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# TALCOT LAKE WILDLIFE MANAGEMENT AREA MASTER PLAN, 1977-1986

Minnesota Department of Natural Resources



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**TALCOT LAKE WILDLIFE MANAGEMENT AREA  
MASTER PLAN, 1977-1986**

**Minnesota Department of Natural Resources  
Division of Fish and Wildlife  
St. Paul, Minnesota  
August, 1977**

## PREFACE

Concurrent with our population growth, our natural resources have been increasingly exploited through demands for raw materials and outdoor recreational opportunities. Recognizing Minnesota's existing and potential recreation and natural resource use problems, the 1969 legislature requested a 'Study of the Total Environment' called Project 80. The study, to guide the legislature in reviewing appropriation requests for the acquisition, development, and maintenance of state-owned lands used for outdoor recreation, was conducted by the State Planning Agency and the Department of Natural Resources.

Project 80 recommendations led to the Outdoor Recreation Act of 1975. The Act established an outdoor recreation system to preserve and properly use Minnesota's natural, cultural, and historical resources. The system is composed of 11 different classes of state-owned lands administered by the Department of Natural Resources, the Minnesota Historical Society, and the Department of Transportation (Appendix A). Each class within the system has a unique purpose and use. In this way, the system provides a variety of recreational opportunities with minimal use conflicts.

The Department of Natural Resources is preparing comprehensive management plans for 9 wildlife management areas having resident managers. The plans include present and projected regional perspectives, resource inventories, and demand and use analyses, as well as acquisition and development schedules, cost estimates, and resource management programs. Existing written and unwritten plans are synthesized into comprehensive documents. These are 10-year management plans, and they will be revised as new management practices develop, new resource philosophies evolve, and new problems are encountered.

Under a cooperative agreement with the State Planning Agency, the Department of Natural Resources completed plans for the Whitewater, Carlos Avery, Mille Lacs, Talcot Lake, and Lac qui Parle Wildlife Management Areas during the 1976-77 biennium. Plans for the Roseau River, Red Lake, Hubbel Pond, and Thief Lake Wildlife Management Areas will be completed during the 1978-79 biennium.

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## INTRODUCTION

Minnesota has an abundance of natural resources. To many people, Minnesota's wildlife management areas and their associated wildlife and plant communities are among the state's most precious resources. In accord with the Outdoor Recreation Act of 1975, this master plan outlines the management of the Talcot Lake Wildlife Management Area (WMA) through 1987. The plan was developed by defining area goals, examining existing conditions, identifying management considerations, and then developing appropriate management programs.

### Description

The Talcot Lake WMA includes 4,006 acres in Cottonwood and Murray counties (Figure 1). The unit includes Talcot Lake and all of its lakeshore, marsh, and bottomlands along the West Branch of the Des Moines River, and adjacent grassland and cropland. The area includes public hunting land, a state game refuge, and part of a state waterfowl refuge.

The management area is located between Windom and Fulda on State Highway 62. Talcot Lake is about

165 miles southwest of Minneapolis-St. Paul via U.S. Highway 169 and State Highway 60. Worthington (population 9,825) is the largest nearby city and is 24 miles southwest of the area via U.S. Highway 59.

### Legal Purpose

Minnesota's wildlife management areas are administered by the Commissioner of Natural Resources to perpetuate and, if necessary, reestablish quality wildlife habitats for the maximum production of a variety of wildlife species. These areas are land and water habitats having a high potential for wildlife production and providing opportunities for public hunting, trapping, fishing, and other compatible outdoor recreational uses (Minnesota Statutes, Section 86A.05, subd. 8, 1976).

Public lands have a limited potential for multiple recreational use. Minnesota has never actively encouraged the multiple recreational use of wildlife lands. The Commissioner of Natural Resources recognized those public uses directly associated with public enjoyment through observation, interpretation, and understanding

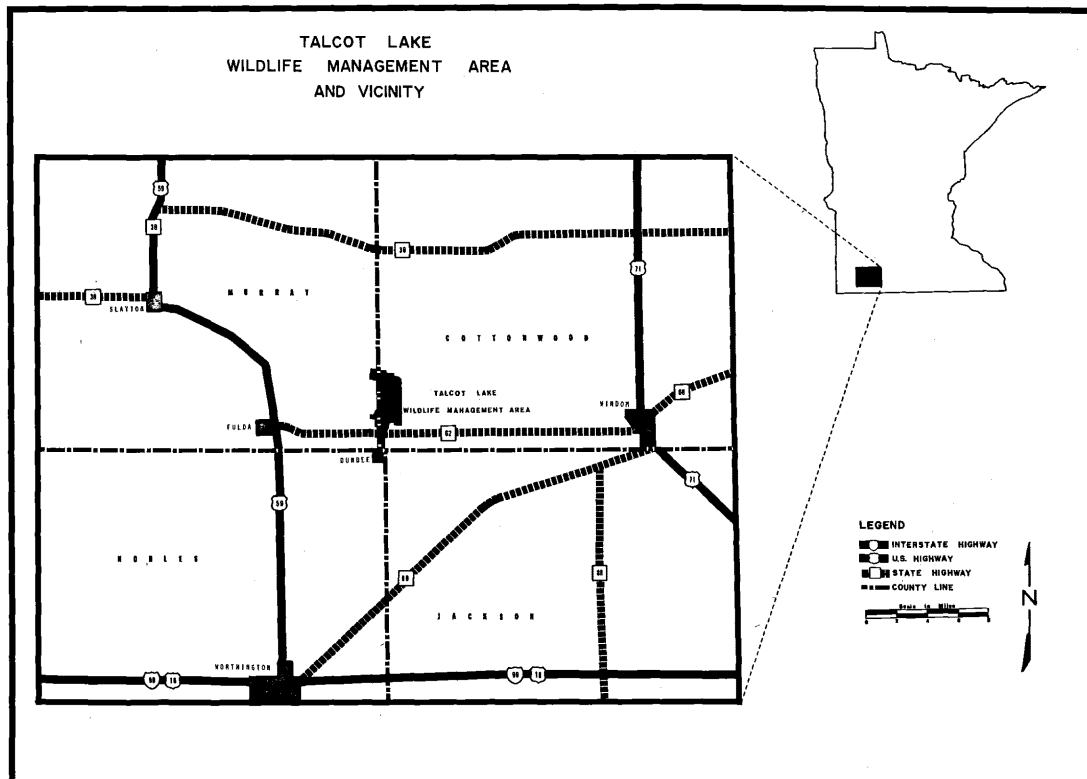


Figure 1

of fish and wildlife populations and habitats were recreational uses compatible with Minnesota's wildlife management areas. Similarly, the U.S. Fish and Wildlife Service has recently realized that national wildlife refuge goals are endangered by conflicts between the demand for recreation and the ability of the resource to accommodate the use (Pulliam 1974). The greatest contribution from our country's wildlife lands is the fostering of public uses directly associated with fish and wildlife and their habitats.

#### **Long-range Goals**

The primary goal of the Talcot Lake WMA is to maintain or restore a variety of grassland, wetland, forest, and agricultural habitats that will benefit diverse

resident and migratory wildlife. This goal will perpetuate wildlife populations and natural plant communities in a part of Minnesota where intensive land use has reduced wildlife populations and eliminated many natural areas.

Paralleling the primary goal, the area will be managed to provide public use consistent with the purpose of wildlife management areas. The area will be developed to provide opportunities for activities which are directly oriented towards wildlife and fish. Since taxes on sportsmen have paid for most of the development and management of the Talcot Lake WMA, the primary concern of the unit will be to provide quality public hunting, trapping, and fishing. People densities will be maintained at levels which will prevent excessive interference among users and will not endanger wildlife populations.

## **HISTORICAL AND ARCHAEOLOGICAL ASPECTS**

Historical knowledge is invaluable to natural resource management. Many of the land use problems and attitudes toward natural resource use arose with settlement of the region. Cognizance of the historical use of an area's natural resources, the strong points and shortcomings of these practices, and the policies regarding natural resource use is necessary to develop a comprehensive management plan.

#### **Local History**

Prehistorically, the prairies near Talcot Lake supported abundant wildlife. Bison from the plains, fish from the streams, and waterfowl from the marshes supported nomadic Sioux. Areas adjacent to Talcot Lake and the Des Moines River harbored the only stands of trees and probably provided shelter from harsh weather for wildlife and Indians.

An American Fur Company trading post at Talcot Lake was one of the first permanent contacts between white and Sioux people in southwestern Minnesota (Cottonwood County Historical Society 1970). The post's location suggests the Talcot Lake area was a local concentration point for Indian hunters and trappers.

The Treaty of Traverse des Sioux in 1851 and the defeat of the Sioux after an uprising in 1862 cleared the way for white settlement. Cottonwood County was surveyed in 1857, yet few settlers arrived until a rail line was completed to the site of Windom in 1871. Most pioneer settlers were American-born migrants from New England and the Midwest States. Substantial numbers of Russian, Norwegian, and German immigrants were recorded in a 1910 census (Brown 1916).

Early settlers often met harsh conditions. Prairie fires were common, and settlers endured a devastating 5-year grasshopper plague and severe winters in the

1870's. The soil and climate of the region, however, were conducive to agriculture, and some of the earliest land claims were in Southbrook Township. These claims were near Talcot Lake or the Des Moines River where timber was available (Brown 1916).

Concern with 'weeds' began early, and in 1897 county law decreed that all standing Russian thistle be destroyed. Shortly thereafter, a 'weed agent' was retained to enforce the law. Drainage of the numerous marshes and sloughs began soon after settlement, and in 1911 an 'excessive program of public ditching' (Terry 1943) began, and many wetlands were drained in the ensuing years. A drain tile factory operated in Windom 'several years' before 1916 (Brown 1916). Since settlement, a productive agricultural economy has developed with attendant service communities. The prairie and much of its wildlife were almost eliminated in favor of corn and soybeans.

#### **Wildlife Management Area History**

Talcot Lake was first established as a National Wildlife Refuge through the cooperation of state and federal agencies. The Minnesota Conservation Department initiated the project in 1935 with the purchase of about 1,000 acres of marsh and marginal cropland. Minnesota transferred 80 acres of land to the federal government for the construction of a dam at the Des Moines River outlet of Talcot Lake. The dam was constructed in 1936 by the federal Works Progress Administration to stabilize water levels on Talcot Lake and adjacent wetlands.

The Talcot Lake Migratory Bird Refuge was established in 1939 by the U.S. Biological Survey. In 1940, Minnesota deeded 725 acres and gave use permits for another 160 acres to the federal government. In 1948, a state and federal cooperative agreement shifted man-

agement of the area to Minnesota but retained federal ownership. Title to the project was returned to Minnesota in 1957 in exchange for state-owned lands in the Tamarac and Rice Lake National Wildlife refuges. Minnesota has managed the area as a game refuge, waterfowl refuge, and public hunting grounds since 1957.

#### Archaeological Aspects

The Minnesota State Archaeologist was consulted for information concerning archaeological sites on or near the area. Two known prehistoric sites occur. One may be a habitation site; the other has unknown significance, but stone implements have been found nearby

(Johnson 1977). Johnson also described the archaeological potential as: "The Des Moines River flowage is one of the most important zones for archaeological site locations in southwestern Minnesota. The 2 known sites in the management area reflect this."

#### Historical Sites

The Minnesota State Historical Society, Cottonwood County Historical Society, and a Minnesota Department of Natural Resources (DNR) inventory of historic areas (1971) were consulted for locations of historic sites on the area. There are no known historical sites in need of special management consideration.

## RESOURCE INVENTORY

The resources have been divided into 2 classes: abiotic and biotic. While each category influences the other, the abiotic conditions in an area generally determine the diversity, distribution, and density of the biotic resources. For this reason, the inventory of the abiotic resources is presented first, followed by the biotic resource inventory. Examination of existing resources and conditions, with an understanding of the food habits, cover requirements, population dynamics, and behavior of game and nongame wildlife, is needed to develop programs resulting in the sustained production and use of these populations.

#### Abiotic Resources

**Climate.** Temperature and precipitation data were tabulated for 3 reporting stations within a 25 mile radius of Talcot Lake (Table 1). The climate is 'continental' with hot summers and cold winters. Temperatures average about 14° F in January and 73° F in July. Usually more than 150 days per year have temperatures above 32° F (Minnesota Department of Agriculture 1975).

Yearly precipitation averages about 26 inches. Approximately two-thirds of the precipitation occurs during the growing season. Annual snowfall averages 30-40 inches (Baker *et al.* 1967), and heavy snows with blizzard conditions may occur.

**Geology.** Two distinct bedrock formations occur in the management area. Sedimentary rocks, mostly shale, siltstone, and sandstone, originating in the Cretaceous geological period, underlie most of the unit. Sioux quartzite, a Precambrian metamorphosed sandstone, underlies the unit south of Talcot Lake. Except for pockets of sandstone, most bedrock has low water permeability (Anderson *et al.* 1975).

The management area is situated on the eastern edge of an elevated area of resistant bedrock in Iowa, South Dakota, and Minnesota known as the Coteau des Prairie.

The Coteau des Prairie affected glacial activity and caused much moraine deposition resulting in a rolling topography with numerous wet depressions (Wright 1972). The Des Moines River lies in a glacial meltwater channel, thus most of the area is located on a glacial outwash of stones, gravel, and coarse sand. South of Talcot Lake, most of the unit is on a ground moraine of silty calcareous till containing lesser amounts of clay, sand, and gravel (Matsch 1972).

Mineral potential, based on a 'fair' knowledge of the geology of the area, was assessed by the Minnesota DNR, Division of Minerals (David Meinke, personal communication). Mineral potential was rated low, with the remote possibility that silver and uranium could occur on the unit.

**Soils.** The Talcot Lake WMA region is characterized by the Brunizem, or Prairie, great soil group. These soils are limited almost entirely to the corn belt of the United States (Millar *et al.* 1965) and developed in a semi-humid climate under tall grass prairie vegetation. Brunizems have a dark, granular topsoil more than 6 inches deep, are high in nutrients and organic matter, and have a blocky brown subsoil containing leached clay particles (Millar *et al.* 1965). These prairie soils are among the best farm soils in the world.

The soils of the Talcot Lake WMA are typical of the region. Many of the area soils were formed from stream channel sand and gravel and do not hold moisture well. This property severely limits agricultural productivity and the development of water impoundments.

The area north of Talcot Lake in the Des Moines River floodplain is dominated by soils formed from fine glacial sediments over sand and gravel. These soils are often flooded and have a high water table but are droughty. Soils formed from glacial till cover only a part of the area. Glacial till soils occur on rolling topography

Table 1. Average normal temperature, precipitation, and snowfall for the Talcot Lake WMA vicinity, 1941-1970.

Station	Month												Average Normal Total
	J	F	M	A	M	J	J	A	S	O	N	D	
Tracy													
Temperature (°F)	13.6	18.2	29.0	45.7	58.1	68.0	73.0	71.5	61.3	51.1	33.1	19.6	
Precipitation (in.)	0.57	0.77	1.37	2.30	3.43	4.08	3.52	2.67	3.04	1.60	1.05	0.69	25.09
Snowfall (in.)	5.0	7.0	9.5	2.5	T <sup>1</sup>	0.0	0.0	0.0	T <sup>1</sup>	T <sup>1</sup>	3.5	9.0	36.5
Windom													
Temperature (°F)	14.1	19.0	29.7	46.2	58.4	68.2	72.8	71.3	61.3	51.1	33.9	20.3	
Precipitation (in.)	0.51	0.68	1.42	2.35	3.61	4.50	3.74	3.30	3.54	1.70	0.95	0.70	27.00
Worthington													
Snowfall (in.)	4.5	6.0	9.0	2.0	T <sup>1</sup>	0.0	0.0	0.0	0.0	0.5	4.0	5.0	31.0

1. Less than 0.05 inches.

Source: Forecast Office, National Weather Service, U.S. Department of Commerce, Minneapolis, Minnesota.

Table 2. Soil characteristics of the Talcot Lake WMA.

Characteristics	Soil Map Designation Symbol	S.C.S. Soil Map Unit Number <sup>1</sup>
<b>High</b>		
Drainage	H-1	27, 41
Erosion potential	H-2	41, 102, 960
Fertility	H-3	94, 96, 130, 197
Flooding potential	H-4	18, 137, 1032
<b>Medium</b>		
Drainage	M-1	None <sup>2</sup>
Erosion potential	M-2	41, 102, 961
Fertility	M-3	None
Flooding potential	M-4	None
<b>Low</b>		
Drainage	L-1	86, 113, 114, 214, 219, 229, 247, 255
Erosion potential	L-2	None
Fertility	L-3	None
Flooding potential	L-4	None

1. U.S. Soil Conservation Service standard numerical designation for soil series in Minnesota. Names of soil series corresponding to these numbers are listed in Appendix B.

2. Soils with this characteristic do not occur on the management area.

at the fringes of the management area and are mostly loams and clay loams having good to excellent agricultural potential. These soils erode easily on the steeper slopes and are wet in low areas.

Soil types were mapped from U.S. Soil Conservation Service soil surveys. Thirty-three soil types from 29 soil series occur on the management area (Appendix B). The soil types were classified and mapped according to characteristics including drainage, erosion, flooding and fertility (Table 2 and Figure 2).

**Underground Hydrology.** The general pattern of ground water movement is from recharge areas in the uplands to lakes, streams, and marshes. Thus, the Talcot Lake WMA is a discharge area with the permeable sand and gravel of the uplands providing limited recharge.

Aquifers in the Talcot Lake vicinity may occur in surficial or buried sand and gravel deposits in glacial till or sandstone bedrock. Water-bearing sand and gravel usually lie close to the surface. The glacial till on the remainder of the area is greater than 200 feet thick and contains buried sand and gravel aquifers (Anderson *et al.* 1975).

Well flows of 100-500 gallons per minute in surficial deposits and 5-150 gallons per minute in buried aquifers are adequate for most purposes (Anderson *et al.* 1975). Water from both sources is extremely hard with concentrations of iron, manganese, and total dissolved solids often exceeding drinking water standards (Table 3). After extensive treatment, the water is potable but still distasteful to most people. Water from surficial deposits generally has lower dissolved solid concentrations. However, these aquifers are susceptible to contamination from surface sources due to the high permeability of the sand and gravel (Anderson *et al.* 1976).

**Watersheds.** The watershed upstream from the Talcot Lake Dam includes 526 square miles in Murray,

may be usable." Class 3B is the intermediate Industrial Cottonwood, Lyon, and Pipestone counties. Flow is southeast. Beaver Creek, Lime Creek, and many lakes, including Lake Shetek (3,596 acres) and Lake Sara (1,176 acres), contribute to the Des Moines River above Talcot Lake (Anderson *et al.* 1976). Lakes in the watershed absorb runoff and help reduce flood magnitudes. However, the management area is subject to flooding in the spring and after heavy rains.

The west fork of the Des Moines River flows into the area from the northwest, enters the north end of Talcot Lake, and exits Talcot Lake over a dam on the west side. This river meanders about 7.5 stream miles through the area while dropping about 10 feet in elevation. The river's floodplain includes about 1,700 acres on the unit.

Base flow is about 16 cubic feet per second (c.f.s.) at the Talcot Lake Dam (Anderson *et al.* 1976). Expected flood flows at the Talcot Lake Dam were calculated in an unpublished 1963 hydrologic study by the Division of Waters, Minnesota DNR. Maximum flows of at least 170 c.f.s. are expected each year. Extreme flows of 1,613 c.f.c. and 2,380 c.f.s. are expected at 5 and 10 year intervals, and the 30-year flood should be 3,820 c.f.s.

The river is navigable by canoe above the lake during spring high water until about June 1. Below the dam, canoe travel is possible from spring breakup until about July 1.

The West Fork of the Des Moines River has 2C and 3B interstate water quality classifications (Minnesota Pollution Control Agency 1973). Class 2C is the lowest quality Fisheries and Recreation classification, and it requires that the "quality be such as to permit the propagation and maintenance of rough fish or species commonly inhabiting waters of the vicinity under natural conditions and be suitable for boating and other forms of aquatic recreation for which the interstate waters

**Table 3. Hardness and dissolved solids in milligrams per liter of groundwater sampled in sand and gravel aquifers near the Talcot Lake WMA.**

	Well Location				Consumption Limits <sup>1</sup>
	5 mi. E. of Talcot Lake	Windom, MN.	Jackson, MN.	Dundee, MN.	
<b>Aquifer</b>	Surficial	Surficial	Surficial	Buried	
<b>Depth</b>	31 feet	100 feet	42 feet	80 feet	
<b>Hardness and dissolved solids</b>					
<b>Iron</b>	2.7	1.5	2.9	7.6	0.3
<b>Manganese</b>	0.77	0.29	0.59	0.36	0.05
<b>Nitrate</b>	0.00	4.4	4.4	-	45
<b>Dissolved solids</b>	600	360	650	1,600	500
<b>Hardness as CaCO</b>					
Calcium, magnesium	490	310	530	1,000	-
Non-carbonate	250	120	180	720	-

1. Recommended domestic consumption limits (Minnesota Pollution Control Agency 1973).  
Source: Anderson *et al.* 1977.

may be usable." Class 3B is the intermediate Industrial Consumption classification, and it requires that the "quality shall be such as to permit their use for general industrial purposes, except food processing, with only a moderate degree of treatment". Permissible ranges of pertinent substances and characteristics are defined by the Minnesota Pollution Control Agency (1973). Fecal coliform counts, an indicator of contamination by human or animal wastes, were measured in 1967 and 1968 at the Minnesota Pollution Control Agency sampling site above the Talcot Lake WMA. The counts indicate the water quality was probably within the 3B and 2C levels.

Twice during the summer of 1976, Des Moines River water samples were taken above Talcot Lake and immediately above the Talcot Lake Dam (Appendix C, Sites 1 and 5). Measurements of 10 chemical properties indicated that the water was moderately alkaline and moderately high in dissolved solids, including important plant nutrients such as nitrates and phosphate. Total hardness, ranging from 360 to 720 parts per million measured at Jackson in 1974, is very high (U.S. Department of the Interior 1974). In 1976, dissolved oxygen was not measured, but previous measurements in the Des Moines River by the Minnesota Pollution Control Agency indicate that oxygen levels are generally high except at times during the winter. The turbulence of the water flowing over the dam should aerate the water below the lake except during periods of no flow. Water temperatures of 27° C (81° F) have been recorded below Talcot Lake at Jackson, Minnesota (U.S. Department of the Interior 1974). Runoff with agricultural chemicals is the major source of water pollution.

Talcot Lake (678 acres) is entirely within the management area boundaries. The lake has 2 basins with the average depth of the north basin being less than the south basin. The maximum depth is about 6.5 feet, and more than half of the lake is less than 5 feet deep. The bottom of the south basin is mostly firm, sandy clay while more muck occurs in the north basin. The entire lake is navigable by motor boat or canoe.

The lake level is controlled by a 250-foot long clay-cored dike and a 175-foot long concrete weir (Figure 3). Dike elevation is 1,410 feet above sea level, and the crest of the weir is 1,405.84 feet above sea level. The water control structure is a 16.5 foot wide, manually operated radial gate with a sill height of 1,398.31 feet above sea level. The dam was originally constructed in 1936. Renovation of the dam in 1968 raised the lake levels 18 inches and provided more water control. The dam is operated to maintain maximum water depth.

The resident manager monitors lake levels from a gauge at the dam. In the last 30 years, water levels have ranged from 1,410.7 feet in 1969 to about 1,396 feet in 1976. The median high water level from 1960 to 1976 was 1,407.0 feet (no data from 1966 and 1967).

The lake is subject to frequent, major fluctuations. From 1909-1950, 34 floods of more than 300 c.f.s. were recorded. Two-thirds of these occurred from March 11 to April 20, one-sixth in June, and the remainder in July, August, and September.

The Section of Wildlife manages the entire shore of the lake. However, local farmers have 3 permanent stock watering easements, and Cottonwood County leases a public water access (Figure 3). The shoreline

is gently sloping on the south and north and moderate to very steep on the west and the east side of the south basin. Bank erosion, once a problem on the east side of the south basin, has been controlled. The lake is surrounded by grasslands, shrublands and forests, and variable stands of emergent aquatic vegetation.

Water quality in Talcot Lake (Appendix C, Site 4) is similar to the Des Moines River. The lake is moderately alkaline, high in dissolved solids including plant nutrients, and very turbid during open water. Visibility from the surface (Secchi disc readings) is about 1 foot in midsummer, and the water color ranges from brown to light green due to suspended silt and algae (unpublished Minnesota DNR game lake surveys 1950, 1962, 1967).

The dissolved oxygen in Talcot Lake has only been measured during the winter. During periods of heavy ice and snow cover, dissolved oxygen is often depleted. Very low oxygen levels, killing most fish in the lake, occurred in 6 years between 1964 and 1975. During calm, hot summer days, the deeper parts of the lake may also be anoxic.

Surrounding farms may pollute the lake. Runoff containing fertilizers and other chemicals may enter through the Des Moines River and the intermittent streams. The cattle watering easements are a minor pollution source. Dundee (population 138), located south of the unit along an inlet stream, is another potential pollution source. Pollutants from adjacent land are likely to be diluted and in part flushed from the lake due to the flow-through of the Des Moines River.

In addition to Talcot Lake, 1,200 acres of the area are wetlands along the Des Moines River floodplain and in depressions in the uplands. Marshes consist of 130 acres of deep marsh (Type IV), 890 acres of seasonal wetlands (Type III), and 180 acres of temporary wetlands (Type II).

A 25 acre impounded marsh with a 75 foot clay-cored earthen dike is located in the south one-half of Section 18, T. 105N., R. 38W., and a 50 acre impounded marsh with a 1,000 foot clay-cored earthen dike is located in the northeast quarter of the same section (Figure 3). Both dikes are equipped with drop inlet-type water control structures. Several dredged "doughnut-shaped" ponds with nesting islands have been constructed in the floodplain north of Talcot Lake.

The Des Moines River is the water source for almost all marshes. The marshes in the northeast corner of the area receive inflow from Oak Lake while the impoundment in the south half of Section 18 is supplied by intermittent streams. Marsh water tends to be very turbid due to suspended silt and the actions of rough fish. Water was sampled in 3 wetlands (Appendix C, Sites 2, 3, and 6), and 10 chemical parameters were measured. The water was moderately alkaline and high in dissolved ions. Total alkalinity and phosphorous and nitrate concentrations tended to be higher in these wetlands than in the Des Moines River or Talcot Lake. Marsh water also tended to be lower in sulfate and chloride ions. Water levels in all wetlands were very low when sampled in 1976.

#### **Biotic Resources**

*Vegetation.* The management area is in the grassland biome (Odum 1971). Before settlement, the up-



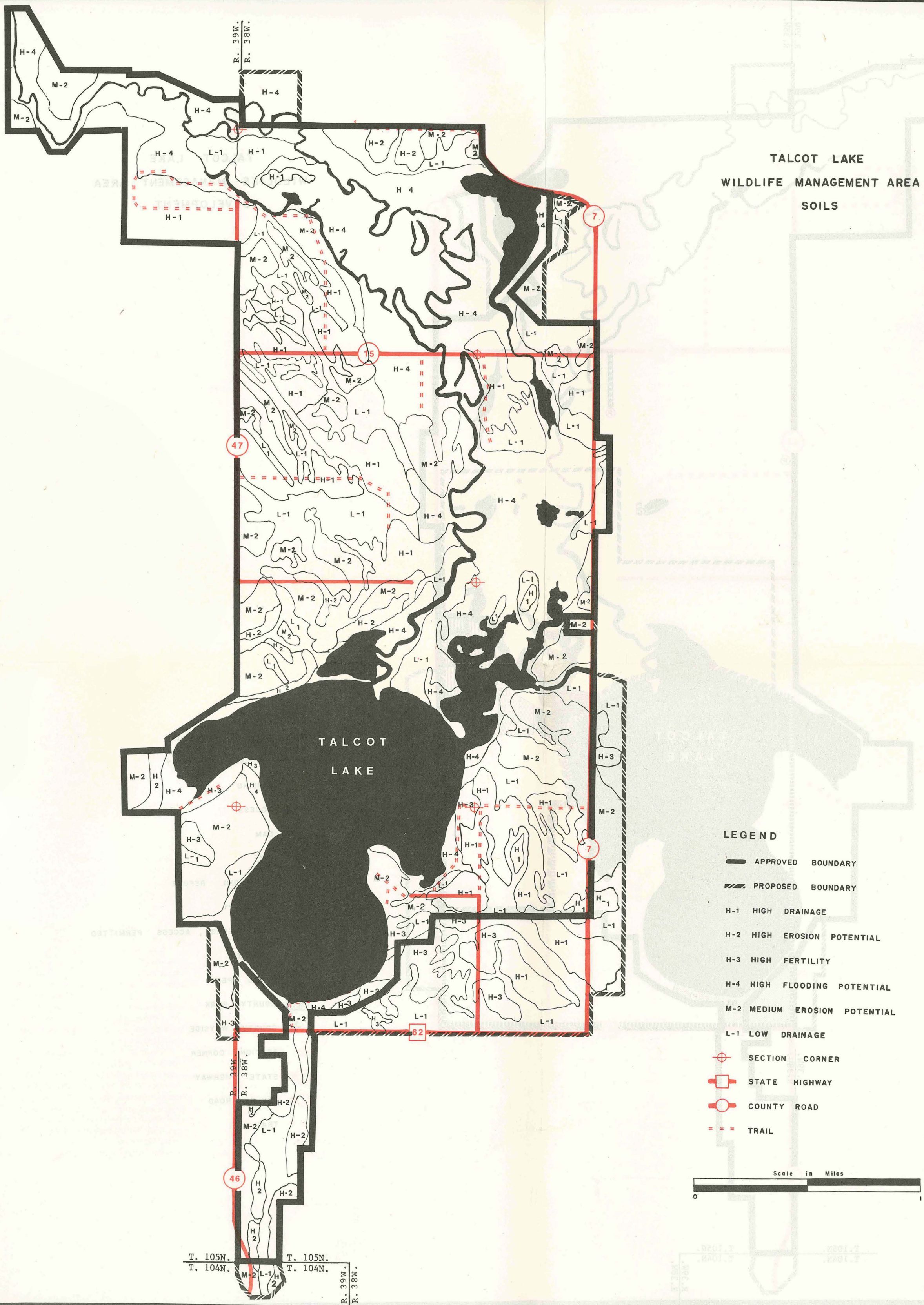
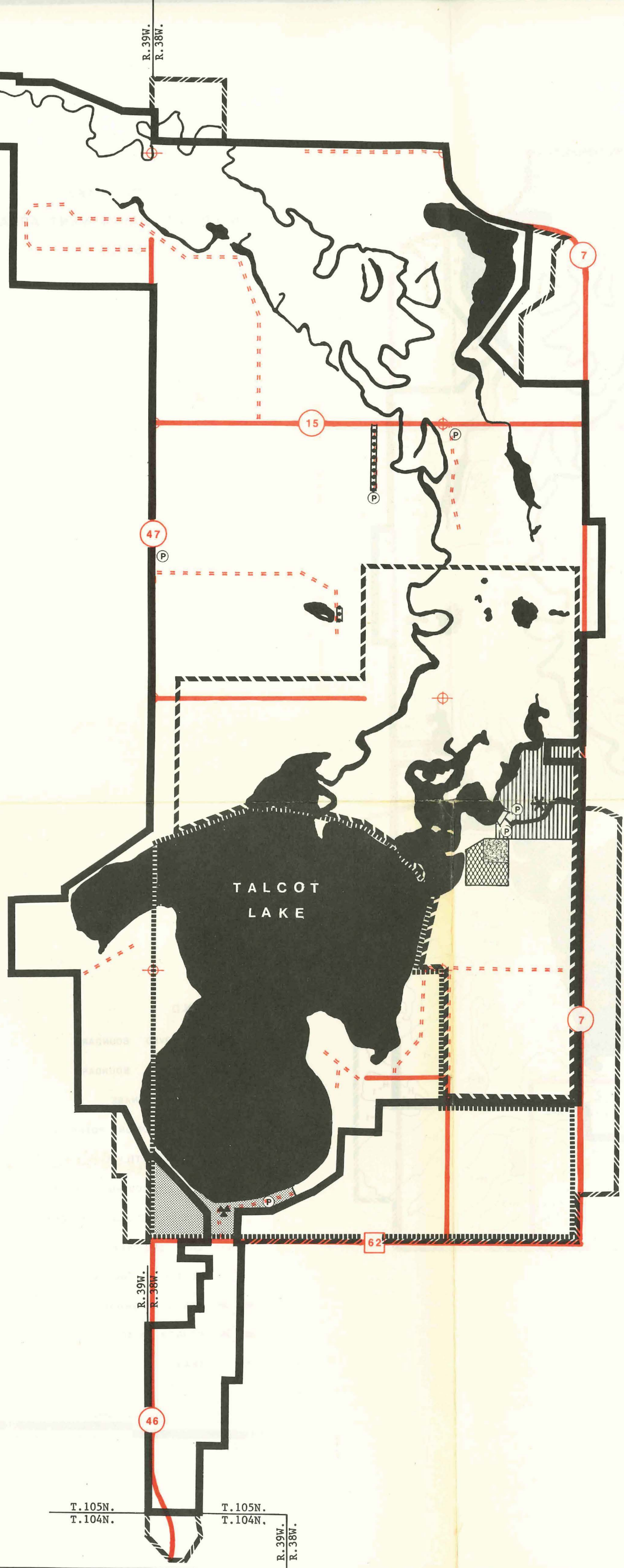


Figure 2



# TALCOT LAKE WILDLIFE MANAGEMENT AREA DEVELOPMENT



- LEGEND**
- APPROVED BOUNDARY
  - - - PROPOSED BOUNDARY
  - PARKING
  - ▲ ACCESS
  - ▬ DAM
  - ▬ DIKE
  - ..... WATERFOWL REFUGE
  - ▨ SANCTUARY
  - ▧ GAME REFUGE, ACCESS PERMITTED
  - ▩ NURSERY
  - ▦ GOOSE PEN
  - ▤ COUNTY PARK
  - \* COUNTY WAYSIDE
  - ⊕ SECTION CORNER
  - ▬ STATE HIGHWAY
  - COUNTY ROAD
  - - - TRAIL

Figure 3

lands were vegetated by stands of both tall and short prairie grasses, and the Des Moines River floodplain was a broad, shallow marsh. Small areas of bottomland hardwood forest occurred in narrow bands along the river, on the east side of the lake, and on upland marsh islands which were protected from fires. Fire rejuvenated and maintained the prairie by returning nutrients accumulated in ground litter to the soil and by preventing the encroachment of woody plants into prairie edges and wet meadows (Curtis 1959).

After settlement, the prairie grasslands were eliminated from the area by farming. The forests were utilized by settlers for fuel and lumber; the existing stands are second growth. Aquatic vegetation has been virtually eliminated from Talcot Lake due to actions of introduced rough fish, increased water depth following the construction of the dam, and an increased silt load in the river.

More recently, vegetational changes occurred as the wildlife management area was developed. Many small grain fields were either seeded to non-native grasses or planted with woody vegetation. In addition, the Talcot Lake Dam and several small impoundments have increased the wetland acreage. Marshes now exist where wet meadow or lowland brush once dominated.

Plant communities were delineated using 35 mm color infrared slides taken by Section of Wildlife personnel in July, 1976 (Figure 4). The vegetative composition of each community was described from intensive field work. Eight communities were identified, and the species composition and successional trends of each are described.

**Bottomland Hardwoods (BH).** Bottomland hardwoods occur on soils which are frequently flooded and usually water-saturated within a few inches of the surface. This community occurs in only a few areas, totaling 236 acres, and is dominated by American elm, green ash, and silver maple. Species composition of individual stands depends on the degree of disturbance by periodic flooding and the relative water content of the soil (Curtis 1959). Willows and cottonwood occur on soils disturbed by flooding and silt deposition. Box elder, bur oak, and basswood may grow on the upland edges where soil conditions are more stable.

Ground layer species include grasses and sedges in wet sites and wood nettle, stinging nettle, broad-leaved goldenrod, and other forbs in drier sites. Characteristic shrubs such as prickly ash, common buckthorn, currant, and goosberry occur most commonly in openings or along upland edges. Vines such as woodbine, wild grape, and poison ivy are found under closed canopies.

Stand composition is likely to remain constant unless a change in soil conditions occurs. American elms, dying of Dutch elm disease, will gradually be replaced in the overstory by other species. Fire is unlikely to alter the composition of large stands since most species are somewhat fire-resistant (Curtis 1959). However, recurring fires will prevent the invasion of upland and lowland sites by this community.

**Cover Plantings (CP).** These areas consist of shrubs planted for management purposes. Honeysuckle, wild plum, and caragana are usually planted. Small groves of red cedar, blue spruce, and ponderosa pine have been planted in several locations in conjunction with food plots.

Cover plantings are mostly non-native species that require special protection and cultivation. If not constantly maintained, the trees and shrubs will die and the site will revert to grassland. Severe drought and fire will eliminate these plantings.

**Lowland Brush (LB).** This community of sandbar

willow and other shrubs occurs on water saturated soils in the Des Moines River floodplain where soils are disturbed frequently by flooding and silt deposition. Forbs include false indigo, dogbane, smart weeds, and beggar ticks. Reed canary grass, rice cutgrass, and several sedges are also common.

If conditions remain stable or become drier plant species composition will change toward a cottonwood-willow bottomland hardwood forest. Increased water depth or the introduction of periodic fires will favor marsh vegetation.

**Prairie (Pr).** This community consists of abandoned pastures which have been invaded by bluegrass and quack grass but contain remnants of the original prairie vegetation. Repeated fires will favor the reestablishment of second growth prairie dominated by little bluestem with needle grasses, dropseed grasses, big bluestem, and sideoats gramma also occurring.

**Old Field (OF).** This community is dominated by grasses and forbs invading inactive agricultural lands. Smooth brome grass dominates, but lesser amounts of quack grass, timothy, and bluegrass also occur. Forbs present include goldenrods, sweet clovers, asters, and Canada thistle.

Without disturbance, shrubs and tree seedlings will become established in wetter areas or near the edge of the bottomland hardwood community, and succession is toward a forest dominated by cottonwood, American elm, and box elder.

Repeated fires will favor the reestablishment of prairie dominated by big and little bluestem with needle grasses, dropseed grasses, switch grass, and Indian grass occurring.

**Agricultural Lands (C).** In 1975, 231.3 acres of corn, 88.4 acres of winter wheat, 68.3 acres of alfalfa, and 66.5 acres of oats were planted on the area for a total of 454.5 acres of agricultural land.

**Temporary Wetlands (Type II).** Temporary wetlands occur on sites where shallow water stands for several weeks in the spring, and soils range from water-saturated to moist. Soil moisture influences species composition. On the wettest sites, stands of narrow-leaf and broadleaf cattail dominate. In drier areas, reed canary, rice cutgrass, and sedges form dense stands. Forbs, such as smartweeds, docks, and mints, occur on disturbed sites.

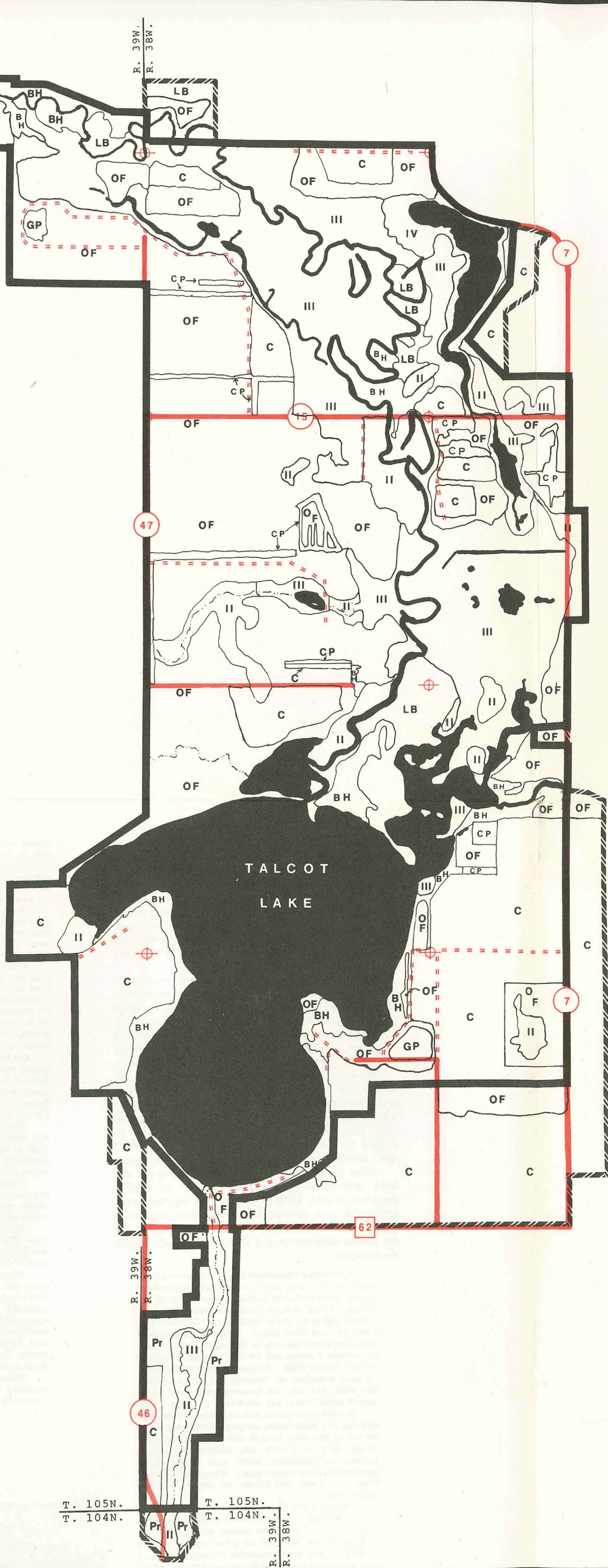
Succession is to wet grasslands. If water levels are increased in depth and duration, the site will change to a seasonal wetland or deep marsh. Fire exclusion will



An example of a type IV deep marsh.



TALCOT LAKE  
WILDLIFE MANAGEMENT AREA  
VEGETATION



LEGEND

- APPROVED BOUNDARY
- - - PROPOSED BOUNDARY
- BH BOTTOMLAND HARDWOOD
- LB LOWLAND BRUSH
- C CROPLAND
- OF OLD FIELD
- CP COVER PLANTING
- Pr PRAIRIE
- ~ INTERMITTENT STREAM
- II TEMPORARY WETLAND
- III SEASONAL WETLAND
- IV DEEP MARSH
- GP GRAVEL PIT
- ⊕ SECTION CORNER
- STATE HIGHWAY
- COUNTY ROAD
- - - TRAIL

Scale in Miles  
0 1

Figure 4



permit invasion by shrubs and small trees characteristic of the lowland brush communities.

**Seasonal Wetlands (Type III).** This wetland has water depths up to 3 feet in the spring, but the standing water may disappear by mid to late summer in many years. Dense stands of narrowleaf and broadleaf cattail predominate in shallower basins. Deeper areas with open water may have scattered emergent, submergent, or floating aquatic plants. Arrowhead and giant burreed are common emergents. Pondweeds, water milfoil, and common bladderwort are common submergent species. Often small potholes may be covered by a mat of floating plants, particularly the duckweeds. As water levels recede, the mudflats of the open water areas may be colonized by moist soil plants, such as smartweeds, dock, and the beggar-ticks.

Succession occurs as wetlands fill. Temporary wetlands, lowland brush, and possibly bottomland hardwoods will replace seasonal wetlands. Increasing water levels will encourage deep marshes.

**Deep Marsh (Type IV).** Community composition is similar to the seasonal wetlands except that the water is deeper and more permanent. This community has up to 5.5 feet of water in the spring and retains water during all but the driest years.

The relative stability of water levels sustains a more diverse submergent and emergent plant community than occurs in seasonal wetlands. Successional trends are identical to seasonal wetlands. Periodic fires will recycle nutrients and increase the vigor of the vegetation but will not change the community species composition.

Table 4. Game birds occurring in the Talcot Lake WMA vicinity.

Common Name	Year-round Resident	Migrant	Summer Resident
<b>Nonresident</b>			
Whistling swan <sup>1</sup>		C	
White-fronted goose		U	
Snow goose		C	
Black duck		R	
Green-winged teal		A	
American wigeon		C	
Canvasback		U	
Greater scaup		R	
Lesser scaup		C	
Common goldeneye		U	
Bufflehead		U	
White-winged scoter		R	
Common merganser		U	
Red-breasted merganser		U	
Sandhill crane <sup>1</sup>		U	
American woodcock		R	
<b>Resident</b>			
Canada goose		C	C
Mallard		A	A
Gadwall		C	R
Pintail		U	U
Blue-winged teal		A	A
Northern shoveler		U	U
Redhead		U	U
Ring-necked duck		U	U
Ruddy duck		C	U
Hooded merganser		U	R
Wood duck		C	C
Ring-necked pheasant	C		
Gray partridge	C		
Virginia rail		U	U
Sora		C	C
Common gallinule		R	R
American coot		A	A
Common snipe		C	C
Mourning dove <sup>1</sup>		A	A

A = abundant, C = common, U = uncommon, R = rare. 1. Not presently hunted in Minnesota

**Birds.** The management area provides habitat for many different migratory and resident birds. Records of early explorers and residents indicate that the bird diversity and abundance was greater prior to settlement and extensive agriculture. The trumpeter swan and sharp-tailed grouse once were common in the region (Roberts 1932). Prairie chickens became abundant with early agriculture but were extirpated in the early 1900's as land use became more intensive. Other birds which readily adapt to man's land use increased from former numbers or have become established since settlement.

A list of birds known to occur or probably occurring on the area was compiled from lists prepared by Robert Janssen of the Minnesota Ornithologists' Union and the resident manager. A total of 241 bird species has been observed or is likely to occur in the vicinity. There are 16 year-round resident species and 96 additional summer residents. A total of 113 migrants and 17 winter visitors may occur on the area. Breeding species include representatives of the grassland and deciduous forest biomes; migrant species represent the grassland, coniferous forest, and tundra biomes.

Nineteen game birds nest on the management area (Table 4). In addition, 14 game species migrate through the area. Ring-necked pheasant and gray partridge are resident upland game birds. Mallard, blue-winged teal, wood duck, and Canada geese are the common breeding waterfowl. Other breeding game birds include rails, common snipe, American coot, and common gallinule.

The giant Canada goose, once eliminated from much of its range (Hanson 1965), was reestablished on the area by the Minnesota DNR. Flightless geese, 8 to 10 weeks old, were moved to the area in 1968, 1969, and 1975 and confined in a 35-acre pen. When 2 years old, the birds were released during February.

In 1976, approximately 100 pairs of geese nested on the management area. About 300 young were reared to flying stage, and the fall population of resident geese

was approximately 600 including non-breeding birds. The resident goose flock attracts Canada geese during migrations. Peak Canada goose numbers were 2,600, 3,800, and 4,000 geese in 1974, 1975, and 1976 (Table 5), an increase of 53 percent since 1974. These migrations were "medium-sized" Todd's Canada geese from the Eastern Prairie Population (Bellrose 1975) and giant Canada geese from elsewhere in southwestern Minnesota.

Canada goose use days for September 30 to November 25 were calculated by multiplying each weekly count (Table 5) by 7. Counts were estimated when data were missing. Estimated Canada goose use days ranged from 135,800 in 1974 to 186,200 in 1976 for a 37 percent increase.

Talcot Lake has traditionally attracted migrating mallards in the fall. In the late 1950's and early 1960's, peak mallard counts were about 25,000 to 30,000, and even larger concentrations occurred in the early 1950's. Peak mallard numbers declined to 16,000 in 1976 (Table 5). In 1976, mallard use days were estimated at 409,500 between October 1 and November 10.

Snow geese stop at the area in the fall, but peak numbers vary. Generally 250 to 500 are present through October and early November. Peak numbers were 400 in 1975 and 1,200 in 1976.

Pheasants are more abundant on the management area than on surrounding farmland. However, pheasant populations in southwestern Minnesota have declined over the past 20 years. August, 1974 roadside pheasant counts in Cottonwood and Murray counties were 50 and 84 pheasants per 100 miles. These counts were 51 and 66 percent lower than in 1966. Pheasant counts per 100 miles in 9 southwestern Minnesota counties declined to 7 in 1976 from an average of 366 between 1955 and 1964. No pheasant censuses have been conducted on the management area.

The management area's habitats attract a variety of other migrating and breeding birds (Table 6). Wooded

**Table 5. Weekly estimates of Canada goose, mallard, and snow goose numbers at the Talcot Lake WMA, 1974-1976.**

1974 <sup>1</sup>			1975 <sup>1</sup>				1976			
Date	Canada Geese	Mallards	Date	Canada Geese	Mallards	Snow Geese	Date	Canada Geese	Mallards	Snow Geese
10-15	2,300	-2	9-30	1,000	3,000	0	10-6	3,400	2,500	300
10-22										
10-22	2,000	2,000	10-7	2,000	5,000	250	10-13	3,500	5,000	300
10-29	2,600	6,000	10-15	3,100	3,000	300	10-19	4,000	15,000	500
11-5	2,500	10,000	10-22	3,800	3,000	400	10-26	3,000	16,000	1,200
11-12	2,600	10,000	10-29	3,000	5,000	250	11-3	4,000	10,000	-2
11-28	2,500	17,000	11-5	3,200	6,000	0	11-10	2,700	10,000	500
11-26	1,900	2,000	11-14	-2	20,000	-2				
			11-18	3,000	2,000	0				
			11-26	1,200	-2	-2				

1. No snow goose estimates.

2. No estimates.

Table 6. Nongame birds occurring in the Talcot Lake WMA vicinity.

Common Name	Year-round Resident	Summer Migrant	Winter Resident	Visitor	Common Name	Year-round Resident	Summer Migrant	Winter Resident	Visitor
Nonresident					Nonresident				
Common loon		U			Swainson's thrush		U		
Red-necked grebe		U			Gray-cheeked thrush		U		
Horned grebe		C			Veery		U		
White pelican		C			Golden-crowned kinglet		C		
Double-crested cormorant		C			Ruby-crowned kinglet		C		
Cattle egret		R			Water pipit		U		
Turkey vulture		U			Northern shrike				R
Goshawk			U		Solitary vireo		U		
Sharp-shinned hawk		U			Philadelphia vireo		R		
Cooper's hawk		R			Black and white warbler		C		
Broad-winged hawk		C			Golden-winged warbler		U		
Swainson's hawk		U			Tennessee warbler		C		
Rough-legged hawk			U		Orange-crowned warbler		C		
Golden eagle		R			Nashville warbler		C		
Bald eagle		U			Northern parula		U		
Osprey		U			Magnolia warbler		U		
Peregrine falcon		R			Cape May warbler		R		
Merlin		R			Black-throated blue warbler		R		
Semipalmated plover		U			Yellow-rumped warbler		C		
American golden plover		C			Black-throated green warbler		U		
Black-bellied plover		U			Blackburnian warbler		U		
Ruddy turnstone		U			Chestnut-sided warbler		U		
Lesser yellowlegs		C			Bay-breasted warbler		U		
Willet		U			Pine warbler		U		
Red knot		R			Palm warbler		U		
Pectoral sandpiper		C			Ovenbird		C		
White-rumped sandpiper		C			Northern waterthrush		U		
Baird's sandpiper		U			Connecticut warbler		U		
Least sandpiper		C			Mourning warbler		U		
Dunlin		U			Wilson's warbler		U		
Semipalmated sandpiper		C			Canada warbler		U		
Western sandpiper		U			Rusty blackbird		C		
Sanderling		U			Evening grosbeak				U
Short-billed dowitcher		U			Purple finch				U
Long-billed dowitcher		C			Hoary redpoll				U
Stilt sandpiper		C			Common redpoll				C
Buff-breasted sandpiper		R			Pine siskin				R
Marbled godwit		U			Red crossbill				R
Hudsonian godwit		U			White-winged crossbill				R
American avocet		R			Rufous-sided towhee		U		
Wilson's phalarope		C			Le Conte's sparrow		U		
Northern phalarope		U			Sharp-tailed sparrow		R		
Herring gull		C			Dark-eyed junco				A
Ring-billed gull		A			Tree sparrow				C
Franklin's gull		A			Field sparrow		U		
Bonaparte's gull		U			Resident				
Common tern		R			Eared grebe		U	U	
Caspian tern		U			Western grebe		U	U	
Snowy owl			R		Pied-billed grebe		C	C	
Burrowing owl		Cas			Great blue heron		C	C	
Long-eared owl		R			Green heron		U	R	
Short-eared owl		R			Great egret		U	U	
Saw-whet owl		R			Black-crowned night heron		U	U	
Yellow-bellied sapsucker		U			Least bittern		R	R	
Alder flycatcher		U			American bittern		U	U	
Olive-sided flycatcher		U			Red-tailed hawk		C	C	
Red-breasted nuthatch		U			Marsh hawk		U	U	
Brown creeper		U			American kestrel		C	C	
Winter wren		U			King rail		R	R	
Hermit thrush		U			Killdeer		C	C	
Harris's sparrow		C			Upland sandpiper		U	U	
White-crowned sparrow		C			Spotted sandpiper		C	C	
White-throated sparrow		C			Solitary sandpiper		U	U	
Fox sparrow		C			Greater yellowlegs		C	C	
Lincoln's sparrow		U			Forster's tern		C	C	
Lapland longspur			C		Black tern		C	C	
Smith's longspur			R		Rock dove	C			
Chestnut-collared longspur			R		Yellow-billed cuckoo		U	U	
Snow bunting			C		Black-billed cuckoo		U	U	
					Screech owl	U			
					Great horned owl	U			

A = abundant, C = common, U = uncommon, R = rare, Cas = casual (very rare).

Table 6. (Continued)

Common Name	Year-round Resident	Migrant	Summer Resident	Winter Visitor	Common Name	Year-round Resident	Migrant	Summer Resident	Winter Visitor
Resident					Resident				
Barred owl	U				Cedar waxwing		C	C	
Common nighthawk		C	C		Loggerhead shrike		R	R	
Chimney swift		C	C		Starling	A			
Ruby-throated hummingbird		U	U		Yellow-throated vireo		U	U	
Belted kingfisher		C	C		Red-eyed vireo		C	C	
Common flicker		C	C		Warbling vireo		C	C	
Pileated woodpecker	R				Yellow warbler		C	C	
Redheaded woodpecker		C	C		Common yellowthroat		C	C	
Hairy woodpecker	C				American redstart		C	R	
Downy woodpecker	C				House sparrow	A			
Eastern kingbird		C	C		Bobolink		C	C	
Western kingbird		C	C		Western meadowlark		A	A	
Great crested flycatcher		U	U		Yellow-headed blackbird		A	A	
Eastern phoebe		U	U		Red-winged blackbird		A	A	
Willow flycatcher		U	U		Orchard oriole		U	U	
Least flycatcher		C	C		Northern oriole		C	C	
Eastern wood pewee		U	U		Brewer's blackbird		U	U	
Horned lark		A	A		Common grackle		A	A	
Tree swallow		A	A		Brown-headed cowbird		A	A	
Bank swallow		C	C		Scarlet tanager		R	R	
Rough-winged swallow		C	C		Cardinal	R			
Barn swallow		A	A		Rose-breasted grosbeak		C	C	
Cliff swallow		C	C		Indigo bunting		C	C	
Purple martin		C	C		Dickcissel		C	C	
Blue jay	C				American goldfinch		C	C	
Common crow	C				Savannah sparrow		C	C	
Black-capped chickadee	C				Grasshopper sparrow		U	U	
White-breasted nuthatch	C				Vesper sparrow		C	C	
House wren		C	C		Chipping sparrow		C	C	
Long-billed marsh wren		C	C		Clay-colored sparrow		C	C	
Short-billed marsh wren		C	C		Swamp sparrow		C	C	
Gray catbird		C	C		Song sparrow		A	A	
Brown thrasher		C	C						
American robin		A	A						
Eastern bluebird		C	C						

A = abundant, C = common, U = uncommon, R = rare, Cas = casual (very rare).



and brushy areas harbor warblers and other songbirds. Shorebirds and wading birds are abundant during migrations and the summer. Bald eagles are common in late summer and fall. Golden eagles are regular but uncommon fall visitors. White pelicans are seen from spring through early fall.



Blue-winged teal commonly nest at Talcot Lake WMA.

**Mammals.** The mammal diversity and abundance on the management area are probably lower than before white settlement. Species adapted to the prairies have vanished or become scarce. Timber wolves were once common and were still bountied locally in 1900 (Brown 1916). White-tailed deer and beaver, once abundant but nearly extirpated by the early 1900's, are once again common. The early occurrence of many mammals is not documented due to their inconspicuous nature and lack of economic importance.

A list of mammal species inhabiting the area was prepared from verified location records provided by Dr. E. B. Hazard, Bemidji State University, and by consulting with the resident manager. Forty-four species occur commonly on the management area (Table 7). Mule deer and pronghorn occur as rare transients, and 3 small mammal species probably occur.

About 60 white-tailed deer are year-round residents, but numbers increase during the winter as deer from adjoining land seek shelter and food. Aerial censuses show that winter populations have increased dramatically since 1955 and have been relatively stable since 1973 (Table 8). The major increase in 1975 was probably due to severe weather conditions.

Eleven regularly occurring mammal species are protected by Minnesota laws. The white-tailed deer is intensively hunted on the area. For the 2 rabbit and squirrel species, hunting pressure is very light. Muskrat, mink, and beaver are trapped under permit. The raccoon and

Table 7. Mammals occurring in the Talcot Lake WMA vicinity.

Game	Nongame
Virginia opossum	Masked shrew
Eastern cottontail	Short-tailed shrew
White-tailed jackrabbit	Eastern mole
Gray squirrel	Little brown myotis
Fox squirrel	Keen's myotis <sup>3</sup>
Beaver	Silver-haired bat <sup>3</sup>
Muskrat	Big brown bat
Mink	Red bat
Raccoon	Hoary bat
Mule deer <sup>1</sup>	Eastern chipmunk
White-tailed deer	Woodchuck
Pronghorn <sup>1</sup>	Richardson's ground squirrel
Coyote	Thirteen-lined ground squirrel
Red fox	Franklin's ground squirrel
Gray fox	Red squirrel
Short-tailed weasel	Southern flying squirrel <sup>3</sup>
Long-tailed weasel	Plains pocket gopher
Badger	Plains pocket mouse
Bobcat <sup>2</sup>	Western harvest mouse
Spotted skunk	Deer mouse
Striped skunk	White-footed mouse
	Northern grasshopper mouse
	Meadow vole
	Prairie vole
	Norway rat
	House mouse
	Meadow jumping mouse
	Least weasel

1. Rare transient occurrence. 2. Possible occurrence. 3. Probable occurrence.

**Table 8. Number of white-tailed deer counted in winter aerial censuses on Talcot Lake WMA from 1955 to 1976.**

Year	Number	Year	Number
1955	59	1965	101
1956	55	1969	150
1959	49	1971	153
1960	49	1973	237
1962	101	1974	201
1963	94	1975	439
1964	158	1976	271

red and gray foxes are both hunted and trapped.

The remaining 32 regular species are unprotected by Minnesota statutes but receive full protection on the management area between March 1 and September 1. Weasels, badgers, and skunks are taken during trapping for other species but are not actively sought due to their low commercial value.

*Fish.* A fish survey of the Des Moines River and lakes and streams in the watershed was conducted in

July, 1973 (Table 9). Sites above and below Talcot Lake were seined by Minnesota DNR personnel (unpublished Section of Fisheries data). Fish species' presence was also determined from Minnesota DNR stocking records and rough fish removed from Talcot Lake on a permit basis (unpublished Section of Fisheries data). Since 1971, more than 1 million game fish, mostly walleye fry, have been stocked by the Minnesota DNR (Table 10).

Eight game fish and 21 nongame fish species are known to occur in the Des Moines River Watershed. Game fish seined most frequently were yellow perch, orange spotted sunfish, northern pike, and black crappie. The most commonly caught rough fish were white sucker, black bullhead, carp, and smallmouth buffalo. Forage fish included fathead minnows, river shiners, spotfin shiners, sand shiners, and johnny darters. Many other species probably occur but have not been documented.

Game fish most commonly caught are northern pike, black crappie, walleye, and bluegill. Fish growth is excellent. However, winter fish kills occur when heavy ice and snow cover block out sunlight. Since 1955, Talcot Lake was opened in 9 years to unlimited fishing. In anticipation of winter kills, adult game fish are often netted and transplanted to deeper lakes.

Rough fish populations are high despite intensive removal. These fish contribute to the lake's turbidity by disturbing bottom sediments. In the 1960's, the Section of Fisheries planned to eradicate the rough fish in the Des Moines Watershed above Talcot Lake. A rough fish control screen was installed, but eradication plans have been abandoned.

**Table 9. Fish occurring in the West Fork Des Moines River Watershed.**

Game Fish	Number seined in survey	Nongame Fish	Number seined in survey
Northern pike	12	Carp	319
Black crappie	12	Stoneroller	9
White crappie	2	Creek chub	739
Green sunfish	9	Fathead minnow	2,791
Bluegill	0 <sup>1</sup>	Bluntnose minnow	306
Orange spotted sunfish	59	Brassy minnow	45
Yellow perch	122	Common shiner	311
Walleye	1	Spotfin shiner	832
		Sand shiner	488
		River shiner	2,407
		Bigmouth buffalo	19
		Smallmouth buffalo	137
		River carpsucker	1
		White sucker	494
		Yellow bullhead	2
		Black bullhead	346
		Tadpole madtom	6
		Blackside darter	5
		Johnny darter	476
		Barred fantail darter	1
		Freshwater drum	2

1. Stocked by the Minnesota DNR in Talcot Lake but not found in Des Moines river seining survey.  
Source: Minnesota DNR, Section of Fisheries files.

Table 10. Fish species stocked or harvested from Talcot Lake, 1970-1975.

Game fish	Number stocked	Rough fish	Pounds harvested
Walleye		Carp	149,313
fry	1,060,000	Bullheads <sup>1</sup>	35,864
fingerlings	10,579	Buffalo <sup>2</sup>	113,512
Northern pike		Suckers <sup>3</sup>	4,820
adults	128		
fingerlings	35,063		
Black crappie			
adults	5,150		
Bluegill			
adults	920		

1. Primarily black bullheads; uncommonly yellow bullheads.

2. Smallmouth buffalo and bigmouth buffalo.

3. Probably white suckers.

## OPERATIONS

The operation of the Talcot Lake WMA relies on capital improvements, equipment, staff, and funding. The relationship of the management area to other wildlife areas within the Minnesota DNR Region IV is important to understanding administrative and funding procedures and problems. A knowledge of the present operation is necessary to formulate a comprehensive plan that will utilize existing development and equipment and can be implemented under anticipated budgetary and administrative constraints.

### Administration and Fiscal

The Talcot Lake WMA is one of Minnesota's 851 wildlife management areas and is administered through the DNR Region IV offices in New Ulm and Slayton. Region IV consists of 27 counties and includes 400 other wildlife management areas with 87,000 total managed acres. Ten wildlife managers manage the 400 other wildlife areas, including the 27,803-acre Lac qui Parle WMA. The regional wildlife manager supervises management of all wildlife areas in Region IV.

Wildlife and fish administration and management in

Minnesota is financed primarily through appropriations from the Game and Fish Fund. Receipts from hunting, trapping, and fishing license sales, cash receipts from wildlife management areas, and federal-aid matching funds are paid into the Game and Fish Fund. These monies are dedicated for state-wide fish and wildlife management and are disbursed to the Sections of Wildlife and Fisheries in the Minnesota DNR.

Federal matching funds are derived from the Federal Aid in Wildlife Restoration Act (Pittman-Robertson Act) and the Federal Aid in Sport Fish Restoration Act (Dingell-Johnson Act). These acts imposed excise taxes on sporting arms, ammunition, archery equipment, and fishing equipment. Funds from these taxes may be used to match state funds on a 3:1 ratio for federally approved wildlife and fish management.

The Section of Wildlife administers and finances regional wildlife management through a program budget system. Funding is for specific programs and not individual management areas in the region. Day to day purchases on the Talcot Lake WMA are made at the resident manager's discretion. Major equipment is purchased

**Table 11. Expenditures and income on the Talcot Lake WMA in 1975.**

<b>Regional Expenditures</b>	
Permanent salaries	\$ 35,962
Seasonal salaries	24,404
CETA <sup>1</sup> salaries	3,850
Equipment purchase	16,600
Retail and contract services	23,470
<b>Land Bureau and Administrative</b>	
<b>Services Expenditures</b>	
Payments in lieu of taxes	1,237
Real estate taxes	624
<b>Total Expenditures</b>	<b>\$106,147</b>
<b>Income</b>	
Rough fish removal	\$ 1,081

1. Federal Comprehensive Employment Training Act. Salary is the estimated cost of equivalent state employees.

and seasonal employees are hired with approval of the Region IV wildlife manager.

Expenditures and income in 1975, estimated from the resident manager's records, totaled \$106,147 and \$1,081 (Table 11). Retail and contract purchases and equipment purchases totaled about \$40,000 in 1975. Salaries of personnel administered through the unit in 1975 totaled about \$60,000. Also, \$3,850 was provided by the Comprehensive Employment Training Act (CETA), a federally funded program for the unemployed. However, 60 to 70 percent of these expenditures were utilized for work outside the area.

Heavy equipment, major equipment repairs, and capital improvements are itemized and paid from the regional wildlife management budget. These expenses for the area vary yearly depending on equipment and management needs. Equipment used on Talcot Lake is replaced when needed but after equipment priorities for other management areas within the region are considered. Similarly, major capital improvements, such as buildings, dikes, and control structures, are funded on a region-wide basis.

Payments in lieu of taxes are made to each county based on the total acreage of wildlife lands in the county which is eligible (Minnesota Statutes, Section 97.49, subd. 3, 1976). The payment is 35 percent of the wildlife management area's gross receipts or \$0.50 per acre, whichever is greater; and payments in lieu of taxes were \$1,236.64 in 1975 at \$0.50 per acre. In addition, Minn-

esota Statutes, Section 272.011 (1976) requires the state to pay real estate taxes on all state-owned residences occupied by state personnel. In 1975, real estate taxes paid on the manager's residence totaled \$623.34.

Rough Fish harvest generated the only cash revenue on the unit. In 1975, this revenue was \$1,081.14.

#### Capital Improvements

Fourteen buildings, providing a residence for the manager, office space, equipment storage and repair facilities, grain storage, and temporary lodging quarters for the Minnesota DNR staff and field personnel, are maintained on the unit (Table 12). Seven buildings have been constructed since 1952; the remaining structures were existing when the area was purchased. Nine buildings are in poor or very poor condition.

The other improvements are service and access roads, dikes, and parking lots (Figure 3). There are 7.8 miles of road within the unit; 6.1 miles are open for public traffic and the remainder are service roads. The Minnesota DNR, Section of Wildlife maintains 4.8 miles of road, while 3.0 miles are county, township, and state roads. Ten parking lots are located at strategic access points. Each lot has space for about 10 vehicles. Two of the lots are maintained at the dam for fishermen and sightseers. Four packed earth or clay-cored dikes, with a total length of 2,000 feet, are located on the unit.

Other public use facilities are maintained by Cottonwood County. These facilities include a county recreation area on the south end of Talcot Lake and a rest stop-picnic area near the dam (Figure 3). An 8-acre tree and shrub nursery is located south of the Talcot Lake Dam (Figure 3). An underground cold storage house is used to store nursery stock.

#### Equipment

Fifty-five pieces of equipment for maintenance and development on the Talcot Lake WMA and other Region IV wildlife areas are maintained at the Talcot Lake WMA (Table 13). Major equipment includes 10 tractors, 11 trucks, various farm implements, and tree planting and nursery equipment. Approximately 35 to 40 percent of all equipment hours are utilized on the Talcot Lake WMA, and nearly half of the equipment is used only 20 percent or less on the management area. One-third of the equipment is more than 10 years old.

#### Staff

The unit is manned by a full-time resident manager. Two 9-month seasonal laborers work from February

**Table 12. Buildings maintained on the Talcot Lake WMA.**

Building	Construction Date	Dimensions (feet)	Condition
Residence, 2-story	1952	22 x 24	Good
Utility and garage, 2-story	1951	28 x 46	Good
Garage	1966	28 x 60	Good
Machine shed	Unknown	12 x 20	Poor
Lumber shed	1965	18 x 30	Poor
Storage building	Unknown	20 x 26	Poor
Storage building	Unknown	18 x 18	Poor
Storage shed	Unknown	9 x 12	Poor
Storage shed	Unknown	14 x 22	Poor
Storage shed	Unknown	8 x 8	Poor
Corn crib, wooden	1964	7 x 16	Fair
Corn crib, wooden	Unknown	8 x 16	Poor
Corn crib, concrete & wire	1968	18 diam.	Fair
Cold storage building	1969	14 x 14	Very Poor

Table 13. Equipment based on the Talcot Lake WMA.

Type	Make and Model	Model Year	% WMA Use
Tractor	International	1949	20
Tractor	Ford 871	1961	70
Tractor/Loader	Case 310E Crawler	1964	40
Tractor	Ford 2000	1964	30
Tractor	Ford 2000	1966	30
Tractor	Ford 5000	1967	40
Tractor	Ford 3000	1967	30
Tractor	Ford 5000	1973	50
Tractor	Ford 8600	1974	20
Tractor	Ford 3000	1975	20
Mower, lawn	Homelite	1974	100
Mower, rotary	Brush Hog 450	1974	50
Mower	Ford 315-1	1964	50
Mower, flail	Ford 501-22-125	Unknown	30
Truck	Dodge 2-ton	1965	10
Truck	Chevrolet 2-ton	1966	10
Truck	Ford 2½-ton	1967	10
Truck	Ford 2-ton	1969	20
Truck	Dodge ¾-ton	1970	100
Truck	Chevrolet 2-ton	1970	20
Truck	Ford 2-ton	1971	10
Truck	Ford 2-ton	1971	10
Truck	Ford 2-ton	1973	30
Truck	International 2-ton	1974	30
Truck	International 2-ton	1976	20
Jeep	Willys	1953	90
Trackster	Cushman	1972	90
Baller, tree	Jiffy	1968	100
Loader	Du-al 3100	1976	90
Seeder, broadcast	Unknown	1976	20
Plow, 3-bottom	Ford 101	1072	50
Harrow, disc	International 122	1970	30
Harrow, disc	International 122	1972	30
Harrow, drag	Ford	1972	80
Cultivator	Ford	Unknown	80
Rototiller	Troy	Unknown	10
Sprayer, weed	Solderholm 235R	1967	5
Sprayer, weed	Solderholm 235R	1969	5
Sprayer, weed	Solderholm 235R	1972	5
Sprayer, weed	Solderholm 235R	1975	5
Sprayer, weed	Solderholm 235R	1975	5
Trailer, tilt top	Wisconsin 1000	1963	2
Trailer, boat	Spartan 1100	1968	40
Trailer, tilt top	Miller J	1969	2
Trailer, tilt top	Miller TT12	1973	2
Trailer, tilt top	Miller OT12	1975	2
Pump	Crisafulli	1974	0
Lifter, tree	Home made	1950	100
Lifter, tree	Unknown	Unknown	100
Planter, corn	John Deere 290	1967	0
Planter, corn	Bridger	1976	100
Planter, tree	Lowther	1962	100
Planter, tree	Lowther ST	1970	0
Planter, tree	Lowther ST	1970	5
Motor, outboard	Mercury 110	1965	80

through October, and a 9-month laborer-heavy equipment operator is employed from April through December. Temporary seasonal laborers are employed from April through September depending on the availability of funds. In 1975, 2 to 4 temporary seasonal laborers worked in February, March, April, August, September, and October, and 6 to 8 worked during May, June, and July. A total of 6,194.5 man-hours of temporary seasonal labor was employed in 1975.

In addition to state employees, a seasonal laborer and a clerical worker were employed under the CETA

program. These employees worked about 1,240 hours on the Talcot Lake WMA at no cost to the state.

The staff's time is divided between management of the Talcot unit, regular maintenance and development work on 288 smaller wildlife management areas in 16 southwestern counties, and periodic work on areas in 6 other counties. All of the employees spend the majority of their time working on the small wildlife units. Work on the small units includes posting, fencing, weed control, food plot and cover planting and maintenance, and wetland maintenance and development.

## LAND OWNERSHIP

The management goals can be realized when all lands within the project boundary are acquired. The management direction and acquisition status are related to land ownership patterns, the project acquisition history, and the sources of acquisition funds. Priorities must be set for unacquired land to identify those tracts where special acquisition effort is necessary to improve the management capabilities of the project.

### Acquisition Status

As of June 1, 1977, the Talcot Lake WMA included 2,842.79 and 460.53 acres of state-owned land in Cottonwood and Murray counties (Table 14). In Cottonwood County, 804.44 acres were purchased from the Minnesota Trust Fund; the remaining project lands were acquired from private individuals.

More than \$202,429 from 3 funding sources has been spent on land acquisition (Table 15). Monies have been obtained from hunting license fees and surcharges, federal-aid project matching funds from an excise tax on sporting arms and ammunition, and Minnesota Resources Commission (MRC) appropriations from general state

Table 15. Sources of funds and acreage purchased in the Talcot Lake WMA.

Source of Funds	Amount	Acreage
Section of Wildlife project	\$ 8,540.83	989.08
Federal Aid project	115,639.02	1,795.84
Minnesota Resource Commission	78,250.00	518.40
Total	\$202,429.85	3,303.32

Table 14. Previous ownership of state-owned land in the Talcot Lake WMA.

Previous Ownership	County		Total (acres)
	Cottonwood (acres)	Murray (acres)	
Private	2,038.35	460.53	2,498.88
Trust Fund	804.44	0.00	804.44
Total	2,842.79	460.53	3,303.32

Table 16. Land acquisition priorities for the Talcot Lake WMA.

Priority	County			Total (acres)
	Cottonwood (acres)	Murray (acres)	Nobles (acres)	
Critical	517	22	—	539
Desirable	49	—	10	59
Eventual	40	112	—	152
Total (acres)	606	134	10	750



TALCOT LAKE  
WILDLIFE MANAGEMENT AREA  
STATE OWNERSHIP AND  
ACQUISITION PRIORITIES

LEGEND

- TRACT NUMBER
- STATE OWNED
- ▨ CRITICAL
- ▩ DESIRABLE
- ▧ EVENTUAL
- APPROVED BOUNDARY
- - - PROPOSED BOUNDARY
- ⊕ SECTION CORNER
- ▬ STATE HIGHWAY
- COUNTY ROAD
- - - TRAIL

Scale in Miles

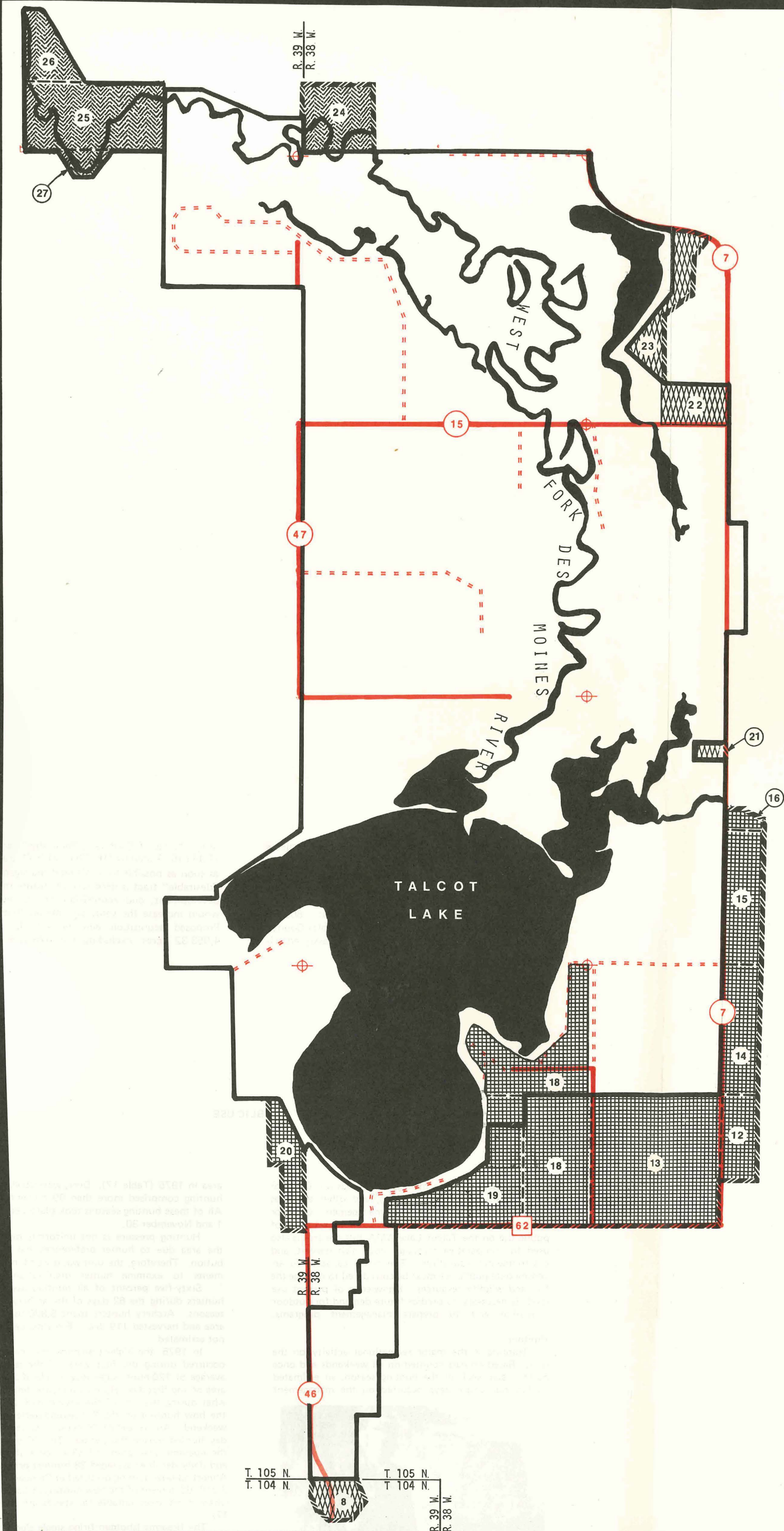
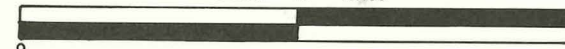


Figure 5



revenues. Section of Wildlife and federal-aid projects have paid for about 84 percent of the land. The remaining lands were purchased with MRC monies.

#### Acquisition Priorities

Proposed acquisition totals 750 acres: 606 in Cottonwood, 134 in Murray, and 10 in Nobles County (Figure 5). The 16 unacquired tracts were assigned pri-

ority ratings of "critical", "desirable", and "eventual" (Table 16, Appendix D). The "critical" tracts are needed as soon as possible to implement management plans. A "desirable" tract is necessary for future management or development, and acquisition of an "eventual" tract would increase the value and managability of the unit. Proposed acquisition will increase the ownership to 4,053.32 acres, excluding the 678-acre Talcot Lake.

## PUBLIC USE

Minnesota wildlife management areas are used for public hunting, trapping, fishing, and other activities compatible with wildlife and fish management. Outdoor recreation has always accounted for the largest share of public use on the Talcot Lake WMA, but the area is also used for cooperative farming, rough fish harvest, and environmental education. The area's capacity to accommodate public use must be considered to manage the fish and wildlife resources. Knowledge of present use levels is necessary to predict future demand for outdoor recreation and to prepare management programs.

#### Hunting

Hunting is the major recreational activity on the unit. Based on cars counted on all weekends and once during each week of the hunting season, an estimated 10,115 hunter-use days occurred on the management

area in 1975 (Table 17). Deer, waterfowl, and pheasant hunting comprised more than 99 percent of the total. All of these hunting seasons took place between October 1 and November 30.

Hunting pressure is not uniformly distributed over the area due to hunter preferences and habitat distribution. Therefore, the unit was divided into 4 compartments to examine hunter distribution (Figure 6).

Sixty-five percent of all hunting use was by deer hunters during the 62 days of the archery and firearms seasons. Archery hunters spent 5,820 use days on the area and harvested 119 deer. Firearms deer harvest was not estimated.

In 1975, the highest archery deer hunter densities occurred during the first week of the season with an average of 120 hunters per square mile of public hunting area on the first day. Hunting pressure diminished somewhat during the rest of the season with 30 percent of the bow hunting on the 8 weekends after the opening weekend. An average of 35 people per square mile per day hunted during this period. The 35 weekdays after the opening week absorbed 53 percent of the hunting, and daily densities averaged 28 hunters per square mile. Almost all bow hunting occurred in Compartments 1 and 2 with 62 percent of the bow hunting in Compartment 1 where most trees suitable for stands are found (Table 17).

The firearms (shotgun firing single slugs) deer hunting season was 4 days in 1975. Hunters chose between a 1-day season on November 1 or a 3-day season on November 6, 7, and 8. Both seasons were bucks only with quotas on antlerless deer permits. Antlerless permits were assigned by a lottery. A total of 741 hunter-days occurred with 24 percent on November 1 and 76 percent in the second period (Table 17). Hunter densities were about 57 and 60 per square mile per day in the 2 periods in Compartments 1 and 2.

Waterfowl hunter-days during the 50-day 1975 season accounted for 33 percent of all hunting. Only 3



*Bow and arrow deer hunting attracts more hunters to the Talcot Lake WMA than any other activity.*



percent of the waterfowl hunter-days occurred on opening day, while 18 percent occurred in the first 5 days of the season. Hunting pressure for the rest of the season was fairly uniform but heavier on weekends. No harvest estimates were made.

Compartments 1, 2, and 3 accommodated 15, 31, and 54 percent of all waterfowl hunting. On the opening day of the waterfowl season, an estimated 16 hunters hunted per square mile in Compartments 1 and 2 with 27 hunters per linear mile along CSAH 7 in Compartment 3. Hunter densities were highest on the first weekend with 22 hunters per square mile per day in Compartments 1 and 2 and 36 per mile of road per day in Compartment 3. The remaining weekend and weekday densities were about equal, being 9 hunters per square mile per day in Compartments 1 and 2 and 14 per mile per day in Compartment 3.

Most waterfowl hunting was "pass shooting" along the refuge boundary. Water levels were very low and little hunting opportunity existed in marshes and sloughs in 1975. This situation may have forced more hunters to hunt from the roadside than in wetter years.

Pheasant hunting accounted for only 2 percent of all hunting in 1975. Pheasant hunting has declined about 90 percent in the past 15 years. This decline may be due to reduced pheasant populations on the area and in the vicinity. Compartments 1, 2, and 4 provide 50, 25, and 25 percent of all pheasant hunting. Hunting

pressure is most intense in Compartment 4 where 25 percent of the hunting effort occurred on 7 percent of the available land. Pheasant hunters were more numerous on the opening weekend than on succeeding days with daily densities of 6 hunters per square mile on opening weekend compared to 4 and 2 per square mile on the remaining weekends and weekdays. No harvest estimates were made.

About 100 hunter-use days were spent hunting fox, raccoon, squirrel, and rabbit and comprised less than 1 percent of all hunting. No hunter distribution or harvest estimates could be made.

#### Trapping

The resident manager issues a limited number of general trapping permits each year and assigns each trapper to a specific area. Permits are also issued to trap a specific number of beaver at specified locations. In 1973, 1974, and 1975, 5, 11, and 8 general trapping permits were issued, and 1 beaver trapping permit was issued in 1975. Trapping is most intensive near roads and trails.

Since 1973, trappers have been required to submit reports on their catch (Table 18). Muskrat and mink comprised 75 percent of the reported harvest. The estimated average season income for trappers ranged from \$106 to \$177 over the 3 years. Fox and raccoon have become more heavily trapped in recent years because of

Table 17. Estimated temporal and spatial distribution of hunters on the Talcot Lake WMA in 1975.

	Deer		Waterfowl	Pheasant
	Firearms	Archery		
Temporal distribution				
Hunter-use days	741	5,820	3,314	240
Opening day	Nov. 1	Oct. 4	Oct. 1	Oct. 25
% use	24	8	3	8
Opening weekend	—	Oct. 4,5	Oct. 4,5	Oct. 25, 26
% use	—	13	9	16
First week	—	Oct. 4-10	Oct. 1-5	Oct. 25-31
% use	—	17	18	24
Remaining weekends	Nov. 8	16 days	12 days	8 days
% use	25	30	22	42
Remaining weekdays	Nov. 6-7	35 days	33 days	15 days
% use	51	53	60	33
Spatial distribution				
% use in Compartment 1 (1.62 sq. mi.)	44	62	15	50
% use in Compartment 2 (1.50 sq. mi.)	56	38	31	25
% use in Compartment 3 (2.20 linear mi.)	0	0	54	0
% use in Compartment 4 (0.20 sq. mi. )	0	0	0	25

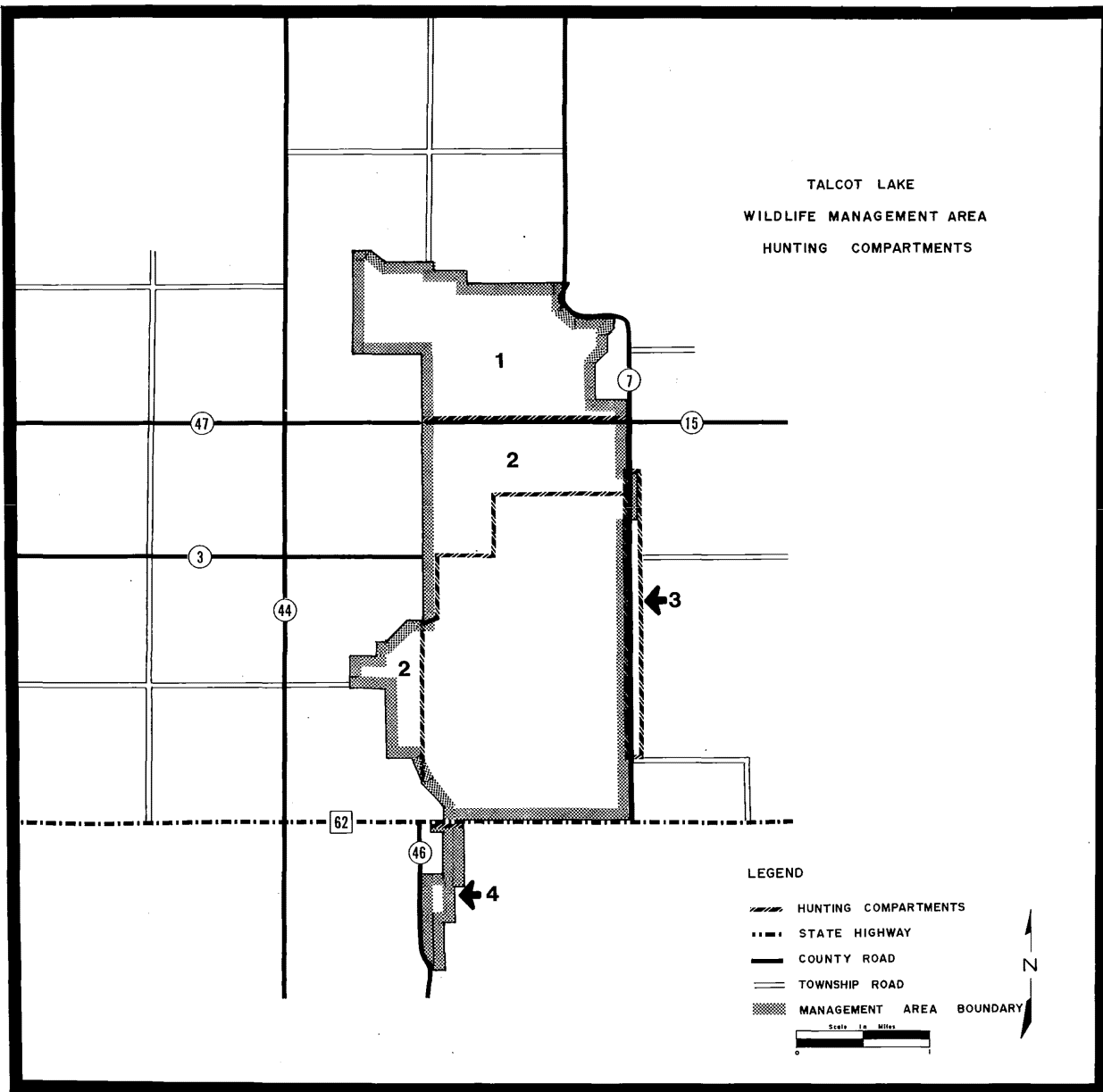


Figure 6

their greater fur value. Skunks are commonly taken but are not actively trapped because of their low commercial value. Badger and opossum are taken very rarely.

#### Fishing

Fishing is the second most popular form of recreation at the Talcot Lake WMA. An estimated 9,225 fisherman-use days occurred from May 1 to December 31, 1975. This estimate was derived from car counts at the fishing access points. Anglers fish primarily from shore at the Talcot Lake Dam, the county park on the south end of the lake, and from boats on Talcot Lake. The fish most commonly caught were northern pike, black crappie, walleye, and bluegill.

Most fishing occurs in the late spring and early summer. Between May 1 and June 30, 1975, an estimated 75 fishermen per day used the area. From July 1 to December 31, fishing pressure averaged 25 anglers per day. During the summer, most people fished from boats. Fishing at the dam increased somewhat in the fall. Ice fishing from December 31, 1975 to May 1, 1976 was light.

Table 18. Fur harvest reported on the Talcot Lake WMA, 1973-1975.

Species	Year		
	1973	1974 <sup>1</sup>	1975 <sup>2</sup>
Muskrat	90	48	20
Mink	23	22	12
Raccoon	15	14	2
Red fox	4	5	2
Skunk	8	5	4
Badger	0	0	3
Opossum	1	1	0
Beaver	0	0	10
Estimated Fur Value	\$884	\$637	\$544

1. 5 of 11 trappers did not report.

2. 3 of 8 trappers did not report.

Rough fish are seined from under the ice by contractors. The contracts are let by bidding, and the contractor paid about \$.01 per pound for rough fish weighing more than 2.5 pounds in 1975.

**Table 19. Outdoor recreation use days for the Talcot Lake WMA in 1975, excluding hunting trapping, and fishing.**

Activity	Use days
Wildlife observation	5,000
Camping (county park)	2,600
Swimming (county park)	1,800
Group tours	440
Boating	500
Picnicking (county park and rest stop)	400
Birdwatching/photography	250
Cross-country skiing	100
<b>Total</b>	<b>11,090</b>

#### Other Activities

The management area is also used for wildlife observation, camping, swimming, group tours, boating, picnicking, bird watching, photography, and cross-country skiing (Table 19). These activities accounted for an estimated 11,090 use days, or 35 percent of the total recreation in 1975; however, many of these activities occur at such low levels that accurate use estimates were not possible.

Wildlife observation consists mostly of casual driving around the management area. Picnicking and camping occur only on land leased to Cottonwood County. Other activities occur at a low level throughout the area.

In 1975, the resident manager conducted 11 tour groups for 440 people. Tour participants included

**Table 20. Cooperative farming data for the Talcot Lake WMA, 1975.**

County	Crop	Acres	State Return (Acres)	
			Harvested	Unharvested
Cottonwood				
	Corn	63.0	0.0	39.7
	Oats	36.5	12.2	0.0
	Wheat	55.0	0.0	0.0
	Alfalfa	35.0	11.7	0.0
	Total	189.5	23.9	39.7
Murray				
	Corn	50.0	0.0	16.7
	Oats	30.0	10.0	0.0
	Total	80.0	10.0	16.7

school, civic, and sportsmen's groups. The unit's resources, management, and development were explained to the groups.

#### Agricultural Leases

Part of the cropland on the unit is farmed by private operators to provide fall and winter food for concentrations of deer, waterfowl, and upland game. In 1975, cropland was leased to 6 individuals who harvested two-thirds of the crops leaving the remainder for wildlife food. Cooperative farming agreements on 269.5 acres yielded 56.4 acres of standing corn and 33.9 acres of harvested oats which were baled and stacked in the fields (Table 20).

## LOCAL PERSPECTIVE

Fish and wildlife management can be influenced by factors in the management area vicinity. Land use, demographic characteristics, and economic conditions must be examined before formulating a comprehensive plan. Development, or the potential for development adjacent to the management area may affect future management decisions. In addition, the availability of public lands for outdoor recreation in the vicinity will influence

the demand for recreation on the area.

#### General

The combined population of Cottonwood and Murray counties is approximately 26,900, and a 3 percent decline is projected by 1980 (Minnesota State Planning Agency 1975a). Windom (population 3,952) is the largest city in the 2 counties. Worthington (popula-

tion 9,825) is about 25 miles southwest, Mankato (population 30,895) is 80 miles northeast, and Rochester, Austin, and the Twin Cities are all more than a 3-hour drive from the area.

The 2 counties have a basically agrarian economy. In 1970, 32 percent of the labor force was employed in agriculture (U.S. Department of Commerce 1971). Ninety-five percent of the land in Cottonwood and Murray counties is classed as cultivated or pasture and open land (Minnesota State Planning Agency 1975b). Corn and soybeans were harvested on about 79 percent of the cultivated land in 1974 (Minnesota Department of Agriculture 1975). Oats, wheat, and hay each accounted for 6 percent of the harvest on cultivated land in 1974.

Tourist and travel related expenses comprise less than 1 percent of gross sales in each county. Cottonwood County ranks 60th of 87 Minnesota counties in tourist expenses, and Murray County ranks last (Minnesota Department of Economic Development 1975).

Forests in these 2 counties were never abundant and cover only 0.3 percent of the total area. Moreover, drainage of wetlands continues on a large scale.

Public land and recreational facilities in the 2 counties are scarce. There are 13,263 acres of public use lands, and the Talcot Lake WMA is the largest single tract in the 2 counties. State wildlife management areas and federal waterfowl production areas comprise 92 percent of all public use lands (Table 21). Lake Shetek State Park is 5 percent of the total, and other recreational lands make up the remainder. The 2 counties have the following public recreational facilities: 6 campgrounds with 307 sites (most near Lake Shetek), 19 picnic grounds, 14 public accesses, 4 swimming beaches, 2 swimming pools, 18 miles of snowmobile trails, 3 miles of bicycle trails, and 4 miles of horseback and hiking trails (Minnesota DNR, 1974a).

#### Cottonwood County Park

The county park at the south end of Talcot Lake (Figures 3 and 7) includes 1 of the 2 swimming beaches and 1 of only 4 public accesses in Cottonwood County. The park is a traditional area for swimming, camping, picnicking, and boating.

The park was developed in 1957 and maintained by the Dundee Rod and Gun Club until 1975 when Cottonwood County assumed responsibility. The Division of Fish and Wildlife is cooperating with Cottonwood County in the orderly development of the site. Cottonwood County owns 30 acres west of the south inlet to

Talcot Lake. The county is leasing 6.1 acres east of the inlet with 565 yards of shoreline from the Section of Wildlife until 1985 (Figure 7).

In 1976, the county applied for \$20,000 in Land and Water Conservation funds to develop the site. Application approval is expected following an archaeological survey. Park development is scheduled over a 5-year period. Plans for the county land call for a 30-site landscaped campground, more than 800 feet of gravel access road, 2 vault-type toilet facilities, 2 small playgrounds, and walkways with a footbridge to the beach. Beach development on state land will include two 100 by 200 foot parking lots, picnic areas with a shelter, a bathhouse with an additional vault-type toilet, a well, a boat landing with dock, and a walkway along the beach. In 1975, county officials agreed that the park may be used for controlled hunting.

**Table 21. State, federal, and privately-owned recreational land in Cottonwood and Murray counties.**

Public-Use Lands	Area (acres)
Talcot Lake WMA	3,328 <sup>1</sup>
Other State WMAs	7,537
Federal Waterfowl Production Areas	1,011
Lake Shetek State Park	708
Other recreation areas open to public	
Cottonwood County	340
Murray County	121

1. Does not include Talcot Lake, 678 acres.

#### Cottonwood County Wayside

In June, 1967, Cottonwood County leased 7.4 acres of state land north of the Talcot Lake Dam for 10 years. This area was developed as a county highway wayside and has a parking lot and picnic tables.

#### Des Moines River Canoe Route

The Des Moines River is designated as a state canoe route and will be developed to provide access and public use. Current plans call for the route to begin below the Talcot Lake Dam with a canoe access on the management area at the county wayside.

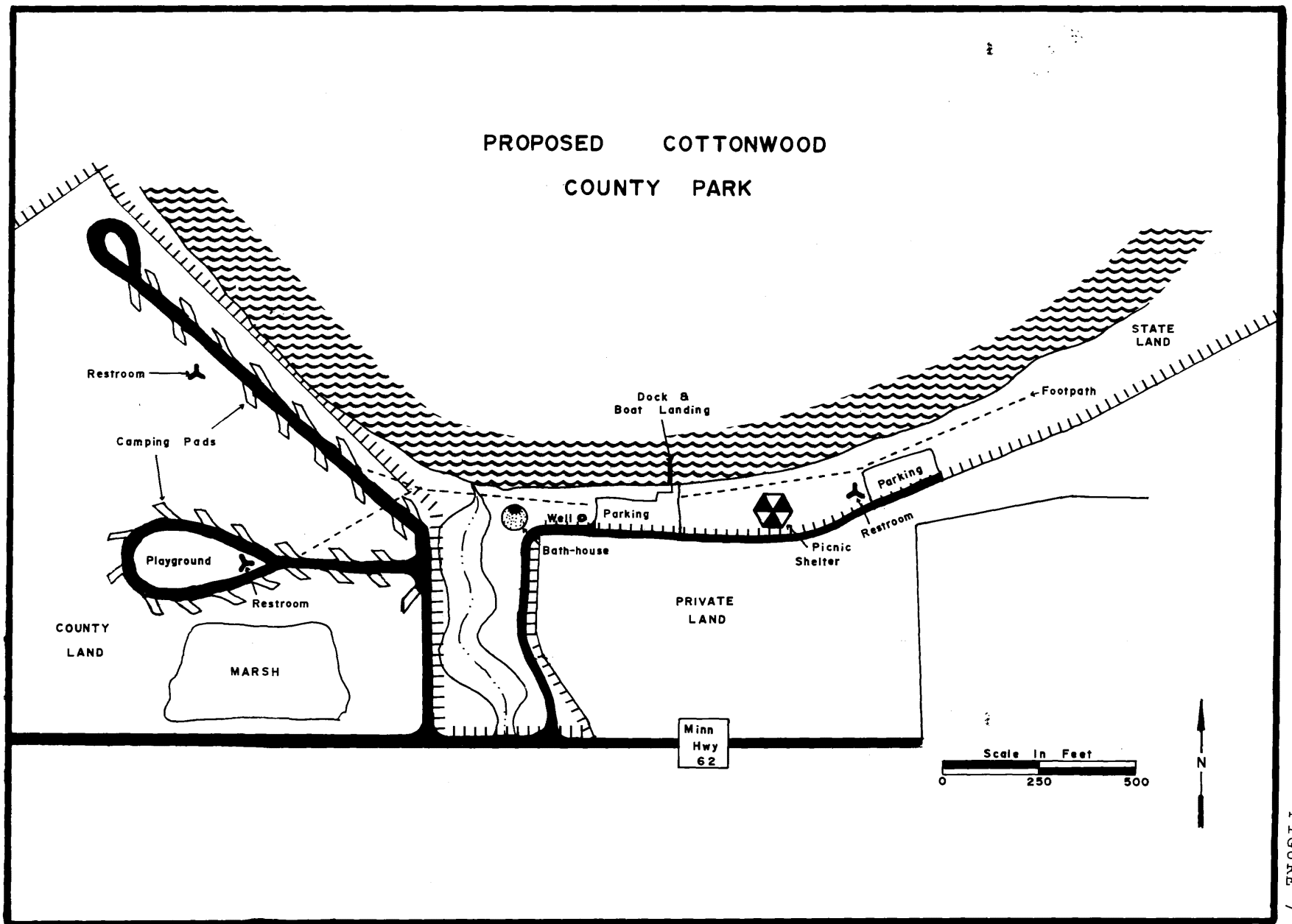


Figure 7

FIGURE 7

## RECREATION DEMAND AND CAPACITY

Anticipating the demand for hunting, trapping, fishing, and other wildlife oriented recreation is essential for the development of a management plan. By relating future demand to the recreation capacity of the area, programs can be designed to both utilize and protect the area's resources.

### Demand

Projecting the wildlife oriented use of the Talcot Lake WMA is a critical management consideration. These difficult projections are made for hunting, trapping, and fishing by examining state-wide population trends, game abundance and harvest, availability of private land for these activities, and license sales. An understanding of future demands for other types of compatible recreation can be gained from participation surveys when the limitations of these surveys are recognized (Minnesota DNR 1974a). Although Minnesota sportsmen and wildlife enthusiasts are mobile, most pressure will occur on lands closest to densely populated regions.

Annual aerial censuses and "pellet group" counts provide indexes to Minnesota white-tailed deer populations. Deer numbers have declined as a result of habitat deterioration through plant community succession in northern forested areas (Erickson, *et al.* 1961, Mooty 1971, Byelich *et al.* 1972). At the same time, deer harvest has declined and hunter success dropped from a high of 66 percent in 1950 to 21 percent in 1974. To help reverse these trends, the Minnesota DNR restricted the deer season in 1976.

Deer numbers in the southern and western Minnesota agricultural zones have increased from extremely low levels in the 1920's; and recently, Minnesota's agricultural region has contributed an increasing proportion of the state-wide deer harvest (Ludwig 1977). In the past, seasons were closed during many years in parts of the agricultural zone because of low and fluctuating deer numbers. To increase and stabilize deer numbers and permit an annual deer season, new regulations allowing a general harvest of antlered deer with a limited harvest of antlerless deer were formulated in 1975.

Except for 1969-1971, big game license sales have increased since 1940 at a rate greater than the overall population growth. With a restricted and delayed season in 1976, 233,000 licenses were sold. Restrictive deer seasons are likely to continue over much of Minnesota in the near future, and license sales will probably remain between 300-350,000 through 1985, increasing proportionately to the state population. However, the recent regulation changes may increase the attractiveness of the

agricultural zones, including the Talcot Lake WMA, to deer hunters by increasing the number of deer and allowing longer, more predictable seasons.

Changing farm practices since 1940 have greatly reduced habitat for farmland wildlife. A shift from small grains to row crops, coupled with fall plowing, drainage, and removal of fences and shelterbelts, has contributed to the loss (Nelson and Chesness 1964, Harmon and Nelson 1973). This trend is most apparent in south-central, southwest, and west-central Minnesota. A 1972 sample of 4 townships in south-central Minnesota revealed that fall plowed land accounted for up to 79 percent of a total township area (Brown *et al.* 1975). Land retirement programs such as Soil Bank and Set-Aside have been discontinued, further reducing land available for wildlife (Berner 1972).

Similarly, to expand tillable acreage, wetlands are being drained at the rate of 4 percent a year. In the 19 western county prairie pothole region, where federal waterfowl production areas are concentrated, 26,004 wetlands were drained from 1964 to 1974 (U.S. Department of the Interior 1975). Drainage resulted in a 57.6 percent decrease in Type III wetlands, the most productive areas for waterfowl and wetland furbearers. In 1974, 117,026 acres of wetlands, or 47.6 percent of all wetlands in these 19 counties, were protected by state or federal programs. Because of intensive agricultural practices, farmland wildlife and waterfowl are not as much a by-product of agriculture as they once were.

Reflecting the general decline in farmland wildlife, small game license sales have declined from a 1963 high of 341,687 to 221,154 in 1969. However, sales of small game licenses have stabilized at about 280,000 since 1970 and are expected to remain near this level. Waterfowl hunters presently account for more than half of the total small game license sales.

Sales of federal migratory waterfowl stamps are related to bag limits and season lengths as well as the cost of the stamp. Sales have fluctuated between 122-180,000 since 1966. The number of waterfowl hunters should remain a relatively constant proportion of the state's population if waterfowl populations remain relatively stable (Minnesota DNR 1974a). Future restriction of regulations, increases in the price of the federal migratory bird stamp, and the Minnesota migratory bird stamp may temporarily depress the number of waterfowl hunters. Although state waterfowl numbers may decline in the future, the Talcot Lake WMA is one of only a few public Canada goose hunting areas in Minnesota and goose hunting demands on the area will probably remain

high.

The demand for trapping opportunities will, no doubt, be related to the availability of places to trap, fur prices, and public sentiment towards trapping. The number of trapping licenses sold in Minnesota has fluctuated widely from a high of 53,899 in 1946 to a low of 5,903 in 1971. More than 11,000 trapping licenses were sold in 1975. The demand for trapping opportunities will probably remain near the current level in the near future.

The Minnesota DNR presently administers 851 wildlife management areas, many of which are located in Minnesota's farm belt and contain wetlands. Because intensive agricultural practices are depressing the production of wildlife on private land, wildlife management areas are increasingly important for both wildlife and sportsmen. Additionally, forest habitat improvement for white-tailed deer is concentrated on wildlife management areas or other public lands and will attract an increasing number of hunters. Wildlife management areas are increasingly important to urban hunters who have difficulty obtaining access to private land (Klessig 1970). As Minnesota's population increases so will the total number of hunters who rely on wildlife management areas.

Admittedly, the preceding discussions are only qualitative. These projections suggest that total hunting demand in Minnesota will not increase dramatically in the near future, but increasingly intensive use of private lands will accelerate the importance of management areas to Minnesota's wildlife and sportsmen. Likewise, the same trend is developing for other wildlife related recreation. With the exception of deer and Canada goose hunting the demand for hunting and wildlife related recreation on the Talcot Lake WMA should reflect state-wide trends.

#### Capacity

In order to develop comprehensive plans insuring quality public recreational use while protecting a wildlife management area's resources, the capacity of the area for hunting, trapping, fishing, and other compatible uses must be examined. Concentrations of sensitive wildlife

populations may require the exclusion of hunting, trapping, fishing, or trespass at specific times from sanctuaries and refuges established within a wildlife management area.

The capacity of the Talcot Lake WMA to accommodate hunters, trappers, and fishermen is related to many factors, such as fish and wildlife abundance; hunting, trapping, and fishing regulations; vegetation; and access. Excessive user densities result in interference or conflicts between sportsmen. The U.S. Fish and Wildlife Service and U.S. Bureau of Outdoor Recreation have developed hunter and fishermen density guidelines for quality hunting and fishing which may be a useful guide for wildlife management areas (Table 22).

Furthermore, quality experiences depend not only on user densities, fish and wildlife habitats, and fish and game abundance, but also on the sportsmanship and sense of responsibility of hunters and fishermen. Thus, the same set of user density standards cannot be applied uniformly to all wildlife management areas. The capacity of the Talcot Lake WMA to accommodate hunters should be examined in terms of hunting experiences which are rewarding to hunters and acceptable to the nonhunting public. Likewise, the fishermen capacity should be examined in terms of densities fostering quality fishing experiences.

The Division of Fish and Wildlife encourages the use of wildlife management areas for outdoor recreation related to fish and wildlife or their habitats. A management area's attractiveness for and capacity to support activities such as wildlife observation and photography or walking through the area, depend on many factors such as access and the variety and sensitivity of the area's wildlife populations, plant communities, and topography.

The Talcot Lake WMA has spectacular waterfowl concentrations, and easily observed white-tailed deer and resident Canada geese. Some of these resources are sensitive to overuse. However, when used in a dispersed manner by low densities of people, the management area can accommodate many visitor-days of waterfowl and deer observation and photography, walking for pleasure, and other compatible activities.

**Table 22. Hunter and fisherman density guidelines proposed by U.S. Fish and Wildlife Service and U.S. Bureau of Outdoor Recreation**

Species	Guideline	Length of stay (hours)
Geese	1 blind per 200 yards per 2 hunters	4
Ducks	1 blind per 10 acres of marsh per 2 hunters or 1 blind per 200 yards	4
Upland game birds	13 hunters per square mile	2
Small game	13 hunters per square mile	4
Pheasants	64 hunters per square mile	3
Deer	13 hunters per square mile	8

Source: U.S. Department of the Interior 1967, 1972.

## MANAGEMENT PROGRAMS

Plans for the Talcot Lake WMA should insure the sustained production and use of a variety of fish and wildlife and the protection of the unique scientific, historic, and aesthetic resources. To develop these plans, the problems, needs, and opportunities for better management of the area were first identified. These considerations were determined by examining the relationships among the resources, public use, land acquisition programs, operation, local perspective, and the projected demand for fish and wildlife oriented recreation. In light of these considerations, management programs were based on research findings and experience. Most management programs will be concerned with the maintenance and development of wetlands, grasslands, forests, and cropland essential for waterfowl, white-tailed deer, small game, and other wildlife. Programs will also be developed to provide visitors with quality experiences.

### Wetland Management

**Objectives.** Wetlands will be managed primarily for waterfowl and furbearer production and use and for public hunting and trapping. Wetlands will be managed for an interspersed of emergent vegetation and open water with as much submergent vegetation as possible.

**Considerations.** Wetlands are important habitat for many wildlife species. However, these areas are managed primarily for waterfowl production and public hunting. Wetland conditions which limit waterfowl production and use include: 1) fluctuating water levels in the waterfowl nesting season, 2) water turbidity which limits aquatic plant growth, 3) lack of adequate water in late summer and fall, and 4) dense stands of cattail and emergent vegetation.

Data on flood occurrence suggest that high water levels can be expected at any time during the spring and early summer. Flood water can destroy nests of geese, ducks, coots, gallinules, and other game and nongame birds.

Water turbidity caused by rough fish disturbance, the silt load in the river, and algal blooms cannot be effectively controlled. However, carp barriers may be effective on some impoundments. Water turbidity will continue to limit the growth of submerged aquatic plants which benefit waterfowl.

Likewise, low late summer and fall water levels are a result of weather and drainage patterns and cannot be controlled. Low fall water levels decrease the amount of waterfowl hunting areas and marsh used by duck and geese. Lack of water may help to control rough fish

populations somewhat, but the conditions also limit muskrat and beaver populations which need water for survival over winter. Periodic drying, however, increases the productivity of marshes and favors the growth of waterfowl food plants (Kadlec 1962).

Most of the management area is underlain by glacial outwash sands and gravels with low water holding capacity. This property makes pothole development in the uplands impossible. Water retention is better in natural low areas where silt and organic matter have accumulated to seal wetland bottoms, but these areas dry up faster than wetlands over heavy soils. A dependable water source is necessary to keep water in the impoundments through the late summer and fall. The Des Moines River could provide water in wetter years, but periods of no flow are common in late summer through winter.

Dikes may help retain water in marshes for longer periods. Most marshes on the unit normally drain into the Des Moines River after the spring floods. Water control structures retard this drainage. Dikes should be located where soils are relatively impermeable and where watersheds are adequate to maintain desired water levels. In addition, managers and administrators must determine whether the benefits of each proposed dike justify the projected costs.

Dense stands of cattail, occurring on the marshes north of Talcot Lake and in the drier floodplain marshes, discourage waterfowl use. These stands should be thinned to provide a better interspersed of open water. Techniques for thinning stands include mechanical removal, pothole construction, level ditching, herbicide treatment, raising water levels (Linde 1969), and increasing muskrat populations (Krummes 1941). Recent research by Linde *et al.*, (1976) suggested that cattail may be most effectively killed or controlled in late June or early July when total nonstructural carbohydrates in the plants are lowest.

**Present Programs.** Four dikes have been constructed on small watersheds to create shallow impoundments (Figure 3). Water levels in the 2 impoundments in Section 18 are maintained by stop log control structures. The 2 small impoundments in Section 7 have no water control structures.

Dikes and control structures damaged by flooding and beaver and muskrat activity are repaired as needed. A 2,640-foot long dike in Section 17 (Figure 3) was constructed prior to the Talcot Lake Dam improvement but is no longer functional and is not repaired.

Beaver and muskrat create marsh openings, and beaver dams help retain water in the floodplain marshes.



Only nuisance beaver are trapped, and muskrat trapping is closely monitored. No trapping is permitted within the game refuge.



*Islands, providing nest sites for Canada geese and ducks, have been constructed on the unit.*

**Future Programs.** The feasibility of more impoundments on the small watersheds in the floodplain will be investigated. Two impoundments (Nos. 5 and 6, Table 23) in Section 31, south of State Highway 72 have been engineered and final construction decisions will be made in 1977 or 1978. These impoundments would require 270 feet of clay-cored dike and 2 drop inlet or box inlet type water control structures and would provide an estimated 45 acres of marsh averaging 2 to 3 feet deep.

The cost feasibility and engineering needs of 4 other impoundments will be examined. Proposed development in the "Sauger slough" in Section 7 (Dike Nos. 1 and 2, Table 23) include 2 dikes totaling about 1,700 feet which should impound approximately 100 acres of marsh. The feasibility of a low-water inlet ditch with a selective flow control structure located at the site of an existing dike along the Des Moines River (Figures 3 and 8) will be examined. This structure will allow the diversion of water to the impoundments in the Sauger slough

during late summer and fall if river flow is adequate. If feasible, dike No. 3 in Section 8 will be constructed when Cottonwood County replaces the bridge on CSAH 15. This dike would allow control of water levels on the large marsh east of the river in Sections 7 and 8. Likewise, dike No. 4 will be constructed east of the existing dike in Section 18, impounding an estimated 35 acres of marsh. Waterfowl nesting islands, goose nesting structures, and level ditches will be constructed and maintained in the impounded areas. Planning for the development of these wetlands will require additional funds.

A stand of dense cattail and lowland brush south and west of the Talcot Lake Dam will be burned in late April or early May each year to provide a Canada goose roosting and brood rearing area (Figure 8). If funds are available, a cattail mower will be purchased for emergent vegetation management on the Talcot Lake WMA and other southwestern Minnesota wildlife management areas.

Proposed land acquisition will protect existing wetlands and allow for future development. Tracts 24 through 27 are in the Des Moines River floodplain, and tract 8 is marsh along a small, intermittent stream (Appendix D).

#### Grassland Management

**Objectives** Grasslands, including prairie remnants and old field communities, will be managed to provide blocks of secure nesting cover for waterfowl and upland game birds. Prairie tracts and some old fields will be restored to resemble the presettlement vegetation.

**Considerations** Upland nesting waterfowl, upland game birds, and many nongame birds depend on grasslands for nest sites. Grasslands are also important as roosting sites and winter cover for upland game birds. These areas are also used by deer, rabbits, and small mammals. Most grasslands on the unit were cultivated and are characterized by domesticated or introduced plant species. Small tracts of uncultivated pastureland with remnant prairie communities remain in the southern tip of the unit (Section 31, T. 105N., R. 38W.).

Dense, undisturbed grasslands are beneficial to upland nesting waterfowl (Kirsch 1969), pheasants (Frank and Woehler 1969), upland sandpipers (Kirsch and Higgins 1975), and songbirds (Verner 1975). Optimum dense nesting cover (DNC) can be created by

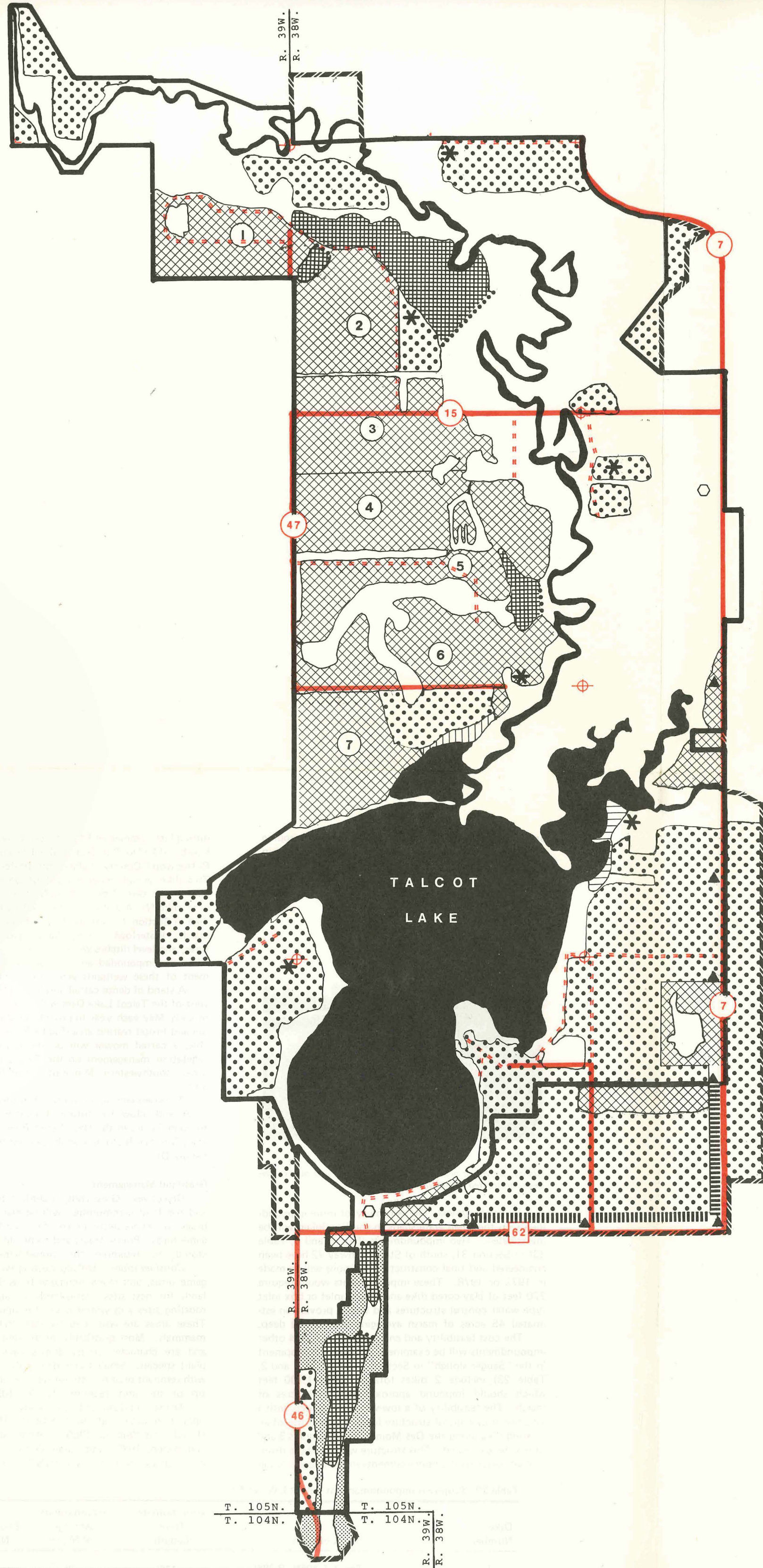
**Table 23. Proposed impoundments at Talcot Lake WMA.**

Dike Number	Location	Approximate Dike Length	Approximate Acreage of Marsh	Engineering Needed
1	Sec. 7, T. 105N., R. 38W.	175'	25	Yes
2	Sec. 7, " "	1,500'	75	Yes
3	Sec. 8, " "	50'	1	Yes
4	Sec. 18, " "	200'	35	Yes
5	Sec. 31, " "	150'	10	Yes
6	Sec. 31, " "	120'	35	No

1. Will allow water level control but will not create additional marsh.



**TALCOT LAKE  
WILDLIFE MANAGEMENT AREA  
PROPOSED MANAGEMENT AND DEVELOPMENT**



**LEGEND**

- APPROVED BOUNDARY
- PROPOSED BOUNDARY
- ..... PROPOSED DIKE
- INFORMATIONAL SIGN
- ▨ OLD FIELD MANAGEMENT BLOCKS
- SEVEN MAJOR AREAS
- ▤ APPROXIMATE IMPOUNDMENT AREA
- ▦ CROPLAND
- ▧ MOWED FOR GOOSE BROWSE
- ▨ ANNUAL WETLAND BURN
- ▩ PROPOSED PRAIRIE BURN
- PROPOSED SHRUB PLANTING
- \* DEER FEEDING SITE
- ▲ PROPOSED PARKING LOT
- ⊕ SECTION CORNER
- STATE HIGHWAY
- COUNTY ROAD
- - - TRAIL

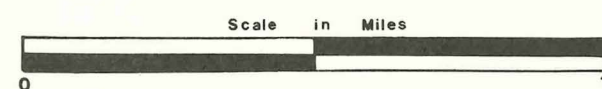


Figure 8



planting 40- to 160-acre tracts with a wheatgrass, brome grass, alfalfa mixture at 5 to 10-year intervals (Duebbert and Lokemoen 1976, Duebbert and Kantrud 1974). Haying and grazing are detrimental to waterfowl and other wildlife species (Kirsch 1969, Tester and Marshall 1962).

Grasslands require active management to maintain the desired plant species and habitat structures. A 950-acre old field in Sections 7, 18, and 19 is dominated by brome grass and alfalfa (Figure 4). Most of the alfalfa has died, and the tract is being heavily invaded by quack grass and bluegrass. Strips of brush cover, food plots, and marshes are located within this tract. Elsewhere, former cropland and pasture have been allowed to revert to grass and forb cover.

Prairies also provide excellent nesting cover for waterfowl and other species. Regular burning keeps prairie stands vigorous by recycling built-up litter; also, burning helps restore prairies competing with exotic plant communities (Curtis 1959). Prairies are extremely rare in southwestern Minnesota and should be preserved or restored for the scientific and aesthetic values and the diversity they provide (Minnesota DNR 1975a).

All grasslands on the Talcot Lake WMA are close enough to Talcot Lake and semi-permanent marshes to be valuable as waterfowl nesting cover.

**Present Programs.** Grassland is left undisturbed. Haying and grazing are prohibited on the management area, and a 5-acre strip on the lakeshore north of the Talcot Lake inlet is mowed annually in August or September to provide a Canada goose grazing area.

**Future Programs.** Grassland management will become more intensive. Livestock grazing and haying will continue to be prohibited on the area. The 5-acre mowed strip managed for Canada goose grazing will be maintained (Figure 8).

The grasslands on the west side of the unit have been divided into 7 management blocks (Figure 8). One or more blocks will be burned in an attempt to reestab-

lish prairie vegetation. If burning proves successful, the management blocks will be burned on a 4-year rotation. Otherwise, one block per year will be plowed and planted to a wheatgrass, brome grass, and alfalfa mixture. Other old fields will be treated similarly.

Two strips of former pasture containing prairie plant species are located in Section 31 (Figure 8). The east and west strips will be burned at 4-year intervals in an attempt to restore a second growth prairie community. Each burn will require clearing of about 2.5 miles of firebreaks.

### Woody Cover Management

**Objectives.** Tree and shrub communities will be managed to provide benefits to white-tailed deer, wood ducks, upland game, and nongame wildlife.

**Considerations.** Bottomland hardwoods, lowland brush, and woody shelter plantings cover 15 percent of the unit. Although not extensive, these communities add significantly to the plant and animal diversity.

Mature timber provides habitat for animals such as tree squirrels, raccoons, opossums, raptors, herons, wood ducks, woodpeckers, and forest songbirds. Forest edges and brush provide habitat for deer, cottontails, skunks, many small mammals, ring-necked pheasants, and songbirds such as the indigo bunting, yellowthroat, and yellow warbler. A relative scarcity makes forests valuable scenic and educational resources in southwestern Minnesota.

Shrub and conifer cover plantings provide winter shelter for many species including deer, rabbits, and ring-necked pheasants; they also provide nesting habitat for such songbirds as the mourning dove, catbird, robin, brown thrasher, and cardinal. Woody cover near food plots and forming travel lanes between food plots provides the greatest benefit to wintering wildlife. Plantings must be protected from fire and are susceptible to drought damage.

Nest boxes in forests may increase the number of



*Prescribed burning may restore prairie vegetation and prevent shrub invasion of grasslands.*

wood ducks and other birds if natural cavities are limited (U.S. Department of the Interior 1968, Verner 1975). About 200 wood duck nest boxes have been placed in large trees near wetlands. Most nest boxes were erected by local citizen groups. These boxes are not "predator proof" and are not maintained or monitored for use.

**Present Programs.** Forests and shrublands are protected from fire. Shrubs and trees are planted and maintained as woody cover in strips and blocks near cropland and grassland. Woody cover maintenance includes watering during dry periods, removal of dead plants, and replanting as necessary.

An 8-acre tree and shrub nursery is maintained on the unit (Figure 4). Small stock is transplanted to the nursery from Minnesota DNR forestry nurseries throughout the state. Stock is held for several years, then it is transplanted to the Talcot Lake WMA and other management areas in the southwest.

**Future Programs.** Present forest and nursery management will continue. Tree and shrub plantings will be maintained and improved as necessary. An additional shrub cover strip will be completed about 200 feet inside the refuge boundary along CSAH 7 and State Highway 62 (Figure 8).

Wood duck nest boxes will be monitored and maintained annually during the winter. New structures will be made "predator proof" and placed near wetlands. Present wood duck nest boxes are in poor repair and will be repaired or removed depending on their utilization by wood ducks and other wildlife. The maintenance of wood duck nest boxes and the evaluation of their use will require increased funding.

#### Cropland Management

**Objectives.** Cropland will be managed to provide supplementary food for resident and migratory wildlife. Food plots for deer will be managed to feed the expected winter numbers and to prevent depredation on private crops. Crops will also be manipulated to sustain desired numbers of Canada geese.

**Considerations.** Agricultural crops, crop residues, and feeding stations on the Talcot Lake WMA are important to wildlife because many foods are scarce in the vicinity. White-tailed deer and ring-necked pheasants depend on these food sources and may be drawn to the unit to form winter concentrations. These crops also attract migratory ducks and geese. Refuge crops are especially important to goose management.

Winter deer concentrations have been increasing and

they often create problems in the vicinity of the unit. Nineteen deer were killed by cars in 1975, 15 of these on CSAH 7 between State Highway 62 and Oaks Lake. Several complaints of deer damage to cribbed corn and crops have been reported in recent years. Food plots and feeding stations must be planned to feed the number of deer expected based on aerial surveys and located to keep deer away from roads, private corn cribs, and crops.

If the number of Canada geese or white-tailed deer using the Talcot Lake WMA continues to increase, additional crops may be necessary in the refuge to prevent crop damage on private lands and to avoid excessive hunting season harvest of Canada geese. Cropland management is complicated because much of the unit is underlain by gravel and sand which cause rapid moisture loss and lost crop production in dry years. Refuge food production may be increased by the acquisition of additional cropland or by more intensive management of the state-owned land.

Acquisition of more cropland could potentially provide more wildlife food. Much of the soil on nearby land is also excessively drained; so yields would continue to fluctuate. In addition, land acquisition is very expensive, and many landowners may not be willing to sell.

Cropland could be managed more intensively by changing the cropping patterns and with irrigation. A ratio of two-thirds corn to one-third winter wheat would increase foods used by geese in the fall and deer in the winter by about 20 percent. Irrigation should approximately double crop yields and stabilize food production in dry years. Intensive cropland management would require added seed, fertilizer, labor, and equipment expenditures.

**Present Programs.** In 1975, 269.5 acres were cropped under cooperative agreements with local farmers, and 193.8 acres were farmed by state personnel (Table 24). Crops included corn, winter wheat, oats, and alfalfa. About 60 percent of the crops was left for wildlife food.

Land was farmed cooperatively by 7 farmers in 1975. The cooperators provided all labor, equipment, and supplies in exchange for two-thirds of the crops. Haying is limited to 1 cutting after July 12. Corn left in the fields in spring was picked by the cooperator and shared equally with the state. Fall plowing was not allowed. The state's 1975 share was 56.3 acres of standing corn and 33.8 acres of harvested oats and alfalfa.

State farmed land, all within the waterfowl refuge, was cropped with 60 percent corn and 40 percent winter

Table 24. Crops grown on Talcot Lake WMA in 1975

Farming Arrangements	Crop	Acres	State Share (acres)	
			Unharvested	Harvested
Cooperative Farming Agreements	Corn	113.0	56.4	—
	Oats	66.5	—	22.2
	Winter Wheat	55.0	—	—
	Alfalfa	35.0	—	11.7
State-farmed	Corn	117.2	117.2	—
	Winter Wheat	43.3	43.3	—
	Alfalfa	33.3	16.7	16.6

wheat and alfalfa. Corn was left standing, winter wheat was planted in August and plowed down in the spring, and alfalfa was cut once in July.

Crops within the refuge are planted primarily for geese, but deer also eat them. Six supplemental deer feeding stations were provided for winter deer use in 1975 (Figure 8). Feeding stations included 3 sites with corn crib feeders and baled hay or oats, 2 sites with oat stacks and 1 site with baled hay and baled oats only. About 56 acres of standing corn, primarily for deer, were located outside the refuge.



*Food plots with adjacent woody cover plantings are maintained for wintering wildlife.*

**Future Programs.** State and cooperative farming will continue; however, some cropping patterns will change. Alfalfa has proved unsatisfactory for wildlife feedings and will be replaced by corn and winter wheat. Also, winter wheat will replace corn on some state-farmed fields where corn yields have been low. About 90 percent of the cropland will be planted equally to corn and winter wheat, and 10 percent to oats. Food plots and feeding stations for deer will be continued and increased if deer populations continue to rise.

About 530 acres of cropland are proposed for acquisition to increase the management flexibility of the unit (Figure 5). Tracts 13, 18, and 19 contain 283 acres of cropland within the refuge. When purchased, these tracts will be planted equally to corn and wheat. The state will probably farm this land, but cooperative agreements may be used depending on the cropland management flexibility needed. Tracts 12, 14, 15 and 20 include 127 acres of cropland which will be share-cropped or seeded to dense nesting cover. Tracts 20 through 25 have about 120 acres of cropland which will be managed for deer and upland game under the cooperative farming agreements.

Management of the state cropland within the refuge may be intensified or de-emphasized as necessary, to manage Canada goose numbers. To increase yields, the crop mixture could be changed to two-thirds corn and

one-third wheat. If needed, part of the cropland could be irrigated to increase and stabilize crop yields. Irrigation would require capital expenditures for wells and equipment. To reduce the attractiveness of the refuge to geese, crops unattractive to geese could be grown or the land retired to dense nesting cover and woody cover strips.

### **Canada Goose Management**

**Objectives.** Canada goose management on the Talcot Lake WMA will be directed toward both the resident and migratory geese. Resident Canada geese will be maintained to occupy the available habitat on the unit. Refuge, food, and hunting pressure will be regulated to limit peak populations and harvest of resident and migrant Canada geese to comply with Minnesota and Mississippi Flyway policies.

**Considerations.** Giant Canada geese have been re-established on the unit and thus restored to part of their presettlement breeding range (Hanson 1965). The resident geese have helped attract migrant Canada geese to the area. The local population appears to be "pioneering" to other small wetlands in the vicinity. Canada geese are a significant resource on the management area and, in time, may overshadow all other wildlife on the unit. Canada geese readily respond to management and attract public attention and admiration. The sometimes tremendous responses of geese to management and people to geese, however, have created very difficult problems on other wildlife areas. Management of the Talcot Lake WMA may benefit from experiences in Minnesota and elsewhere by planning for the ramifications of Canada goose management.

Resident flocks of Canada geese require adequate nesting and brood rearing habitat, as well as protection from overharvest. Nesting sites can be provided in the area wetlands by muskrats (Krummes 1941, Hammond and Mann 1956), islands (Hammond and Mann 1956), and nesting structures (Rienecker 1971). Floods may occur at any time during the nesting period, but nest losses may be prevented by providing elevated nesting structures (Brakhage 1965). During brood rearing Canada geese prefer areas of short, succulent vegetation near water (Geis 1956, Sherwood 1965, MacInnes et al. 1974). Such areas can be maintained by regular haying or mowing of grasslands and water level manipulations in wetlands. Finally, the local breeding flock may be limited if excessive goose hunting pressure develops (see review in Sherwood 1968).

The Talcot Lake WMA lies within the migration path of the Eastern Prairie population (EPP) of Canada geese (Bellrose 1976) which numbered about 225,000 in December 1976. The area lies almost on a straight line between the Lac qui Parle WMA, a heavily used goose staging area, and the Swan Lake National Wildlife Refuge in Missouri, wintering ground for about 90 percent of the EPP.

To accommodate migrant geese, an area must have food and refuge from hunting with water for roosting. The roosting area need not be large; up to 30,000 geese may roost on a 10-acre lake in Rochester, Minnesota (Jack Heather, Minnesota DNR, personal communications). However, areas holding geese for long periods usually have large acreages where geese feed undisturbed

by hunters. The Talcot Lake WMA presently has roosting security sufficient for many more geese than now use the area. In recent years, relatively light hunting pressure in the vicinity has allowed the birds to feed almost freely.

Goose use of the area has increased rapidly since the establishment of the resident flock. Peak goose numbers have occurred in late October through mid-November, then diminished steadily until all geese were gone by freeze-up in early December. If Canada goose numbers continue to increase, impacts will be felt in the local area, Minnesota, and the Mississippi Flyway. Concerns will be: 1) relatively large goose harvests near the area; 2) potential crop depredation; and 3) potential waterfowl disease outbreaks.

The goose harvest locally, within Minnesota, and in the Mississippi Flyway is a major consideration. The Canada goose harvest in Minnesota is managed to meet the following objectives: 1) to limit harvest associated with goose management areas to less than 50 percent of the state harvest (Minnesota Conservation Department 1968); 2) to limit Minnesota's total EPP harvest to avoid mandatory Mississippi Flyway quotas (Section of Wildlife Waterfowl Committee unpublished minutes, June 1976); and 3) to apportion Minnesota's share of the EPP harvest equitably among the state's goose management areas. These objectives are being met now, but the addition of another large harvest area would change patterns in Minnesota and The Mississippi Flyway.

North and South Heron Lakes and Clear Lake lie southeast of the unit. All of these lakes attract Canada geese and have a significant goose harvest in their vicinity. In addition, Canada geese may fly between these lakes and the Talcot Lake WMA. Therefore, North and South Heron Lakes and Clear Lake should be considered whenever harvest restrictions are contemplated for the Talcot Lake WMA.

Crop damage is another concern with large goose concentrations. Depredations are most likely to occur

when wet weather prevents crop harvest (Bossenmaier and Marshall 1958). The potential for crop depredations is also related to the amount of crops within the refuge. Currently, refuge cropland is not sufficient to feed large numbers of geese.

Finally, waterfowl concentrations pose a potential for avian diseases such as duck viral enteritis (DVE) and fowl cholera, as well as botulism and algal poisoning. DVE is especially dangerous. An outbreak of DVE, about 200 miles west of the unit at the Lake Andes National Wildlife Refuge, killed 40,000 mallards in 1973. To date, no significant disease or poisoning has occurred on the Talcot Lake WMA.

Little is known about the number of goose hunters, the harvest, or the availability of hunting opportunities on private land in the vicinity, and nothing is known about the economic impact of goose hunting.

*Present Programs.* A self-sustaining Canada goose flock has been established. About 40 wing-clipped geese from the Carlos Avery Game Farm are being held in the goose holding pen along with about 12 pinioned geese which were donated over the years. Sixty-one elevated tub-nest structures are repaired and replenished with nesting material as staff time permits. Thirty nesting islands are occasionally cleared of woody vegetation. Each July, as many flightless geese as possible are banded by the area personnel. Five acres of grassland are managed to provide succulent vegetation for goose broods (Figure 8). Nesting efforts and population size are not intensively monitored.

Hunting seasons security is provided by the state game and waterfowl refuge (Figure 3). Food is provided on approximately 200 acres of cropland within the state game refuge. Due to variations in production caused by drought and deer use, the goose use days provided cannot be estimated. However, nearly all the food provided has been consumed in the past 3 years.

*Future Programs.* The area will be managed for peak fall populations of less than 10,000 Canada geese.



*Giant Canada geese, now common on the WMA, were re-introduced in 1968.*

Cropland will be managed to provide sufficient feeding security. Hunting pressure in and around the management area will be managed to discourage excessive goose numbers and to allow for a maximum season length within federal limitations. The Canada goose kill will be limited to no more than 10 percent of the yearly peak Canada goose numbers.

If fall goose concentrations exceed 10,000 birds, steps will be taken the following year to reduce the attractiveness of the refuge. As a first step, Talcot Lake would be opened to fishing and boating. If this action is not effective, the refuge could be opened to deer and upland game hunting. If necessary, the amount or attractiveness of the refuge cropland would be reduced and, as a last resort, the geese will be actively hazed with exploders or by state personnel.

Management of a captive breeding flock of geese will be discontinued in 1978. The remaining game farm Canada geese will be released, and the pinioned geese will be transferred to another area or sold. The goose pen will be dismantled, and the land will be planted to crops, nesting cover, or woody vegetation.

Nesting islands and tub-nests will be constructed on the new impoundments. Present nest sites will be maintained yearly and checked for nesting geese. If tub-nests are consistently vacant, they will be relocated.

The goose harvest in the Talcot Lake WMA vicinity will be examined beginning in 1977. Bag check routes will be initiated on private lands to determine the harvest, number of hunters, and types of hunting arrangements. More intensive bag checks will be made on the unit. The harvest in the vicinity of North and South Heron lakes will also be estimated.

Geese will be constantly monitored for signs of disease. If epidemic disease is encountered, state and federal plans will be implemented. These plans call for the isolation or destruction of infected birds, removal of dead birds, and discouragement of additional migrants from the area.

An increase in staff is necessary for the implementation of these programs.

### **Deer Management**

*Objectives.* The population of wintering and resident white-tailed deer will be maintained to satisfy hunter demands while minimizing crop depredations and deer-car collisions. Food, cover, and deer harvest will be managed to sustain the desired deer numbers.

*Considerations.* White-tailed deer are one of the most important wildlife resources on the Talcot Lake WMA. Numbers of resident and wintering deer have increased dramatically in recent years. As a result, the area offers some of the best deer hunting and viewing opportunities in the state.

These benefits also have attendant problems which require consideration. Nineteen deer were killed by cars in 1975, 15 of these on CSAH 7 between State Highway 62 and Oaks Lake. Several complaints of deer damage to cribbed corn and crops have been reported recently. Food plots and feeding stations must be planned to feed the desired number of deer and located to keep deer away from roads, private corn cribs, and crops.

White-tailed deer need breeding habitat, food, cover, and protection from overharvest. For resident deer all

of these habitat components are provided on the unit. For deer outside the management area, summer habitat is plentiful, but winter cover is practically non-existent and winter food consists of cribbed corn or scarce crop residues. In winter, deer concentrate on the Talcot Lake WMA from an area of perhaps 400 square miles (John Ludwig, Minnesota DNR, personal communication). Cover is adequate for migrant deer, however, supplemental corn must be brought in from other wildlife areas and dispensed at deer feeding stations during the winter to lower depredation on private crops.

Deer harvest on the Talcot Lake WMA is high, but exact numbers are not known. The resident manager has confirmed a minimum of 177 deer killed on the unit by archers, firearms hunters, and car collisions in 1975. The total deer harvest on the management area was estimated by comparing the reported kill in Cottonwood and Murray Counties with that in Jackson and Nobles counties, which are similar in overall land use but contain no area comparable to the Talcot Lake WMA. An estimated 137 and 166 deer were killed by archery and firearms deer hunters. Thus, over 50 percent of the deer utilizing the unit are probably killed and retrieved each year. Additional factors such as automobile collisions, unretrieved kills, and disease account for additional mortality.

Winter deer populations have been relatively constant since 1973 (Table 8) and deer have survived recent winters in good physical condition. A large increase in deer numbers in 1975 was probably caused by unusually severe weather (John Ludwig, Minnesota DNR, personal communication). Hunting season mortality is the most important factor regulating numbers of Talcot Lake deer and present deer numbers provide all of the hunting opportunities that can be accommodated. Thus, the present high harvest promotes a stable wintering population and the harvest should be maintained at the current level to prevent a deer increase.

*Present Programs.* Deer are benefiting from the present management of the different types of habitat on the area and the present deer harvest regulations. Six supplemental winter deer feeding stations were provided in 1975 to keep deer away from private corn cribs and highways (Figure 8). Feeding stations included 3 sites with corn crib feeders and baled hay or oats, 2 sites with oat stacks and 1 site with baled hay and baled oats only. About 56 acres of standing corn, primarily for deer, were located outside the waterfowl refuge.

*Future Programs.* Present programs will continue with slight modifications. Deer harvest regulations will be structured to maintain the present average numbers of overwintering deer. Food plots and feeding stations for deer will be continued and increased if deer depredations and deer-car collisions increase. Buckwheat will be planted as a lure crop in a 5 to 10 acre strip in sections 18 and 19, T. 105 N., R. 38 W. in an attempt to prevent summer crop depredations. More lure crops will be planted as needed if the pilot attempt succeeds.

### **Nongame Management**

*Objectives.* An objective of wildlife management on the Talcot Lake WMA will be an effectively balanced program for all indigenous wildlife species. Nongame wildlife will be considered in managing the forests, wet-

lands, prairies, and other habitats on the area.

*Considerations.* In the past, the management of game species was emphasized because of existing knowledge and their popularity for hunting. Recently, public interest and concern for nongame wildlife has increased, especially for endangered species. Applicable information concerning the effects of land management on nongame wildlife is lacking (Curtis and Ripley 1975). Although many nongame species benefit from habitat programs directed at game species, planning for nongame should not be neglected.

Birds are the most visible of the management area's nongame wildlife. Management should satisfy the habitat requirements of summer residents, winter visitors, and migrants. Populations of many migratory species show dramatic fluctuations in density from year to year even when vegetation is not physically modified (Balda 1975). Winter or spring climatic aspects or the conditions on wintering grounds will influence migrant and breeding bird densities. These factors complicate management and the evaluation of different programs.

Nongame bird management should consider 3 factors (Zeedyk and Evans 1975). First, the structural characteristics of the vegetation influence avifauna composition. Maximum birdlife diversity is found when the horizontal and vertical diversity of the vegetation are maximum. Second, bird species are adapted to nearly every habitat so that management benefiting some species can be detrimental to others. Finally, bird species differ in their ability to adapt to habitat variability since some species have specific requirements while others are more general.

Diverse habitats consistent with the ecological characteristics of the vicinity will be maintained and should benefit nongame as well as game species. The maintenance of dense nesting cover and the restoration of prairie tracts will be beneficial to nongame birds (Verner 1975, Kirsch 1976). The maintenance of mature forests and their brushy edges should promote naturally occurring densities of associated nongame species (Balda 1975). Management of wetlands for an interspersed of open water and structurally diverse emergent vegetation will benefit many marsh birds (Weller and Spatcher 1965). Finally, wintering songbirds may gain from wildlife food plots (Burt 1975).

The previous discussion on nongame management is subjective and concerns bird species. While more is known about birds than mammals, too little is known about the relationships of habitat requirements, population density, and behavior of nongame wildlife to accurately assess the effect of game management on these populations. Specific proposals for nongame management on the Talcot Lake WMA cannot be presented.

Beginning in 1977, the Section of Wildlife initiated a non-game program. A nongame wildlife specialist was hired to evaluate current knowledge and propose nongame research programs. The purpose of these research projects is to learn more about nongame wildlife, especially the responses of these species to specific management techniques. Knowledge gained from this research may be applicable to the Talcot Lake WMA.

#### **Public Use Management**

*Objectives.* The Talcot Lake WMA will be managed

to provide quality public hunting, trapping, fishing, and other compatible fish and wildlife related activities. The area will provide primarily dispersed, unstructured recreation; however, Cottonwood County will manage the park and wayside on the area to provide camping, swimming, and water access.

*Considerations.* Because of traditional uses, existing conditions, and the projected demand for hunting, fishing, and other forms of recreation, several topics merit special consideration. The maintenance of high quality public hunting on the Talcot Lake WMA is a major concern. Also, improved informational and educational materials to facilitate public use and enhance the understanding of the area are desirable. Finally, the existing and planned recreational facilities on Talcot Lake, while not strictly compatible with wildlife management goals, will benefit the vicinity because of the local scarcity of lakes for recreation.

A quality hunting experience depends on many factors, one of which is the number of other hunters in the field. Deer hunter densities in 1975 (Table 17) ranged from 2 to 8 times the suggested federal guidelines. At times, crowded conditions for both firearms and archery deer hunting cause interference among hunters and may create a dangerous situation, deer hunting on roadsides and refuge boundaries has also caused crowded, undesirable hunting situations with the added problems of trespass on private land and shooting across roads.

Currently, the first weekend of the archery deer season is the most crowded. However, hunting pressure declined from an opening weekend density of 120 hunters per square mile to 35 hunters per square mile on the 8 remaining weekend days. Hunter densities were even lower during weekdays after the first week.

To improve overall bow hunting quality, the numbers of archers using the area at certain times must be reduced. Limiting hunter numbers will have several effects which must be weighed against the benefits. First, an application and lottery system to allocate hunting opportunities is the only effective and equitable way to reduce hunter numbers. However, this procedure would limit hunter freedom and add complexity to the regulations, thus lowering hunting quality for many. Second, the limitations of numbers could, in effect, prohibit some people from deer hunting since alternative opportunities in the vicinity are limited. Third, lower hunting pressure during some periods may change the total deer harvest on the management area. A lower harvest could increase deer numbers, deer-automobile accidents, and crop depredation while a higher harvest could lead to overharvest. Regulations must be designed to minimize hunter regimentation, provide hunting opportunities over the entire season at current or increased levels, and insure that the entire season at current or increased levels, and insure that the optimum numbers of deer are harvested.

It is difficult to determine desirable hunter densities. Since the Minnesota DNR has limited experience in controlling hunter numbers, any guidelines will be somewhat arbitrary and can be criticized as too high or too low. The average number of archery hunters for the hunted portion of the unit is approximately 32 hunters per square mile per day. By maintaining hunter



densities at an average of 32 hunters per square mile, crowding during the first week of the season would be reduced, present hunter demand could be met, and present harvest levels could probably be sustained.

Because of the short firearms deer season, densities remained high ranging from 57 to 61 hunters per square mile for the 4 day 1975 season. These densities fluctuate from year to year depending on the statewide framework for firearms deer hunting. Although densities are high, relatively few hunters are involved because of the short season.

The antlerless deer permit system, first implemented in the 1975 firearms season may directly influence deer numbers and deer kill on the Talcot Lake WMA. By splitting the season into 2 parts with 2 opening days, average hunter densities may decrease. Additionally, by varying the number of antlerless permits issued for the Talcot Lake vicinity, winter deer numbers can be more precisely controlled. In the future, additional measures to control firearm hunter densities may be needed.

Waterfowl hunting pressure varies yearly with changes in water levels in the marshes; however, hunters on the unit and along CSAH 7 roadside are often crowded. The average spacing between hunters along the roadside ranges between 40 and 125 yards; the U.S. Fish and Wildlife Service suggests a spacing of at least 200 yards. Hunters in the marshes, who are usually "jump" or "pass" shooters, may also be crowded. These conditions are likely to continue or increase with continued wetland drainage in southwestern Minnesota.

Roadside waterfowl hunting provides a less desirable experience than the field or marsh situations. The hunters are poorly concealed and are disturbed by passing automobiles. If Canada goose use increases and crowding continues or worsens, this type of hunting will degenerate into a situation of long-range shooting, races for downed birds, conflicts among hunters, and trespassing in the refuge and on private land. This behavior has occurred on other wildlife areas where firing line hunting occurs, especially for Canada geese.

Roadside hunting may contribute to a poor public image of hunting in general. In a recent survey, unbiased nonhunters were asked to rank 115 "problems with hunting" in order of importance (National Shooting Sports Foundation 1976). "Hunters shoot too close to highways" ranked 16th and 5 of the 20 most important concerns related to human safety. Roadside hunting at the Talcot Lake WMA provides for maximum public exposure, and passing motorists may perceive the hunting to be dangerous even though no property damage or injuries have occurred. Roadside goose hunters at the Talcot Lake WMA often sit on or inside cars parked in the road ditch just outside the refuge boundary while waiting for geese. This situation, combined with littering and local complaints of trespassing to retrieve downed birds, creates low quality goose hunting and presents a poor image to the nonhunting public.

Most waterfowl feeding flights, which provide pass shooting opportunities, take place over the east and south side of the area. State land on the east side of the area is insufficient to provide off-road hunting except within the waterfowl refuge. Approximately 13

controlled off-road shooting stations, spaced 200 yards apart, could be placed inside the present refuge, but would be within one-half mile or less from primary roosting sites and could unduly disturb resting and feeding waterfowl. Because space is so limited, stations would have to be closer to the road and to private land than is desirable. With present land ownership, however, placing blinds inside the refuge is the only method to continue public hunting while eliminating roadside hunting.

The placement of public goose blinds outside the present refuge boundary on the south and east sides of the management area is desirable. These lands are privately owned and could either be purchased or leased from willing landowners. Purchase of the land would be the cheapest and most flexible long range alternative. Acquired land would provide a constant and dependable supply of public hunting and would allow for compatible land use management by state personnel or by lease agreements with local farmers.

If private lands east of CSAH 7 and between the present unit boundary and State Highway 62 and CSAH 7 are acquired (Figure 5), hunting from the road and the roadside ditches could be prohibited since both sides of these roads would be in state ownership. In addition, up to 32 hunting stations could be sited at least 100 yards from roads and 120 yards from private property. These blinds would be away from favored goose feeding and roosting areas and would offer the possibility of hunting with decoys. While these provisions will not satisfy all of the demand for public goose hunting, they are the only feasible alternatives for providing some public hunting, while maintaining a viable waterfowl refuge, eliminating roadside hunting, and trespass problems. If the demand for goose hunting is going to be satisfied, much of it will be on private lands.

Law enforcement is an important consideration with concentrations of people using the area. Instances of willful or inadvertent violations are likely to increase as goose numbers increase, under crowded deer hunting conditions, and as regulations become more complex. The resident manager was given full enforcement authority within 5 miles of the Talcot Lake WMA (Minnesota DNR Commissioner's Delegation Order No. 257, October 30, 1976), however, the manager does not have time for intensive enforcement duties. Conservation officers stationed at Windom and Slayton are also responsible for law enforcement on the area.

Trespassing is a major concern to adjacent landowners, but failure of the public to file complaints hinders enforcement efforts. Snowmobiling on the area is prohibited, but remains a constant problem. Other enforcement considerations are minor. If large goose concentrations develop, however, law enforcement activities will need to be increased substantially. Currently, Region IV enforcement personnel concentrate on the Lac qui Parle WMA during the goose season, and the addition of another area would tax already limited manpower.

The Talcot Lake WMA is the largest of only a few areas in the vicinity that contain diverse plant and animal communities. Therefore, the area presents opportunities for environmental education. Hunter ed-

ucation and more information about the management of the area, and the existing wildlife populations are needed. Interpretative information and maps showing parking areas and access trails are not available. Facilities, staff, and funding are not adequate for expansion of education and information programs.

Few areas suited for boating, swimming, and fishing exist in the Talcot Lake vicinity. Talcot Lake has traditionally been used for these activities by local residents. The public access at the south end of Talcot Lake and the county highway wayside (Figure 3) include leased management area land on which Cottonwood County is currently developing more facilities to meet these needs.

A state water access site is located on the state land within the Cottonwood County Park. Minnesota Statutes, Section 86A.08, subd. 1 (1976) allows the development of water access sites within wildlife management areas. Although water access sites may provide sanitary facilities, parking areas, refuse containers, limited camping and picnicking facilities, and access roads (Minnesota Statutes, Section 86A.05, subd. 9, 1976), the Minnesota DNR policy for wildlife management areas requires water access sites to be developed consistent with the management goals of the area. These policies also prohibit the development of picnic or camping facilities on or adjacent to a water access site. In order to maintain traditional uses and satisfy local needs, an exception to the policy prohibiting the development of camping and picnicking facilities should be allowed.

*Present Programs.* Public use of the Talcot Lake WMA is regulated by the resident manager in accordance with a Minnesota DNR Commissioner's Order (Appendix E). The area includes a state game refuge and a statutory waterfowl refuge (Figure 3). No trespassing is allowed in the game refuge except in the area around the Talcot Lake Dam. Waterfowl hunting is prohibited within the statutory waterfowl refuge, but deer and small game hunting are permitted. Public access to the rest of the unit is allowed between 5:00 a.m. and 10:00 p.m. Several service roads to the interior of the area are closed to vehicles.

A map of the unit, showing the refuges, land ownership, roads, water, and marsh areas, is available. The map summarizes the public use regulations. The resident manager is usually available at the headquarter-residence to answer questions during peak use periods.

Public use of the county park and highway wayside is administered by Cottonwood County. The county regulates the park hours and charges user fees for the beach and camping facilities. The park is open from May 1 to September 30 from 6:00 a.m. until 11:00 p.m.

*Future Programs.* Most present regulations will remain in effect. Additional restrictions on deer and goose hunting will be implemented and considered.

Archery deer hunter densities on the Talcot Lake WMA will be regulated on the opening weekend beginning in the 1978 season. A statewide lottery will be used to allocate hunting opportunities, and hunter densities will be restricted to 35 hunters per square mile. An average of 35 hunters per square mile will allow a slight increase in total hunter use-days for the entire season. Hunter densities in controlled hunts will be modified as necessary to promote hunter satisfaction,

safety, and desired harvest levels. In addition, area personnel in cooperation with adjacent landowners will seek to prohibit deer hunters from using the CSAH 7 roadside along the eastern refuge boundary.

The Section of Wildlife will monitor both archery and firearms deer hunter densities as well as the harvest. If hunter pressure shifts from the controlled opening weekend to the unregulated remaining weekends, then a lottery system will be used to allocate hunting opportunities on all deer season weekends. Similarly, if firearm hunter densities under the new antlerless deer permit system increase, changes in the number of antlerless permits issued will be made or hunting opportunities will be controlled. Special controlled hunting seasons such as a December muzzle-loading firearms or bow and arrow season will be considered if additional deer harvest is necessary.

A controlled hunting zone will be established with cooperation of adjacent landowners. The zone will extend 200 yards outward from the game refuge and waterfowl refuge boundaries along CSAH 7 between State Highway 62 and CSAH 15 and along State Highway 62 from the intersection of CSAH 7 west to the Murray County line (Figure 3). Within the zone, waterfowl hunting will be allowed only at designated stations. Initially, stations will be placed inside the present game refuge 200 feet off the road. Station occupancy will be limited to 3 persons, and no occupancy will be allowed between the end of legal waterfowl hunting hours and 1 hour before legal hunting hours. Stations will be located on state land and will be spaced at 200-yard intervals. Parking will be limited to designated lots. If tracts 12 through 16 and 18 through 20 (Figure 5), can be acquired, off-road hunting stations away from the goose feeding and roosting area will be provided.

If hunting pressure increases and problems with hunter behavior are encountered elsewhere around the area, a similar controlled hunting zone will be established around all or part of the game and waterfowl refuge boundaries. If hunting pressure increases further, the state blinds will be operated on a pre-registration basis with occupancy assigned by lottery. Shot size and shell limits would also be regulated at this time.

The Division of Fish and Wildlife will institute a goose management zone around the Talcot Lake WMA if the estimated Canada goose harvest exceeds 1,000 birds. This zone would allow a harvest quota to be set and season closures made after the quota was reached. The resident manager will work with landowners to develop quality blind spacing standards on private land and to promote daily rental rather than season long leases of hunting blinds.

The Division of Fish and Wildlife will investigate the feasibility of intensively managing the zone around the Talcot Lake WMA to cope with hunting quality and harvest distribution problems that are often associated with Canada goose harvest areas. Possible regulations within this zone include mandatory blind spacing, no hunting from road or railroad rights-of-way, and an individual season goose limit enforced by a tagging system.

More intensive public use management will require additional staff. Additional assistance from the Division of Enforcement may also be necessary to implement

more complex regulations and monitor hunter numbers.

The area map will be updated to show proposed unit boundaries, private land, wetland developments, closed roads, parking lots, refuges, and any controlled hunting zones that may be established. A brochure describing the area will accompany the map and will be available at the headquarters. This brochure will include descriptions of various wildlife species, especially Canada geese; a description of plant communities; and summary of present and planned development and management.

To increase the public understanding of the area's Canada goose management, large signs describing the resident and migrant Canada geese will be placed at the headquarters and at the county park (Figure 8). Information will include the size and origin of the local flock as well as the population size; subspecies; breeding, migration, and wintering areas; and harvest limitations of the Eastern Prairie Population of Canada geese.

Group tours of the area will be continued, and more will be encouraged if additional staff time is available. If demand is high enough and substantial increased funding is available, hunter education and more structured interpretative and educational programs will be developed.

Leases of state land to Cottonwood County for recreation areas will be extended. More development in the county park, including parking lots, toilets, a bath house, and a picnic shelter, is anticipated. A stipulation in the lease will allow the Minnesota DNR to place goose hunting stations on state and county owned land in the county park, if necessary, for goose harvest management.

## Research and Surveys

*Objectives.* Surveys and research will be an integral part of management of the Talcot Lake WMA. Surveys will be conducted to monitor wildlife abundance, public use, and the effects of management on all resources. Research will be encouraged, and the results will be used to improve management capabilities.

*Considerations.* Information on wildlife abundance and distribution, public use, and the effect of management on all resources is needed to guide the development of the management area. Much information is regularly collected in surveys or by informal observation by the area's staff. Added surveys and research are limited by the available staff and funds, available techniques, and the size and public accessibility of the area.

Wildlife abundance is difficult to assess. Aerial surveys of deer and waterfowl are efficient under certain conditions. Transect surveys, such as the roadside pheasant crowing count (Gates 1966), are often used as indexes to small game abundance; but reliable data require intensive effort. Measuring changes in abundance in response to management on specific areas is complicated by changes in abundance in the surrounding area and by animal movements to and from the area.

Wildlife productivity is even more difficult to assess. Deer reproduction can be assessed by the examination of car-killed does. Waterfowl productivity may be examined by breeding pair counts, nest searches, or brood counts; but these measures require extensive labor and funding. Measurement of the reproductive response of waterfowl to habitat manipulation may be

confounded by other factors such as climatic trends, the harvest in the preceding year, or the phenology of the nesting season.

Public use is difficult to assess because of the area's numerous access points and insufficient staff. Present programs concentrate on waterfowl and deer hunters. Information on other hunting, fishing, trapping, and all other activities is collected less intensively and less systematically. To obtain reliable data, car counts, interviews or questionnaires, surveys, and hunter and fisherman bag checks must be conducted systematically throughout the year. This effort will require additional labor and funds.

The effect of management such as wetland development and controlled burning on the resources of the area should be examined. Projects designed to benefit specific wildlife species or groups may be detrimental to other animals, plants, soils, waters, or archaeological and historical sites. All projects should be examined for their impact on nontarget resources. Federal guide lines require these investigations when federal aid is involved.

A recent survey of potential archaeological sites on the area (Johnson 1977) suggested a need for additional emphasis on these resources. The survey recommended the following:

"The access area and the land around the outlet control (Talcot Lake Dam) should be surveyed for archaeological sites. Shoreline and islands within the management area should receive a reconnaissance survey, and sites located through this means should be intensively surveyed."

These surveys cannot be done by the management area staff. Survey support must be obtained from sources other than the Game and Fish Fund.

The area has potential for research in many areas including waterfowl habitat management, nongame management, hunter behavior, and farmland deer populations. Such studies would increase the understanding of human-wildlife interactions and would lead to more effective management. The Talcot Lake WMA is not staffed or funded to conduct research.

*Present Programs.* Present surveys concentrate on the most popular types of hunting. Hunter use is estimated by car counts on weekends and Wednesdays throughout the hunting season. The proportions of waterfowl, deer, small game, and other hunters are estimated based on observations and random interviews. The number of trappers is monitored by the permit system. Use by fishermen and other recreationists is estimated by irregular car counts and observations.

The number of deer and Canada geese killed by hunters is estimated by bag checks made during the resident manager's normal activities. Although other hunters are checked, estimates of other game harvested cannot be made due to small sample sizes. The fur-bearer harvest estimate is often incomplete because of the failure of trappers to complete mandatory reports. Fisherman creel censuses are not made.

Wildlife surveys include the midwinter aerial deer census, ground surveys of resident Canada goose numbers, ground surveys of migratory waterfowl numbers, and annual resident goose banding. No surveys are conducted to determine upland game abundance or duck and goose production.

A reconnaissance archaeological survey is being done in conjunction with county park developments on the south shore of Talcot Lake.

No research is being conducted on the management area. However, the resident manager collects car-killed female deer to be examined for pregnancy rates as part of Minnesota's farmland deer research.

*Future Programs.* All public use of the unit will be surveyed in a more complete, systematic manner. Methods will include car counts, interviews, and post card questionnaires. Surveys will be most intensive during hunting seasons on all weekend days and randomly selected weekdays. Hunters will be checked for game harvested, and success rates will be expanded to estimate harvests. Deer harvest estimates will be possible since the Talcot Lake WMA has been designated as a kill block for deer registration. As many randomly selected days as possible will be surveyed during lower use periods.

Local goose production will be more closely monitored, as will fall goose numbers and harvest. Surveys of duck production and response to management will be conducted as funds become available. Surveys of upland game abundance, such as roadside or transect counts and pheasant crowing counts, will be conducted as staff time allows. Midwinter deer censuses will be conducted yearly as weather conditions permit.

Research by the Minnesota DNR and other competent researchers will be encouraged, and assistance will be provided within funding limitations. Research topics which are particularly relevant to the management of the unit include habitat use, movements, and nutrition-productivity relationships of farmland deer; response of waterfowl, small game, and nongame wildlife to habitat manipulation such as controlled burning, dense nesting cover and woody cover plantings, and wetland management; and the behavior and expectations of hunters and other recreationists on the unit.

## **Management of Other Southwestern Wildlife Management Areas**

*Objectives.* The Talcot Lake WMA will be used as a support base for management of nearly 300 wildlife management areas in southwestern Minnesota.

*Considerations.* Wildlife management areas are located throughout southwestern Minnesota. They are managed by 8 area wildlife managers under the direction of the Region IV Wildlife Supervisor. Equipment and personnel must be transported to various areas as necessary. The Talcot Lake WMA is centrally located and has some facilities for equipment storage and maintenance and labor supervision.

Current facilities and personnel are inadequate for the proper execution of this support function. Equipment storage facilities are limited, and much equipment must be parked in open lots. Also, proper equipment maintenance repair require trained personnel which are not currently available. In addition, increased wetland development financed by the new Minnesota water-equipment, and materials.

*Present Programs.* Crews of temporary laborers are based at the Talcot Lake WMA from April through October, under the supervision of the resident manager. These crews perform management work directed by area wildlife managers. Activities include posting signs, fencing, weed spraying, woody cover planting and maintenance, and wetland and grassland management.

*Future Programs.* Current work will be continued. An undetermined number of additional temporary laborers will be employed each season for accelerated wetland management and development. An assistant resident manager may be needed to help with the supervision of work crews. Additional equipment, including a cattail mower, will be purchased for additional wetland development.

## **IMPLEMENTATION**

Programs to manage wildlife and to provide quality fish and wildlife related recreation were developed based on present conditions and expectations for the future. Implementation of these programs depends on land ownership, land and management costs, the amount and sources of funds, and the level of wildlife abundance and public demand.

### **Land Ownership**

Land acquisition at the Talcot Lake WMA will be an important consideration in the next 10 years. Additional land is needed for goose management, public hunting, wetland and floodplain protection, and wetland development. Land acquisition has been hindered by the lack of funds and the reluctance of owners to sell.

The project boundaries were reviewed and acquisition priorities determined in 1974 (Minnesota DNR 1975b). These boundaries and priorities were reassessed in 1975, and additions and changes in priorities were made (Appendix D). A total of 750 acres was proposed for acquisition, and 539 acres rated "critical" must be purchased to implement all phases of this plan. Because of the uncertain availability of land, lower priority tracts may be purchased before higher priority tracts. Prospective sellers will be contacted by the resident manager, the Region IV land acquisition specialist, area wildlife managers, and the regional wildlife supervisor.

Formal Minnesota DNR proposals must be prepared for project expansions and approved by Region IV and the Division of Fish and Wildlife. County board approval is also needed for the 430-acre project expansion. Complete state ownership of refuge and adjacent project lands would increase the total state-owned cropland in the waterfowl refuge in Cottonwood County to more than 1,000 acres. If 1,000 acres of cropland are owned for goose management in any county, payments must be made equivalent to taxes on comparable private cropland (Minnesota Statutes, Section 97.49, subd. 7, 1976).

Land will be purchased only from willing sellers after impartial appraisal of the market value. Land trades will be negotiated, if possible, when landowners desire.

#### **Land Costs**

The cost of lands proposed for acquisition in 1977 was estimated at \$550,000. The value of southwestern Minnesota land increased 93 percent from 1967 through 1974 (Christianson and Raup 1975); so the cost of acquisition will be much higher if land is bought over a long period of time.

Land will be purchased during the 1978-79 biennium with funds from a general revenue bonding program called "Resource 2000". A hunting and trapping license surcharge which generates funds for land acquisition is also authorized until 1985. Monies appropriated by the Minnesota Resources Commission (now the Legislative Commission on Minnesota Resources) have been used for acquisition, and similar appropriations are a potential funding source. Acquisition funds will be disbursed from the Minnesota DNR, Bureau of Lands in St. Paul.

#### **Management Programs and Costs**

Although most management programs on the Talcot Lake WMA will be implemented through the Division of Fish and Wildlife, Section of Wildlife, some will be implemented by the Section of Fisheries and the Division of Enforcement. Implementation of programs by the various disciplines is discussed separately. Management by the Section of Wildlife is the most complex, and Section of Wildlife costs are estimated in the greatest detail.

*Division of Fish and Wildlife.* Allocating funds for specific fish and wildlife management and implementing the projects is difficult because many activities are dependent to a large degree on uncontrollable conditions. Prescribed burning is most effective with dry conditions, and the construction of dikes and level ditching are also dependent on seasonal weather trends. Proposed de-

velopments and management strategies also depend on land acquisition. Managers must have the flexibility to decide how funds will be spent through the year and to modify programs to suit changing conditions.

Costs for the proposed plans were estimated from the 1975 expenditures. The total regional expenditures on the area for salaries, routine equipment and facility maintenance and operation, and yearly habitat maintenance and development were used as a baseline for the annual spending level estimates. Major equipment purchases and capital improvements require larger expenditures which are made as wildlife funds and needs in the region permit. All costs were estimated in 1975 dollars.

The wildlife management programs were placed in 3 alternative spending levels (Table 25). The first group of programs has the highest priority and can be implemented at the baseline spending level without cutbacks in current management programs. Two additional programs require increased funding for manpower and support expenses. Programs in the second group have a higher priority than those in the highest spending level. All spending levels require additional funds for the purchase of equipment or the construction of capital improvements. These capital investments are required to immediately implement all programs. Although the capital expenditures are included in Table 25, these costs will be incurred only once during the planning period.

Present fisheries management programs will continue under current funding levels. Stocking and rough fish removal will be administered by Windom Area Fisheries personnel.

Equipment replacement needs are difficult to predict because of the uncertain demands on equipment. Equipment wear is related to the management programs being conducted throughout Region IV and on the area which, in turn, are determined by such uncontrollable factors as weather trends and available funds. Because of these factors, the anticipated equipment replacement is scheduled in 5-year intervals (Table 26).

*Division of Enforcement.* Law enforcement efforts will be coordinated by the area enforcement supervisor at Clarkfield. If additional law enforcement is needed near the Talcot Lake WMA, the assignment of an additional conservation officer would be considered. This addition to the Region IV Division of Enforcement complement would require increased annual funding of about \$25,000.

#### **Management Area Funding**

Although special appropriations are sometimes received, the acquisition, development, and operation of the area has been generally dependent on dedicated funds. Revenue available to the Division of Fish and Wildlife for state-wide fish and wildlife management is related to hunting, fishing, and trapping license sales which, in turn, determines the level of federal-aid matching funds Minnesota is eligible to receive. For the most part, the Division of Fish and Wildlife operates within a budget that can only be increased by greater license sales or higher license fees. Similarly, should license sales decline, revenue would also decline.

A \$3.00 Minnesota migratory waterfowl stamp was

Table 25. Annual spending alternatives for the management of the Talcot Lake WMA.

Level I. Management at current spending levels

Wetland management

1. Maintain dikes and control structures
2. Construct 3 proposed dikes with control structures
3. Maintain and develop wetlands on other WMAs

Grassland management

1. Annual mowing of 5-acre goose brood area
2. Noxious weed control on Talcot Lake and other WMA's

Woody cover management

1. Operate 8-acre nursery
2. Plant and maintain woody cover on Talcot Lake and other WMA's

Cropland management

1. Administer cooperative farming agreements
2. Farm present amount of cropland for wildlife
3. Continue supplemental winter deer feeding

Canada goose management

1. Maintain goose nest sites infrequently
2. Monitor geese for disease

Public use management

1. Erect and maintain signs and fencing on Talcot Lake and other WMA's
2. Revise and update unit map
3. Continue group tours

Surveys and research

1. Continue present hunter and trapper surveys
2. Conduct annual winter deer census
3. Estimate resident Canada goose numbers annually
4. Estimate fall migratory waterfowl numbers weekly
5. Assist with basic research projects

Annual spending		Immediate capital needs for implementation	
1975 baseline	\$106,000	Replacement	
Added labor and support	— 0 —	Cold storage building	\$ 8,000
Annual total	\$106,000	New	
		Drop inlet water control structures (3)	4,500
		Machine storage building 60' x 80'	20,000
		Grain elevator 46'	2,100
		Grain drill 14'	2,000
		Crisafulli pump 2" with pipe	1,500
		Water tank with pump	800
		Total	\$38,900

Level II. Additional management with increased spending.

Wetland management

1. Construct 2 proposed impoundments
2. Burn 30 acres of cattails annually
3. Develop additional wetlands on other WMAs.

Grassland management

1. Plant 140 acres per year to dense nesting cover
2. Burn 50 acres of prairie on 4-year rotation
3. Experimentally burn 140 to 160 acres of old field
4. Maintain 950 acres of grassland by burning on a 4-year rotation or replanting on a 7-year rotation

Table 25. (Continued)

Woody cover management			
1. Plant and maintain 2 miles of cover strips			
Cropland management			
1. Farm up to 300 acres of additional cropland			
Canada goose management			
1. Maintain goose nest structures and islands annually			
Public use management			
1. Construct controlled goose shooting stations			
2. Increase law enforcement effort			
3. Administer controlled deer hunt			
4. Prepare informational brochures on resources and management			
5. Construct Canada goose informational signs			
Surveys and research			
1. Conduct systematic biennial public use surveys			
2. Conduct intensive goose harvest surveys in the vicinity of the unit			
Annual Spending		Immediate capital needs for implementation	
Level I annual total	\$106,000	Level I total	\$38,900
Added labor and support	30,000	New	
(1 assistant area manager)		Drop inlet water control structures (2)	3,000
(1 mechanic, 9-month)		Total	\$41,900
(2, 3-month laborers)			
Annual total	\$136,000		

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**Level III. Additional management with increased spending**


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Wetland management	
1. Control additional emergent vegetation on Talcot Lake and other WMA's	
Cropland management	
1. Farm 530 acres in the refuge or proposed acquisition more intensively	
2. Irrigate 160 acres within the refuge	
Woody cover management	
1. Repair or replace wood duck nest boxes	
2. Maintain boxes annually	
Canada goose management	
1. Administer goose harvest quota	
Public use management	
1. Administer controlled goose hunt	
2. Increase law enforcement effort	
3. Provide additional educational tours	
Surveys and research	
1. Survey annually Canada goose production and population	
2. Survey annually upland game abundance	
3. Survey annually duck production	

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Table 25. (Continued)

Annual spending		Immediate capital needs for implementation	
Level II annual total	\$136,000	Level II total	\$ 41,900
Added labor and support	30,200	New	
(2, 9-month laborers)		Tractor, 100 h.p.	20,000
(1 clerk typist)		Cultivator, 14'	2,000
(support expenses)		Plow, 5-bottom	3,500
		Corn picker, 2-row	4,500
		Trailer w/grain bins (2)	2,000
Annual total	\$166,200	Cattail mower	4,500
		Well and center-pivot irrigation system	50,000
		Total	\$128,400

Table 26. Equipment replacement schedule for the Talcot Lake WMA.

Period	Item/Model (number)	Cost
1977-1981	Tractor/International	\$ 8,000
	Tractor/Ford 871	10,000
	Truck/Dodge, 2-ton	8,500
	Truck/Chevrolet, 2-ton	8,500
	Truck/Ford, 2½-ton	10,000
	Jeep/Willys	7,000
	Tree baller	1,000
	Mower/Ford 315-1	1,000
	Mower/Ford 507-22-125	1,000
	Cultivator/Ford	2,000
	Tree lifters (2)	1,000
	Tree planter	2,200
Outboard motor/Mercury 110	700	
1982-1986	Tractor/Case 310 E loader	\$27,000
	Tractors/Ford 2000 (2)	20,000
	Tractor/Ford 3000	10,000
	Tractor/Ford 5000	10,000
	Trucks/Ford, 2-ton (3)	25,500
	Truck/Dodge, ½-ton	5,000
	Truck/Chevrolet, 2-ton	8,500
	All-terrain vehicle/Cushman	4,000
	Harrow, disc/International 122 (2)	2,000
	Harrow, drag/Ford	500
	Field sprayer/Solderholm 235R (2)	2,200
	Trailer/Wisconsin 1000	3,500

initiated in 1977. Purchase of this stamp by waterfowl hunters and other people interested in conservation will provide increased funds for wetland development. In addition, the 1977 legislature appropriated \$500,000 for state-wide wildlife habitat improvement during the 1978-79 biennium as part of the "Resource 2000" program.

Except for the recent increased revenue provided by the migratory waterfowl stamp and possible future general fund appropriations, management funds will probably not increase significantly by 1987. According-

ly, most proposals are planned within the present budgetary constraints. Wildlife management finances in Region IV are somewhat flexible, and some proposals requiring increased spending could be financed by shifting funds between items in the Region IV budget. However, the restructuring of spending priorities could be detrimental to some regional wildlife functions. To maintain the present wildlife management in Region IV and to implement all of the planned management on the Talcot Lake WMA, increased funding in Region IV will be needed.



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## Appendix A. The Minnesota Outdoor Recreation System.

Classification	Purpose	Administration
Natural State Park	A natural state park shall be established to protect and perpetuate extensive areas of the state possessing those resources which illustrate and exemplify Minnesota's natural phenomena and to provide for the use, enjoyment, and understanding of such resources without impairment for the enjoyment and recreation of future generations.	Commissioner of Natural Resources
Recreational State Park	A recreational state park shall be established to provide a broad selection of outdoor recreation opportunities in a natural setting which may be used by large numbers of people.	Commissioner of Natural Resources
State Trail	A state trail shall be established to provide a recreational travel route which connects units of the outdoor recreation system or the national trail system, provides access to or passage through other areas which have significant scenic, historic, scientific, or recreational qualities or reestablishes or permits travel along an historically prominent travel route or which provides commuter transportation.	Commissioners of Transportation and Natural Resources
State Scientific and Natural Areas	A scientific and natural area shall be established to protect and perpetuate in an undisturbed natural state those natural features which possess exceptional scientific or educational value.	Commissioner of Natural Resources
State Wilderness Area	A state wilderness area shall be established to preserve, in a natural wild and undeveloped condition, areas which offer outstanding opportunities for solitude and primitive types of outdoor recreation.	Commissioner of Natural Resources
State Forest and State Forest Sub-Areas	A state forest, as established by Minnesota Statutes, Section 89.021, shall be administered to accomplish the purposes set forth in that section, and a state forest sub-area shall be established to permit development and management of specialized outdoor recreation at locations and in a manner consistent with the primary purpose of the forest.	Commissioner of Natural Resources
State Wildlife Management Area	A state wildlife management area shall be established to protect those lands and waters which have a high potential for wildlife production and to develop and manage these lands and waters for the production of wildlife, for public hunting, fishing, and trapping, and for other compatible outdoor recreational uses.	Commissioner of Natural Resources
State Water Access Site	A state water access site shall be established to provide public access to rivers and lakes which are suitable for outdoor water recreation and where the access is necessary to permit public use.	Commissioner of Natural Resources
State Wild, Scenic, and Recreational Rivers	State wild, scenic, and recreational rivers shall be established to protect and maintain the natural characteristics of all or a portion of a river or stream or its tributaries, or lake through which the river or stream flows which together with adjacent lands possesses outstanding scenic, scientific, historical, or recreational value, as provided by Sections 104.31 to 104.40.	Commissioner of Natural Resources
State Historic Sites	A state historic site shall be established to preserve, restore, and interpret buildings and other structures, locales, sites, antiquities, and related lands which aptly illustrate significant events, personalities, and features of the history and archaeology of the state or nation.	Commissioner of Natural Resources, Minnesota Historical Society, Board of Regents of the University of Minnesota, Governmental subdivisions of the State and County Historical Societies.
State Rest Area	A state rest area shall be established to promote a safe, pleasurable, and informative travel experience along Minnesota highways by providing areas and facilities at reasonable intervals for information, emergencies, or the rest and comfort of travelers.	Commissioner of Transportation

Appendix B. U.S. Soil Conservation Service soil numbers, series, and types for the Talcot Lake WMA soils.

Number	Series	Type
18	Comfrey	clay loam
27	Dickenson	fine sandy loam
33	Barnes	loam
36	Flom	clay loam
41	Estherville	sandy loam
70	Svea	loam
86	Canisteo	clay loam
94	Terril	loam
96	Collingwood	silty clay
102	Clarion	loam and clay loam
113	Webster	clay loam
114	Glencoe	clay loam
130	Nicollet	loam and clay loam
137	Dovray	silty clay
197	Kingston	silty clay loam
210	Fulda	silty clay loam
214	Talcot	silty clay loam
219	Rolfe	clay loam
229	Waldorf	silty clay loam
247	Linder	sandy loam
255	Mayer	loam
359	Lamoure	silt loam, frequently flooded
373	Renshaw	loam
418	Lamoure	silt loam
905	Barnes-Buse-Renshaw	loam complex
913	Buse-Barnes	loam complex
960	Storden-Clarion	loam and clay loam complex
961	Storden-Clarion-Estherville	loam and clay loam complex
1032	Lake beaches	undifferentiated

Appendix C. Water chemistry measurements from 6 sites on the Talcot Lake WMA, 1976.

Parameters <sup>2</sup>	Sites sampled 5-21-76 <sup>1</sup>						Sites sampled 7-21-76					
	A	B	C	D	E	F	A	B	C	D	E	F
Sulfate	246	200	550	500	325	200	272	146	98	273	273	221
Total phosphorous	0.095	0.327	0.539	0.191	0.240	0.225	0.362	1.004	1.072	0.245	0.350	0.610
Soluable phosphorous	0.041	0.101	0.218	0.058	0.076	0.101	0.125	0.212	0.568	0.098	0.087	0.249
Chloride	66	32	65	76	75	37	170	68	84	96	100	68
Nitrogen												
Ammonia	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.175	0.415	0.120	0.175	0.130	0.120
Nitrite	0.0032	0.0039	0.0032	0.0031	0.0034	0.0038	0.0084	0.0072	0.0054	0.0007	0.0020	0.0111
Nitrate	0.022	0.011	0.012	0.006	0.007	0.005	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total Kjeldahl	2.42	5.01	4.99	2.81	3.26	2.26	—	—	—	—	—	—
Total organic	—	—	—	—	—	—	2.622	5.934	3.138	2.016	2.940	2.940
pH	8.2	8.2	8.0	8.1	8.0	8.0	8.4	7.82	9.12	8.82	8.52	8.52
Total alkalinity	212.5	247.5	222.5	132.5	142.5	362.5	142.5	187.5	262.5	135.0	282.5	282.5

1. Sampling site

- A. Des Moines River at Cottonwood County Rd. 15.
- B. Impoundment in Section 18, T. 105N., R. 38W.
- C. Dugout Pond Section 18, T. 105N., R. 38W.
- D. Talcot Lake public access.
- E. Talcot Lake immediately above dam.
- F. Marsh 100 yards west of area headquarters.

2. Measurements in parts per million except pH.

Appendix D. Acreage and acquisition priority of tracts to be acquired on the Talcot Lake WMA.

County	Tract <sup>1</sup> Number	Township	Range	Section	Acreage	Priority
Cottonwood	12	105N	38W.	29	25	Critical
	13	105N.	38W.	29	160	Critical
	14	105N.	38W.	29	40	Critical
	15	105N.	38W.	20	40	Critical
	16	105N.	38W.	20	12	Critical
	18	105N.	38W.	30	159	Critical
	19	105N.	38W.	30	81	Critical
	21	105N.	38W.	20	5	Desirable
	22	105N.	38W.	8	24	Desirable
	23	105N.	38W.	8	20	Desirable
	24	105N.	38W.	6	40	Eventual
Murray	20	105N.	39W.	25	22	Critical
	25	105N.	39W.	1	80	Eventual
	26	105N.	29W.	1	20	Eventual
	27	105N.	39W.	1	12	Eventual
Nobles	8	104N.	39W.	1	10	Desirable

1. Tract numbers correspond to the numbering system on the DNR Bureau of Lands Project Unit Maps.

## Appendix E. Regulations Relating to the Public Use of Wildlife Management Areas, Commissioner's Order No. 1961.

No use shall be made of any state-owned wildlife management area except in accordance with the following regulations:

### Section 1. *Entry and use.*

- (a) Those parts of wildlife management areas posted "STATE GAME REFUGE — NO TRESPASSING" or "WILDLIFE SANCTUARY — NO TRESPASSING" shall not be entered except as authorized by an agent of the Commissioner.
- (b) No part of any wildlife management area may be entered or used during the hours 10:00 P.M. to 5:00 A.M. if so posted at the major access points.

### Sec. 2. *Hunting and trapping.*

- (a) Protected wild animals may be taken on wildlife management areas by hunting or trapping during the established seasons therefore in the zones in which they are located unless the wildlife management area is specifically closed by Commissioner's Order. Upon request by an agent of the Commissioner, all persons shall report animals taken on wildlife management areas and submit them for inspection.
- (b) Unprotected wild animals may be taken on wildlife management areas from September 1 through the last day in February unless the wildlife management area is specifically closed by Commissioner's Order. Nuisance animals may be controlled under permit issued by a wildlife manager.

### Sec. 3. *Commercial fishing.*

The taking of minnows and other live baits for commercial purposes may be allowed only under permit from the wildlife manager and only on wildlife management areas over 2000 acres in size.

### Sec. 4. *Watercraft.*

Use of motorized watercraft is permitted only on the following Wildlife Management Areas except where posted otherwise by agents of the Commissioner:

- (a) In the Gores Wildlife Management Area (Mississippi River Pool 3, Dakota and Goodhue Counties) motorized watercraft may be used without limitation on size.
- (b) In the Lac Qui Parle Wildlife Management Area (Big Stone, Chippewa, Lac Qui Parle, and Swift Counties) motorized watercraft may be used without limitation on size.
- (c) In the Mud-Goose Wildlife Management Area (Cass County) motorized watercraft powered by motors of 10 horsepower or less may be used except *during the waterfowl season*.
- (d) In the Orwell Wildlife Management Area (Ottertail County) motorized watercraft powered by motors of 10 horsepower or less may be used.
- (e) In the Roseau River Wildlife Management Area (Roseau County) motorized watercraft may be used in the main channel of the Roseau River. Motorized watercraft powered by motors of 10 horsepower or less may be used elsewhere on this management area during the waterfowl season only.
- (f) In the Talcot Lake Wildlife Management Area (Cotton-Wood and Murray Counties) motorized watercraft may be used on Talcot Lake *except during the waterfowl season*. Such watercraft are not permitted on the river and marshes.
- (g) In the Thief Lake Wildlife Management Area (Marshall County) motorized watercraft powered by motors of 10 horsepower or less may be used.
- (h) In the Walnut Lake Wildlife Management Area (Faribault County) motorized watercraft powered by motors of 10 horsepower or less may be used in that portion of the area known as South Walnut Lake.

### Sec. 5. *Vehicles*

- (a) Regulations in this section do not pertain to Federal State or County highways or Township roads.
- (b) No person shall operate an all-terrain vehicle, hang glider, air boat, or hover craft in a wildlife management area. No person shall operate a snowmobile in any wildlife management area without the written permission of the wildlife manager in charge thereof in that part of the state lying south and west of a line described as follows: U.S. Highway No. 2 from East Grand Forks easterly to Bemidji; thence southerly along U.S. Highway No. 71 to Wadena; thence easterly along U.S. Highway No. 10 to Staples and U.S. Highway No. 210 to Carlton; thence east in a straight line to the easterly boundary of the state.
- (c) Motor vehicles may be operated on the following wildlife management areas, but not in excess of 20 mph. They may be operated only on established roads, and no vehicle may be driven beyond a sign prohibiting vehicular use or beyond any man-made vehicle barrier.
  1. Carlos Avery Wildlife Management Area (Anoka and Chisago Counties)
  2. Hubbel Pond Wildlife Management Area (Becker County)
  3. Mille Lacs Wildlife Management Area (Kanabec and Mille Lacs Counties)
  4. Red Lake Wildlife Management Area (Beltrami County)
  5. Roseau River Wildlife Management Area (Roseau County)
  6. Thief Lake Wildlife Management Area (Marshall County)
- (d) Vehicles are prohibited on all other wildlife management areas except they may be operated, not in excess of 20 mph, on those routes designated by signs as being for travel purposes.
- (e) No vehicle shall be parked where it obstructs travel.

Sec. 6. *Aircraft.*

Unauthorized use of aircraft below 1000 feet AGL (above ground level) over a wildlife management area is prohibited except in emergencies.

Sec. 7. *Firearms and target shooting.*

Target, trap, skeet, or promiscuous shooting is prohibited.

Sec. 8. *Disorderly conduct.*

Obnoxious behavior or other disorderly conduct is prohibited.

Sec. 9. *Disposal of waste and abandonment of property.*

Disposal or abandonment of garbage, trash, spoil, sludge, rocks, vehicles, or other debris or personal property on any wildlife management area is prohibited. Boats, decoys, and other equipment must not be left unattended overnight except traps on those wildlife areas open to trapping.

Sec. 10. *Destruction or removal of property.*

Signs, posts, fences, buildings, trees, shrubs, vines, plants, or other property may not be destroyed or removed except that marsh vegetation may be used to build blinds on the area, and edible and decorative portions of plants (except wild rice) may be picked for personal use. Wild rice may not be harvested unless the area is specifically opened by commissioner's order.

Sec. 11. *Private property or structures.*

No person shall construct or maintain any building, dock, fence, billboard, sign, or other structure on any wildlife management area, except that duck blinds may be erected but shall not become private property or be used to preempt hunting rights. It is unlawful to construct, occupy or use any elevated scaffold or other elevated device for the purpose of hunting, watching for or killing big game, except that portable tree stands may be used for

this purpose provided they are removed each day at the close of hunting hours and do no permanent damage to trees in which they are placed.

Sec. 12. *Private operations.*

Soliciting business, agricultural cropping, beekeeping or conducting other commercial enterprises on any wildlife management area is prohibited except by lease agreement.

Sec. 13. *Introduction of plants or animals.*

Plant and animal life taken elsewhere shall not be released, placed, or transplanted on any wildlife management area except as approved by the wildlife manager.

Sec. 14. *Animal trespass.*

Livestock, horses, and other domestic animals, except dogs being used for hunting purposes, shall not be permitted on wildlife management areas except under cooperative agreement or permit prepared by the wildlife manager.

Sec. 15. *Camping.*

No person shall camp on any wildlife management area except by permit or in designated areas during the hunting season.

Sec. 16. *Other compatible uses.*

Wildlife management areas may be used for hiking, wildlife observation, sport fishing, and other wildlife-related uses provided such uses are not inconsistent with sections 1 through 15 of this order.

Sec. 17. These regulations do not apply to persons engaged in official Department of Natural Resources operations or research projects approved by the Department of Natural Resources.

Sec. 18. Commissioner's Order No. 1948 is hereby superseded.

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