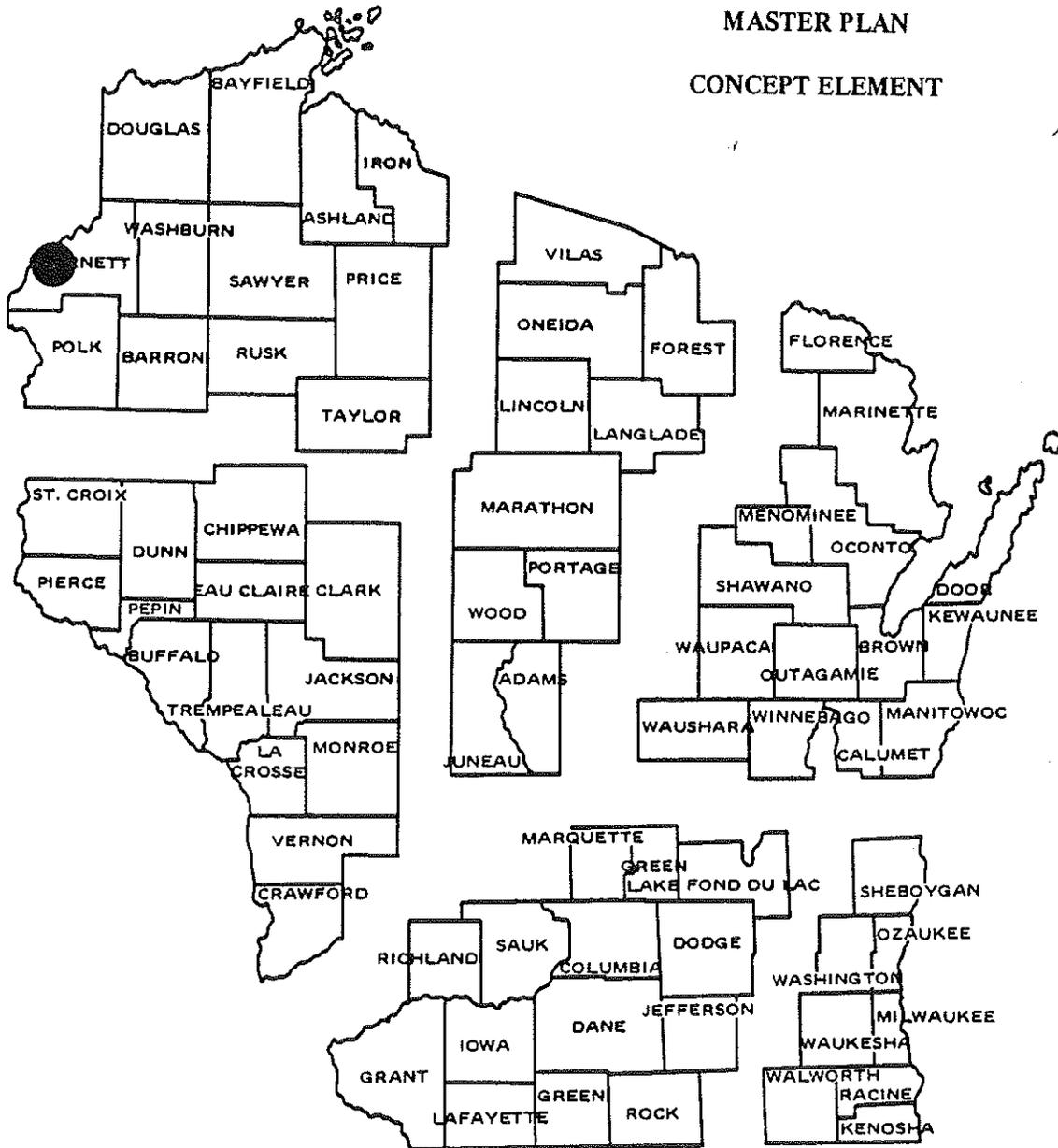


CREX MEADOWS WILDLIFE AREA

MASTER PLAN

CONCEPT ELEMENT



Property Task Force

Approved By: NRB

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Paul Kooiker - Crex Meadows Property Manager
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Date: 10-27-82

INTRODUCTION

The Crex Meadows Wildlife Area is located in western Burnett County primarily in the Township of West Marshland (Figure 1). It is the second largest state-owned wildlife area in Wisconsin. The Village of Grantsburg is adjacent to the extreme southwest corner of the property. The Minneapolis-St. Paul metropolitan area is 90 miles southwest and thus in rather close proximity to Crex.

Crex Meadows, with an approved acreage goal of 30,097.58 acres is the largest and best known of the four segments of the Glacial Lake Grantsburg Wildlife Management Complex. The other three segments are: 1) Fish Lake Wildlife Area (approved acreage goal of 14,124 acres), 2) Amsterdam Sloughs Wildlife Area (approved acreage goal of 7,233.3 acres), and 3) Danbury Wildlife Area (approved acreage goal of 2,866 acres). Crex Meadows has received national attention due to the extensive use of prescribed fire to restore prairie grouse habitat and due to the restoration and enhancement of thousands of acres of wetland wildlife habitat.

The long range management of the Glacial Lake Grantsburg Wildlife complex continues to be for waterfowl and prairie grouse.

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SECTION I. - ACTIONS

GOAL AND OBJECTIVES

Goal

To manage a state-owned wildlife area for the production of wildlife emphasizing migratory game birds, prairie grouse, endangered and threatened species; and to provide public hunting, trapping, wildlife education and observation, and other compatible outdoor recreational opportunities.

Annual Objectives

1. Produce 4,500 ducks on 6,000 acres of flowed marsh.
2. Produce 1,000 goslings from a spring population of 2,000 geese.
3. Produce an average fall population of 600 sharp-tailed grouse.
4. Maintain a minimum population of certain endangered and threatened species as follows:
 - a. Prairie chickens (threatened): 50 cocks (spring).
 - b. Double-crested cormorant (endangered): 25 nesting pairs.
 - c. Osprey (endangered): 2 nesting pairs.
 - d. Bald eagle (endangered): 1 nesting pair.
5. Provide 31,000 participant days of recreation as follows:
 - a. Waterfowl: 6,500
 - b. Deer: 7,500 gun
6,000 bow
 - c. Other small game: 6,000
 - d. Predators: 2,000
 - e. Trapping: 3,000
6. Provide 10,000 guided visitor days while maintaining 70,000 visitor days of wildlife education and observation activities.
7. Provide for an average of waterfowl use days by local and migrant waterfowl during the period September 15 through freeze-up of:
 - a. Ducks: 480,000 days with an average peak population of 11,000.
 - b. Geese: 420,000 days with an average peak population of 3,000 local giant Canadas, 6,000 migrant Canadas, and 2,500 migrant snow geese.
8. Provide 2,000 participant days of fall camping.
9. Protect and maintain 12 historical sites.
10. Maintain wintering habitat for 500-700 deer.

11. Provide opportunities for 2,000 participant days of snowmobiling recreation associated with a county trail system.

Annual Additional Benefits

1. Provide a harvest of:
 - a. 1,500 muskrats
 - b. 25 beaver
 - c. 10 otter
2. Contribute to the habitat of nongame including resident and migratory species such as great blue herons, sandhill cranes, and loons.
3. Provide 5,000 participant days of additional recreational opportunities including cross-country skiing, hiking, berry picking, picnicking, and photography.
4. Harvest about 1,200 cords of timber consistent with wildlife objectives. Of this total, 800 cords will be generated by clearing and 400 cords by forest habitat management.
5. Harvest forage minnows when available.

RECOMMENDED MANAGEMENT AND DEVELOPMENT PROGRAM

Continued implementation of a brush-prairie/wetland management program is recommended. This management direction has resulted in expanding populations of ducks, geese, sharp-tailed grouse, and aquatic furbearers, and has provided habitat for the endangered bald eagle, osprey, and double-crested cormorant. The current management program has also resulted in establishing the only Wisconsin population of prairie chickens disjunct from the central Wisconsin populations. Other species such as sandhill cranes, loons, herons, harriers, and Blanding's turtles have also benefited.

Thousands of visitors use Crex each year for hunting and non-hunting wildlife recreation and education. Current management has provided convenient access to the property and has resulted in "up-close", non-disturbing opportunities to view wildlife, a main attraction for Crex users.

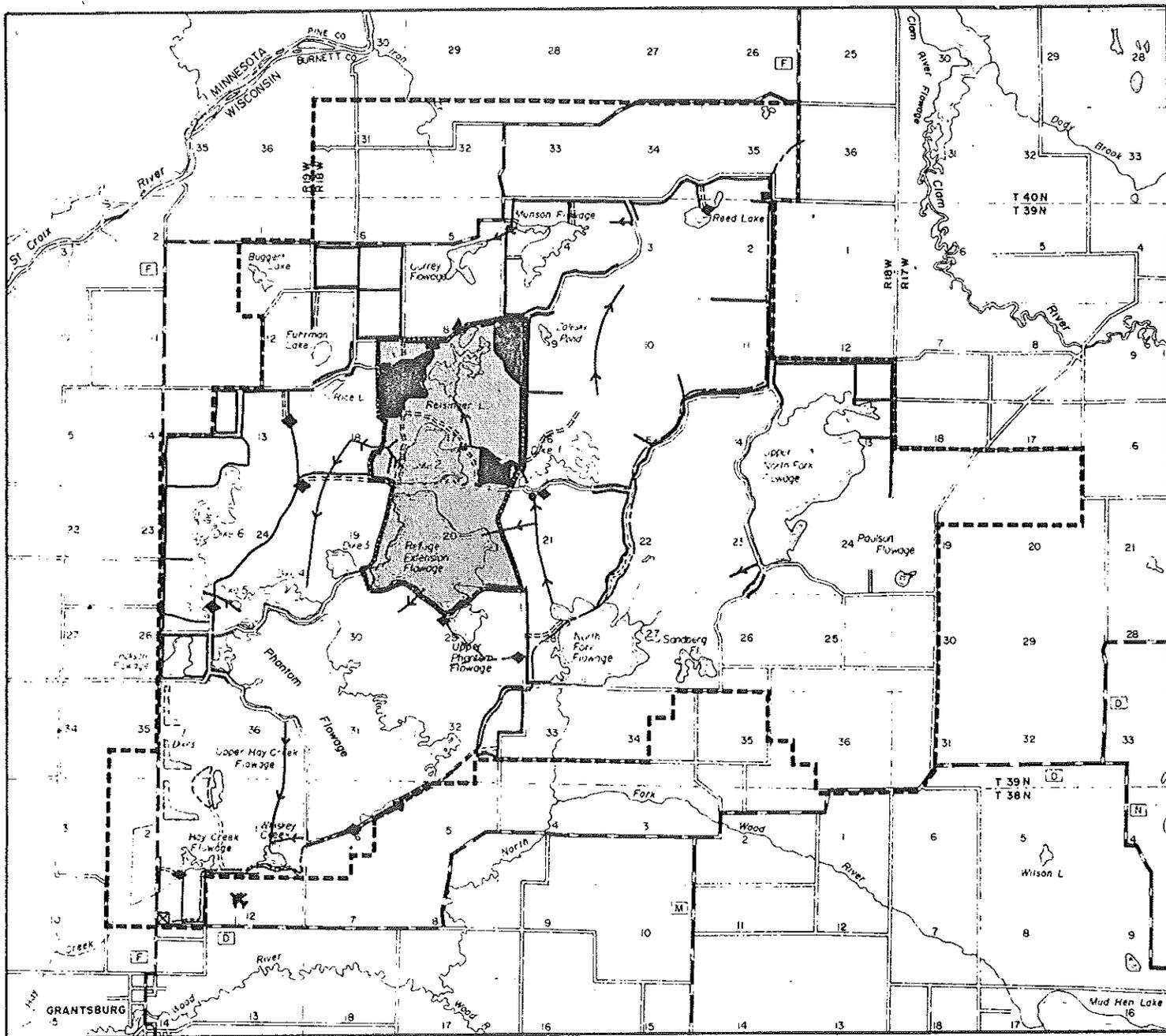
Crex Meadows is considered the core property of the Glacial Lake Grantsburg Wildlife Area Complex. Management of all Glacial Lake properties is primarily for waterfowl and prairie grouse. The other properties are not as well developed as Crex, especially in regard to brush-prairie habitat restoration. However, even at this point, there seems to be an interrelationship between the 3 Glacial Lake properties (Crex, Fish Lake, Amsterdam Sloughs). Field observations suggest that ducks, geese, cormorants, osprey, eagles, and herons move freely between these properties. A similar interrelationship is expected for sharp-tailed grouse as brush-prairie habitat development advances on Fish Lake and Amsterdam Sloughs.

Increasing sharp-tailed grouse populations is a major objective on all Glacial Lake properties. The close physical relationship of Crex to Fish Lake and Amsterdam Sloughs Wildlife Areas, and the Governor Knowles State Forest is a primary factor for optimistic expectations for sharptails on these properties. Sharptail populations on Crex should increase significantly as brush-prairie habitat restoration continues. Following development, Crex and the other Glacial Lake properties will comprise the most significant brush-prairie habitat remaining in Wisconsin and the existence of this habitat will be essential for maintaining viable populations of sharp-tailed grouse.

Planned Developments

Existing developments are shown in Figure 2. Planned development actions necessary to attain the stated goals and objectives are shown in Figure 3 and are described as follows.

1. Construction of 4.8 miles of dike to create 13 additional flowages totaling 2,010 acres. Three of these proposed flowages will be major projects, each flooding 450 acres or more. Each of 3 flowages will flood 150 acres. The remaining 7 small flowages will average 30 acres each. All flowages will have water control structures. At full development, 6,100 acres of open water will exist on Crex and an additional 5,000 acres of marsh will be affected by flowages.
2. Construction of 3.7 miles of water transfer ditch to facilitate water control and movement. Since the main water source on Crex is the North Fork Flowage, pumping and water movement through ditches is often necessary to maintain normal water levels in flowages in the north and west sections of Crex.
3. Restoration and creation of 300 potholes (.05 acre each), generally within 1/4 mile of brood water. These are breeding pair sites installed by bulldozing which will be located primarily in the southeast corner and west near dike 6.
4. Restoration of brush-prairie habitat by clearing approximately 3,000 acres of forested upland using timber sales, firewood permits and noncommercial methods. An estimated 800 cords will be harvested annually for about 10 years in conjunction with land clearing.
5. Construction of 29 miles of firebreak to facilitate prescribed burning on areas cleared and restored to brush prairie. Some of this firebreak construction will occur around parcels already in brush-prairie habitat in order to simplify prescribed burning. Upon full development, an average of 4,000 acres will be burned annually to maintain the brush prairie and wetland habitat in an open condition.
6. Establishment of 250 acres of dense nesting cover on old agricultural fields to provide nesting habitat for waterfowl and prairie chickens.
7. Annual Cultivation of a maximum of 260 acres within the refuge to provide food for local migrating ducks, geese, and sandhill cranes as well as wintering sharp-tailed grouse and prairie chickens. Cropping alternatives will be pursued to minimize costs while remaining consistent with property objectives.



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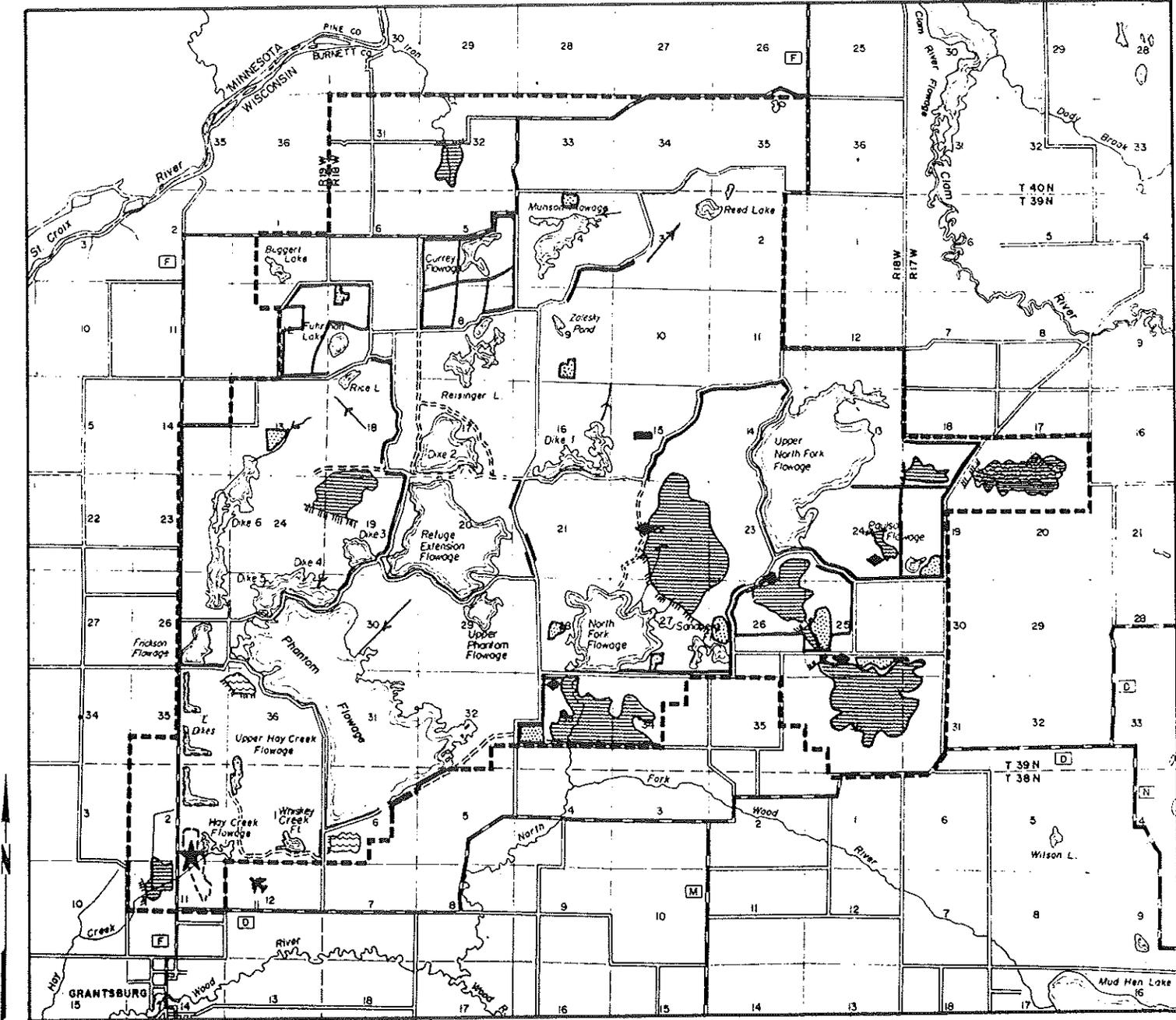
LEGEND

- PROJECT BOUNDARY
- FIREBREAK
- DITCH
- ▭ AGRICULTURAL FIELD
- ▨ DENSE NESTING COVER
- ▩ REFUGE
- HIKING-HUNTER TRAILS
- DRIVEABLE TRAILS
- SNOWMOBILE TRAIL
- LAKE OR FLOWAGE*
- ◆ PARKING LOT
- ▣ OBSERVATION AREA
- ▲ PICNIC AREA
- ⊙ DIVERSION PUMP
- ⊠ HEADQUARTERS

*NOTE: POTHOLES ARE NOT SHOWN

CREX MEADOWS WILDLIFE AREA

FIGURE 2 EXISTING DEVELOPMENTS



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LEGEND

-  PROJECT BOUNDARY
-  FIREBREAK
-  DITCH
-  DENSE NESTING COVER
-  HIKING-HUNTER TRAIL
-  DIKE
-  FLOWAGE
-  PARKING LOT
-  OBSERVATION AREA
-  INTERPRETIVE CENTER (POSSIBLE LOCATION)

**CREX MEADOWS
WILDLIFE AREA**

8. Maintenance of approximately 3,500 acres of high quality prairie chicken habitat. This area will include the refuge and a 1/4 to 1/2 mile strip surrounding the refuge. This management will differ from brush-prairie development in that a much more grassy habitat will be encouraged. The agricultural fields and wetlands are included in the 3,500 acres.
9. Upon completion of all land purchases, about 6,000 acres of timber will be managed for forest wildlife. The 3,500 acres of jack pine and scrub oak on the north end of Crex has had heavy use by wintering deer since the 1940's. This area will be managed for wintering deer as state ownership and agreements with Burnett County allow. The remaining 2,500 acres include forested areas west and south of Phantom Flowage, south of the refuge extension dike, and the southeast corner of Crex. Aspen types will be managed for deer, ruffed grouse, and woodcock using small, scattered clearcuts. Oak on better sites will be managed for mature and old growth stands. White and red pine will generally be left uncut and management will preserve snag trees and less common forest types such as swamp hardwoods. Forest wildlife habitat improvement will generate an estimated 400 cords annually.
10. Installation of 15 heron/cormorant nesting platforms on flowages to replace the loss of natural dead tree nesting sites. If herons or cormorants use these structures, additional platforms will be installed to encourage an increased cormorant population and to maintain the heron rookeries. Osprey nest platforms will be installed as necessary to replace nests or deteriorated platforms.

Other demonstrative nesting structures may be utilized in conjunction with wildlife education efforts. Specific possibilities are loon islands, islands for black terns, bluebird houses, phoebe platforms, sparrow hawk boxes and wood duck houses. Artificial nest structures for geese may be used in large sedge marshes where suitable natural habitat is lacking.

11. Creation of 4 1/2 miles of trails for hiking and hunter access trails. Most of the trails follow old logging roads and will require a minimum of new development. A 1 1/2 mile trail, beginning and ending at the Crex Headquarters, will be designed as an interpretive trail to help educate and inform users about wildlife management practices.
12. Construction of one additional observation area in the east central part of the property.
13. Five parking lots will be constructed as the proposed flowages are built. They will function as combined parking and boat access sites.
14. A 10-mile snowmobile trail lease with Burnett County will be maintained but no additional snowmobile trails are planned.
15. No further development of picnic or developed camping areas is planned. The existing picnic-camping area just north of the refuge will be maintained for these purposes. Camping will be allowed by permit only from September 1 through December 31. Management of this site requires occasional grass mowing, garbage pickup and maintenance of toilets and other structures.

16. Six historical sites on state-owned lands will continue to be designated using routed signs. Six additional sites will be protected when acquired. A State Historical Marker has been installed on one site. By agreement, the Burnett County Audubon Society purchased the Historical Marker and DNR provides routine maintenance.
17. The Crex Meadows Headquarters is located in the southwest corner of the property at the junction of County Trunks D and F. The headquarters buildings will be used as a combination office and nature center until a separate interpretive center is constructed elsewhere on Crex. Future plans may include construction of an office for the field crew as an addition to the existing shop. Also planned is an expanded shop, vehicle and equipment storage area. In the future, other buildings may be winterized to facilitate year round meetings and educational workshops.
18. All areas proposed for development will be examined for the presence of endangered and threatened wild animals and wild plants. If listed species are found, development will be suspended until the District Endangered and Nongame Species Coordinator is consulted, the site evaluated, and appropriate protective measures taken.
19. A complete biological inventory of the property will be conducted as funds permit. Additional property objectives may be developed following completion of such an inventory.
20. All areas of future development will also be investigated for the presence or absence of historical or archaeological sites and appropriate protective measures taken to protect significant sites. Should any sites be found during development, construction will be suspended until the State Historical Preservation Office is consulted.
21. As the interpretive program expands a wildlife interpretive center is proposed for construction. The center may be located near but not directly adjacent to the Crex Headquarters. The center would be used as the focal point for interpretive activities on Crex.

Maintenance

Planned maintenance actions at full development are described as follows:

1. Maintain 23 miles of dikes.
2. Conduct water control activities on 39 flowages impounding 6,100 acres of open water.
3. Maintain 84 miles of firebreak.
4. Maintain 18,000 acres of brush prairie - wetlands habitat by burning an average of 4,000 acres annually.
5. Maintain public use facilities including one interpretive center, 14 parking lots, one rest area, and 4 observation areas.
6. Litter pick-up and posting.

Acquisition (Figure 4)

It is proposed to reduce the property boundary slightly by eliminating 40 acres (Parcel A) of timber not needed for management purposes. An additional 205 acres (Parcel B) are owned by the state outside of the approved boundary and will be used for trading purposes or sold outright.

Burnett County owns 1,762 acres within the Crex boundary. This acreage is entered under the County Forest Law (s. 28.11, Stats.) and is managed for multiple forest and wildlife benefits. Of this total, 505 acres on the east (Parcel C) have importance to Crex management for watershed protection and waterfowl production potential. The remaining 1,257 acres is located in northeastern portion of Crex (Parcel D). Of this acreage, only the eastern 520 acres offers excellent sharptail management potential and, if developed, would tie the wildlife area to similar lands in the adjoining state forest. In the future, it may be possible to develop a cooperative management plan with Burnett County that would allow this area to be managed for sharptails either by a lease agreement or, perhaps by trading lands with the county.

Because the planimetered lands (measured acreage) within the property boundary exceed the purchase goal by about 1,600 acres, but not all lands are required for management, no change in the 30,097.58 acre goal is recommended. This will enable the Department to retain flexibility in purchase selection until the acreage goal is achieved. The current policy is to purchase only from willing sellers.

In all likelihood, only a small portion of the forested land north of County Highway F will be acquired. Here, the primary need is to purchase cabin sites or potential cabin sites to prevent the establishment of development inconsistent with surrounding public lands. This acquisition approach was implemented with Natural Resources Board approval following a boundary expansion in 1972.

Timetable Costs

Acquisition will be close to completion within 15 years depending upon an adequate level of funding. It is probable that some permanent and seasonal home development will occur and prevent eventual state ownership of some parcels.

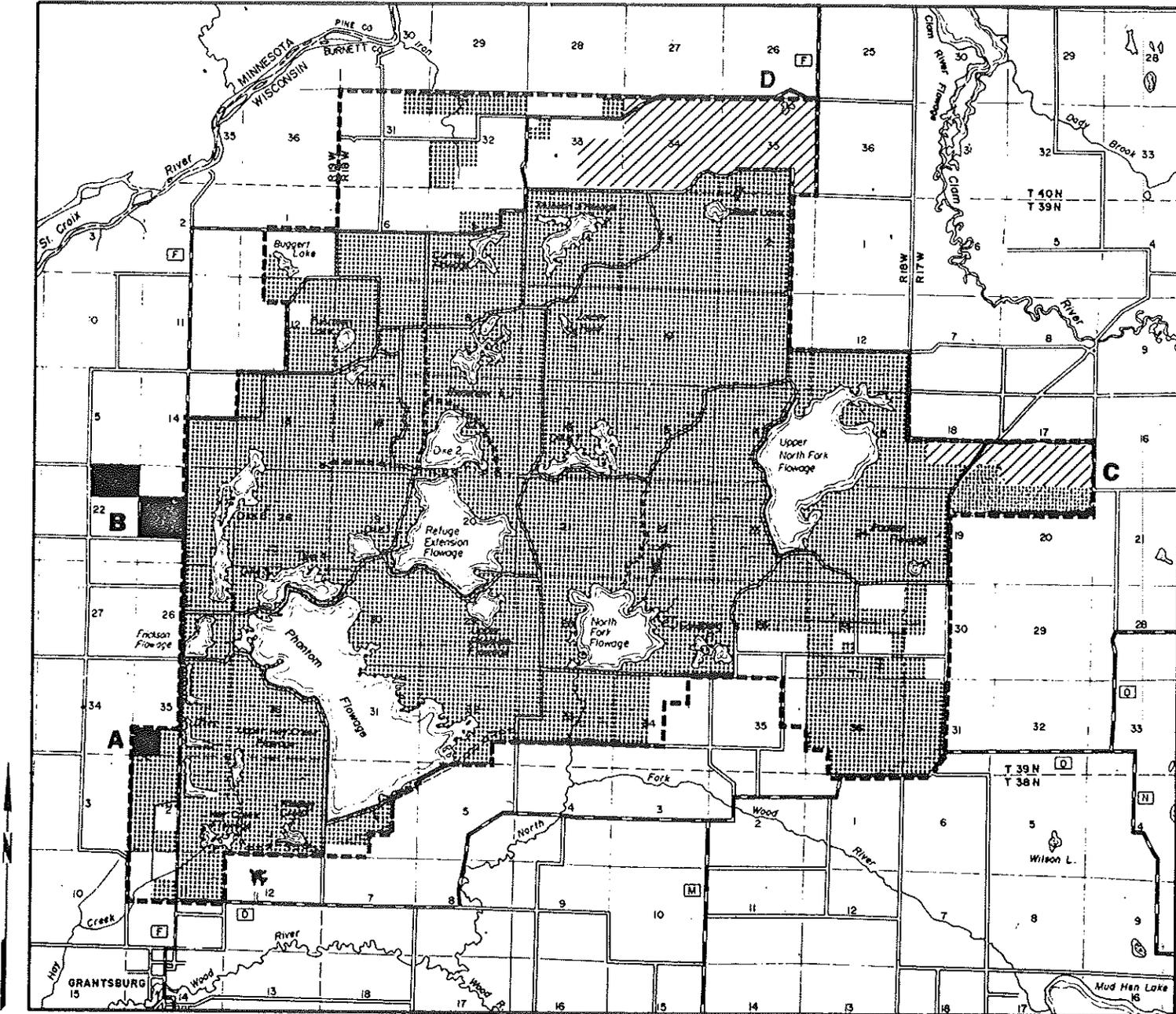
Cost estimates assume full development and are presented in Table 1, page 11.

Planned developments are expected to be 80 percent completed within 10 years if the present level of funding is maintained. In 15 years, all planned developments should be completed and management will be essentially maintenance.

Other Considerations

Wildlife Interpretation

Crex Meadows is the second largest and one of the most intensively managed wildlife area in the state. The area receives over 115,000 visitors annually. About 1/4 of these visits are made by hunters and the remainder are



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LEGEND

--- PROJECT BOUNDARY

--- REVISED BOUNDARY

▒ STATE-OWNED

■ LANDS TO BE ELIMINATED (A-B)

▨ COUNTY-OWNED (C-D)

CREX MEADOWS
WILDLIFE AREA

FIGURE 4 PROPERTY OWNERSHIP

made by nonhunters primarily interested in wildlife observation. Since 1970, over 650 guided tours involving nearly 30,000 visitors have been given by Crex personnel.

An interpretive wildlife manager position was created at Crex Meadows in 1980. The purpose of the program is to explain and interpret wildlife ecology and management. The position resulted from the need to better accommodate the thousands of visitors to Crex and from a recognized opportunity to provide these visitors with a significant wildlife educational experience. The interpretive manager's position also includes standard wildlife manager assignments such as surveys, habitat maintenance and habitat development.

The interpretive program is in its infancy. While there is a tremendous potential for this program, current funding is primarily from hunting and fishing license revenue and Pittman-Robertson funds and is largely committed to habitat work. Thus, the program will probably develop slowly. Initially, activities will concentrate on: guiding tour groups; using informational leaflets, and news releases to teach wildlife management principles; holding special wildlife ecology workshops for teachers, students, hunters, and interested citizens; developing self-guiding written and audio-visual material for visitors; and using the former headquarters building as a mini-wildlife interpretive center containing mounts, displays and other materials on wildlife.

Emphasis in the first few years will focus on developing workshops, techniques and identifying potential non-DNR funding support for interpretive activities. It is hoped this clientele and support will generate sufficient donated funds to allow the program to expand. A long term objective is to use donated funds (in part) to construct a wildlife interpretive center and implement a full range of wildlife interpretation and education activities. As currently conceived, such a facility would contain displays and exhibits depicting wildlife and plant communities and wildlife management practices. An auditorium complete with audio-visual equipment would also be included to accommodate group presentations.

Crex Meadows and the Glacial Lake Complex are ideally suited for wildlife interpretive work. The wildlife properties are already well known and relatively close to major metropolitan areas. Crex supports an abundant, diverse flora and fauna. The brush-prairie/wetland management emphasis being applied on such a large scale is unique to Wisconsin. The growing interest expressed in nonhunting wildlife recreation as well as the need to better educate and train new as well as experienced hunters are important considerations. Opportunities for providing new information and techniques to other statewide programs are also available and will be implemented. It is believed that a strong wildlife interpretive education program will greatly strengthen support for all wildlife management programs in Wisconsin.

Table 1. Estimated Acquisition and Development Costs (1981 dollars)

Acquisition: 1,194 acres @ \$300/acre	\$358,200
Flowages: 3 - 450 a. @ \$ 50,000 each	\$150,000
3 - 150 a. @ \$ 20,000 each	60,000
7 - 30 a. @ \$ 10,000 each	70,000
Water transfer ditch (3.7 mi.)	10,000
Potholes (300/.05 acre each @ \$ 150 each)	45,000
Clearing (Commercial sales and firewood permits will result in a substantial net <u>income</u> to state)	30,000
Firebreaks (29 mi. @ \$ 1,200/mi.)	34,800
Dense Nesting Cover establishment (250 acres @ \$100/acre)	25,000
Artificial nest structures (Heron/cormorant platforms)	1,500
4 1/2 miles of hiking trail	1,000
Addition to shop	50,000
Interpretive Center	<u>100,000</u>
TOTALS: Development	\$577,300
Acquisition	<u>358,200</u>
GRAND TOTAL:	\$935,500

Table 2. Estimated Annual Maintenance* Costs (1981 dollars)

Dikes	\$5,000
Prescribed burning (4000 acres/year @ \$1.50/acre)	6,000
Agricultural Cropping (260 a./year)	16,000
Facilities	5,000
Water Management	4,500
Firebreak (20 miles)	<u>3,000</u>
TOTAL:	\$ 39,500

*Includes salaries, equipment, and supplies

Wildlife Reintroductions

Past reintroductions of native wildlife species to Crex Meadows prairie-wetland habitat have been very successful. Reintroductions of the giant Canada goose (1957), gadwall duck (1970), and the greater prairie chicken (1974) have all resulted in healthy breeding populations of these species. In the future, the feasibility of redhead duck and the white-tailed jackrabbit reintroductions will be investigated.

SECTION II. - SUPPORT DATA

BACKGROUND INFORMATION

Historical

The Crex Meadows Wildlife Area occupies a portion of what early writers referred to as the Northwest Pine Barrens or "the barrens". The barrens consisted of about 1,500 square miles of shallow sedge marshes interspersed across a gently rolling sand plain.

The marshes were formed in the basin of old Glacial Lake Grantsburg. A lobe of the last advance of the Wisconsin glacier blocked the St. Croix River forming the lake. When the ice dam melted a series of shallow lakes remained, eventually forming the marshes as they exist today.

According to Vogl¹ the original upland vegetation on Crex is correctly termed a jack pine-scrub oak prairie savanna. More commonly, this vegetation type is called a brush-prairie consisting of jack pine, red pine, and Hill's oak (mostly sprouts) scattered throughout an undulating expanse of prairie grasses, sweet fern and hazel. The vegetation was maintained in this condition by wildfires which periodically swept through the area.

Prior to use by white settlers, Fox, Dakota, and Chippewa Indians used Crex extensively. Ducks, geese and sandhill cranes nested here and were hunted; cranberries and blueberries were also harvested. Numerous Indian battles are said to have occurred in the region during the 1600's and the Chippewa Indians ruled the area when the first white man arrived in the 1700's.

White settlement occurred during the middle 1800's and the first attempts at marsh drainage occurred shortly thereafter. Large scale commercial drainage for farming was initiated about 1890. Drainage was successful enough to upset the entire ecological pattern of the marshes from a productive wet prairie to a dry sedge or "wire grass" marsh. Some agriculture followed and marsh hay was harvested from much of the area. The sandy soils of this region were easily plowed but were not very fertile and many farms were soon abandoned.

Drainage of marshes resulted in a decline in the number of nesting and migrant waterfowl. However, prairie chickens and sharp-tailed grouse thrived in this new habitat and excellent hunting was enjoyed by those who availed themselves of the opportunity.

¹Vogl, Richard C. 1964. Vegetational History of Crex Meadows, A Prairie Savanna in Northwestern Wisconsin. The American Midland Naturalist, Vol. 72, No. 1, PP. 157-175.

In 1912, the area was purchased by the Crex Carpet Company, an eastern corporation engaged in the manufacture of grass rugs. Several large camps were operated on the area by the Crex Carpet Company and the harvested "wire grass", Carex stricta, was manufactured into carpets and other grass products in St. Paul. Market competition, primarily the development of linoleum floor covering, and ecological changes on the marsh forced bankruptcy of the Crex Carpet Company in the early thirties.

During the Great Depression of the 1930's and the accompanying drought of that period, further agricultural attempts failed. By 1940, nearly two-thirds of the land was tax delinquent.

Acquisition

Crex Meadows was created in 1945 when the state purchased several thousand acres that had become tax delinquent. In 1949, this acquisition project was submitted to the Fish and Wildlife Service and, following approval, acquisition continued with Pittman-Robertson (P-R) funds. By 1953, 17,000 acres had been acquired at an average cost of \$2.16 per acre. The original purchase goal was 19,000 acres but has been subsequently expanded over the years to the current goal of 30,097.58 acres. To date, 26,901.27 acres have been acquired at a total cost of \$346,741.29 (\$12.80 per acre). Acquisition is 89 percent complete and all land is held in fee title.

Management

When acquisition began, all of the wetlands had been at least partially drained and much of the original brush-prairie had grown into closed forests due to increased fire protection and the subsequent reduction in the number of wildfires. Original management plans were to restore the wetlands and uplands to presettlement conditions and this management direction continues to be implemented.

Brush-prairie-wetland restorations were initiated in 1947 under the guidance of property manager Norm Stone. The first developments consisted of a series of 8 low dikes constructed between 1947 and 1949. From experience with these dikes, it was deemed feasible to begin more extensive developments and, in 1950, a federal (P-R) development project was approved by the Fish and Wildlife Service. This federal funding has continued since 1950.

To date, over 18 miles of dike have been constructed resulting in 26 flowages consisting of 4,100 acres of open water and 4,000 acres of flowed marsh. Ten miles of ditches, 31 water control structures and a diversion pump capable of pumping over 10,000 gallons per minute are used to regulate water levels.

This wetland restoration has resulted in large breeding populations of mallards, blue-winged teal, ring-necked ducks, other waterfowl, and wetland wildlife. A captive flock of giant Canada geese was established in 1957 and descendants from this flock now constitute a free flying flock numbering near 1,800. Other wetland wildlife includes muskrats, beaver, otter, mink, common loons, sandhill cranes, double-crested cormorants, and black terns. Bald eagles and osprey, both endangered species, nest on the property and also make use of Crex during migrations.

Upland management has concentrated on improving habitat conditions for prairie grouse. Over 6,000 acres of jack pine-oak woodland, which "grew up" following increased wildfire control in the 1930's and 40's, have been restored to the original brush-prairie using mechanical clearing and prescribed fire. Fifty-five miles of firebreaks have been constructed to facilitate prescribed burning.

A 2,300-acre refuge (s. 15.01, Wis. Adm. Code) located in the center of Crex includes several flowages and 260 acres of agricultural fields to provide food for migrant and resident wildlife. Migrant concentrations have numbered in excess of 15,000 ducks and 10,000 geese.

A Youth Conservation Camp has operated on Crex since 1964 as a "side camp" to the Ernie Swift Youth Camp near Minong. Camp facilities constructed at the headquarters include two bunkhouses, a bathhouse, and a kitchen-dining room. YCC work activities have included facilities maintenance, goose banding, surveys, and habitat management.

Crex annually attracts thousands of visitors. A survey conducted in 1976 estimated over 88,000 visits while a 1981 survey estimated 115,000 visits. Of this number, it was estimated 75 percent of the visits were nonhunting oriented and 25 percent were for hunting and trapping. The excellent road system allows easy viewing of wildlife and has proven highly attractive to users, especially during waterfowl migrations.

Administration

Work activities on the Glacial Lake Grantsburg Wildlife Complex are conducted by a staff of 7 permanent, fulltime employees. The staff consists of a property manager, an interpretive wildlife manager, a mechanic, and 4 wildlife technicians including a crew foreman. The property manager has responsibility for overall supervision and management of Crex Meadows and 3 other Glacial Lake properties. The Glacial Lake Grantsburg Complex is administered as a part of the Cumberland Area; therefore, the property manager reports directly to the Cumberland Area Wildlife Manager.

Cooperative efforts with other functions play an important role in the management of Glacial Lake Grantsburg properties. Forest management assistance is provided by the Grantsburg Forester-Ranger. Once the property manager determines the location and size of a timber sale or firewood permit area, the forester-ranger sets up and conducts the sale. The forester-ranger also provides assistance in other timber management activities such as thinning or pruning.

Responsibility and implementation of the prescribed burning program rests with the property manager. The burns are conducted by the Crex crew and area wildlife personnel. Grantsburg fire control personnel normally provide assistance by keeping a tractor-plow unit and tanker on standby. The decision to proceed with a burn is made by the property manager. The burning permit is issued daily by the Grantsburg Forester-Ranger, and he can withhold issuance of a permit if he feels conditions are too risky to burn. Area and district personnel from other functions often assist with the burns.

Law enforcement activities on Crex are conducted by wildlife personnel holding credentials, with assistance from the wardens stationed at Grantsburg. Assistance is also provided by the Grantsburg Forester-Ranger and the Superintendent of the Governor Knowles State Forest; both of these employees normally have credentials. Routine patrol and normal work activities by the Crex crew result in daily contact with users of Crex (campers, firewood cutters, etc.), and offers a highly effective "preventive enforcement". Hunting seasons on Crex require a more intensive law enforcement effort. All credential holders normally work on Crex and other Glacial Lake Wildlife properties at that time of year.

RESOURCE CAPABILITIES AND INVENTORY

Soils, Geology and Hydrology

Organic and deep sandy soils dominate the wildlife area. The organic soils, formed by the breakdown of organic materials such as grasses and sedges, are very poorly drained. These soils occur in a patchwork pattern across the entire area.

The deep sandy soils are primarily the Meehan-Newson Association. Another deep sandy soil, the Omega-Vilas-Friendship Association, is found along the northern and western boundaries. These two soil associations are poorly to excessively well drained.

Smaller areas of sandy loams (Blomford-Meenon) and loamy sands (Gaslyn-Hertel-Pence) occur in the southeastern and east central portion of the area. The drainage of these soils ranges from excessive to poor.

Glacial till was deposited over all of Burnett County as a result of the retreat of the Wisconsin glacier 10-15,000 years ago. The till varies in thickness from a few feet up to 300 feet. A glacial lake (Glacial Lake Grantsburg) was formed as a result of this glacier. As the waters of this lake receded, a system of shallow lakes remained. Through natural succession, these shallow lakes have become the marshes now found throughout the area.

The northwestern third of Crex is underlain by a very dense volcanic bedrock (Keweenawan trap rock). A sand-gravel aquifer in this area produces less than 100 gallons of water per minute. The remainder of the area is underlain by Upper Cambrian sandstone. This layer is 100-200 feet thick and has a sandstone aquifer producing less than 100 gallons of water per minute.

Wildlife Resources

Wildlife is abundant, diverse, and highly visible on Crex. The interspersion of wetland, brush prairie and forest creates excellent habitat for a wide variety of mammals, birds, reptiles, amphibians, and invertebrates.

The wetland habitat type accounts for the largest number of individuals and the greatest variety of species. Wetland species are the most visible wildlife. Much work has been done to restore wetlands drained in the early 1900's and wildlife has responded dramatically.

Waterfowl are perhaps the most observed wetland birds and all species using the Mississippi Flyway have been recorded on the area. Each spring and fall, thousands of people come principally to view the concentrations of migrating geese and ducks.

The Crex Canada goose flock began with the reintroduction of 49 birds in 1957. The subspecies introduced was the giant Canada goose, (Branta canadensis maxima) and the local flock now numbers about 1,800 in September. Fall concentrations of Canada geese generally peak at 4,000 to 5,000 but occasionally up to 10,000 are seen on the area. Crex lies on the division between the Eastern Prairie and Mississippi Valley of Canada goose populations² and geese using Crex during migrations belong to both populations. Most Crex geese do not associate with the Horicon population in Wisconsin. Snow geese are present only during migrations and normal peak numbers vary between 1,500 and 2,000.

Mallards, blue-winged teal, wood ducks, green-winged teal, shoveler, ring-necked duck, hooded merganser and gadwall are common breeding ducks on Crex. Wigeons, black ducks, ruddy ducks, and pintails are also known to nest but are less common. Gadwalls were reintroduced in 1970 and 1972. Surveys indicate duckling production averages 60-80 per 100 acres of flowage. Average peak fall concentrations of migrating ducks are about 5,000 mallards with lesser numbers of ringnecks, wood ducks and teal.

Approximately 15 pair of greater sandhill cranes nest on the area. Crex is one of the major sandhill crane staging areas in Wisconsin and, in recent years, has had peak fall populations of 250-325 birds. These birds use the agricultural fields intensively during migrations.

A great blue heron-double crested cormorant colony on Phantom Lake which formerly contained nearly 200 nests has declined over the years due to the loss of nest trees during windstorms. This colony contained only two active great blue heron nests in 1981 and it will likely soon phase out of existence. Three cormorant nesting poles were erected near this colony in 1976 but, so far, neither herons nor cormorants have used them for nesting.

A great blue heron rookery of about 65 active nests is currently thriving on North Fork Flowage. Plans have been made to erect nest poles in this rookery in anticipation herons will begin using them before their nest trees are blown down.

Other birds using Crex wetlands include: common loon (minimum of seven nesting pair), pied-billed grebes, bitterns, green herons, sora rails, coots, spotted sandpipers, marsh wrens, red-winged and yellow headed blackbirds, black terns, snipe, yellow-throats, harriers, and Leconte's sparrow.

Muskrats are the most common aquatic furbearer on Crex wetlands. Mink, otter, and beaver are also common.

Turtles and frogs found on Crex are: painted, snapping, and Blanding's turtles (a Wisconsin threatened species); the leopard, chorus, green, spring peeper, and wood frogs; eastern and Cope's gray treefrogs. Other amphibians include the American toad, tiger salamander, and blue-spotted salamander.

²Bellrose, F.C., 1976. Ducks, Geese and Swans of North America, Stackpole Books. 543 pp.

Reptiles include the eastern garter snake, red-bellied snake, smooth green snake, hognose snake, bullsnake, fox snake, prairie skink and five-lined skink.

Brush-prairie is a scarce and unique habitat type in Wisconsin and, on Crex, supports a population of greater prairie chicken and sharp-tailed grouse. The prairie chicken was reintroduced on Crex in 1974 and 1975 in an effort to establish a population distinct from that of central Wisconsin. The primary habitat for chickens is about 3,500 acres in and around the refuge area which is considerably more open and "grassy" than most of Crex. A 1977 spring survey indicated 25 "booming" males using one booming ground within the refuge. In the spring of 1981, 19 booming males were counted on the same booming ground.

Prairie chicken broods have been sighted since the reintroduction and, though the number of displaying males may have decreased, reproduction is occurring. The population is felt to be fairly secure but additional effort is needed to adequately determine the status of this bird. Winter feeding of corn has occurred since reintroduction following similar management for chickens in central Wisconsin.

Most of Crex has been closed to sharptail hunting since the chicken reintroduction because the 2 species are easily confused by hunters. Sharptail hunting was closed on Crex in 1974 with the reintroduction of prairie chickens. It reopened again in 1980 on the eastern edge of the Crex area after it was determined prairie chickens did not use this area. Hunters found birds relatively plentiful and an estimated 30 were taken during the season.

Seven sharptail dancing grounds are known to exist on Crex and 55 male sharptails were observed in 1981. Based upon these numbers, the fall sharptail population is estimated at 250-300. Considerable effort has been expended to restore a large acreage of Crex to the historical brush-prairie habitat. In response, the number of displaying male sharptails has increased from a low of 5 in 1947 to a high of 55 in 1981. Considering the dramatic loss of sharptail habitat in western Burnett County since 1947, it becomes important to realize that Crex contains the only remaining significant habitat for sharptails in this portion of Wisconsin.

Brush-prairie is also habitat for the badger, Franklin ground squirrel, thirteen-lined ground squirrel, pocket gopher, coyote, meadowlark, eastern kingbird, vesper sparrow, and upland sandpiper. Raptors make considerable use of Crex, especially during migration. Red-tailed hawks, rough-legged hawks and kestrels are common.

Scrub oak/aspens/jack pine forests comprise the third main habitat type on Crex. Although much forested area is slated for reversion to brush-prairie, about 6,000 acres will ultimately remain in forest. Deer, bear, gray squirrel, snowshoe hare, raccoon, ruffed grouse, bobcat, great horned, and barred owls, downy, hairy and pileated woodpeckers, and numerous songbirds utilize these areas. Forested sites will be managed for forest wildlife and normal silvicultural practices may have to be altered to meet wildlife objectives.

A highlight of Crex is the number of Wisconsin endangered and threatened species using the area. Three endangered species nest on Crex or have nested in the recent past. The former double-crested cormorant colony on Phantom Lake was previously discussed. Cormorants nesting at the nearby Fish Lake Wildlife Area use Crex for feeding and roosting. In spring and fall, large concentrations of cormorants are seen on some of the larger flowages.

Crex currently has one nesting pair of bald eagles (the nest was not active in 1981), and receives heavy use by migrating eagles. As many as 10 individuals have been seen on the area in a single day.

Two pair of osprey nest on the wildlife area. Four nest platforms have been erected, two on Phantom Lake and two on North Fork Flowage, but only one of these has been used. The other nest is in a dead tree.

Other endangered species observed on the area are the peregrine falcon, and common tern. Each of these species occurs as transients and no evidence of nesting has been found.

Five threatened species occur on Crex. Two, the greater prairie chicken and Blanding's turtle, breed on the area. No nesting records exist for the great egret, Cooper's hawk and red-shouldered hawk. Considerable woodland exists and it is possible that these hawk species breed on the property. The great egret is most often seen in late summer and its occurrence is probably a result of fall dispersal activity typical of herons. No great egret nesting colonies are known to occur in the region.

Land management for wildlife has focused heavily on wetlands and brush-prairie restoration. Flowage construction and prescribed burning have been the primary means of achieving the desired habitat diversity. The result of this management is the thriving wildlife populations discussed above. Future habitat management plans call for continued development and maintenance activities.

Additional flowage development and forest clearing to restore brush-prairie will increase populations of nearly all species now occurring. The negative aspect of brush-prairie restoration is the elimination of forest and associated forest habitats. However, the wildlife management emphasis for Crex Meadows has been to favor maximum development of the scarce brush-prairie habitat and its associated wildlife resources over the locally and statewide abundant forest habitat resources.

Overall, ruffed grouse, gray squirrel, and possibly raccoon, will decrease as brush-prairie restoration nears completion. However, these wildlife species will remain plentiful on the 6,000 acres of forested habitat to be left on Crex. Grouse prefer the aspen-willow-alder areas, although they can be found to a limited extent in young oak and jack pine. Even at full development, ruffed grouse will remain abundant in the aspen forest and along the aspen edges adjacent to brush-prairie. Squirrels and raccoons will thrive in the mature oak-jack pine forests to be conserved on Crex. Squirrels in this region of Wisconsin are lightly hunted and their populations are consistently high unless there is a serious acorn crop failure.

All of Crex Meadows is contained within Deer Management Unit 10. This Unit is very productive and overwinter populations are currently between 30 and 35 deer per square mile, well above the desired overwinter level of 25. Crex itself contains excellent deer range. Deer use the entire wildlife area and will remain on the property during winters with low to moderate snow depths. During winters with deep snow, deer move north or east into the jack pine/oak forests seeking shelter from snow and wind.

Deer populations will not be adversely affected by further brush-prairie restoration as demonstrated by current high densities. Brush-prairie is excellent year-round deer habitat because of the quantity and quality of food provided by this cover type.

The 2,300-acre refuge is a critical part of waterfowl, sandhill crane and prairie chicken habitat on Crex. Within the refuge, 260 acres are planted annually to corn, millet, buckwheat, and rye to provide food for migrating waterfowl and cranes. The crop fields are also important to prairie chickens and sharptails. The refuge provides water and sanctuary for these species and is the primary reason geese and ducks remain on the property well into the hunting season.

The public roads around the refuge perimeter offer excellent viewing of waterfowl, cranes, deer and a good chance to see prairie chicken, sharp-tailed grouse, coyotes, and many other species. Most wildlife viewing occurs from the refuge perimeter roads. The Phantom Flowage dike road is probably the second most popular road from which to view wildlife.

A 1976 survey showed wildlife oriented activities on Crex are dominated by nonhunting use. Even so, about 30,000 hunter/trapper use days occur annually, primarily for waterfowl and deer hunting as well as muskrat trapping. Crex is also a very popular bow deer hunting area, especially for Minnesota hunters. Hunter and trapper densities are highest on opening days but are never excessive. Waterfowl hunters tend to concentrate at popular, easily accessible areas.

At the present time, there appears to be no need for any type of hunter control on Crex. Goose hunting pressure and harvest of the local giant Canada goose flock will need monitoring to detect signs of overharvest so protective measures can be initiated as needed. A 74 square mile area incorporating all of Crex as well as farmland south and east of the wildlife area is closed to Canada goose hunting.

Fish Resources

Waters within Crex support mostly minnow and forage fish populations. Of the 26 flowages and natural ponds within the wildlife area, only two, Phantom Flowage and North Fork Flowage, are known to support substantial fish populations. Species known to be present in these flowages are fathead minnows, mudminnows, sticklebacks, and bullheads.

The North Fork Flowage supported a fishable population of northern pike until low over-winter dissolved oxygen levels in 1979 resulted in heavy northern pike mortality. It is unknown if any northern pike remain today. Periodically, Phantom Lake has also had a fishable population of northern pike.

No endangered or threatened fish, amphibians or molluscs are known to occur. However, no systematic survey of Crex flowages, canals or ponds has ever been done to determine the presence or abundance of fish. A survey of fish resources is needed to understand and manage the full range of species using Crex.

Crews from the Spooner Warmwater Hatchery annually seine fathead minnows along dikes of Phantom and North Fork Flowages. In 1980, a total of 807 quarts of small fatheads and 884 pounds of large fatheads were removed from these two bodies of water. In addition, there is a limited amount of commercial seining on Crex flowages and ditches.

Because a number of wildlife species depend upon fish for food, additional work should be done to assess the status of fish populations on Crex. Otters, herons, cormorants, terns, osprey and loons all feed on the flowages and future management decisions should consider impacts upon these species via the food fish resource. Opportunities may be present to enhance the abundance of fish-eating wildlife by manipulating the fishery resource.

A sport fishery will always be limited by the shallowness of the flowages and the potential for winterkill. Management for a sport fishery will be discouraged because of disturbance to nesting herons, waterfowl and osprey, and because of feeding by cormorants. Disturbance is an important factor affecting these birds and even fishing could result in conflicts with managing these birds. In those situations where a natural fishery develops (northern pike and bullheads), access can be obtained from dikes or boat access sites.

Future management will involve surveying each flowage to determine existing fish populations, and investigating the fish management potentials of the flowages. Minnow seining by state crews and commercial bait dealers will be closely monitored. Minnow seining will be reduced or suspended if it appears that the food resource of fish-eating species is being overexploited. Several of the fish-eating birds are on the Wisconsin Endangered or Threatened species list.

Vegetative Cover

The vegetation of Crex Meadows reflects the area's history of glaciation, inundation by a glacial lake, extensive wildfires, logging, farming, drainage, wildfire control, farm abandonment and finally, management to reestablish the original pre-settlement vegetation conditions.

At the time state management began, uplands and lowlands on Crex were converting to jack pine, scrub oak, and aspen woodlands. Vogl's³ work concluded that the original vegetation on Crex was a jack pine-oak savanna with an average of 8 trees per acre. Today, upland pine-oak stands average 318 trees per acre, thus the present forests on Crex are essentially an unnatural condition resulting from wild fire control.

Reconnaissance of state-owned lands within the boundaries of Crex was completed in spring 1981. The existing vegetation composition is shown in Figure 5 and the acreage of each vegetation type listed in the following table.

³Vogl, Richard J. 1961. The Effects of Fire on Some Upland Vegetation Types. Ph.D. Thesis, University of Wisconsin, Madison. 154 pp.

Table 3. Vegetation Types

<u>Type</u>	<u>Acreage</u>	<u>Percent</u>
Open water	4,100	15.2
Sedge marsh	7,876	29.2
Lowland brush	1,787	6.6
Tamarack	70	.2
Brush prairie-grass prairie	6,046	22.5
Oak-jack pine	3,811	14.2
Jack pine	314	1.2
Red pine	35	.1
White pine	124	.5
Aspen	1,783	6.6
Agricultural fields	280	1.0
Other (roads, dike, buildings)	675	2.5
TOTALS	<u>26,901*</u>	<u>99.3%</u>

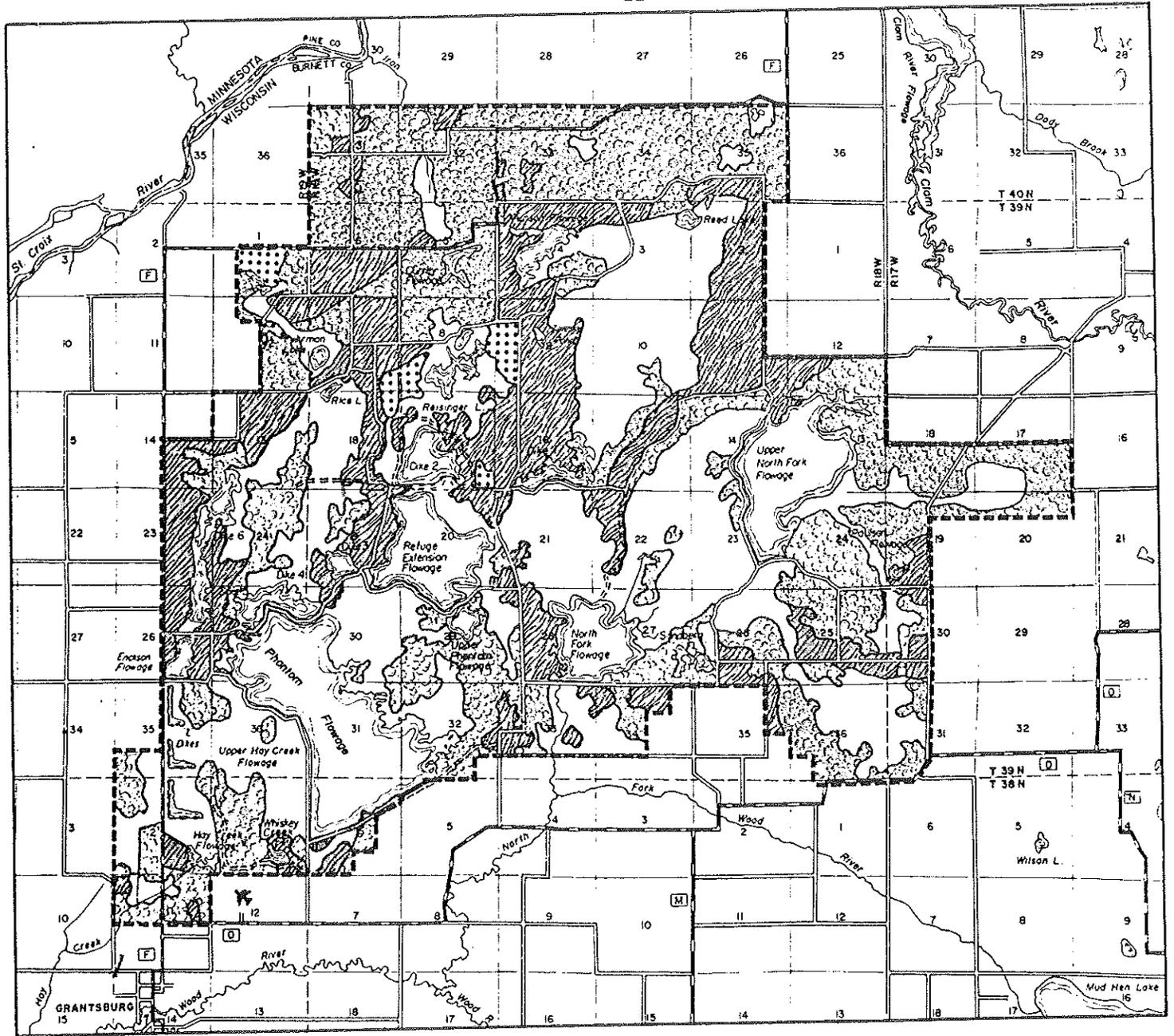
* Represents 89 percent of land within CMWA boundaries.

Following the initial prescribed burns which were the first efforts to convert forests back to brush prairie, a tremendous response in prairie plants was observed. As noted elsewhere in Wisconsin, prairie plants persisted for decades under forest canopies until released by removal of the forest overstory. A list has been compiled of 212 upland plant species, many of them indicative of Wisconsin dry, dry-mesic, mesic and wet-mesic prairies such as big and little bluestem, Indian grass, needlegrass, northern bedstraw, leadplant, hoary puccoon, prairie phlox, and blazing star.

Following drainage attempts of the early 1900's, wetlands became dominated by the sedge, Carex stricta, and bluejoint grass. Annual harvesting of sedge meadows for hay kept the meadows largely brush free. However, following widespread farm abandonment, the demise of the Crex Carpet Company, and increased wildfire control the wetlands were invaded by aspen, willow, bog birch, spirea, and alder. On most wetlands, this successional trend has finally been reversed through flowage construction and repeated burning.

Today, nearly all wetland areas are affected to some degree by flowages. The less affected wetlands are still dominated by sedge and bluejoint, but shrub invasion occurs slowly. Those wetlands converted from a sedge meadow to Type 3, 4, and 5 wetlands support fair to excellent growth of aquatic plants such as cattail, burreed, pickerel weed, pondweeds, bulrush, bladderwort, water lily, and arrowheads.

Woodlands on Crex are of average productivity for the "sand country" of western Burnett County. Yields of 10-20 pulpwood cords per acre can be expected on a rotation timetable of 40-50 years, but more forest products production could occur under intensive pine culture. No unique or old growth forest areas occur, although a few stands of rather large white pine occur in the southeastern part of the area.



4000 0 4000 FEET

LEGEND

-  PROJECT BOUNDARY
-  OPEN WATER
-  AGRICULTURAL FIELDS
-  FORESTED
-  UPLAND PRAIRIE
-  MARSH

CREX MEADOWS
WILDLIFE AREA

FIGURE 5 EXISTING VEGETATION

Vegetation management will continue to emphasize brush-prairie and wetlands restoration. Fire will be the principal tool used to manipulate vegetation. Throughout history, wildfires have been prevalent in this area and vegetation is highly adapted to fire. With fire, a large acreage can be treated with minimum effort and expense.

Woodland acres will continue to be managed for some commercial harvest. Following additional restoration of 3,000 acres of brush-prairie, vegetation composition will look similar to Figure 6. Many small islands and pockets of forest cover will remain within the brush-prairie and marsh habitat components. Thus, the future vista on Crex will be more of a parkland than a treeless expanse.

All of Crex has been divided into prescribed burn units utilizing firebreaks and flowages as boundaries. Areas managed with fire are scheduled for burning every 2 to 5 years. Burn units average about 390 acres and range from 15 acres to 1,000 acres. Ideally, burning plans are designed to produce an interspersion of burned and unburned areas of varying sizes.

No threatened or endangered plant species have been identified on Crex. Vogl's 1961 work concentrated on upland plant species and additional work should be conducted on wetland plants.

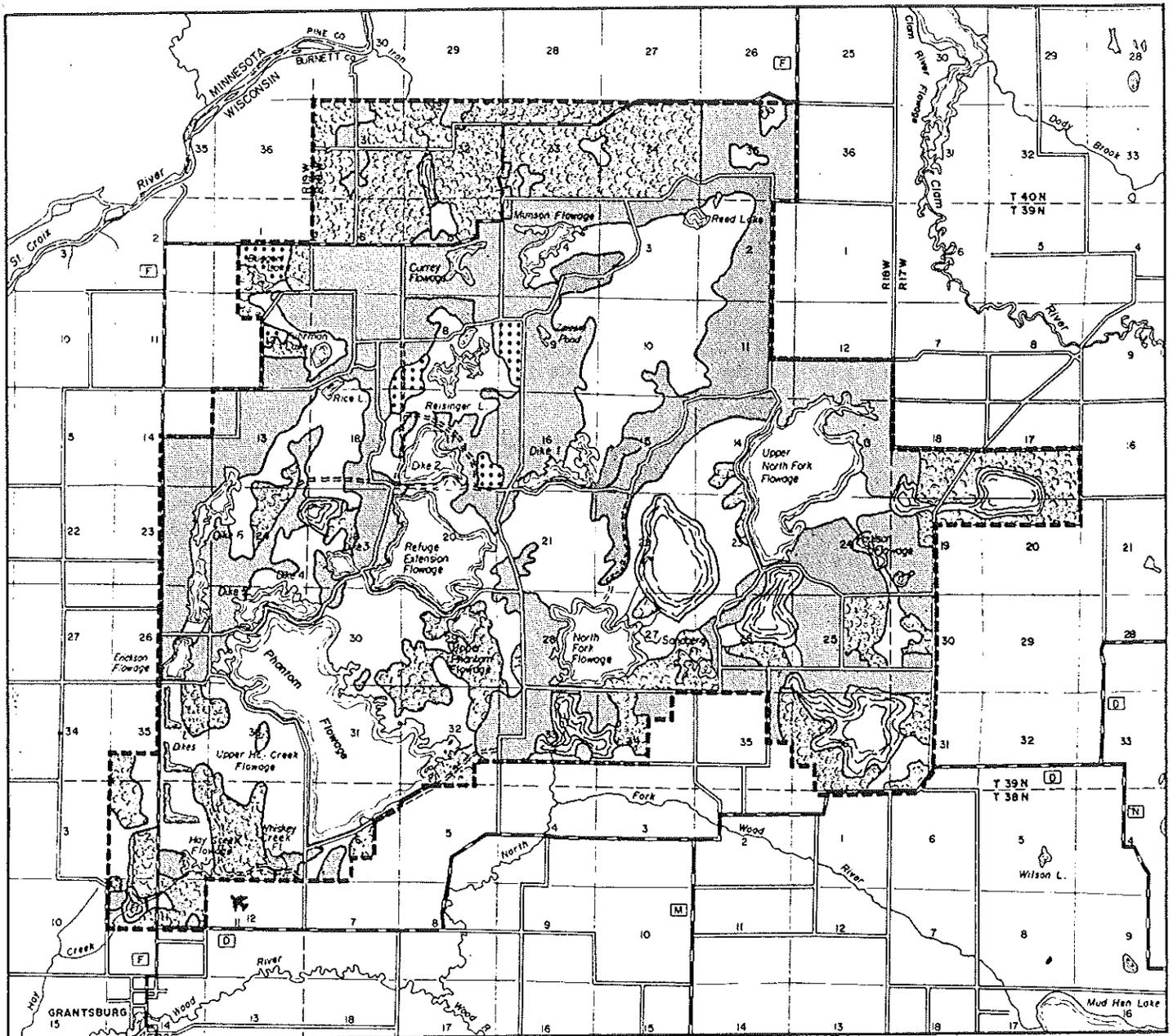
Brush-prairie is a unique vegetation type and has been largely eliminated in Wisconsin due to wildfire control and intensive pine forest culture. The existing remnants of brush-prairie, which once occupied over two million acres in the state, occur now principally on state-owned lands managed for sharp-tailed grouse. Thus, vegetation management on Crex (and on the entire Glacial Lake Grantsburg Complex) takes on a much broader role than just providing habitat for select wildlife species. A remnant of an interesting and original Wisconsin ecosystem is being maintained. The value of Crex Meadows may, in the long term, be greater for its native vegetation types and restored ecosystems than for its abundant and well known wildlife species.

Water Resources

The average annual precipitation for Burnett County is about 30 inches and the average annual runoff is about 9.3 inches. Drainage on Crex is predominant to the southwest and ultimately to the Wood River. The western half drains naturally through Phantom Flowage to Hay Creek which joins the Wood River west of Grantsburg. The eastern half drains into the North Fork of the Wood River east of Grantsburg.

Most permanent waters were created or have been affected by dikes. Reed Lake, Reisinger Lake, Rice Lake, Fuhrman Lake, and Munson Lake are natural lakes that have been raised by impoundments. The remaining flowages were created by extensive diking. All flowages are dependent upon runoff and, during drought periods, water levels are reduced.

Surface water quality was sampled in the summer of 1980 using a "HACH" water test kit; pH averaged 7.1 and ranged from 6.0 to 8.5. Total alkalinity averaged 20 and ranged from 2 to 58. Crex flowages suffer no turbidity but are stained dark due to the presence of organic acids. This dark color limits light transparency and the depth for growth of aquatic plants. Water quality



4000 0 4000 FEET

LEGEND

----- PROJECT BOUNDARY

OPEN WATER

CREX MEADOWS
WILDLIFE AREA

CROP FIELDS

FORESTED

UPLAND PRAIRIE

MARSH

FIGURE 6 FUTURE VEGETATION

appears sufficient to support a diverse aquatic flora and fauna. Future flowage developments should produce results similar to existing flowages.

The diking and construction of water transfer ditches has resulted in the ability to convey water between flowages. The addition of a diversion pump capable of moving two to three acre-feet of water per hour provides the capability of moving water from the North Fork Flowage basin to all other watersheds on Crex. The diversion pump literally pumps water uphill from the North Fork Flowage to flowages that otherwise receive little runoff.

The diversion pump creates potential for utilizing natural moist soil plant culture within the refuge and on other flowages. Future management will investigate the potential for moist soil plant management to enhance the productivity of the flowages and provide more of the fall food base for migrating waterfowl.

Research studies have shown that runoff from brush-prairie is more fertile than runoff from forested areas. Thus, the restoration of brush-prairie habitat should assist waterfowl management efforts by somewhat enhancing water fertility. This concept is supported by surface water pH values taken in the 1940's which averaged 5.5 as compared to 7.1 in 1980.

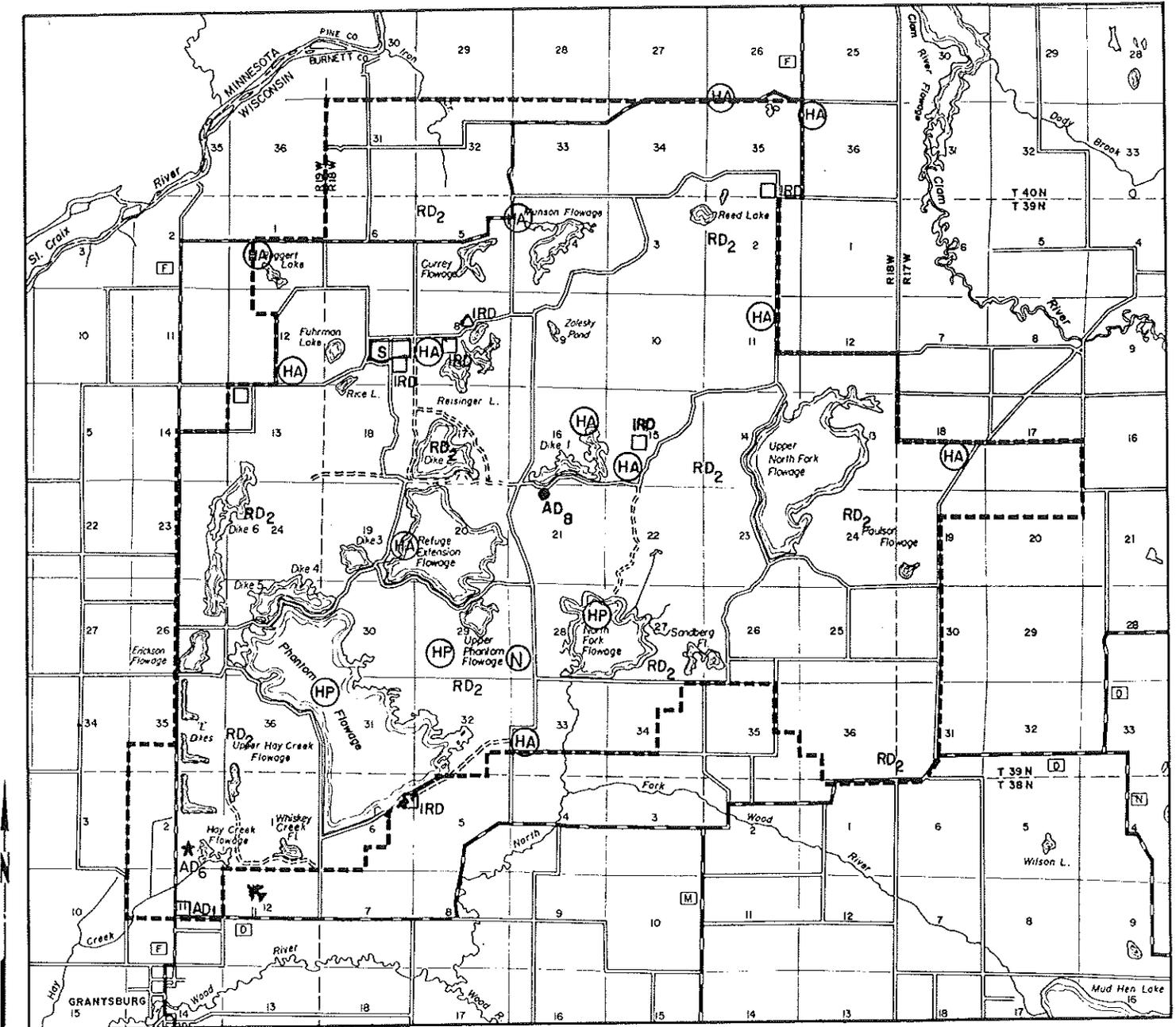
Historical and Archaeological

Twelve historical sites have been identified within the wildlife area boundaries (Figure 7). Only six occur on state-owned lands. All sites relate to original attempts at settling the area in the late 1800's and early 1900's, and to the operations of the Crex Carpet Company. Most sites are already designated with a routed sign. The only structure remaining is the West Marshland Town Hall. The original Ekdall church and school building were recently destroyed during a wildfire in April, 1980. The Ekdall church was rebuilt on the original site in 1981.

Management of the six state-owned sites is limited to designating sites with routed signs. A Wisconsin State Historical Marker overlooking the refuge was erected in 1977. This was the first state historical marker approved for Burnett County and it commemorates attempts at settling Crex and the restoration of the marshes as wildlife habitat. General maintenance of the marker is performed by DNR personnel.

The State Historical Society has indicated there are no known archaeological sites within the wildlife area. They point out this is probably due to lack of any systematic surveys for such sites. Areas surveyed for archaeological sites in the nearby St. Croix National Riverway and the Governor Knowles State Forest are known to contain historic and prehistoric archaeological material, and the Historical Society believes it highly probable Crex also contains such material.

The developing wildlife interpretive program will also give attention to the history of Crex Meadows by accumulating and preserving pertinent information, especially information applicable to wildlife management.



4000 0 4000 FEET

LEGEND

- PROJECT BOUNDARY
- RD₂ WILDLIFE MANAGEMENT AREA
- HP HABITAT PRESERVATION AREA
- HA HISTORICAL SITE
- IRD INTENSIVE RECREATIONAL AREA
- S SCIENTIFIC AREA
- AD₁ HEADQUARTERS
- AD₆ INTERPRETIVE CENTER
- AD₈ DIVERSION PUMP
- N PUBLIC USE NATURAL AREA

CREX MEADOWS
WILDLIFE AREA

FIGURE 7 LAND USE CLASSIFICATION

No attempts will be made to specifically purchase historical or archaeological sites. Purchase of any such site will only occur as an incidental result of normal acquisition.

Land Use Potential

The DNR uniform classification of land uses as applied to Crex Meadows is shown in Figure 7. The following briefly describes each classification used.

1. Wildlife Development Area - (RD 2) includes most of Crex and is used for all areas managed as brush-prairie, wetland, and forest. This classification recognizes the need to implement the planned developments to achieve wildlife objectives.

2. Habitat Preservation Area (HP) is applied to the portion of Phantom Flowage and North Fork Flowage which support active great blue heron rookeries. There is also one osprey nest on Phantom Flowage and one on North Fork Flowage designated as Habitat Preservation Areas.

One active bald eagle nest has been identified and will also be designated a Habitat Preservation Area. In the future, any new rookery, osprey nest, cormorant colony or bald eagle nest will be assigned this classification. The amount of land sufficient to protect nesting habitat is relatively small, generally about 40 acres.

3. Historical and Archaeological (HA) designation will apply to the 6 historical sites currently on DNR owned lands and will be designated using routed signs only. The State Historical Marker is the most significant of the 6. Any additional acquisition of sites with historical or archaeological significance will be placed in this classification.

4. Intensive Recreational Development (IRD) is applied to all observation areas, parking lots, the picnic-camping area, boat access sites and the snowmobile trail.

5. The one Scientific Area (S) is a 79 acre example of brush-prairie vegetation. This area is managed by prescribed burning every 2 to 4 years. An additional 40-acre northern sedge meadow site has been identified as a natural area of significance and will be designated Public Use Natural Area (N). It contains a particularly good example of "wire grass" sedge meadow.

6. Headquarters Site (ADI) consists of the office, shop, storage buildings and the YCC camp buildings. The office building will be used as a combination office and "mini" wildlife interpretive center until an interpretive center is constructed elsewhere on the property.

7. Wildlife Interpretive Center (AD 6). No firm location for this has been selected, but a number of possibilities exist. As the Crex Wildlife Management Interpretive Program grows, an interpretive center will be needed to adequately accommodate the user.

MANAGEMENT PROBLEMS

1. Prescribed burning:

Crex Meadows is well known for the use of fire to maintain desired plant communities. Periodic fire kills the top growth of vegetation and regenerates prairie plants maintaining the brush-prairie. Fire also controls woody brush invasion in wetlands. Though well accepted and promoted by knowledgeable conservationists, general public acceptance of burning is sometimes marginal. Criticisms generally focus on the need for burning, diverting potential forest land into brush-prairie, destroying nesting wildlife, possible wildfire hazard, and the amount burned in a given year.

As the amount of burning increases on all Glacial Lake properties, a more active public relations and information effort will be required. Prescribed fire is the least expensive and most efficient tool available to accomplish wildlife management objectives. It is also the most natural tool available. The brush-prairie vegetation type and associated wildlife are fire dependent and cannot be maintained without periodic burning. These concepts need to be fully presented for public review and the interpretive program will focus heavily on the role of fire in management.

An additional concern as acreage managed by fire increases is manpower, equipment and time. Burning needs to be done under specific conditions which occur primarily in spring and fall. Fires must burn hot enough to kill back sprouting oak. When conditions are suitable, it is important to get as much done as possible. Over the years, variable spring and fall weather have often prevented burning because it was either too wet or too dry. Because of the increasing acreages managed by fire on Glacial Lake properties and other wildlife areas in the Cumberland Area, the following items need to be addressed to make the use of fire feasible on the scale needed for proper management:

- a. The minimum and maximum burning conditions need to be more fully defined for each "burn unit", broadening the time frame and weather conditions under which effective burning can occur. Wind speed is the critical element and winds greater than 20 mph generally limit burning. However, recent burn evaluations show burning can, at times, be successfully done with lower temperatures and higher humidities than previously utilized. All burns will be documented by recording pre-burn weather, conditions during the burn, and pre and post burn vegetation. Potential air pollution concerns should also be addressed.
- b. Utilize more fall burning. In the past, fall burning was used infrequently due to presumptions that it was not as effective at controlling oak as spring burning and that it temporarily reduced hunting opportunities. Fall burning has been used successfully on the Namekagon Barrens. However, the potential for peat burns in dry marshes must be considered.

- c. Improve coordination with fire control so their equipment can be available "on site" and used during burns. This may be difficult because good prescribed burning weather overlaps with hazardous wildfire conditions. It will probably not be possible to plan to use fire control equipment during "high" fire danger conditions.
- d. Increase efficiency by: burning off marshes in winter or early spring so they can act as firebreaks and reduce the need for backfiring on upland burns; combining burn units and burn larger areas at one time; begin burning as early as possible in the day and continue to burn as long as possible into the night; develop the ability to organize 2 complete burning crews of about 10 men each so 2 units can be burned simultaneously.

2. Brush-Prairie Restoration

Some concern has been expressed by some local residents that restoration to brush-prairie habitat may result in a drastic decline in forest game species particularly deer. While ruffed grouse, woodcock, gray squirrel, and snowshoe hare will probably decline in numbers, deer will not decline. Existing brush-prairie is excellent spring, summer and fall deer habitat and has received heavy use by wintering deer. The traditional deer wintering area on the extreme north edge of Crex will continue to be managed for wintering deer and forest products.

Brush-prairie restoration effort is clearly an effort to preserve a unique vegetation type and to provide habitat for a declining species, the sharp-tailed grouse. Locally and statewide forest resources are abundant while brush-prairie is scarce. An additional important benefit is that the combined brush-prairie/wetland complex on Crex has produced a diverse and abundant wildlife resource community.

3. Firebreak Development

Construction of firebreaks is difficult and expensive in lowland forest and wetland types, but without firebreaks burning of large sedge marshes such as Reed's Lake and North Fork marshes is difficult and expensive. Periodic burning of these marshes is critical to control woody plant succession and maintain nesting cover for ducks, geese, sandhill cranes, and habitat for sharp-tailed grouse and prairie chickens. Possible solutions lie in development of flowages in these large marshes, or construction of transfer ditches. Flowages, dikes and ditches can all be used as effective firebreaks.

4. Soil Limitations

The term "Barrens" appropriately describes most of Crex because of the infertile, droughty, sand soils. These soils produce sufficiently well to provide excellent natural cover and food for wildlife. However, these sandy soils increase the costs of agricultural cropping by requiring a high level of management to prevent wind erosion and to maintain fertility.

5. Agricultural Cropping

Agricultural crops in the refuge are highly attractive to migrating geese, sandhill cranes, and ducks as well as resident deer, prairie chickens and sharptails. Cropping, however, is expensive costing \$59/acre (about \$16,000) in 1980 for all manpower, equipment and supplies. It is an expensive part of the total Glacial Lake operating budget accounting for 19 percent of total operations. Sharecropping cannot be utilized to reduce these costs because of the long travel distance from area farms.

However, the benefits of cropland are considerable. For Crex visitors, waterfowl and other wildlife can be seen in large numbers and at close range. The fields are the center of sandhill crane activity during fall staging. Prairie chickens were reintroduced mainly because cropping opened up a large area of suitable habitat. Deer trails to and from the fields offer excellent bow hunting opportunities.

Negative factors include the observation that some visitors may view the refuge crop fields as Crex Meadows per se and overlook the other 90 percent of the property. The high visibility of wildlife on the refuge at times may create a false impression that annual production of wildlife is more dependent upon the crop fields than the surrounding natural habitat.

The size of the cropping area has been reduced over the past several years from 400 to 260 acres with little apparent impact on wildlife use. However, caution is needed if further reductions occur because the relationships between cropping patterns on Crex and populations of prairie chickens, sharp-tailed grouse and geese are currently not well known. The impact of crop reduction on staging cranes is also unknown. Crop depredations by geese on adjacent private lands have not been a problem.

Rising costs may require further cropping reductions and/or different techniques. With limited funding expected, it may be prudent to modify current practices for a time to allow for completing planned brush-prairie development. Once a maintenance level of operations is established, agricultural cropping can serve to greatly enhance wildlife-people interactions.

6. Firewood Cutting

Firewood permits and small firewood sales have been effectively used to clear land. Up to 800 permits per year have been issued for the Glacial Lake Complex. Some firewood cutters may think Crex and other Glacial Lake properties will be continuing firewood sources. However, after full brush-prairie conversion is achieved (possibly within 10 years), firewood will be available from forested areas in a much smaller volume than now exists. Thus, there is concern that current practices are creating public expectations which cannot be satisfied. Additional public relations work will be needed to properly inform firewood cutters of the future supply from Glacial Lake Properties.

7. Water Quality and Supply

Production of aquatic plants and all aquatic animal life is limited by low to moderate fertility (pH 6.5 to 7.0, total alkalinity 5-50 ppm) and, in some flowages, by limited light penetration due to dark stain in the water. An abundance of iron-oxides also colors some seepage areas an orangish color.

Water quality is enhanced by brush-prairie and burning. Runoff from brush and burned areas is more fertile than runoff from forest lands. Productivity may be further enhanced by utilizing drawdowns to produce moist soil plant communities which, when flooded, will release nutrients. The drawdown principle is a well documented, short-term stimulator of aquatic productivity.

All Crex flowages depend upon surface runoff, but runoff is often insufficient to maintain water levels in flowages on the central, northern and western areas of Crex. The water supply in the North Fork Flowage drainage is generally adequate and often in excess of need. The diversion pump has been often used to pump water from the North Fork Flowage into other flowage basins. The water transfer ditch system allows this to be easily done. As fuel prices continue to rise, pumping costs will increase and the amount of pumping done may need to be decreased. The use of wind powered pumps and/or generators offers some potential for moving water at less cost.

A thorough analysis of a drainage system's "water budget" is critical when planning a flowage. Watershed size, stream flow, and potential evaporation losses must be determined to ensure that downstream flow will remain adequate after the flowage is constructed.

8. Private Development Encroachment and Other Public Land Ownership.

Existing state ownership on Crex is sufficiently contiguous to prevent significant impacts upon management. Burnett County forest land borders Crex on the northeast corner and should prevent private encroachment in this area.

State ownership is least contiguous in the southeast part of the property and private development here may prevent future public ownership and management for wildlife. Prescribed burning in this area may also be severely limited. Seasonal or permanent home development along the western and northern boundaries may eventually cause some problems for prescribed burns.

A potential for expanded sharptail management exists if Burnett County-owned land in the northeast corner were to be partially converted to brush-prairie. This expansion would allow the Governor Knowles State Forest sharptail area to be directly linked with Crex. About 520 acres would have to be properly manipulated to successfully accomplish this "linkage". This could be accomplished by developing a cooperative management plan with Burnett County.

9. Plant and Animal Diseases

No plant diseases are known to exist on the property which would impact property objectives. Dutch elm disease is prevalent but is not adversely affecting wildlife populations. Oak wilt is not known to be present.

No wildlife disease outbreaks are known to have occurred on Crex. No waterfowl die-off of any type has ever been observed. Lead poisoning may potentially be a problem because hunting pressure on some flowages is fairly heavy. No bottom sampling for lead shot has been conducted and spent shot levels are not known. Bottom sampling will be done in the future and if concentrations of lead shot are found to be available to feeding wildlife, appropriate regulations will be recommended.

Crex personnel are instructed to be observant for sick wildlife during their routine work so any outbreaks of disease or poisoning will probably be quickly found. Any suspected wildlife disease problems will be referred immediately to the wildlife disease specialist in Madison for a suggested course of action.

RECREATION AND EDUCATIONAL NEEDS

Crex Meadows is within 100 miles of the metropolitan areas of Minneapolis-St. Paul and Duluth-Superior which have a combined population in excess of two million. Because of its proximity to population centers, the general area of western Burnett County has become a major weekend recreation area. The primary attractions are the large public land holdings of the Governor Knowles State Forest, St. Croix River National Scenic Riverway, and the Glacial Lake Grantsburg Wildlife Areas. The scenic riverway and state forest attract many hikers, campers, canoers, anglers, horseback riders, cross country skiers, and snowmobilers. The wildlife areas attract hunters, trappers, hikers, and in general those seeking a wildlife related outdoor experience.

Crex Meadows, while already attracting over 115,000 visits per year, can support additional use. However, it will be necessary to accommodate future use consistent with the purpose of the property and the goal and objectives of this plan. Currently, nearly all use is wildlife related. Most users hunt, trap, photograph, or just view wildlife. These activities are essentially why Crex was established and are highly compatible with one another.

More intensive forms of recreation such as camping and picnicking have been limited to only one site; this was done to accommodate hunters and wildlife viewers. Increasing nonwildlife-related recreation would ultimately conflict with wildlife management objectives. The nearby state forest and scenic riverway are managed to accommodate extensive recreation. Crex can best serve public outdoor recreation needs by emphasizing only wildlife-related activities. In this regard, hunting, trapping, wildlife viewing, and the wildlife interpretive program will continue to be emphasized.

In the past, user controls have been employed sparingly on the wildlife area. Hunter density control has not been necessary but will continue to be monitored. This is especially important for the opening weekends of the waterfowl, bow deer and gun deer seasons. Campers are restricted by permit to one site from September 1 through December 31. Snowmobilers are confined to the county trail and no other motorized vehicles or horses are allowed on any trail. However, all existing trails are open for other foot travel including hunters, hikers, and skiers.

Except for airboats, other motor boats are permitted on Crex flowages. Typically, only low horsepower motors are associated with fishing and hunting are used and have not caused problems such as increased water turbidity, aquatic vegetation damage or disturbance harmful to wildlife. While no restriction is currently needed, if motor boat use increases and/or larger horsepower motors become common, restrictions may be implemented to protect habitat, wildlife and the dike system.

ANALYSIS OF ALTERNATIVES

1. Continued Implementation of Brush-Prairie/Wetland Development and Management

This alternative is recommended for management and is described in Section I. It is the alternative most consistent with the original purpose and intent of the wildlife area prescribed by the federal (Pittman-Robertson) funding program. All existing developments will be maintained. Future development will consist mainly of creating 13 flowages totaling 2,010 acres and restoring 3,000 acres to brush-prairie habitat.

This alternative stresses the importance of restoring and maintaining a large amount of wetland and brush-prairie habitat as necessary to achieve wildlife population goals. A diverse population of ducks, geese, sharp-tailed grouse, endangered species, threatened species and other wildlife associated with wetlands and brush-prairie will result from this alternative.

Forest wildlife such as squirrels, ruffed grouse, cavity nesting birds, and others will lose about 3,000 acres of existing habitat as it is restored to brush-prairie. Deer populations on and in the vicinity will not be adversely affected. Brush-prairie provides an "edge effect" and is high quality deer range. With this alternative, about 6,000 acres will continue to be managed as forest habitat.

About 3,500 of the 6,000 acres are oak-jackpine woodland and the bulk of this forest type is north of Highway "F". This area will be managed as winter deer habitat. The remaining 2,500 acres is mostly aspen that is the most productive of ruffed grouse, woodcock, and snowshoe hare. In addition to this 6,000 acres, many small clumps of aspen, oak, and occasional pine will be scattered throughout Crex in areas missed by prescribed burns. Most of these scattered wooded groves will occur along upland-marsh edges and on small islands in marshes.

2. Limit Development and Management to Existing Level

Under this alternative, brush-prairie and wetlands restoration would be held at their existing levels of development. Some additional landclearing would occur within areas already surrounded by firebreaks. However, no new firebreak development or flowage developments would occur. All existing developments would be maintained. If this alternative were implemented, most wildlife populations would probably stabilize at their current levels since no new habitat would be created.

Increases in species abundance would depend upon more intensive management of existing habitat to increase habitat quality and carrying capacity. Increases appear possible for the endangered species (cormorant, osprey, and eagle) through the use of artificial nesting structures and nesting area protection. Waterfowl and furbearer populations will probably not increase unless existing habitats can be managed for increased fertility.

Sharp-tailed grouse numbers may increase somewhat as landclearing is conducted in areas already surrounded by firebreaks. Overall, however, most wildlife populations would probably stabilize at about their current levels unless techniques were developed to increase habitat carrying capacity. The stated goal and objectives would not be met with this alternative.

3. Increase Total Amount of Wetlands and Brush-Prairie Development

If wildlife developments were increased above that suggested in Alternative 1, most emphasis would be placed on sharp-tailed grouse. Additional effort in agricultural cropping, flowage construction, nesting cover establishment, and burning above that proposed in Alternative 1, would not be cost effective in producing a major increase in additional wildlife benefits.

Attempting to create sharp-tailed grouse habitat on all areas of Crex would be difficult and expensive because it would involve wet woodland areas difficult to clear and burn. These woodland areas also serve as winter sharptail habitat and are excellent ruffed grouse habitat. Clearing the oak-jackpine woods north of Highway "F" would result in a loss of forest wildlife habitat and a decrease in conifer habitat used by wintering deer.

4. Management Modifications to Include Nonwildlife-related Management Activities

The present scope of wildlife management on Crex is very broad and expansion would be difficult. Management directly benefits endangered and threatened species and has greatly benefited many nongame species. Specific nongame management techniques are implemented as they become available such as critical habitat protection and artificial nesting structures. Game management techniques applied have made Crex one of the better hunting areas in the state.

The number of nonwildlife related activities has been limited and such activities have been discouraged. However, a discussion of alternatives would not be complete without addressing potentials for nonwildlife-related management. Three areas will be considered: forest production, sport fishery management, and nonwildlife-related recreation.

Forest Production

Forest products are currently removed from Crex as a result of specific actions designed to enhance wildlife habitat. A change in management emphasis from maximum wildlife production to maximum forest products production would involve conversion of oak and some aspen areas to pine and could involve conversion of brush prairie to forest, probably pine plantations.

Intensifying forest production would reduce wildlife habitat quality and, if brush-prairie were planted to trees, would result in direct habitat loss. A significant loss of brush-prairie habitat would mean a reduction or loss of waterfowl and sharptails.

Intensive forest management and sharp-tailed grouse management are incompatible land uses. The present forest wildlife/forest production relationship optimizes wildlife habitat while also producing significant timber sale revenue as a byproduct of habitat development. The existing program should be continued if wildlife management is to be the primary emphasis.

Sport Fishery Management

Potentials for sport fisheries appear to be limited by the shallowness of flowages as well as recurring winterkill. Deeper flowages like Phantom and North Fork may be able to support a limited fishery. North Fork and Phantom Flowages had fair northern pike fisheries until they winterkilled in 1979. From time to time, fisheries personnel have inquired about using certain flowages on Crex as rearing ponds for northern pike. There is some potential for this use and it could be explored. Minnow seining by the Spooner Warmwater hatchery crew has been conducted annually with no observed adverse impacts upon fish-eating wildlife.

Developing a sport fishery would severely conflict with many species of wildlife that require freedom from disturbance during the nesting and rearing seasons such as, osprey, cormorants, herons, geese, and ducks. Any interest in developing a recreational fishery would have to be seriously evaluated in relation to its impact upon endangered and threatened species and waterfowl production.

Nonwildlife-Related Recreation

Hunting, trapping, wildlife observation, and wildlife study have been the traditional recreational uses of Crex Meadows. These uses have been the only ones encouraged on Crex. Conceivably other forms of outdoor recreation could be accommodated but many would adversely effect wildlife.

In general, those activities that will disturb wildlife, destroy or degrade habitat, or conflict with the primary wildlife-related uses should be discouraged. Such activities include motorboating on flowages, horseback riding, off road vehicles, air boat use on marshes, unregulated camping, unrestricted snowmobile use and similar activities.

Uses such as controlled camping, picnicking in the rest area, dog trials and cross country skiing on existing trails can be accommodated without adverse impact upon wildlife or property developments.

Any activity which is not wildlife-related needs to be evaluated in relation to its short and long-term effects on species abundance and production, habitat destruction, property developments, and in relation to the established goal, objectives and general purpose of the property.

In general, only uses which are wildlife related and which cannot be adequately accommodated elsewhere should be encouraged. Because Crex Meadows was acquired and developed as a wildlife area, it would be difficult to accommodate any significant amount of nonwildlife related uses without altering the overall purpose of the property.

