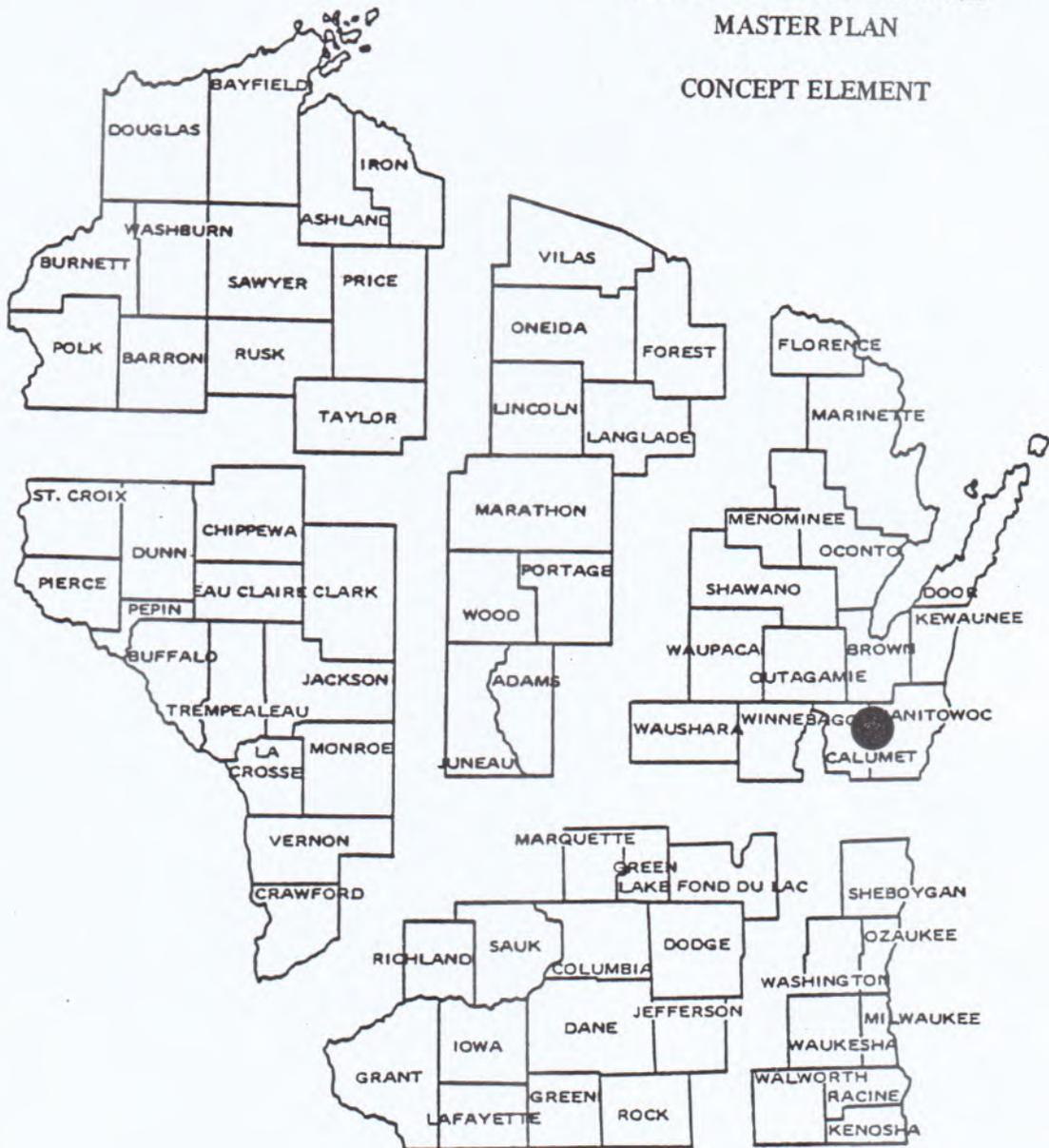


KILLSNAKE WILDLIFE AREA
 MASTER PLAN
 CONCEPT ELEMENT



Property Task Force

Approved By: Natural Resources Board

Leader: DAVE EVENSON, PROPERTY MANAGER
 GARY JOLIN, AREA WILDLIFE MANAGER
 DON THOMPSON, FORESTER
 LEE MEYERS, FISH MANAGER

Date: January 27, 1982

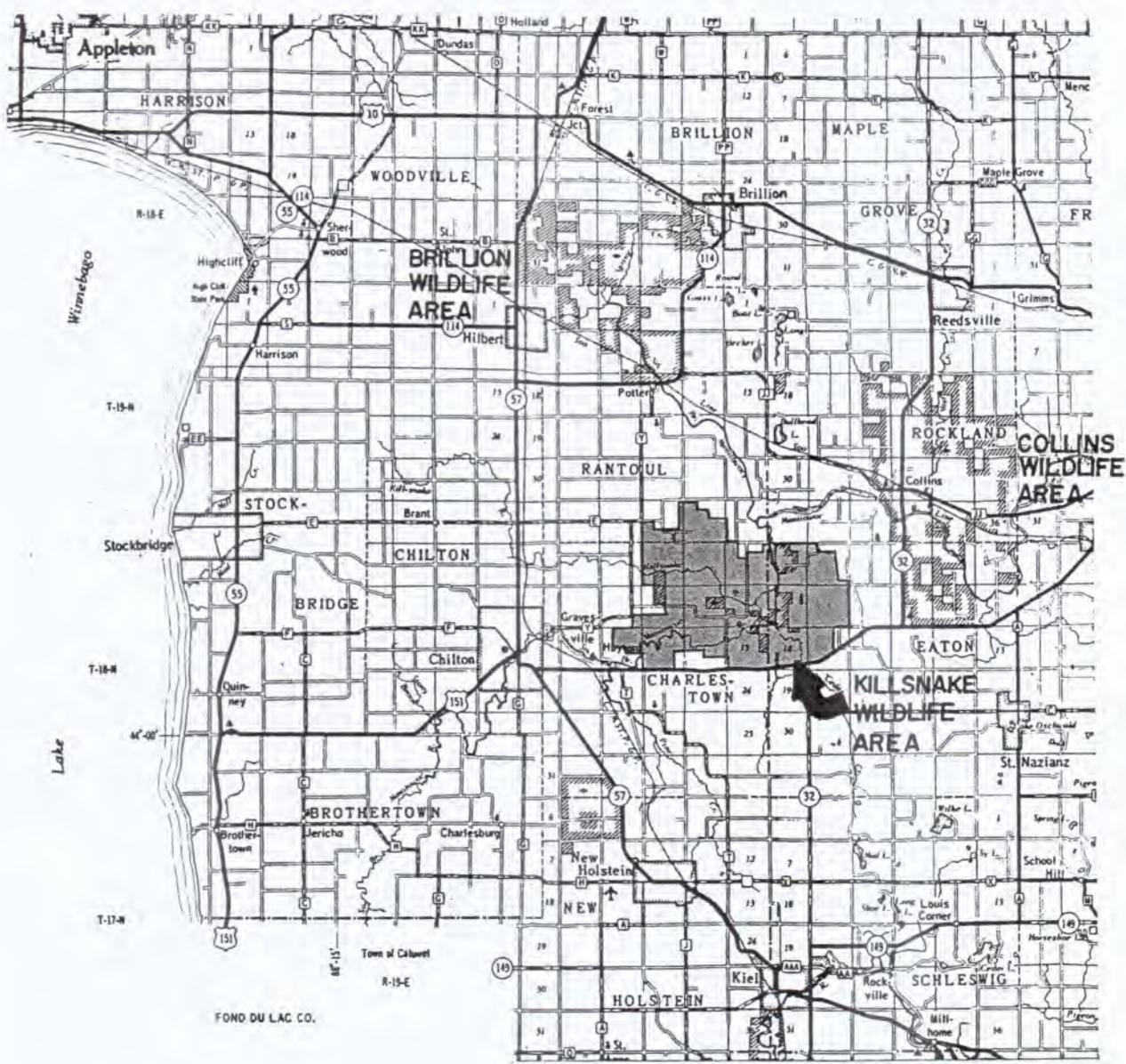
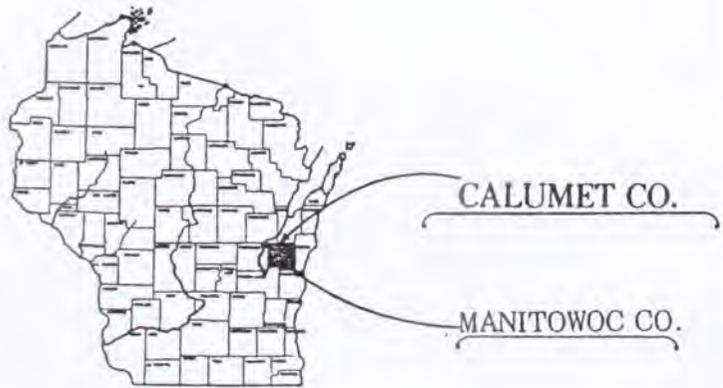


FIGURE 1 LOCATOR

LEGEND

<ul style="list-style-type: none"> Portland Cement Blank Concrete Bituminous Gravel Earth Town Road Fee Lane Multilane Divided Freeway Interchange Highway Separation Interstate Highway No. U.S. Highway No. State Highway No. County Hwy. Letter 	<ul style="list-style-type: none"> Recessed Down State Boundary County Boundary Civil Town Boundary Corporate Limits Met & State Forest Resort Fish Hatchery Zoo County Seat Unincorporated Village School Public Boat or Fish Club Hospital 	<ul style="list-style-type: none"> Linked Tower Reaper Station Public Camp & Picnic Site State Park State Park County Park Reserve
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GOAL, OBJECTIVES AND ADDITIONAL BENEFITS

To manage a state-owned wildlife area for the production of waterfowl and to provide public hunting, trapping, fishing and compatible non-hunting recreational and educational opportunities.

Annual Objectives:

1. Produce an average of 4 ducks per acre on 50 acres of water (200 ducks) and provide 400 participant days of duck hunting opportunity each year through 1989.
2. Produce an average of one duck per acre on 2,500 acres of water (2,500 ducks) and provide 4,000 participant days of duck hunting each year beyond 1989.
3. Increase the average use by local and migrant waterfowl during the month of October from:
 - a. About 400 to 5,000 ducks (at peak levels)
 - b. About 100 to 5,000-10,000 geese.
4. Provide 1,000 participant days of pheasant hunting.
5. Protect a minimum of 2 historical sites.

Annual Additional Benefits:

1. Provide about 5,500 participant days of hunting and trapping opportunities as follows:
 - a. Deer - 3,000
 - b. Rabbits and squirrels - 1,000
 - c. Trapping - 500
2. Provide 400 angler days of fishing.
3. Accommodate 10,000 participant days of compatible, educational, and non-hunting recreation.
4. Benefit nongame species indigenous and transient to the region.

RECOMMENDED MANAGEMENT AND DEVELOPMENT PROGRAM

Property Development:

Because current state ownership is limited to only 34% of the total ownership goal, most development activities will be delayed until such time as adequate ownership patterns occur. A significant portion of these activities are dependent upon flowage construction which may not be constructed until well beyond the target year (1989). Additional environmental concerns will be addressed in conjunction with future engineering surveys by a separate Environmental Impact Assessment Worksheet prior to initiating flowage development projects.

A flowage of 1,610 acres is proposed on the Killsnake River west of Lemke Road (Figure 2). This would be accomplished through the construction of a 4,500-foot dike between two upland peninsulas, holding a head of 6 feet or less. This flowage would have these water depths: 0-2 feet - 620 acres, 2-4 feet - 515 acres, 4-6 feet - 475 acres.

A second dike 2,300 feet long would impound 940 acres on the south branch of the Manitowoc River west of Lemke Road. Water depths would be as follows: 0-2 feet - 320 acres, 2-4 feet - 510 acres, 4-5 feet - 110 acres. Essentially the same acreage could be flowed by raising and/or slightly relocating 2.5 miles of Aebischer and Lemke Roads, using the roads for dikes.

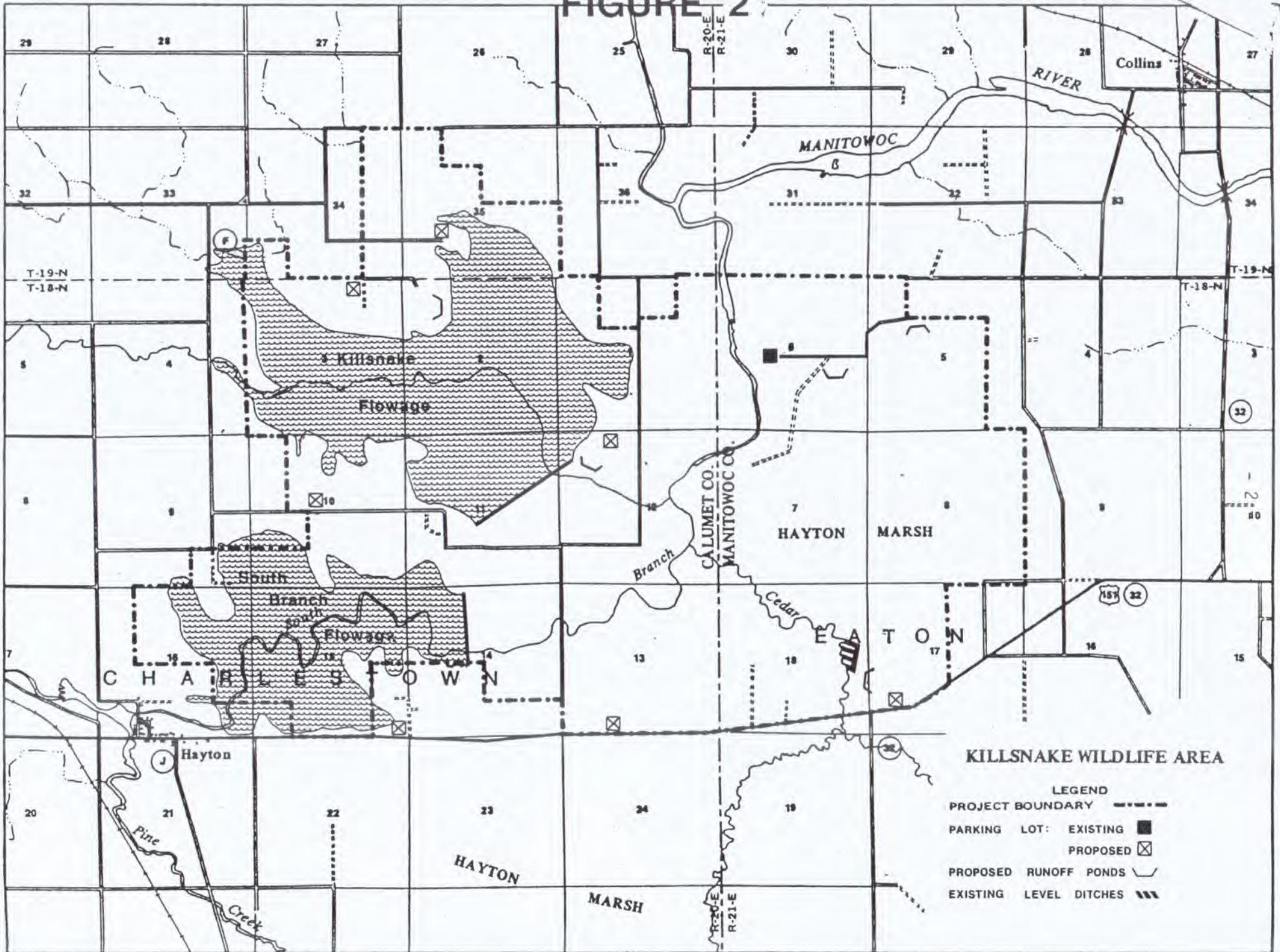
In addition to contributing significantly to state duck production and hunting objectives, the Killsnake Wildlife Area has been identified in Wisconsin's recently adopted Canada goose management plan as a strategic property for accommodating 175,000 Canada geese in east central Wisconsin by 1990.

To achieve the goose management objective, a closed area will be established incorporating part of one of the above flowages as well as adjacent upland. In order to keep as much land as possible open for public hunting, the closed area should be only as large as needed to accomplish the objective, probably about 1,000 acres. Various hunter control techniques may be used including blind or stake spacing, shell limits or physically difficult terrain from which to hunt consistent with the Wisconsin goose management plan. Such design will be incorporated immediately upon designation of the closed area.

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FIGURE 2



KILLSNAKE WILDLIFE AREA

- LEGEND**
- PROJECT BOUNDARY
 - PARKING LOT: EXISTING
 - PROPOSED X
 - PROPOSED RUNOFF PONDS
 - EXISTING LEVEL DITCHES

The objective of producing ducks will require substantial effort to be made on the uplands, as well as within the flowage and unflowed lowlands. Current knowledge would indicate a need for 1,500+ acres of tall, dense, undisturbed nesting cover, as well as intensive lowland projects, possibly including nesting islands and nesting structures. The flowages, together with spring flooding and the river channels below the flowages, will provide breeding pair territories and brood requirements. Six to ten upland runoff ponds will supplement breeding pair territories and may provide brood cover.

Other upland development will include management for small game species, such as food patches and hedgerow plantings. Goose browse and food plantings will be provided. About 10 parking lots will be developed as the need arises. Shallow draft boat access will be available at three of these parking lots.

Due to the scattered state ownership of tracts, physical inaccessibility, and type of forest stands, there is very little forest management opportunity on the property. In the future, as ownership increases, forested tracts will be managed under sound forestry practices with wildlife considerations. Swamp conifer stands at present are of more value for wildlife cover than for forest products. While most of the swamp hardwoods are of low quality, some improvement may be forthcoming.

Plant and animal inventories will be completed in advance of any flowage development. This will probably be accomplished in conjunction with environmental impact assessment projects.

Land Control:

Based upon the best data available, it is the Department's opinion that the tailwaters of both planned flowages would extend beyond the current boundary and require a boundary and acreage goal adjustment. Further, poor quality habitat located on the east boundary has been evaluated and found to be unnecessary for achieving proposed objectives. About 25 acres of surplus state-owned land located in the eastern area will be sold or traded.

Current state ownership is 3,208.51 acres. The net effect of the recommended boundary modification is to increase the ownership goal from 9,106.63 to 9,200 acres; an increase of 93.37 acres.

Chronological Order of Development:

Because two-thirds of this property has not been acquired and major development is still some years away, any estimate of dates of development costs in 1981 dollars would be relatively meaningless. A rough estimate places costs at about \$3.4 million. The order of development will be as follows:

- Dense nesting cover (continuing)
- Hedge row, food patch development (continuing outside of prime DNC areas)
- Small pond construction
- Flowage construction
- Parking lot construction

Land acquisition will remain a high priority activity based upon a "willing seller-buyer" procedure. The purchase of improvements will be avoided wherever possible. Costs are estimated at about \$5 million.

SECTION II - SUPPORT DATA

BACKGROUND INFORMATION

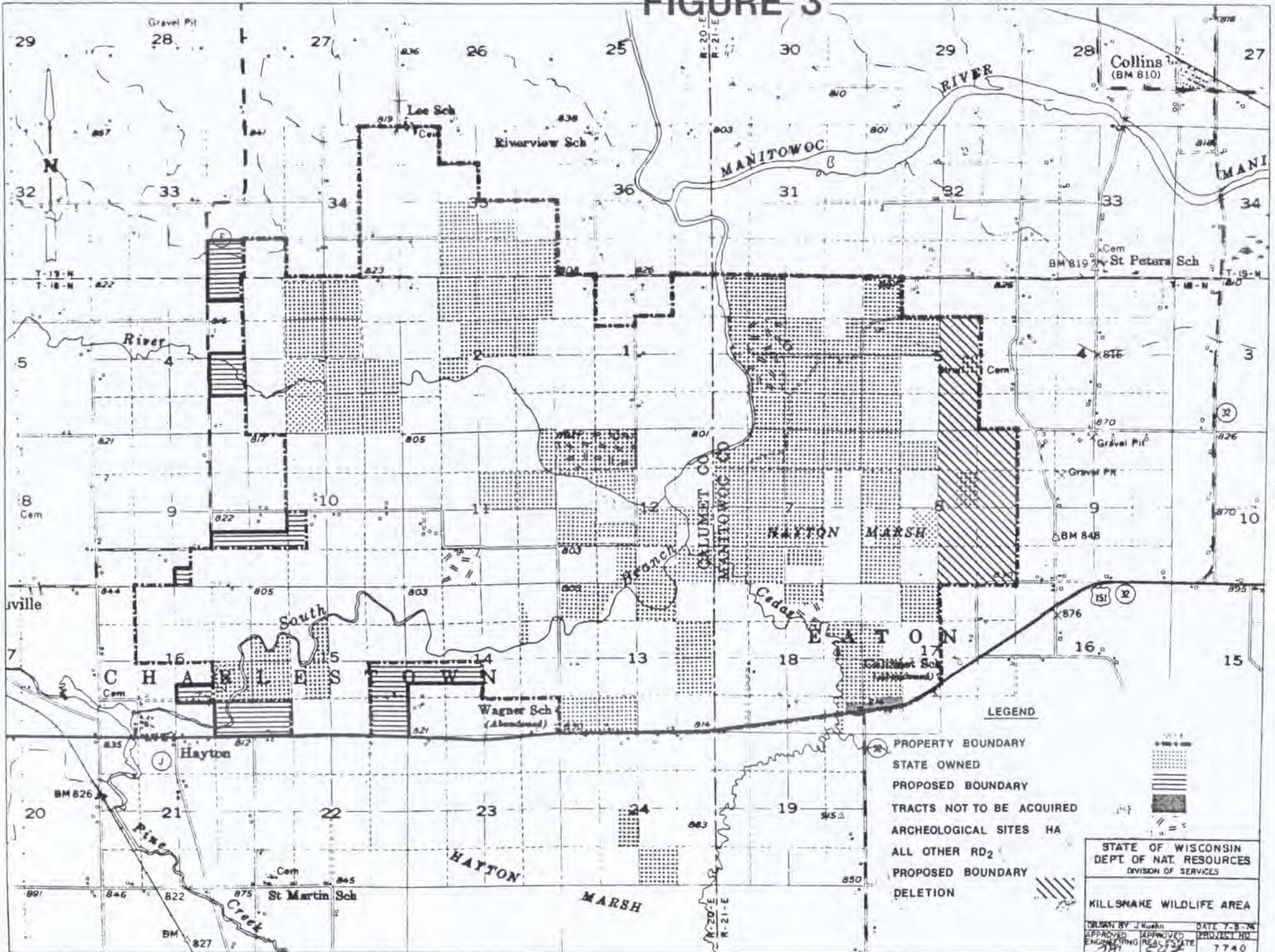
Physical Setting:

This wildlife area is located in Calumet and Manitowoc Counties in east central Wisconsin, equidistant from Lake Michigan and Lake Winnebago. The property lies 4 miles south of the Brillion Wildlife Area (5,306 acres) and 3 miles southwest of the Collins Wildlife Area (4,350 acres). Upon completion of development, the 3 properties will complement one another. The Killsnake property includes the confluence of the Killsnake River, the South Branch of the Manitowoc River and Cedar Creek. Uplands are gently rolling fertile clay loams; lowlands consist of peat and muck soils.

Historical:

Before the arrival of white men, lowland vegetation was primarily swamp conifer with a large stand of cedar in the Cedar Creek area and a large tamarack-cedar swamp was located in the northwest portion of the existing wildlife area. In about 1880, most of the wooded portion burned out, with the resulting loss of much of the conifer. Indian use of the area for hunting and fishing continued quite late, with the last remnant of the Bark House Clan using the lowland forest until about the turn of the century.

FIGURE 3



- LEGEND**
- PROPERTY BOUNDARY
 - STATE OWNED
 - ▨ PROPOSED BOUNDARY
 - ▩ TRACTS NOT TO BE ACQUIRED
 - HA ARCHEOLOGICAL SITES
 - RD₂ ALL OTHER
 - ▨ PROPOSED BOUNDARY
 - ▩ DELETION

STATE OF WISCONSIN
DEPT OF NAT. RESOURCES
DIVISION OF SERVICES

KILLSNAKE WILDLIFE AREA

DESIGNED BY J. Kuehn	DATE 7-8-84
APPROVED ENGINEERING REAL ESTATE	PROJECT NO. 7740

In 1948, the Killsnake Bottoms and Cedar Creek area, which occupied about 4,500 acres within the present boundary, were set up as leased areas. Originally conceived as a goose satellite area, the Wisconsin Conservation Commission approved an acquisition goal of 1,738.26 acres in Manitowoc County on April 1, 1955. This unit was also approved by the Eaton Town Board on March 29, 1955 and by the U.S. Department of Interior for Federal Aid on July 12, 1955.

The first land was purchased in March, 1956. Excellent support for this property establishment was received from the Manitowoc County Fish and Game Protective Association and the Manitowoc Chapter of the Isaac Walton League. In the mid- sixties, it became apparent that a more viable property could be formed by increasing the size substantially into Calumet County. In 1969, a revised acreage goal of 9,106.63 was approved and remains as the goal up to the time of this master plan.

Current Management Activities:

No major development has yet been undertaken at Killsnake Wildlife Area. Management efforts include the sale and demolition of farm buildings as acquisition proceeds. About 300 acres of uplands are sharecropped with emphasis upon conversion to dense nesting cover and food plots. About 100 acres of canary grass marsh hay are sold each year. A fur farm which was acquired includes 2,600 feet of level ditch which provides a brood area for waterfowl (especially wood ducks) and good habitat for muskrats and other furbearers. Approximately 300 wood ducks and mallards are banded each summer. About 280 rooster pheasants from the Poynette Game Farm are released annually for put and take hunting.

The Killsnake wildlife area is used primarily by hunters at the present time. An estimated 2,900 hunting and trapping visitations are made to the area each year. These include 2,000 hunter days for deer (gun and bow) 400 days for pheasants, 400 days for ducks, 200 participant days for small game and 160 trapper visitations.

An estimated 1,800 participant trips are made to Killsnake Marsh for other recreational and educational uses. This includes trips made for fishing, nature study, bird watching, berry and mushroom picking, and canoeing.

RESOURCE CAPABILITIES

Soils and Geology:

The soil types most prevalent in the marsh are Seelyville and Suamico mucks (formerly Houghton and Carbondale). These are poorly drained peat soils which flood seasonally and typically have a water table less than a foot below the surface during the remainder of the year. Soil borings show that most of these peat soils are 4-5 feet deep, overlying gray clay.

Surrounding the marsh are gently rolling uplands with a maximum elevation difference from marsh to the highest point on the area of 60 feet. The most common soils on the uplands are Kewaunee loam, a well drained clayey soil over clayey glacial till, and Manawa silt loam, which is a somewhat poorly drained clayey soil. These soils are well suited to agriculture.

Fish and Wildlife:

A stream shocker survey of the Killsnake and south branch of the Manitowoc Rivers in August of 1977 showed carp and black bullheads to be the most common species. Also present in lesser numbers were northern pike, rock bass, white suckers, as well as fathead minnows, bluntnose minnows, creek chubs and other unidentified forage minnows. Crayfish were common along most of the stream with some snails, mayflies and scuds present. These same species are also common in the south branch of the Manitowoc River and Cedar Creek. According to local sources, Cedar Creek once was a brook trout stream and the Manitowoc River supported larger populations of northern pike than at present.

During spring migrations, the marsh supports waterfowl by the thousands. Common species are mallards, pintails, northern shovelers, redheads, wood ducks, blue-winged teal, black ducks, lesser scaup, wigeon, ringneck ducks, coot, Canada geese and whistling swans. Mud flats during this time are heavily utilized by greater and lesser yellow legs, pectoral sandpipers, semipalmated sandpipers, dunlins, and other shorebirds.

Other birds which utilize the area include pheasant, Hungarian partridge, ruffed grouse, woodcock, common snipe, sandhill cranes, black terns, great blue herons, little green herons, American bitterns and at least 35 species of passerine birds. Raptors are represented by harriers, red tailed hawks, kestrels, rough-legged hawks, screech owls, great horned owls and barred owls.

Reptiles and amphibians found on the property includes snapping turtles, western painted turtles, northern water snakes, eastern garter snakes, spotted salamanders, toads, spring peepers, leopard, and green frogs.

White-tailed deer, cottontail rabbits, fox, flying and gray squirrels, raccoons, skunks, woodchucks, opossum, muskrats, mink and red fox, and small mammals are present in good numbers. Grey fox and coyotes are uncommon on the wildlife area. No endangered or threatened species are known to be found on the property although cormorants (endangered) may use the property in the future. The Office of Endangered and Nongame Species (DNR) will be consulted regarding inventory needs.

Vegetative Cover:

A map of vegetative cover found on the wildlife area is found in Figure 4. No endangered or threatened plant species are known to be found on the property. An intensive survey would be required to determine their presence and relative abundance, especially in areas of proposed development.

Within the property boundary there are 2,819 acres of agricultural uplands; about 2,600 acres are considered prime agricultural land. A majority of these are privately owned, serving as a base for dairy operations and are cropped in corn, oats and alfalfa. Of the 485 upland acres presently owned by the department, 244 are in retired hay fields or native grassland cover with the remainder being sharecropped.

Some 2,505 acres of swamp hardwoods are found on the property. Predominant among the tree species are black ash, red maple, cottonwood, willow and American elm. Understory consists of seedlings of the above as well as willow brush, red osier dogwood, spirea, lowland asters, canary grass, jewel weed and stinging nettles. Almost all of the stands are non-commercial, due to Dutch elm disease as well as pasturing of woods. About 998 acres were once elm dominated swamp hardwoods but now must be classified as lowland brush. The composition of lowland brush is similar to the understory of swamp hardwoods, with willow and red osier dogwood being the dominant types.

Marsh grass, covering 2,180 acres, consists almost entirely of monotypic canary grass, but does include scattered brush or cattail pockets. Marsh hay is made on about 6-700 acres depending on the wetness of the year and the demand for bedding or feed.

Swamp conifers are found on 774 acres, mostly in the eastern portion of the property. This consists primarily of stands of white cedar, with occasional tamaracks. For the most part, there is no understory, but where natural or manmade openings occur there is swamp hardwood reproduction.

VEGETATION

<u>Type</u>	<u>Acreage</u>
Agricultural	2,819 acres
Swamp hardwoods	2,377 acres
Marsh grass	2,221 acres
Lowland brush	992 acres
Swamp conifers	619 acres
Farmsteads, roads, etc.	118 acres
Open water (in rivers)	53 acres
Total	<u>9,199 acres</u>

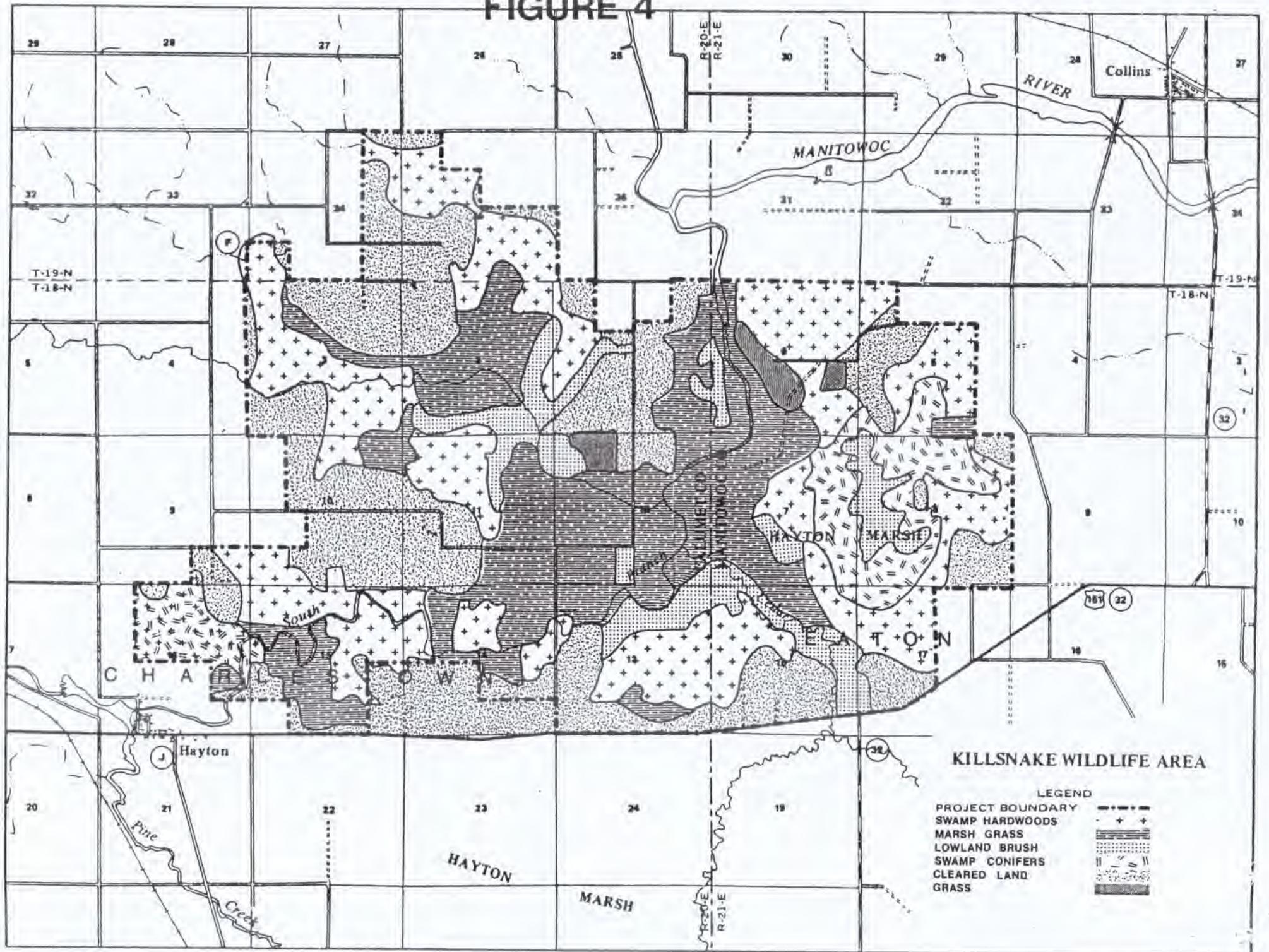
Water Resources:

The confluence of the Killsnake River, the south branch of the Manitowoc River and Cedar Creek occurs in the approximate center of the Killsnake property. Pine Creek flows into the Manitowoc at the southwest corner of the property and three unnamed intermittent streams flow into the northwest corner. The watershed of the Killsnake Wildlife Area is approximately 193 square miles, and drains the south half of Calumet County as well as parts of adjacent Manitowoc, Sheboygan and Fond du Lac Counties. The waters draining into Killsnake Marsh are generally high in nutrients and low in dissolved oxygen.

The Killsnake River is a hard water stream with muck and silt as the most common bottom materials. This river does not receive any municipal or industrial effluents. Runoff from adjoining croplands results in a heavy load of plant nutrients. The shallow state of the river in mid-summer, coupled with vigorous aquatic plant growth of coontail, water milfoil, and pondweeds, cause the river to be nearly closed to even canoe travel in the summer. Summer D.O. levels range from 3-6 mg./liter.

The south branch of the Manitowoc River, which originates in Fond du Lac County, is a hard water river with silt and muck as primary bottom types. Flowing through Chilton, it carries treated effluent from the sewage treatment plant. Runoff from farm fields combined with the effluent make the Manitowoc River rich in organic nutrients. Dissolved oxygen levels of 5-8 mg./l. are found in summer.

FIGURE 4



KILLSNAKE WILDLIFE AREA

- LEGEND
- PROJECT BOUNDARY
 - SWAMP HARDWOODS
 - MARSH GRASS
 - LOWLAND BRUSH
 - SWAMP CONIFERS
 - CLEARED LAND
 - GRASS

Cedar Creek is a small hard water stream which originates at Mud Lake five miles south of the Killsnake Wildlife Area. Bottom types include gravel and silt or muck. This creek runs through a large lowland conifer forest before entering the property, where springs supplement the water flow. Dissolved oxygen levels are low, from 0.2-3.1 mg/l. Its pH is more neutral (7.3) than the other two rivers and its temperature is 2-4 centigrade degrees cooler.

Spring flooding is an annual occurrence in the marsh. Within the property boundary, all but the agricultural land or a total of 7,500 acres can be considered floodplain. The road crossing the open marsh is completely inundated. Portions of the marsh remain flooded or saturated from break up in mid-March until late May. Flood waters are released slowly through a natural restriction at Cato Falls some 12 miles downstream.

Historical and Archaeological Features:

There currently are four archaeological sites lying within the Killsnake Wildlife Area boundaries. One landowner in Section 11, Town of Charlestown, has found over 150 projectile points and 25 stone axes on his land, some dating back 9,000 years. This site will be preserved. A number of arrowheads and spear points have also been found in the N 1/2NW of Section 12 (Charlestown), and in SENW and NESW of Section 6 (Eaton); another site to be protected. An Indian chief was buried in the NENW, Section 12 (Charlestown). His remains and relics have been moved to the Milwaukee Public Museum. A campsite has been located in the S 1/2NWNE of Section 18 (Eaton).

The wildlife area property manager will establish liaison with the Historic Preservation Division of the State Historical Society to establish inventory and protection needs prior to the execution of ground disturbance activities.

Land Use Potential:

The areas described above will be classified as Historical and Archaeological (HA). The bulk of the property is classified as Fish and Wildlife Management Area (RD₂).

The Scientific Areas Preservation Council was contacted in February, 1980 and reported that no present or potential Scientific Areas within the Killsnake boundaries were known. The property manager will coordinate with the council if potential sites are found.

MANAGEMENT PROBLEMS

1. Over-Use - Currently, this property is used heavily by deer hunters, especially on opening weekend, as well as by duck and pheasant hunters, also concentrated on opening weekends. These are the only times crowding is experienced on the property. Development of the area for waterfowl will probably increase competition and crowding. Some type of control of hunter numbers or spacing may be required.

After development, this property will be capable of producing about 2,500 ducks annually. For highly mobile species, such as waterfowl, permissible harvest has to be assessed on a regional basis, however, since the current demand for ducks somewhat exceeds the estimated supply, harvest levels on this property will be monitored with a goal of providing harvest opportunities that are reasonably proportional to production.

2. Rough Fish - Carp are present in the Manitowoc River system and will be present within any impoundment. Proposed over-winter drawdowns will allow the marsh to freeze down and probably kill most of the carp. Carp are not expected to be a major problem but there is a chance that occasional negative management measures or chemical treatment may be required for their control or eradication.

3. Ownership Pattern/Cost - About 6,000 acres of private lands with 64 landowners remain within the present property boundary. While some of these are small tracts owned for hunting, most are active dairy farms. Acquisition of remaining acres can be expected to take a long time.

4. Water Quality - At present, the Manitowoc River basin does not have desirable water quality primarily because of the runoff of silt and plant nutrients from surrounding agricultural lands. Dissolved oxygen levels are low (5 mg/liter average) and, therefore, presents a severe threat of summer fish-kill.

Upon development, some of the nearby uplands will be converted to grass cover which will reduce the runoff problems. However, it would still be unlikely that water quality within the flowage will be very good. The major streams feeding the flowage area will provide some turnover of water, preventing stagnation from occurring.

RECREATION NEEDS AND JUSTIFICATIONS

Calumet and Manitowoc Counties are experiencing a rapid increase in population, as is the surrounding Fox River Valley. Fifteen percent of the state's population lives within 50 miles of Killsnake Wildlife Area. Of these, some 364,000 or 8% of the state total live in 9 cities. In addition, it is only 75 miles from central Milwaukee to Killsnake. Many of this urban population must look to the surrounding countryside for their outdoor recreation.

Sightseeing/Nature Study:

Residents of Regions 7 and 8 (from the Wisconsin Comprehensive Outdoor Recreation Plan: Region 7 includes Outagamie, Calumet, Winnebago and Fond du Lac Counties. Region 8 includes Door, Kewaunee, Brown, Manitowoc and Sheboygan Counties) generate sightseeing recreation occasions at a rate equal to the state average. However, less than 35% of this demand is satisfied within the regions and out-of-state visitors account for 65% of total sightseeing demand. Sightseeing recreation is expected to increase an estimated 25% by the year 1990.

Sightseeing, more than other recreational activities, requires a scenic vista or wildlife that is easily observed and protection from land-use changes which would destroy them. Some sightseers take advantage of the scenic views and wildlife activity now, but a marked increase is likely if a major flowage were to be constructed.

Better information systems and signing programs may be needed to accommodate nature study, photography, and sightseeings. Interests in outdoor educational opportunities are not known but are expected to increase significantly over the next ten years.

Hunting:

The population density of Regions 7 and 8 are steadily encroaching on the recreation-resource base. Many private lands are being lost to other uses or are posted against any form of trespass. Moreover, the quality of wildlife habitat available is steadily decreasing. Hedgerows, woodlots and odd corners are being cleared and farmed. Productive waterfowl habitat consisting of brood water combined with undisturbed grassy nesting cover is in very short supply.

Along with the decreasing habitat base, an increasing number of people are participating in hunting activities. Existing resources cannot satisfy the projected demand for high quality recreational hunting experiences in Regions 7 and 8. Current trends in habitat loss, posting, and numbers of hunters could easily discourage participation increases anticipated by 1980 and 1990:

Number of Annual Hunting Days - Regions 7 and 8

1970 -	1,278,022
1980 -	1,493,179
1990 -	1,750,886

Efforts directed toward maintaining quality recreational hunting opportunities must include both the conservation and development of wildlife habitat in important areas like the Killsnake Marsh.

ANALYSIS OF ALTERNATIVES

It appears very likely that major developments as described in the recommended management section of this plan will not be implemented within the decade. It also seems possible that some of the actions listed below may emerge as viable alternatives in a future with changing values and land uses. NOTE: Each alternative is compared to the proposed objectives and management presented on page one.

1. Main Dike - Manitowoc River. From the early stages of planning for this property, it has been obvious that a relatively short dike (900 feet) in Section 6, Town of Eaton, could impound about 3,500 acres (at the 804 contour). No boundary change would be required for this flowage. However, in conjunction with this, 2.5 miles of town road would either have to be raised by 6-8 feet, or abandoned, which is unlikely.

In addition, this main flowage would flood 230 acres of swamp conifer type which is used by wintering deer. It is also possible that this flowage could adversely affect the remaining 465 acres of swamp conifer in this area. However, the white cedar is not regenerating itself, and at the present time no silvicultural method is known to assure regeneration of white cedar in the presence of a large deer herd. Presently, there is strong public opposition to this flowage, especially among deer hunters.

a. Impact on Objectives

This large pool would provide brood water for about 1,000 more ducklings than stated in the proposed objectives of this plan (3,500 vs. 2,500). It is debatable as to whether or not the property boundary encompasses a sufficient quantity of nesting cover to support such a large flowage.

All other objectives proposed on page one could also be met by this alternative. There would be some degradation of deer hunting benefits (10-15%) because of flooding.

b. Impact on Acquisition

About 1,000 acres across the north and west side of the proposed acquisition boundary would not be critically needed for management. Most of this surplus would be comprised of lowlands located between the 804 and 808 contours. All other agricultural lands would be needed under this alternative.

c. Development Costs.

Control Structure/Dike - \$37,000.00; Road/Bridge relocation - \$2.4 million.

Requires coordination and maintenance agreement with local township government.

2. Killsnake River Flowage and south branch of the Manitowoc River Flowage.

NEW DIKES

A 4,500 foot dike on the Killsnake River and a 2,300 foot dike on the south branch of the Manitowoc River would form impoundments of 1,600 and 940 acres respectively. The Killsnake Flowage would be located on the 806 MSL and the South Branch Flowage on the 808 MSL. These levels indicate the highest ground that could be affected in the tail waters; gates would have to be set somewhat lower to insure this occurs.

ALTERNATE DIKES

Essentially the same flowages described in NEW DIKES could be flowed by raising and/or slightly relocating 2.5 miles of Lemke and Aebischer Roads and using these roads as dikes. These could be accomplished independently or in conjunction with the main pool to form a three pool system. With this alternate set of dikes, about 500 more acres of deep water (5-6 ft.) would be impounded in the Killsnake pool and South Branch Manitowoc pool than with the dike sites in the Recommended Management Section. The deep water area would not provide brood water for ducks, but would provide a resting and staging area for waterfowl.

In addition, the South Branch pool could be held at 806 MSL instead of 808 MSL and still be an effective pool. A boundary change of 140 acres would contain the 806 MSL South Branch pool, as opposed to the need for 280 additional acres for this pool at 808 MSL. The Killsnake Pool at 806 MSL would require 100 additional acres, the same as in the Recommended Management Section.

a. Impact on Objectives

All objectives and additional benefits presented on page one could also be met by either of these alternatives.

b. Impact on Acquisition

In either alternative, 440 acres located on the east side of the property could be removed from the boundary. However, the NEW DIKES alternative would require an additional 410 acres on the west and the ALTERNATIVE DIKE alternative would require an additional 240 acres in the same area.

c. Development Costs.

NEW DIKES: control structure/dike - \$185,000

ALTERNATIVE DIKES: bridge/road relocation - \$2.4 million. Note: the roads currently flood most years.

3. Reduced Pool Size. Either of the two pools west of the road system could be put in, at either dike site, independently of the other. While at the present time it appears that both pools are viable and desirable, future values may change so that a single pool is all that is desired. In such a case, either pool could be built, depending on land ownership or other factors would sharply reduce objectives for duck production and goose-use.

a. Impact on Objectives:

Duck production on either pool west of Lemke Road would be reduced from 2,500 to 1,000-1,500. Duck use peaks in October would decrease to 2-3,000 and goose peaks may drop below 5,000 depending upon the effect of the closed area size.

Other objectives would be met, but additional benefits would be reduced somewhat.

b. Impact on Acquisition:

About 2,000 acres of upland and lowland (say \$2,000,000) would not be required by this alternative.

c. Development Costs:

Depending on which pool was constructed and whether the road was cored and raised or a new dike was constructed, costs of a single impoundment would range from \$65,000 to \$1,000,000.

4. Decrease Property Size or Development. The Killsnake Wildlife Area could exist as a smaller property, or as an essentially undeveloped property. In the case of decreased boundaries or development, however, it would be doubtful if the objective of duck production could be met. In addition, while the number of participant days perhaps could be met, the experience would not be as satisfying as in a less crowded situation.

a. Impact on Objectives:

Duck production and waterfowl use would be reduced up to 80% depending on the amount of reduction. Recreational use would be reduced and result in crowded situations.

b. Impact on Acquisition:

Purchase could either stop completely or, more logically, about 1,000 more acres would be purchased for blocking in ownership patterns. Costs would be held to less than one million dollars.

c. Development Costs:

Limited to \$50,000. Includes small ponds, cover establishment, posting, and routine management activities.

5. Increase Property Size or Development. The property boundary at present, with slight modifications, contains most of the contiguous wetlands in the vicinity and necessary amounts of uplands. Increasing the boundary in any given direction would include primarily more agricultural land. At the present time, it appears that the proposed level of development will suit the objectives of the master plan and anticipated recreational needs. Because full development is so far in the future, a higher level of management including trails, observation towers, overlooks, or other features should be considered in a future update of this plan.

a. Impact on Objectives:

With increased quantities of uplands converted to nesting habitat, it would be possible to produce more ducks - up to a point. Fall waterfowl use would not likely increase very significantly. More recreation could be produced.

b. Impact on Acquisition:

Increased property size will increase acquisition cost proportionally. It is likely that more uplands and improvements would be involved and, therefore, costs would rise markedly.

c. Development Costs:

Minimum - \$2.4 million

Maximum - \$4.0 million

APPENDIX

Master Plan Comments

By: Henry Kolka
Representing: Wild Resources Advisory Council
Date: October 13, 1980

The Property Task Force of Dave Evenson, Gary Jolin, Don Thompson and Lee Meyers of the Killsnake Wildlife Area Master Plan Concept Element have conceived, and projected, with appropriate approval a most ambitious proposal for the project area. It is very possible that the socio-economic resistance against acquiring some of the property patterns will increase in the near future, forcing modification of a well-designed plan. The Wild Resources Advisory Council congratulates the designers of the Killsnake Wildlife Area projection.

General Review

The Wild Resources Advisory Council congratulates the Task Force for proposing a bold plan of action for the Killsnake Wildlife Area, however the Council would consider it a malfeasance of its responsibility if it didn't review some of the potential near negative aspects. The WRAC considers three factors very basic to the ultimate success or failure of the plan at the proposed Master Plan Concept Element level. As the Council sees it, these problems are: Agricultural lands, educational perspectives, and large flowage impacts.

Agricultural Lands

The Killsnake Wildlife Area Master Plan Concept Element does not provide adequate assessment of Agricultural Lands component of the NRB's approved 9,106 acre goal for the project area. 1) How many acres are in this category? 2) How much of it are prime agricultural lands? 3) What will be the approximate cost of acquiring this land? With national and state level programs of preserving prime agricultural lands heating up, such acquisitions could pose a serious problem in finalizing the goal.

DNR RESPONSE: 1) 2,819 acres. 2) About 2,600. 3) Prime agricultural land is selling for about \$1,400.00 per acre. The state currently owns 440 acres of cropland.

Educational Perspective

WRAC considers planning for a more meaningful educational and non-consumptive recreational programs extremely important toward achieving the acreage goal of the wildlife area. Since this property is within easy reach of the two densest population concentrations of Wisconsin, the Lake Michigan shoreline and the Fox River Valley, the educational and non-consumptive recreational demand can be assumed to be increasingly real and heavy, in the projected time span of the project. To satisfy this need, the Task Force is obligated to address this problem much more elaborately than they have in their concept element. Likewise, they will need to have much more complete specie inventories of all phases of wildlife found in the Killsnake Wildlife Area than have been provided in the document. The ultimate success of the proposal could very conceivably come from this document of projected public use.

DNR RESPONSE: The Department does not feel elaboration of educational and non-consumptive uses is appropriate in this document. Both topics will be addressed in the Strategic Element of the Comprehensive Fish and Wildlife Planning System.

Large Flowage Impacts

The projection of a large flowage involving around 3,000 acres of water will definitely result in benefits and no benefits. As a goose satellite area to Horicon, it could conceivably inherit most of its problems, thus adding nearby farmers discontent to the existing opposition of the deer hunters to flowage expansion. It will also require a measured judgement of the planners and the interested public of changing large ecosystem of swamp lands to flowage waters.

Comments and Recommendations

1. page 1--Goal.

WRAC recommends that and educational be inserted between the words, recreational and opportunities.

DNR RESPONSE: Concur; text modified.

2. page 1--Annual Additional Benefits.

Item 3.

WRAC recommends that educational and be inserted after compatible and before nonhunting.

Item 4.

The Council suggests the insertion of and transient between the word indigenous and to.

DNR RESPONSE: Concur; text modified.

3. Property Development.

WRAC recommends that a paragraph be added addressing the following: habitat management of nongame species, education and nonhunting recreation, observation trails, and a nature center.

DNR RESPONSE: Management objectives have not been created because of funding constraints. The Plan will be modified in the future if this situation is rectified.

4. Figure 2.

WRAC suggests that the chart and legend include the following, where necessary: labeling of the streams (on chart), road symbol in legend, and naming pertinent county and town roads and showing on chart and legend the north-southwest snowmobile trail.

DNR RESPONSE: Concur; figure labeled.

5. page 3--Chronological Order of Development.

WRAC has a question regarding this listing. Wouldn't it be advisable to include nature trail construction and nature center in this list?

DNR RESPONSE: Do not agree. Limited funds and manpower prohibits the establishment of these facilities.

6. page 4--Figure 3.

To make the chart more meaningful to the review, the WRAC suggests:

Legend Corrections

- a. After the broken line symbol outlining the property, the Council suggests posting a solid line symbol indicating the proposed expansion.
- b. WRAC suggests changing the label Proposed Boundary to Proposed land acquisitions.

Question. There are four sites indicated by the symbol HA (Archaeological Sites--misspelled in the legend). Item 5 under Annual Objectives states "Protect a minimum of 2..." Which two on the chart are designated for that honor?

DNR RESPONSE: Corrections incorporated.

7. page 5--first paragraph.

The WRAC in comment 4 asks that the snowmobile trail be shown on Figure 2 and that it be labeled or identified in the legend. The Council's general opinion is the publically used snowmobiles are not compatible with the goals and objectives of a wildlife area and should be phased out as soon as possible.

DNR RESPONSE: The planned trail did not materialize because present private trail systems are adequate to meet local needs.

8. page 5--third paragraph from top of page.

WRAC assumes that in the listed "1,800 participant trips" education played a part of that role, consequently we recommend that and educational be inserted between the words recreational and uses.

DNR RESPONSE: Concur; text modified.

9. page 5--Ownerships.

WRAC is puzzled over the use of the following statement "An acreage goal of 9,106 acres within a boundary which encompasses 9,249 acres". Which sum was approved NRB in 1969 and which sum total is recommended by the project planners?

DNR RESPONSE: Text clarified.

10. Fish and Wildlife--paragraphs 2, 3, and 4, page 5.

2. (above)WRAC suggests at least a partial listing of "a variety of shorebirds."

3. This is a fair listing. The Council suggests elaboration of two categories; a "great variety of passerine birds". Too general. Please list.

4. WRAC recommends listing of other nongame mammal species and addition of common reptiles and amphibians in a new paragraph.

DNR RESPONSE: Do not agree. The value of such a list is considered academic.

11. Vegetative Cover; paragraphs 1, 2, and 3--page 5.

1. (above) WRAC agrees with the concept expressed by the Property Task Force that an "intensive survey" of plant species and listing of them before proposed development is launched.

2. With only 485 acres of a proposed total of 2,626 acres of ag. lands in state ownership, the realization of property goal is in serious quandary. (See comments under Agricultural Lands in General Review.)

3. WRAC recommends an expanded listing of those in this paragraph, particularly of the flowering plants.

12. Figure 4--page 6.

WRAC suggests the inclusion of proposed project boundary using a solid black line on chart and in the legend. Also, somewhere a chart should show agricultural lands.

DNR RESPONSE: Legend clarified.

13. page 7--Historical and Archeological Features.

WRAC questions the spelling used of archaeological. Not Webster's first choice. In the Annual Objectives, it is proposed to protect a minimum of two. The Task Force should be given the reviewer an inkling of the chosen two in the first paragraph under the above heading.

DNR RESPONSE: Text corrected.

14. page 8--Sightseeing, paragraphs 1, 2, and 3.

1. (above paragraph).

WRAC recommends insertion of and education between recreation and is.

2. Council recommends insertion of and educational between the words recreational and activities.

3. WRAC suggests insertion of students of nature between photographers and the word and.

DNR RESPONSE: Concur; text added.

15. Analysis of Alternatives.

WRAC does not agree with the assessment that the listed educational and recreational needs must wait for "full development". The Council recommends that this pattern of property use be recognized and at least partially implemented on present state owned land. After all, 3,111 acres of actual ownership and control is not exactly a pittance.

DNR RESPONSE: Text modified.

By: Forest Stearns
Representing: Scientific Areas Preservation Council
Date: October 23, 1980

We have reviewed the concept master plan for the Killsnake Wildlife Area and wish to offer several comments.

Our general impression is that planning for dikes to flood 2,500 acres of wetlands is premature based on the currently predominantly private land ownership, increasing concerns for preservation of the beneficial ecosystem functions which occur in wetlands, and lack of water quality or engineering information.

It appears that the proposed development could adversely affect a large acreage of swamp hardwoods and a small acreage of swamp conifer.

Since land acquisition is apt to continue over at least the ten year planning period, we urge that the options of flowage development and their magnitude be left open for further consideration when more land has been acquired.

DNR RESPONSE: While flowage development is the primary purpose of the land acquisition effort, reconsideration will occur if conditions change.

By: Thomas J. Evans
Representing: Mineral Resources Section
Geological and Natural History Survey
Date: October 15, 1980

The staff of the Geological and Natural History Survey has reviewed the Killsnake Wildlife Area Master Plan. Based upon this review, we have no substantive comments on this concept element.

By: Roy C. Willey, Jr.
Representing: EC Wis. Regional Planning Commission
Date: November 4, 1980

Subject: Killsnake Wildlife Area Master Plan; East Central Review No. 80-465

The East Central Wisconsin Regional Planning Commission has reviewed the Master Plan for the Killsnake Wildlife Area as it relates to regional plans and programs for Calumet County. East Central finds the proposed project and recommended alternatives to be consistent with regional plans for the areas.

The only additional analysis and discussion we feel should be included involves the rerouting of the county snowmobile trail because of ice conditions. While the trail could possibly be rerouted because of disturbance to wildlife, the pools should be drained down during the winter, thus permitting trail use of most of the pool area. A drawdown could also potentially assist in flood control in the spring.

DNR RESPONSE: Trail was eliminated.

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