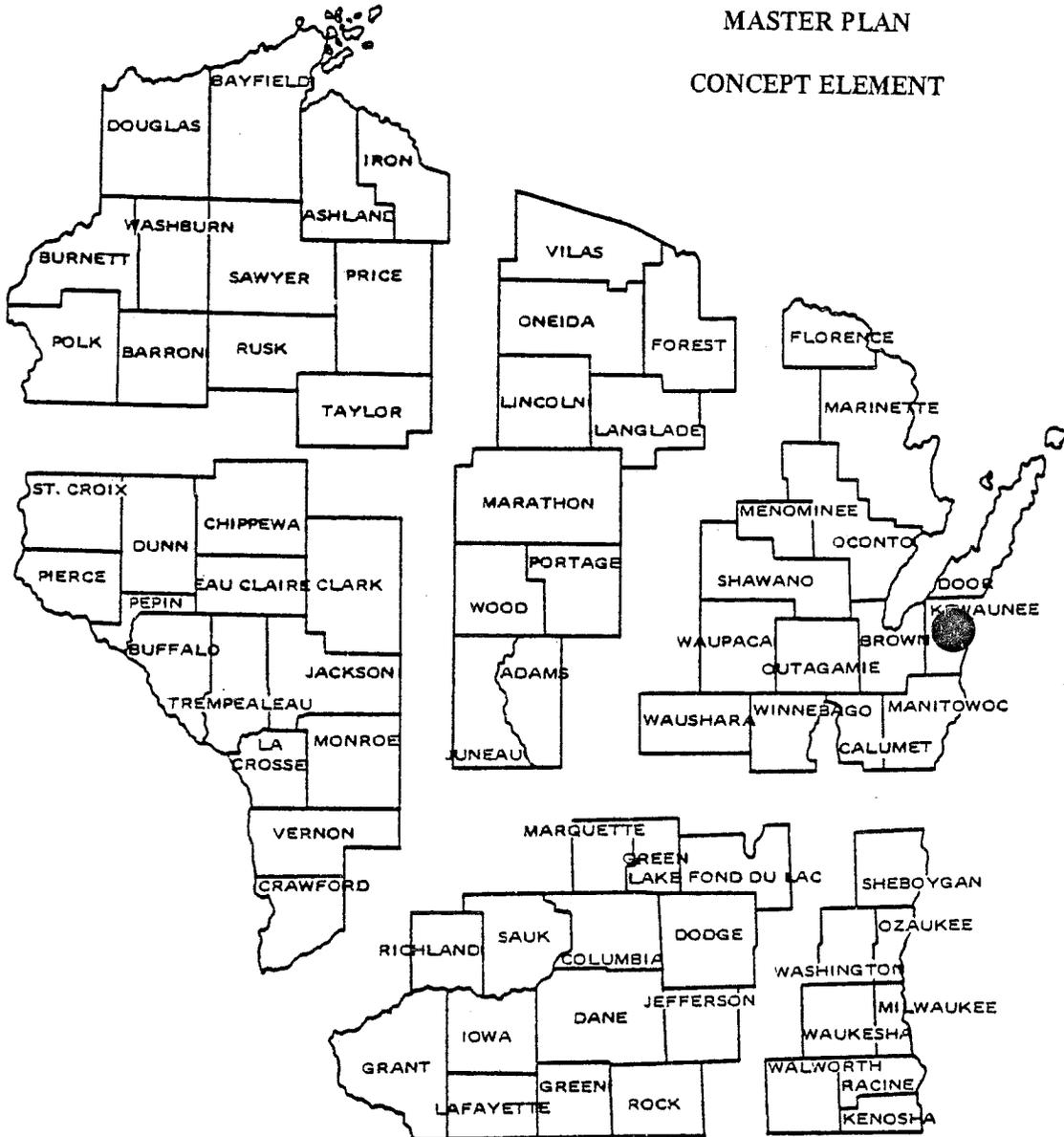


KEWAUNEE FISH AND WILDLIFE AREA

MASTER PLAN

CONCEPT ELEMENT



Property Task Force

Approved By: _____

Leader: Dan Olson - Area Wildlife Manager
Jim Moore - Supervisor - Lake Michigan Work Unit
Jack Hoisington - Area Forester
Gary Patzke - Manager - Peninsula State Park
Chuck Petrie - Area Warden
Mike Russo - Environmental Specialist - Water Quality

Date: _____

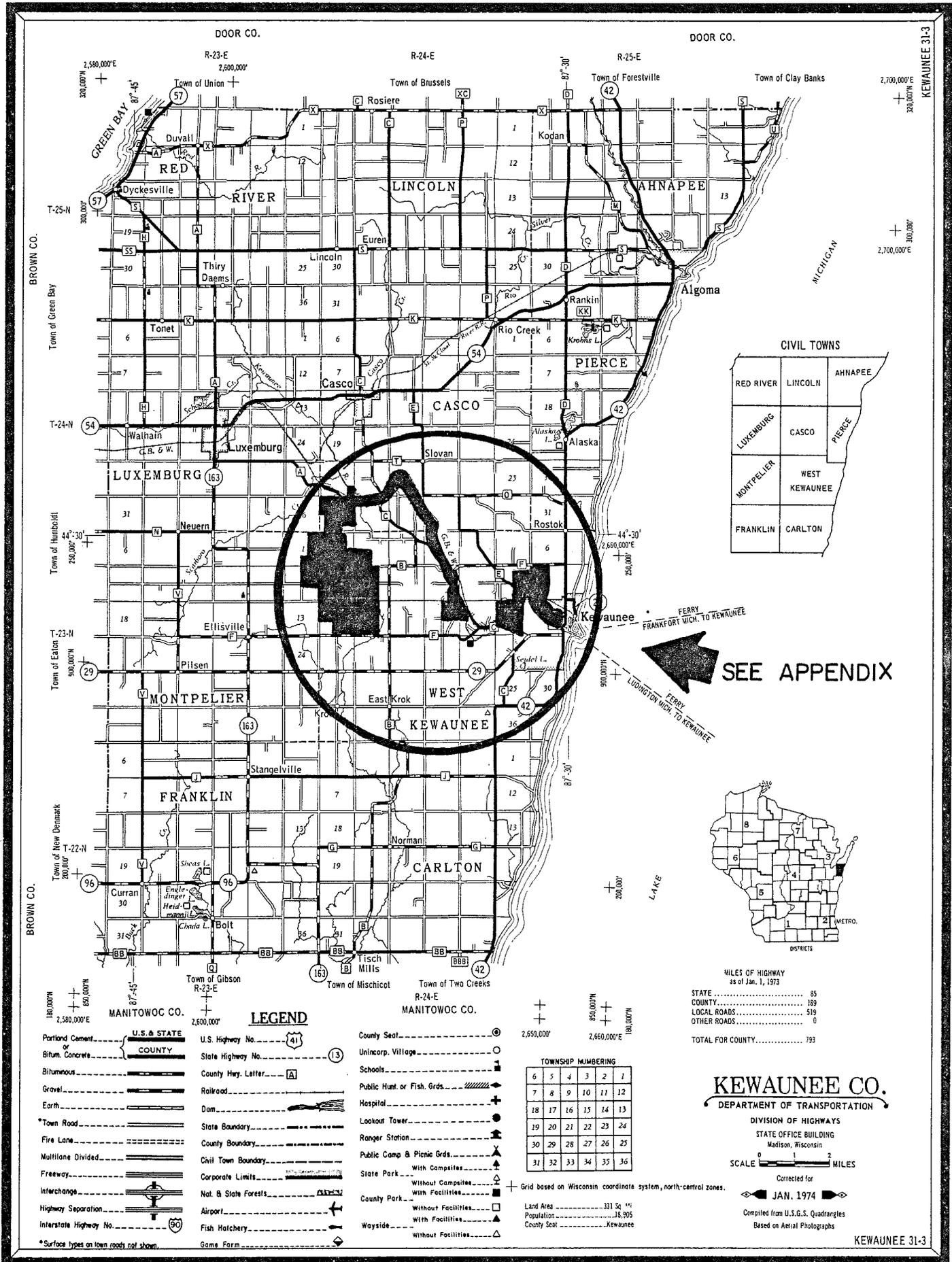


FIGURE 1 LOCATOR

Table of Contents

	<u>Page</u>
SECTION I - ACTIONS	
GOAL, OBJECTIVES AND ADDITIONAL BENEFITS	1
RECOMMENDED MANAGEMENT AND DEVELOPMENT PROGRAM	1
SECTION II - SUPPORT DATA	
BACKGROUND INFORMATION	2
RESOURCE CAPABILITIES AND INVENTORY	9
Soils, Geology and Hydrology	
Fish and Wildlife	
Vegetative Cover	
Water Resources	
Historical and Archaeological Features	
Land Use Potential	
MANAGEMENT PROBLEMS	18
RECREATION NEEDS AND JUSTIFICATIONS	19
ANALYSIS OF ALTERNATIVES	20
APPENDIX	21

SECTION I - ACTIONS

GOAL, OBJECTIVES AND ADDITIONAL BENEFITS

Goal: To manage a state-owned fish and wildlife area with emphasis on habitat preservation, fish and wildlife based recreation and to provide compatible recreational opportunities.

Objectives:

1. Provide 300 angler days (currently 100 angler days) of native brook and rainbow trout fishing.
2. Maintain 3,500 participant days of hunting and trapping: 800 - deer, 2,000 - pheasant, 100 - waterfowl, 500 - other small game and 100 - trapping.
3. Maintain 30,000 angler days of salmonid fishing.
4. Maintain a wintering herd of about 600 deer.
5. Protect a minimum of one archaeological area for educational and scientific purposes.

Annual Additional Benefits:

1. Contribute toward the habitat of resident and migrating threatened and endangered species.
2. Provide 2,000 participant days (currently 100 participant days) of compatible other recreational and educational activities including hiking, cross-country skiing, photography and nature observation.
3. Accommodate 1,000 angler days (currently 500 angler days) of warm water fishing.
4. Harvest available forest products consistent with property objectives.

RECOMMENDED MANAGEMENT AND DEVELOPMENT PROGRAM

Currently, four active acquisition properties are located on or adjacent to the Kewaunee River (Figure 1). It is recommended they be combined under one property: The Kewaunee Fish and Wildlife Area. In this plan, the four properties will be managed concurrently under both fish and wildlife programs. This is needed to improve continuity and to simplify management. The property area will include critical areas of wildlife habitat, wetlands, and land subject to erosion along the Kewaunee River. It will provide a buffer to increase protection and better block in boundary lines.

All land within the property boundaries will be designated as Fish and Wildlife Development Area under the uniform classification system of land use. The land acquired by the state will be protected from residential, commercial, and agricultural expansion. It will allow fish and wildlife programs to manage the boundaries except for one archaeological (copper culture) site which remains undisclosed but protected from development proposed by the state. No major developments are planned for this property.

The current acreage goal is 4,822.88 for the combined property and is adequate to meet the proposed goal and objectives; 1,606 acres are currently state-owned. In most instances, improvements such as residences (12 within the property) will not be purchased due to the high cost of acquisition and relocation. However, the decision to purchase and remove the buildings would be made if it is found they conflict with property plans in the future. Acquisition is to be pursued on land within the property boundaries when it becomes available. The cost varies from \$300 per acre to \$1,000 per acre. Estimated costs for land is listed in Table 1.

Operation and maintenance costs will be maintained at the current level which varies from \$900 to \$2,300 annually for fish and wildlife management but may increase because of inflation or the purchase of more land. Costs today are incurred by toilet rental for salmon snagging areas, posting, road resurfacing, fish entrap pickup, and garbage cleanup.

Fish management will include: stream habitat improvement on Little Scarboro Creek, trout stocking and imprinting of 150,000 - 200,000 chinook salmon, redistribution of salmonid fishing pressure along the Kewaunee River, and riprapping areas of extreme erosion. Current funding is not available to stock coho salmon but, should it become available, 50,000 to 100,000 should be released. The boat access is sufficient for the area and no additional sites are planned.

Wildlife management will continue to be directed at protecting and enhancing the remaining wildlife habitat while still providing hunting opportunities. The stocking of pheasants will continue. Annual allotments will be directed by the forthcoming pheasant release policy. Pheasants will not be stocked in areas of the property used for salmonid snagging. This technique has alleviated hunter-fishermen conflicts.

Seventy-five acres are sharecropped on this property. Sharecropping efforts provide winter food patches and cover for wildlife utilizing corn, alfalfa and small grains. In addition to sharecropping, grassland establishment and tree and shrub planting will be carried out to provide wildlife food and cover and protect the watershed. Tree and shrub planting as well as grassland establishment will be continued in this area and promoted in other units as more land is acquired. In addition to food and cover for wildlife it will help stabilize streambanks.

The Little Scarboro Units will also be managed to maintain the deer wintering area. Forest openings 1-10 acres will be maintained or created in the Little Scarboro Unit to benefit deer, grouse, woodcock, rabbits, and numerous non-game species. Forest management, particularly in the Scarboro Units, may include timber harvesting of commercially valuable forest by selective cutting and clear cutting. However, a commercial harvest is unlikely at the present time because most of the forest area is immature.

A cross-country ski and snowmobile corridor, one chain wide will be available in the Little Scarboro Unit; it will be designated as a use area but not specifically designated for ski use. Recreational activities will be restricted to day-use only. Camping will not be allowed.

SECTION II - SUPPORT DATA

BACKGROUND INFORMATION

Physical Setting:

The Kewaunee Fish and Wildlife Area is located, for the most part, adjacent to the Kewaunee River in Kewaunee County, situated in the lower half of Wisconsin. The property extends from the Kewaunee River estuary, near the mouth of the river, to 10.3 miles upstream including a large swamp around Little Scarboro Creek. Communities in and around the property are Kewaunee, Algoma, Luxemburg, and Casco. The property is a consolidation of four previously established properties referred to in this master plan as fish or wildlife areas. The units are the Kewaunee Wildlife Area, Kewaunee River Fish Area, Little Scarboro Fish Area and Little Scarboro Wildlife Area (Figures 2-7).

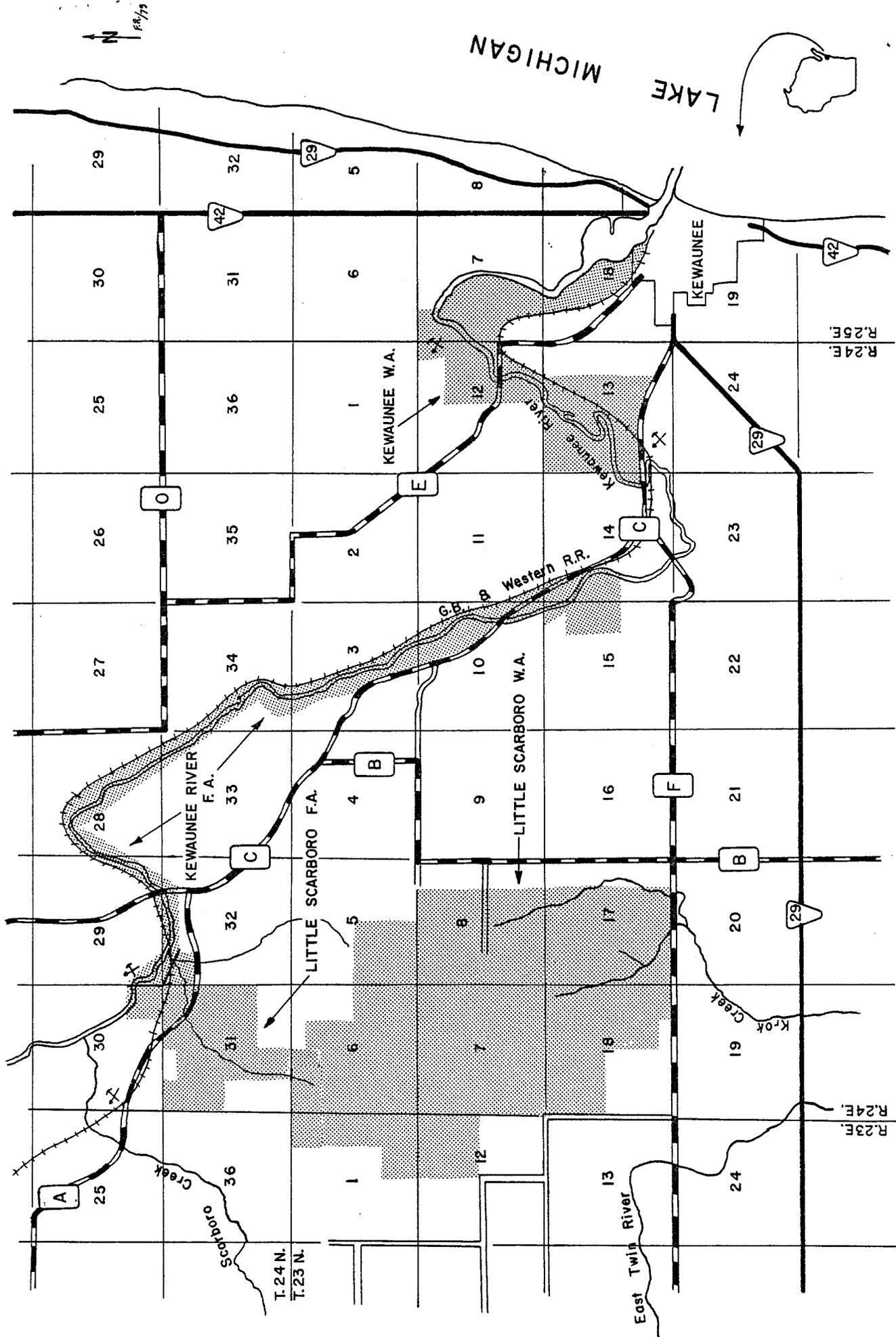
History:

The Kewaunee region is composed of rural farming communities of primarily Belgian heritage. After moving to Wisconsin in the early 1800's the Belgians chose to live near Green Bay because the French language was used extensively. Today, Brown, Kewaunee and Door Counties still contain the largest rural settlement of Belgian people in the United States.

State activity in the Kewaunee region began in 1957 with acquisition in the Kewaunee Wildlife Area. This property adjoins the lower four miles of the Kewaunee River. It provides some of the better habitat in the county for deer and pheasants. The wetlands in the estuary-like mouth of the Kewaunee River produce and attract some waterfowl. In 1969, a state salmon release pond was constructed in this unit and 200,000 coho and chinook salmon are released annually.

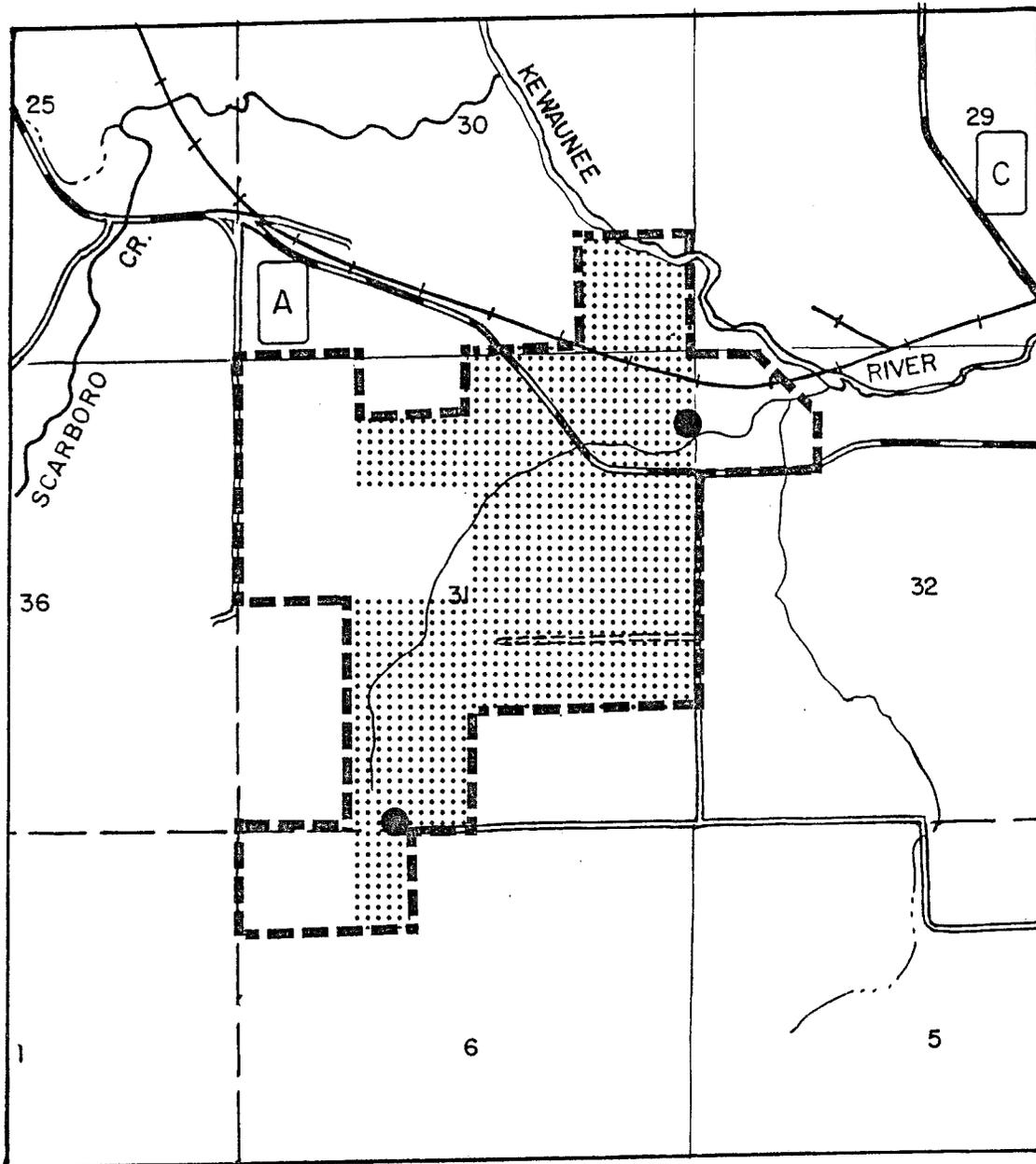
The Little Scarboro Fishery Area was initiated in 1958. It surrounds Little Scarboro Creek which is a tributary to the Kewaunee River. It is a Class I brook trout stream and the only Lake Michigan tributary in Wisconsin where significant numbers of naturally reproducing coho salmon have been found. The unit provides public access to the stream and, in conjunction with the Little Scarboro W.A., supports the largest deer herd in the county (600 wintering deer). It also is used extensively for wildlife habitat development with active sharecropping, grassland establishment and tree and shrub planting activities.

Little Scarboro Wildlife Area was started in 1959 as a fish management property. In 1970, the Kewaunee Hunting and Fishing Club voted to support public land acquisition of Lipsky's Swamp (a section of the wildlife area) and, in 1972, the unit became an active property. It provides land for public hunting and other mixed outdoor activities. It is also an important deer wintering area.



KEWAUNEE FISH AND WILDLIFE AREA

FIGURE 2 UNIT RELATIONSHIP SCALE 1:62500



LITTLE SCARBORO
FISHERY AREA

LEGEND

-  PROPERTY BOUNDARY
-  STATE LAND
-  PRIVATE LAND
-  EXISTING PARKING LOT

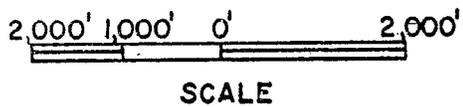
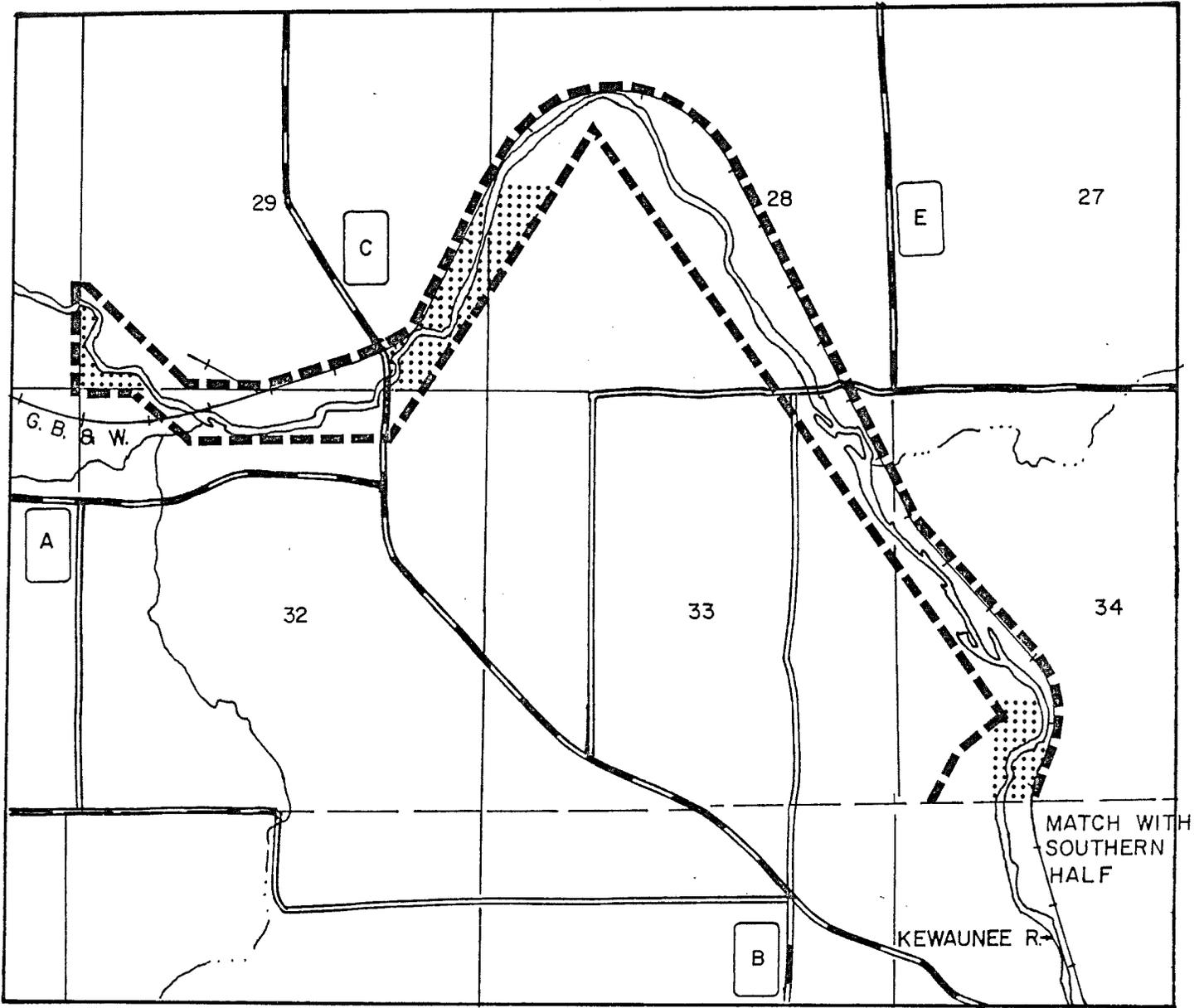


FIGURE 4



KEWAUNEE RIVER
FISHERY AREA
(NORTHERN HALF)

LEGEND

-  PROPERTY BOUNDARY
-  STATE LAND
-  PRIVATE LAND

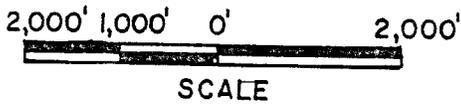
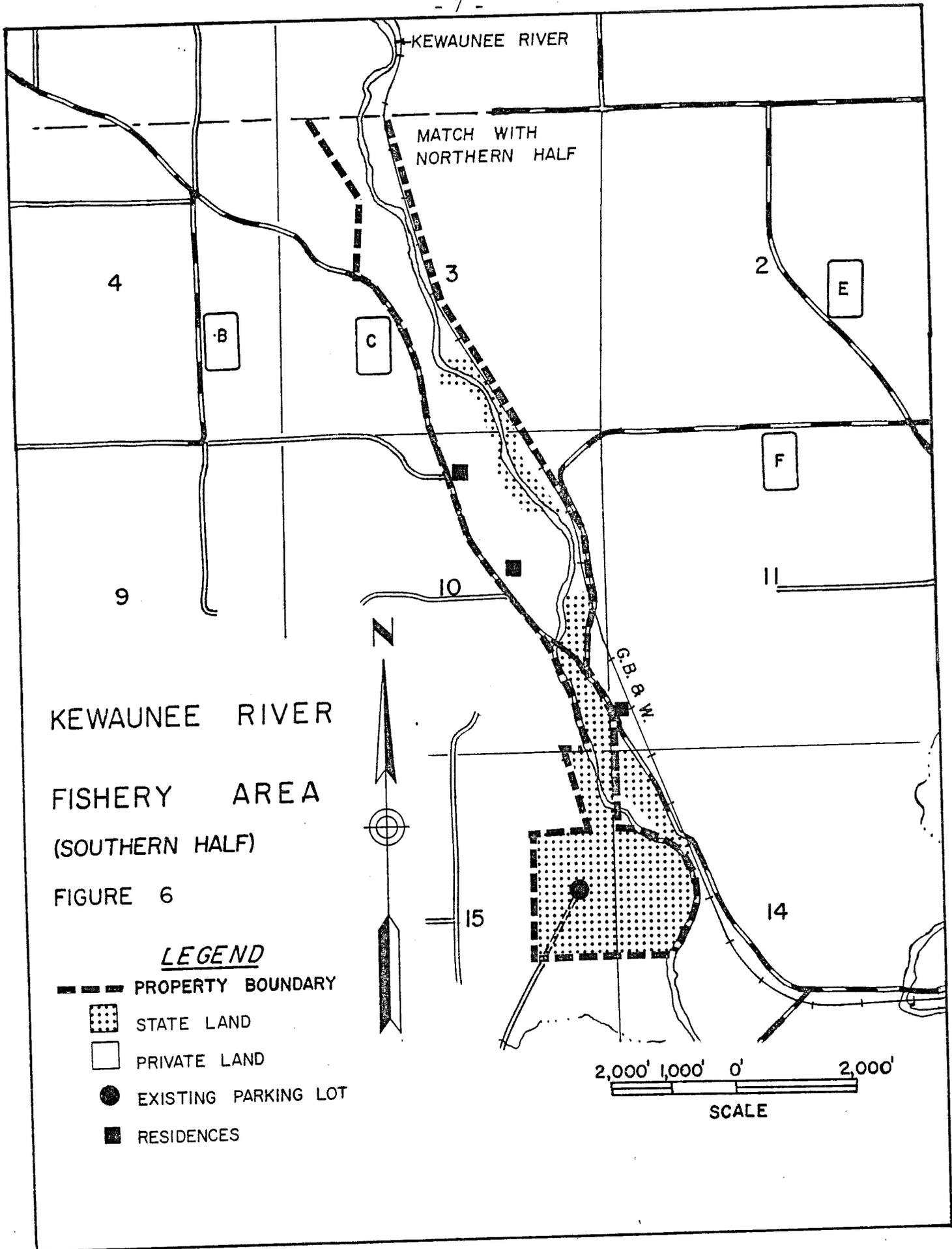


FIGURE 5



KEWAUNEE RIVER

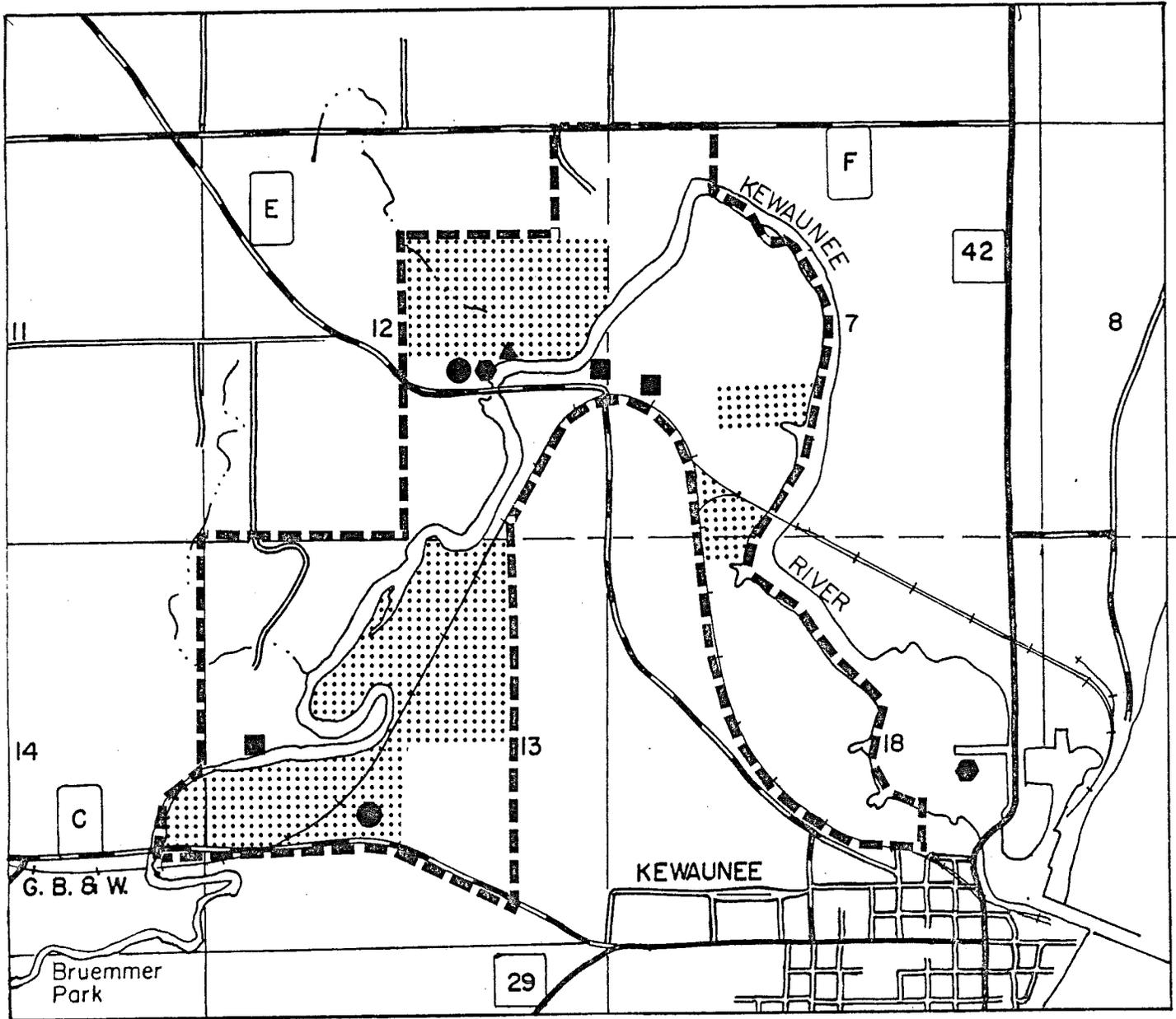
FISHERY AREA
(SOUTHERN HALF)

FIGURE 6

LEGEND

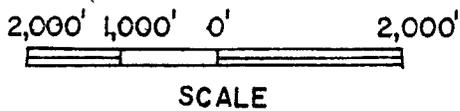
- PROPERTY BOUNDARY
- ▣ STATE LAND
- PRIVATE LAND
- EXISTING PARKING LOT
- RESIDENCES

2,000' 1,000' 0' 2,000'
SCALE



LEGEND

-  PROPERTY BOUNDARY
-  STATE LAND
-  PRIVATE LAND
-  EXISTING PARKING LOT
-  BOAT ACCESS
-  RESIDENCES
-  SALMON RELEASE POND



KEWAUNEE WILDLIFE AREA
FIGURE 7

Table 1 - Land Ownership

Units	Private Lands to Be Purchased	Number Parcels	Parcels With Improvements	Existing State Ownership	Acreage Goal	Estimated Cost To Complete
Kewaunee Wildlife	524.42	11	4	346.7	871.12	\$175,700
Kewaunee River Fisheries	115.46	15	3	279.3	394.76	\$37,000
L. Scarboro Fisheries	58.70	2	0	432.3	491.00	\$30,500
L. Scarboro Wildlife	2,518.30	40	5	547.7	3,066.00	\$1,300,000
Total	3,216.88	68	12	1,606.0	4,822.88	\$1,543,200

As plans were formulated to create a salmon release pond on the Kewaunee River within the Kewaunee Wildlife Unit, it was apparent public fishing pressure would greatly increase in the area. The Kewaunee River Fish Area was initiated in 1968 to provide habitat components, more land for public fishing and protect the critical stream. The Kewaunee River flowing through this unit has many riffles and pools that attract anadromous fish and contains a Class I trout stream as a tributary.

In summation, the state owns and manages 1,606 of the 4,822.88 acres identified in the property. The land is managed for fish and wildlife and provides public hunting and fishing. Management practices utilized on state land include sharecropping, grassland establishment, tree and shrub planting, pheasant stocking, salmon stocking and streambank improvement.

RESOURCE INVENTORY AND CAPABILITY

Geology, Soils and Hydrology

The geologic and geomorphic characteristics of the Kewaunee River area have shaped and continue to affect the natural processes of this region. The bedrock consists of Niagara dolomite 300-700 feet thick which often occurs at an altitude of 590 feet above sea level (Martin, 1965). This is at or near the surface in many parts of the area. The dolomite was deposited during the Silurian Age and, in conjunction with area glaciation, resulted in the ridges and lowlands of this region. The Wisconsin stage was the last period of glaciation in Wisconsin and completely covered Kewaunee County.

The continental glacier was composed of two lobes: the Lake Michigan lobe which covered the eastern part of the county, and the Green Bay lobe which covered the western portion. Between these two lobes was deposited a thick stratified layer of sand and gravel called an interlobate moraine. This moraine presently forms the Kettle Moraine Hills and extends along the Little Scarboro Wildlife Unit.

Most of the property consists of ridges and lowlands occupied by glacial outwash (sand and gravel) deposited when meltwaters of the receding glacier moved sediment into river valleys and low lying area. These deposits are all relatively thin (less than 100 feet) and account for most of the mineral soils in the property. An esker (a ridge of glacial sand and gravel) occurs in the Little Scarboro Wildlife Unit.

The soils found in the property are primarily derived from glacial origin. There are 38 soils which fall into nine groups. The most extensive soil types in the property are the poorly drained organic soils and flooded soils of the low lying land. The organic soils are derived from the decomposition of thick deposits of plant remains which have resulted in quantities of peat occurring with the muck. The peat-muck and related soils can be drained and cultivated but methods are difficult and expensive. These soils provide potential sources of peat for fuel which were harvested at one time within the Little Scarboro Wildlife Unit.

The remaining soils occupying the property are loams, sands and complexes of the two. They range from well drained to very poorly drained. They originate from outwash, lacustrine and glacial till with slopes varying from 6% to 35%, often resulting in erosion problems. Storm induced erosion and agricultural runoff have led to the accumulation of alluvial soils in the Kewaunee River harbor area. A marshy estuary in the Kewaunee Wildlife Unit serves as a natural buffer for a limited amount of eroded material.

Prime farmland soil types found in the property are Bonduel, Dresden, Fabris, Kewaunee, Manawa and Waymore. Farmland soil types of statewide importance listed in the area include Allendale, Boyer, Carbondale, Dresden, Keowns, Kewaunee, Summerville, Wauseon, and Waymore. However, none of these soils are listed as Class I agricultural land because they are limited due to wetness or slope.

Sand and gravel for commercial purposes are excavated from pits in and adjacent to the property.

In general, most of the soils of the Kewaunee property are limited for agriculture because of wetness or the slope of terrain. Pasture is a common use today but erosion on such areas is evident. Residential use is limited to elevated sites. Compatible uses of the property include hunting, fishing, nature observation, education and scientific study, cross-country skiing and snowmobiling.

The most important element of the property is the Kewaunee River which adjoins 10.3 miles of the four units. Lake Michigan has a pronounced effect on the lower four miles of the river. This section has a low gradient and water depths ranging from 3-5 feet. Consequently, a seiche in Lake Michigan will result in a water level change of up to six inches as far as three miles upstream (W.D.N.R., 1978).

The Little Scarboro Unit drains to the north by Little Scarboro Creek which flows into the Kewaunee River, and to the south by two intermediate streams of the East Twin River. The rolling hills are well drained and the low lying areas are very poorly drained.

Fish and Wildlife

The Kewaunee River provides spawning and nursery area for 28 species of fish. Game fish include yellow perch, smallmouth bass, northern pike, walleye, coho and chinook salmon, brown, rainbow and brook trout, rock bass, and brown and black bullhead.

Fish stocking has contributed greatly to sport fishing in Lake Michigan and its tributary waters including the Kewaunee River. Presently, the state administers a salmonid stocking program from a pond on the Kewaunee River within the Kewaunee Wildlife Unit. Each fall salmon return to the stocking site.

Brown, brook, and spring-run rainbow trout also migrate in and out of the river. These fish provide fishing for both conventional and foul-hook fishing. This annually amounts to an estimated 27,600 hours of river fishing, harvesting 2,700 fish, and 35,800 hours of pier and breakwater fishing, harvesting 3,700 fish. The Kewaunee River also provides some of the best ice fishing in the area.

The spring outlets in the northern part of the Little Scarboro Units are the source of one of the most productive trout streams in northeast Wisconsin. It produces approximately 3,900 trout per mile. Salmon migrate from Lake Michigan up the Kewaunee River approximately 10 miles and have reproduced in Little Scarboro Creek. This is the only stream in Wisconsin flowing into Lake Michigan that contains naturally reproduced fingerling salmon in significant numbers.

Crayfish are abundant in the upstream area of the Kewaunee River but harvest numbers are unknown. An endangered fish, the greater redhorse, has been recorded to be found in the Kewaunee River.

No information is available on the reptiles and amphibians of the property area. However, it is expected the area would contain a contingent of species which have Kewaunee County in their normal range.

The Kewaunee area contains a high diversity of wildlife species common to habitat components which are largely coniferous, hardwoods and shrub lowlands, with lesser amounts of agricultural and brush land. Mammals classified as game animals sighted on the property include white-tailed deer, gray squirrel, cottontail rabbit and raccoon. Furbearers include muskrat, mink, raccoon, red fox, weasel, and striped skunk.

Other mammals observed are badger, red squirrel, chipmunk, and many other small mammals whose range extends into the region. The exact number of species is not known at this time due to the absence of any intensive survey work.

The Little Scarboro Wildlife Unit alone contains 3.7% of the deer habitat available in the county but supports 25% of the county's wintering deer population (W.D.N.R., 1977b). It is also intensively hunted.

Game bird species present include ruffed grouse, Hungarian partridge, pheasant, woodcock and snipe. Waterfowl, including mallard, blue-winged teal, green-winged teal, wood duck, gadwall, widgeon, hooded merganser, scaup, goldeneye and bufflehead are attracted to the wetland estuary near the mouth of the Kewaunee River.

Non-game bird species have not been completely assessed on the property but the area is expected to contain species whose range covers habitats of the property. Birds observed on informal surveys were great horned owl, yellow-headed blackbird, red-winged blackbird, grackle, goldfinch, towhee, robin, swallow, orchard oriole, song and savannah sparrows, green heron, kingfisher, great blue heron, herring gull, ring-billed gull, spotted sandpiper, and black tern.

The state stocks approximately 700 pheasants annually within the property boundaries and local sportsmen's clubs stock an additional 500 pheasant. There is a minimal amount of natural reproduction in the pheasant population of this region. Turkeys have also been privately introduced near the property and frequently are found on the property.

No threatened or endangered mammals or birds are known to frequent the property. However, the white-tailed jackrabbit which was formerly listed under watch status, has been observed in the vicinity.

Vegetative Cover (Figures 6-9)

The vegetation covering the Kewaunee Fish and Wildlife Area is primarily composed of 18 cover types of which eight types account for 92% of the cover. The eight types are cedar, swamp hardwoods, tamarack, lowland brush, cropland, grass, lowland grass, and emergent vegetation. Cover maps for each unit are found in the Appendix.

Wetland plant communities predominate the property area covering 63% of it; the rest covered by agriculture cropland, grass, or other upland types. However, even some of these non-wetland species occur in areas where they may be classified as Type I, Type VII wetlands (Shaw and Fredine, 1956). Generally, Types I, II, VI, and VII wetlands occur along the upper Kewaunee River and Little Scarboro Creek in the Kewaunee River Fisheries Unit and the two Little Scarboro Units. Little Scarboro Wildlife Unit is 75% Type VI and VII wetlands. Types III, IV, and V are located in the lower Kewaunee River within the Kewaunee Wildlife Unit.

Approximately 44% of the property is covered by forest, limited to species adapted to wet, poorly drained soils. The dominant species is white cedar occupying 17% of the property, most of it is the Little Scarboro Wildlife Unit. The thickets are dominated by white cedar with white birch occurring in moderate amounts and a mixed variety of swamp hardwoods. No white cedar reproduction is present, probably due to the high population of deer wintering in the swamp. High volumes of potential cedar posts, up to 500 per acre, grow in the lowlands.

Swamp hardwood stands occupy 14% of the property area. As with most of the tree species present, the stands are relatively young with tree cover and density highly variable. Black ash, white birch and black willow often dominate with aspen, elm and red maple occurring commonly. Tamarack and hemlock also occur in the property.

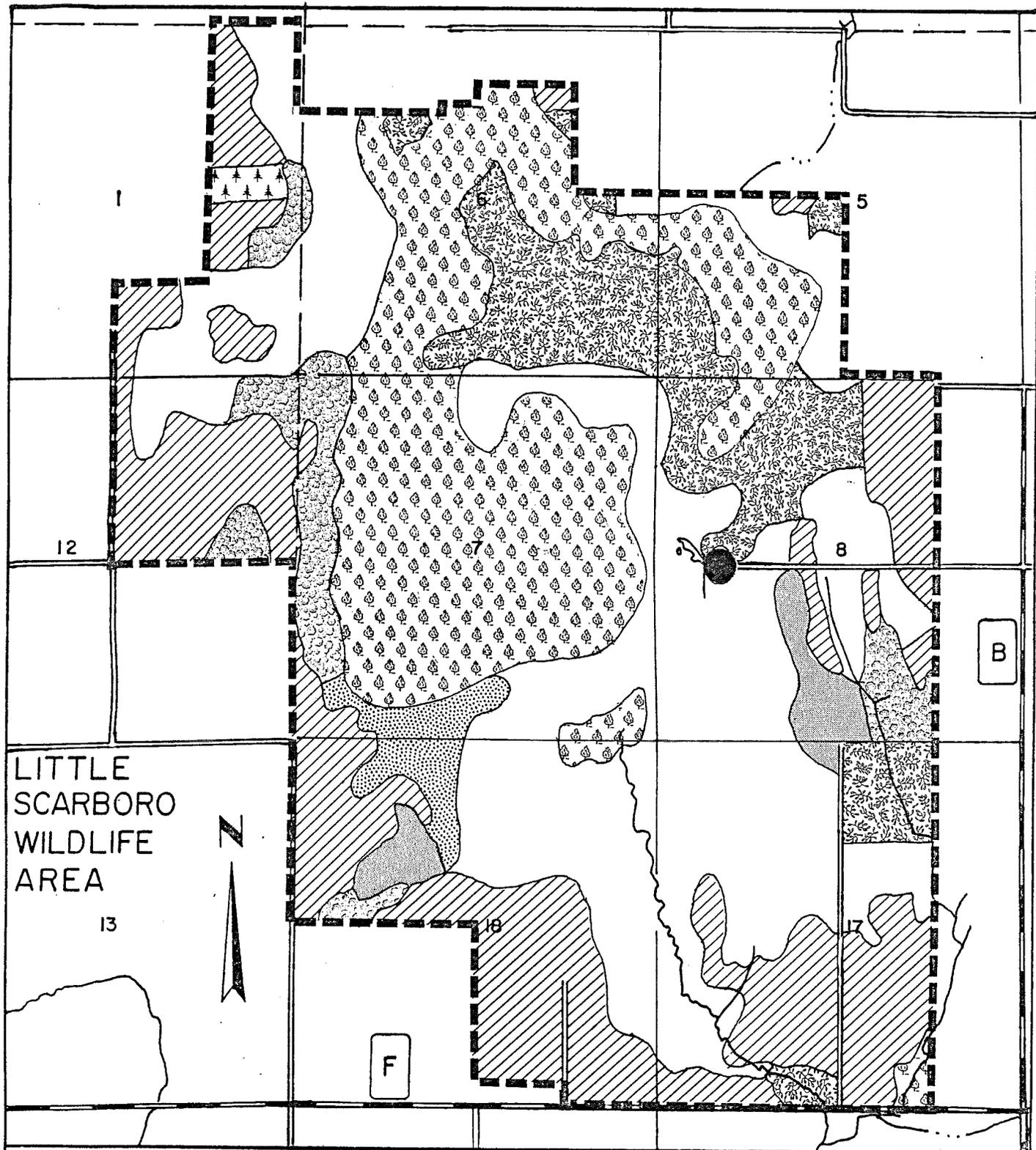
Lowland brush, both willow and alder, occupy approximately 12% of the property, most occurring in the two Little Scarboro Units. The cover type is generally dense, often impenetrable with heights of 15 to 30 feet.

Grassland, both commercial and noncommercial lowland types, and emergent vegetation cover 15% of the property. Most is found in the Kewaunee River is the only area producing significant numbers of waterfowl and offering hunting opportunities. However, current production remains low.

No endangered or threatened plants are known to exist on the property. If any are discovered, action will be taken to protect areas of inhabitance.

Agricultural lands and fallow areas occupy 29% of the property; only about 10% of the cropland is considered prime. Land adjacent to the Kewaunee River is often farmed or grazed to the water's edge resulting in increased nutrient and erosion problems. This area should be fenced and allowed to return to natural grass or shrub type cover. This would protect the streambank and enhance water quality.

State land in the Little Scarboro Fisheries Unit is sharecropped on some of the upland areas and managed to establish grassland communities or tree and shrub areas. This type of management provides an excellent buffer for the stream areas, increases wildlife habitat, and enhances hunting opportunities.



LITTLE
SCARBORO
WILDLIFE
AREA

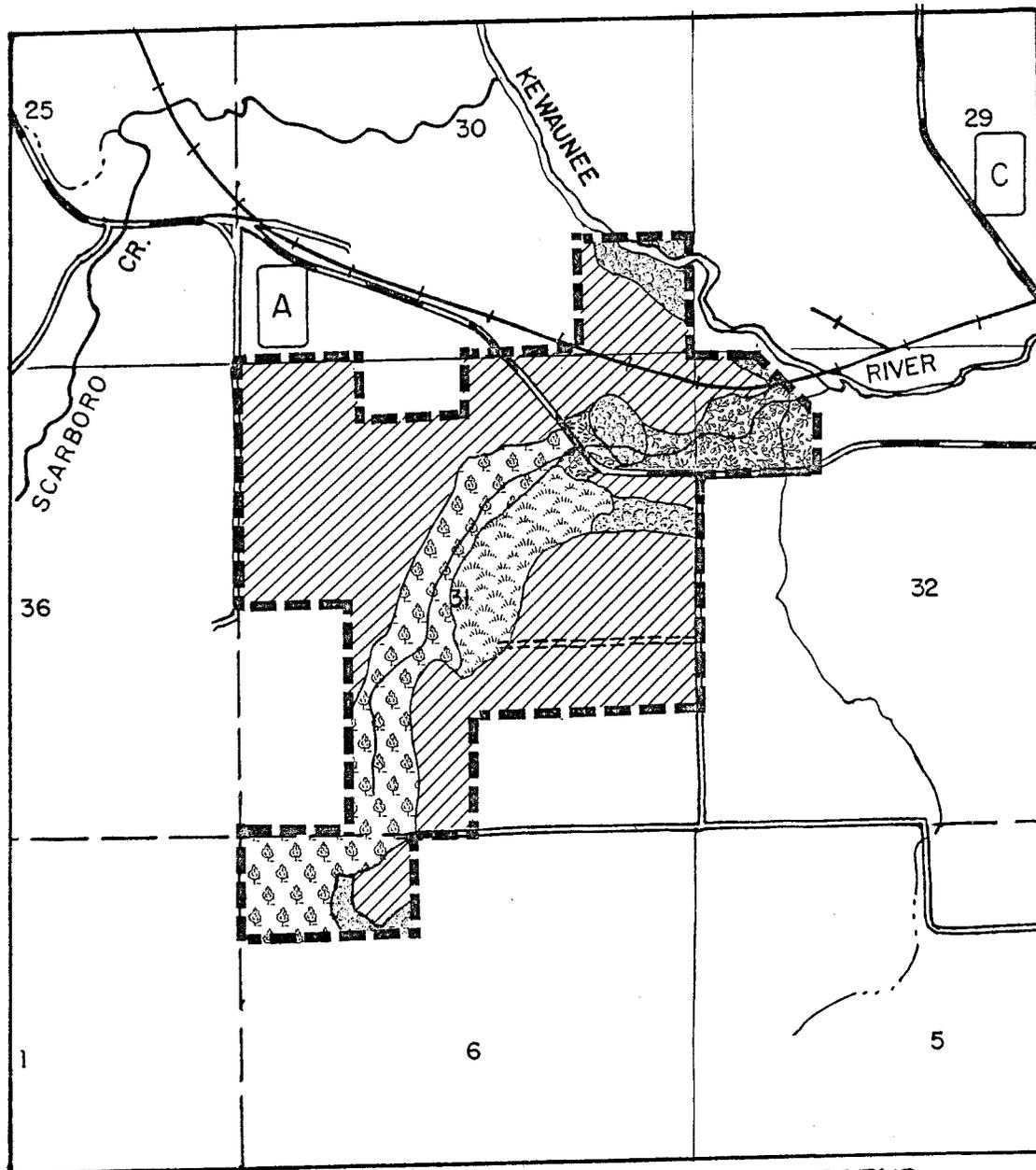
LEGEND

- | | | | | | | | |
|---|----------------------|---|-------|---|-------------|---|--|
|  | PROPERTY BOUNDARY |  | CEDAR |  | HARDWOOD |  | FARMLAND |
|  | LOWLAND BRUSH WILLOW |  | ASPEN |  | WHITE BIRCH |  | PINE |
|  | PARKING AREA | | | | |  | LOWLAND BRUSH
(WITH OTHER COMPONENTS) |

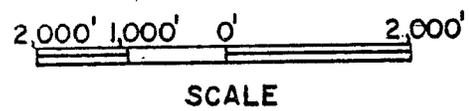
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SCALE

FIGURE 8



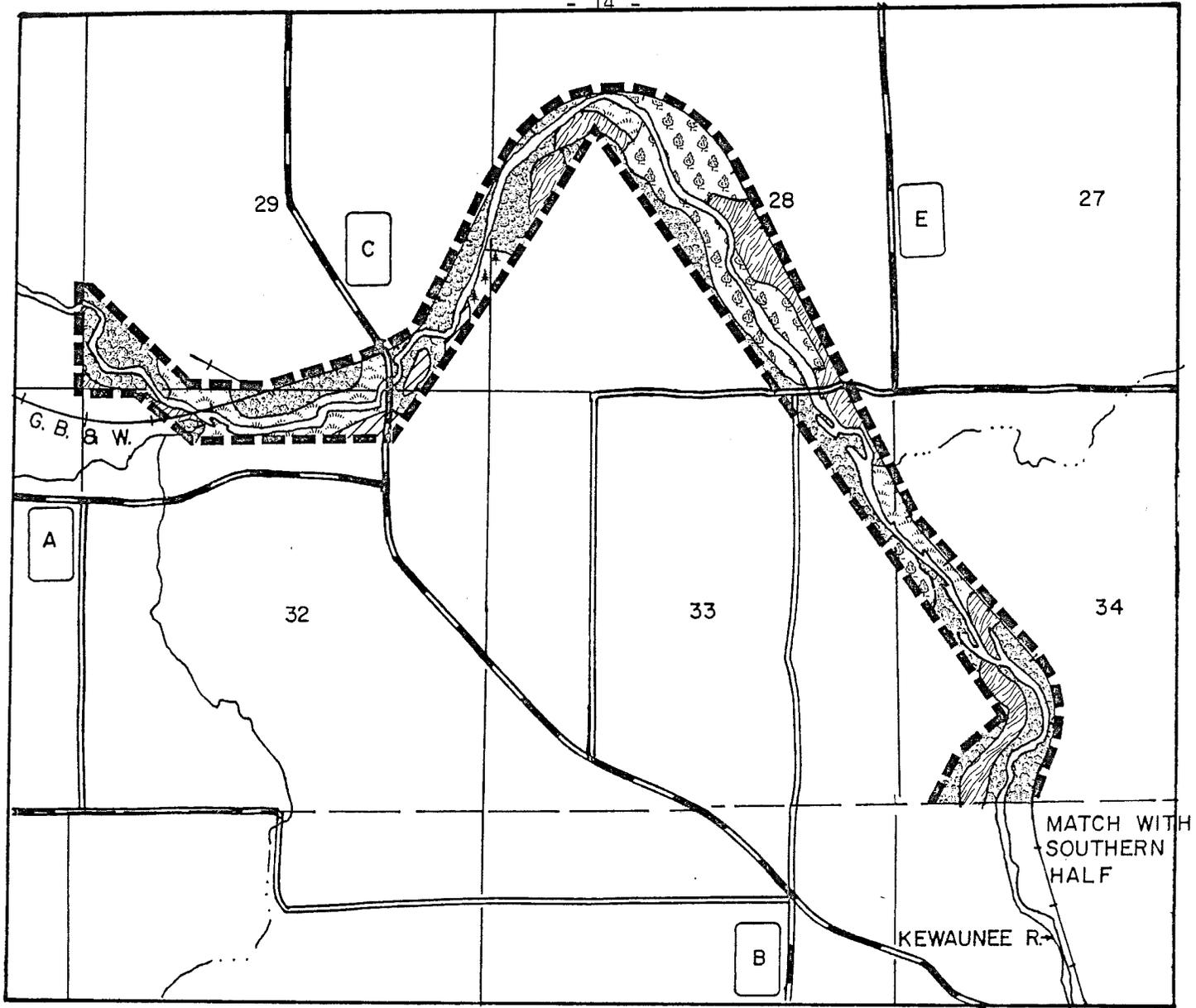
LITTLE SCARBORO FISHERY AREA



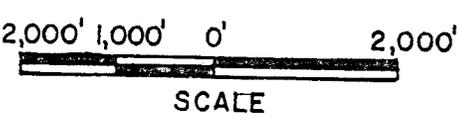
LEGEND

-  PROPERTY BOUNDARY
-  CEDAR
-  FARMLAND
-  LOWLAND BRUSH WILLOW
-  GRASSLAND
-  HARDWOOD

FIGURE 9



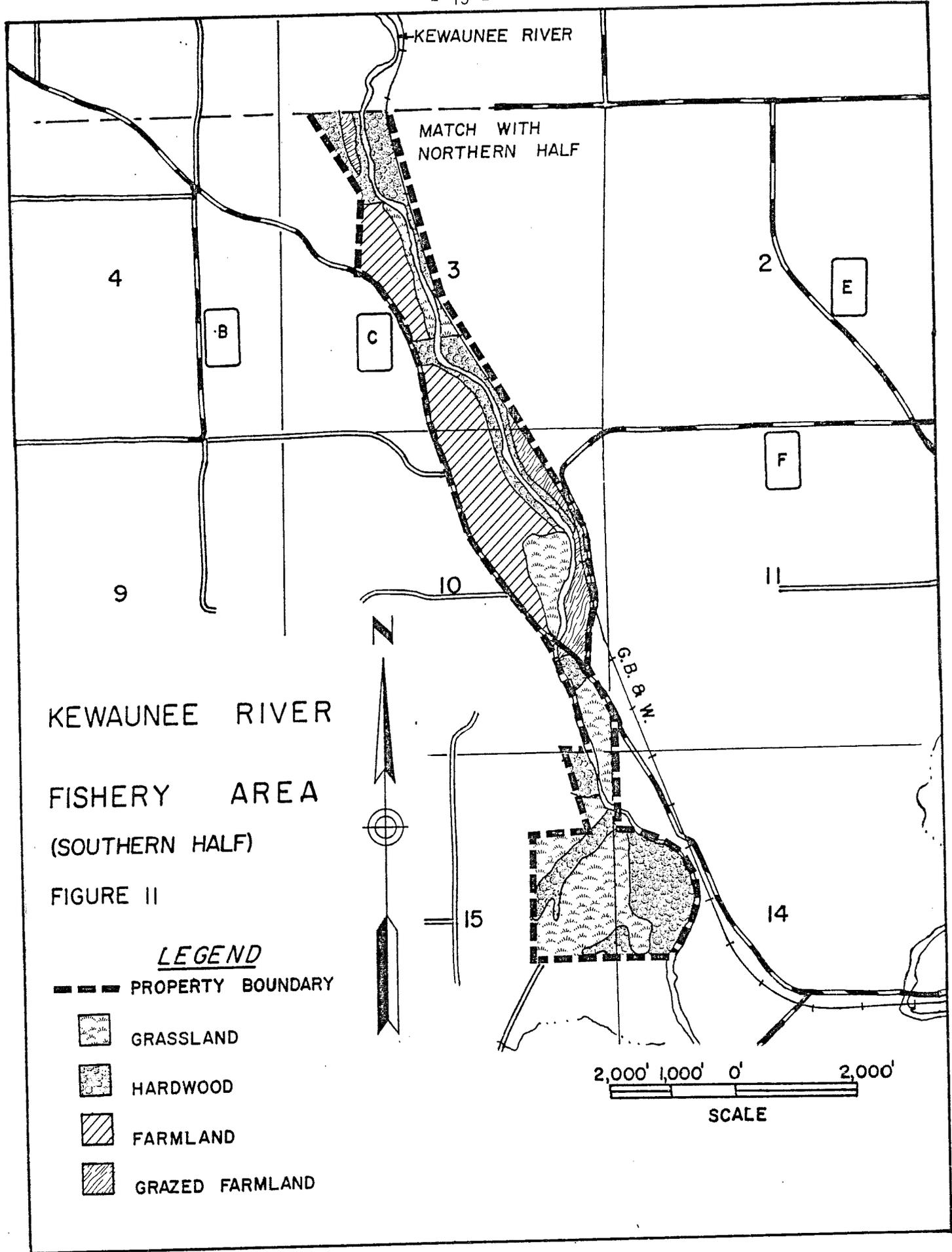
KEWAUNEE RIVER
FISHERY AREA
(NORTHERN HALF)



LEGEND

-  PROPERTY BOUNDARY
-  CEDAR
-  FARMLAND
-  GRAZED FARMLAND
-  HARDWOOD
-  PINE
-  GRASSLAND

FIGURE 10



KEWAUNEE RIVER

FISHERY AREA

(SOUTHERN HALF)

FIGURE II

LEGEND

--- PROPERTY BOUNDARY

GRASSLAND

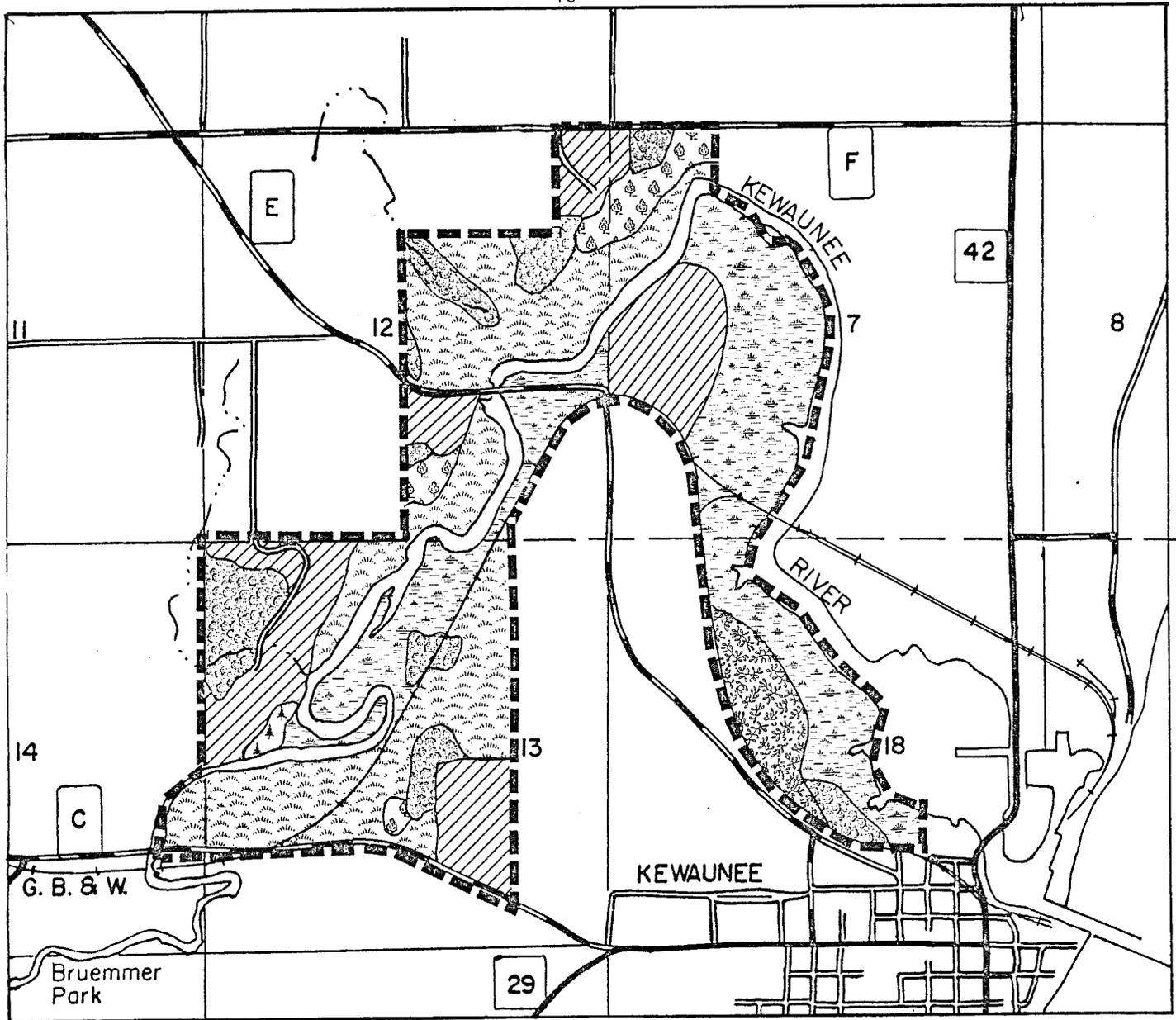
HARDWOOD

FARMLAND

GRAZED FARMLAND

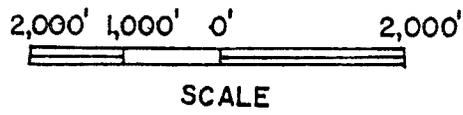
2,000' 1,000' 0' 2,000'

SCALE



LEGEND

-  PROPERTY BOUNDARY
-  HARDWOOD
-  LOWLAND BRUSH WILLOW
-  PINE
-  FARMLAND
-  MARSH
-  GRASSLAND
-  CEDAR



KEWAUNEE WILDLIFE AREA
 FIGURE 12

Table 2 - Vegetative Cover

Cover Types	Kewaunee W.A.	Kewaunee River F. A.	Lt. Scarboro F.A.	Lt. Scarboro W.A.	%	Total
White Pine	10	--	--	7	1	17
Cedar	35	69	90	737	17	931
Red Pine	--	18	--	7	1	25
White Spruce	--	--	--	6	1	6
Hemlock	18	--	--		1	18
Tamarack	--	--	--	309	5	309
Northern Hardwoods	74	25	15	55	3	169
Swamp Hardwoods	43	215	25	463	14	746
Bottomland Hardwoods	--	20	--	--	1	20
Aspen	--	--	--	64	1	64
White Birch	--	--	--	52	1	52
Lowland Brush (10% prime)	44		52	556	12	652
Farmland	170	228	331	810	29	1539
Grass	100	55	48	--	4	203
Lowland Grass	126	97	--	--	5	223
Emergent Vegetation	251	--	--	--	6	251
<hr/>						
Totals	871	727	561	3066		5225

Water Resources

The Kewaunee River is a low gradient stream (6.4 feet/mile) which drains 139 square miles. It has a pH of 8.1 and total alkalinity of 291. It flows nearly across the entire base of the Door County peninsula. The river is 21.9 miles long, fertile, generally turbid, and yet has gravel in the upstream area. The fishery consists of trout from the mouth of Casco Creek downstream to County Highway C. The remaining section of stream supports many forage and rough fish species and others mentioned in the fish and wildlife section of this master plan. Stream access is possible at numerous road crossings, although, only about the last three miles of stream are traversible by canoe during low flow. It does provide canoeists a fine float during April-May. Approximately 460 acres of wetland border the Kewaunee River, mostly near the mouth, which is influenced by Lake Michigan water levels.

Little Scarboro Creek is a short, spring fed tributary stream to the Kewaunee River. It is approximately 1.5 miles long and has a fairly steep gradient (43 feet per mile). It has a pH of 7.9 and a total alkalinity of 243. The water is clear and the substrate is sand and gravel. Access is possible from County Highway A and the state land adjoining the stream. The entire stream is Class I brook trout water. Portions of the creek have had stream improvements to benefit trout habitat.

Krok Creek is a shallow stream 10.6 miles long with a gradient of 14.2 feet per mile. It has a pH of 7.8 and a total alkalinity of 275. The headwaters originate in the Little Scarboro Wildlife Unit as two intermittent streams. They join and flow southward into the East Twin River. Over 7.5 miles of the stream support brook and rainbow trout with 1.25 miles exhibiting natural reproduction (W.C.D., 1966). Access is available at numerous road crossings. The stream is bordered in its headwater area and various other places by cedar lowlands. It is stocked annually.

Historical and Archaeological Features:

One archaeological feature has been identified. This area contains a cache of lithic (stone) tools which will be protected and preserved. As for the rest of the property, no systematic survey for historical and archaeological materials has been conducted. However, available information does indicate that in this part of Wisconsin it is highly probable other prehistoric archaeological materials may be present. Until a detailed study is completed, the possibility of findings will be considered in all aspects of management. The State Historical Society (Historic Preservation Officer) will be contacted before scheduling any developments.

Land Use Potential:

The uniform classification land use which will allow maximum additional opportunities for resource protection and management is Fish and Wildlife Development Area (RD 2). This has been designated for all the land within the property boundaries. The property has no unique or unusual features to warrant a special land use classification. The property will receive protection under the auspices of state ownership and yet will allow development enhancing the value of the area for fish and wildlife based recreation.

One archaeological site (HA) has been designated within the wildlife area. Because of the fragile nature of this type of finding, the location will not be given in order to adequately protect the site. Other sites which may be discovered in the future will be considered in the same manner. Unless the sites are of major significance, they will be protected but not specifically identified.

Currently, only one major public boat access facility (Capacity: 150-200 cars and trailers) serves the navigable portion of the Keweenaw River (the lower three miles) and Lake Michigan. This access handles all boat sizes. Another public boat access is available in the Keweenaw Wildlife Unit (Figure 5). This site is designed to handle only car top boats, skiffs, and canoes. It will remain a limited access site unless a need to improve it develops. Canoes may be launched at various road crossings but portions of the Keweenaw River upstream from Bremmer Park are navigable only during high water in spring. No new boat access sites have been identified for the property. Available sites are adequate to handle most future needs.

Closed areas and refuges for either fish or wildlife programs are not a part of current management strategies. There are no plans to implement such restrictive zones in the future management of the property. But, if a need should develop to protect the resources or regulate their use, closed areas, refuges and no entry zones could be utilized.

MANAGEMENT PROBLEMS

Private development encroachment is a threat to land adjacent to the Keweenaw River. Movement of people from the cities and towns out into the metropolitan fringe is increasing each year. It's not as serious a threat in Keweenaw County as in other areas but as the population expands, pressure on wetlands and adjacent uplands increases both economically and ecologically. Presently 8% of the Keweenaw watershed is in the floodplain with 17% of that used for wetland wildlife. Added to the actual developments are the concurrent shoreline alterations and wetland despoilation that further reduce wildlife habitat.

Poor wildlife habitat is a major problem on much of the land in the property. This is partially a result of cultivation and agricultural practices. As more land is acquired by the state, the land will be planted with trees, shrubs and other plants which will supply basic habitat needs for wildlife. Also, management practices will be implemented to improve surface runoff, erosion and nutrient input to benefit water quality in the Keweenaw River and associated wildlife and fish resources.

The water quality of the lower third of the Keweenaw River is considered good and steadily improves upstream to where Little Scarboro and Casco Creeks enter. Much of this upstream area is considered trout water. Further upstream, the Keweenaw River receives much nutrient and sediment loading which deteriorates water quality. This results from streambank grazing, cultivation, farm runoff, three sewage treatment plants, and numerous private sewage disposal systems. Flood water is also a major concern within the area. Poor land management techniques contribute to excessive surface runoff affecting crops, property, and wildlife and fish resources.

Public overuse often occurs on state land in the property. In the Keweenaw Wildlife Area, the streambank is fairly denuded of vegetation from trampling by fishermen during the salmon snagging season. The streambank usually takes until the end of the following summer to recover. In addition to the trampling problem is over-crowding which leads to littering and low quality fishing experiences. Over-crowding also occurs during the pheasant and deer seasons. A constant monitoring of the property is necessary to insure protection of the resources, public safety, and quality outdoor experiences.

Private inholdings may disrupt the continuity of the property and create management problems relating to access right of way, complaints on hunting, trespass, fire, conflicting land use, fencing, and animal damage. This may result in special management policies. The inholdings usually occur as single units and will be considered in all aspects of property management.

Difficulties in law enforcement have resulted in the past with respect to hunting and fishing violations, littering, vandalism, and unauthorized use of motor vehicles. Public misuse and enforcement problems should decrease through public education and awareness efforts and increased patrolling efforts.

Conflicting uses of state land have developed since the salmon snagging season began in 1972. Each fall the snagging season coincides with pheasant hunting season which results in hunter-fishermen confrontations and safety problems. The problem has been temporarily resolved by not stocking pheasants in areas used for fishing until fishing pressure diminishes. However, the problem should be given more consideration in future management.

RECREATION NEEDS AND JUSTIFICATIONS

Wetland and stream bank protection is paramount for the Kewaunee River watershed as it is for many areas of Wisconsin. The watershed is characterized by gently undulating to steep slopes located on soils with erosion problems. Approximately 92% of the watershed consists of upland with the remaining 8% located in the floodplain. Most of the Kewaunee Wildlife Area is located in this 8%. The wetlands, streambanks and floodplain land when left in a natural vegetated state reduce flooding problems, erosion, and nutrient input. Thus, through completion of the property and proper management techniques; cropland, private property, and fish and wildlife habitat will be benefitted.

Habitat preservation is an important aspect of the property. As land becomes more and more valuable for residential, industrial and agricultural uses, wildlife habitat is lost. Agricultural use is the main problem in the Kewaunee area today. Grazing and farming of streambanks and erosion prone areas, causes many water quality problems as well as reduces habitat areas. Properly managed, the property will protect approximately 10 miles of streambank, promoting natural vegetation. Techniques to reclaim habitat areas will be employed as time and funding permit.

With increased development of natural areas and agricultural land statewide as well as in Kewaunee County, and continued posting of private lands, hunting pressure on public land will increase over the next decade. The current population of Kewaunee County is approximately 20,200 people and is expected to increase to 22,260 (2.8%) by 1990 (W.D.N.R., 1977a). Hunting pressure will also increase on all land available for hunting.

The areas available for hunting in Kewaunee County appear sufficient to provide hunting opportunities for most local residents. However, located within 50 miles of the property are the cities of Green Bay, Manitowoc, Sheboygan and Appleton, amounting to approximately 350,000 people, and many of these people will also make use of the area. Many destructive land use practices have greatly reduced game production capability and living space. The Kewaunee Fish and Wildlife Area will provide some additional hunting space and supportive habitat.

The inland water resources suitable for fishing are minimal in the Kewaunee area. Only 1% of the state's fishing waters are located in the area. The area's rivers, several lakes, and Lake Michigan suffer from various degrees of pollution. The rivers appear to be recovering their usefulness as a recreational resource and the inland lakes holding their own. Improved land use practices are needed to further increase water quality to support better fishing, especially in the lower 18 miles of the Kewaunee River. This will occur for the lower 10 miles of stream under the proposed property.

The lake trout and salmon fishery has been one of the most successful stocking programs gaining national recognition. The Kewaunee River is currently utilized as an access to Lake Michigan and as an imprint area for salmon release. This accounts for the tremendous fishing use the river receives. Current use is expected to at least remain the same and more state land would enhance the fishing experience.

Nonhunting, trapping and fishing activities will also be in greater demand in the future. Activities such as boating, canoeing, cross-country skiing, snowmobiling, and outdoor or nature study are compatible with property use. Many activities and future use can be accommodated by a corridor type trail system. This will allow the property to be used to the maximum level.

ANALYSIS OF ALTERNATIVES

Enlarge the Fish and Wildlife Area

Enlargement of property boundaries to enhance goals and objectives could be carried out in the upstream area of the Kewaunee River. An expansion would protect more streambank and allow for more habitat areas. However, the contribution of the additional land would not significantly add to the property to offset the additional costs of acquisition and relocation. Expansion of the property boundaries around other areas now delineated would provide a land buffer and would impact adjacent farmland. This would remove more agricultural land from production and not materially contribute to the accomplishment of additional objectives.

Inclusion of major development activities such as trail designation, water impoundments, and parking facilities might well lead to overuse of the property. Current personnel staffing is insufficient to adequately care for such developments and adding personnel is unlikely.

Reduce the Fish and Wildlife Area:

The property boundaries now identify land necessary for the protection of wetlands, streambanks and adjacent uplands of the fish and wildlife area. Any reduction would seriously jeopardize the property's ability to achieve optimum goals and objectives and result in a continued loss of habitat and recreational areas.

If the acquisition was not completed beyond the present stage and the existing level of maintenance continued, the fish and wildlife area units would still provide limited outdoor recreation experiences. However, the limited state ownership does not provide adequate protection of habitat components critical for adequate population levels of fish and wildlife. While public hunting and fishing could be provided without additional state ownership by utilizing leases, habitat deterioration would likely occur and have negative impact on water quality, the trout and salmon fishery, and reduce the amount of deer and small game habitat.

Maintain the Status Quo:

Maintaining the current level of management means no change in land acquisition boundaries or acreage goals and minimal development. Habitat protection is emphasized and enhancement is implemented where environmental discrepancies occur. The proposed goal and objectives with needed management activities are presented in Section I.

APPENDIX A
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