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MINNESOTA DEPARTMENT OF CONSERVATION

DIVISION OF GAME AND FISH  
RESEARCH AND PLANNING SECTION

BIOLOGICAL REPORT ON THE  
RABBIT RIVER WATERSHED  
GRANT, OTTERTAIL, WILKIN AND TRAVERSE COUNTIES

December 1963  
Fish and Wildlife Surveys Unit  
Federal Aid Project FW-1-R

## RABBIT RIVER WATERSHED ABSTRACT

1. Rabbit River Watershed, draining 297 square miles, is located in West-Central Minnesota and includes portions of Ottertail, Wilkin, Traverse and Grant Counties.
2. Problems include rapid run off from the eastern portion and poor drainage in the western portion.
3. Project proposals include cleaning and constructing small floodways in the flat western portion and creating water retention sites on the highland of the eastern portion.
4. The watershed is prime pheasant range. Waterfowl use the area extensively for nesting and during migration. Furbearers and predators as well as a small population of deer are found in the watershed.
5. Hunting is a major recreational activity as well as an economic uplift to the watershed. Project proposals for changes in land use should take this into consideration.



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## Rabbit River Watershed

Grant, Ottertail, Wilkin and Traverse Counties

### I. Introduction

#### Name, Location and Type of Program

Rabbit River Watershed is located in West-central Minnesota. Included are portions of the following counties; namely, Southwestern Grant; Northwestern Ottertail; Northeastern Wilkin; and Southeastern Traverse. Application for assistance is under Public Law 566, Small Watershed Act.

#### Drainage Patterns and Tributary Status

County and judicial ditch systems connect the potholes in the upper reaches with the Rabbit River in the flat western portion. The Rabbit River, draining 297 square miles, flows into the Bois de Sioux River about 12 miles south of Breckenridge. The Bois de Sioux is part of the Hudson's Bay drainage through the Red River of the North. Most of the watershed lies in the flat bed of glacial Lake Agassiz, (Red River Valley).

#### Watershed Problems

Rapid runoff from the eastern portion combined with poor drainage in the western part results in serious flooding. Flood damage to the village of Tintah, sedimentation in the ditches, cornfields flooded, and collapsed ditch structures are the result of this problem.

#### Watershed Sponsors

The Soil Conservation Districts of Grant, West Ottertail, Wilkin, and Traverse Counties, as well as the Grant, Ottertail, Wilkin, and Traverse County Commissioners are named as sponsors in the application.

#### Status of Application

The project has been approved for planning and is in an active planning stage by the Soil Conservation Service.

### II. Description of the Area

#### Size

The watershed is 297 square miles (190,000 acres) in area. It is approximately 20 miles wide and 22 miles long.

Approximately one-fourth is found in each county.

#### Topography (Hydrologic Atlas of Minnesota, Minnesota Conservation Department)

The western portion is a flat lowland plain covered with lake sediments deposited by glacial Lake Agassiz. A rolling upland glacial till plain with average width of 8 miles consists of discontinuous morainal hills and depressions and extends along the eastern border of the lowland plain.

The transition from upland to lowland is characterized by a slope which descends 40 feet in a distance of several miles.

Altitudes range from 980 feet in the lowland plains of the Bois de Sioux River to 1,200 feet in the morainal hills of the eastern portion.

Soils (Soil Survey Reconnaissance Red River Valley Area of Minnesota - USDA)

The important soils in the area are those included in the Fargo, Bearden, Ulen, Pelan, Barnes, and Nebish series.

The two great zonal groups, Chernozem and Podzals, occur in the area. The Chernozems are represented by Fargo and the Bearden soils on the uplands. The Podzals are represented by the Taylor in the lake bed and the Nebish on the highlands.

Climate

Climate is typical of the continental climate of the Central States with medium rainfall and subhumid conditions (see appendix tables 1A and 2A). It is characterized by long winters and relatively hot summers.

Agricultural and Commercial Features

Agriculture is the predominant occupation. According to the Minnesota Department of Agriculture, the average size farm in Wilkin County is 402 acres and 209 acres in Ottertail County.

The population density is 11 persons per square mile (1950 census).

There are five farm-supported villages. They include: Campbell (pop. 365-1960), Wendell (pop. 253-1960) Tintah (pop. 228-1960) Tenney (pop. 35-1960) and Nausha (pop. 146-1960).

Land Use and Ownership

WETLANDS

MEANDERED LAKES

The following meandered lakes are located in the watershed.

Table 1      Meandered Lakes within Rabbit River Watershed  
(Gazetteer of Meandered Lakes in Minnesota)

<u>Name</u>	<u>Acreage</u>	<u>Type</u>
<u>Grant County</u>		
Ash Lake	255	IVa deep open water marsh
Stony Lake	164	IVb deep open water marsh with emergents
<u>Ottertail County</u>		
Upper Lightning	741	IVb deep open water marsh with emergents
Total	<u>1,160</u>	

See appendix (table 8A) for description of Minnesota Wetlands.

NON-MEANDERED LAKES

The non-meandered wetlands are given in table 2.

Table 2      Non-meandered Wetlands in Rabbit River Watershed

<u>Type</u>	<u>Number of Areas</u>	<u>Acreage</u>
IIa - Sedge meadow -	19	278
IIb - Fine grass meadow -	13	234
IIc - Coarse grass meadow -	10	100
IIIa - Cattail cane marsh -	51	818
IIIb - Bulrush - flag marsh -	31	456
IIIc - Mud flat emergent -	1	43
IVa - Open water marsh -	19	278
Total	<u>144</u>	<u>2,307</u>

See appendix (table 8A) for complete description of wetland types.

All the wetlands are confined to the eastern upland portion of the watershed.

## Wetland Ownership

There are 5 state-owned Wildlife Management Areas. They are given in the following table.

Table 3      State-Owned Wildlife Management Areas Within The Rabbit River Watershed (June 30, 1963)

<u>Name</u>	<u>Location</u>	<u>Acreage</u>
<u>Grant County</u>		
Bergerud Unit	T.130 R.43 S.8,9	34
Kube-Swift Unit	T.130 R.44 S.10,11,12	330
Marple Unit	T.130 R.44 S.14,23	73
Shuck Unit	T.130 R.44 S.13,19,24 43	51
<u>Ottertail County</u>		
Doran Unit	T.131 R.44 S.17	57
Total		545

## UPLAND Land Use

Land use is given in table 4. Percentages are based on 210 samples taken from the entire watershed in September 1962.

Table 4      Land Use Rabbit River Watershed, September 1962

<u>Land Use</u>	<u>Percent</u>
Small grain	45
Corn	6
Farmstead	7
Alfalfa	3
Soybeans	6
Legume hay	6
Pasture	11
Idle land	16

The high amount of idle land was due to spring flooding which prevented crops from being planted, and from soil bank land.

### III. Plan of Development

Soil Conservation Service plan of development includes cleaning and enlarging floodways, and constructing water retention sites.

Fifty miles of floodways will be cleaned and enlarged to speed runoff in the flat western portion.

Five water retention sites (see table 5), capable of holding one to six feet of water, are proposed in the eastern portion to retain water during periods of high flow.

Table 5      Proposed Water Retention Sites, Rabbit River Watershed

<u>Name</u>	<u>Location</u>
<u>Ottertail County</u>	
Unnamed (R-1)	T.131 R.44 S.27,28
Unnamed (R-2)	T.131 R.44 S.29
<u>Grant County</u>	
Unnamed (R-3)	T.130 R.44 S.23
Anderson Marsh (R-4)	T.130 R.44 S.36
Bailey's Slough (R-5)	T.128 R.43 S.6

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IV. Fishery and Wildlife Values  
General

Hunting ranks as one of the major recreational activities within the watershed.

Pheasants are the number one game species with this area ususally having one of the highest populations in the state. Hunting pressure is heavy and hunters are normally quite successful.

It is also an excellent waterfowl area with the wetlands producing many broods and receiving heavy migrational use.

Deer, mink, muskrats, fox and raccoons are found in the watershed.

The only fishery is the Rabbit River west of Campbell with rough fish and northern pike.

Fishery Habitat and Values

There are no game fish lakes in the watershed. Several of the larger lakes and sloughs contain rough fish (carp and bullheads) which move up the Rabbit River in the spring, but these generally winter-kill.

The lower portion of the Rabbit River, from the town of Campbell to the Bois de Sioux River, is the only fishery.

Bullheads, carp and other rough fish along with northern pike move up the Rabbit River during spawning.

Fishing pressure is light with area farmers doing most of the angling.

Extreme fluctuations in water levels and the turbidity make little in the way of fish management within the river possible.

Fishery habitat along the river could be improved by better land management practices to reduce erosion and turbidity. Limiting grazing and adding shelter belts along the river with a more stabilized flow would improve conditions for game fish.

## Wildlife Habitat and Values

### Upland Game

As mentioned in the previous section, the ringed-necked pheasant is the most important game species within the watershed. Jackrabbits, fox, squirrel and raccoon also inhabit the area and provide many hours of recreation. The following discussion on habitat generally applies to the above as well as pheasants.

### Habitat

Nesting and winter cover are the most important considerations in good pheasant habitat.

It has been shown (Harris 1959) that grain fields and road ditches account for the major production of pheasants.

Grain fields provide good nesting cover and have few mowing losses. Road ditches also supply the needed nesting cover, provided mowing is delayed.

Winter cover is essential to maintaining good populations. The tall, rank stands of cattail and cane (Type III wetlands), provide the needed protection from the elements. Farm woodlots adjacent to the wetlands also give the birds shelter.

The high percentage of idle land (16%) combined with small grain as the major crop (45%) makes the Rabbit River Watershed one of the prime producers of pheasants. The Type IIIa and b wetlands (1,273 acres) in the eastern upland provide the winter cover needed to maintain the population. The ditch banks and shelter belts of the flat, western portion provide some cover but more is needed in this region.

### Populations

Brood counts and summer census on a state-wide basis indicate the Rabbit River Watershed has one of the highest pheasant populations in the state.

Brood counts for a ten-year period show the 4 counties within the watershed to have a 21% higher production of pheasants than the state average (appendix table 3A).

Population densities for 1961 show the watershed to have 41 to 80 hens per square mile in the spring and 59 to 115 cocks per square mile in the fall. Highest fall density showed 95 cocks per square mile in the vicinity of Grant County. 1963 densities are shown on the map at the end of the appendix.

### Hunter Use and Success

A pheasant hunter survey was made in this watershed on opening weekend of the 1962 season. The following table gives the results of this survey and compares it with other watersheds within the pheasant range.

Table 6      Pheasant Hunter Pressure and Success on Various Watersheds Opening Weekend 1962 (Unpublished Minnesota Conservation Department)

<u>Area</u>	<u>Total Miles Covered</u>	<u>Total Cars</u>	<u>Cars per Mile</u>	<u>Ave. Bag per Hunter</u>
Rabbit River Watershed (Grant, Ottertail, Traverse, Wilkin Counties)	134	149	1.1	1.9
Janesville Watershed (Waseca County)	89	58	0.7	0.8
East Branch Chippewa River Watershed (Pope and Swift Counties)	68	26	0.5	1.3

In comparing pressure and success between the flat, western zone and the moraine hills of the eastern portion, little difference was found. Hunting pressure varied from 1 to 1.4 cars per mile in both regions. Birds bagged per hunter averaged 1.2 to 3.0 in both zones.

In summary, the pheasant being the most important game species in the watershed, both from the stand point of population and hunter use, should be given emphasis in any management recommendations.

#### Waterfowl

##### Habitat

The waterfowl habitat is chiefly in the moraine hills of the eastern portion.

The type III (83 areas, 1,316 acres) and type IV (21 areas, 1,282 acres) provide the best waterfowl areas.

Nest success by cover type is shown in appendix table 4A. The best results are found in the dry land marsh areas with water within 50 yards of the nest.

The type IV wetlands are the best feeding and loafing areas. Characteristics of a good area include, depth 3 feet or less, good growths of emergent and submergent vegetations, open water areas, logs or shoreline suitable for loafing areas and the availability of food.

Several of the important waterfowl areas have been surveyed. A summary of the information collected follows. A list of waterfowl lakes for which maps and reports are available is given in the Appendix, Table 5A.

#### Grant County

##### 1. Ash Lake T. 130 - R. 44, 43 - S. 24-25, 19-30

Ash Lake is a meandered, waterfowl and muskrat lake. It is 255 acres in size and averages 3.5 feet deep with a maximum of 5 feet. Vegetation is scarce with only scattered cattail, cane and bulrush present. Submergent vegetation consists of sago pondweed found only at the south end of the lake.

The lake serves as a loafing and feeding area for migratory waterfowl. In its present condition the lake is a poor waterfowl habitat. Allowing the water level to temporarily drop would vastly improve conditions by stimulating aquatic plant growth which in turn would provide more cover and feeding areas.

Carp were seen jumping in the lake and they may be the cause of the poor growth of vegetation and turbid water.

2. Anderson Marsh T. 130 - R. 44 - S. 36 (R.4)

This is a non-meandered, waterfowl marsh of 168 acres. There is no public access. The maximum depth is 2 feet with an average of 1 foot. Algae is found throughout the marsh. Emergent vegetation consists of abundant stands of cane, cattail and bulrush. Submergent vegetation includes duckweed and coontail. Nesting cover, brood cover and loafing spots are good. The lack of submergent vegetation detracts from the otherwise good conditions. The type III wetlands surrounding the marsh provides excellent pheasant cover.

Carp were observed in this marsh also, and they could have a detrimental effect on the game habitat.

3. Bailey Marsh T. 128 - R. 43 - S. 6 (R.5)

This is a non-meandered waterfowl marsh with no public access. It is approximately 200 acres in size. Maximum depth is 16 inches with an average of 14 inches. Vegetation is abundant with stands of bulrush, cane and cattail were distributed throughout the marsh. Submerged vegetation includes areas of abundant sago pondweed, duckweed and water milfoil. This marsh is excellent waterfowl area in its present condition. Waterfowl production has been good but the marsh needs more loafing areas. The south end of the marsh has good deer and pheasant cover with many trees and shrubs.

4. Marple Marsh T. 130 - R. 44 - S. 14, 23

This is a non-meandered, waterfowl marsh which is owned by the state as a wildlife management area. It is 73 acres in size. The maximum depth is 2 feet with an average of 1.5 feet. The water is clear to the bottom with little algae growth. Abundant emergent vegetation is present including cattail, bulrush and arrowhead. Submergent vegetation includes abundant duckweed, coontail and water milfoil with Berchtold's and sago pondweed also present. Approximately 30% of the area is covered by emergents. Nesting and brood cover is good and an ample supply of loafing areas are available.

5. Kube - Swift Marshes T. 130 R. 44 S. 10, 11, 12

These are non-meandered waterfowl marshes which are owned by the state as Wildlife Management Areas. Their aggregate area totals 330 acres. The maximum depth is 2.5 feet with an average depth of 1.5 feet. Vegetation is abundant with stands of cattail, bulrush and sedge surrounding the open water. Submergent vegetation includes duckweed, water milfoil and coontail. Sago pondweed and narrowleaf pondweed are also present. Emergent vegetation covers 75% of Swift Marsh and 25% of Kube Marsh. Waterfowl nesting and brood cover is good. Loafing sites are scarce, mostly on mud flats and old muskrat houses. Several broods are raised on the marsh each year and migrational use is heavy.

## Ottertail County

### 1. Upper Lightning Lake T. 131 - R. 44 - S. 13, 14, 23, 24, 25, 26, 36

This is a meandered waterfowl and muskrat lake. There is no public access. It is 741 acres in size. Maximum depth is 5.8 feet with an average depth of 4.5 feet. Algae is very heavy in sheltered bays. Vegetation is scattered. Emergents include bulrush, cattails, cane, sedge, and arrowhead. The bulrush and cattails are scattered around the edges. Submergents are abundant with sago pondweed, coontail and duckweed found all over the lake. Berchtolds, claspingleaf and narrow-leaf pondweed are also present. Thirty percent of the lake is under four feet in depth and five percent of the lake is covered by emergents. Nesting for puddle ducks is fair, while nesting for divers is poor. Brood cover is fair and there are few loafing spots. The lake is mainly used as a migrational resting area. Conditions could be improved by allowing the water level to temporarily be lowered, this would encourage more vegetation for cover and food.

### 2. Unnamed Marsh T. 131 - R. 44 - S. 27, 28

This is a non-meandered waterfowl and muskrat marsh with no public access. The marsh is approximately 160 acres. Maximum depth is 3.5 feet with an average of 1 foot. Vegetation is abundant with dense growths of bulrush, cattail and cane covering 85% of the marsh. Submerged vegetation includes duckweed, bladderwort and water milfoil. Nesting cover is excellent. Brood cover is good, but more open water is needed. Loafing sites are plentiful. Waterfowl nesting and migrational use have been good in the past but in recent years, the lack of open water areas has reduced the usage. A water control structure at the outlet would permit water levels to rise creating more open water available for use. The southeastern portion of the marsh is excellent winter pheasant cover. This would be an excellent area to purchase and control as a Wildlife Management Area.

The eastern portion of the watershed is excellent duck habitat although the areas are limited. Wetlands acquisition should be considered on many of these areas to insure adequate waterfowl habitat.

## Hunter Use and Success

The results of the 1960 waterfowl harvest from hunter report cards is given in Appendix table 6A. They are compared with the state averages.

Most of the privately owned marshes are leased and there is no public access to the meandered wetlands. This puts extremely heavy hunting pressure on the few state owned Wildlife Management Areas in the watershed.

## Big Game

The white-tailed deer is the only big game species present in the watershed. Habitat is limited to shelter belts, wooded sloughs and marsh areas. Although the habitat is sparse, a small population is found in the watershed.

No information is available on deer hunter use and success within the watershed. The zones change from year to year and some areas are closed to hunting.

The area is open every year to bow and arrow hunting providing many hours of recreation. When open to firearms the area has a one-day hunt using a shotgun with single slug only.

### Furbearers and Predators

The watershed holds a substantial number of furbearers and predators which include muskrats, mink, racoon, and fox. Data for harvests based on hunter report cards is given in appendix table 7A. Habitat beneficial to upland game and waterfowl also improve furbear and predators conditions by providing suitable cover and feeding areas.

## V. Summary

The Rabbit River Watershed is located in west-central Minnesota, draining 297 square miles of highly fertile farm land in the Glacial Lake Agassiz bottoms and beach.

The major problems include rapid runoff from the eastern highlands and poor drainage in the western lowlands.

Proposals for controlling flood damage include water retention sites in the highlands and improving drainage in the lowlands.

The watershed has excellent game habitat, supporting a large pheasant population and containing many wetlands beneficial to waterfowl as well as deer and furbearers.

The watershed offers many opportunities in the form of outdoor recreation which could be developed.

## VI. Recommendations for Fishery and Wildlife

### Management Possibilities on Retention Sites and Channeling

#### 1. Unnamed (R-1) T. 131 - R. 44 - S. 27, 28

This is an excellent waterfowl and pheasant area and should be considered for purchase as a Wildlife Management Area.

A permanent impoundment of one to three feet in depth should be established in addition to the water held during period of high flow.

The entire 200 acre basin could be converted into an excellent duck marsh by constructing a dike across the outlet channel which passes through the ridge. The dike would only need to be 30 to 40 feet in length and high enough to raise the water level in the basin from two to three feet.\*

#### 2. Unnamed (R-2) T. 131 - R. 44 - S. 29

A permanent impoundment of 1 to 2 feet should be established in addition to the water held during periods of high flow. If this is not possible, dugouts could be created in the impoundment basin to hold water permanently and create waterfowl areas. Cover planting and shelter belts should be encouraged along edges of impoundment to provide winter protection for pheasants.

\* (Unpublished Report Western Township Game Habitat Project No. 1)

3. Unnamed (R-3) T. 130 - R. 44 - S. 23

A permanent impoundment of 2 to 3 feet should be established in addition to water held during periods of high flow.

More engineering is needed on this area to determine effect this retention site will have on the Marple Wildlife Management Area which is located directly to the east of the impoundment.

4. Anderson Marsh (R-4) T. 130 R. 44 S. 36

A water control structure is needed on this area to permit drawdowns as well as retaining water during periods of high flow.

Water levels temporarily dropped 1.5 feet below the spring of 1963 level, would permit more submergent vegetation to become established. The outlet may have to be improved in order to permit drawdowns.

A rough fish barrier is needed at the outlet to permit submergent vegetation to grow in this marsh and adjacent Ash Lake.

5. Bailey Marsh (R-5) T. 128 - R. 43 - S. 6

This is an excellent waterfowl area and should be considered for purchase as a Wildlife Management Area. The southern portion of the marsh could be improved for waterfowl by creating one or 2 dugouts in thick cattails. The present border of shrubs and trees should be left as winter cover for pheasants.

6. Rabbit River T. 130 - R. 45 - S. 13, 14, 24, 25

Excellent winter cover is presently provided in this area by dense shrubs and trees along banks. This is the only major winter cover in this region of the watershed. Project proposals should protect as much of this cover as possible. If eliminated, it should be replaced as soon as possible.

### General

1. Upper Lightning Lake, T. 131 R. 44 S. 13, 14, 23, 24, 25, 36, should be protected against any attempted drainage.

Presently there is no public access to the meandered lake. The large point on the eastern shore (Sections 25, 36) would provide an excellent access. A recreational area could be developed with picnic sites and campgrounds to accommodate pheasant and duck hunters.

2. Provide more winter cover for pheasants in the western portion of the watershed. Possible measures include; planting trees and shrubs along township roads not used in the winter, eliminate burning of ditch banks and road ways, encourage shelter belts and woodlots and protect them from grazing, planting lilac and honeysuckle in present shelter belts and woodlots to provide additional cover.

3. Refrain from mowing roadways and ditch banks until pheasant nesting is completed.

4. Creation of farm ponds and dugouts to collect water normally left standing in the fields. A fringe of vegetation would provide excellent wildlife cover.

5. Limit grazing and plant trees and shrubs on channel banks to prevent erosion and provide cover.

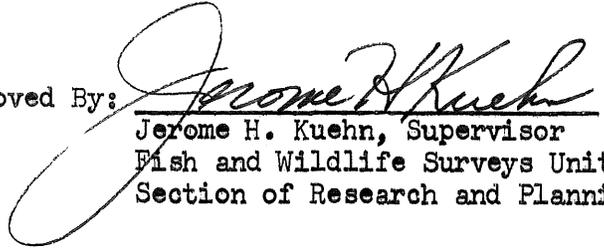
6. Provisions should be made to protect all potholes and wetlands in eastern portion from any attempted drainage that might result from new channeling.

VII. Credits and Signatures

Field Work and Report By:

Richard Hassinger, Game Biologist  
Fish and Wildlife Surveys Unit

Approved By:



Jerome H. Kuehn, Supervisor  
Fish and Wildlife Surveys Unit  
Section of Research and Planning

Date:

MAR 13 1964

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A P P E N D I X

Table 1A. Mean Temperature and Precipitation Recorded at Campbell, Minnesota\* (1931-1955) (U.S. Department of Commerce)

	Temperature	Precipitation
January	7.7	.80
February	11.5	.98
March	24.9	1.18
April	42.2	1.93
May	55.4	2.79
June	64.9	4.01
July	71.0	3.12
August	68.8	2.88
September	58.5	1.88
October	46.3	1.22
November	28.0	1.02
December	14.1	.61
ANNUAL	41.1-Mean	22.42-Total

\*Campbell is located approximately in the center of the watershed.

Table 2A. Climate Recorded at Campbell, Minnesota for 65 year period (Department of Conservation)

	Temp. Of.	Maximum	111	
		Mean Annual	40.6	
		Minimum	-40	
PRECIPITATION INCHES	ANNUAL	Maximum	36.29	
		Year	1916	
		Mean	22.42	
		Minimum	12.12	
		Year	1934	
		Snowfall	39.3	
	MEAN	Apr.-Sept.	16.61	
		Oct.-Mar.	5.81	
			Max. 24 hr.	3.56
			Year	8-21-16

Table 3A. 10 Year Summary of Pheasant Counts\* Birds per 100 miles - Year

County	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	Ave. 1950- 1959
Upland Grant	55	346	459	162	192	-	-	378	518	300	722	301
Upland Ottertail	48	302	182	55	-	149	92	185	432	458	324	211
Flatland Wilkin	31	77	165	21	113	159	281	221	401	252	487	172
Flatland Traverse	601	718	449	403	435	795	282	403	833	-	496	547
4 County Average	184	361	314	160	247	276	552	272	546	252	508	334
14 West Central County Average	221	194	188	161	227	342	243	258	566	313	356	264
64 County Average (Pheasant Range)	208	216	256	143	264	361	287	269	438	267	273	265

\*Unpublished by Nelson 1960 (Minnesota Conservation Department)

Table 4A. Duck Nest Success by Cover-type from three Minnesota Areas  
(Minnesota P-R Quarterly Progress Report 1962)

	<u>Mahnomen Co.</u>	<u>Ottertail Co.</u>	<u>Pope Co.</u>
Pasture	-	-	0
Undisturbed prairie	27%	-	-
Soil bank	-	-	41%
Upland grass	-	40%	21%
Wild Hay	-	-	33%
Marsh: dry land	26%	46%	100%
over-water	46%	-	0
Alfalfa	0	-	30%
Miscellaneous	<u>38%</u>	<u>21%</u>	<u>-</u>
Average Success	36%	31%	42%

Table 5A. Game lakes for which survey reports and maps are available  
from Minnesota Conservation Department.

<u>Name</u>	<u>Location</u>
<u>Grant County</u>	
Ash Lake	T.130-R.44,43-S.24,25,19,30
Bailey's Slough	T.128-R.43-S.6
Marples Marsh	T.130-R.44-S.14,23
Swift Kube Marshes	T.130-R.44-S.10,11,12
Anderson Marsh	T.130-R.44-S.36
Stony Lake	T.130-R.44-S.12
<u>Ottertail County</u>	
Western Township Marsh	T.131-R.44-S.27,28
Upper Lightning Lake	T.131-R.44-S.21,22,28,27,34,35

Table 6A. 1960 Waterfowl Harvest From Hunter Report Cards  
(Minnesota Conservation Department)

<u>County</u>	<u>Days Hunted</u>	<u>Waterfowl Bagged</u>	<u>Ducks per Day Hunted</u>	<u>Ducks per (season) Hunter</u>	<u>Duck Kill per sq.mile water area</u>
Grant	833	1616	1.89	10.21	92.47
Ottertail	4995	8354	1.62	9.15	618.62
Wilkin	180	323	1.73	8.64	311.00*
Traverse	419	563	1.25	7.28	58.22
4 County Average	1606	2714	1.62	8.82	270.08
State Average (87 counties)	744	1212	1.52	3.65	25.43

\* Water area less 1 square mile.

Table 7A

Table 7A. Furbearer and Predator Harvests for 1956 and 1957 from Hunter Report Cards (Minnesota Conservation Department)

<u>County</u>	<u>Number per square mile</u>					
	<u>Mink</u>		<u>Muskrat</u>		<u>Raccoon</u>	
	<u>1956</u>	<u>1957</u>	<u>1956</u>	<u>1957</u>	<u>1956</u>	<u>1957</u>
Grant	1.60	1.26	0.63	1.30	0.15	0.50
Ottertail	0.32	1.78	6.62	2.79	0.24	1.08
Wilkin	0.16	0.42	0.02	1.43	0.13	0.02
Traverse	0.13	0.0	--	0.0	0.08	0.04
State Average	0.69	0.77	2.01	1.83	0.21	0.40

Table 8A. Minnesota Wetlands Classification

- Type I - Seasonally flooded basins or flats - Shallow depressions that contain standing water for only a few days in the spring or after heavy rains.
- IA - Seasonally flooded meadow basin - Seasonally flooded basin in a meadow, pasture, or idle land. May have scattered wetland plants such as smartweeds, sedges, spikerush, whitetop, and burreeds.
- IB - Seasonally flooded barren basin - Seasonally flooded basin in cultivated land. Usually no vegetation is present.
- Type II - Meadows - Shallow depressions that contain standing water for a few days in the spring or after heavy rains. Soils may be waterlogged within at least a few inches of its surface during the growing season. Vegetation is primarily sedges, grasses, smartweeds, rushes, and docks, and beggartick, etc.
- IIA - Sedge meadows - Entirely or predominantly wide or narrowleaf sedges. May have other thinly scattered plants such as cane or occasional willow shrubs.
- IIIB - Fine grass meadow - Predominantly thin-stalked marsh grasses such as reedtop grass, blue-joint, manna grasses, some bluegrasses, slough grass, squirrel tail grass, whitetop grass, and cord grass. Cover is usually under five feet.
- IIC - Coarse grass meadow - Predominantly thick-stalked grasses such as reed canary grass, but may have other thick-stalked marsh vegetation such as dock, beggartick, smartweeds, or occasional upland plants such as goldenrod or sunflower. Height is from three to six feet.
- Type III - Shallow marshes - Marshy depressions which may have variable water depths up to 30 inches or which may be merely waterlogged. They are usually covered with heavy-stalked emergents of varying density and height. The emergents may form a dense cover or there may be scattered open water areas.

IIIA - Cattail - cane marsh - Predominantly stands of tall, heavy-stalked emergents such as cattail and cane. Height is usually from 5 to 7 feet.

IIIB - Bulrush - flag marsh - Predominantly stands of shorter, heavy-stalked emergents such as sweet flag, blue flag, river bulrush, threesquare, woolgrass, rice cutgrass, and hard and softstem bulrush. Height usually varies from two to six feet.

IIIC - Mud flat emergents - Predominantly short marsh emergents such as arrowheads, wapatos, spike and needle rushes, and occasionally swamp aster, marigold, water plantain, and water parsnip. Often found in a fringe around open water or on mud flats. Height is usually under two feet.

Type IV - Deep marsh - Water depths to four or five feet. Emergent vegetation, if present, is either confined to a fringe or to scattered plants or clumps of bulrush or cane. Submerged aquatic vegetation may be present.

IVA - Open water marsh - Emergents limited to a variable (relatively narrow width) fringe of cattail, cane, bulrush, and to rare individual spears of bulrush, cattail, or cane in the open water.

IVB - Open water with emergents marsh - Predominantly open water but with occasional to common stands of bulrush, cattail, or cane.

IVC - Rice - waterlily marsh - This type may be open water early in the growing season, but usually overgrows with wild rice or water lilies later in the year. This type may be difficult to classify early in the growing season.

Type V - Fish Lakes - Open water of sufficient depths to be normally capable of supporting a permanent game fish population.

VA - Marginal fish-game lakes - Water depths from 6 to 12 feet. Includes freezeout fish lakes but have excessive depth for optimum game use.

Type VI - Shrub swamps - Soils normally waterlogged during the growing season, but may occasionally have water depths to one foot. Predominant shrubs are willows or alders. Height of shrubs is usually five to fifteen feet. There may be an understory of sedge, cattail, reed canary grass, ferns, cane, or grasses.

Type VII - Wooded swamps - Soils waterlogged but may occasionally have water depths to one foot. Usually mature trees of over fifteen feet in height.

VIIA - Wooded deciduous swamp - Predominantly deciduous trees such as elm, ash, or mature willow. May have an understory of grasses or smartweeds.

VIIB - Coniferous swamp - Predominantly coniferous trees such as spruce, cedars, balsam fir, or cedar, but also including tamarack. May have an understory of mosses, leatherleaf, or brush.

Type VIII - Shrub bogs - Vegetation is predominantly such shrubs as leatherleaf or Labrador tea. Height is usually limited to three feet or less. There may be an understory of mosses and occasionally sedges.

Uses of this system:

Typing marshes by this system should be limited to actual field use with typing by such means as aerial photos not being broken down finer than Type II, III, IV, etc.

Marshes are often or more than one type. For example, a Type IV marsh may have bays of Type III or II. These marshes should be divided into two or more types.



NORTH DAKOTA

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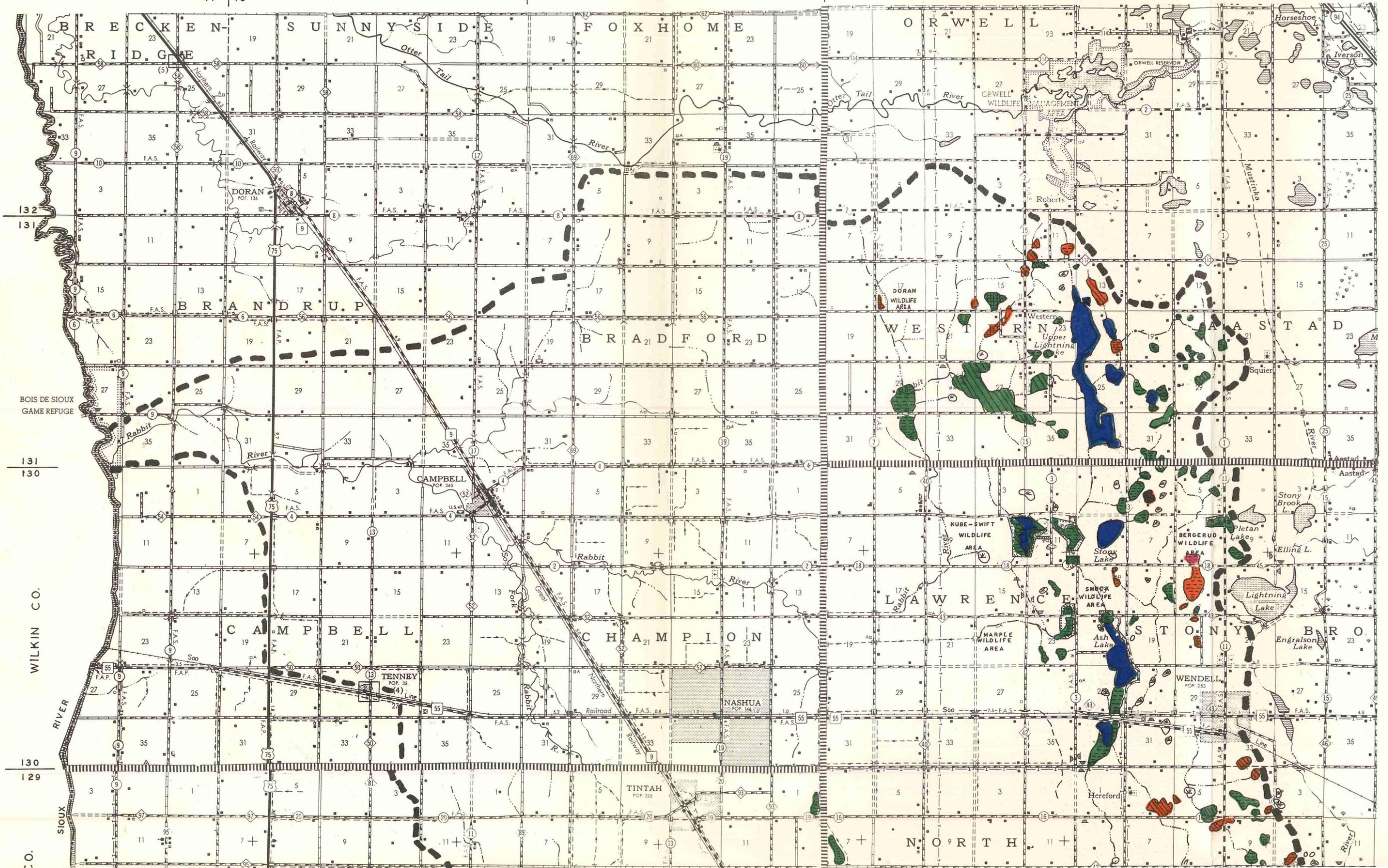
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BOIS DE SIOUX GAME REFUGE

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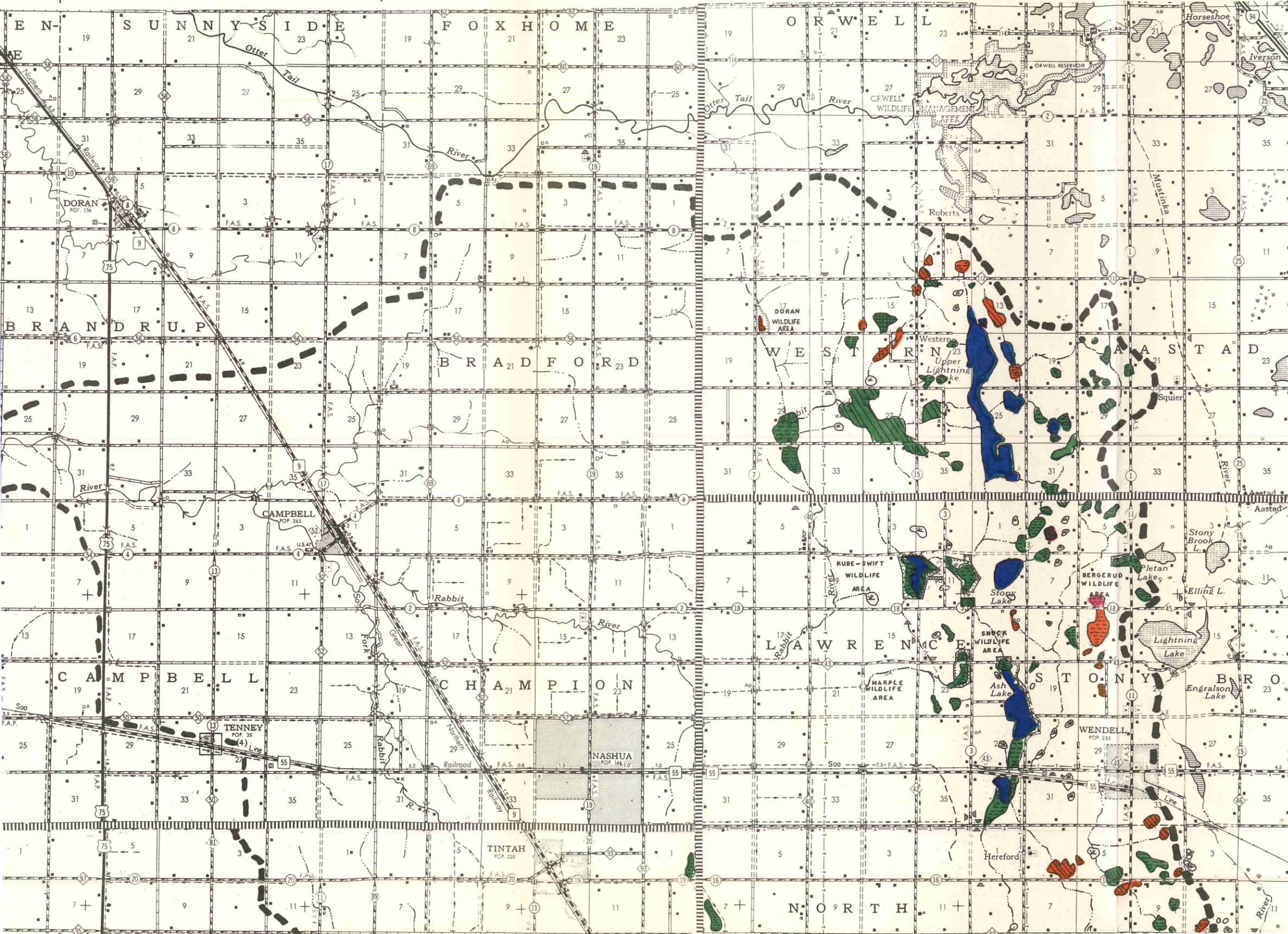
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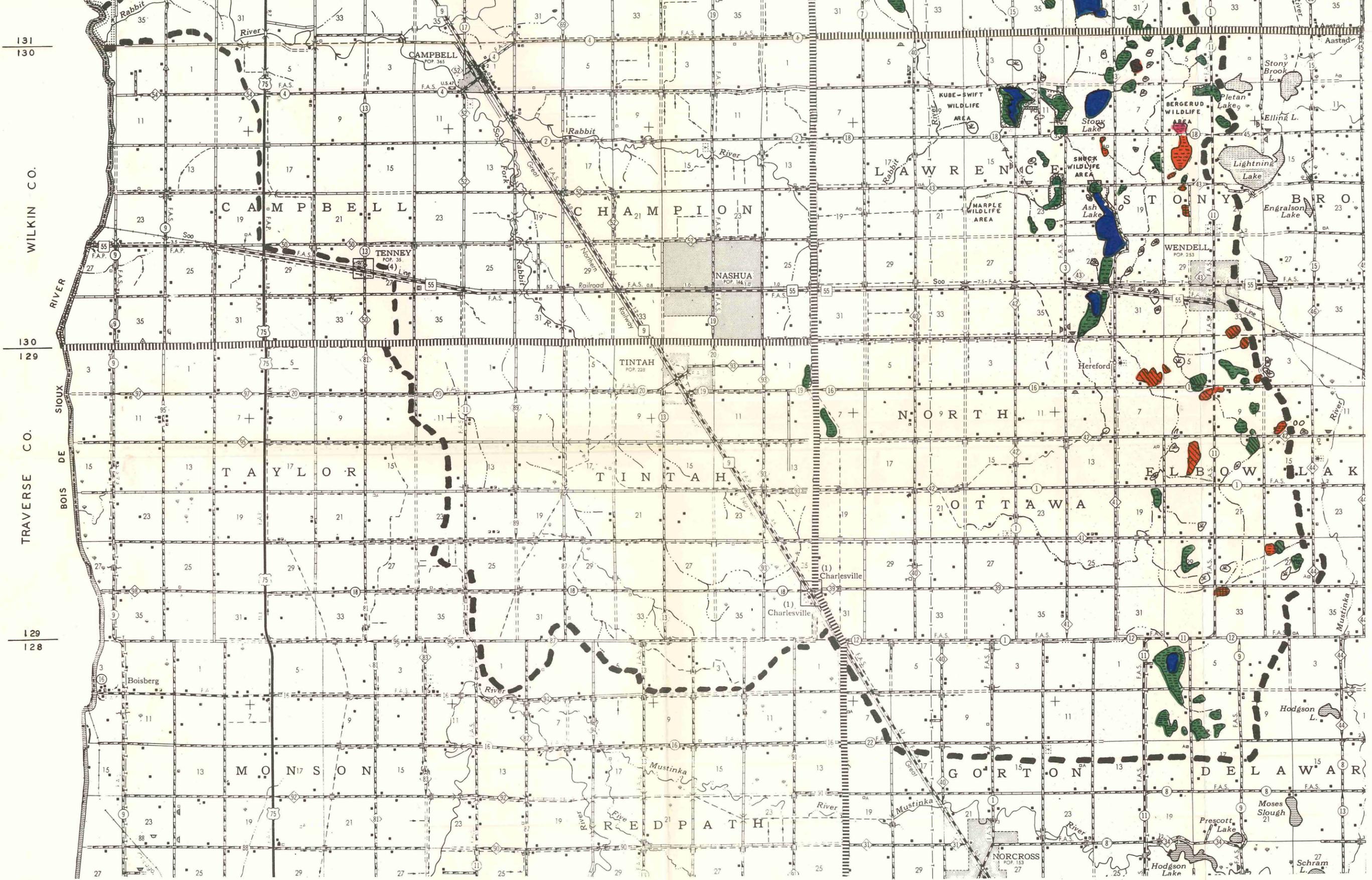
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**LEGEND**

- OPEN WATER WITH EMERGENTS
- CATTAIL CANE MARSH



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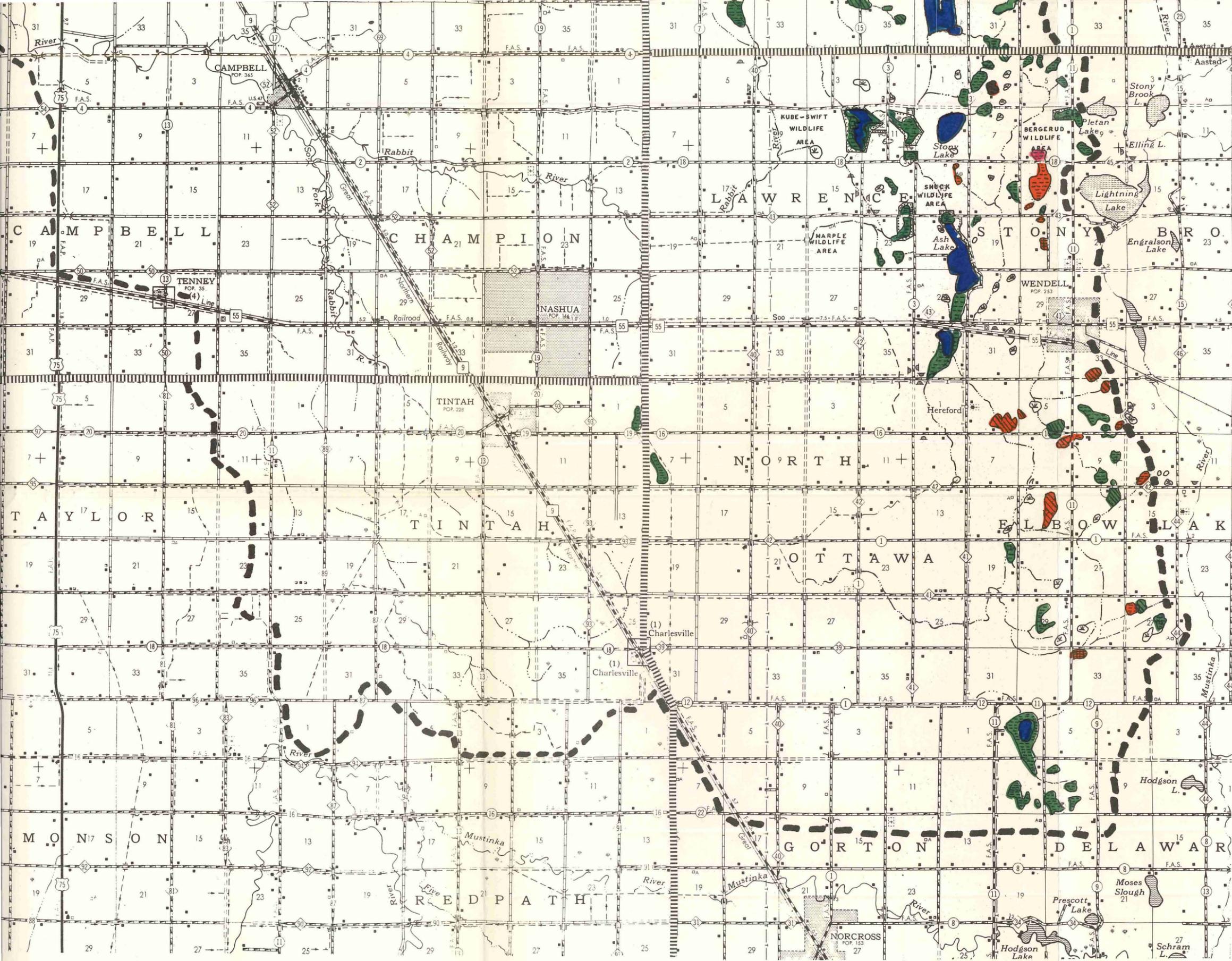
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**LEGEND**

- OPEN WATER WITH EMERGENTS
- CATTAIL CANE MARSH
- BULRUSH FLAG MARSH
- MUD FLAT EMERGENT MARSH
- SEDGE MEADOW
- FINE GRASS MEADOW
- COARSE GRASS MEADOW
- UNCLASSIFIED MARSHES
- STREAMS
- DITCHES
- STATE-OWNED WILDLIFE AREAS
- WATERSHED BOUNDARY
- IMPROVED ROADS
- UNIMPROVED ROADS
- DWELLING
- COUNTY LINE
- SCALE IN MILES

STATE OF MINNESOTA  
DEPARTMENT OF CONSERVATION

DIVISION OF GAME AND FISH  
RESEARCH AND PLANNING SECTION

**RABBIT RIVER WATERSHED**

OTTERTAIL, GRANT, WILKIN, TRAVERSE, CO.

FIELDWORK: E.M. B.M.	DRAWN BY: E.M.	MAP NO.: 20
DATE 9-11-62	DATE 12-1-63	FW-170





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