19	7.64	6.81	3.64	1.90	3.59	2.99	1.24	1.98	5.98	1.14
0.6	11.57		3.66	1.85	1.00	1.21	1.92	0.85	0.71	3.60	1.06
0.7				1.19	0.73	0.97	1.63	0.36	0.95	3.01	0.68
0.8				1.00	0.31	0.36	0.74	0.05	0.54	2.66	0.26
0.9				0.41	0.11	0.11	1.06	0.03	0.40	2.34	0.21
1.0				0.08	0.39	0.01	0.54	0.01		1.08	0.04
1.1				1.20				0.00			
1.2				0.14							
1.3				0.01							
1.4				0.01							

-Depth in Meters

SH = South Heron

NH = North Heron

Readings taken on the same day were taken at different locations along the transects.

Light penetration deteriorated as the summer progressed, largely due to algal turbidity. Sometimes the water seemed to clear, especially after recent rains. There may have been some stratification taking place immediately after rainfalls.

#### SUMMARY AND CONCLUSIONS

Problems in Heron Lake are chemical (excess nutrients and sediment) and hydrological (too much water too fast).

Three major sources of suspended sediments are runoff, shoreline erosion, and resuspension of bottom sediments. A major contribution to suspended solids is inputted via tributaries, color changes in the water are noticeable where these tributaries empty into Heron Lake. Resuspension of lake sediment is also a prominent contributor, as Heron Lake is a large area of shallow water. Increasing soil conservation practices in the watershed would be a contribution to improving suspended sediments in the system. Nutrient input is a major contribution to algal blooms and of decline in Sago Pondweed production, and probably the most costly to control. If a decision were made to attempt a reversal of water quality decline, nutrient inputs should be reduced and efforts should be made to continue and improve soil erosion control practices.

Water fluctuations take place more rapidly than the lake's ecosystem can react. Nests are flooded, and the Sago Pondweed is affected by increased wave action and decreased surface photosynthesis. The lake ecosystem cannot respond



to these radical bounces. Most critical for successful nesting and continued Sago production is controlling the extreme water fluctuations in the lake. Ideally this would be with wetlands buffering agricultural drainage to reduce flooding and filter excess nutrients, chemicals and sediment. An immediate advantage to colonial nesters would be the introduction of additional floating nesting platforms or moving existing platforms to Colony "B", as it is the predominant gull and tern nesting site.

#### RECOMMENDATIONS

Monitoring, researching and continuing study of Sago Pondweed in Heron Lake should persist as it is a key component and monitor of environmental health in Heron Lake. Cooperative efforts with pollution control agencies, and university research teams are most beneficial.

I would certainly recommend continuing annual non-game colonial waterbird censusing, being careful to keep disturbances at a minimum. Methods described in this report should be used to conduct the surveys, if methods deviate, all changes should be carefully documented to keep data comparable. I would recommend getting an early start, becoming familiar with the area, techniques and organizing activities. A model and a plan including optimum dates of visits to colonies should be prepared.

There are difficulties in estimation differences when new people conduct surveys. Among additional constraints are difficulties of finding all nests, identifying owners, revisiting nests sufficiently frequently to determine mortality, yet avoid disturbances. The most appropriate measure of population reproductive success is survival of young to the point of leaving the colony in relation to the number of reproductive adults in the population, however, this would not give information on failed nestings.

Defined colonies more often than not are large, multispecies, asynchronous, widely spaced and nearly inaccessible. Census technique whose purpose is to provide population estimate should have known precision (how close repeated measurements are to each other) and accuracy (how close measurement are to the real value). Accuracy would be nearly impossible to implement in this situation, but when precision of method is known, differences between subsequent estimations can then be calculated, without these it is very difficult to know if population estimates can meet goals set for collecting data in first place. Standardization is essential along with knowledge of precision for doing comparisons. For these reasons, my suggestions would be to implement a model and plan for increased comparability of data collections.

Suggestions for continuation of nongame surveys:

- 1.) Continue annual non-game waterbird surveys. Develop census techniques for future use to standardize comparability in annual non-game colonial waterbird, rail,



and shorebird surveys. Extend surveys to neighboring wetland and wildlife areas around Heron Lake.

2.) Protect and improve habitat for non-game species in the Heron Lake Watershed. Special emphasis on protecting nesting areas and critical habitats important to endangered, threatened or special concern-listed species by using easements, acquisition, conservation and registry programs.

3.) Develop a bird list for the Heron Lake area. Develop interpretation and management brochures on non-game wildlife. Conduct informational meetings for interested landowners on Heron Lake watershed and set up non-game watch groups to report unusual bird and non-game species sightings.

In an article in the Migratory Nongame Bird Section of USFWS Research a plea is made for consistency in survey, census and personnel use so that data can later be interpreted on state, regional, and national levels. There is concern expressed for the needs of standard protocol. Observer estimates can differ by several fold, masking any real population differences.

Table III

Objectives that could be considered in designing a long-term colonial waterbird monitoring program:

- 1.) Are there changes in
  - a. number of species: - e.g., range expansion/contraction
    1. Standard protocol procedures would be needed to extrapolate number estimations for birds, nests, brood size, and colony area.
  - b. number of colonies
  - c. colony sizes
  - d. colony site used
  - e. hatching and/or fledgling success
    1. documentation of all possibilities of nesting failures and disturbances.
- 2.) What habitats are being used
  - a. by nesting birds
  - b. by roosting birds
  - c. during migration
  - d. during winter
- 3.) What species distribution pattern are there relative to
  - a. public vs. private owned land
  - b. industrial/agricultural activity (potential contamination)
  - c. recreational areas

Additional specific recommendations would be to closely monitor black tern colonies minimizing disturbances, but emphasizing protection of habitats. Black tern are becoming



well established on Heron Lake and care should be taken not to deter them. I would increase efforts for studying rail activities also, Heron Lake has good potential for rail use. There was a report of a king rail on the Bill Fest property that Frosty Anderson (veteran wildlife biologist) feels was a legitimate report. I suggest beginning early with rail census preparation including preparing rail recordings and extending area of census.

Heron Lake is a wonderful nesting area and refuge for many diverse species. This is truly a refuge for wildlife as there are very few disturbances, species remain secluded and in a wild state. It is essential to assure continued and improved conditions for breeding and resting waterbirds. Cooperative private and public actions are critical in protecting and enhancing non-game habitat in the Heron Lake Watershed.

#### ACKNOWLEDGEMENTS

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I would also like to thank the volunteers who contributed their time in assisting me in various ways. They include Kara Henning, Paul Hovland, K. Costello, and Rick Chaffee.



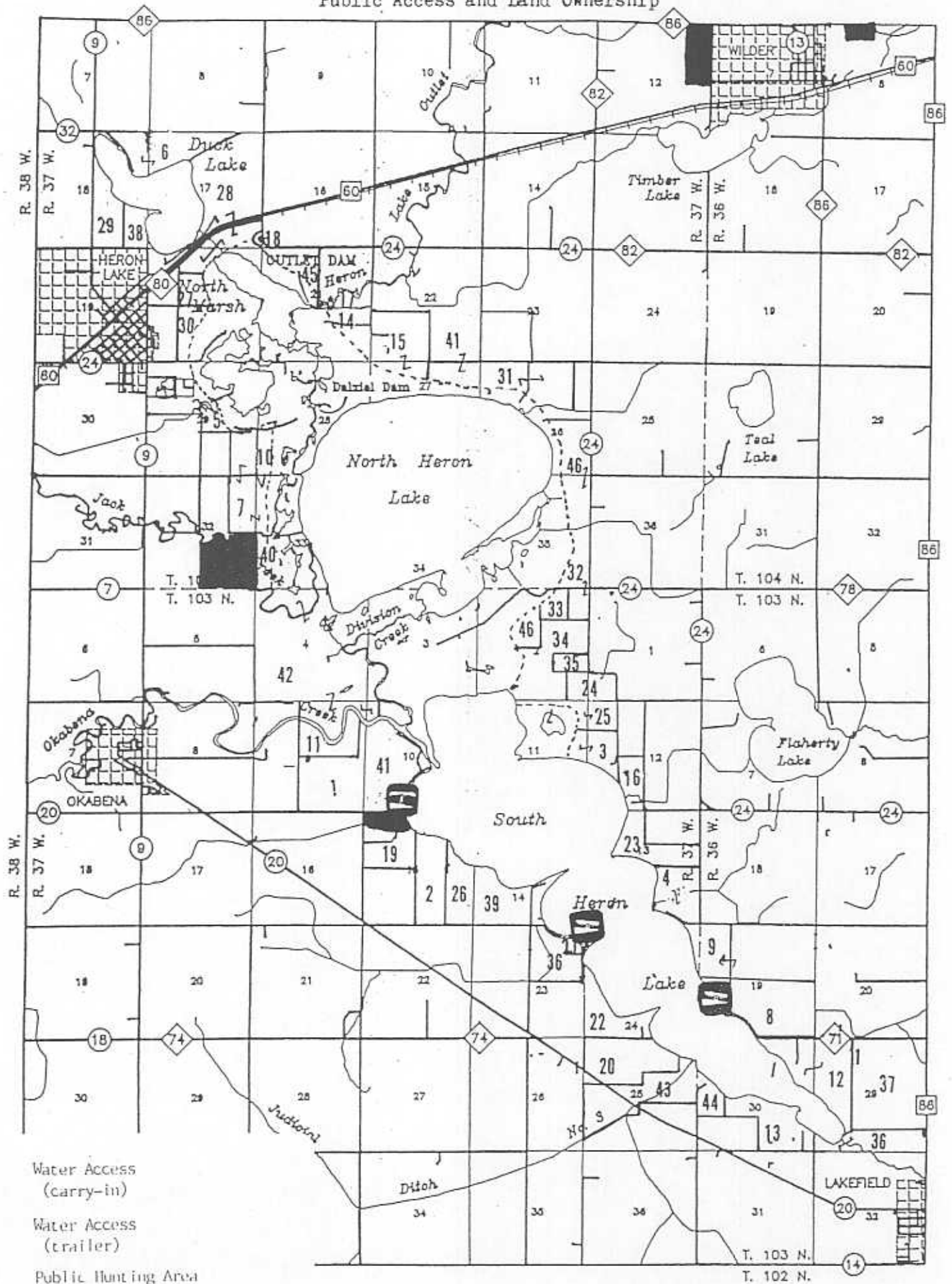
Landowners on the Heron Lake System correlating with Public  
Access and Land Ownership Map

- 1.) Bass, Adeline - Okabeena Creek (Borders TNC)
- 2.) Benson, Margaret - Northwest South Heron Lake
- 3.) Bonnel, Ralph - Northeast South Heron Lake
- 4.) Burmeister, Albert - East South Heron Lake
- 5.) Carlson, Arthur - Southwest North Marsh
- 6.) Chepa, Barbara - Northeast Duck Lake
- 7.) Cranston, Merlin - West North Heron Lake
- 8.) Daberkow, Clyde - Southeast South Heron Lake
- 9.) Daberkow, Henry - Southeast South Heron Lake
- 10.) Dalziel, Avis - Northwest North Heron Lake
- 11.) Dewall, Michael - Okabeena Creek, (borders TNC)
- 12.) Dicks, Glen - Southeast South Heron Lake
- 13.) Engan, C.M. - South South Heron Lake
- 14.) Fest, Agnes - Southeast North Marsh
- 15.) Fest, William - North North Heron Lake
- 16.) Gentz, Maynard - East North Heron Lake (Middle Lake)
- 17.) Hay, John - Heron Lake Outlet
- 18.) Hay, Virginia - Northwest North Marsh
- 19.) Henning, David - Northwest South Heron Lake
- 20.) Hendrickson, Valborg - Southwest South Heron Lake
- 21.) Jackson County - Sandy Point
- 22.) Johnson, J.C. - Southwest South Heron Lake
- 23.) Johnson, Stan - East South Heron Lake
- 24.) Kolander, Charles - Northeast South Heron Lake
- 25.) Kolander, Oliver - Northeast South Heron Lake
- 26.) Kraft, Edwin - Northwest South Heron Lake (Middle Lk)
- 27.) Leach, Lester - North and West North Marsh
- 28.) Liepold, Linus - East and South Duck Lake
- 29.) Liepold, Leonard - Northwest Duck Lake
- 30.) Moore, Juletta - West North Marsh
- 31.) Peter, Merten - North and Northeast North Heron Lake
- 32.) Pohlman, Arnold - Southeast North Heron Lake
- 33.) Pohlman, David - South North Heron Lake
- 34.) Pohlman, Verna - Northeast South Heron Lake
- 35.) Pohlman, Victor - Northeast South Heron Lake
- 36.) Rossow, Warren - South South Heron Lake
- 37.) Schultz, Mildred - South South Heron Lake
- 38.) Schumaker, Russ - West Duck Lake
- 39.) Stern, Robert - West South Heron Lake
- 40.) St. Paul Gun Club - Southwest North Heron Lake
- 41.) The Nature Conservancy - North North Heron Lake,  
- Northwest South Heron Lake  
(Okabeena Creek)
- 42.) Thompson, James - Southwest North Heron Lake  
- Okabeena Creek  
- Jack Creek
- 43.) Trondson, Darlene - Southwest South Heron Lake
- 44.) Trondson, Melvin - Southwest South Heron Lake
- 45.) Underwood, Eloise - East North Marsh
- 46.) Winzer, Charles - West and South North Heron Lake



# HERON LAKE — JACKSON COUNTY

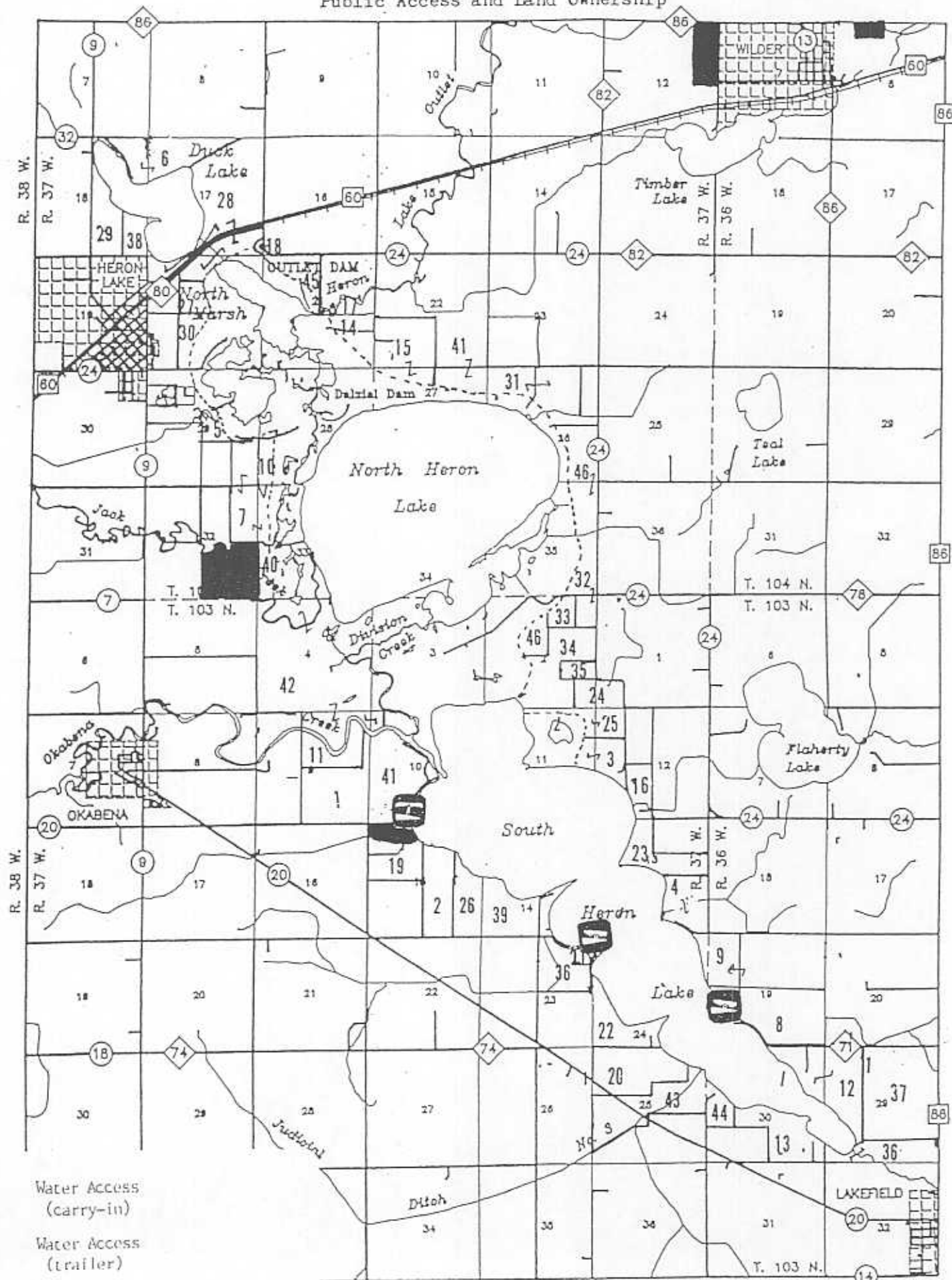
Public Access and Land Ownership





# HERON LAKE — JACKSON COUNTY

Public Access and Land Ownership



Water Access  
(carry-in)

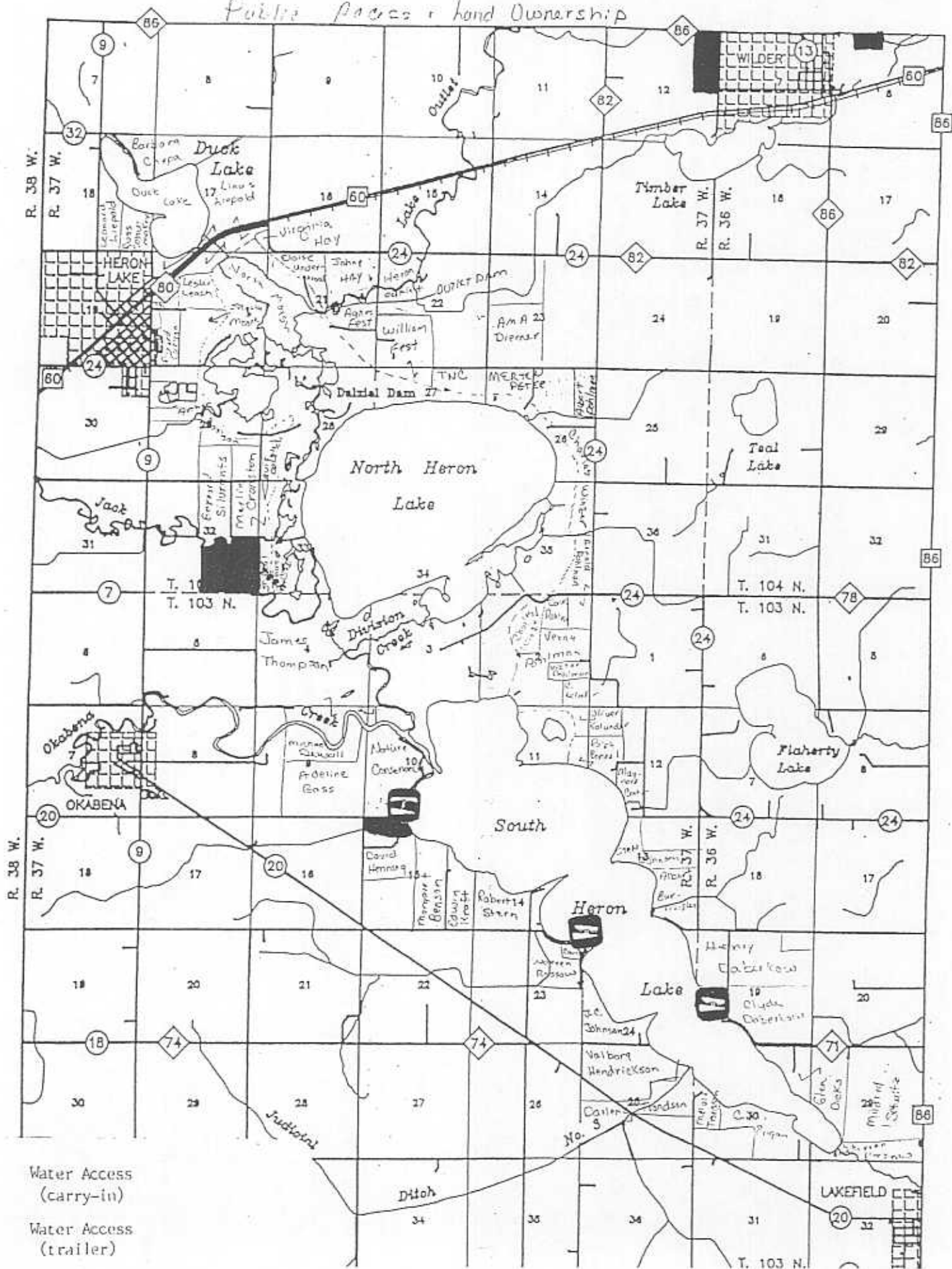
Water Access  
(trailer)





# HERON LAKE — JACKSON COUNTY

*Public Access & Land Ownership*



Water Access  
(carry-in)

Water Access  
(trailer)



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