

WESTERN MINNESOTA
COLONIAL WATERBIRD
NESTING SITE
INVENTORY
1981

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TABLE OF CONTENTS

	Page
INTRODUCTION	1
STUDY AREA	2
METHODS	4
RESULTS	5
Big Stone County	5
Chippewa County	7
Douglas County	8
Grant County	9
Kanidyohi County	12
Lac qui Parle County	14
Pope County	15
Stevens County	17
Swift County	20
Traverse County	21
DISCUSSION	21
Hérons	21
Double-crested Cormorants	26
White Pelicans	28
Western Grebes	29
Eared Grebes	33
Forester's Terns	34

	Page
RECOMMENDATIONS	34
LITERATURE CITED	39
APPENDIX	40

INTRODUCTION

One characteristic of Minnesota's bluestem prairie northern hardwood transition zone is the interspersed of lakes and marshes. This is ideal habitat for a number of colonial nesting waterbirds. Interest in these birds has increased in the past decade for several reasons. Many of these species are large and easily noticed by even the casual observer. Their colonial nesting habits make them even more obvious, but also make them vulnerable to some unique problems. If even one colony site is destroyed the loss of nests may be in the hundreds or even thousands. Also these birds are at the top of the food chain and are therefore susceptible to buildup of toxic chemicals. Their continued success in Minnesota is a measure of our environmental quality.

Data on colonial nesting waterbirds has, in the past, been collected by a network of interested volunteers. Known colonies have for the past few years, been inventoried annually to obtain data on population trends. Much valuable information has been collected by these people. This study was initiated to thoroughly survey one area of the state. Known colonies were to be inventoried and an attempt made to discover new or previously unknown colonies.

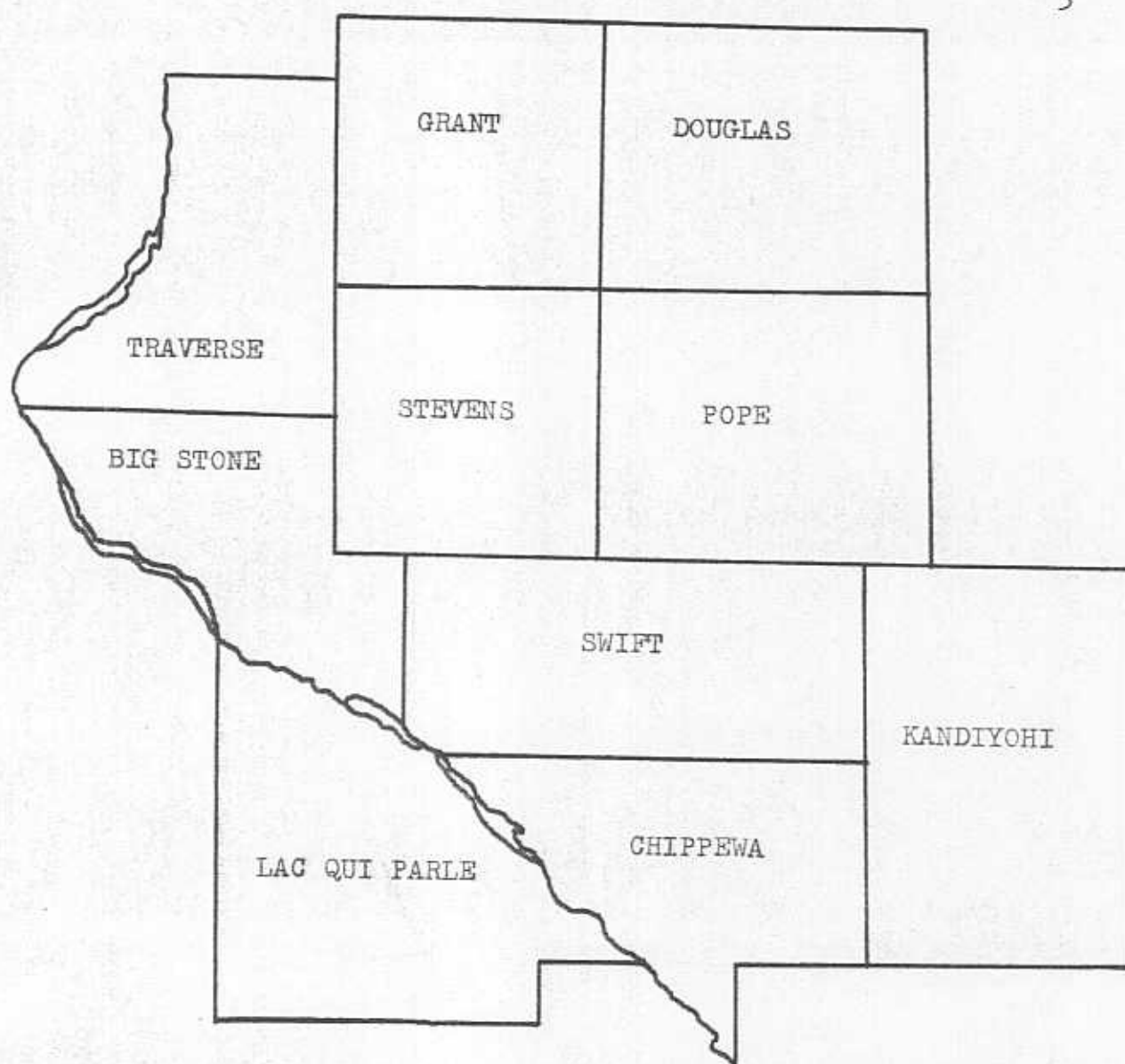
STUDY AREA

The area chosen in west-central Minnesota contains several colonies of various species of these birds. Six heronries were known to exist which contained great blue herons, great egrets, black-crowned night herons, and occasionally some of the more unusual herons. Double-crested cormorants are also present in most of the heronries as well as other locations. Western grebes, eared grebes, and Forester's terns nest at several locations and one of two Minnesota nesting sites of the white pelican is included in this area.

The study area comprises ten counties from about the center of the state west to the South Dakota border (Figure 1). The ten counties included in this survey are; Big Stone, Chippewa, Douglas, Grant, Kandiyohi, Lac qui Parle, Stevens, Swift, and Traverse. The area covered consists of approximately 7000 square miles.

The vegetation of this region varies from the potholes of the bluestem prairie in the southwest to the northern hardwood forests with interspersed lakes and marshes in the northeast. Sites surveyed were primarily lakes, man-made reservoirs, and the larger marshes. Many of the numerous small marshes were not thoroughly surveyed.

The survey was conducted from 15 June to 31 July. A



0 10 20



Figure 1. Study area.

total of 3155 miles was driven while making the inventory.⁴
The size of the area and the time allotted somewhat restricted the scope of this study.

METHODS

Known heronries were surveyed first because of the starting date of the study. Four heronries were actually inventoried and data for three additional colonies had already been collected by other observers. Heron colonies I surveyed were done by walking transects at each colony and recording trees and nests with a portable cassette recorder. The counts were based on an inventory of the entire colony instead of a sample. At larger colonies spray paint was used to mark trees to prevent overlap of transects.

Data on the pelicans and cormorants at Marsh L. were gathered on two banding trips to the island. To survey the grebes and terns a daily route was plotted to include known colonies and to permit observation of as many other water bodies as was feasible. Most lakes were checked only once. If there was some question whether birds present were breeding the site was checked until a determination could be made.

Individual observations were recorded for the grebes, pelicans, cormorants, and terns. These birds are restricted

to more permanent water bodies for nesting and foraging. 5
Individual heron sightings were not recorded. These sightings seemed to be dependant upon the distance to the nearest colony. These birds also tend to forage solitarily in many cases and often in small temporary water bodies or even on uplands.

All lakes surveyed are listed in the appendix.

RESULTS

This section will be presented by county. In all tables the number following the lake name refers to the number of individuals observed. Other abbreviations used include; *=presence of nests or flightless young, a=adult birds, b=broods, and n=nests.

Big Stone County

Big Stone County is unique in that all colonial species that nest in the study area nest in this county. A total of 34 water bodies was surveyed in Big Stone County. Table 1 lists the lakes where colonial waterbirds were observed.

Colonies of nesting waterbirds occurred at six separate locations in the county. Excepting herons various species of these birds were observed at 15 different sites.

Species nesting at the Big Stone NWR heronry include;

Table 1. Sightings of selected colonial waterbirds in Big Stone County.

Double-crested cormorant	Western grebe
<hr/> *Marsh L. (263-young) *Big Stone NWR (400-n) Artichoke L. (15-a) E. Toqua L. (75-a) Hanson L. (8-a) Otrey L. (22-a) Bentson L. (36-a) Lannon L. (5-a) N. Rothwell L. (13-a) S. Rothwell L. (4-a) Lyseng L. (3-a) Long L. (4-a) Long Tom L. (4-a) Big Stone L.	<hr/> *Marsh L. (8-b,27-a) *Otrey L. (40-b,104-a) *Eli L. (6-b,15-a) *Lyseng L. (31-b,77-a) *Big Stone NWR (a few-b) E. Toqua L. (48-a) <hr/> Eared grebe <hr/> *Dismal Swamp WPA (11-n,18-a) *Lyseng L. (5-n,11-a) E. Toqua L. (1-a)
White pelican	Forester's tern
<hr/> *Marsh L. (1061-young) Artichoke L. (22-a) E. Toqua L. (6-a) Hanson L. (11-a) Otrey L. (10-a) Bentson L. (44-a) Lannon L. (3-a) Long L. (8-a) Big Stone NWR (56-a) Big Stone L.	<hr/> *Marsh L. (6-n,15-a) Eli L. (6-a) Long L. (4-a) Big Stone NWR (12-a) Big Stone L.

130 great blue herons, 80 great egrets, 75 black-crowned night herons, and 400 double-crested cormorants. This colony is located in one of the refuge pools that was flooded about five years ago. The trees have all died and refuge personnel feel that especially the smaller herons have declined in the past few years.

White pelicans and cormorants nest on a small island in Marsh L. A total of 1061 pelicans and 263 cormorants were banded in 1981. All birds were banded as prefledging juveniles.

Western grebes nested at five locations in Big Stone County. The size of the colonies varied from a few broods at Big Stone NWR (M. Beuer, pers. comm.) to 40 broods at Otrey L. Samples of young/brood were taken at Otrey L., 2.35 young/brood (N=20), and Lyseng L., 2.85 young/brood (N=13). This would result in a potential production of 94 and 88 young grebes respectively.

Eared grebes nested at two sites in this county. Five nests were found at Lyseng L. and 11 nests at Dismal Swamp WPA. The birds were not disturbed to count eggs.

Marsh L. is the only site where Forester's tern nests were located. This is probably not an accurate reflection of tern nesting in this county.

Chippewa County

Colonial waterbirds were observed at two sites in Chippewa County. Cormorants were observed at Buffalo L.

and at the Watson Sag. I have observed pelicans and western grebes at the latter site in other years but none were present in 1981. These are the only significant bodies of water in the county.

Douglas County

Colonial waterbirds were observed at ten different sites out of the 77 sites surveyed in Douglas County (Table 2). L. Christina contained the only nesting site in the county. Sixty-three western grebe and 17 Forester's tern nests were located in a hardwood stand in the southwest portion of the lake.

Douglas County consists of hardwood uplands interspersed with lakes. This habitat type may not be as acceptable to many of the colonial birds as are the prairie lakes and marshes.

Table 2. Sightings of selected colonial waterbirds in Douglas County.

Double-crested cormorant	Western grebe
Davidson L. (3-a)	Maple L. (4-a)
Hubrid L. (11-a)	*L. Christina (63-n)
Solberg L. (3-a)	
Barsness L. (14-a)	Forester's
Halleque L. (9-a)	tern
Gilbert L. (5-a)	
Moon L. (8-a)	
	Smith L. (3-a)
	*L. Christina (17-n)

Grant County

9

Sixty-five lakes and marshes were surveyed in Grant County. Colonial waterbirds were observed at 27 locations but nested at only one site in the county. The heronry on Egret Island in Pelican L. contains great blue herons, great egrets, black-crowned night herons, and double-crested cormorants. Three adult little blue herons were also present but nesting could not be confirmed. See Table 3.

Egret Island is a 34 acre island (Figure 2) composed of marsh and hardwood uplands. A total of 2190 nests were counted of which 83 were unoccupied or the species could not be determined. Table 4 contains the data on nest counts and a projection of the possible production from these nests based on samples of young/nest. From the 2107 known nests 5424 young herons and cormorants were potentially produced.

Table 4. Breakdown of nests at the Egret Island colony with estimated young/nest and the potential production based on these samples.

Species	# Nests	<u>Young</u> Nest	N	Possible Production
Great blue heron	585	2.38	47	1392
Great egret	550	2.67	56	1468
Black-crowned night heron	425	2.25	39	956
Double-crested cormorant	549	2.93	46	1608

Table 3. Sightings of selected colonial waterbirds in Grant County

Double-crested cormorant	White pelican
*Pelican L. (549-n)	Werk L. (1-a)
Bailey Slough (2-a)	Doughty L. (1-a)
Lightening L. (7-a)	Graham L. (3-a)
Elbow L. (3-a)	Niemackl L. (15-a)
Worm L. (10-a)	
Round L. (6-a)	
Graham L. (8-a)	
Keitzman L. (2-a)	Western grebe
Shauer L. (1-a)	
Wilson L. (4-a)	
Lower Elk L. (2-a)	Pelican L. (23-a)
Retzlaff L. (1-a)	Ash L. (12-a)
Thompson L. (13-a)	Island L. (3-a)
Church L. (1-a)	Round L. (15-a)
Peterson L. (1-a)	WMA T129 R41 S17 (2-a)
Sylvan L. (26-a)	
unnamed T128 R41 S3 (31-a)	
Malgren L. (6-a)	Forester's tern
WMA T129 R41 S17 (1-a)	
WPA T129 R41 S9 (65-a)	
Shady Grove L. (3-a)	
Bah L. (13-a)	Pelican L. (5-n)

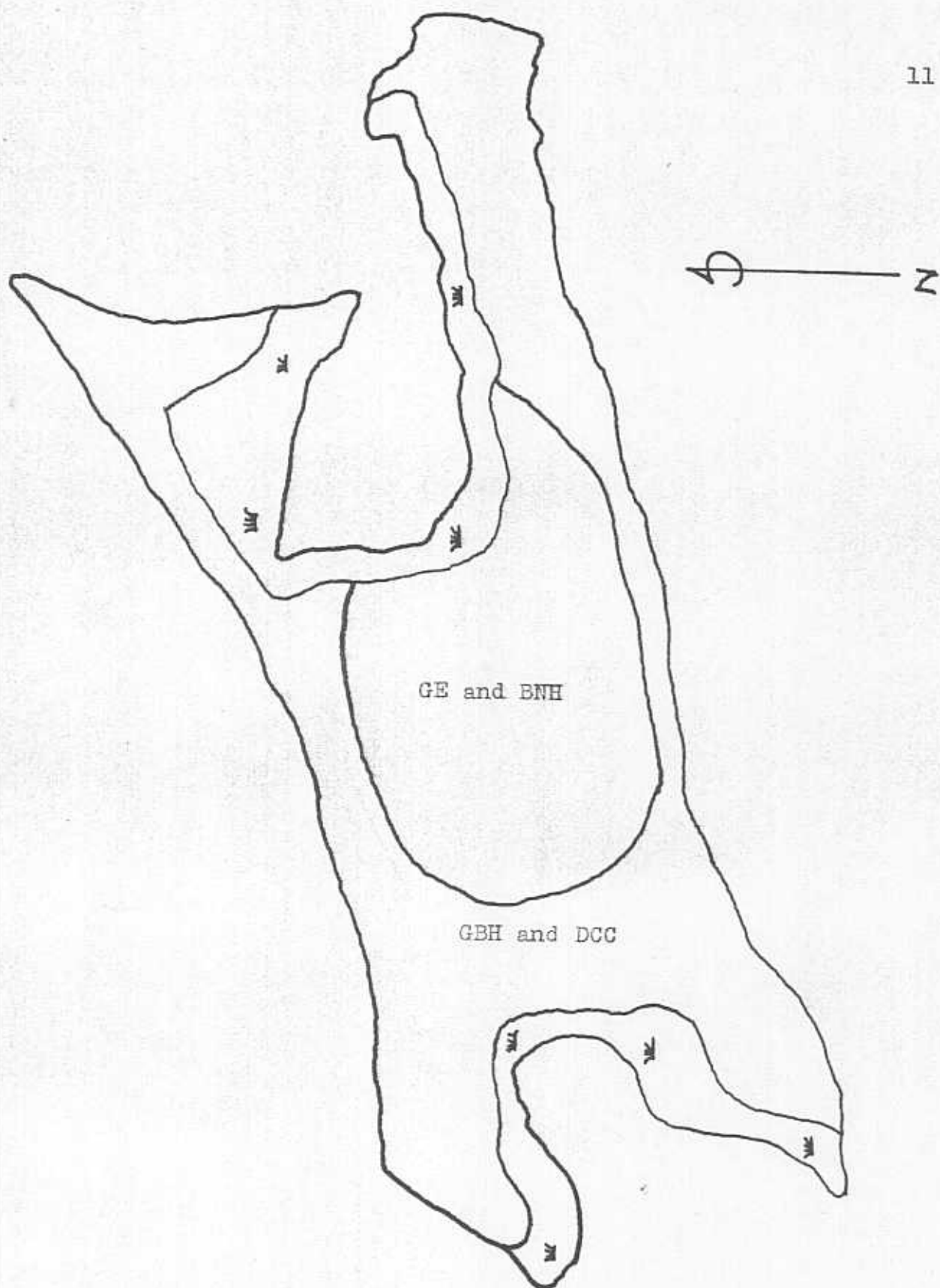


Figure 2. Egret Island colony showing approximate distribution of species. 16"=1 mile.

Kandiyohi County

Seventy-four water bodies were surveyed in Kandiyohi County. Colonial waterbirds were observed at ten locations (Table 5) with nesting confirmed at three sites. The heronry at Long L. is the largest in the state according to present data. This colony was surveyed by Rob Naplin (AWM) and Jeff Miller (Asst. AWM).

They have established a sample transect across the colony (Figure 3). From this sample they have calculated total population for the colony. Based on a 0.96 acre sample of 132 nests they have calculated; 1186 great blue heron nests, 860 great egret nests, 279 black-crowned night heron nests, and 156 double-crested cormorant nests. This totals 2325 nests in the 17.6 acre colony. The island is 47 acres of primarily hardwoods so there is ample room for expansion of the colony. Flocks of about 100 white pelicans have been summering on the island for the past few years.

This island is owned by eight separate landowners complicating efforts to protect the colony. The lake is also becoming increasingly popular for fishing, raising the possibility of additional disturbance. Efforts to protect the colony by surrounding landowners are in progress and will be discussed further in the following section.

Another small heron colony at L. Monongalia was surveyed by Jeff Miller. This small privately owned island

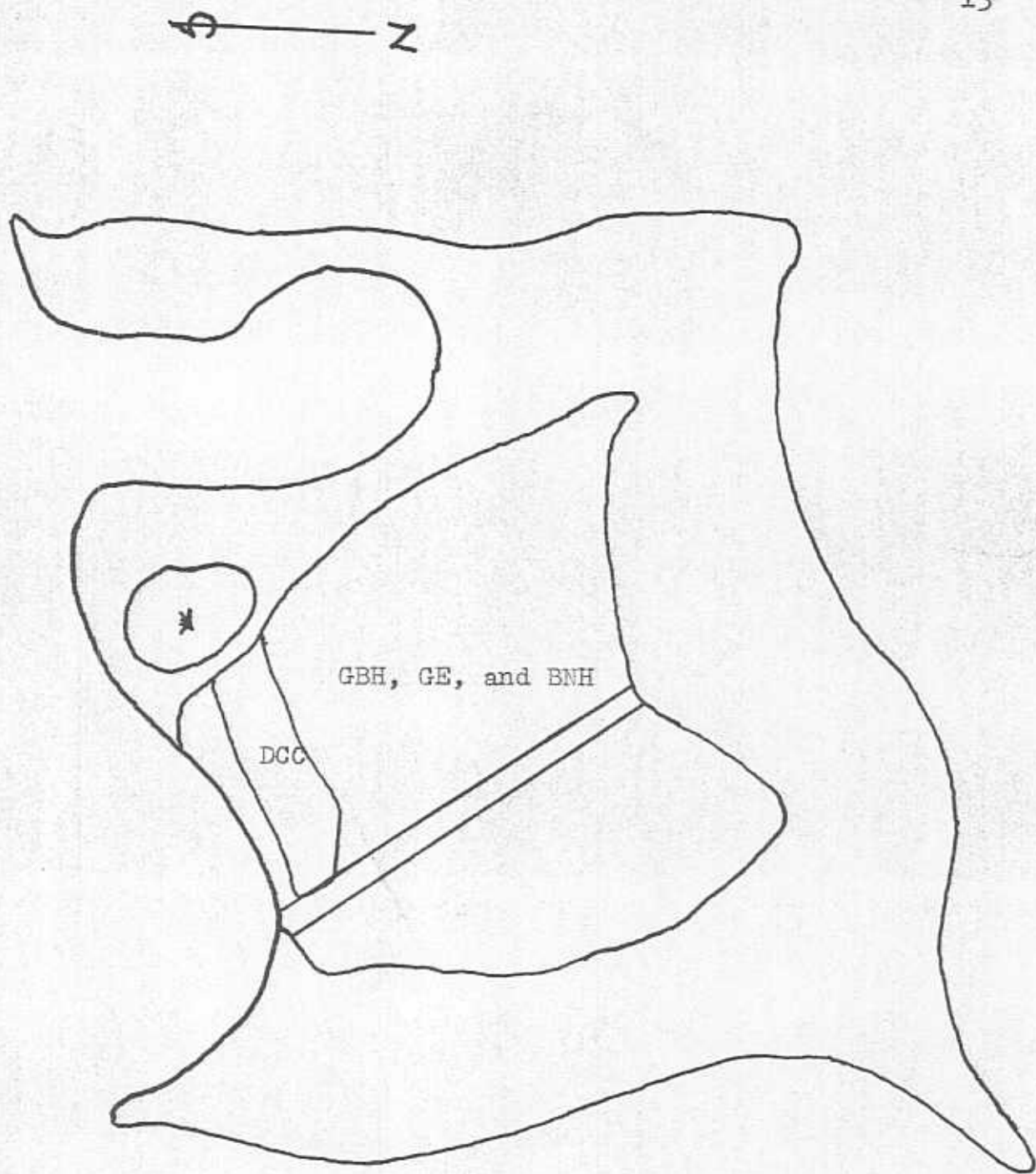


Figure 3. Long L. colony showing distribution of species and 50'x840' sample transect. 16"=1 mile.

contained 147 nests of which 130 were occupied by great blue herons.

14

Table 5. Sightings of selected colonial waterbirds in Kandiyohi County.

Double-crested cormorant	White pelican
<hr/>	<hr/>
*Long L. (156-n) Wheeler L. (40-a) Point L. (8-a) Ringo L. (21-a) Eagle L. (3-a) Nest L. (6-a) unnamed T121 R36 S25	Long L. (14-a) Wagonga L. (89-a) Little Kandiyohi L. (28-a) Lindgren L. (2-a)
Western grebe	Forester's tern
<hr/>	<hr/>
*Wagonga L. (10-n, 140-a) Sunburg L. (4-a)	Wagonga L. (67-a and juv.)

Western grebes were nesting at Wagonga L. when that lake was surveyed. Only ten nests could be located but 140 adult birds were counted on the lake. At least 67 Forester's terns were also present about one-third of which were fledged juvenile birds.

Lac qui Parle County

Six sites were surveyed in Lac qui Parle County. White pelicans and double-crested cormorants were present at Lac qui Parle L. No nesting sites of colonial waterbirds could be found in this county.

Pope County

Seventy lakes and marshes were inventoried in Pope County. Colonial waterbirds were observed at 12 sites (Table 6) and were found nesting at two locations.

Table 6. Sightings of selected colonial waterbirds in Pope County.

Double-crested cormorant	Western grebe
*L. Johanna (302-n) Malmedal L. (4-a) Strandness L. (8-a) L. Emily (13-a) Camp L. (4-a) Marlu L. (8-a) L. Hoff (2-a)	Grove L. (1-a) *L. Reno (26-b, 81-a) L. Minnewaska (13-a) Forester's tern
White pelican	Eared grebe
McIver L. (4-a) L. Emily (1-a)	Ellen L. (2-a) Grove L. (4-a) *L. Reno (6-n, 16-a) L. Minnewaska (17-a) L. Johanna (5-a) McIver L. (2-a)

The heronry at L. Johanna is located on a six acre island owned by the Bureau of Land Management (BLM). The colony consists of 848 nests of which 43 were unoccupied or the species could not be determined. Table 7 shows the composition of the colony with regard to the birds nesting and the trees they are using. Table 8 gives the breakdown of nests by species and the possible production based on a sample of young/nest. The 805 occupied nests could con-

Table 7. Composition of the L. Johanna heronry.

Tree Species	% of nest containing trees	GBH nests	DCC nests	GE nests	BNH nests	Total nests
Cottonwood	5.6% (10)	25.2% (75)	17.5% (53)			15.9% (128)
Ash	2.2% (4)	3.0% (9)	6.0% (18)			3.4% (27)
Elm	27.2% (49)	26.3% (78)	37.7% (114)	34.5% (39)	10.8% (10)	29.9% (241)
Basswood	10% (18)	14.1% (42)	14.2% (43)	7.1% (8)	3.2% (3)	11.9% (96)
Box Elder	38.3% (69)	8.4% (25)	5.0% (15)	57.5% (65)	74.2% (69)	21.6% (174)
Oak	1.1% (2)	2.7% (8)	3.3% (10)	0.9% (1)		2.4% (19)
Cherry	0.5% (1)				6.4% (6)	0.7% (6)
Red-berried Elder	2.2% (4)				5.4% (5)	0.6% (5)
Dead Trees	12.8% (23)	20.2% (60)	16.2% (49)			13.5% (109)

Table 8. Breakdown of nests at the L. Johanna heronry with estimated young/nest and the potential production based on these samples.

Species	# Nests	Young/Nest	N	Possible Production
Great blue heron	585	2.38	47	1392
Great egret	550	2.67	56	1468
Black-crowned night heron	425	2.25	39	958
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Elm	27.2% (49)	26.3% (78)	37.7% (114)	34.5% (39)	10.8% (10)	29.9% (241)
Basswood	10% (18)	14.1% (42)	14.2% (43)	7.1% (8)	3.2% (3)	11.9% (96)
Box Elder	38.3% (69)	8.4% (25)	5.0% (15)	57.5% (65)	74.2% (69)	21.6% (174)
Oak	1.1% (2)	2.7% (8)	3.3% (10)	0.9% (1)		2.4% (19)
Cherry	0.5% (1)				6.4% (6)	0.7% (6)
Red-berried Elder	2.2% (4)				5.4% (5)	0.6% (5)
Dead Trees	12.8% (23)	20.2% (60)	16.2% (49)			13.5% (109)
Total	99.9% (180)	99.9% (297)	99.9% (302)	100% (113)	100% (93)	99.9% (805)

Table 8. Breakdown of nests at L. Johanna colony with estimated young/nest and the potential production based on these samples.

Species	# Nests	Young/nest	N	Possible Production
Great blue heron	297	2.45	64	728
Great egret	113	2.4	22	271
Black-crowned night heron	93	2.27	21	211
Double-crested cormorant	302	2.74	65	827

cievably have produced 2037 young herons and cormorants.

The approximate distribution of nests is shown in Figure 4.

This colony was visited twice due to a change in census methods. On both occasions one adult little blue heron was observed at about the same location. Nesting could not be confirmed.

Western grebes and Forester's terns were nesting at L. Reno. Twenty-six broods and 81 adult grebes were counted on the lake. Six tern nests and 16 adults were also present.

Stevens County

Forty lakes and marshes were surveyed in Stevens County. Colonial Waterbirds were observed at 19 different locations (Table 9). Nesting was confirmed at four locations and was apparently unsuccessful at another site.

A heron colony was discovered on the south shore of N. Pomme de Terre L. There were 59 total nests of which 50 were occupied by great blue herons on 6 May 1981. The colony was rechecked on 20 June and all nest were abandoned. Egg shell fragments were found under at least 15 nests.

The other waterbird colonies located in Stevens County include three western grebe, two eared grebe, and one Forester's tern colonies. Western grebe colonies were found at Charlotte (Olson) L. (14 broods), Harstad Slough (16 broods), and Crystal L. (4 broods). Eared grebe nesting was confirmed at Harstad Slough (12 broods) and

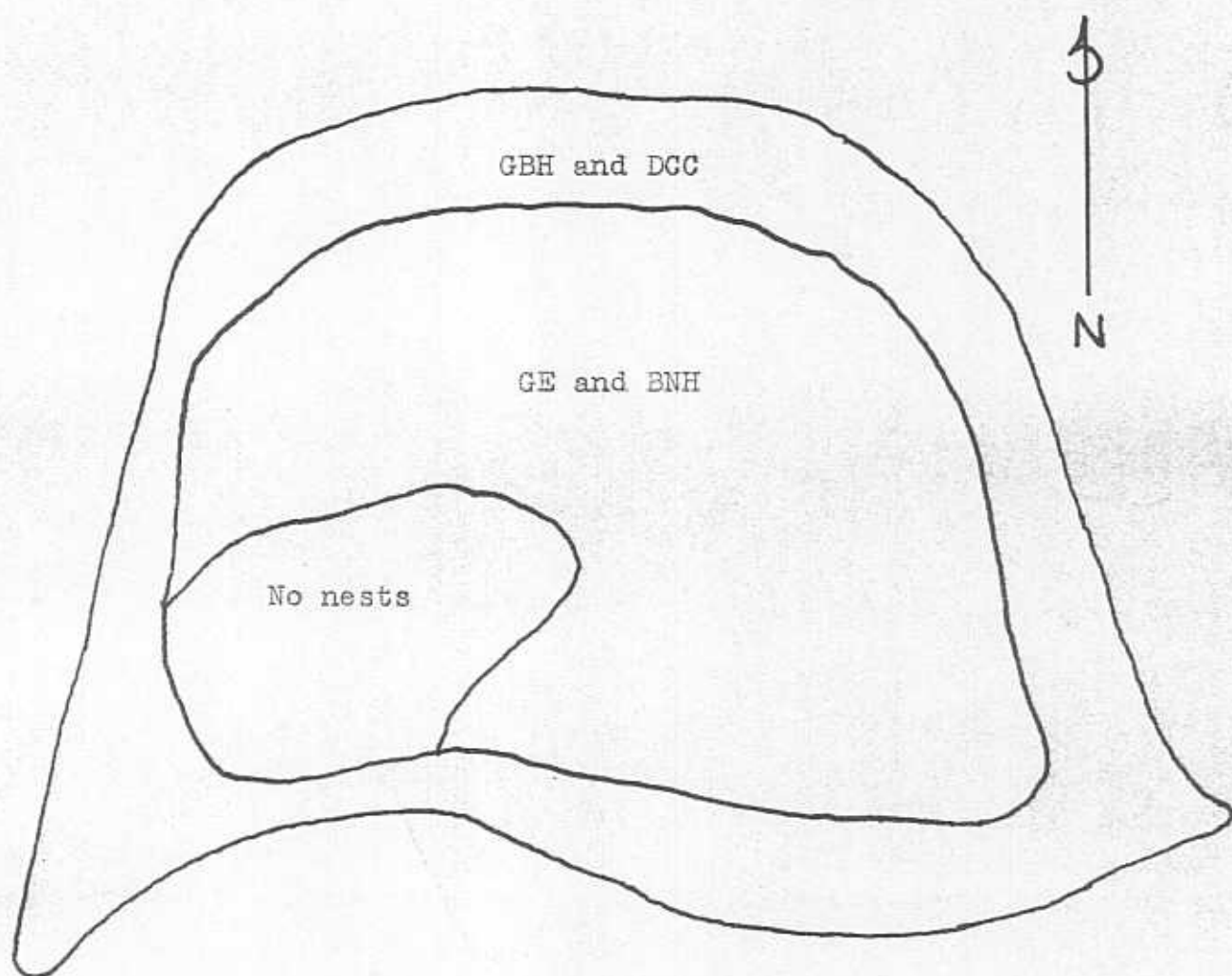


Figure 4. L. Johanna colony showing distribution of species.
48"=1 mile.

Table 9. Sightings of selected colonial waterbirds in Stevens County.

Double-crested cormorant	White pelican
<hr/> Long L. (19-a) Charlotte (Olson) L. (9-a) Cyrus L. (44-a) Page L. (53-a) N. Pomme de Terre L. (7-a) Middle Pomme de Terre L. (6-a) Perkins L. (3-a) Moore L. (3-a) Bjork L. (6-a) Fish L. (4-a) L. Hattie (16-a) Gorder L. (14-a) Crystal L. (4-a) WPA T124 R41 S9 (4-a) unnamed T124 R41 S12 (84-a)	<hr/> Long L. (29-a) Charlotte (Olson) L. (15-a) Cyrus L. (13-a) Page L. (27-a) Hanse L. (6-a) N. Pomme de Terre L. (4-a) Middle Pomme de Terre L. (8-a) Perkins L. (6-a) unnamed T124 R41 S12 (33-a) Moore L. (5-a) Swan L. (4-a) Fish L. (2-a) Gorder L. (18-a) WPA T124 R41 S9 (6-a)
Western grebe	Eared grebe
<hr/> *Charlotte (Olson) L. (14-b, 46-a) *Harstad Slough (16-b, 44-a) *Crystal L. (4-b, 11-a) Long L. (39-a) Cyrus L. (12-a) Fish L. (15-a) Gorder L. (36-a)	<hr/> *Clear L. (4-b, 27-a) *Harstad Slough (12-b, 33-a) *Gorder L. (3-b, 11-a)
	Forester's tern
	<hr/> *Crystal L. (6-n, 15-a)

Gorder L. (3 broods). Six Forester's tern nests were found at Crystal L.

Swift County

Twenty-two water bodies were surveyed in Swift County. Colonial waterbirds were observed at eight separate locations (Table 10). The only nesting site is the colony at L. Hassel.

Table 10. Sightings of selected colonial waterbirds in Swift County.

Double-crested cormorants	White pelican
L. Oliver (100-a)	L. Oliver (14-a)
L. Griffin (5-a)	L. Griffin (1-a)
*L. Hassel (15-n)	Hart L. (8-a)
Shible L. (14-a)	L. Hassel (4-a)
Hart L. (23-a)	WPA T121 R43 S6 (5-a)
Monson L. (6-a)	
	Western grebe
	L. Johnson (2-a)

The heron colony at L. Hassel is located on a 2.5 acre island. The ownership of the island is being transferred from the BLM to the Swift County Soil and Water Conservation District (SWCD). Fifteen double-crested cormorant and 12 great blue heron nests were counted on 20 June. These nests were constructed in six separate trees one of which, containing two nests, was dead. A sample, although small, resulted in 2.6 young cormorants/nest

(N=7) and 2.0 young herons/nest (N=5).

21

Traverse County

Colonial waterbirds were observed at two locations in Traverse County. White pelicans and double-crested cormorants were present on L. Traverse. The size of the lake made a total count of birds impossible. Pelicans, cormorants and western grebes were seen on Mud L. This lake was also too large for an individual count to be accurate.

DISCUSSION

Herons

Eight locations in the study area had been identified as nesting sites for herons. Nesting was successful at six of the sites in 1981. The colony at Marsh L. has been declining recently and was inactive this year.

Nesting was initiated in at least 50 nests at the Pomme de Terre colony in May 1981. On 20 June all nests had been abandoned and egg shells were present under many nests. The eggs had not broken upon impact but had fallen as fragments. Six fox squirrels were seen in the colony when it was surveyed. That the squirrels were responsible for the egg predation is only speculation.

The L. Hassel colony was discovered in 1978 when only a few cormorants nested there. Great blue herons and cormorants nested in both 1980 and 1981. The nesting population is small but has been increasing slowly. Ownership

of this colony is being transferred to the Swift County SWCD from the BLM for use by the local scout troop. At a meeting between personnel from the BLM and members of the SWCD board it was decided that the island would be off limits to the scouts during the nesting season. With this restriction the chances of disturbance to the nesting birds should be eliminated.

The colony at Big Stone NWR is located in an area that was flooded in 1975. Since that time the underbrush and trees have died. Refuge personnel feel the lack of undergrowth is probably responsible for the absence of the snowy egrets, cattle egrets, little blue herons and yellow-crowned night herons. All of these species are still observed on or near the refuge regularly. The refuge personnel are quite sure the birds are now nesting in another area of the refuge. They have been unable to locate the specific site as yet. The slow decline of the species still represented at the colony is possibly also due to the loss of cover from live vegetation. From refuge personnel and local birders I learned that the present location is at least the third site for that colony since the early 1960s. If this is the case hopefully the birds will find another acceptable site in the flooded river bottoms of the refuge.

The heron colony at L. Johanna has been at that location since at least the mid 1960s. I visited that site with a friend in about 1966. All four of the species cur-

rently nesting were present at that time. There were no dead trees on a 1951 aerial photo of the island. The vegetation was too dense for any nests to be visible on the photo. This colony has undergone some dramatic population fluctuations in the past four years. Estimates for both 1977 and 1978 were 1500 nests. In 1979 only about 300 nests were counted (Henderson, 1979). During the early 1970s little blue herons, cattle egrets, and snowy egrets were all reported nesting at this colony. Yellow-crowned night herons were seen at the colony at that time (Green and Janssen, 1975).

The 1981 count of 805 nests means the population is on the increase again. One little blue heron was present on the island but nesting could not be confirmed. This colony is owned by the BLM and is to be managed by the Morris Wetland District. The lake is not a fishing lake so disturbance during the nesting season is minimal. Hopefully the current population trend will continue.

Egret Island in Pelican L. may be the largest colony in the state. According to my data there were about 2100 nests which would be fewer than the Long L. colony. However Jim Evans of The Nature Conservancy spent four days censusing the colony. He counted 600 great blue herons, 750 great egrets, 600 black-crowned night herons, and 600 double-crested cormorants. This total of 2550 nests would make this colony the largest in the state. Jim also said

they have correspondance in their files indicating the 24
herons have been nesting on that island since the 1920s.

Information on the colony at L. Monongalia is limited. The colony is located on a privately owned island in a rather isolated area. The lake seems little used for fishing so disturbance is minimal. The population of this colony has remained between 100 and 200 nests for the past few years (Henderson, 1979). This year 130 nests were occupied by great blue herons.

The other large colony in the study area is located on a large privately owned island in Long L. north of Willmar. This colony has increased dramatically in recent years. In 1979 the colony was estimated to contain 1494 nests. The 1981 estimate was 2325 nests for an increase of more than 50% in two years. I talked to a couple of people that live on the lake who did not know how long the birds had been nesting on the island. They could only say it had been for several years.

A proposal was submitted by Dale Wright to have the island designated a nongame wildlife sanctuary. Dale was away for the summer so I was unable to discuss the proposal with him. The plan calls for designation of and posting the island as a sanctuary with trespass prohibited during the nesting season. The original owners would retain ownership and control of the land. Development would be discouraged. The proposal as a whole is commendable and work-

able. A few of the items need further discussion.

I would like to see some minor changes in the posting procedure. Post the island with metal signs stating: Nongame Wildlife Sanctuary, NO TRESPASSING, April 1 to August 1. These signs should be placed at the shoreline so they are visible from the lake. I dislike placing signs in the water because they could be potentially dangerous and the action of ice on the signs makes frequent replacement necessary. I would also not be in favor of putting informational signs on the island because this encourages people to come close enough to read the signs and in so doing, disturbing the birds. One attractive sign bearing pertinent information and possibly brochures could be located at the public access. A sign at the access would be seen by all people using the lake except residents, who presumably would know about the birds. This sign would also inform people that landing on the island is restricted before they are actually at the island.

The proposal to hire a caretaker and permit guided tours even from a boat is troublesome. At times during the nesting season even boats in the vicinity of the colony can cause unnecessary disturbance to the nesting birds. Someone should be designated to have authority to permit visits to the island by anyone who has a legitimate reason for wanting access to the island. I feel a full-time caretaker patrolling from a boat is impractical and probably

a dangerous precedent to set. TNC reports nesting at the Pelican L. colony for more than 50 years. This lake at times receives intense fishing pressure. This would indicate that as long as the colony itself is undisturbed the fishing pressure is not likely to drive away the birds. If the people living around the lake are truly concerned with the welfare of these birds they may be willing to help insure the birds are not harassed. They could do so by immediately reporting problems to an appropriate official. If this system were to prove unacceptable additional security could be considered.

Double-crested Cormorants

Seven locations in the study area had been identified as cormorant nesting sites. Cormorants were observed at 83 locations, (Table 11) more than any other species by nearly 100%.

One previously identified site has been abandoned. The colony at Artichoke L. has been inactive at least since 1976. I spent many hours at the lake that year as part of a white pelican study. Although cormorants were numerous on the lake no nests were found.

Five cormorant colonies are associated with heronries. These colonies are; L. Hassel, Pelican L., L. Johanna, Long L., and Big Stone NWR. General comments on these colonies in the section on herons are also relevant to cormorants. The number of cormorants nesting at these colonies

Table 11. Number of locations, by county, where selected colonial waterbirds were sighted.

County	Lakes Inventoried	DCC	WP	WG	EG	FT
Big Stone	34	14(2)	10(1)	7(5)	3(2)	5(1)
Chippewa	2	2				
Douglas	77	7		2(1)		2(1)
Grant	66	22(1)	4	5		1(1)
Kandiyohi	74	7(1)	4	2(1)		1
Lac qui Parle	6	1	1			
Pope	70	7(1)	2	3(1)	1	5(1)
Stevens	40	15	14	7(3)	3(2)	1(1)
Swift	22	6(1)	5	1		
Traverse	2	2	2	1		
Total	393	83(6)	42(1)	29(11)	7(4)	16(6)

has remained fairly stable in recent years.

Cormorants also nest at the white pelican colony at Marsh L. They have been nesting on that island since the 1950s according to a local farmer. The number of young cormorants banded this year was down considerably. Only 263 young cormorants were banded compared to 500 to 700 in previous years. Many of the cormorants were too large this year and were able to escape before they could be caught. All of the people involved with cormorant banding for the past few years agreed the number of cormorant nests was reduced in 1981 but probably not to the extent indicated by the banding data.

White Pelicans

White pelicans nest at only one site in the study area but were observed at 42 lakes. Pelicans first nested at Marsh L. in 1968. Before that year they had been absent as breeding birds in Minnesota since 1878 (Roberts, 1936). They have since initiated nesting on an island in Lake of the Woods. These are the only two nesting sites in the state.

For the first years the breeding population fluctuated widely. From 1976 to 1980 the number of young pelicans banded increased annually. The number of young pelicans banded in 1976, 1977, and 1978 was 454, 500 and 601 respectively (Orr, 1980). In 1979, 613 young, and in 1980, 695

young, were banded (A.H. Grewe, pers. comm.). The number of young banded in 1981 increased substantially to 1061. From the denuded appearance of the island it has probably reached capacity. There is virtually no room left for additional nesting.

Continued growth of the pelican population in Minnesota will probably depend upon successful initiation of new colonies. Potential sites include additional islands in Marsh L., several islands in Big Stone NWR, and somewhere in Kandiyohi County. There have been large flocks of nonbreeding pelicans at several lakes there for the past few summers. They may return to nest at one of these lakes if a suitable site is available.

The immediate concern however is the colony at Marsh L. As crowding on the island increases individual productivity decreases (Orr, 1980). If the birds would colonize the adjacent large island growth could continue for many years. These pelicans seem to prefer a bare substrate for nesting. This situation could be created by burning the large island in early spring. This would produce the desired conditions and would not permanently harm existing vegetation if the experiment was unsuccessful.

Western Grebes

Eleven locations had been identified, in the study area, as nesting sites of western grebes. Six of these sites were inactive in 1981. The remaining five sites were

active and six additional colonies were discovered. West-³⁰
ern grebes were observed at 29 locations in the study area.

The inactive colonies were located at Pelican L., Gorder L., L. Traverse, Thielke L., Sunburg L., and Long L. Grebes were not even observed at L. Traverse, Thielke L., and Long L. The reason for their disappearance at L. Traverse was not clear. There was abundant emergent vegetation and the water level seemed adequate. Jeff Miller Asst. AWM at Willmar felt the colony at Long L. disappeared because of a rise in water levels that had substantially reduced the amount of emergent vegetation. Water level was also the determining factor at Thielke L. On 2 June the lake was completely dry making it unacceptable to grebes.

Western grebes were present at Pelican L., Gorder L., and Sunburg L. but no nests or downy young could be found even though all sites were checked several times. Western grebes had been declining at Sunburg L. for a few years (Henderson, 1979). Only four birds were observed there in 1981. More than 20 birds were present at both Gorder L., and Pelican L. but no evidence of nesting could be found. The grebes at Pelican L. could have been from the adjacent colony at L. Christina.

Western grebes were nesting at five previously identified sites: L. Reno, L. Christina, ~~Charlotte~~^{Charlotte} L., Big Stone NWR, and Marsh L. The largest colony, of 63 nests, was located at L. Christina. This colony was surveyed on 15 July.

31

All grebes were still incubating on that date while one-half grown young had been seen in Big Stone County two weeks earlier. This is a dramatic difference in nest timing for a distance of only 50 miles. Timing of nest initiation may be dependant upon a combination of factors. Weather, localized water conditions and the type of vegetation could all influence the initiation of nesting. Cattails probably offer dense cover earlier than bullrush stands, due to more residual cover and earlier appearance of new growth. Vegetation seemed to be the difference in the cases cited.

The breeding population at L. Reno and ~~Charlotte~~ L. seem to be remaining stable. From personal observations the colony at Marsh L. was reduced in 1981. Only 37 adult grebes were counted this year while in the late 1970s more than 100 adults ^{were} regularly present on the lake.

Six new or previously unknown western grebe colonies were discovered. Three of these colonies, Otrey L., Lyseng L., and Eli L. were located in Big Stone County. I have seen grebes at Eli L. and Otrey L. in the past but I am not certain if nesting had occurred previously. Lyseng L. is not visible from any road so an active colony could have gone undiscovered there for several years. The colony at Eli L. is small, six broods, while Otrey L. and Lyseng L. had 40 and 31 broods respectively.

Two new colonies were located in Stevens County. Har-

stad Slough at Donnelly had 16 broods and Crystal L. in Morris had four broods. Both of these colonies are located in populated areas so it is unlikely they could have been overlooked for very long.

A new colony was discovered in Kandiyohi County at Wagonga L. south of Willmar. At least 140 adult grebes were counted on the lake. A thin line of bullrush near the south shore contained 10 nests. It is possible the bulk of these birds were nonbreeders. Palmer (1962) was uncertain of age at first breeding and he also found nonbreeding birds returning to nesting areas.

Western grebes were observed at 18 locations where no evidence of nesting could be found. Some of these birds could be from adjacent colonies as at Pelican L. and Maple L. near the L. Reno colony. Birds observed at Long L. and Cyrus L. in Stevens County could be from the colony at Charlotte L. Up to 50 grebes were present at those two lakes in early June while only a few grebes were seen at these lakes in July when the young began moving around on Charlotte L.

The other sightings were likely to be nonbreeding birds. I checked E. Toqua L. in Big Stone County four times and each time more than 40 grebes were present. No indication of nesting could be found and very little suitable habitat was present. The birds were always in the center of the lake actively feeding. The population

of western grebes nesting in the study area appears to be stable or possibly increasing slightly. The numerous lakes where nonbreeding grebes were observed should be watched for future nesting.

Eared Grebes

Three locations had been identified as nesting sites of eared grebes. The colonies at Salt L. and Big Stone NWR were inactive. Salt L. dried up in June which would prevent nesting. Only a few grebes had ever nested at the refuge but none were present in 1981. The other known site was Gorder L. in Stevens County. I counted four broods on the lake and 11 adults.

Four new colonies were discovered. Two colonies in Stevens County, Harstad Slough and Clear L. contained 12 broods and 33 adults and four broods and 27 adults respectively. The other two new colonies were located in Big Stone County. Eleven nests were discovered at Dismal Swamp WPA and seven nests were found at Lyseng L. Only the colony at Dismal Swamp may be in danger of disturbance. The colony was located about 75 meters from a road and was clearly visible from the road. These birds could make easy targets for "gopher hunters" or the like. Three grebes were seen at two locations where nesting could not be confirmed.

Forester's Terns

Only one site was identified as a Forester's tern nesting site. This was Clear L. in Stevens County which was not active in 1981.

A great deal of effort was not expended searching for Forester's terns. Four nesting sites were discovered and terns were observed at 11 other locations. The terns were likely nesting at all the sites where they were seen and probably others that I overlooked. The largest colony of 17 nests was located at L. Christina near the western grebe colony. Small colonies were found at Marsh L., Pelican L., and Crystal L. with five nests, five nests, and eight nests respectively.

From the number of terns observed at Big Stone NWR (12), L. Reno (11), and Wagonga L. (67) there is a good possibility that each of these sites have active colonies. Of the 67 terns at Wagonga L. at least one-third were fledged juvenile birds.

RECOMMENDATIONS

The forms presently in use seem functional and thorough. The timing of inventories may need some flexibility. From my experience counting nests in May, it is often difficult to determine nest occupancy. The incubating adults are more excitable in the early portion of the nesting season. I surveyed the heronries in late June and determined nest

occupancy by the presence of juvenile birds. In most cases the young were large enough to be easily seen above the nest bowl. In very dense colonies the additional foilage could limit visibility. This also works in reverse to make the observer less conspicuous thereby reducing the extent of disturbance caused by censusing.

Rob Naplin and Jeff Miller have established one transect across the colony to obtain a representative sample and calculate the total population from this sample. With a colony the size of Long L. this represents a substantial time savings. All colonies where this method would be used could be tested to compare accuracy of census methods.

Censusing grebes by counting nests is very time consuming and disruptive to the colony. Western grebe nests are generally well hidden and not easily found. Counting broods accompanying adults is a more efficient census method although possibly a little less accurate. The time saved and reduction of disturbance I feel compensate for slightly reduced accuracy. The difference in nest initiation times encountered in this study must be considered if one mass effort is planned to complete the census.

Most eared grebe colonies I encountered were visible from a distance and easily counted with a spotting scope. This method eliminates or greatly reduces disturbance of the nesting birds.

My recommendations regarding the Long L. and the L.

Hassel colonies are contained in the discussion section.

At present the major heron, cormorant, and pelican nesting sites seem fairly secure. Only the colonies in Kandiyohi County are located on private land. The colony at L. Monongalia is located in an area where development is unlikely. The concern of the residents at Long L. will hopefully insure the future of this important colony.

The situation with regard to grebes is unclear. The birds seem to have quite specific nesting requirements. The annual fluctuation of water levels in western Minnesota may force these birds to nest at different sites from year to year. Until ^{more} data on specific colonies is available purchase of potential grebe nesting sites could become an exercise in futility.

The purchase of easements may be a preferable alternative to actual title transfer. This would substantially reduce the costs and yet provide the necessary protection. The ^{duration} of the easements could be determined by the given situation and contain a clause for renewal. With the flexibility exhibited by some of the colonial birds in their choice of nest sites I believe this should be the first step in the process.

All of the grebe nesting sites are presently protected by public ownership or are on bodies of water large enough to fall under control of the public waters bill. This law could be an invaluable tool for the prevention of nesting

habitat loss.

The future of colonial waterbirds in Minnesota appears promising at present. The populations have been remaining stable or even increasing slightly. The factors affecting these birds, loss of feeding and breeding habitat, contamination from pollution, and disturbance at nesting sites are all within our ability to control. The future of colonial waterbirds, as ~~it is~~ with nearly all wildlife, is in our hands. Whether this will be to their advantage or disadvantage remains to be seen.

SUMMARY OF COLONIAL WATERBIRD NESTING SITES

Colony Name	Species	Co.	T	R	S	Date	# nests or broods	Comments	Ownership
Big Stone NWR	GBH, GE, BNH, DCC	BS	121	45	32	6/26	130, 80, 75, 400		USFWS
Big Stone NWR	WG	BS	120	45	5		a few		USFWS
Marsh Lake	WP, DCC, WG, FT	BS	120	44	15	6/21	1061, 263, 8-b, 6-n		MDNR
Otrey L.	WG	BS	122	45	20	6/30	40-b		
Eli L.	WG	BS	123	46	15	7/2	6-b		
Lyseng L.	WG, EG	BS	123	46	34	7/2	31-b, 5-n		
Dismal Swamp WPA	EG	BS	123	45	14	7/13	11-n		USFWS
L. Christina	WG, FT	DO	130	40	18	7/15	63-n, 17-n		
Pelican L.	GBH, GE, BNH, DCC, FT	GR	130	41	23	6/25	583, 550, 425, 549, 5	3-a LBH	TNC
Long L.	GBH, GE, BNH, DCC	KA	120	35	14		1186, 860, 279, 156		Private
L. Monongalia	GBH	KA	122	34	34		130		Private
Wagonga L.	WG	KA	118	34	6	7/7	10	140-a WG	
L. Johanna	GBH, GE, BNH, DCC	PO	123	36	17	6/26	297, 113, 93, 302	1-a LBH	BLM
L. Reno	WG, FT	PO	126	38	10	7/9	26-b, 6-n		
Pomme de Terre L.	GBH	SV	126	41	18	5/6	50-n	0-n, 6/20	Private
Charlottesville L.	WG	SV	125	41	24	7/8	14-b		
Harstad Slough	WG, EG	SV	126	42	30	7/30	16-b, 12-b	WFL. Ref.	
Crystal L.	WG, FT	SV	124	42	3	7/30	4-b, 6-n	FT 7/14	
Gorder L.	EG	SV	124	43	26	7/13	3-n		
L. Hassel	GBH, DCC	SW	122	39	9	6/20	12-n, 15-n		SW Co SWCD
Clear L.	EG	SV	124	43	16	7/30	4-b	WFL. Ref.	

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APPENDIX A

Lakes surveyed for this inventory listed by county.

BIG STONE COUNTY

T120 R44
Marsh L.

T121 R45
Long Tom L. sec. 6
Peterson L. sec. 8
Horseshoe L. sec. 15,16
Big Stone NWR

T121 R46
Walter L. sec. 1,12
Lindgren L. sec. 11
Big Stone L.

T122 R44
Artichoke L.
Long L. sec 22,27,34

T122 R45
Karl Slough sec. 6
Bentson L. sec. 7
Hanson Slough sec. 15
Otreys L. sec. 19,20,29
Hanson L. sec. 21,28

T122 R46
Thielke L. sec. 2,11
Olson L. sec. 3
Swenson L. sec. 3
Twin L. sec. 26,35

T123 R45
Dismal Swamp WPA sec. 14

T123 R46
S. Rothwell L. sec. 4,5
Eli L. sec. 10,15
Lyseng L. sec. 34
Basset Slough sec. 34
Cup L. sec. 4

T124 R46
W. Toqua L. sec. 8,17
E. Toqua L. sec. 9,16
Lannon L. sec. 15
N. Rothwell L. sec. 33
L. Leo sec. 30

T124 R47
Barry L. sec. 5,8
Fogarty L. sec. 21
unnamed sec. 13,24
unnamed sec. 27

CHIPPEWA COUNTY

T118 R42
Watson Sag sec. 1,2,3

T119 R38
Buffalo L. sec. 6,7

DOUGLAS COUNTY

T127 R36

Swim L. sec. 2
 Kuhtz L. sec. 25
 Shulz L. sec. 27

T127 R37

Union L. sec. 9
 Lovera L. sec. 27
 Maple L. sec. 29

T127 R38

L. Mary
 Skogland Slough sec. 7
 Turtle L. sec. 25

T127 R39

Wolf L. sec. 2
 L. Oscar sec. 5
 Kron L. sec. 9
 S. Oscar L. sec. 9
 Blackwell L. sec. 10
 Grants L. sec. 11
 Freeborn L. sec. 19
 Long L. sec. 19
 Pocket L. sec. 24
 Mattson L. sec. 28
 Mud L. sec. 27

T127 R40

Round L. sec. 20
 Long L. sec. 25
 Hegg L. sec. 26, 27

T128 R36

Smith L. sec. 31

T128 R37

L. L'Homme Dieu sec. 4, 5
 Geneva L. sec. 9, 15
 Agnes L. sec. 18
 Victoria L. sec. 21, 28
 Jessie L. sec. 27
 Burgen L. sec. 33

T128 R38

Brophy L. sec. 10
 Stony L. sec. 11
 Cowdry L. sec. 14
 L. Mina sec. 17
 Lakota L. sec. 23

T128 R39

Elk L. sec. 1
 William L. sec. 14, 15
 Elizabeth L. sec. 16
 Gilbert L. sec. 17
 Round L. sec. 26
 Crooked L. sec. 27
 Brandon L. sec. 32
 Crooks L. sec. 35
 Mill L. sec. 36

T128 R40

Amos L. sec. 2
 Thorsen L. sec. 12
 Barsness L. sec. 12
 Halleque L. sec. 14
 L. Venus sec. 15
 Quam L. sec. 23
 Jorgenson L. sec. 30

T129 R37

L. Carlos
 Laura L. sec. 28

T129 R38

L. Ida

T129 R39

Upper Hunt L. sec. 5
 Lower Hunt L. sec. 5
 Stowe L. sec. 7, 8
 Little Chippewa L. sec. 9
 Chippewa L. sec. 12
 Devils L. sec. 15
 Whiskey L. sec. 22
 Aldrich L. sec. 26
 Moon L. sec. 28
 Nelson L. sec. 35

APPENDIX A (cont.)

42

DOUGLAS COUNTY (cont.)

T129 R40
 Malta L. sec. 7
 Davidson L. sec. 19
 Erwin L. sec. 21
 Hubrid L. sec. 30
 Solberg L. sec. 30
 Albert L. sec. 31
 Jennie L. sec. 35

T130 R37
 Vermont L. sec. 7
 L. Irene sec. 14,23
 L. Milona

T130 R39
 Boesen L. sec. 8
 L. Aaron sec. 16
 L. Moses sec. 16,17
 Stockhousen L. sec. 18
 Stockhaven L. sec. 19

T130 R40
 L. Christina.

GRANT COUNTY

T127 R41
 Wilson L. sec. 13,14
 WMA sec. 24

T127 R42
 Patchen L. sec. 35,36
 Shauer L. sec. 34

T127 R43
 Burr L. sec. 2
 Big L. sec. 7,8
 Johnson L. sec. 11
 Nelson L. sec. 19
 Graham L. sec. 19
 Doughty L. sec. 20
 Keitzman Slough sec. 21
 Olsrud L. sec. 22,23
 Werk L. sec. 25
 Niemackl L. sec. 27,28,29
 WMA sec. 33

T127 R44
 Pullman L. sec. 24

T128 R41
 Sylvan L. sec. 2,3
 Barrett L. sec. 6,7
 Thompson L. sec. 10,15
 Peterson L. sec. 11
 Willow Slough sec. 14
 Round L. sec. 21
 Torstenson L. sec. 23
 Church L. sec. 23
 Ellingson L. sec. 24
 Elk L. sec. 27
 Spring L. sec. 27
 Lower Elk L. sec. 35

T128 R42
 Cormorant L. sec. 9,16,17
 Swan L. sec. 10
 Horseshoe L. sec. 14
 Huset L. sec. 18

T128 R43
 WPA sec. 6
 Prescott L. sec. 20
 Moses L. sec. 21,22
 Hibrooten L. sec. 25

APPENDIX A (cont.)

43

GRANT COUNTY (cont.)

T129 R41
 Bah L. sec. 1,12
 Shady Grove L. sec. 5
 WPA sec. 8,9
 WMA sec. 17
 Kenny L. sec. 18
 WPA sec. 19
 Malgren L. sec. 26
 Pomme de Terre L.

T129 R42
 Elbow L. sec. 6,7
 unnamed sec. 6
 Worm L. sec. 8,17
 Island L. sec. 20
 Round L. sec. 29,30
 Long L. sec. 26,35

T130 R41
 Melby L. sec. 10,15
 Pelican L.

T130 R42
 Briggs L. sec. 1
 Hagen L. sec. 2
 Grinder L. sec. 10
 Mill Pond L. sec. 13,14
 unnamed sec. 15

T130 R43
 Stony Brook L. sec. 3,10
 Elling L. sec. 10
 Lightening L. sec. 15,16

T130 R44
 Stony L. sec. 12
 Ash L. sec. 24,25
 Mud L. sec. 36

KANDIYOHI COUNTY

T117 R33
 L. Lillian sec. 6,7

T118 R33
 L. Elizabeth sec. 2,3
 Cherry L. sec. 6
 Otter L. sec. 10
 Johnson L. sec. 10,11

T118 R34
 Little Kandiyohi L. sec. 1,2
 Wagonga L. sec. 5,6
 Big Kandiyohi L.

T118 R35
 Stevens L. sec. 29

T118 R36
 Olson L. sec. 26

T119 R33
 Pay L. sec. 2
 Summit L. sec. 9,16
 unnamed sec. 11
 L. Carrie sec. 26
 L. Ella sec. 27,34
 L. Minnetaga sec. 30,31
 Mud L. sec. 36

T119 R34
 Swan L. sec. 26
 L. Eleanor sec. 31
 L. Kasota sec. 36

T119 R35
 Willmar L. sec. 2,11
 Foot L. sec. 9,10

T119 R36
 St. Johns L. sec. 1

APPENDIX A (cont.)

KANDIYOHI COUNTY (cont.)

T120 R33

Sperry L. sec. 16
 Diamond L.
 Schultz L. sec. 23,26
 Wheeler L. sec. 26,34
 Hubbard L. sec. 27,28

T120 R34

Henderson L. sec. 6
 Twin Ls. sec. 7,8
 Eagle L. sec. 19

T120 R35

Ringo L. sec. 1
 L. Florida sec. 3,4
 unnamed sec. 12
 Long L. sec. 13,14,15
 E. Solomon L. sec. 29,30
 King L. sec. 23
 Point L. sec. 24
 Skataas L. sec. 26
 Swan L. sec. 35

T120 R36

Bunning L. sec. 14
 Church L. sec. 23
 W. Solomon L. sec. 25
 Lindgren L. sec. 26
 Swan L. sec. 9,10

T121 R33

Shoemaker L. sec. 6,7
 Calhoun L. sec. 21
 Jessie L. sec. 31

T121 R34

Nest L. sec. 29
 George L. sec. 32
 Woodcock L. sec. 33

T121 R35

L. Andrew sec. 2,3
 Swan L. sec. 3,4
 Norway L.
 Middle L. sec. 9,10
 Mary L. sec. 19
 Norstedt L. sec. 24,25
 L. Florida
 Crook L. sec. 29,32
 unnamed sec. 36

T121 R36

E. Sunburg L. sec. 5
 Henjum L. sec. 22
 Swensen L. sec. 24,25
 unnamed sec. 25

T122 R34

Monongalia L.

T122 R35

Hystad L. sec. 7
 Games L. sec. 32

T122 R36

Crook L. sec. 3
 Brenner L. sec. 6,7
 L. Ole sec. 10
 L. Hefta sec. 18
 Glesne L. sec. 21,22
 Blaamyhre L. sec. 22
 unnamed sec. 29
 Sunburg L. sec. 31

APPENDIX A (cont.)

45

LAC QUI PARLE COUNTY

T117 R46
Salt L. sec. 5,8
WMA sec. 36

T118 R46
Pegg L. sec. 4

T118 R44
WMA sec. 7,18

POPE COUNTY

T123 R36
L. Johanna sec. 8,17
E. Johanna L. sec. 34

T124 R40
L. Emily

T123 R37
L. Linka sec. 6
Gilchrist L. sec. 7
Nilson L. sec. 11
Scandinavian L. sec. 20
Goose L. sec. 21
Sather L. sec. 31
L. Simon sec. 33

T125 R36
Alice L. sec. 7
Eckert L. sec. 18
Grove L. sec. 26,34
McCloud L. sec. 33

T125 R37
Marlu L. sec. 26,27
Camp L. sec. 30,31

T123 R38
L. Hanson sec. 2
L. Hoff sec. 3,4
Kolstad L. sec. 5
Rasmuson L. sec. 19

T125 R38
Star L. sec. 5
Trapper L. sec. 6
Pelican L. sec. 9
L. Minnewaska

T123 R39
Paulson L. sec. 2
Benson L. sec. 14
Swan L. sec. 22

T125 R39
Strandness L. sec. 1
Malmedal L. sec. 2
Wollan L. sec. 11

T124 R37
Round L. sec. 11,12
unnamed sec. 14
Swenoda L. sec. 15,21
Anderson L. sec. 30

T125 R40
WPA sec. 9
Otter L. sec. 7

T124 R38
Stenerson L. sec. 10
L. Ben sec. 14,23
L. Jenum sec. 15
L. Mary sec. 21
Celia L. sec. 21
Nelson L. sec. 28
Edwards L. sec. 32

T126 R36
Ellen L. sec. 4
Westport L. sec. 21,22
Swan L. sec. 32,33

T126 R37
Leven L. sec. 11,12
Villard L. sec. 23
Amelia L. sec. 26,35

APPENDIX A (cont.)

POPE COUNTY (cont.)

T126 R38

L. Reno
 Liar L. sec. 17
 Horse L. sec. 18
 John L. sec. 21
 Ann L. sec. 22

T126 R39

Jorgenson L. sec. 2,3
 Diamond L. sec. 12,13
 Mitmoen L. sec. 16
 Larson L. sec. 17
 Anderson L. sec. 18

T126 R40

Pike L. sec. 1
 Christopherson L. sec. 2
 Rosby L. sec. 13
 Wicklund L. sec. 15
 Osterberg L. sec. 17
 Irgens L. sec. 24,25
 Erickson L. sec. 25
 Belgium L. sec. 26
 McIver L. sec. 35,36

STEVENS COUNTY

T123 R44

Grossman Slough sec. 6

T124 R41

unnamed sec. 12
 Page L. sec. 27
 WPA sec. 35

T124 R42

Pomme de Terre Pool sec. 1
 Crystal L. sec. 3
 Coleman Slough sec. 13

T124 R43

Clear L. sec. 9
 WPA sec. 12
 L. Hattie sec. 22
 Flax L. sec. 26
 Gorder (Frog) L. sec. 25,26
 WPA sec. 15

T124 R44

Gravel L. sec. 8,17
 WPA sec. 15

T125 R42

Wintermute L. sec. 12

T125 R43

Fish L. sec. 6

T125 R41

N. Baker L. sec. 3
 Baker L. sec. 10
 Scandia L. sec. 14
 Bjork L. sec. 15
 L. Hanson sec. 15,22
 Hanse L. sec. 22
 Charlotte (Olson) L. sec. 24
 L. Cyrus sec. 25
 Long L. sec. 26,35
 Round L. sec. 36
 Moose L. sec. 14,23

T126 R41

N. Pomme de Terre L. sec. 7,18
 Middle Pomme de Terre L. sec. 19
 Erickson L. sec. 11
 Swan L. sec. 26,35
 Perkins L. sec. 20,29,30

T126 R42

Silver L. sec. 3
 unnamed sec. 17,18
 Harstad Slough sec. 30

T126 R43

Cottonwood L. sec. 1
 Barrett L. sec. 4
 unnamed sec. 26

T126 R44

Mud L. sec. 36

APPENDIX A (cont.)

47

SWIFT COUNTY

T120 R43
Spring L. sec. 4

T121 R37
Monson L. sec. 1,2
L. Frank sec. 6
W. Sunburg L. sec. 1
unnamed sec. 2

T121 R38
L. Hollerberg sec. 11,14

T121 R43
Hart L. sec. 20
Shible L. sec. 27,34

T122 R38
Camp L. sec. 1

T122 R39
L. Hassel sec. 9
L. Moore sec. 14,15
Frovold L. sec. 15,16
L. Johnson sec. 17

T122 R40
Malachy L. sec. 22
Lynch L. sec. 27

T122 R43
L. Griffin sec. 5,8
Henry L. sec. 21
L. Oliver sec. 26,27,35
L. Henry sec. 29
unnamed sec. 19
unnamed sec. 29
unnamed sec. 31

TRAVERSE COUNTY

L. Traverse
Mud L.