Survey of the Fauna and Flora in City of La Crosse Area Wetlands

Final Project Report: Natural Resources 491

22 August 1979

By Kurt Brownell

Wildlife Technician

Introduction

The purpose of this study is to document game and non-game wildlife in La Crosse area wetlands and to cover-type them for possible wetlands acquisition and preservation by the Department of Natural Resources.

Literature Review

Nicklaus, R. H. 1975. Final Report: Wildlife Value, La Crosse Marsh. Department of Natural Resources, Mississippi River Work Unit, La Crosse, Wisconsin. 6 pp.

Smith, W. A. 1978. The Vascular Flora of Myrick Marsh. Department of Biology, University of Wisconsin-La Crosse. 24 pp.

Harris, P. A. 1974. The Avifauna of Myrick Marsh. W. S. O. Research Report. 12 pp.

Description of Study Area

The study area is located in La Crosse, Wisconsin (Sections within T15N-R7W and T16N-R7W). The climate is humid continental with an average 31 inches of precipitation per year with 60% occurring during the growing season. The growing season is 163 days from April 29 through October 9.

La Crosse County lies within the driftless area and the bedrock is Precambrian granite. Alluvium is the parent material and soils in the study area consist of poorly drained alluvial and marsh series.

Vegetative cover consists of bottomland hardwoods, rushes, sedges, and other plants which tolerate water, as found in marsh soils.

La Crosse was first settled in 1841 but the area under study has remained relatively undeveloped. Cutting of marsh hay, farming in dry years, pasture, logging, and recreation are all past or present uses of the area. The city also used to pump it's water from wells beneath the marsh so a system of dikes had been built in T16N-R7W sections 28 and 33 (see map). The wells have since been abandoned.

Methods

1) I looked at aerial photos and quadrangle maps to determine where the wetlands are. An aerial survey of the La Crosse area was done to obtain color prints of the marshes and allow me to see if I missed any areas.

2) Small blocks of each wetland were mapped out and surveyed. If the wetland was small enough (1-200 acres) it was surveyed as one unit.

3) The blocks were then surveyed by walking along dikes, railroad rights of way, roads, and through the marsh itself. A canoe trip was taken down the La Crosse river starting at Highway 16 and ending at the Mississippi river. Binoculars (7x50) were used to aid in identification of wildlife present. Bird calls, tracks, signs, and a small mammal trap line (snap traps and peanut butter bait) were also used. With the help of Fred Lesher, amateur bird watcher and UW-L teacher, I played tape recorded calls of various rails (Rallidae) to try and obtain a response.

Table 1.

Results

Birds

Birds	Areas Documented														Frequency of Occurrence
	1	2	3	4	5	6	7	8	9	10	11	12	Carr Street	La Crosse River Canoe Trip	
Kestrel, Falco sparverius	1	5					1								21.4
Northern oriole, Icterus galbula	X				X		X	X		X				X	42.9
Barn swallow, Hirundo rustica erythrogaster	X		X	X	X	X	X			X	X	X		X	71.4
Acadian flycatcher, Empidonax virescens	X														7.1
Indigo bunting, Passerina cyanea	X			X			X	X				X	X	X	50.0
Downy woodpecker, Dendrocopus pubescens	X						X						X	X	28.6
Catbird, Dumetella carolinensis	X	X	X		X	X	X	X	X	X	X		X	X	85.7
Yellow warbler, Dendroica petechia	X	X	X	X	X	X			X		X	X	X	X	78.6
Common yellowthroat, Geothylpis trichas	X	X	X	X	X	X	X	X	X	X	X	X	X	X	100.0
Red-winged blackbird, Agelaius phoeniceus	X	X	X	X	X	X	X	X	X	X	X	X	X	X	100.0
Cowbird, Molothrus ater ater	X	X			X	X	X	X	X	X			X	X	71.4
Killdeer, Charadrius vociferus vociferus	X	X		X	X		X			X	X	X	X	X	71.4
Robin, Turdus migratorius	X	X	X		X		X	X	X	X	X	X	X	X	85.7

Table 1. Continued.

Birds	1	2	3	4	5	6	7	8	9	10	11	12	Carr Street	La Crosse River Canoe Trip	Frequency of Occurrence
Lesser yellowlegs, *Totanus flavipes*										3					7.1
Least flycatcher, *Empidonax minimus*									X	X			X		21.4
Red-headed woodpecker, *Melanerpes erythrocephalus erythrocephalus*														X	7.1
Yellow-throated vireo, *Vireo flavifrons*														X	7.1
Short-billed marsh wren, *Cistothorus platensis stellaris*														X	7.1
Bank swallow, *Riparia riparia riparia*														X	7.1
Great horned owl, *Strix nebulosa nebulosa*														1	7.1
Hairy woodpecker, *Dendrocopus villosus*													X	X	14.3
Pileated woodpecker, *Hylatomus pileatus*													2		7.1

Table 1. Continued.

Birds	Areas Documented														Frequency of Occurrence
	1	2	3	4	5	6	7	8	9	10	11	12	Carr Street	La Crosse River Canoe Trip	
Yellow-headed blackbird, *Xanthocephalus xanthocephalus*						X	X			X				X	28.6
Hooded merganser, *Lophodytes cucullatus*						14	14	5	2	8					35.7
Great crested flycatcher, *Myiarchus crinitus*						X							X	X	21.4
Coot, *Fulica americana*						1	1		1						21.4
Crow, *Corvus brachyrhynchos*						X							X		14.3
Bluejay, *Cyanocitta cristata*						X								X	14.3
Sora rail, *Porzana carolina*						1	1								14.3
Wood duck, *Aix sponsa*						25			15	2	12		10		35.7
Common gallinule, *Gallinula chropus cachinnans*						1				2					14.3
White-breasted nuthatch, *Sitta carolinensis*						X							X	X	21.4
Virginia rail, *Rallus limicola limicola*						1	3	1							21.4
Rose-breasted grosbeak, *Pheuticus ludovicianus*								X	X					X	21.4
Blue-winged teal, *Anas discors*									1	16				3	21.4
Chimney swift, *Choetura pelagica*	X	X							X					X	28.6

Table 1. Continued.

Birds	Areas Documented														Frequency of Occurrence
	1	2	3	4	5	6	7	8	9	10	11	12	Carr Street	La Crosse River Canoe Trip	
Long-billed marsh wren, Telmatodytes palustris			X		X	X	X		X						35.7
Black-billed cuckoo, Coccyzus erythropthalmus				X	X		X								21.4
Rough-winged swallow, Stelgidopteryx ruficollis serripennis					X	X	X		X	X					35.7
Woodcock, Philothela minor					X			1							14.3
Black-capped chickadee, Parus atricapillus					X	X	X							X	28.6
Rufous-sided towhee, Pipilo erythrophthalmus					X										7.1
Rock dove, Columba livia					X							X	X	X	28.6
Brown thrasher, Toxostoma rufum rufum					X		X			X					21.4
Traill's flycatcher, Empidonax traillii traillii	X	X			X	X			X			X		X	50.0
Mallard duck, Anas platyrhynchos platyrhynchos					25	8	1		1	13		2		2	50.0
Western meadowlark, Sturnella neglecta		X													7.1
Black tern, Chlidonias nigra surinamensis						5	1		2	6	1		1		42.9

Table 1. Continued.

Birds	Areas Documented														Frequency of Occurrence
	1	2	3	4	5	6	7	8	9	10	11	12	Carr Street	La Crosse River Canoe Trip	
Nighthawk, *Chordeiles minor*		X													7.1
Purple martin, *Progne subis subis*		X					X			X			X	X	35.7
Cliff swallow, *Petrochelidon pyrrhonata albifrons*		X													7.1
Bobwhite quail, *Colinus virginianus*		1	3	1								1		2	35.7
Belted kingfisher, *Megaceryle alcyon alcyon*		X		X	X	X	X		X	X	X	X		X	71.4
Phoebe, *Sayornis phoebe*		X													7.1
American egret, *Casmerodius albus egretta*		1			4	3	3	2		2			1		50.0
Great blue heron, *Ardea herodias*			1		1	2	2	1			1		1	2	57.1
Red-eyed vireo, *Vireo olivaceus*			X												7.1
Bobolink, *Dolichonyx oryzivorus*			X												7.1
American redstart, *Setophaga ruticilla*			X			X	X		X				X	X	42.9
Eastern wood pewee, *Contopus virens*			X	X	X									X	28.6
Cardinal, *Richmondena cardinalis*			X	X	X	X	X	X	X				X	X	64.3
Spotted sandpiper, *Actitis macularia*			1						1				1	2	28.6

Table 1. Continued.

Birds	Areas Documented														Frequency of Occurrence
	1	2	3	4	5	6	7	8	9	10	11	12	Carr Street	La Crosse River Canoe Trip	
Mourning dove, *Zenaidura macroura carolinensis*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	100.0
Common goldfinch, *Spinus tristis tistis*	X	X	X	X	X		X	X	X	X			X	X	78.6
Grackle, *Quiscalus* spp.	X	X		X		X	X	X					X	X	57.1
Cedar waxwing, *Bombycilla cedrorum*	X	X	X	X	X		X		X					X	57.1
Eastern meadowlark, *Sturnella magna*	X	X	X	X										X	35.7
Flicker, *Colaptes auratus*	X	X		X	X	X	X	X	X	X	X		X	X	85.7
Song sparrow, *Melospiza melodia*		X	X	X	X	X	X	X	X	X		X	X	X	85.7
Green heron, *Butorides virescens virescens*		1			3		1		2	2	1		1	1	57.1
Red-tailed hawk, *Buteo jamaicensis*		1												2	14.3
Warbling vireo, *Vireo gilvus gilvus*		X	X		X	X	X	X		X	X	X	X	X	78.6
English sparrow, *Passer domesticus domesticus*		X			X	X	X		X				X		42.9
Tree swallow, *Iridoprocne bicolor*		X	X		X	X					X		X	X	50.0
House wren, *Troglodytes aedon*		X			X		X		X		X	X	X	X	57.1

Table 2.

Mammals

Mammals	Areas Documented														Frequency of Occurrence
	1	2	3	4	5	6	7	8	9	10	11	12	Carr Street	La Crosse River Canoe Trip	
Cottontail rabbit, *Sylvilagus floridanus*		1			1	1	2	2	1						42.9
Gray squirrel, *Sciurus carolinensis*						1	1	1						1	28.6
Woodchuck, *Marmota monax*								1						1	14.3
Raccoon, *Procyon lotor*	X	X	X		X	X								X	42.9
White-tailed deer, *Odocoileus virginianus*			X		X										14.3
Beaver, *Castor canadensis*					X									3	14.3
Muskrat, *Ondatra zibethicus*											3				7.1
Striped skunk, *Mephitis mephitis*													1		7.1

Table 3.

Results of Small Mammal Trapping

	Area 3			Area 6		
	Number Caught	Number of trap nights	Number of animals per 100 trap nights	Number Caught	Number of trap nights	Number of animals per 100 trap nights
Meadow vole, Microtus pennsylvanicus pennsylvanicus	2	98	2.04	2	57	3.51
Jumping mouse, Zapus hudsonius hudsonius				1	57	1.75
Northern white-footed mouse, Peromyscus leucopus noveboracensis	4	98	4.08			

Note: I started with 20 traps but 1 got lost.

A number denotes amount seen.

X = Documented but not counted.

Table 4.

Area	Dates Surveyed	Acres
1	June 27 and July 5, 13, 1979	136
2	June 25, 27 and July 5, 1979	184
3	June 25, 27 and July 13, 1979	220
4	July 17, 1979	244
5	July 5, 9, 12, 17, 1979	204
6	July 5, 6, 9, 12, 16, 18, 1979	64
7	July 9, 12, 13, 16, 17, 20, 1979	228
8	July 9, 10, 1979	55.75
9	July 9, 11, 13, 16, 1979	124
10	July 11, 16, 1979	30
11	July 24, 26, 1979	14.75
12	July 24, 1979	15
Carr Street	July 12, 1979	16
La Crosse River Canoe Trip	July 28, 1979	-

Discussion

As my results show, this area is rich in wildlife with 75 species of birds and 11 species of mammals found. The Avifauna of Myrick Marsh (Harris 1975) lists a total of 124 bird species but his study encompassed the migration seasons. Reed canary grass (Phalaris arundinacea) was the dominant covertype with arrowhead (Sagittaria spp.) and sedges (Carex spp.) in the wetter areas and cottonwoods (Populus deltoides), boxelder (Acer negundo), silver maple (Acer saccharinum), elm (Ulmus spp.), and willow (Salix spp.) in the drier areas.

Management Proposals

1. Pothole construction

There is a need for permanent pothole construction in areas 1-5 (Figure 5). It need not be limited to these areas, however. Potholes can greatly enhance productivity of the marshes and Evans et. al. (1952) noted that dabbling ducks best utilize potholes of 0-.5 acres. This, combined with reed canary grass as cover and a visual barrier between potholes, would best suit our area.

Potholes may be constructed in three ways: blasting, bulldozing, and dragline.

Blasting can be accomplished by the use of dynamite or ammonium nitrate. Ammonium nitrate is cheaper and safer to handle and store so I would recommend it's use over dynamite.

The disadvantages of blasting potholes are as follows:

1) Very steep sides result and as water levels drop later in the summer, visibility and thus use is reduced. It has been found though that ducks which established territories during higher water will continue to use them.

2) Due to the steep sides, material will slough in for a number of years until the bank has stabilized, thus reducing the life of the pothole.
3) Blasting within the city limits may be undesirable or prohibited.

Blasting potholes on a per acre-foot basis is very expensive but on a per pothole basis, it's by far the cheapest method of construction. This method is best used when limited funds are available. It is difficult to get costs due to the different soil conditions you may encounter.

Bulldozing is one of the cheapest methods, costing $87 per acre-foot (1969 figures) with favorable conditions. It must be dry enough to get equipment in so this is one limiting factor. Regulations require removal of spoil from a floodplain. With the addition of lime, readily available in La Crosse county, this soil could be sold as black dirt and some of the initial investment retrieved. Useful life has been shown to be an average of 25 years.

Dragline construction is used in an area which is too wet for other methods. Due to the high cost (an average of $435.33 per acre-foot in 1969), large areas must be done.

Pothole construction in this area could best be accomplished by a bulldozer working in the late summer, fall, or early winter. Spoil could then be picked up as soon as the ground was frozen hard enough to support heavy equipment.

2. Wood duck nesting boxes.

Wood duck (Aix sponsa) houses can be constructed with little or no cost to the D.N.R. by having area boy scouts build and maintain them as a requirement for receipt of the Hornaday Conservation Award (Figure 1). The department may supply materials but we prefer that the scouts handle everything.

Wood duck nesting boxes together with natural cavities will make this area highly attractive to cavity nesting birds and mammals. Suitable cover is already present in bottomland hardwoods along the La Crosse River, edges of the marsh, and the dike system. At present, areas 4-12 and the Carr St. marsh are suitable sites. Once potholes are established in the drier portions, all areas will be attractive to ducks.

Wild rice

At present, wild rice (Zizania aquatica) would be best suited for areas 6, 7, 9, 10 and the Carr St. marsh. These areas meet the requirement of 6-18 inches of water during the growing season. By the middle of June, depending on growing conditions, all the rice needs is wet soil as it's now strong enough to support itself. With the addition of potholes, all areas would be suitable for wild rice production.

Costs are quoted at $3.40 a pound when buying in bulk at Kester's Wild Game Food Nurseries in Omro, WI. Approximately 50 pounds per acre are needed for the initial seeding and it should be self sustaining after that, barring a drought or a fire such as occurred on 9 April 1977.

Wild rice is very easy to establish and once there; waterfowl (Anatidae), rails, and bobolinks (Dolichonyx oryzivorus) utilize it heavily.

4. Willow control

Willow (Salix spp.) control is desirable in areas 3-10 as it is encroaching on marshland and choking out more desirable plants. Along the La Crosse River it should be left as a food source for beaver (Castor canadensis). In areas far from the river, beaver probably will not utilize it.

Displacement of reed canary grass by willow reduces available spawning grounds for northern pike (Esox lucius). Northerns lay their eggs in these

grassy areas. Within 2-4 weeks the eggs hatch and the fry are eventually carried into the river by receding flood waters.

Canary grass is also utilized as 1/2 - 2% of a bobwhite quail's (Colinus virginianis virginianis) diet. Ducks have been found with crops full of the seeds according to Horicon DNR personnel.

The main value of willow control is to maintain the prairie and marsh habitat. Deciduous forests already abound in this state while wetlands and prairies become scarcer each year.

Mechanical methods of control include knocking down the brush and spraying the herbicide Ammate via bulldozer and boom sprayer. Application of Ammate could also be accomplished by hand sprayer or brushing it on the stumps. The brush must then be hauled from the flood plain as city ordinance prohibits burning.

Herb Wilson, District Operations Coordinator with the D.N.R. indicates costs range from $9.50-$250.00 per 14,000 square feet for a bulldozer to knock down the brush. This represents extremes of soft mud to frozen ground with no snow cover. Costs for brush collection and spraying were not available.

Another method is to use Y.A.C.C. people to brush by hand and apply the spray as they go. Some leaders don't allow their crews to apply spray. In this case a professional would have to be hired. Work could be done during the summer when water levels have receded.

No cost figures are available, but it would provide work and experience in wetlands management for young people. This benefit would have to be weighed against costs of hiring a bulldozer operator.

Ammate (ammonium sulfamate), the broad-leaved specific herbicide to be used, has been applied quite extensively around the state in trout habitat improvement, work at Horicon, and numerous other instances. The LD_{50} is 3,900 mg/kg for rats (Rattus spp.) and it is highly water soluble. It is highly corrosive to metals so a plastic, stainless steel, aluminum, or bronze sprayer are recommended. Upon contact with acid conditions like those present in the marsh, it hydrolizes rapidly and there is no evidence that it builds up in the food chain. One caution though is irritation caused to the respiratory passages when inhaled. It also must be applied before the plant goes dormant so the compound can be absorbed. It kills by precipitating the protein of the cell protoplasm (Prey, A. Forest Pathologist D.N.R. Personal consultation).

5. Water level control

Due to cost, water control would be limited to areas 8 and 9 where culverts can be blocked with stop logs to prevent flood water from draining away. This would also help solve the willow problem in these areas as deep water would remain much longer.

Other alternatives would be to install pumps or build a dam on the La Crosse River. A dam would flood the area permanently and structures could then be installed to control water levels as needed for drawdowns to plant duck food, reflooding for fall migrations, and many other things. I believe that costs would prohibit this though at least in the near future.

Interesting Observations

On 17 July 1979 in area 5 I spotted a killdeer (Charadrius vociferus vociferus) on the Burlington Northern railroad right of way. It acted as though it had a nest near by so I backed off and watched through the binoculars to try and spot the nest location.

As it came back to its nest, I noticed something white in its beak. I tried to find the nest again but was unsuccessful so I backed off and the killdeer repeated this performance. When I found the nest, there were 4 eggs on the verge of hatching and 25-30 white pebbles lining the nest. The nest was located in the dark rocks typically found in and around a railroad bed. Of all the killdeer nests I found on railroad rights of way, this was the only one with white pebbles in it.

Conclusion

I believe production of wildlife on these areas can be significantly increased by using most or all of my management proposals. Figures 2, 3 and 4 show the best land use is wildlife due to the soil. Logging isn't economical due to the small amount of forested area.

There are many other wetlands in islands and sloughs of the Mississippi and Black Rivers but time didn't permit me to survey them.

My special thanks to Fred Lesher for all his help.

Literature Cited

Klick, T. A., D. F. Gebken, and C. W. Theinen. 1971. Surface Water Resources of La Crosse County. Department of Natural Resources, Wisconsin. 59 pp.

Beatty, M. T. 1960. Soil Survey of La Crosse County, Wisconsin. United States Department of Agriculture. 93 pp.

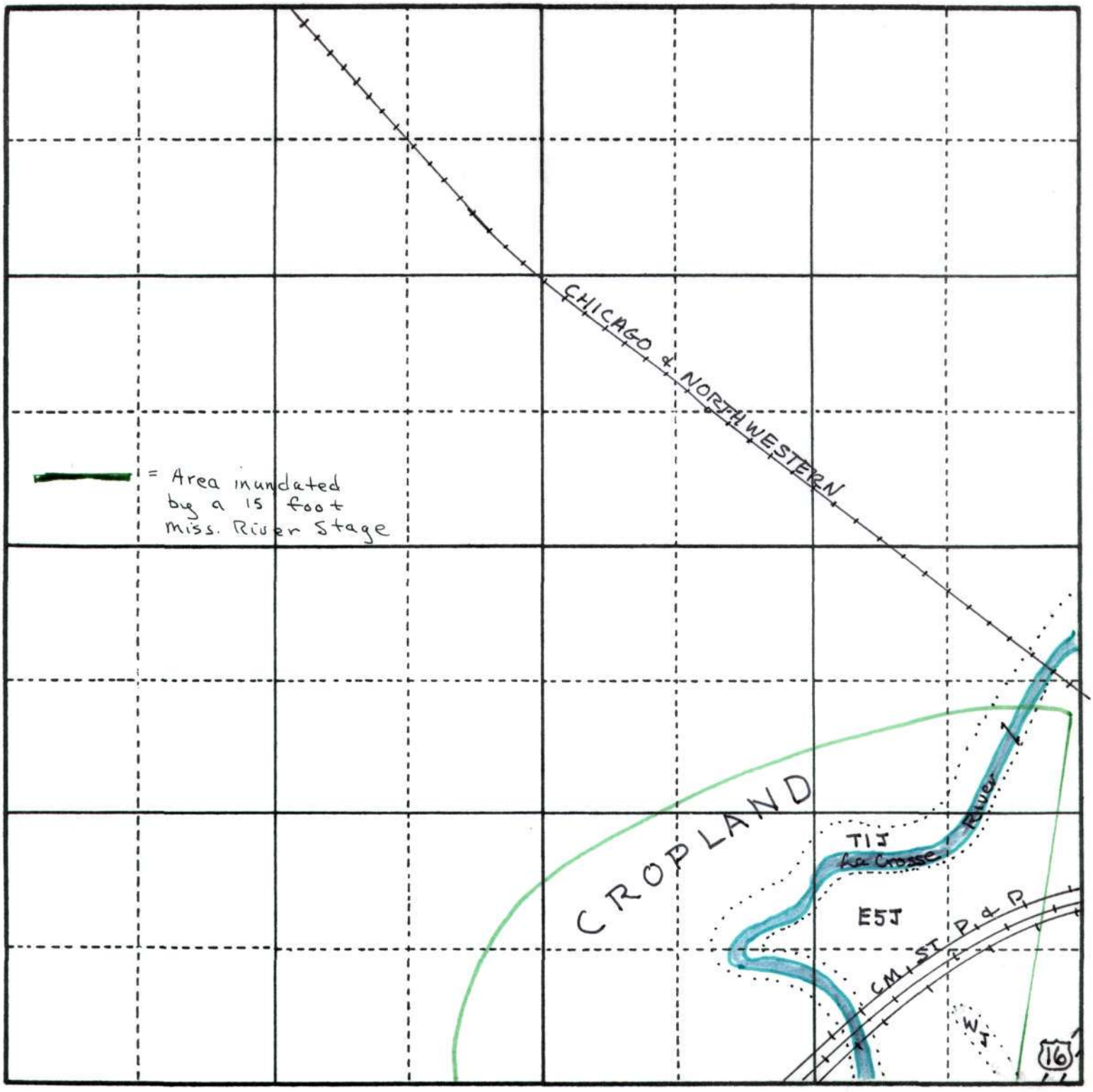
Martin, A. C., H. S. Zim, and A. L. Nelson. 1951. American wildlife and plants. Dover Publ., NY. 500 pp.

Linde, A. F. 1969. Techniques For Wetland Management. Department of Natural Resources, Madison, Wisconsin. 156 pp.

DEPARTMENT OF NATURAL RESOURCES

SECTION MAP
FORM 8600-16 REV. 4-77

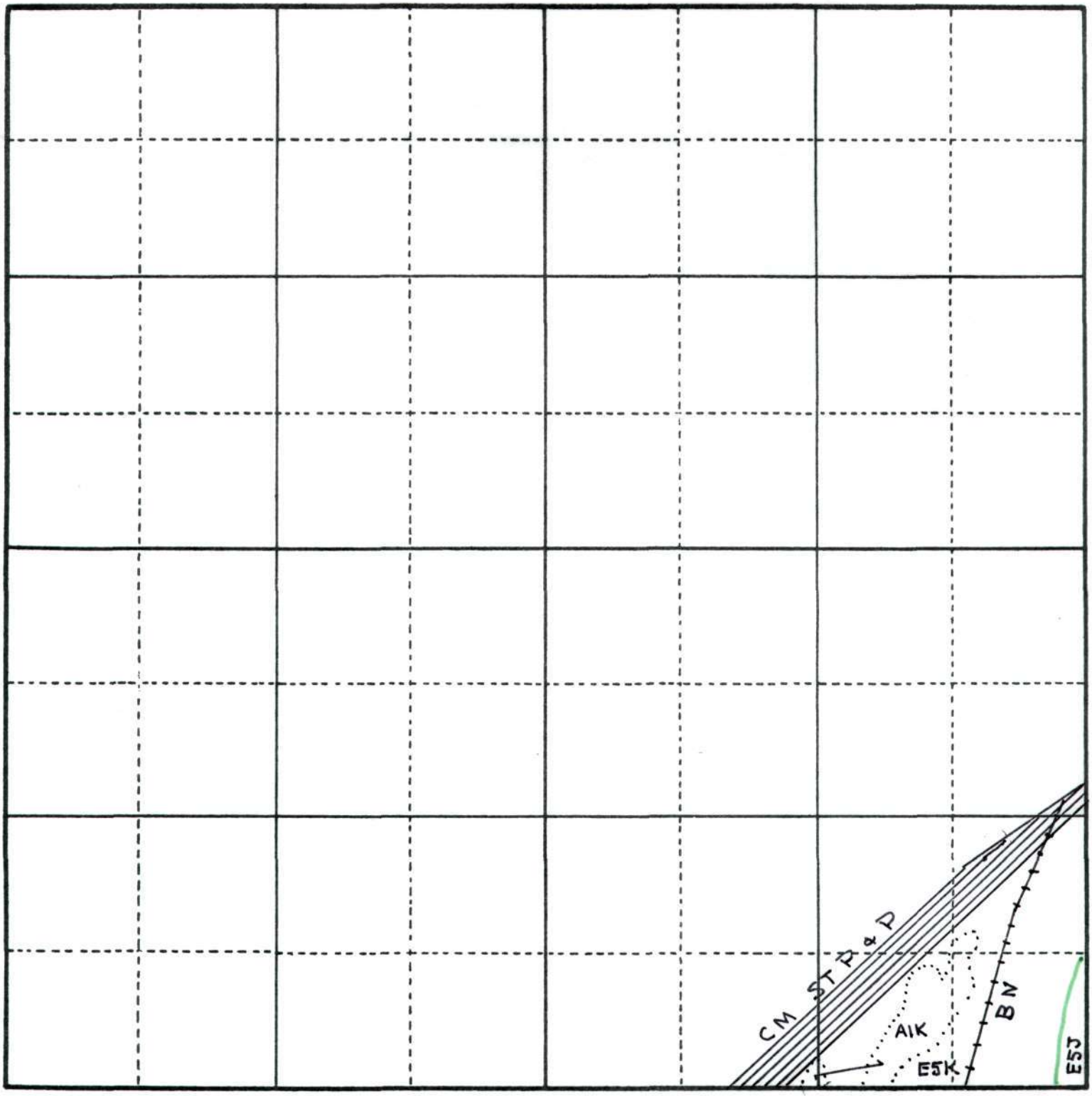
PROJECT			MAPPED BY	
LACROSSE AREA WETLAND SURVEY			Kurt Brownell	
COUNTY	LANDOWNER			
LACROSSE	See Attachment 1			
TOWN	ADDRESS			
SECTION	TOWNSHIP	RANGE	SCALE	ACREAGE
16	16 N	7 W	1 mile : 20.1 cm	acres



DEPARTMENT OF NATURAL RESOURCES

SECTION MAP
FORM 8600-16 REV. 4-77

PROJECT			MAPPED BY	
LACROSSE AREA WETLAND SURVEY			Kurt Brownell	
COUNTY	LANDOWNER			
LACROSSE	Elmer Swanson and others			
TOWN	ADDRESS			
SECTION	TOWNSHIP	RANGE	SCALE	ACREAGE
20	16N	7W	1 mile : 20.1 cm	acres



DEPARTMENT OF NATURAL RESOURCES

SECTION MAP
FORM 8600-16 REV. 4-77

PROJECT			MAPPED BY	
LACROSSE AREA WETLAND SURVEY			Kurt Brownell	
COUNTY	LANDOWNER			
LACROSSE	See Attachment 1			
TOWN	ADDRESS			
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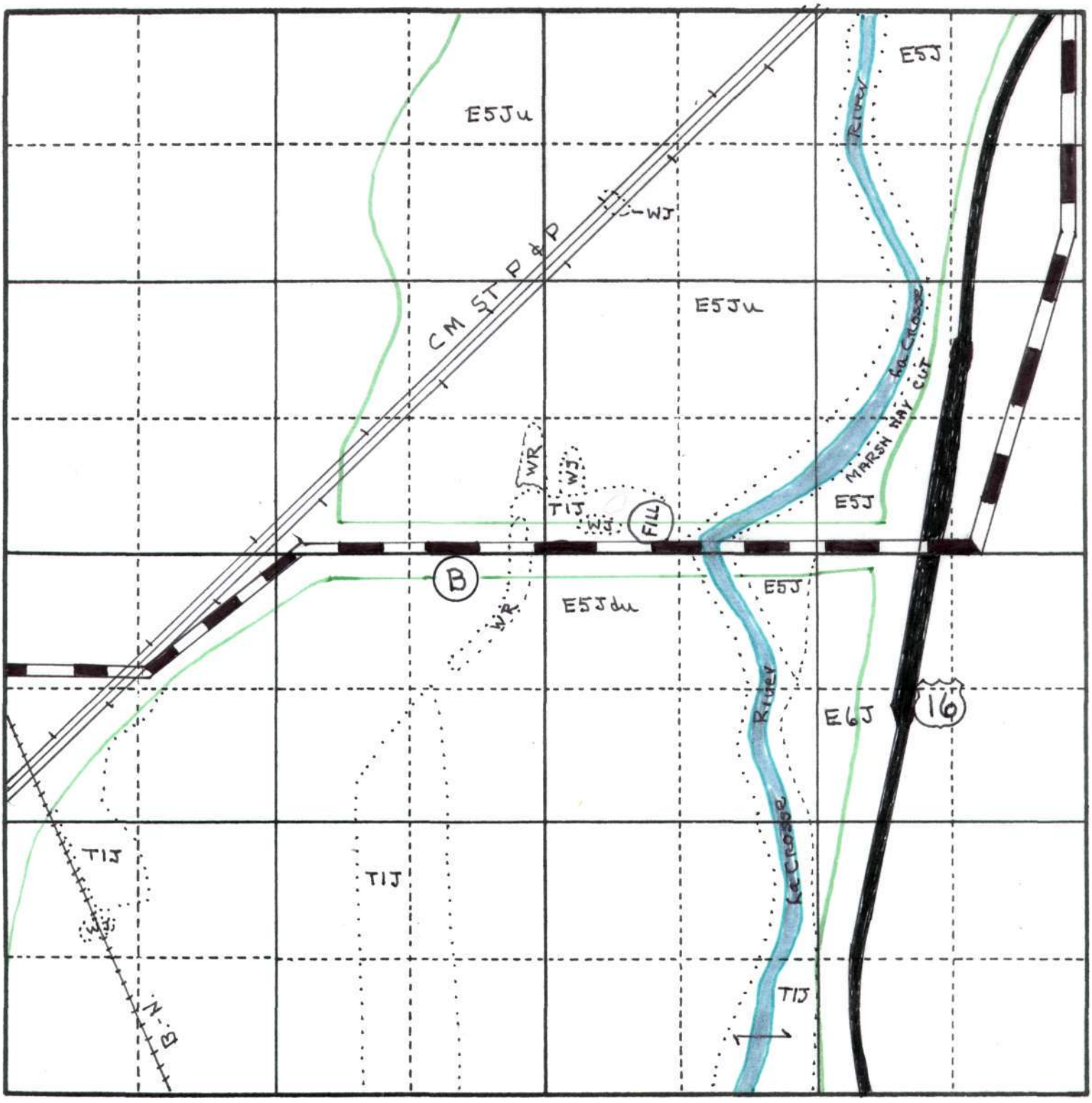
21	16N	7W	1 mile : 20.1 cm	acres



DEPARTMENT OF NATURAL RESOURCES

SECTION MAP
FORM 8600-16 REV. 4-77

PROJECT		MAPPED BY	
LACROSSE AREA WETLAND SURVEY		Kurt Brownell	
COUNTY	LANDOWNER	See Attachment 1	
LACROSSE			
TOWN	ADDRESS		
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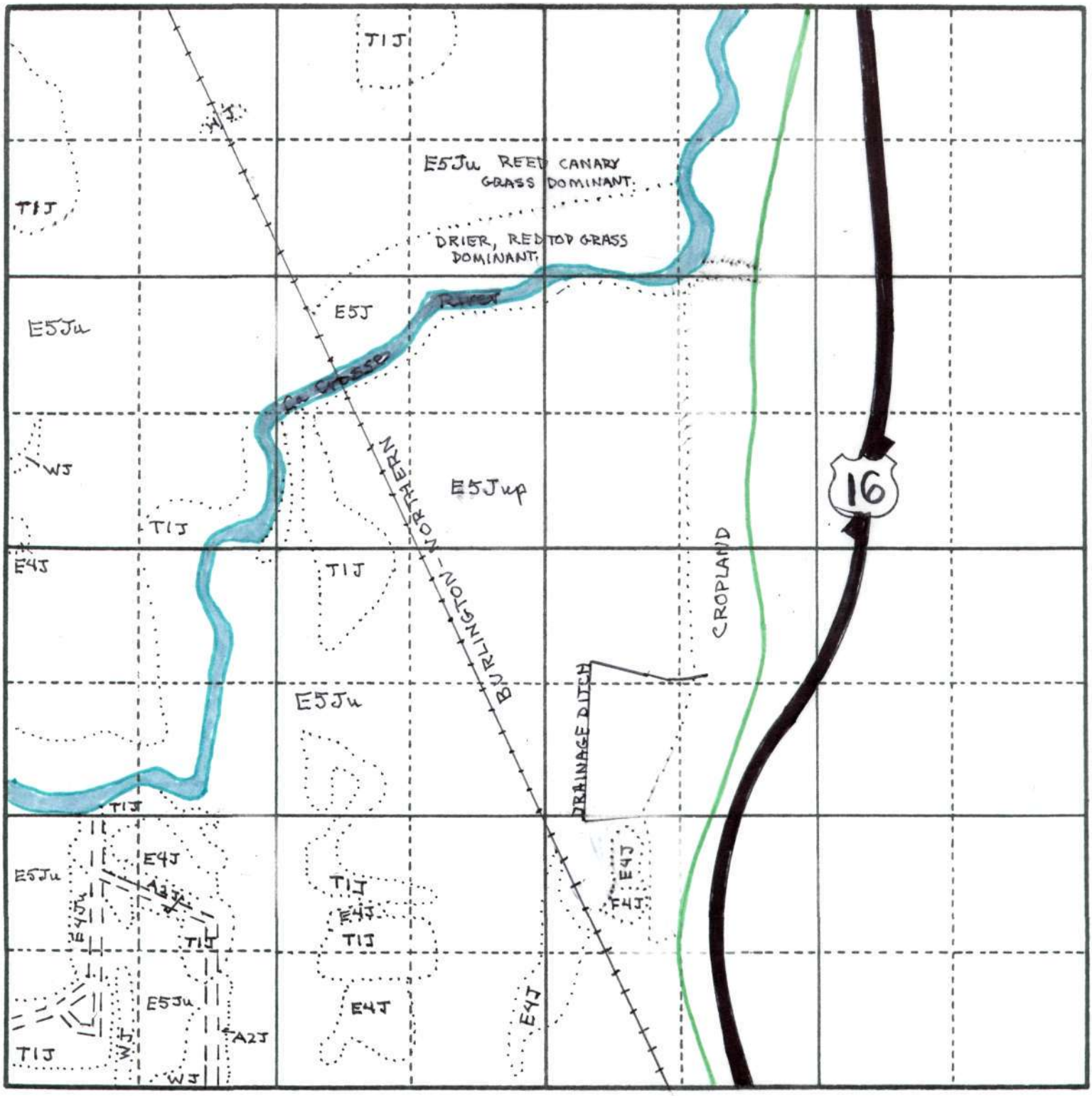
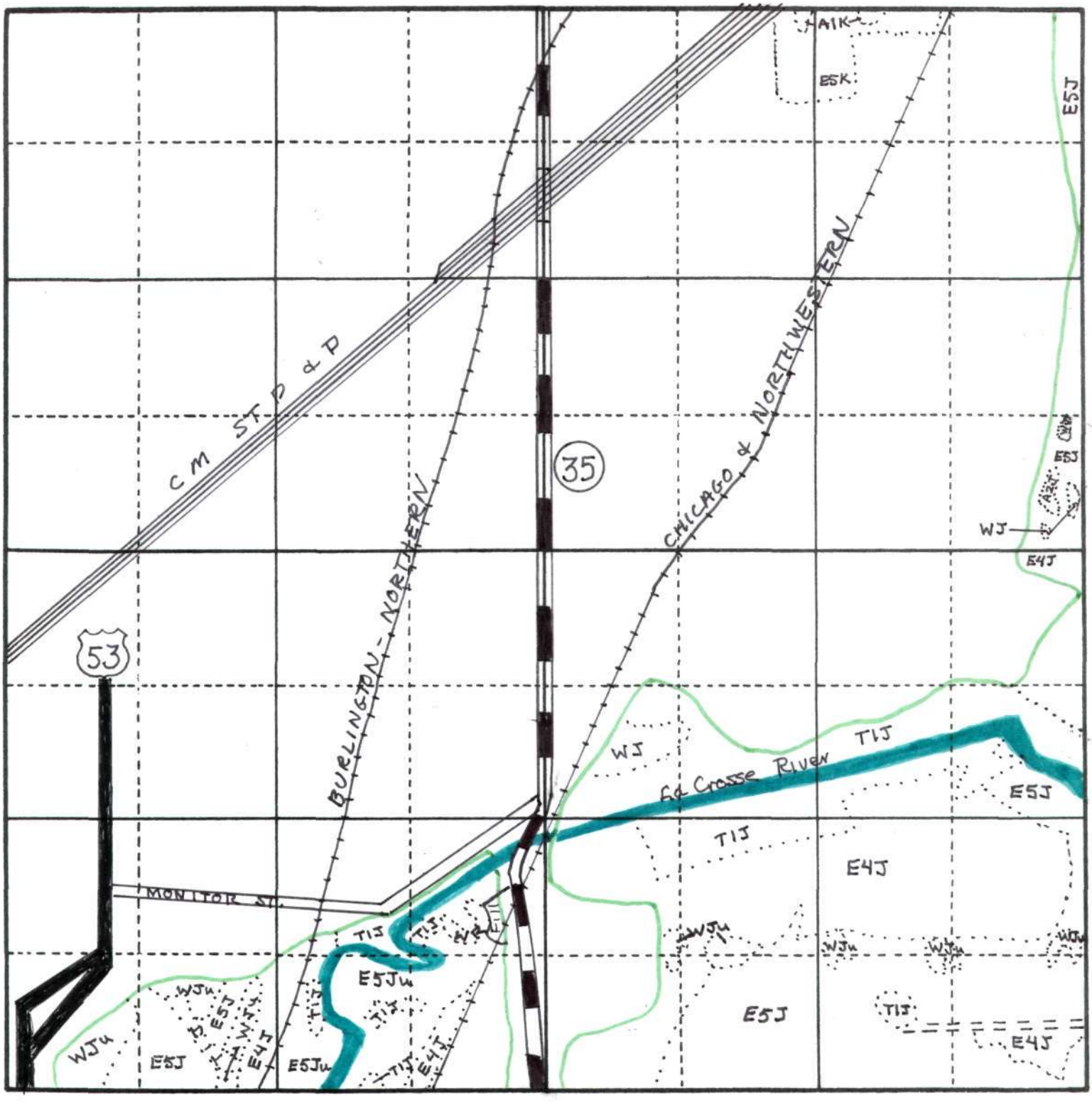


DEPARTMENT OF NATURAL RESOURCES

SECTION MAP
FORM 8600-16 REV. 4-77

PROJECT			MAPPED BY	
LACROSSE AREA WETLAND SURVEY			Kurt Brownell	
COUNTY		LANDOWNER		
LACROSSE		See Attachment 1		
TOWN		ADDRESS		
SECTION	TOWNSHIP	RANGE	SCALE	ACREAGE
29	16N	7W	1 mile : 20.1 cm	acres

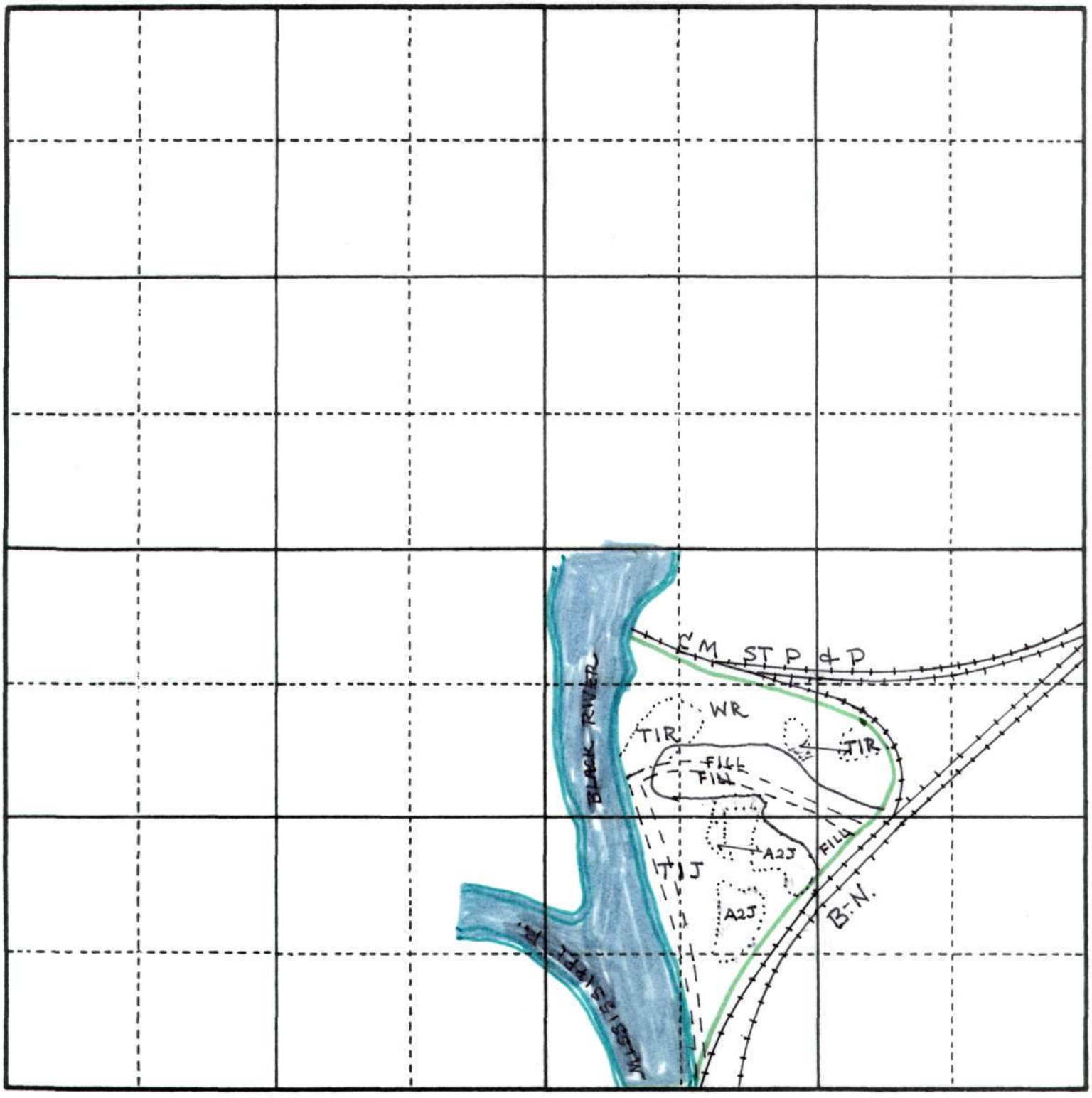


DEPARTMENT OF NATURAL RESOURCES

SECTION MAP
FORM 8600-16 REV. 4-77

PROJECT	MAPPED BY
LACROSSE AREA WETLAND SURVEY	Kurt Brownell
COUNTY	**LANDOWNER**
LACROSSE	Harry Locketz
TOWN	**ADDRESS**

SECTION	TOWNSHIP	RANGE	SCALE	ACREAGE
30	16 N	7 W	1 mile : 20.1 cm.	acres

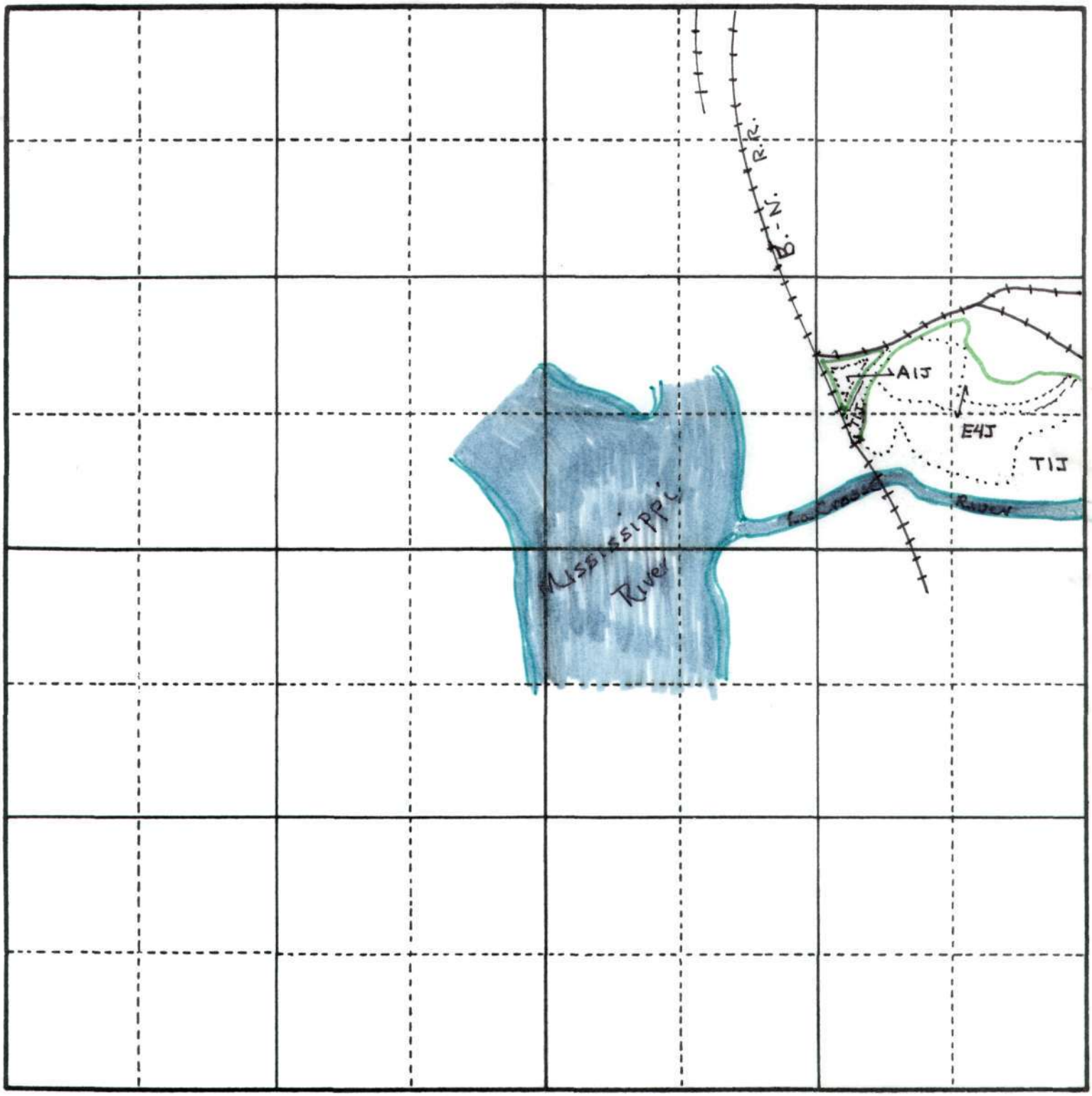


DEPARTMENT OF NATURAL RESOURCES

SECTION MAP
FORM 8600-16 REV. 4-77

PROJECT		MAPPED BY	
LACROSSE AREA WETLANDS SURVEY		Kurt Brownell	
COUNTY	LANDOWNER	City of LaCrosse	
LACROSSE			
TOWN	ADDRESS		

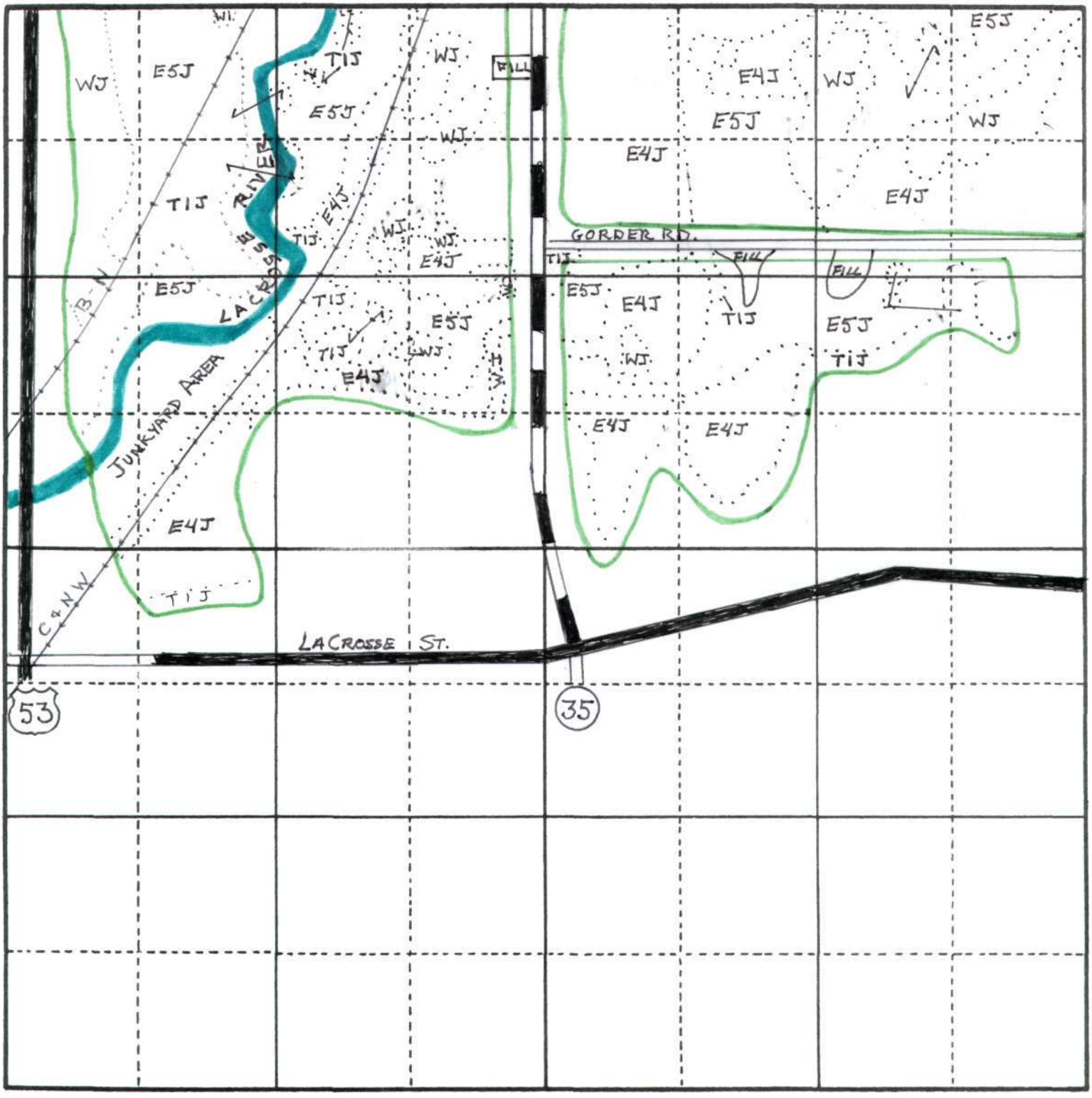
SECTION	TOWNSHIP	RANGE	SCALE	ACREAGE
31	16N	7W	1 mile : 20.1 cm.	acres



DEPARTMENT OF NATURAL RESOURCES

SECTION MAP
FORM 8600-16 REV. 4-77

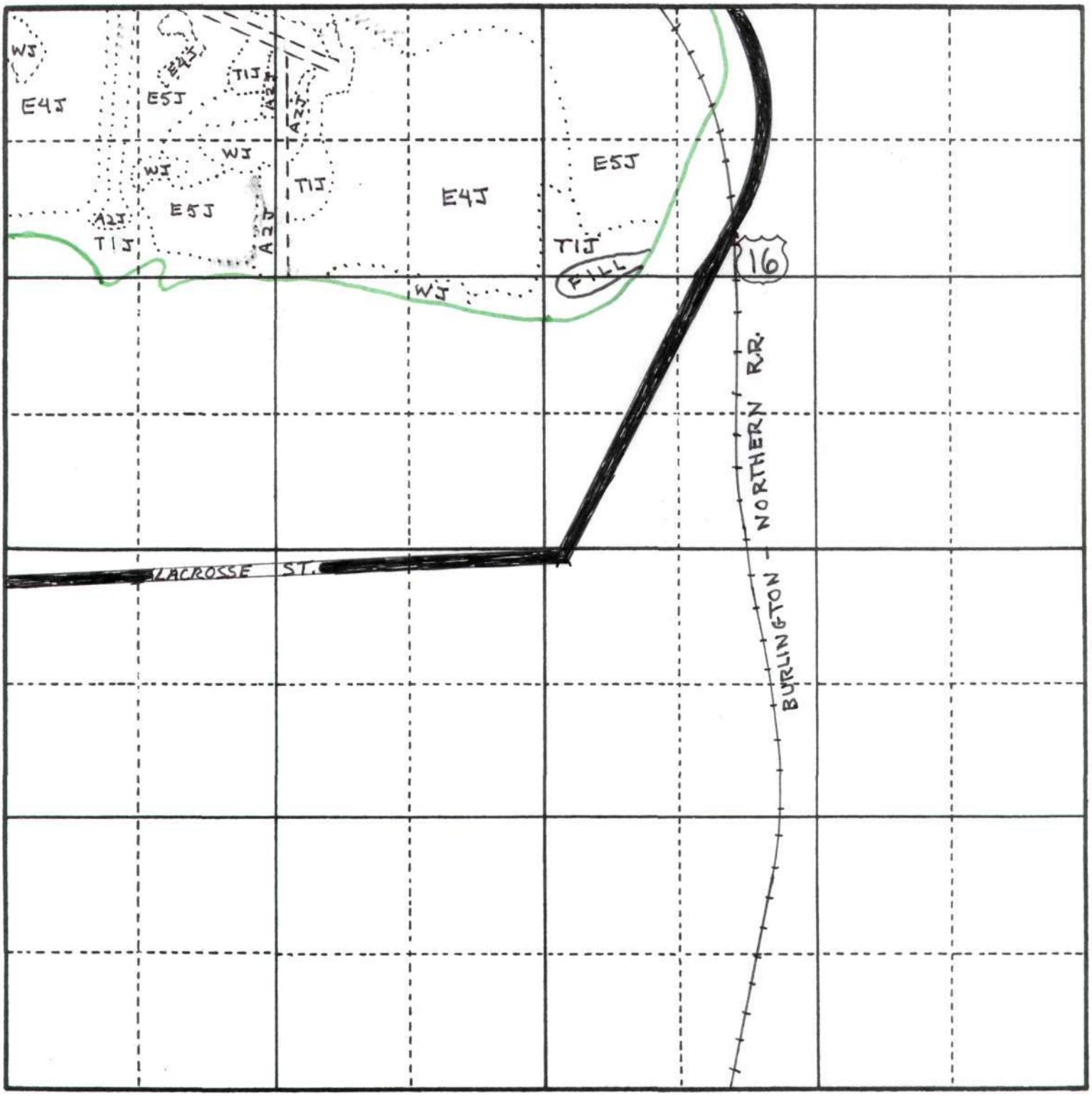
PROJECT		MAPPED BY	
LACROSSE AREA WETLAND SURVEY		Kurt Brownell	
COUNTY		LANDOWNER	
LACROSSE		See Attachment 1	
TOWN		ADDRESS	
SECTION	TOWNSHIP	RANGE	SCALE	ACREAGE
32	16N	7W	1 mile : 20.1 cm.	acres



DEPARTMENT OF NATURAL RESOURCES

SECTION MAP
FORM 8600-16 REV. 4-77

PROJECT			MAPPED BY	
LACROSSE AREA WETLAND SURVEY			Kurt Brownell	
COUNTY	LANDOWNER			
LACROSSE	See Attachment 1			
TOWN	ADDRESS			
SECTION	TOWNSHIP	RANGE	SCALE	ACREAGE
33	16 N	7 W	1 mile : 20.1 cm.	acres



Attachment 1

PAUL [illegible]
[illegible] FINKAL

OWNERSHIP OF MYRICK MARSH

A. Otto Lieder
B. Max's
C. City of LaCrosse
D. Murphy Gerrard
E. Hoeschler
F. Bill Northern
G. University of Wisconsin LaCrosse
H. Sam Katz
I. Northern States Power
J. City of LaCrosse
K. C. B. & Q Railroad
L. Shiftar
M. Herman Keppel
N. Slaback
O. Harry Keppel
P. L. M. Beck
Q. Hazel Gegenfurtner
R. Nilson Corporation

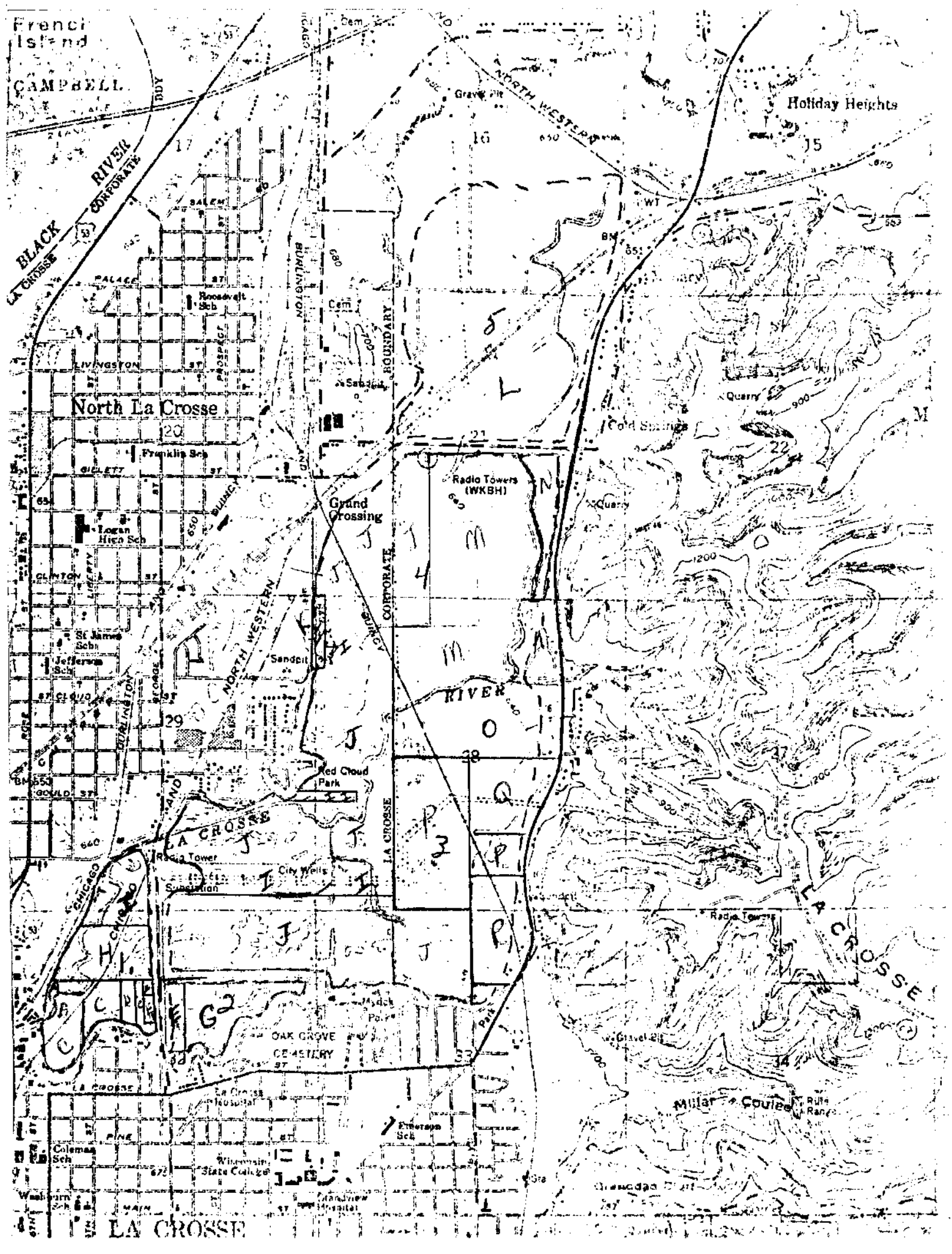

French Island
CAMPBELL
BLACK RIVER
LA CROSSE
CORPORATE
BOUNDARY
Holiday Heights
North La Crosse
Grand Crossing
Radio Towers (WKBH)
Quarry
Cold Storage
Sandpit
Red Cloud Park
Radio Tower
City Wells Substation
OAK GROVE CEMETERY
Miller Coulee
Gravel Pit
Roosevelt Sch
Franklin Sch
Logan High Sch
St James Sch
Jefferson Sch
Coleman Sch
Emerson Sch
Washburn Sch
La Crosse Hospital
Wisconsin State College
Grandview Hospital
CHICAGO
BURLINGTON
NORTH WESTERN
LA CROSSE
RIVER
LA CROSSE

Figure 1

BOY SCOUTS OF AMERICA

APPLICATION FOR A

William T. Hornaday Award

FOR DISTINGUISHED SERVICE IN

CONSERVATION

GIVEN IN COOPERATION WITH

THE NATURAL SCIENCE FOR YOUTH FOUNDATION

Name_____ Age_____ No._____ Date_____
Indicate pack, troop, or post.

Address_____ City_____ State_____

Council_____ District_____

City_____ State, ZIP_____ Expiration date of unit_____

COUNCIL COMMITTEE APPROVAL

The above-named Cub Scout, Scout, Explorer or unit has our approval for the Hornaday award.

_____
Chairman's signature Date

CONSERVATION ADVISER APPROVAL

The above-named Cub Scout, Scout, Explorer, or unit has my approval for the Hornaday award.

_____
Adviser's signature Date

LOCAL COUNCIL ACTION AND APPROVAL*

Award Approved

Unit Hornaday Award _____
Date

Hornaday Badge _____
Date

_____
Scout Executive

*Unit certificates and badges will be mailed to councils upon receipt of this page, with all approvals, by the Conservation Service, Boy Scouts of America, North Brunswick, N.J. 08902.

NOTE: THIS PAGE MUST BE FILLED OUT OR THE APPLICATION CANNOT BE CONSIDERED.

WHAT I DID

List here everything you did that has resulted in better conservation practices in your community. If you have earned the Environmental Science, Forestry, Soil and Water Conservation, or Fish and Wildlife Management merit badges, list here the dates the awards were made. But do not list here projects carried out in earning the merit badges.

ATTACHED MATERIALS

List here the endorsements, letters of recommendation, news articles, etc., which show what you have done.

This conservation-awards program was initiated in 1914 by Dr. William Temple Hornaday, then director of the New York Zoological Park, in an effort to inspire the Boy Scouts of America to work constructively for conservation. It was funded for 20 years through his Permanent Wildlife Protection Fund. Upon his death, the award was sponsored for 35 years by the New York Zoological Society and named in his honor, the William T. Hornaday Award for Distinguished Service to Conservation, thus appropriately paying tribute to the nation's outstanding pioneer wildlife conservationist. In 1974 the Natural Science for Youth Foundation took over sponsorship of this program.

Since its inception in 1914, this award has been highly prized by those fortunate enough to receive it in recognition of exceptional and unusual service to a very important area of Scouting. For many years it has inspired large numbers of Scouts and their leaders to work constructively for conservation.

The Hornaday award may be given in one of five forms:

1. Unit Certificate to a pack, patrol, troop, post, or a group of five or more Scouts or Explorers for unique conservation or environmental quality project.

2. Badge to a Scout or Explorer for outstanding service to conservation or environmental quality within a council.

3. Bronze Medal to a Scout or Explorer for exceptional service to conservation or environmental quality, within a council.

4. Silver Medal to a Scout or Explorer for unusual and distinguished service to conservation or environmental quality on a state or regional basis. Not more than six Silver Medals will be awarded each year.

5. A Gold Medallion to an adult Scouter or Explorer leader for unusual and distinguished service to conservation or environmental quality on a state, BSA region, or national basis. Emphasis will be, whenever possible, based on national impact.

The Unit Certificate and the **Badge** are awarded by the local council. Application is made through the local council.

The **Bronze Medal** is awarded by the national office of the BSA upon the recommendation of the council and the Awards Committee of the Natural Science for Youth Foundation following a review of recommendations and application submitted by a council. This award can only be considered when a qualified Scout or Explorer is nominated by his or her council, and no Scout or Explorer may personally apply. Final selection is made by the Natural Science for Youth Foundation and presentation is made by the council.

The Silver Medal is handled in the same way as the Bronze in regard to recommendation and application. The award is the highest possible attainment for a Scout or Explorer in conservation.

The **Gold Medallion** may be considered when a qualified Scouter is recommended by his or her council, an established conservation organization, or by any responsible recognized conservationist. This nomination is to be made by the Awards Committee of the Natural Science for Youth Foundation. Upon selection, the nomination must be approved by the national BSA Conservation Committee. The Gold Medallion is the highest possible attainment for a Scouter in conservation. Presentation of the award is limited to one a year.

How Applications Are Judged

The land across America and conservation problems and practices vary widely from state to state and within some states. Thus, what might be considered distinguished or unusual service to one area might not be considered outstanding elsewhere. Consequently, applicants for any of the Hornaday awards must work under the guidance of a local conservation professional or agency or with the help of a qualified layman in conservation. The council should provide guidance as to the qualifications of all proposed conservation advisers. The conservation adviser must approve the application, indicating that he has guided and monitored the applicant in outlining his program of activity to ensure that it meets a local or regional need. The project should be aimed at helping arouse public recognition of the need for adequate protection and management of air, soil, water, mineral, forest, grassland, wildlife, and energy resources with full consideration for environmental conservation.

Applications will be judged by a council committee composed of professional people who know the needs, problems, and practices of conservation within the local council area. They will base judgments on the opportunities present for outstanding work in conservation in relation to the work actually accomplished by the applicant. They will also base judgment on two principal factors.

1. The extent to which the applicant has actually contributed to the improvement or better management of natural resources or the environment.

2. The extent to which the applicant has encouraged other people to plan, understand, and practice sound conservation methods.

It is important, too, that applicants demonstrate activity in several fields of conservation, where possible—such as soil, air, and water; forests or grasslands; wildlife; energy; and environmental quality.

Nominations for the Bronze and Silver Medals will be further evaluated by the national Hornaday Awards Committee as to:

1. Bronze - exceptional service to conservation or environmental quality within a council.

2. Silver - unusual and distinguished service to conservation or environmental quality on a state or BSA regional level.

The Gold Medallion will be evaluated for unusual and distinguished service in conservation and quality of the environment on a state or regionwide, but preferably on a national basis, as contrasted to a single council area.

REQUIREMENTS

A Scout or Explorer should plan his or her activities quite early in his or her career as the successful attainment of all awards will take at least 18 months to accomplish. The following actions are considered essential:

1. Earn Environment and Conservation skill awards (Scouts only).
2. Earn Environmental Science merit badge and one more merit badge of the primary conservation and quality of the environment merit badge group (i.e., Forestry, Soil and Water Conservation, Fish and Wildlife Management, for the badges). Environmental Science and two other merit badges from this group are required for the Bronze Medal. All badges in this group are required for the Silver Medal.*
3. Earn at least three of the nature and conservation group: Bird Study, Botany, Geology, Insect Life, Reptile Study, Oceanography, Mammals, Nature, and Weather.
4. Identify, plan, and carry out, under the guidance of the conservation adviser, a local project in four of the following project areas: Energy Conservation; Soil and Water Conservation; Fish and Wildlife Management; Forestry and Range Management; Air and Water Pollution Control; Resource Recovery. The four projects must include Energy Conservation and Water or Air Pollution Control.

Note: Projects accomplished for the Hornaday awards may not be the same as accomplished for earned merit badges.

5. Carry out projects to influence other people to understand and undertake conservation work and/or objectives. These might include the following: Letters to editors; news stories published; exhibits and displays; leadership in the accomplishment of troop or post projects; talks at public meetings; service project with a state fish and game department or local conservation and public interest groups.
6. Submit a resume covering: a summary of the local or regional project in the conservation and quality-of-the-environment fields together with a summary of the efforts to influence other people to practice conservation.
7. The complete program of the applicant, as planned and carried out, will be reviewed and approved by the council for the award of the Certificate and/or Badge and, further, if deemed qualified, will be recommended to the William T. Hornaday Awards Committee for consideration for the Silver and Bronze Medal.

*If local circumstances make it impossible to complete any one of these merit badges, the council may grant a waiver. An explanation of this waiver should be included with other materials submitted.

How To Submit Applications

Applications for Unit Certificate and Bronze Badge must be submitted on Form 21-107 to the council, which will decide whether such application is worthy of consideration for these Hornaday awards. Qualified applicants will be interviewed by a council committee.* The committee determines whether the applicant qualified for the Hornaday Badge (in cases of groups, for the Certificate). Each council has the authority to grant the Certificate and the Badge.**

If a council committee determines that the application merits consideration for the Hornaday medals, the application and all supporting materials will be forwarded to the national office, Boy Scouts of America, where it will be judged by the national Hornaday Awards committee.

In judging the application, the appearance and organization of materials that accompany the application are very important. Many times applicants appear to be qualified for the award, but in presenting their applications they fail to send along adequate supporting information to show what they have done or they fail to present the material in an easy-to-understand fashion.

Applicants should remember that many times their application form, with supporting evidence of work accomplished, is the only basis that the judges have for making awards or refusing them. Thus, the applications should be filled out as neatly as possible, and the list of activities should be as complete and descriptive as possible. The accompanying exhibits of letters, snapshots, project descriptions, drawings, planning papers, news clippings, talks given, etc., should be well-organized, neatly mounted in a notebook or scrapbook, and labeled.

* For reasons of distance or geography, an ad hoc committee in the applicant's community may be designated for the interview.

** Councils may obtain certificates and badges as they are earned by writing to the Conservation Service at the national office.

Figure 2

Soil Series Alluvial land, wet LRA ALL Date March 1970

Map Symbols _____ Name _____

SOIL INTERPRETATIONS

BRIEF SOIL DESCRIPTION Deep, somewhat poorly to poorly drained, loamy soils formed in stream sediments. These are nearly level, moderately permeable soils with high available water capacity. Subject to frequent flooding.

INTERPRETATIONS FOR CROPLAND, PASTURE, AND WOODLAND AND OTHER LAND USES

Cropland - general and specialty farm crops	VERY SEVERE - high water table; frequent flooding.
Pasture	SEVERE - sod easily damaged when wet; subject to high water table; subject to frequent flooding.
Woodland	Production potential LOW to HIGH; LOW for conifers.
Other	

Land capability unit and yield predictions (crops, hay, pasture)

Slope Class	Eros.	Capability Unit	Corn-Grain (bu.) A	Corn-Grain (bu.) B	Corn-Silage (tons) A	Corn-Silage (tons) B	Oats (bu) A	Oats (bu) B	Alfalfa-Brome Hay (tons) A	Alfalfa-Brome Hay (tons) B	Bluegrass Pasture (AUD) A	Bluegrass Pasture (AUD) B
0-2%		Vw-14	-	-	-	-	-	-	-	-	50	110

LIMITATIONS FOR WILDLIFE HABITAT ELEMENTS

Grain and Seed Crops		SEVERE - high water table; frequent flooding.
Grass and Legumes		SEVERE - high water table; frequent flooding.
Wild Herbaceous Upland Plants		SEVERE - high water table; frequent flooding.
Woody Plants	Hardwood	MODERATE - high water table; frequent flooding.
	Conifers	SEVERE - high water table; frequent flooding.
Wetland Food and Cover Plants		SLIGHT - frequent flooding.
Shallow and Deep Water Developments		SLIGHT - moderate permeability.

LIMITATIONS AND SOIL FEATURES AFFECTING RECREATION

Tent and Camp Trailer Sites	VERY SEVERE - site remains wet and soft for long periods; poor trafficability when wet; frequent flooding.
Picnic Areas, Parks, & Extensive Play Areas	SEVERE - site remains wet and soft for long periods; poor trafficability; frequent flooding.
Playground, Athletic Field, and Intensive Play Areas	SEVERE - frequent flooding; poor trafficability and sod easily damaged when wet.
Bridle Paths, Nature and Hiking Trails	SEVERE - poor trafficability; frequent flooding; wet for long periods.
Golf Course Fairways	SEVERE - poor trafficability; site remains wet and soft for long periods; turf easily damaged when wet; frequent flooding.

Alluvial land, wet

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

Depth Inches	Classification			Percent of Material Passing Sieve			Permeability in/hr	Available water capacity in/in	Soil reaction pH	Shrink-swell potential
	USDA	Unified	AASHO	No. 4 5.0 mm.	No. 10 2.0 mm.	No. 200 0.074 mm.				
Surface layer										
			---V A R I A B L E---							
Subsoil										
Underlying material										

INTERPRETATIONS OF ENGINEERING PROPERTIES — Hydrologic Group B

Suitability as a source of:	
Topsoil	Fair - high water table; frequent flooding.
Sand and gravel	Unsuitable - loamy.
Road subgrade and highway fills	Poor - low bearing value and unstable when wet; not accessible when wet.
Limitations and Soil Features Affecting:	
Highway Location	SEVERE - high water table; hauling and excavating difficult; frequent flooding.
Foundations for low buildings	VERY SEVERE - frequent flooding; high water table; low stability.
Corrosion hazard — Metal	MODERATE
Corrosion hazard — Concrete	LOW
Pond reservoir areas	Moderate permeability; high water table; frequent flooding.
Dams, dikes and embankments	Subsoil and substratum have fair stability and compaction characteristics.
Waterways	Difficult to vegetate and construct; frequent flooding.
Drainage	Subsurface or surface drainage feasible; frequent flooding; moderately permeable.
Terraces and diversions	Not applicable.
Irrigation	High available water capacity; deep soil; moderate water intake rate; frequent flooding.

LIMITATIONS FOR SOME URBAN USES

Sanitary land fill	VERY SEVERE - high water table; frequent flooding.
Disposal fields	VERY SEVERE - high water table; frequent flooding.
Sewage lagoons	VERY SEVERE - moderate permeability; frequent flooding.

The soil is evaluated only to a depth of 5 feet or less. Soils are rated on the basis of 4 soil suitability and limitation classes. In the following definitions the suitability rating is listed first and limitation rating listed second:
Good, Slight - The soils have no limitations or limitations for a given use that are easy to overcome; Fair, Moderate - The soils have limitations for a given use that can be overcome by average management and manipulation; Poor, Severe - The soils have limitations for a given use that are difficult to overcome; Unsuitable, Very Severe - The soils have limitations that generally preclude their use for a given purpose.

USDA-SCS-LINCOLN, NEBR. 1969
5,N-27111

Figure 3

Soil Series Alluvial land LRA ALL Date March 1970

Map Symbols _____ Name _____

SOIL INTERPRETATIONS

BRIEF SOIL DESCRIPTION Deep, moderately well to somewhat poorly drained soils formed in stream sediments. These are nearly level, moderately permeable areas with high available water capacity. Subject to occasional flooding.

INTERPRETATIONS FOR CROPLAND, PASTURE, AND WOODLAND AND OTHER LAND USES

Cropland - general and specialty farm crops	MODERATE - subject to occasional flooding.
Pasture	MODERATE - subject to occasional flooding.
Woodland	Production potential is MEDIUM.
Other	

Land capability unit and yield predictions (crops, hay, pasture)

Slope Class	Eros.	Capability Unit	Corn-Grain (bu.) A	Corn-Grain (bu.) B	Corn-Silage (tons) A	Corn-Silage (tons) B	Oats (bu) A	Oats (bu) B	Alfalfa-Brome Hay (tons) A	Alfalfa-Brome Hay (tons) B	Bluegrass Pasture (tons) A	Bluegrass Pasture (tons) B
1-3%		IIw-12	40	60	9	12	40	60	2.5	3.5	60	100

LIMITATIONS FOR WILDLIFE HABITAT ELEMENTS

Grain and Seed Crops		SLIGHT - subject to occasional flooding.
Grass and Legumes		SLIGHT - subject to occasional flooding.
Wild Herbaceous Upland Plants		SLIGHT - subject to occasional flooding.
Woody Plants	Hardwood	MODERATE - subject to occasional flooding.
	Conifers	SEVERE - subject to occasional flooding; few species suited.
Wetland Food and Cover Plants		SEVERE - few species suited.
Shallow and Deep Water Developments		SEVERE - moderate permeability; subject to occasional flooding.

LIMITATIONS AND SOIL FEATURES AFFECTING RECREATION

Tent and Camp Trailer Sites	SEVERE - occasional flooding; slippery when wet.
Picnic Areas, Parks, & Extensive Play Areas	MODERATE - occasional flooding.
Playground, Athletic Field, and Intensive Play Areas	SEVERE - occasional flooding; slippery when wet.
Bridle Paths, Nature and Hiking Trails	MODERATE - occasional flooding; muddy and slippery when wet.
Golf Course Fairways	MODERATE - occasional flooding; muddy and slipper when wet.

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

Depth Inches	Classification			Percent of Material Passing Sieve			Permeability in/hr	Available water capacity in/in	Soil reaction pH	Shrink-swell potential
	USDA	Unified	AASHO	No. 4 5.0 mm.	No. 10 2.0 mm	No. 200 0.074 mm.				
Surface layer										
Subsoil		---	V A R I A B L E		---					
Underlying material										

INTERPRETATIONS OF ENGINEERING PROPERTIES — Hydrologic Group B

Suitability as a source of:	
Topsoil	Fair
Sand and gravel	Unsuitable - loamy
Road subgrade and highway fills	Poor - subject to occasional flooding; frost hazard.
Limitations and Soil Features Affecting:	
Highway Location	SEVERE - subject to occasional flooding; high frost heave potential.
Foundations for low buildings	MODERATE - moderate compressibility and bearing value. SEVERE for basements; occasional flooding.
Corrosion hazard — Metal	MODERATE
Corrosion hazard — Concrete	LOW
Pond reservoir areas	Moderate permeability; subject to flooding; substratum varies.
Dams, dikes and embankments	Moderate permeability; substratum varies; piping hazard.
Waterways	Subject to flooding; some species not suited.
Drainage	Subject to flooding; dikes and surface drains feasible.
Terraces and diversions	Generally not applicable.
Irrigation	Deep soil; moderate water intake rate; subject to flooding; high available water capacity.

LIMITATIONS FOR SOME URBAN USES

Sanitary land fill	SEVERE - subject to flooding.
Disposal fields	SEVERE - subject to flooding.
Sewage lagoons	SEVERE - subject to flooding; moderate permeability.

The soil is evaluated only to a depth of 5 feet or less. Soils are rated on the basis of 4 soil suitability and limitation classes. In the following definitions the suitability rating is listed first and limitation rating listed second:
Good, Slight - The soils have no limitations or limitations for a given use that are easy to overcome; Fair, Moderate - The soils have limitations for a given use that can be overcome by average management and manipulation; Poor, Severe - The soils have limitations for a given use that are difficult to overcome; Unsuitable, Very Severe - The soils have limitations that generally preclude their use for a given purpose.

USDA-SCS-LINCOLN, NEBR. 1969

S,N-27111

Figure 4

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL SURVEY INTERPRETATIONS

SERIES Marsh
STATE Wisconsin
MLRA All

Most of the year this miscellaneous land type is inundated by water in sloughs and along margins of lakes, streams and flowages.

ESTIMATED SOIL PROPERTIES SIGNIFICANT TO ENGINEERING

Major Soil Horizons (inches)	Classification			Coarse Fract. >3 in. %	Percentage less than 3 inches Passing Sieve No.--				LL	PI	Permeability in./hr.	Avail. Water Capac. in./in.	Soil Reaction pH	Shrink Swell Potential
	USDA Texture	Unified	AASHO		4	10	40	200						
0-60					-- VARIABLE --									

Flooding: Flooded most of the year
Hydrologic group: D
Depth to water table: Water above the land surface
Depth to bedrock: More than 6 feet
Corrosivity - uncoated steel: Moderate
Corrosivity - concrete: Moderate

SUITABILITY OF SOIL AS SOURCE OF SELECTED MATERIAL AND FEATURES AFFECTING USE

Roadfill	Very poor - under water most of the year.
Sand	Very poor - under water most of the year.
Gravel	Very poor - under water most of the year.
Topsoil	Very poor - under water most of the year.

DEGREE AND KIND OF SOIL LIMITATION FOR SELECTED USES

Septic Tank Filter Fields	Very severe
Sewage Lagoons	Very severe
Shallow Excavations	Very severe
Dwellings:	
With Basements	Very severe
Without Basements	Very severe
Sanitary Landfill	Very severe
Local Roads and Streets	Very severe
Potential Frost Action	High

MAJOR SOIL FEATURES AFFECTING SELECTED USES

Pond Reservoir Areas	Under water most of the year.
Embankments, Dikes, and Levees	Under water most of the year.
Drainage of Cropland and Pasture	Not applicable.
Irrigation	Not applicable.
Terraces and Diversions	Not applicable.
Grassed Waterways	Not applicable.

Golf Course Fairways - Not applicable.

Series Marsh

DEGREE OF SOIL LIMITATION AND MAJOR FEATURES AFFECTING RECREATION USES

Camp Areas	Very severe - flooded most of the year.
Picnic Areas	Very severe - flooded most of the year.
Playgrounds	Very severe - flooded most of the year.
Paths and Trails	Very severe - flooded most of the year.

CAPABILITY, SOIL LOSS FACTORS, AND POTENTIAL YIELDS--(High level management)

Phases of Series	Capability	Soil Loss K	Soil Loss T				
0-2%	VIIw15			Not suitable for crop production.			

PASTURELAND AND HAYLAND

Phases of Series	Group	Species, Yield in AUMs for Dryland (Irrigated) Forage Production
0-2%	Dw	Not suitable for crop production.

WILDLIFE HABITAT SUITABILITY

Phases of Series	Potential for--							Potential for--		
	Grain and Seed Crops	Grasses, Legumes	Wild Herbaceous Plants	Hardwood Trees and Shrubs	Coniferous Plants	Wetland Food and Cover	Shallow Water Devel.	Openland Wildlife	Woodland Wildlife	Wetland Wildlife
0-2%	Very poor	V. poor	V. poor	V. poor	V. poor	Good	Flooded most of the year	V. poor	V. poor	Good

WOODLAND SUITABILITY

Phases of Series	Ordination	Potential Productivity		Woodland Management Hazards				Suitable Species		Other
		Important Trees	Site Index	Erosion Hazard	Equipment Limitations	Seeding Mortality	Plant Competition	To Favor	To Plant	
0-2%	6w5	Not suitable for forestry use.								

RANGE

Phases of Series	Range Site Name	Climax Vegetation and Productivity of Air-Dry Herbage (lb./ac.)

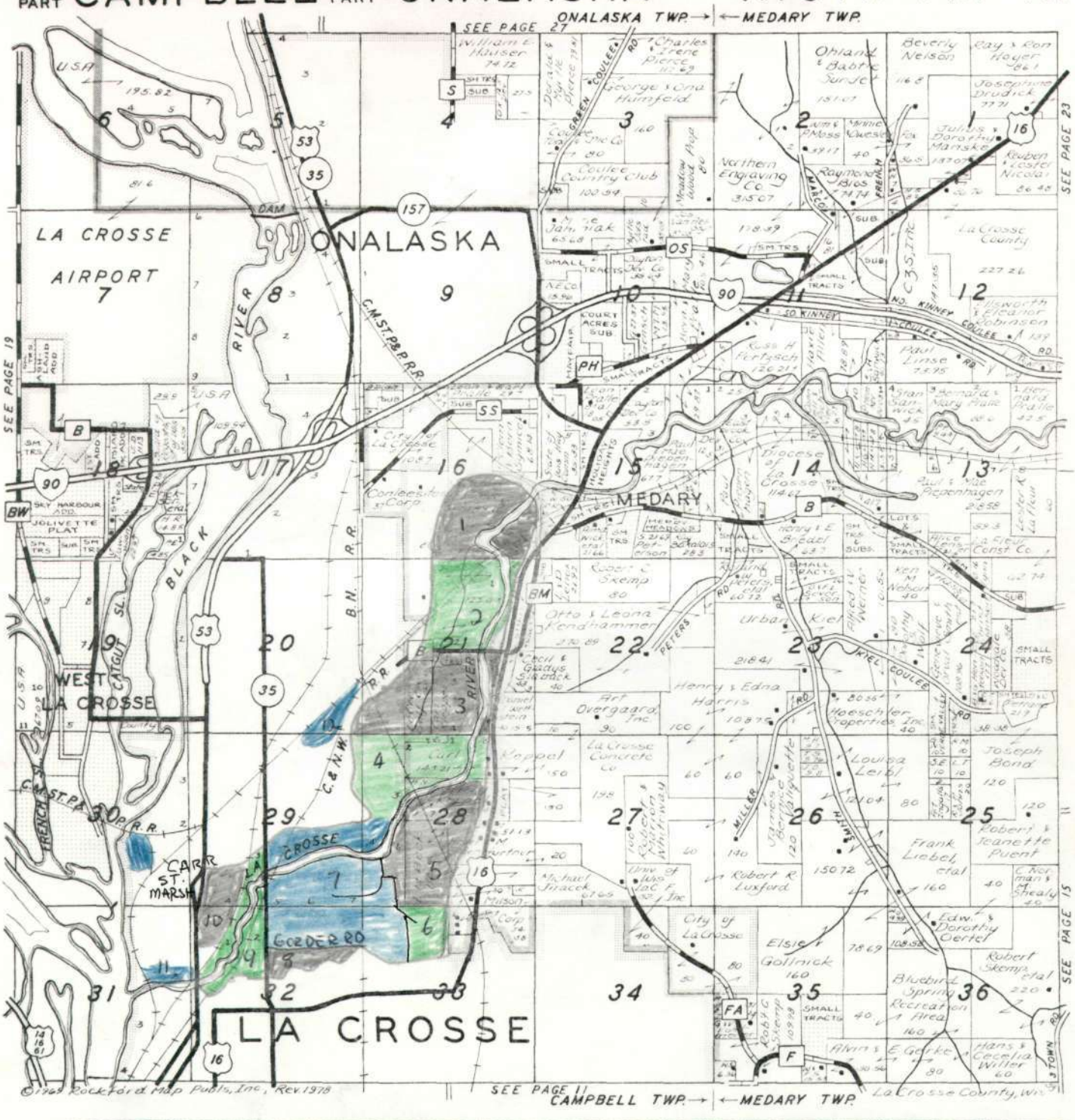
WINDBREAK

Group	Adapted Trees to Plant	Tree Height Prediction at 20 Years Age	Relative Vigor

OTHER

USDA-SCS-LINCOLN, NEBR. 1973

Figure 5 Map showing areas surveyed



Aerial Photos taken 18 July 1979

Looking west in area 2

Looking west in areas 5, 6, 7, 8, and 9

Looking west in areas 9 and 10

Looking south into areas 5, 6, 7, 8, and 9

Looking north from South part of areas 6 and 7

Looking South into areas 2, 3, and 4

Looking west into area 12

Looking east into area 11

Looking west into the Carr St. marsh

Looking west into area 8 (University owned)

APPENDIX A

W.S.C. RESEARCH REPORT: The Avifauna of Myrick Marsh

By

Paul A. Harris

This study was undertaken in order to investigate the species composition of Myrick Marsh. This study started in the fall of 1973 and will be concluded in the spring of 1975. Information on the utilization of the marsh by the various species is needed for a record of the area and for the possible use of such data to help save the marsh for future enjoyment instead of being destroyed.

Study Area

The study area covers 700 acres of a marsh within the city limits of La Crosse, Wisconsin. The main source of water for the marsh is the La Crosse River which forms the northern and western boundaries of the study area. The Burlington and Quiney Railroad borders the marsh on the east side and the Myrick Park and the La Crosse Cemetery form its southern border.

The marsh itself is composed of various plant communities. The wet marsh consists chiefly of sedges, cattail, and arrowhead. The upland area of the marsh contains a mixture of deciduous species such as oak, maple, elm, cottonwood, and willows. The third major community is grassland with timothy,

quack, reed canary and other grass species (see Fig. 1).

The marsh is subject to seasonal fluctuations in river stages which cause corresponding fluctuations in the water level of the marsh.

Methods and Materials

Various routes were established following boundaries and crossing large areas so that representative habitat areas of the marsh were covered (see Fig.2). Observations of species seen were recorded along with numbers of individuals seen. The temperature, sky conditions and time spent in the field were also noted.

Along with species composition of the marsh, an attempt was made to determine what species use the marsh as a nesting area. Nests were located mainly from the flushing of the nestling bird and from the collection of empty nests. The empty nests were identified and keyed by means of Headstrom, 1970.

Mist nets, funnel traps and potter traps were used to capture and band birds. Nestlings and locals were banded when found in nests or vicinity. Through the use of banding techniques, future studies may determine the per cent of banded birds that returned to the marsh.

Results

At the time of writing, 124 different species have been seen within the confines of the study area from November 1, 1973, to August 24, 1974. Of the 124 species identified to date, 48 species are known to nest in the study area.

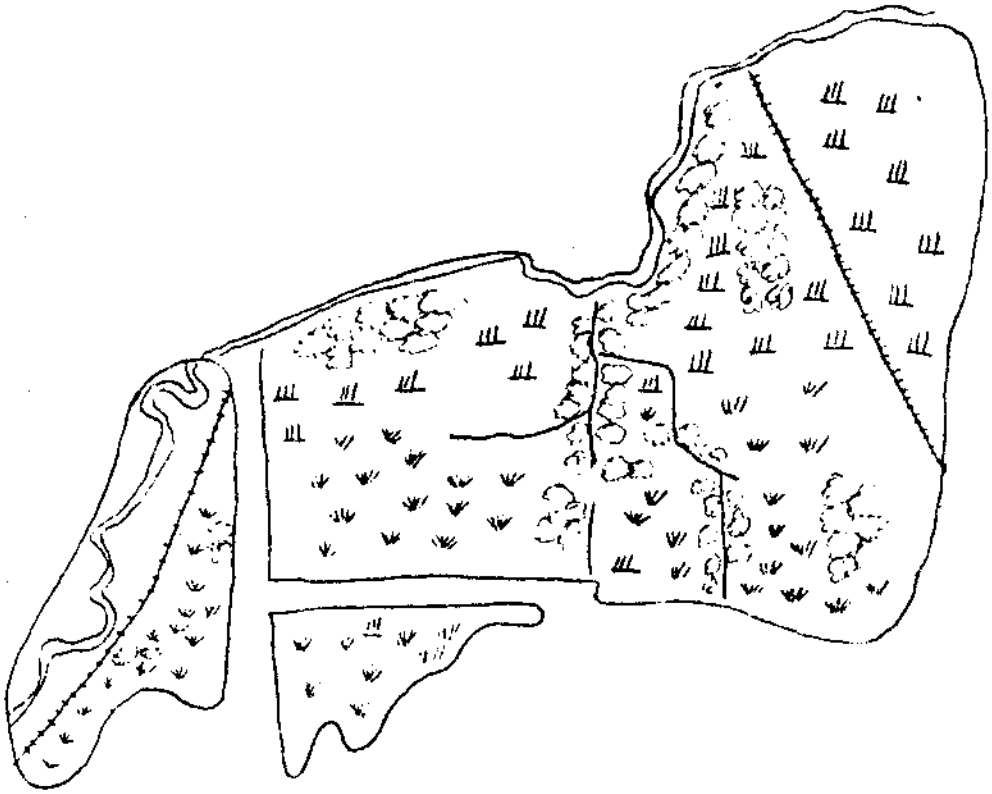


Fig. I - Vegetational Distribution of Eyrlok Marsh

: Wet Marsh

: Deciduous Woods

: Grass Areas

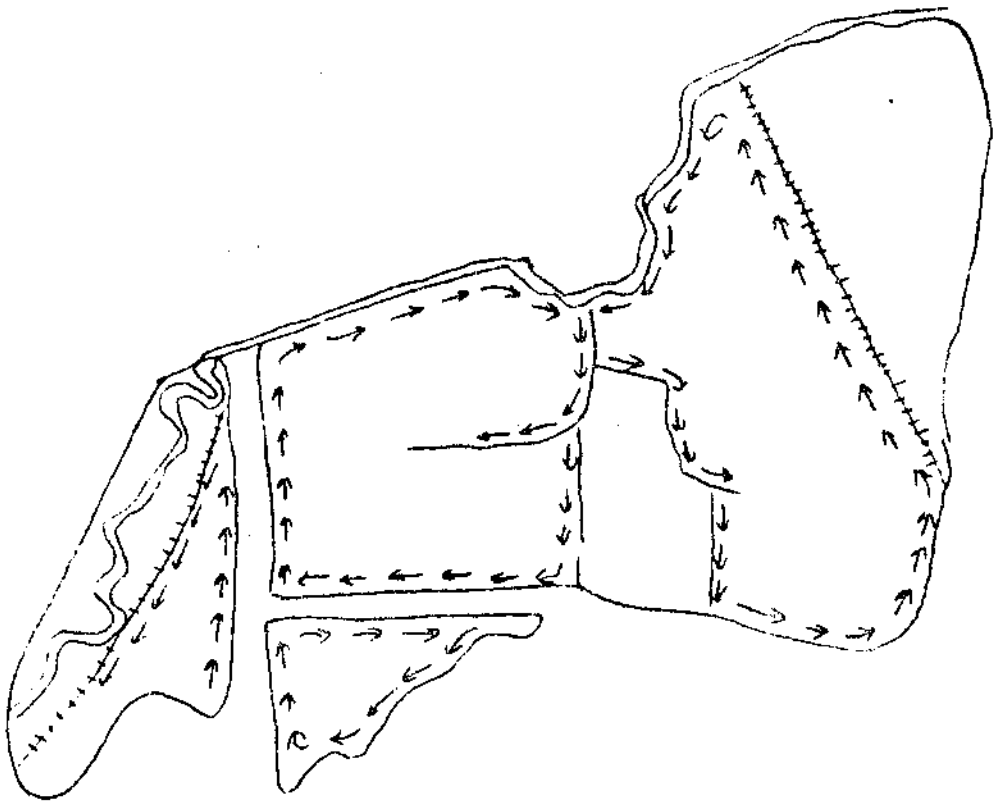


Fig 2: Various Routes Followed Through the Study Area

Route Followed : ⟶

A list of observations gathered from field trips and classwork in the marsh show that the White-breasted Nuthatch (Sitta carolinensis) and the Black-capped Chickadee (Parus stricapillus) also nest in the study area although none were found nesting during this study.

A nesting study was initially incorporated into the research project. A total of 21 nests were marked and observed. The species involved were Red-winged Blackbirds (Angelaius phoeniceus), Catbird (Dumetella carolinensis) and Yellow-headed Blackbird (Xanthocephalus xanthocephalus). During the latter half of June, there was an increase in water volume in the marsh and 90% of the nests in the study were lost. High water remained in the marsh for two weeks before a decrease in water allowed the birds to attempt renesting. With the loss of the original nests, no further attempt at a nesting study was undertaken.

The banding data (Table I) for the study area shows ten species of birds banded. A total of 77 individuals were banded. Next winter and spring more trapping will be done to see if any banded birds have returned to the same area.

The composition of the study area (TableII) for winter, spring, and summer are rated at this time according to frequency. The total hours spent in the field were divided into the total number of individuals of a species to get the number of birds per hour per season. The cumulative results at this time are:

SPECIES	NUMBER BANDED
Tree Sparrow	12
American Goldfinch	3
Common Grackle	12
Red-winged Blackbird	22
Yellow-headed Blackbird	2
Catbird	19
Cardinal	3
Robin	2
Song Sparrow	1
Swamp Sparrow	1
TOTAL: 10	77

Table I: ·ending Record From January 1, 1974 to August 24, 1974

Table II: Abundance of Species at Different Seasons

Species	Winter	Spring	Summer
1. Pied-billed Grebe*	------	common	common
2. Great Blue Heron	------	common	common
3. Green Heron	------	common	common
4. Common Egret	------	common	common
5. American Bittern	------	scarce	scarce
6. Canada Goose	common	------	------
7. Snow Goose	------	scarce	------
8. Mallard*	common	common	common
9. Green-winged Teal	------	------	scarce
10. Blue-winged Teal*	scarce	common	common
11. Shoveller	scarce	common	------
12. Wood Duck*	common	common	common
13. Ring-necked Duck	------	common	------
14. Lesser Scaup	------	common	------
15. Bufflehead	------	scarce	------
16. Ruddy Duck	------	scarce	------
17. Hooded Merganser*	common	common	common
18. Red-tailed Hawk	common	common	------
19. Broad-winged Hawk	------	scarce	------
20. Osprey	------	scarce	------
21. Kestrel	scarce	scarce	------
22. Ruffed Grouse	------	scarce	------
23. Bobwhite*	common	common	common
24. Ring-necked Pheasant	scarce	------	------
25. King Rail*	------	------	scarce

26. Virginia Rail*	------	------	common
27. Sora Rail*	------	common	common
28. Common Gallinule	------	------	scarce
29. Coot*	common	common	common
30. Killdeer*	common	common	common
31. Common Snipe*	scarce	scarce	common
32. Spotted Sandpiper	------	scarce	scarce
33. Solitary Sandpiper	------	scarce	common
34. Greater Yellowlegs	------	------	scarce
35. Lesser Yellowlegs	------	common	common
36. Least Sandpiper	------	scarce	common
37. Semipalmated Sandpiper	------	scarce	------
38. Black Tern*	------	common	common
39. Rock Dove	common	common	common
40. Mourning Dove*	common	common	common
41. Yellow-billed Cuckoo*	------	------	scarce
42. Black-billed Cuckoo	------	------	scarce
43. Great Horned Owl	common	scarce	scarce
44. Common Nighthawk	------	scarce	common
45. Chimney Swift	------	common	common
46. Belted Kingfisher	------	common	common
47. Flicker*	------	common	common
48. Red-bellied Woodpecker	common	scarce	scarce
49. Red-headed Woodpecker	------	scarce	common
50. Yellow-bellied Sapsucker	------	common	------
51. Hairy Woodpecker*	common	scarce	------
52. Downy Woodpecker*	common	common	common
53. Crested Flycatcher	------	scarce	scarce

54. Phoebe*	------	common	scarce
55. Acadian Flycatcher	------	------	scarce
56. Traill's Flycatcher	------	------	scarce
57. Least Flycatcher	------	scarce	common
58. Wood Pewee*	------	scarce	common
59. Tree Swallow*	------	common	common
60. Bank Swallow	------	scarce	common
61. Rough-winged Swallow*	------	common	common
62. Barn Swallow*	------	scarce	common
63. Cliff Swallow	------	scarce	common
64. Blue Jay*	common	common	common
65. Crow	common	common	------
66. Black-capped Chickadee*	common	common	scarce
67. White-breasted Nuthatch*	common	common	common
68. Red-breasted Nuthatch	scarce	------	------
69. Brown Creeper	common	scarce	------
70. House Wren*	------	common	common
71. Carolina Wren	------	------	scarce
72. Long-billed Marsh Wren*	------	------	common
73. Catbird*	------	common	common
74. Brown Thrasher*	------	scarce	common
75. Robin*	scarce	common	common
76. Hermit Thrush	------	scarce	------
77. Gray-cheeked Thrush	------	scarce	------
78. Golden-crowned Kinglet	------	scarce	------
79. Ruby-crowned Kinglet	------	common	------
80. Cedar Waxwing*	------	scarce	common
81. Northern Shrike	scarce	------	------
82. Starling*	common	common	common

83. Warbling Vireo	------	------	common
84. Black and White Warbler	------	scarce	------
85. Prothonotary Warbler	------	------	scarce
86. Nashville Warbler	------	scarce	------
87. Yellow Warbler	------	common	common
88. Magnolia Warbler	------	scarce	------
89. Yellow-rumped Warbler	------	common	------
90. Chestnut-sided Warbler	------	scarce	------
91. Palm Warbler	------	scarce	------
92. Ovenbird	------	scarce	------
93. Northern Waterthrush	------	common	------
94. Louisiana Waterthrush	------	scarce	------
95. Yellowthroat*	------	common	common
96. Redstart*	------	scarce	scarce
97. House Sparrow*	common	common	common
98. Eastern Meadowlark*	scarce	common	------
99. Yellow-headed Blackbird*	------	common	common
100. Red-winged Blackbird*	v.common	v.common	v.common
101. Baltimore Oriole*	------	common	common
102. Rusty Blackbird	common	common	------
103. Brewer's Blackbird	common	common	common
104. Common Grackle*	common	v.common	common
105. Cowbird*	common	common	common
106. Cardinal*	common	common	common
107. Rose-breasted Grosbeak*	------	common	common
108. Indigo Bunting*	------	------	common
109. Purple Finch	------	common	------
110. Hoary Redpoll	scarce	------	------
111. Common Redpoll	common	------	------

112. Pine Siskin	common	scarce	------
113. American Goldfinch*	common	common	common
114. Savannah Sparrow	------	------	scarce
115. Vesper Sparrow	------	------	scarce
116. Dark-eyed Junco	common	common	------
117. Tree Sparrow	common	common	------
118. Chipping Sparrow*	------	------	scarce
119. Field Sparrow	scarce	common	scarce
120. White-throated Sparrow	------	scarce	------
121. Fox Sparrow	------	common	------
122. Swamp Sparrow*	------	common	------
123. Song Sparrow*	common	common	common
124. Lapland Longspur	scarce	------	------
Total Species	45	100	79
Total Individuals	3139	8348	7407
Total hours	50:30	71:35	57:20

Key: scarce-- .01-.09 birds/manhour/season

common-- .1-10 birds/manhour/season

v.common-- 10.1+ birds/manhour/season

*--- Breeding Birds

Winter: November 1,1973 - March 21, 1974

Spring: March 22,1974 - June 21,1974

Summer: June 22,1974 - August 24,1974