

approved
Form 11 00-1
Rev. 11-82

NATURAL RESOURCES BOARD AGENDA ITEM

Item No. _____

SUBJECT: Establishment of the Joel Marsh Wildlife Area, Polk County, and approval of conceptual master plan including an acreage goal of 1,284 acres.

FOR May **BOARD MEETING**
(month)

TO BE PRESENTED BY: Dave Gjestson and Gary Birch

SUMMARY:

The Concept Element of the Master Plan and Final Environmental Impact Statement (FEIS) for the Joel Marsh Wildlife Area, Polk County, have been completed. Total costs associated with the property are:

- Land Acquisition - \$520,000 (1,284 acres)
- Development - \$85,500
- Annual Maintenance - \$3,000

The Department proposes to establish and manage the property for waterfowl production and hunting as well as provide compatible outdoor recreation opportunities. Public support is very favorable.

RECOMMENDATION: That the Natural Resources Board establish the Joel Marsh Wildlife Area in Polk County and approve the Concept Element of the Master Plan for acquisition, development and management. The basis for this recommendation is provided in the attached draft Record of Decision. If the Board approves this recommendation the Record of Decision will be finalized and distributed for public information.

LIST OF ATTACHED REFERENCE MATERIAL:

- No Fiscal Estimate Required
- No Environmental Assessment or Impact Statement Required
- No Background Memo
- Record of Decision

- Yes Attached
- Yes Attached
- Yes Attached
- Yes Attached

APPROVED:

John M. Keener 4-29-83
Bureau Director Date

J.R. Huntoon 5-2-83
Administrator Date

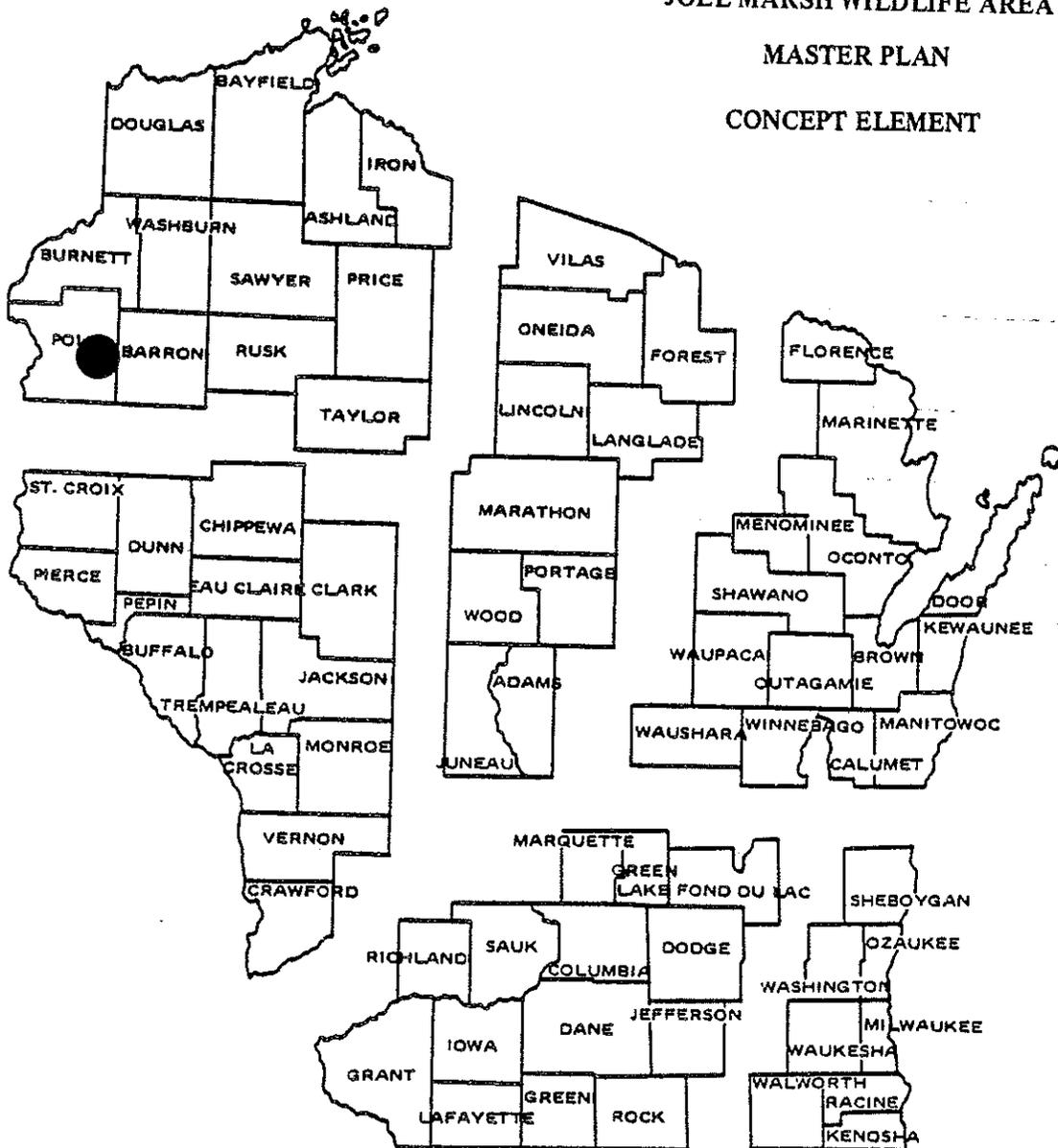
CD Resaduy 5/9/83
Secretary Date

- cc: Judy Scullion - ADM/5
 Ron Nicotera - ADM/5
 James Huntoon - ADM/5
 C. L. Goldsworthy - FIN/1
 H. S. Druckenmiller - EI/3
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 Carl Evert - OL/4

JOEL MARSH WILDLIFE AREA

MASTER PLAN

CONCEPT ELEMENT



Property Task Force

Leader - JOHN L. PORTER, WILDLIFE MANAGER
RICHARD R. CORNELIUS, FISH MANAGER
JOHN DUNN, FORESTER
DENNIS LORENTZ, RESEARCH ASSISTANT

Approved by Natural Resources Board

May 25, 1983

Date

PROPOSED JOEL MARSH WILDLIFE AREA

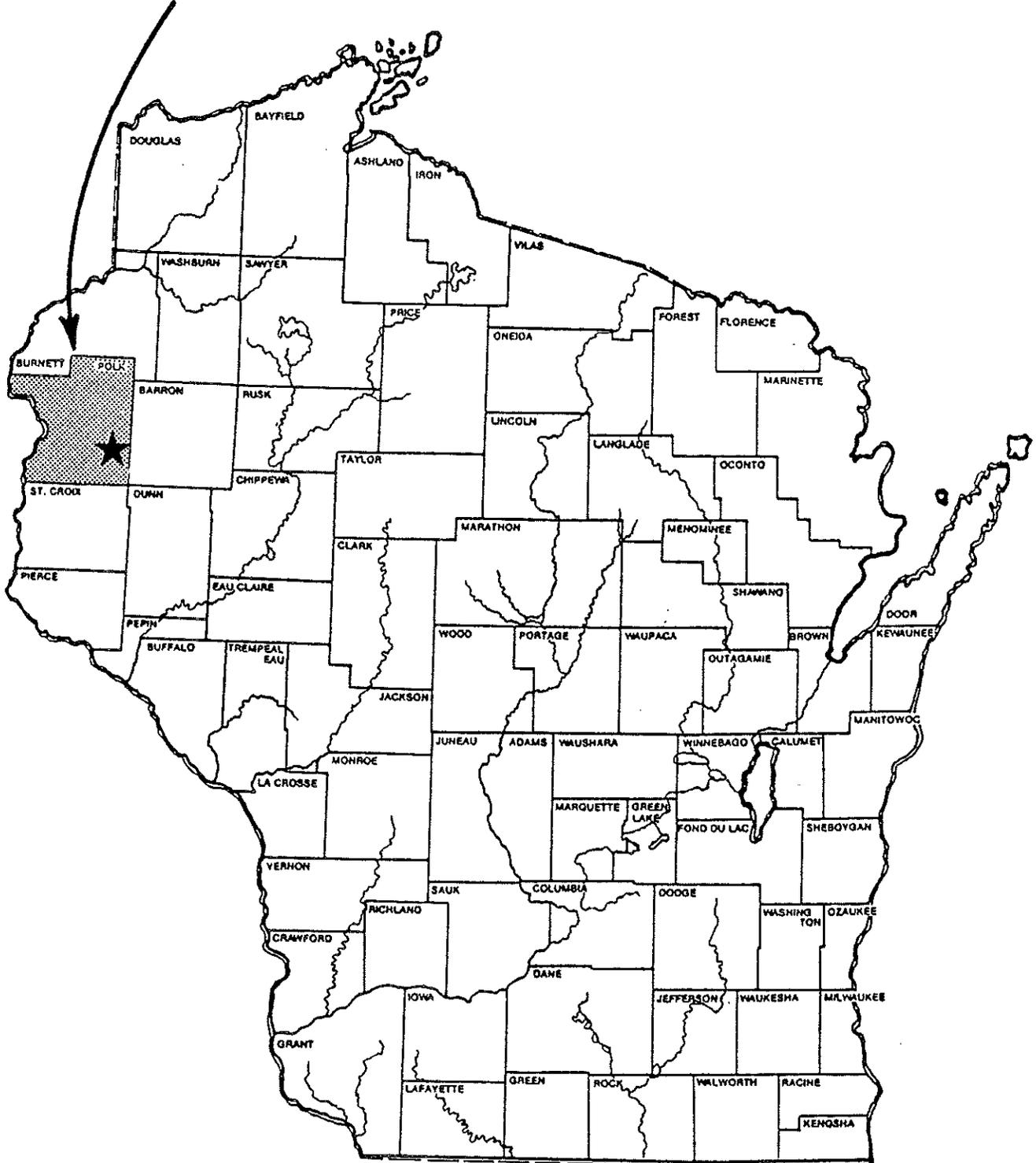


FIGURE 1. STATE LOCATOR

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DESCRIPTION OF THE PROPOSED ACTION AND IDENTIFICATION OF ALTERNATIVES

The Department proposes to acquire 1,284 acres, including part of the existing Joel Flowage and portions of the North Branch of Beaver Brook. Approximately 700 acres of wetlands would be flooded by the construction of two dikes. The goal and objectives of this action would be:

Goal: To acquire and manage a state-owned wildlife area for waterfowl production and hunting as well as to provide for educational and other compatible outdoor recreation opportunities.

Annual Objectives:

1. Produce an average of almost one duck per acre of water (600 ducks).
2. Provide for a maximum of 2,000 participant days of waterfowl hunting.
3. Provide one scenic overlook and protect two archaeological sites for aesthetic appreciation and educational purposes.

Annual Additional Benefits

1. Produce 75 Canada geese.
2. Provide for a maximum of 900 participant days of small game and furbearer, hunting and trapping opportunities.
3. Accommodate a maximum of 3,000 participant days of other recreation such as nature study, photography, cross-country skiing and hiking.
4. Contribute to the habitat of other wildlife including migratory, endangered and threatened species.

PROPOSED ACQUISITION

The acquisition boundary of 1,284 acres is outlined in figure 2 and 3. Within the proposed project boundaries there are eleven private landowners including portions of eight farms and one entire cranberry operation. Most of the area is wetland (868 acres) used occasionally for grazing. However, 189 acres of cultivated cropland are also proposed to be acquired. If the cranberry farm owner decides to sell to the Department, the buildings would be auctioned off and removed from the property.

Acquisition would be on a willing seller-willing buyer basis. Individual parcels within the boundary would be appraised with permission of the landowner. A fair market value would be established and offered to the landowner for acceptance or rejection. If rejected, no further action would be taken beyond routine follow-up contact. If accepted, acquisition would proceed.

The anticipated rate of acquisition is unknown because land would be purchased only from willing sellers. The wetlands are expected to be acquired rapidly. Total land cost is estimated to be about \$520,000 (1982 estimate).

Alternative - An alternative to the Department purchasing Joel Marsh would be no acquisition at all. The impacts of this alternative are discussed on page 30.

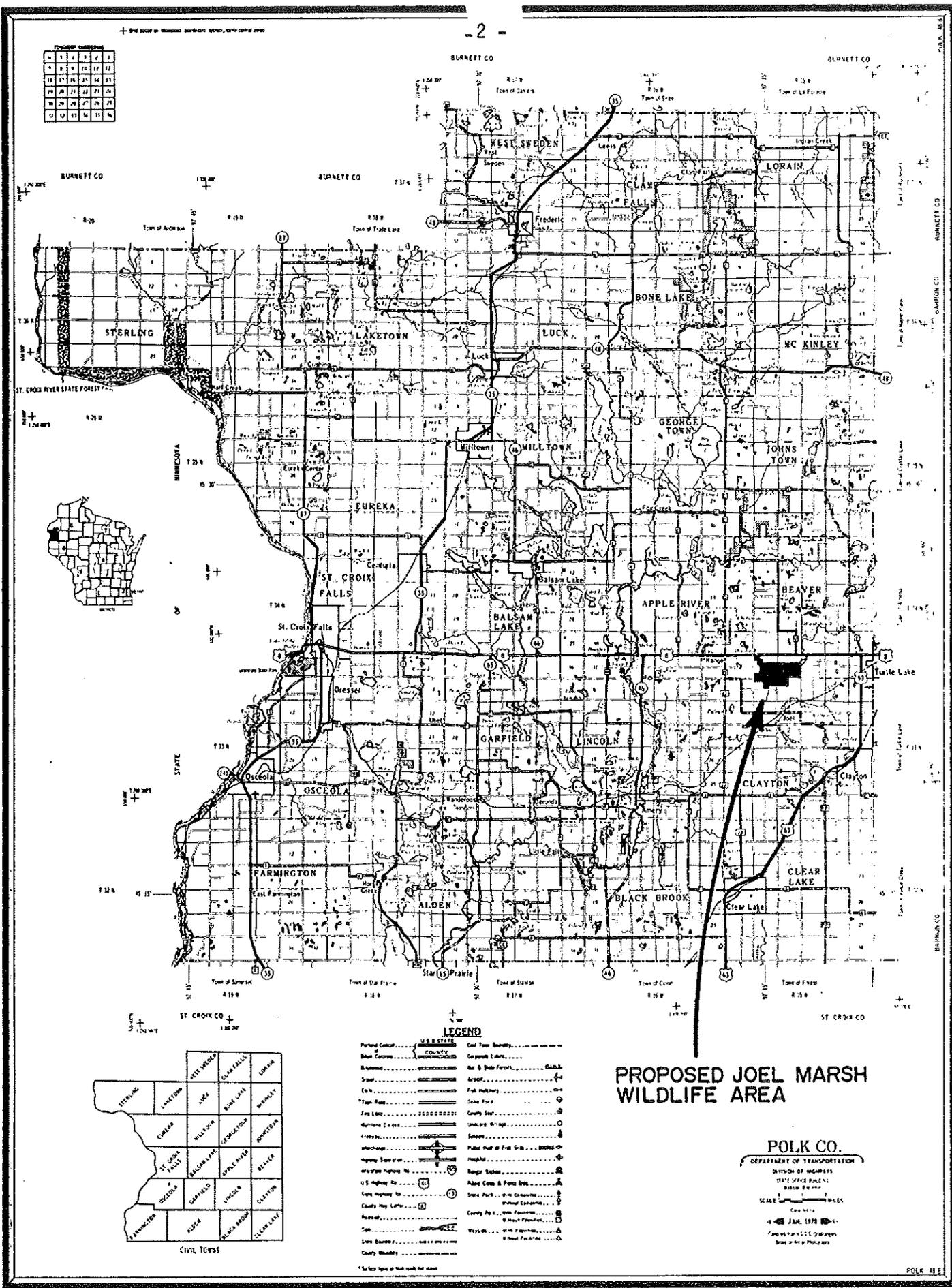


FIGURE 2. COUNTY LOCATOR

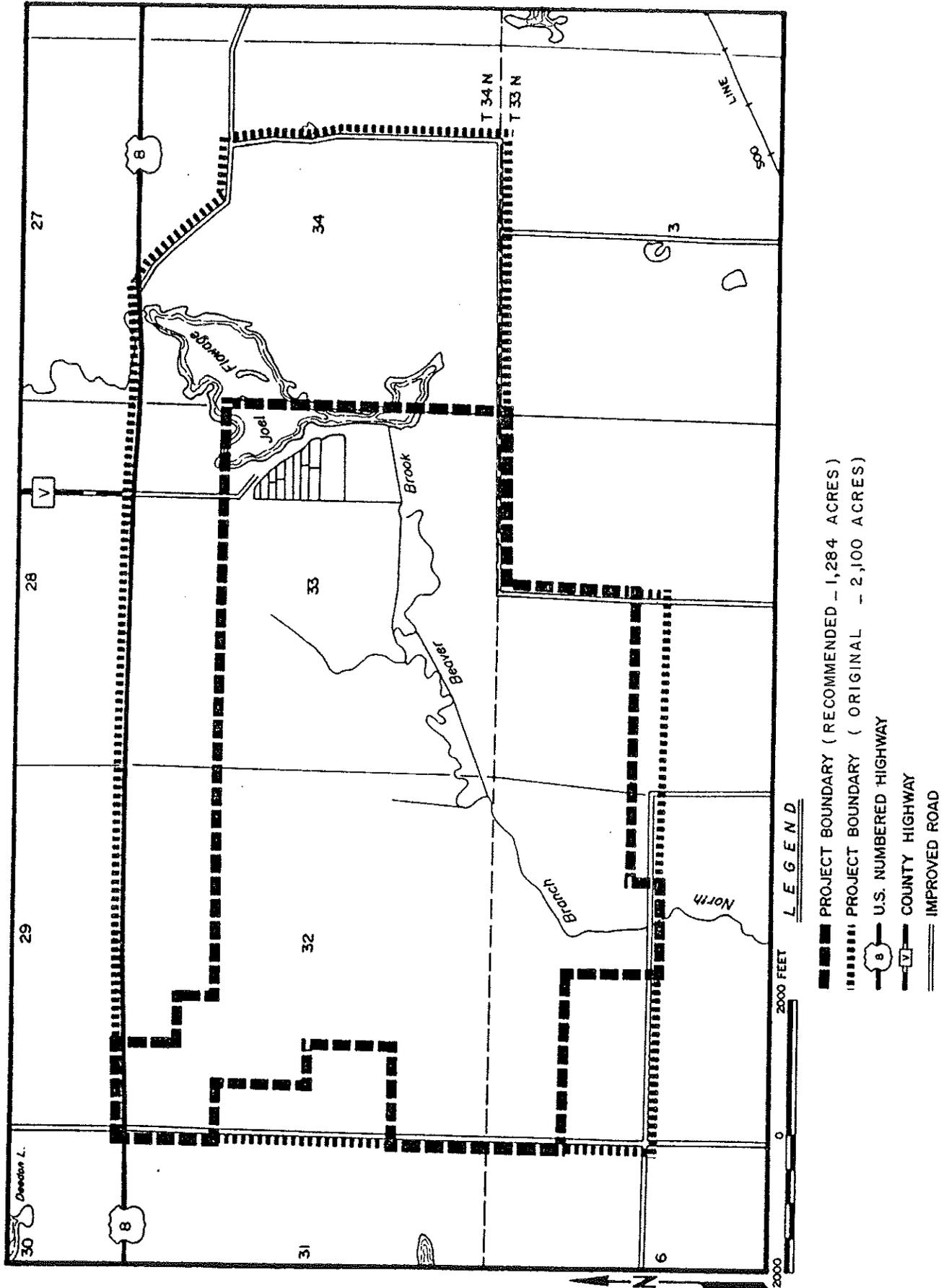


FIGURE 3. ORIGINAL & REVISED BOUNDARY

PROPOSED MANAGEMENT AND DEVELOPMENT

All Department owned property is managed by a system of land use classifications ranging from intensively used picnic areas to wilderness areas. Joel Marsh Wildlife Area would be administered through two land use classifications. The classifications and their respective acreages are:

1. Resource Development-Wildlife Management - 1,244 acres
2. Archaeological Area - 40 acres

Resource Development - One thousand two hundred and forty-four acres would be designated as Resource Development for waterfowl management. Proposed management and development would involve six major areas:

1. development of two shallow flowages
2. conversion of acquired agricultural lands surrounding the marsh to dense nesting cover and periodic burning of this cover
3. excavation of natural depressions for waterfowl pair ponds
4. management of acquired timber lands
5. maintenance of the existing Joel Flowage at its present water level
6. construction of five parking lots with one accompanying overlook

Flowages - The Department proposes to construct two shallow flowages totaling 700 acres (see figure 4). The largest flowage would flood approximately 660 acres on the main stem of the North Branch of Beaver Brook. The smaller flowage proposed north of the main flowage would flood approximately 40 acres. General specifications for the proposed dikes and water control structures are illustrated in figure 5.

The purpose of construction would be to raise the water level 6 feet (from 1,135 to 1,141 feet above sea level) to create an interspersed of open water and emergent vegetation. These types of marshes, both artificial and natural, are very productive of waterfowl and associated wildlife.

Construction of the main dike would occur at the site of the old sawmill dam. The remaining smaller flowage would involve excavating a strip of muck five feet wide and three to six feet deep through the marsh and then filling this trench with mineral soil obtained from nearby upland sites. The dike would then be built from additional mineral soil placed on the filled trench until the desired height and width are reached. A top dressing would be placed over the mineral core using as much of the excavated muck as possible and seeded to prevent erosion (see figure 5). Any muck excavated from the marsh but not used as top dressing would be used to form nesting islands in the flooded areas.

Borrow pits on the upland soils that result from building the dikes would be reshaped to resemble natural potholes. The edges of the pits would be gently sloped and the centers would be no greater than six feet deep. These pits would be made similar to the waterfowl pair ponds described below.

Alternative - An alternative to constructing two dikes is to construct three dikes to increase water depth and management flexibility. This alternative is discussed on page 35.

The two flowages would cost \$50,000 to develop.

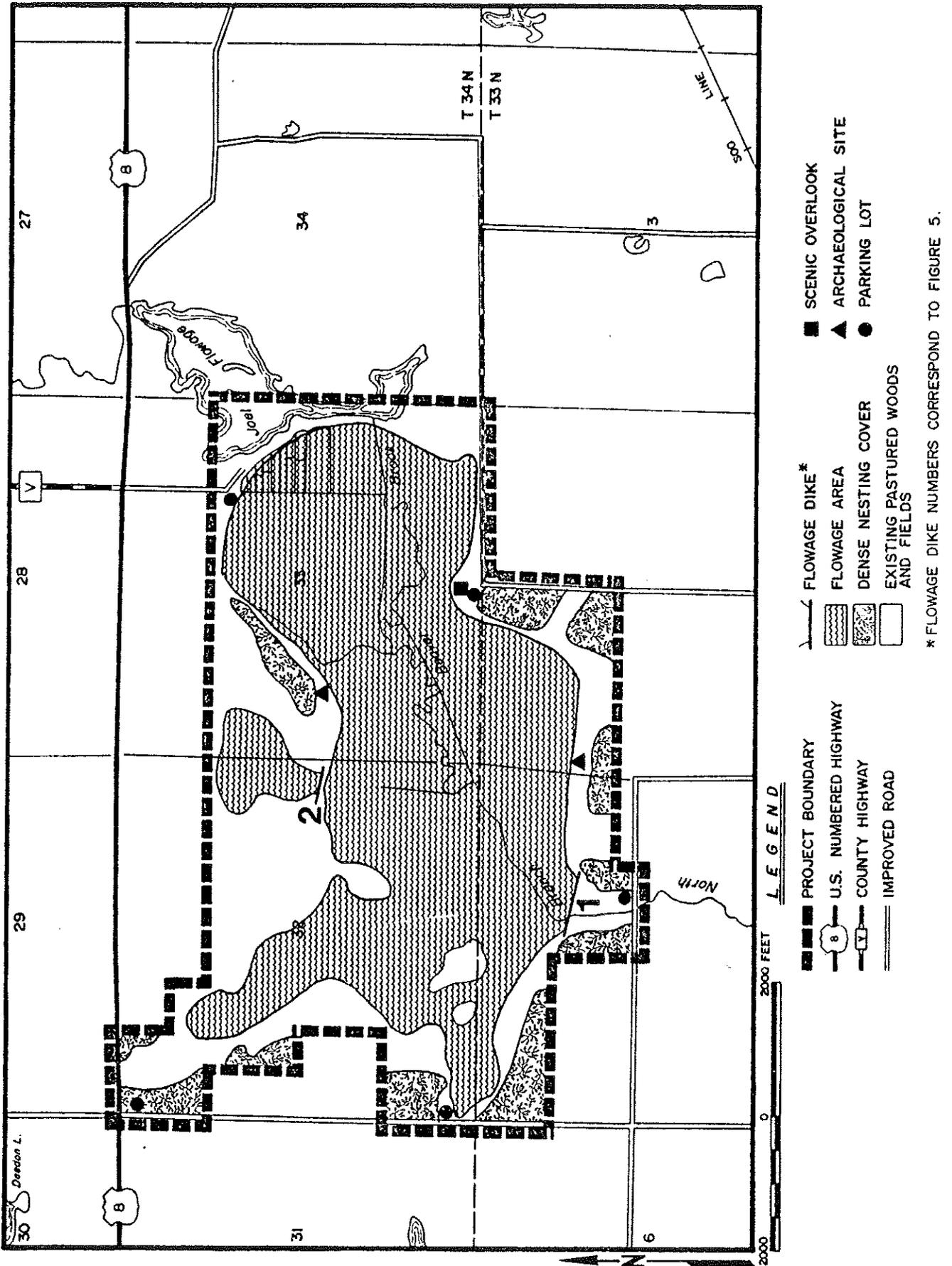
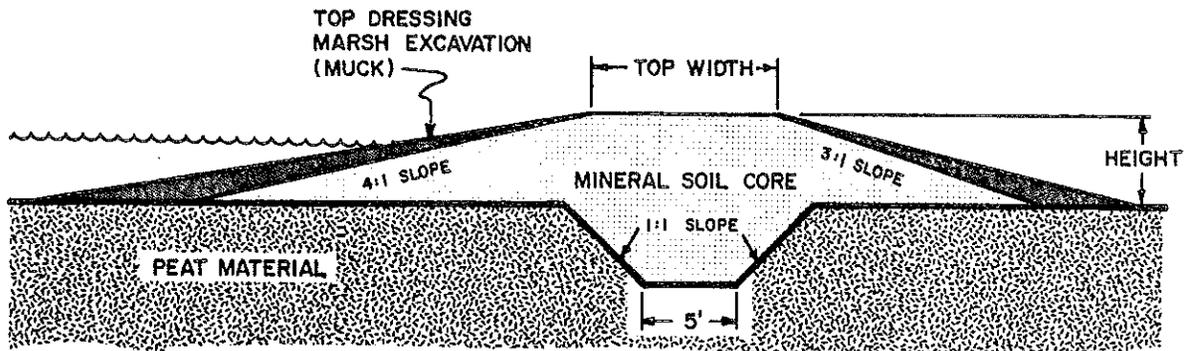
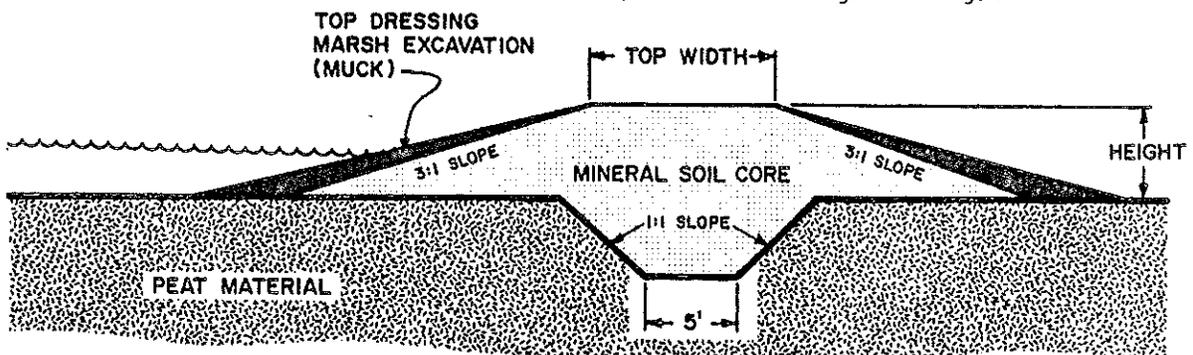


FIGURE 4. PROPOSED DEVELOPMENT



Dike 1.* Length: About 480 feet.
 Top Width: 10 feet.
 Height: 11 feet above stream bed (1,146 feet above sea level).
 Emergency Spillway: 7 feet above stream bed (1,142 feet), could pass a maximum of 450 to 500 cfs.
 Water Level (Full Pool): 6 feet above stream bed (1,141 feet).
 Average flow of the North Branch of Beaver Brook is 3 to 10 c.f.s.
 Control structure would pass a minimum flow of 2 c.f.s.
 The 100 year flood event could raise water flows to 500 c.f.s. (DNR, Bureau of Engineering).



Dike 2.* Length: About 350 feet.
 Height: 6 feet above marsh.
 Water Level: 3-4 feet above stream bed.
 Top Width: 10 feet.

*Dike numbers correspond to figures 4 and 5.

FIGURE 5. GENERALIZED CROSS SECTION OF PROPOSED DIKES

Service roads to both dikes would be constructed and used for maintenance. These roads would be gated but remain open for public hiking, cross-country skiing and foot access for hunting and fishing. Boat landings would not be developed on the flowage but carrying in boats would be allowed. No motorized vehicles would be allowed on the wildlife area.

Alternative - An alternative to constructing dikes and water structures would be for the Department to dig small ponds throughout the wetland basin. Impacts of this are discussed on page 32.

The Department would allow at least 2 cfs (cubic feet per second) of water to flow through the dike structure whenever water is in the flowage. Because of the minimum flow and evapotranspiration the flowage would experience periodic water level fluctuations throughout the year. A typical water level regime would be as follows:

April-May: Full pool or nearly so following normal spring runoff and spring rains

June-July-August: Gradual decrease from full pool. This level may be highly variable from year to year depending upon precipitation and could reach 1/2 pool or less during droughts.

September-October: Normal fall rains can generally but not always be expected to bring flowage levels up from late summer lows but not necessarily to full pool.

Winter: At formation of ice cover the water levels are expected to be at least 1/2 pool during normal years.

Drawdowns would occur about every five years in the impoundment areas mainly to stimulate emergent plant growth. This would consist of draining impounded water to almost preimpounded levels. Drawdowns would generally begin the first week of June and end in August. Complete reflooding in most cases would occur in late winter or early the next spring.

During drawdown of the main flowage, about a 100 acre pool of open water would remain. Both flowages would not be drawn down simultaneously but would follow an alternating schedule to avoid complete absence of water in any given year. Accompanying the drawdowns would be prescribed burning of flowage basins to eliminate invasion of brush and to create better duck feeding areas through natural plant succession. The burns would be timed so that the basin soils would be frozen or too damp to burn.

Existing Joel Flowage - The proposed boundary includes 29 acres of the existing Joel Flowage (see figure 4). The Department plans to retain the present dike and maintain current water levels. A service road is located along the top of the dike and would also be maintained. Under Department ownership, the road would be gated but open to public foot travel.

Waterfowl Pair Ponds - Numerous natural depressions and potholes exist within the project area. Upon acquisition, the Department proposes to enlarge and deepen these natural depressions using bulldozers or draglines. The dragline would be used in marsh areas where bulldozers could not operate. Bulldozers would be used in remaining areas. These enlarged depressions would be designed to fill with runoff water. The natural contours of the depressions would be followed to produce a natural appearing pond with gentle sloping shorelines. Potholes would average about 2,000 square feet surface area and no more than three feet deep. Excess soil from the excavation would be used in dike construction or feathered out from the depression so that a berm would not be left around the pond's edge. The cost to establish 50 pair ponds would be approximately \$7,500.

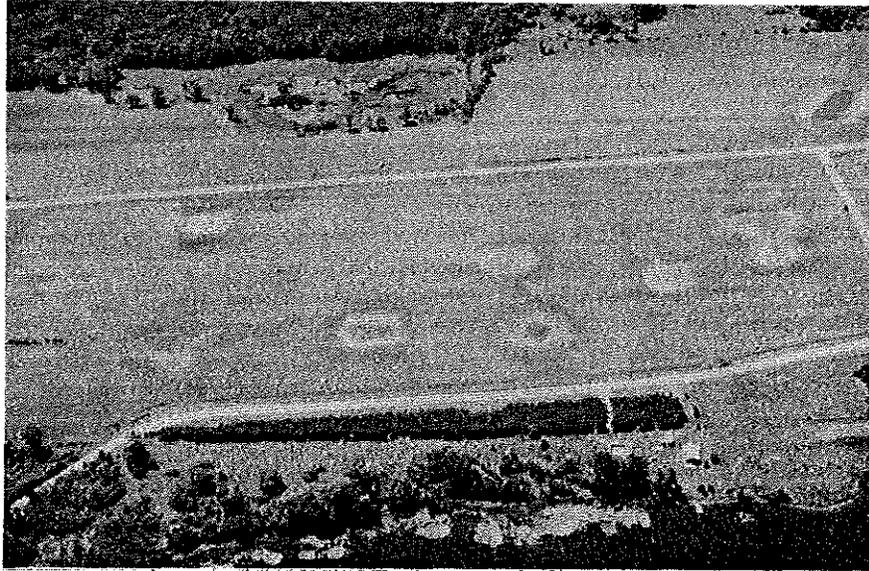


Figure 6. Existing depressions surrounding Joel Marsh would be excavated to create small nesting ponds mainly for Blue-winged teal. This is an aerial photo of similar ponds on another Department property. (Photo: J. Porter)



Figure 7. The above photo illustrates dense nesting cover similar to that which would be planted on purchased agricultural lands (189 acres). (Photo: B.Moss)

Dense Nesting Cover - Surrounding agricultural land would be converted to dense nesting cover for wildlife use as it is purchased. This dense nesting cover typically consists of warm season prairie grasses and forbs that have the ability to stand up through winter snows and provide nesting cover during the spring for many species of animals but principally for waterfowl. These grasses and forbs include big and little bluestem (*Andropogon* spp.), Indian grass (*Sorghastrum*), switch grass (*Panicum*), and several species of forbs such as goldenrods (*Solidago* spp.), and yarrow (*Achillea*). About 230 acres of dense nesting cover would ultimately be developed on the wildlife area (see figure 4). The cost of establishing dense nesting cover would be about \$100 per acre or \$23,000.

Fire would be used periodically on most nonforested parts of the project to encourage establishment and growth of grasses and forbs, and to prevent invasion of woody plant species such as tag alder (*Alnus*), willow (*Salix*) or dogwood (*Cornus*). Prescribed burns would range from 20 to 50 acres in size. Burning would be on a rotation basis and usually done in the spring. Each area would be burned about once every five to ten years.

Two herbicides, Roundup and Atrazine, would also be used to help maintain grass cover and prevent growth of shrubs.

Nest Boxes - Several species of ducks require cavities for nesting instead of dense grasses. Nest boxes would be placed throughout the impoundments to increase production of cavity-nesting waterfowl such as wood ducks and hooded mergansers. The boxes would be cleaned and repaired when needed.

Timber Harvest - Forested areas outlined in figure 12 would be managed using small clear cuts (20 acres) in the oak-aspen timber types. Oak and aspen would be encouraged for mast production and sucker growth for wildlife. The few white pine present would be left uncut for their wildlife and scenic values.

A total of 153 acres of timber would be involved. Logging of merchantable timber would be done by commercial timber sales. Unmerchantable timber would be cut by Department crews, and firewood permits would be issued to use leftover slashings. The objective of timber management would be to enhance forest wildlife habitat and to use available forest products. The Department also desires to retain the forest mix of aspen, oak and pine.

Parking Lots and Overlook - There are five parking lots planned for the perimeter of the project. Each parking lot would accommodate ten cars and would be surfaced with gravel.

An overlook would be constructed of a mound of earth near the southeastern-most parking lot (see figure 4).

Construction of the five parking lots and the overlook area would cost an estimated \$5,000. There would also be maintenance costs associated with the parking lots, such as replacing signs and litter clean up.

Archaeological Area - There are two proposed archaeological areas for Joel Marsh, each consisting of 20 acres (see figure 4). Management of these areas would be preservation. Neither area has been officially identified by the State Historical Society. However, to confirm whether these are of state or local historical significance, the Department would contact a qualified archaeologist to investigate them. The Department would also sample the proposed dike site and vicinity for archaeological remains before construction begins and would ask advise concerning preservation of remains that may lie in the marl pit. If field investigations indicate these sites to be of value, interpretive signing may be provided. The northern site is thought to be a former Indian campsite and the southern site an Indian village. Indian artifacts are occasionally found on both sites.

Public Use

The entire property would be open to hunting, trapping and fishing. No areas closed to these activities are planned due to the relatively small size of this property. No motorized vehicles or horses would be permitted. Only recreation involving foot travel would be encouraged. The flowages would be shallow and not conducive to the use of boats with motors, thus no restriction on boat motors is deemed needed at this time.

CONDEMNATION

As a matter of policy, the Department acquires lands by fee title purchase through patient negotiation and payment of fair market value on a willing seller-willing buyer basis. While the Secretary of the Department has the authority to recommend condemnation, approval is required from the Natural Resources Board, appropriate legislative committees and the Governor. Condemnation action has been exercised by the Department twice since 1969. The Department does not foresee any eventuality which would result in a recommendation for condemnation in the Joel Marsh project.

RELOCATION

Relocation assistance under Public Law 91-646 and Chapter 32, Wisconsin Statutes, would be available to any family or individual who would move as a result of the proposed action. Under these provisions, each relocated family would be fully informed of the rights, benefits and type of assistance available. Efforts would be made to match individual requirements with available, decent, safe and sanitary housing, at economically feasible rents or purchase prices in areas of personal request. Ninety days notice of relocation would be required. Relocation assistance includes moving expenses, supplemental housing payments and informational assistance.

In the case of farm properties, the owner may be eligible for actual, reasonable moving expenses in relocating personal property or an in lieu payment for moving expenses. They may also be eligible for the difference between the payment made for the property purchased by the state and the cost of a comparable replacement farm.

TOTAL COSTS AND FUNDING

Total costs of Joel Marsh Wildlife Area described in the above paragraphs were calculated in 1982 and are broken down into three categories: land, development and maintenance. They are as follows:

| | | |
|--|-------------|-----------------|
| Land | | \$520,000 |
| Development | | |
| establish dense nesting cover - 230 acres @ \$100/acre = | | \$ 23,000 |
| 2 flowages | | \$ 50,000 |
| 5 parking lots and overlook | | \$ 5,000 |
| small pair ponds | | <u>\$ 7,500</u> |
| | Grand Total | \$605,500 |
| Annual maintenance | | \$ 3,000 |

The main flowage would raise the water level close to the township road bordering the west side of Joel Marsh (see figure 15). Preliminary elevation readings indicate that the road would not be threatened by flooding. However, if the road needed to be raised the Department would be responsible for costs. This would be approximately \$9,000.

Money for purchase and development would likely come from state and federal sources appropriated for wildlife management and outdoor recreation use. Federal Pittman-Robertson funds would be sought and if obtained could provide 75% of the money. The remaining 25% would be provided by state ORAP funds. Wisconsin receives about \$2.6 million per year under the Pittman-Robertson funding program. Future funding will probably remain stable in the coming years. The ORAP program amounts to \$60 million over the next 10 years or about \$6 million per year.

DESCRIPTION OF THE AFFECTED ENVIRONMENT

EXISTING PHYSICAL ENVIRONMENT

GEOLOGY

The underlying bedrock of the project area is composed of several undifferentiated sandstones which lie beneath a relatively thin and sometimes broken layer of Prairie du Chien Dolomite limestone. This bedrock is covered with a thick blanket of glacial material that varies in depth from 100 to 150 feet.

Mineral Resources - There are no known commercial mineral resources associated with the bedrock formations (pers. comm. Mike Mudrey, U.S. Geological Survey). Near surface mineral potential includes sand, gravel, peat and marl.

Underlying most of the top soil is ancient river channel sand, usually less than 100 feet thick. Small amounts of gravel deposits are located on the eastern end of the project and in greater quantities further east. Additional amounts of gravel are associated with the sand deposits (pers. comm. Lee Clayton, U.S. Geological Survey).

Within recent years peat soils have taken on importance as a source of energy. The amount, location and type of peat in Joel marsh could possibly be used if the price of petroleum increases substantially. The peat resource would be limited in use to small industries and small municipal power plants because of the relatively small size of the peat deposit (Minn. Dept. Nat. Res., 1979; pers. comm. Anita Sprenger, Wis. DNR energy coordinator).

Marl pits are located near the center of section 32 (see figure 8). Marl mostly consists of manganese and calcium bicarbonates. During the turn of the century when fertilizers were very expensive, marl was mined and used for fertilizing cropland on nearby farms (pers. comm. Lew Posekany, WDNR).

SOILS

The soils of Joel Marsh are composed of two major types. The marsh itself is almost entirely mucks (68% of the project); the surrounding uplands are a mixture of sand and silt loams (32% of the project) (see figure 8).

The muck soils are made up of three types with the Rifle Muck being the most abundant. Seelyville Muck and Markey Muck are soils on the marsh edge. All of these soils are level and very poorly drained with frequent flooding during the year. Annual fluctuations of water levels expose the muck soils to oxygen and enable the soils to trap and retain nutrients brought in by spring floods.

These muck soils are deeper than 50 inches and are not suited for engineering uses such as dike construction or for most agriculture. The soils can be used for cranberry culture.

The majority of muck soils are in the main marsh area but are also found in scattered potholes and depressions surrounding the marsh. Muck soils consistently retain water except during severe drought.

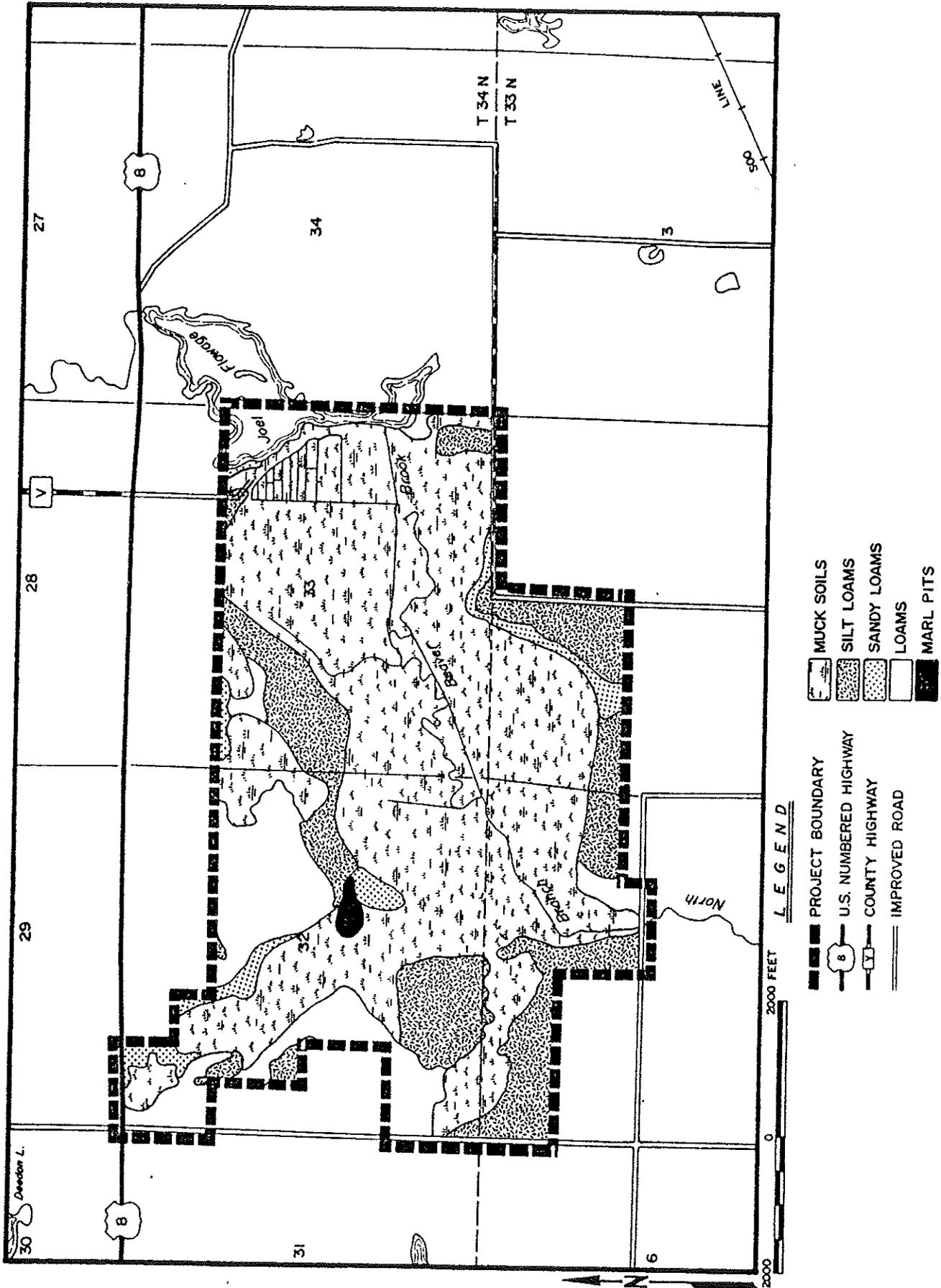


FIGURE 8. GENERALIZED SOILS

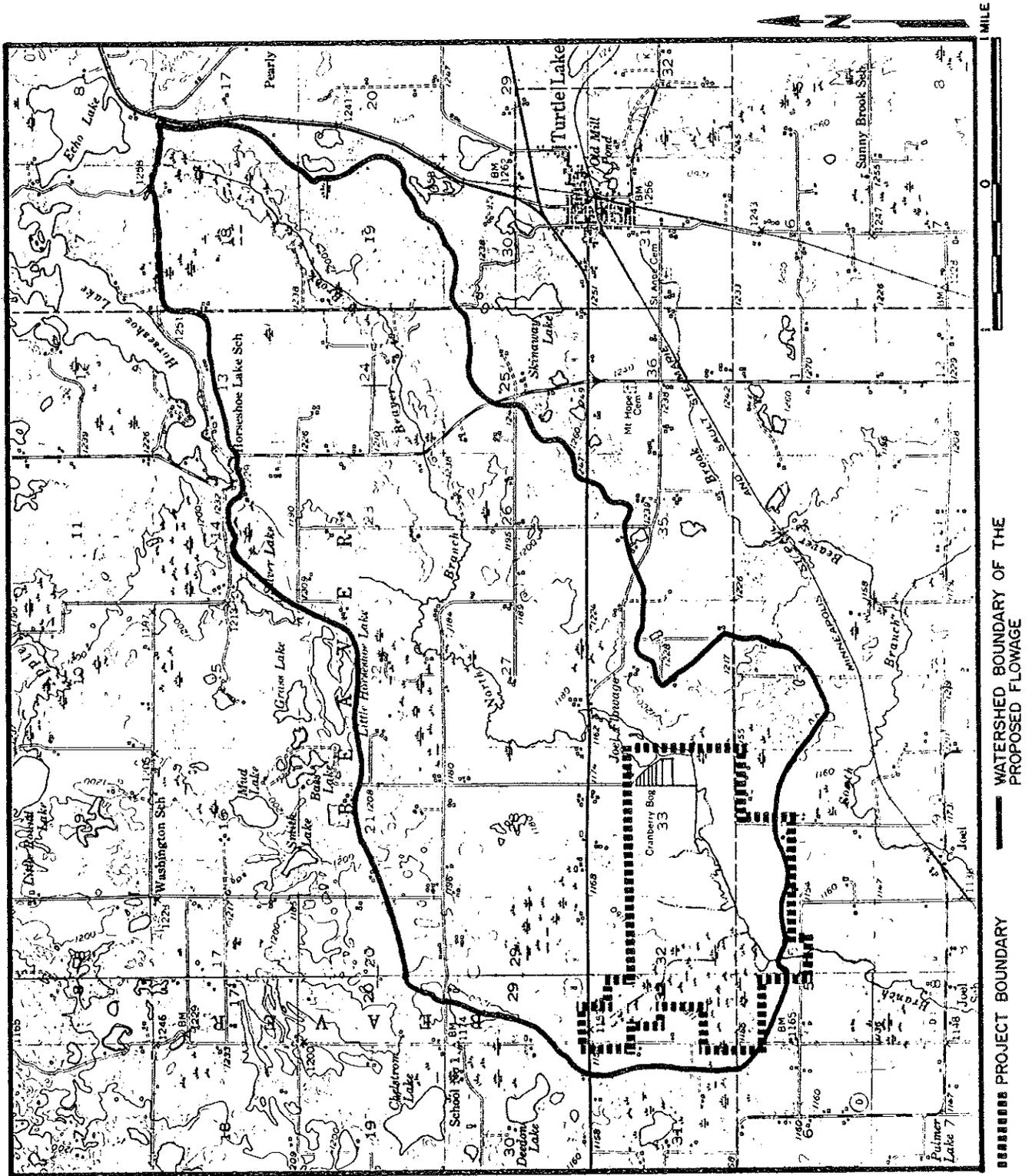


FIGURE 9. NORTH BRANCH BEAVER BROOK WATERSHED AREA

The loam soils that surround the marsh consist of a variety of sandy and silt loams. Generally these soils are undulating, well drained soils and are dark greyish to brown with moderate amounts of organic matter incorporated in them. If the area is not hilly, most of these soils are cultivated either in corn, oats or a hay mixture of grasses and legumes. All the loam soils within the project boundaries are considered suitable for engineering purposes such as road or dike construction.

Two types of soils on the project area are considered prime agricultural soils by the Soil Conservation Service. They are Rosholt loam and Antigo silt loam. These soils total 151 acres or 12% of the entire project. Prime agriculture soils are defined as land best suited for producing food, feed, forage, fiber and oilseed crops and also are available for these uses. They have the soil quality, growing season and moisture supply needed to produce sustained high yields of crops economically when treated and managed, including water management, according to modern farming methods (comm. with U.S. Soil Con. Ser., 1976).

HYDROLOGY

The watershed of the North Branch of Beaver Brook is almost 14 square miles. Beaver Brook begins in a series of small marshes near Echo Lake, flows six miles southwest and enters Joel Flowage (see figure 9). From the flowage, the water is discharged into Joel Marsh. The brook flows through 2 1/2 miles of the marsh and then, two miles further, combines with the South Branch of Beaver Brook. It ultimately joins the Apple River 22 miles further downstream. The stream's depth varies from six inches to three feet. Bottom substrate consists of 50% sand, 40% silt and 10% gravel. Beaver Brook is slow moving throughout most of its length but some pool-riffle areas exist above and below Joel Marsh. Normal summer water flows average three to ten cubic feet per second (cfs). Waterflow has been recorded as high as 20 cfs and a calculated 100 year flood event could produce flows of 500 cfs (DNR, Bureau of Engineering). Low flows have been calculated from available flow data. Two year low flow is 0.8 cfs. Ten year low flow is 0.4 cfs and is the base flow for the brook (DNR, Water Regulation and Zoning). These low flows occur on the average of two and ten years, respectively, for at least seven consecutive days.

Joel Flowage has a 9 1/2 foot dike impounding 64 acres. The maximum water depth behind the dike is eight feet.

Within the 792 acre Joel Marsh, past disturbances have altered the natural hydrology. Ditching in the 1930's lowered the watertable to its current levels. Also, the existing dike for Joel Flowage, in conjunction with 15 acres of cranberry beds, has redirected most of the water flow to ditched channels instead of the natural streambed.

Beaver Brook is hydrologically connected to the marsh. The marsh often has water one to two feet deep during the spring and serves as a large floodwater storage area for the entire watershed. By mid to late summer, most of the marsh is dry enough to support a person walking on it. During the summer and fall, the marsh acts as a water recharge area for Beaver Brook. Eight springs within the marsh contribute a small but constant supply of water. Some of these springs are temporarily dammed by beavers, creating small (1/10 acre) spring fed ponds.

Ground water levels are usually 20 to 30 feet below the ground surface (well construction reports, DNR). Water wells (15) surround most of the marsh and range in depth of 40 to 108 feet deep. All of these wells likely pump from different water bearing sand and rock than those connected with Joel Marsh surface water.

WATER QUALITY

The water flowing out of Joel Marsh is characterized as having low nutrient concentrations with high water clarity. The marsh absorbs and stores nutrients that would otherwise enter the brook (see WETLANDS section). Dissolved oxygen levels in the brook vary with the seasons (as instream temperatures vary) but are usually between four and nine parts per million (ppm). The water is medium-hard with total hardness averaging 130 ppm. Water pH averages near 8.0. Appendix A has a more detailed analysis of the North Branch of Beaver Brook's water quality.

EXISTING BIOLOGICAL ENVIRONMENT

VEGETATION

Historically, the land within the proposed wildlife area was forested with white pine and oak on the uplands and spruce, tamarack and hemlock occupied the lowlands interspersed with wet meadows along the North Branch of Beaver Brook. Logging removed most of this original forest cover during the late 1800's, but the greatest change in the area took place in 1886 when a dam and sawmill were constructed near the southern end of the marsh (the exact place where the proposed main dike would be placed). The marsh was flooded to a reported depth of 20 feet and was used as a log holding pond for the sawmill. Water levels behind this dam fluctuated from the full pool depth of 20 feet to an empty basin leaving large mud flats exposed. In 1904, with the timber resource exhausted, the dam was removed with the intention of draining and farming the marsh. Several miles of drainage ditches were cut into the marsh making the marsh drier than it originally was but never dry enough to seriously consider large scale farming.

Today, the vegetation is a product of disturbances of the past and present (see figure 12). There probably is not a single acre of land on the project that has not been affected by recent human activity. The uplands are now primarily grazed woodlots (153 acres) dominated by aspen and oak with occasional white pine and sugar maple. The ground flora is composed of blue grass (*Poa* sp.), Eurasian weeds such as dandelion (*Taraxacum* sp.), mullein (*Verbascum* sp.) and motherwort (*Leonurus* sp.) and native plants such as Canada goldenrod (*Solidago* sp.) and yarrow (*Achillea* sp.). The remaining uplands are almost entirely in cultivated crops (189 acres) or pasture and will be discussed under Agriculture (page 23).

Wetland vegetation covers 868 acres of the proposed project. The largest type within this wetland area is 792 acres of blue-joint grass mixed with several species of sedges (*Carex*), swamp milkweed (*Asclepias incarnata*), marsh skullcap (*Scutellaria elliptifolia*) and other plants that are typical of wet, open areas (species list in DNR files). This vegetation is uniform throughout the marsh with almost no interspersal with open water.

Wildfires occasionally sweep across the marsh and maintain it in an open grass-sedge condition. Shrubs such as willow (*Salix*) and red-osier dogwood (*Cornus stolonifera*) are kept at low levels.

A forested wetland totaling 61 acres located on the west side of the proposed project is vegetated with quaking aspen (*Populus*) and green ash (*Fraxinus*) with small uplands of white and bur oak (*Quercus*) and paper birch (*Betula*). American elm (*Ulmus*) was more important in the past in these low wooded areas; but because of Dutch Elm Disease, only a remnant population survives.



Figure 10. The main marsh of the proposed area (792 acres) is flat terrain with a uniform blue-joint grass/sedge meadow vegetation cover. Some sections of the North Branch of Beaver Brook were ditched in the past. (Photo: G. Birch)



Figure 11. The uplands surrounding the main marsh are a mixture of pastured woods with scattered oak groves (153 acres), and cultivated fields (189 acres). (Photo: G. Birch)

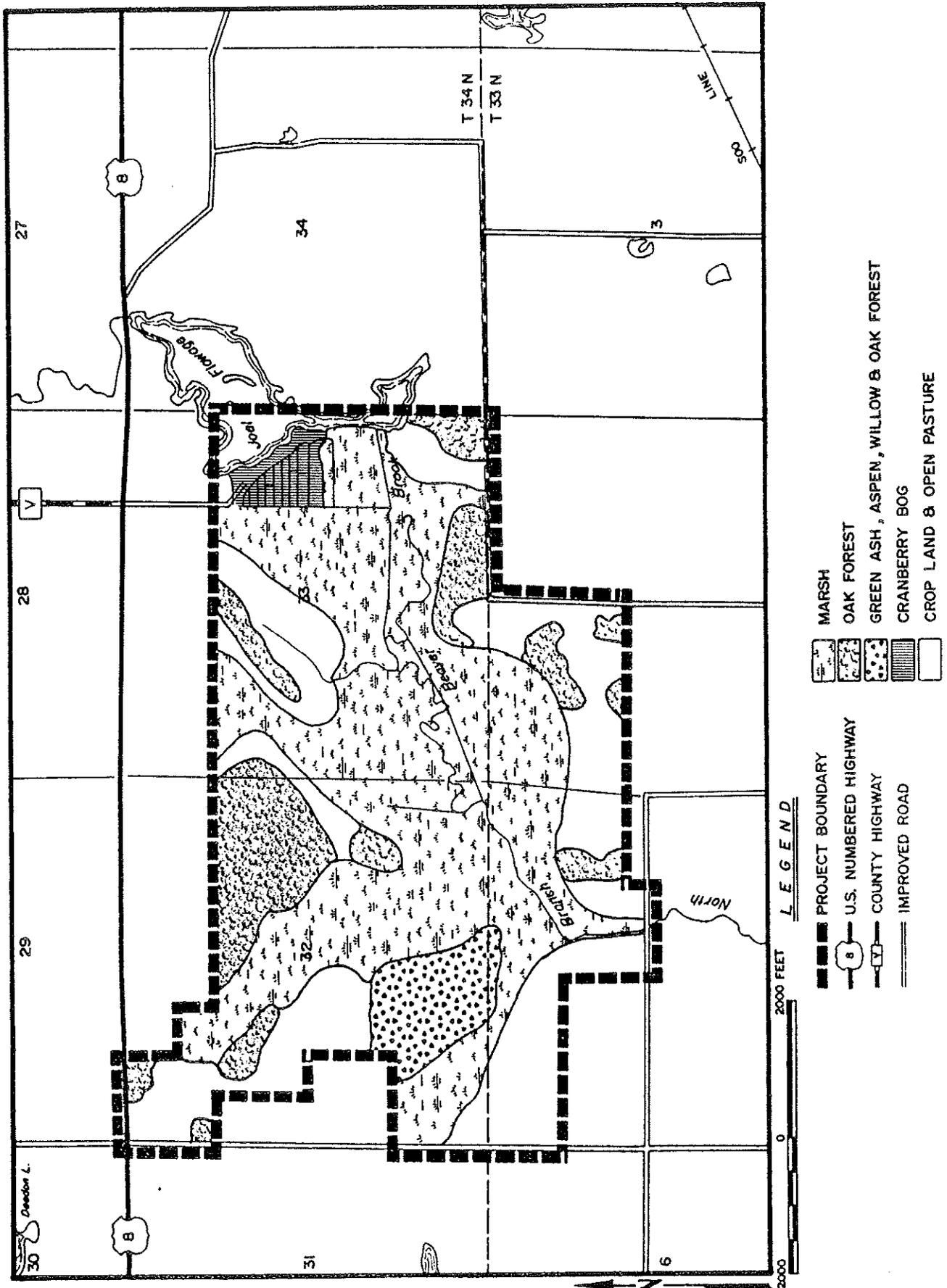


FIGURE 12. VEGETATION

Aquatic vegetation is limited to Joel Flowage and the North Branch of Beaver Brook. The flowage has abundant vegetation growth because of its shallow depth and clear alkaline waters. The dominant plants are white and yellow water lilies (*Nympha odorata* and *Nuphar variegatum*), coontail (*Ceratophyllum* sp.), water milfoil (*Myriophyllum* sp.) elodea, pondweeds (*Potamogeton* spp.) and free floating duckweed (*Lemna* spp.).

WILDLIFE

The mammal population inhabiting Joel Marsh include white-tailed deer, muskrat, beaver, otter, raccoon, least weasel, cotton-tailed rabbit, star-nosed mole, mink and 25 other species. None of these animals are considered uncommon in Wisconsin except the least weasel and star-nosed mole.

Nineteen of the 23 species of amphibians and reptiles present are directly associated with the wetlands of the area. None of these animals are uncommon in Wisconsin except the Blandings turtle which is classified as a threatened species. More discussion on this species can be found under the ENDANGERED AND THREATENED SPECIES section.

Birds are the most numerous and conspicuous group of animals on Joel Marsh. Eighty species have been found in the marsh and surrounding upland area. This list includes only those species that nest and breed within the proposed boundary. However, many other birds that breed further north and west use Joel Marsh as a rest stop or staging area during their migrations. During the spring and fall migration seasons, the most conspicuous birds are geese and ducks. The spring migrants find parts of the wetland flooded most years and in the fall, Joel Flowage provides abundant aquatic vegetation to many diving ducks, coots, grebes and other birds. During the breeding and nesting season, the bird fauna of the marsh is characterized by great blue and green herons, American bittern, red-winged blackbirds, mallards and blue-winged teal, marsh hawk, short-billed marsh wrens, sora and virginia rails. The upland bird life is characterized by red-tailed hawk, owls, red-headed woodpecker, crested flycatcher and several warblers. Mallard, teal and wood duck reproduction is estimated to be between 50 and 100 for the whole marsh.

Ospreys and bald eagles have been noted flying over the marsh but no records of nesting in the proposed area exist. The red-shouldered hawk has also been noted in the area and will be discussed under the ENDANGERED AND THREATENED SPECIES section.

FISH

White suckers, northern pike, chubs, shiners, bluegills and bullheads characterize the populations of fish that occupy the North Branch of Beaver Brook. Large-mouth bass and black crapples are included in the existing Joel Flowage.

Fish habitat on the proposed project's portion of the stream is marginal and not particularly diverse for several reasons. The brook is not large and it was dredged about 1930. In 1936 (and also previous to this date) a dike creating the existing Joel Flowage was constructed, thereby blocking fish runs and spawning activity beyond the dike.

The marsh is not considered a major fish spawning area due to low water levels. Northern pike are known to migrate up the North Branch of Beaver Brook and use Joel Marsh for a spawning area. However, spawning activity is much greater on the lower portions of Beaver Brook and the Apple River. (Richard Cornelius and Jerry Wagner - DNR, Pers. Comm.)

Previous to 1973, the portion of the brook immediately south of the proposed project was managed as a Class III trout stream. Management as a trout stream was discontinued when it was discovered that stocked brown trout were not surviving well.

Carp are not present on any portion of Beaver Brook and most of the Apple River system. The dam at Amery and Black Brook flowage prevent carp movement into Beaver Brook watershed.

ENDANGERED AND THREATENED SPECIES

A pair of loggerhead shrikes, an endangered species, were observed near Joel Marsh during the breeding season suggesting that they were a nesting male and female. The loggerhead shrike is a robin-sized bird that inhabits open farmland, roadsides and field borders. It mainly feeds on insects but occasionally will feed on small birds and rodents. The loggerhead was once common but is now rarely observed. The reason for its decline is uncertain; however, pesticides and "clean farming" are thought to be possibilities (Les, 1979).

Bald eagles and ospreys, both endangered species, have been noted flying over the marsh on an irregular basis, but have not used the area for breeding.

Threatened fauna include red-shouldered hawk and Blanding's turtle.

The red-shouldered hawk was noted once within the proposed area, but whether it nests in the area is questionable. This hawk is most commonly found in wet woods either along large riverine forests or in small creek bottoms. Primary reasons given for this bird's decline are stream straightening, pollution and human disturbance (Wisconsin DNR).

The Blanding's turtle prime habitats are deep marshes and sedge meadows. The main threats to this species are marsh drainage, over-collection and road construction through wetlands, thereby separating nesting areas from hibernating areas. Blanding's turtles are also vulnerable because of their slow maturation; females take 12 years to reach reproductive capability.

No endangered or threatened wild plant species are known to be present on the marsh.

WETLANDS

There are four types of wetlands within the proposed project totaling 868 acres. By far the largest type is the main marsh itself that encompasses 792 acres. Hydrologically, it is classified as a shallow fresh water system with standing water fluctuating from saturated soils to small areas that are more than three feet deep (type II and III). This is almost entirely vegetated by narrow-leaved emergent plants.

Other types of wetlands are the small potholes and depressions (type I) that surround the main marsh. They range from less than an acre to four acres. Their water level fluctuates with seasonal variations in rainfall. These potholes are all shallow wetlands, averaging less than six inches of water during the growing season with some being cultivated during dry years. Those that aren't cultivated are covered completely with a mixture of emergent and wet meadow plants.

Although artificial, the existing Joel Flowage is another wetland system. The entire flowage is 64 acres (the Department proposes to purchase 29 acres including the dike structure). The existing flowage lies upstream from the marsh and acts as a trap for sediment carried by the brook.

There are a variety of wetlands within two miles of the proposed area. They include:

1. tamarack bog with a sphagnum and sedge mat southeast of Joel Marsh
2. more than six shallow pothole wetlands averaging between 20 and 40 acres immediately west of the project
3. deep large, open lakes with associated wetlands two miles northeast
4. Beaver Brook flowing north and south of Joel Marsh contains forested bottomlands and open sedge meadows

Beaver Brook is particularly important because of its direct connection with Joel Marsh. The brook serves as a linear wetland connecting the marsh with the Apple River system ten miles downstream.

All of these wetlands, though altered, perform a variety of ecological functions. Examples of Joel Marsh functions include such things as slowly fluctuating water levels to aid seed germination of certain plants and trapping nutrients which improve downstream water quality. The nutrient trapping also provides a rich substrate for invertebrates such as insects and crustaceans that in turn provide an important food base for other animals. Joel Marsh also provides a degree of isolation important to some animals but not afforded by many surrounding wetland areas because of human recreation and agricultural activities.

Joel Marsh also serves as an area for floodwater storage. The storage capacity is determined by the area of marsh basin and size of the outlet stream (U.S. Army Corp of Eng., 1981). The larger the basin (area in acres x depth in feet) and the smaller the outlet stream, the higher the capacity for storage. Joel Marsh's broad, flat basin and small stream outlet permits the marsh to store large amounts of flood water.

Wetland Regulations - There are several water regulations that exist at the federal, state and county levels. To some extent these regulations also control wetland uses.

Section 404 of the Federal Water Pollution Control Act (Public Law 92-500) authorizes the Corps of Engineers to regulate disposal of dredged materials or placement of fill on wetlands, adjacent to streams with more than 5 cfs water flow on an annual average.

Wisconsin Statutes, Chapter 30 and 31 regulate most alterations of wetlands contiguous to navigable water and is administered by the Department of Natural Resources.

NR 115 (Shoreland Zoning) regulates most activities within a specified distance from streams and is administered by the county planning and zoning committee. Polk County is in the process of rewriting its shoreland ordinance to create shoreland-wetland conservancy districts required in NR 115. This new ordinance will go into effect in 1983 and will apply to the wetlands of Joel Marsh.

The Natural Resources Board must approve the Joel Marsh project before land acquisition and flowage development begins. In their review, they must consider the wetlands policy adopted by the Natural Resources Board under NR 1.95. The policy states that wetlands shall be preserved, protected and managed to maintain, enhance or restore their values in the human environment. The policy also states that it is in the public interest that Department decisions which lead to alteration of or effects on wetlands under its jurisdiction or control are based on the intent to preserve, protect and manage them for the maintenance or enhancement of their values.

EXISTING SOCIAL-ECONOMIC ENVIRONMENT

POPULATION

The population growth in the counties surrounding the proposed project is slightly higher than average for Wisconsin. This region has very similar growth patterns of counties that are near large metropolitan areas such as Milwaukee and Madison in southern Wisconsin. The counties surrounding Joel Marsh are sharing in a nationwide population migration trend from large cities to nearby rural areas and small towns (Newsweek, July 6, 1981). Below, table 1 indicates the magnitude of this population shift for the project area.

Table 1. Population and Trends for the Joel Marsh Area*

| Subdivision | 1970 | 1980 | Percent Change |
|----------------------------|---------|---------|----------------|
| Counties | | | |
| Barron | 33,955 | 38,730 | +14 |
| Burnett | 9,276 | 12,340 | +33 |
| Dunn | 28,991 | 34,314 | +18 |
| Polk | 26,666 | 32,351 | +21 |
| St. Croix | 34,354 | 43,872 | +28 |
| Cities and Villages | | | |
| Balsam Lake | 631 | 960 | +52 |
| Chippewa Falls | 12,351 | 11,845 | -4 |
| Eau Claire | 44,619 | 51,509 | +13 |
| Menomonie | 11,112 | 12,769 | +15 |
| Minneapolis-St. Paul | 744,266 | 641,181 | -14 |
| St. Croix Falls | 1,425 | 1,497 | +5 |
| Turtle Lake | 637 | 762 | +20 |

*Source: U.S. Census Bureau

Several things should be noted in Table 1. While Minneapolis-St. Paul have lost about 14% of their population, this number does not take into account the large growth in the immediate suburbs of these cities. Also, seemingly spectacular growth rates in some very small towns such as Balsam Lake represent the influx of relatively few people.

LAND USE AND OWNERSHIP

On a county wide basis, Polk County has a high percentage of agricultural lands, especially in the eastern and southern portions where the proposed project is located.

Land use in the immediate Joel Marsh area is strongly dominated by agriculture. In Beaver Township where most of the project is located, more than 90% of the land is owned by agricultural interests. The next most important land use (8%) is recreation/retirement land. These are properties, usually less than 40 acres and along lake shores, that are used to build second homes or retirement homes. The remaining 2% is divided among two public agencies; Polk County and the Department of Natural Resources.

Clayton township, which contains a small portion of the marsh, has a very similar land ownership pattern except there are no public lands.

The North Branch of Beaver Brook that flows through the proposed project has a watershed of 8,915 acres in size (see figure 9). Land use within this watershed is outlined in table 2.

Table 2. Land Use Within the North Branch of Beaver Brook Watershed

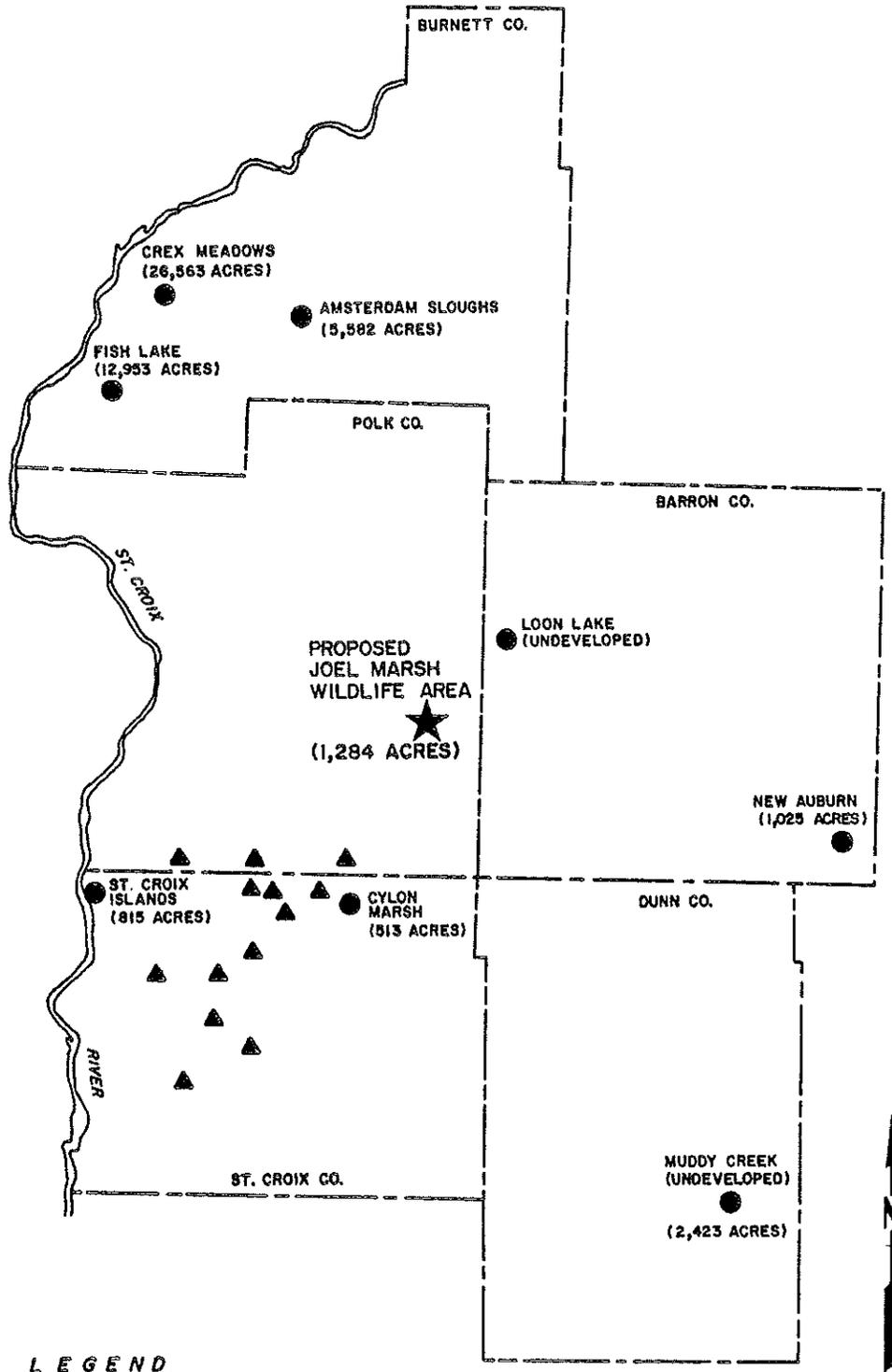
| Land Use | Acreage | Percent |
|--------------------------------|---------|---------|
| Agricultural crops and pasture | 4,214 | 47% |
| Forest | 1,788 | 20% |
| Wetland | 2,913 | 33% |
| Totals | 8,915 | 100% |

The federal Agriculture Stabilization and Conservation Service (ASCS) office has designated Beaver Brook watershed as a special problem area because of heavy siltation and nutrient loads originating from watershed farms. As a result, not only did farms within this watershed receive the usual Agricultural Conservation Program cost sharing money to aid in conservation practices, but also received an additional \$15,000 in 1981 to provide for stream bank improvements, manure storage and terracing to further help control siltation and nutrient loading.

Wetlands - Even though a majority of land is owned by farmers in both townships, many individual farms in this area contain small lakes, ponds and uncultivated wetlands. Some of these areas are kept for recreation such as duck hunting, trapping or for aesthetic reasons. As of 1976, 19% of Polk County's wetlands were drained and cultivated and 42% were used for grazing (WDNR, 1976). This amount of wetland drainage for agriculture is average for agricultural counties of Wisconsin.

Portions of Polk County are designated as an area where federal duck stamp money can be used to purchase wetlands as Waterfowl Production Areas. All the federal wetland purchases have been confined to the southern portion of the county (see figure 13).

Agriculture - The proposed project encompasses portions of 11 private landownerships. All or some portions of nine parcels of land are parts of active farms surrounding the marsh. Land use within the proposed project is outlined in table 3.



LEGEND

- STATE MANAGED AREA
- ▲ FEDERAL WATERFOWL PRODUCTION AREAS GREATER THAN 120 ACRES

FIGURE 13. PUBLIC LANDS PRIMARILY FOR WATERFOWL PRODUCTION IN THE JOEL MARSH AREA

Table 3. Land Use Within the Proposed Boundaries

| Land Use | Acres |
|---|-------|
| Farm (crop) | 189 |
| (pasture) | 41 |
| Forest (under farm use as grazing or woodcutting) | 153 |
| Wetland - open marsh | 792 |
| cranberry bog | 15 |
| wooded swamp | 61 |
| open water | 33 |
| Total Acreage | 1,284 |

Cultivated lands in the proposed project total about 15% of the area; 151 acres (12%) are considered by the Soil Conservation Service as "Prime Agricultural Soils" (see SOILS section for definition). The usual crops grown in the Joel Marsh area are a rotation of alfalfa hay and corn. The average yield of corn on cultivated land is 80 bushels per acre.

Adjacent to Joel Flowage is a cranberry farm that includes approximately 15 acres of cranberry beds.

Zoning - Land use zones surrounding the proposed project consist mainly of one designation - agriculture. Uses within the agricultural zoning district of Polk County include:

1. general farming
2. any residential use
3. mobile home parks
4. construction of dams, telephone and transmission lines

Many other uses may be permitted pending a public hearing and a decision by the Polk County Board of Adjustments.

In Beaver Township, an exception to the agricultural zoning includes Joel Marsh which is designated a conservancy district. This designation is primarily "to protect and preserve the natural character of certain lands for their values to wildlife, water conservation, flood control, forestry and other public purposes" (Polk Co. Zoning Ordinance, 1973). The main uses of lands within this designation include:

1. grazing
2. harvesting of wild crops
3. hunting, fishing and trapping
4. dams, power plants and flowages

Again, other uses may be permitted, some pending public hearing and a decision by the Polk County Board of Adjustments.

In Clayton Township, a shoreland zoning ordinance is in effect within 300 feet of the ordinary high watermark of the North Branch of Beaver Brook; in essence this would likely include all of Joel Marsh in this township. The purpose of the shoreland district is to "protect the waters and shorelands of Polk County by providing for safe and orderly shoreland development" (Polk Co. Shoreland Ordinance, 1973). In this district, residential, recreational and conservancy uses are permitted and a limited number of commercial uses serving recreational needs are allowable as special exception uses.

Polk County is in the process of adopting a more restrictive ordinance under NR 115 (Wisconsin Administrative Code) to protect shorelands and wetlands adjacent to navigable streams such as Joel Marsh.

HISTORIC AND ARCHAEOLOGIC FEATURES

Joel Marsh and the surrounding area has never been systematically surveyed for sites of archaeological or historical significance. There are four locally known sites that may have state significance. Two of these sites are described under Archaeological Areas in the Proposed Action section and have already been disturbed by cultivation for many years.

A third area that may be of historical significance is the old Barker dam site built by Joel Richardson, the namesake of the marsh. The foundation of the old dam is still visible and is located where the largest flowage dike would be constructed. A fourth area of interest is the marl pit (see figure 8) where numerous Bison bones were collected. This is one of two sites in Wisconsin where intact Bison bones have been recovered (pers. comm. V. Tanner and J. Thompson, Clayton and Amery, Wisconsin, and William Green, Wis. Historical Society).

RECREATION

Local - The present recreational use of Joel Marsh is limited due to it being entirely in private ownership. Table 4 indicates the estimated annual recreational use of the marsh and immediate surrounding uplands.

Table 4. Recreation Usage of Joel Marsh Area

| Activity | Number of Participant Days* |
|-------------------------------|---|
| Deer Hunting | 75 - 100 |
| Upland and Small Game Hunting | 250 |
| Waterfowl Hunting | 100 - 150 |
| Trapping | 100 - 200 |
| Fishing | 100 - 500+ (fluctuates widely and almost entirely on the existing Joel Flowage) |

*A participant day is each visit from one person

Source: Wisconsin DNR, 1980

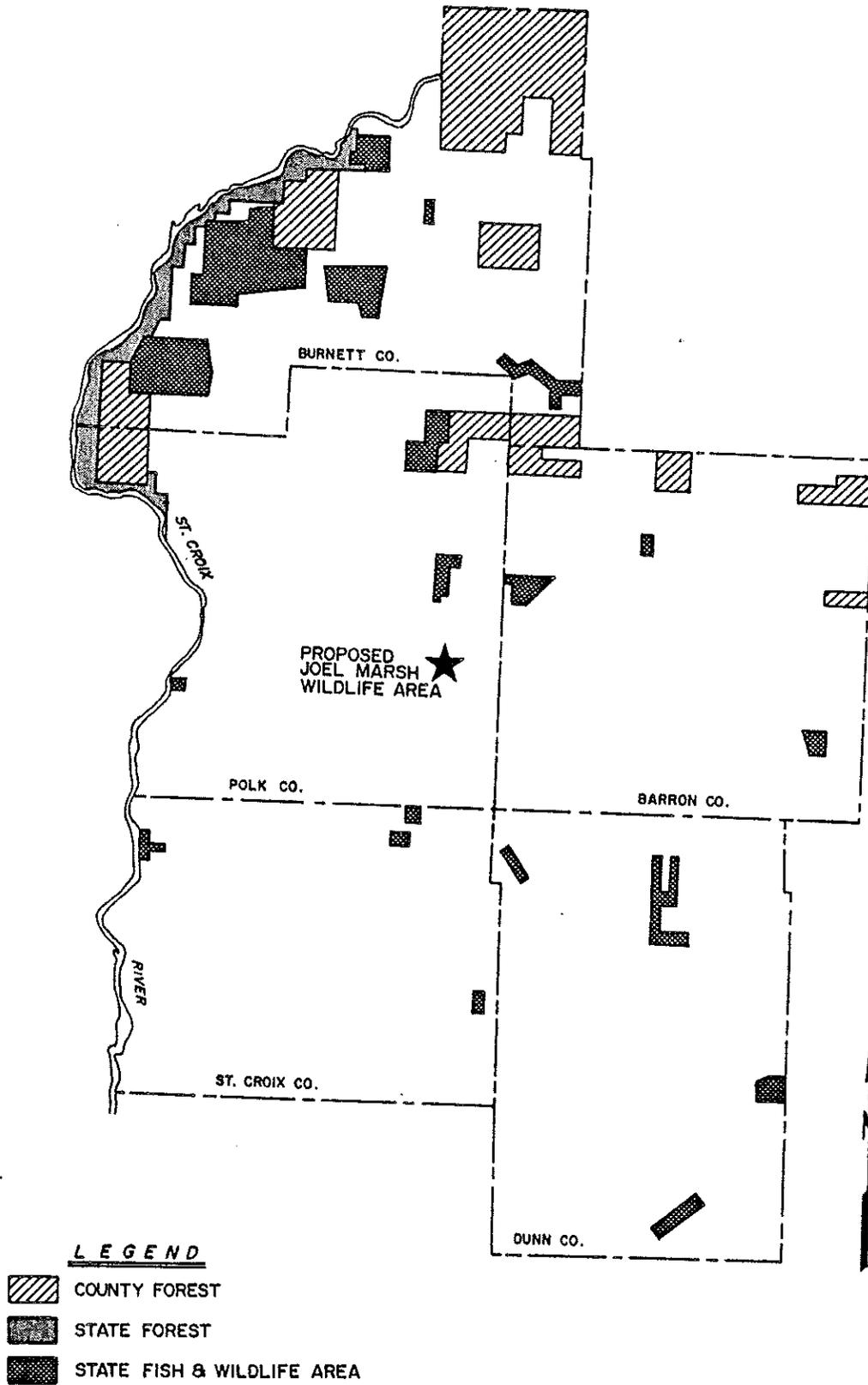


FIGURE 14. GENERALIZED MAJOR PUBLIC OPEN SPACE IN THE JOEL MARSH AREA

Deer hunting provides a small but consistent recreational activity. Current waterfowl hunting is concentrated on the brook and existing Joel Flowage. Small game hunting (pheasants, squirrels and rabbits) is scattered throughout the marsh uplands. Fishing is done mainly on Joel Flowage and is highly variable from one year to the next depending on fish winter kills and water flows. Fish species taken include northern pike, large-mouth bass, bluegills, crapples, bullheads and white suckers. Little fishing activity occurs on the portion of North Branch of Beaver Brook within the proposed project boundary. Trapping provides both a recreational experience and an economic pursuit. Joel Marsh has about four to five trappers who regularly trap muskrat as the single most important animal with some beaver and mink also taken.

Other recreational uses such as cross country skiing, snowshoeing, nature hiking and birdwatching are at very low levels. Canoeing is usually done in conjunction with hunting or trapping. There is also a limited amount of snowmobiling by private landowners on their own lands.

Regional Recreation - Included in the regional recreational picture (Polk, Barron, Burnett, St. Croix and Dunn Counties) is a wide variety of recreational opportunities and publicly owned open space. These lands include county forest and parks, state owned forests and wildlife areas, and a National Wild and Scenic River (St. Croix River). Figure 14 outlines these areas in relation to the proposed project.

Most of the public lands are in northern Polk and Burnett Counties. Polk County has over 31,000 acres open to the public. Despite this public land, most of the hunting in this region is done on private land. For this reason, all county recreation plans (except Dunn County) report that the supply of hunting lands is adequate. However, this conclusion is based on the assumption that private lands will continue to supply the majority of hunting opportunity in the future.

Fishing in Polk and surrounding counties is very popular. The abundance of fishing lakes and streams is adequate to meet present and future demand if public access can be increased on existing lakes and streams and if pollution does not reduce the capabilities of these waters to produce fish (St. Croix County, 1970; West Central Wisc. Regional Planning Comm., 1978).

One of the most important influences on recreational use in this region of Wisconsin is the close proximity of the Minneapolis/St. Paul metropolitan area. Several of the county recreation plans mentioned above indicate that individual counties feel little or no obligation to accommodate the recreational needs of the large influx of people from Minnesota and have reflected this in their locally oriented recreational planning.

An example of the level of nonlocal use is that 75% of the bowhunters in Burnett and Polk Counties are from Minnesota (Wisc. DNR records). The Crux Meadows area attracts 35% of its use from out of state, almost entirely from Minnesota (pers. comm. Paul Koolker, Crux Meadows Mgr.). While these two examples do not represent all types of recreation, they do indicate that substantial use of Polk County's recreation land originates from Minnesota. However, the proposed project area is located several miles east of the prime recreation lands of Polk County. The Joel Marsh area does receive small amounts of nonresident use, but the predominant land use is agriculture and does not provide the attraction of the lake area and large hunting grounds located north and west of Joel Marsh (Gary Spanel, Polk Co. Zoning Administrator; West Central Regional Planning Commission).

The 1982 Wisconsin Outdoor Recreation Plan identifies the loss of wildlife habitat as the number one issue related to recreation in the west central region. Specifically, the problem relates to the loss of wetlands in eastern Polk County through intensive agriculture. Wetland losses degrade water quality for swimming, boating and for reproduction of fish and wildlife species.

AESTHETICS

Joel Marsh is an open flat wetland dominated mostly by grasses. The North Branch of Beaver Brook flows through the marsh area either meandering in its natural channels or through straight ditches. On the northeastern end of the proposed project the brook is interrupted by the nine foot high flowage dike that gently arcs across this end of the marsh. At the foot of the dike are uniform cranberry beds that strongly contrast with the natural marsh vegetation.

The surrounding uplands are flat to slightly rolling intermixed with open farm fields, small woodlots and occasional groups of farm buildings. The views of the proposed project area from the surrounding roads are mostly of farm buildings and fields with limited views of the marsh itself.

TRANSPORTATION

Highway 8 borders part of the proposed wildlife area and crosses Joel Flowage on its northern edge. This highway is one of Wisconsin's major east-west travel corridors. Township roads surround the remainder of Joel Marsh and primarily serve as access to local farms.

UTILITIES

The Dairyland Power Cooperative has plans to construct a moderate sized (161 kv) power line from the Apple River substation to the Barron substation in 1986. The exact route for the line hasn't been selected yet but Joel Marsh lies in a straight line path between the two substations (Advanced Plan 3, Western Wisc. Utilities, Sept. 1981).

EMERGENCY FACILITIES

The nearest fire departments are located in Turtle Lake and Clayton, three and six miles away respectively. Both fire departments are volunteer staffed. Police protection is the responsibility of the Polk County Sheriff's Department.

FISCAL SETTING

The fiscal setting for the townships and county where the project area is located is outlined in table 5. This table shows the tax status for the area as of 1982 and is used as a basis for evaluating the impacts of the proposed land acquisition.

Table 5. Fiscal Setting of the Proposed Area

| | Beaver Township | Clayton Township | Total |
|-----------------------------------|-----------------|------------------|--------------|
| Full Valuation of Townships | \$21,248,300 | \$21,019,000 | \$42,267,300 |
| Full Valuation of Proposed Area | \$ 324,486 | \$ 168,413 | \$ 492,899 |
| Taxes Collected for Proposed Area | \$ 2,377 | \$ 1,234 | \$ 3,611 |
| Total Levy for Municipality | \$ 343,448 | \$ 366,237 | \$ 709,685 |

ALTERNATIVES TO THE PROPOSED ACTION

DO NOTHING

In the absence of this proposed project, the future of Joel Marsh would likely depend on the Wisconsin Shoreland Management program and the cranberry market.

The Wisconsin Shoreland Management program (Sections 59.971 and 144.26, Wisconsin Statutes, and NR 115, Wisconsin Administrative Code) requires counties to adopt zoning regulations to protect all shorelands and wetlands. Polk County is now (1982) reviewing wetland maps of the whole county provided by the Department. The county will then proceed to develop an ordinance to protect shorelands and wetlands adjacent to navigable streams such as Joel Marsh. This process may take up to two years (Gary Spanel, Polk Co. Zoning and Larry Danman, DNR).

Under the new ordinance, activities that now occur on Joel Marsh such as grazing, hunting, timber harvest and cranberry culture, could continue. Ditching, filling or tilling of the main marsh would not be allowed.

Further marsh development for cranberry culture could continue. Additional portions of the main marsh (approximately 50-70 acres) could be converted to cranberry farming. Presently, rapid expansion of cranberry operations is occurring in other counties of Wisconsin. Another important reason for expansion is that the federal marketing rule limiting cranberry bed expansion was eliminated in 1979.

If the proposed wildlife area is not established, land use in Joel Marsh would remain about the same because of the Shoreland Management program. The notable exception would be that 50 to 70 additional acres may be developed into cranberry beds on the east end of the marsh. Cranberry development would be restricted to this acreage because of the limited flow and size of the brook and existing flowage (DNR Water Reg. and Zoning).

Land use patterns on the uplands surrounding the marsh are also likely to remain stable. Agriculture would remain the dominant land use for many years because of good soils. Construction of homes in the proposed area may occur but would be widely scattered. The Joel Marsh area is not within an active home building region. Most new developments are being built near lakes and major streams north and west of the marsh (pers. comm. Gary Spinnell, Polk County Zoning).

Without the proposed project, recreational opportunities, including hunting, bird watching and hiking would not be realized. Those people that would use the proposed area would go elsewhere, probably 20 to 40 miles further north or west. Also, more use could possibly be made of ponds and marshes on private lands.

The amount of habitat for ducks and many other wetland birds, mammals, amphibians and plants would probably remain at present levels. No additional production of waterfowl or any other wildlife would occur and habitat development for some endangered animals would not occur.

Money not spent on land acquisition and development would be available for use on other Department projects.

ALTERNATE PROPERTY BOUNDARIES**EXPAND**

The Draft Master Plan which was presented to the Natural Resources Board in September, 1980, proposed establishment of a project of approximately 2,140 acres (see figure 3). Inclusion of an additional 900 acres would involve the purchase of 300 acres of forest and marsh, and 600 additional acres of cultivated land. The entire existing Joel Flowage could be included in the project boundary.

Management opportunities and flexibility on the property would be enhanced with the additional lands. For example, larger prairie burns or greater selection of water levels for the proposed flowage would be possible. In addition, water levels on existing Joel Flowage could be manipulated for fish and wildlife management purposes. The potential for impacts to surrounding private lands such as air pollution from controlled burns, and hunter trespass would be lessened. The additional lands would also provide more isolation from human activity for all forms of wildlife.

Soil erosion would be reduced because cultivation on 600 acres would decrease or stop and because prairie grasses would be planted on those acres. Anticipated production of waterfowl would rise from 600 ducks to 900 ducks per year because of increased availability of nesting cover and small pothole areas. Other species of animals such as pheasant, bobolinks, meadowlarks, badgers, woodchucks, rabbits and other wildlife that inhabit grasslands and edge habitats would also benefit from additional habitat.

The primary socioeconomic impact would be the cessation of farming operations on 7 farms and the removal of 600 additional acres of agricultural land from production, more than 300 of which are considered prime agricultural land. Surrounding residents would realize a tax increase in present yearly property taxes that would range from \$0.10 for Polk County residents to \$6.00-\$7.00 for Turtle Lake school district residents (\$50,000 property valuation).

Further fiscal impacts would result from the elimination of the agricultural income for the local community.

The acquired acreage would be about 0.4% of the total corn-grain acreage in Polk County. This would be 3 1/2 times greater than the total of the proposed plan.

Costs associated with land acquisition would approximately double (\$1,200,000).

Recreation opportunities would increase for small game hunting, hiking, cross-country skiing and nature study. Waterfowl hunting opportunities would increase only slightly as most of this additional land would be uplands.

REDUCE

Reducing the project boundary would have varying effects depending on what lands were deleted from the proposed plan. If croplands were not purchased, those lands could remain in production and crop income losses would not take place. The cranberry farm would still be subject to purchase but the upland farm, to be purchased under the proposed plan, could remain in operation.

Land acquisition costs would decrease.

Deletion of croplands would reduce annual waterfowl production because of the lack of dense grass cover to conceal nests. It would also increase predation losses. The proposal's benefits to a variety of wildlife inhabiting the open grasslands would be largely foregone.

Small game hunting opportunities would be almost eliminated on the project.

If some wetlands were excluded from purchase, the level topography of the marsh would allow the proposed flowages to flood private wetlands. Flooding easements would have to be purchased or flowages could not be built.

ALTERNATE DEVELOPMENT

POTHOLES AND DUGOUT PONDS

The Department could purchase the proposed amount of land but not develop the flowages or service roads now planned. Other aspects of the proposed plan such as prescribed burns, parking lots and an overlook could still be developed.

As a substitute for the flowages, draglines or bulldozers could create potholes or small dugout ponds. Constructing potholes and ponds would create less open water but duck use per acre of open water would increase in comparison to flowages (Linde, 1969). Also, ducks are attracted to concentrations of small and large ponds, especially for breeding purposes.

The cost of digging 0.01-0.05 acre ponds (20 x 30 feet) would vary. Under conditions similar to those on Joel Marsh, it costs approximately \$200 to dig each pond. Larger ponds (1/4 - 1/2 acres) for duck broods are much more expensive. This includes overhead and other related expenses (per. comm. Dave Everson, DNR). Table 9 below compares flowage and pond construction costs and expected duck production.

Table 9. Comparison of flowage and pothole costs and duck production.

| <u>Flowage</u> (proposed plan estimated) | <u>Ponds</u> (estimated) |
|--|------------------------------------|
| 1 Dike = \$25,000 | One pond (0.01-0.05 acres) = \$200 |
| Duck Production = about 600 | 125 ponds = \$25,000 |
| | Duck Production = about 400 |

Fire might also be used to burn the marsh to create open water areas. During dry years, fires could be started in the peat soils and allowed to burn. When spring runoff occurs, these burned holes would fill with water creating deep water marshes (Beule, 1979). Although the use of fire is inexpensive; it is not without problems. It is difficult to control, and size and depths of burns are unpredictable (Linde, 1969). Also, much of the peat in Joel Marsh is semipermanently wet. Opportunities to burn such soils may come only every 20 or 30 years.

Both mechanically dug ponds and burning have other advantages:

1. The resource resulting from this project development would more closely resemble and function like the existing natural wetland (see WETLAND Impacts) including nutrient retention.
2. Potential impacts to water quality would not occur.

3. The natural fluctuation of water and proposed burning would maintain present dense grass-sedge vegetation.
4. Maintenance costs would be lower.
5. Particular land purchases would not be as critical: development could proceed even with private inholdings in the marsh.

Disadvantages of the ponds would be:

1. Inability to manipulate water levels and stimulate faster growth of waterfowl foods.
2. Dredge spoil from the ponds would have to either be spread across the marsh or hauled away which would greatly increase costs.
3. Geese, cormorants and several other species of birds would not be attracted to the area because the amount of open water would be too small.
4. Productivity of furbearers would be much less than with the proposed flowage.
5. After the duck nesting season, the small ponds provide poor brood rearing areas: the broods would have to move to larger bodies of water.

PURCHASE NATURAL PONDS AND DEEP MARSHES

An alternative is to acquire existing natural ponds (potholes) and deep marshes. There are two possible areas near Joel marsh that already have existing concentrations of pothole marshes; one immediately north and west of the proposed project (see figure 17) and a second area on the Polk-St. Croix County line about 20 miles southwest of the proposed project. This latter area is already designated for purchase by federal Waterfowl Production Area (WPA) funds (see figure 13 for examples).

The main differences between acquiring natural marshes and the proposed Joel Marsh plan is that acquiring natural marshes preserves existing wetlands; the proposed plan changes a drained and altered marsh into a marsh more productive for waterfowl and some other forms of wildlife. In this sense, the proposed plan helps to mitigate loss of wetlands statewide for waterfowl. Natural marshes in the surrounding area will most likely be available and retain their current value for waterfowl even without state ownership. Existing water regulation laws and shoreland zoning generally protect these natural marshes from future drastic alterations detrimental to wildlife.

Both the proposed plan and natural marshes have additional advantages and disadvantages for wildlife, landowners, users, and different types of environmental and monetary costs. The following is a comparison between the two courses of actions.

- Natural marshes would not have the adverse effects on water quality.
- Purchasing natural marshes would not alter wetlands as the proposed plan would.
- Managers cannot manipulate water levels on natural marshes. They must depend on natural water fluctuations.

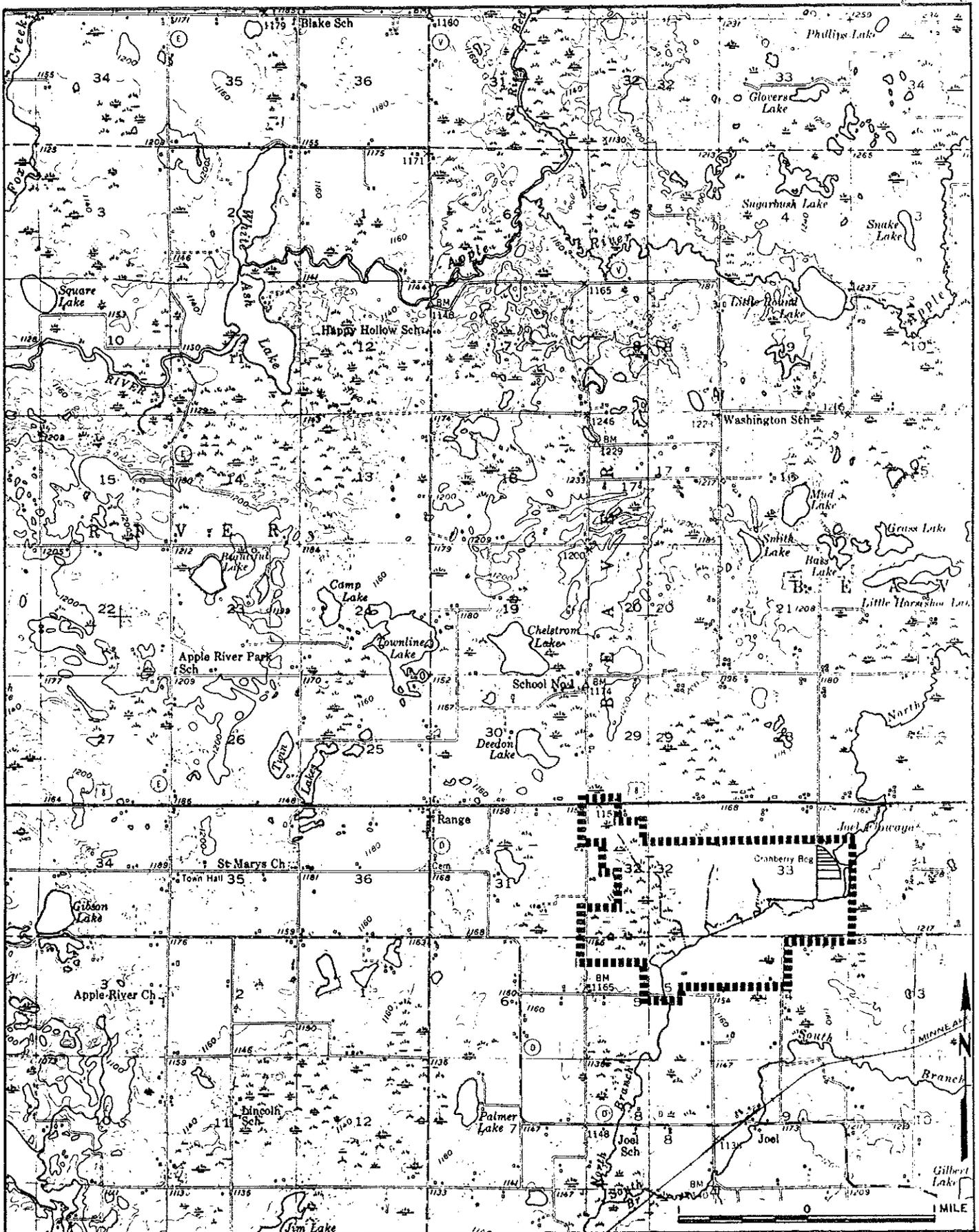


Figure 17. A possible alternative to the proposed plan is to purchase natural potholes (ponds) or natural deep marshes. The above map illustrates the abundance of these types of wetlands north and west of Joel Marsh

- The natural marshes would probably be scattered blocks of land with several wetland types. The proposed plan would also have several types of wetlands but in a single large block of land. The larger block of land would provide habitat for a larger diversity of birds and other animals, including some endangered and threatened species.
- Natural marshes have no construction costs although there would still be maintenance costs in the form of burning, brushing and wood duck house placement.
- The natural marshes would not attract migrating waterfowl like the proposed plan would.
- The natural marshes would be less known to hunters and would tend to disperse hunters over a greater area. However, the proposed plan would have a greater total hunter carrying capacity because of the attractiveness of the proposed plan to waterfowl.
- Because of the smaller size, natural marshes are more limited in total recreation potential, e.g., hiking, deer hunting.
- The proposed plan is dependent on the Department purchasing almost all the land within Joel Marsh. The inability to acquire certain parcels of land would delay the construction of the flowages for the foreseeable future. The purchase of natural marshes would not involve this potential complication.

BUILD A THIRD DIKE

The Department could construct a third dike on the proposed wildlife area (see figure 18). The additional dike would provide deeper water on 60 acres of marsh. But mainly an additional dike would add flexibility to management by providing deep marsh habitat for all wetland animals during a drawdown of the main flowage. When the main flowage is refilled, populations of animals would recover more quickly. To some extent, the existing Joel Flowage, located on the opposite end of the project, would provide the same function of a refuge during drawdown.

The dike would be approximately 2,700 feet long and would require four times more mineral soil to be excavated from the uplands to construct the dike's core. The cost would be at least \$30,000. Also, the dike may increase water depth to where the township road on the west side of the project would need to be raised at a cost of about \$9,000.

PURCHASE EXISTING JOEL FLOWAGE

This alternative would purchase the entire existing Joel Flowage on the northeast side of the marsh. The proposed plan already includes about 29 acres of the flowage including the dike structure. The existing flowage has good habitat for merganser and wood ducks because of its heavily wooded shoreline and is used by a variety of waterfowl as a stopover point during spring and fall migrations. There are also several beaver lodges on the southern end of the flowage. The surrounding land use has 20 to 30 acres of agricultural lands but is otherwise wetlands or forests. The existing flowage would also enhance the proposed flowage by acting as a nutrient trap and providing a more stable water flow.

At least some of these same qualities would remain intact whether the Department purchased this area or not. This is mostly because of water regulations administered by the Department (NR 115 and 116 Admin. Code and Chapters 30, 31, 59 and 144 Wis. Statutes). There is a possibility of a housing development on the west shore of the existing flowage. Although present zoning would not allow this, zoning could be changed in the future.

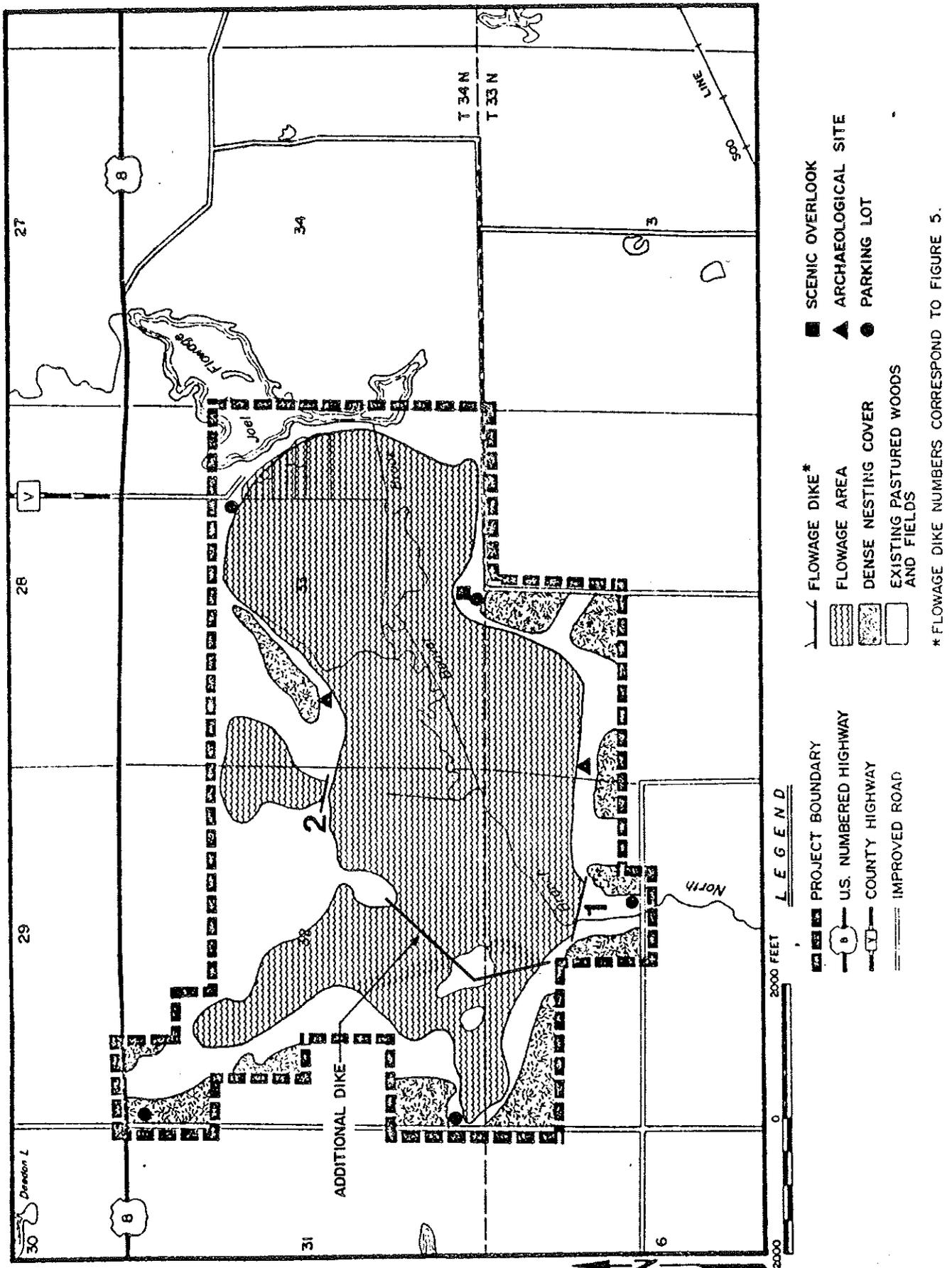


FIGURE 18. AN ADDITIONAL DIKE AS AN ALTERNATIVE TO THE PROPOSAL

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Appendix A. Water chemistry of North Branch of Beaver Brook.

Water samples were collected on eight separate days from July through September, 1981.

| ITEM | AVERAGE (8 samples) | RANGE |
|---|---------------------|--------------------|
| 5 day biochemical oxygen demand | 1.5 mg/l | .8 - 2.5 mg/l |
| pH | 7.9 | 7 - 8.2 |
| total residue | 171 mg/l | 162 - 184 mg/l |
| total volatile residue | 46 mg/l | 32 - 64 mg/l |
| nonfilterable solids | 0 mg/l | 0 - 1 mg/l |
| volatile nonfilterable solids | 0 mg/l | 0 mg/l |
| total phosphorous | 0.06 mg/l | 0.04 - 0.08 mg/l |
| ortho-phosphorous | 0.021 mg/l | 0.013 - 0.029 mg/l |
| total Kjeldahl nitrogen | 0.6 mg/l | 0.5 - 1.0 mg/l |
| ammonia nitrogen | 0.02 mg/l | 0.02 - 0.03 mg/l |
| nitrate-nitrite (NO ₂ -NO ₃) | 0.10 mg/l | 0.06 - 0.13 mg/l |
| total alkalinity (CaCO ₃) | 126 mg/l | 100 - 138 mg/l |
| conductivity at 25°C | 253 MICROMHO | 200 - 280 MICROMHO |
| total hardness (CaCO ₃) | 130 mg/l | 108 - 138 mg/l |
| water flow (cubic feet per second) | 5.2 cfs | 3.6 - 7.6 cfs |

Appendix B. Reactions of plant populations to flooding and fluctuating water levels.

Some wetland plants that would decrease in Joel Marsh because of the proposed flowage.

Some wetland plants that would increase in Joel Marsh because of the proposed flowage.

Swamp milkweed - *Asclepias incarnata*
 Bluejoint grass - *Calamagrostis canadensis*
 Marsh marigold - *Galitha palustris*
 Joe-pye weed - *Eupatorium maculatum*
 Ragged-fringe orchid - *Habenaria lacera*
 Marsh skullcap - *Scutellaria epilobifolia*
 Purple meadow rue - *Thalictrum dasycarpum*
 Marsh-bell flower - *Campanula aparinoides*
 Meadow anemone - *Anemone canadensis*
 Swamp thistle - *Cirsium muticum*
 Small bedstraw - *Galium trifidum*
 Swamp candles - *Lysimachia terrestris*
 Hardhack - *Spiraea tomentosa*
 Blue vervain - *Verbena hastata*

Sedges - *Carex aquatilis*
C. lacustris
C. pseudo-cyperus
 Cattails - *Typha* spp.
 Bur-reed - *Sparganium americanum*
 Bulrushes - *Scirpus validus*
S. acutus
 Smartweeds - *Polygonum coccleum*
P. sagittatum
 Cut grass - *Leersia oryzoides*
 Barnyard grass - *Echinochloa* spp.
 Water-dock - *Rumex* spp.
 Pondweeds - *Potamogeton pectinatus*
P. natans
 Elodea - *Elodea*

Sources: Yeager, 1949; Kadlec, 1962; Robel, 1962; Harris and Marshall, 1963; Burgess, 1969; Read, 1978.

Appendix C

Review Letters from Public Agencies
that Reviewed the Draft Environmental Impact
Statement and the Departments Responses

Department Responses to Agency Review Letters (Match the number of response with numbers indicated on review letters).

1. Mining for peat, marl, sand or gravel would be prohibited under section 144.80 (Wis. Stats).
2. Mineral resources within the wildlife area are discussed in this final environmental impact statement.
3. Peat resources are present on Joel Marsh and are mentioned on page 12.
4. Joel Marsh is a discharge area for the North Branch of Beaver Brook. While the immediate groundwater would raise slightly (3-5 feet), reversal of groundwater flow is unlikely.

There are 15 water wells within 1/2 mile of the marsh and range in depth of 40 to 108 feet deep. All of these wells pump from different water bearing sand and rock than those connected with Joel Marsh surface water.
5. Further work on this question was conducted between the Draft and Final Environmental Impact Statement. Page 36 and paragraph discuss this more fully.
6. The Department of Natural Resources has coordinated with the Department of Transportation (see letter from D.L. Wilson, Department of Transportation) and with both affected townships. See page 47.
7. Done.
8. All areas that would be affected by the flowage would be surveyed i.e., the dike site and flowage basin.
9. The proposed acquisition is limited to south of Highway 8. If auxiliary lanes would be needed on Highway 8, there would be room to place them at township road intersections.
10. Dense nesting cover would not restrict vision at highway intersections. The nesting cover would be established at a much lower elevation than the highways are.
11. Noted. This would be implemented.
12. The proposed flowage would not affect the flow of water under the Highway 8 bridge. The established elevation for the flowage would be from 1,138 to 1,145 feet above sea level.
13. Done.
14. The alternative of acquiring the entire existing Joel Flowage is examined on page 35.
15. The sentence was rewritten to read that during migration 500 to 1,500 ducks per day would utilize the flowage.

APPENDIX D

MASTER PLAN COMMENTS

By: Richard Dexter, Compliance Coordinator
Representing: The State Historical Society
The Historic Preservation Division
Date: June 9, 1980

In reviewing the concept element of the Joel Marsh Wildlife Area Master Plan, I noted with interest the mention of a prehistoric Indian site near the southern boundary of the Wildlife Area and the remains of a dam and sawmill on the south end of Joel Marsh. Both sites were unknown to us.

I would appreciate receiving any additional information you may have regarding these sites; specifically, I would like a large scale map showing their respective locations so that we may include these sites in our inventory.

DNR RESPONSE: Information provided as requested.

There is some discrepancy in the Concept Element regarding the number of prehistoric archaeological sites known to be present in the Wildlife Area. The map indicates that there are two sites on the uplands south of the west branch of Beaver Brook; the paragraph regarding historical and archaeological features, however, mentions only one archaeological site. I would appreciate it if you could clarify this matter for me.

DNR RESPONSE: Clarified in text and to S.H.S.

This brings me to a more substantive comment regarding the working of the Concept Element as it concerns historical and cultural properties. The presence of the prehistoric site is but one indication of the relatively high density of prehistoric cultural material that can be found in this part of Polk County. While we have not previously received any reports of artifactual material in the Wildlife Area, a large number of sites have been reported from the surrounding area.

We believe that there is a high probability that there are many other prehistoric sites in the Wildlife Area in addition to the one or two already discovered. We recommend that prior to any ground-disturbing activities an archaeological survey be made of the areas to be affected. This will insure that potentially valuable scientific information is not inadvertently destroyed.

DNR RESPONSE: Noted; survey pending.

Finally, as the recommended management and development program calls for the continued acquisition of land within the proposed Wildlife Area boundaries, a standard review procedure should be established to ascertain whether any of the buildings on the properties to be acquired are of potential historical or architectural significance.

DNR RESPONSE: Review will be accomplished.

If the land acquisitions or development projects involve federal funds, licenses or permits, our further review will be required for compliance with Section 106 of the National Historic Preservation Act of 1966 and its implementing regulations (36 CFR Part 800).

By: Thomas Evans
Representing: Geological and Natural History Survey
Date: June 12, 1980

The staff of the Geological and Natural History Survey has reviewed the Concept Element of Wildlife Area Master Plan for Joel Marsh Wildlife Area. Based on this review, I wish to make the following comments:

With respect to the Geology, Soils, and Hydrology section, the underlying bedrock is not Precambrian granite as stated. According to Mike Mudrey, a geologist on our staff, the area of the Marsh is located in glacial material that is about 100 feet thick, overlying Paleozoic bedrock that includes the Prairie du Chien Dolomite (Ordovician age) and younger sandstones of Cambrian age. These units are a source of ground water just 4 miles to the south.

DNR RESPONSE: Text corrected.

Thank you for the opportunity to review and comment. Please do not hesitate to contact me with any questions that may arise from our suggested change.

By: Henry Kolka
Representing: Wild Resources Advisory Council
Date: June 24, 1980

The Joel Marsh Wildlife Area is one of the better planned wildlife areas of the Bureau. The Property Task Force are to be congratulated for projecting such a high professional quality proposal. Unfortunately, timing of this proposal has to face unsurmountable obstacles. Inflation and near chaotic condition of national economy has reduced the national and state level funding capabilities and strong battle lines are drawn between prime agriculture and prime recreational lands. None of these negative factors hold much promise of realizing Joel Marsh Wildlife Area as projected in the Master plan Concept Element.

General Review

The Wild Resources Council considers the Joel Marsh Wildlife Area Master Plan Element as one of the better wildlife proposals. The Council congratulates the project area Task Force for its conception. It is strong in wildlife philosophy and wildlife ethics and the project analysis and management proposals are concise and sound.

Regardless of how basically sound the analysis and project plans are, the Joel Marsh Wildlife Area is still in a dream stage and rapidly approaching nightmare status. With the sources of funding at all levels becoming less reliable and with inflation driving up land prices, the future of a 2,100 acre project area does not look good at all. In spite of the favorable potential, the WRAC recommends that Natural Resources Board and the project area Task Force takes another look at the proposal as is. The Council considers playing politics with 792 acres of agricultural land, a good share of it of prime quality, not the best form of public relations. Likewise it doesn't find it defensible since a possible majority of the users will be out of states. The WRAC likes and favors the general concept of the project area, but it does not endorse the impacts as described above.

DNR RESPONSE: The property has been reduced in size. Agree that increased costs coupled with deteriorating funding produces a perplexing problem when faced with new acquisition opportunities. The high priority the wildlife program has placed upon waterfowl related wetlands together with elimination of land acquisition on low priority areas enables the Department to implement this proposal.

Less than half of the 792 acres are considered prime agricultural lands. The recreational trade-offs are considered more advantageous to the regional user. However, this subject will be treated in detail within the EIS. The DNR does not agree that a majority of users will be out of state residents.

Comments and Recommendations

1. Goals.

The WRAC suggests the addition of a word educational after recreation. This section of sentence would read "outdoor recreational and educational opportunities."

DNR RESPONSE: Concur; text added.

2. Annual Additional Benefits, item 3.

The WRAC suggests the addition of word photography after nature study.

DNR RESPONSE: Concur; text added.

3. Proposed Acquisition.

The WRAC is chagrined with the 1977 start of Joel Marsh Wildlife Area--very unfortunate timing. In light of present condition of economy and issues stated in General Review, we urge that the Land and Business Committee and the Board of Natural Resources take another look at the total project as proposed.

4. Ownership and Existing Land Use.

The WRAC thinks that 792 acres classified as prime agricultural land and pasture is the main obstacle, in all aspects, toward realizing the acquisition of the project area as proposed in the plan.

5. Management.

The WRAC considers the assessment and associate management of: wildlife vegetative cover; water resources; historical and archaeological features and land use potential--one of the best of all master plan concept elements reviewed.

6. Management Problems.

The WRAC views the encroachment of rural residences of projected property site as one of the complicated people problems. The master plan does not indicate any machinery to stop this except outright purchase. Since this proposal is not an active one--what next?

DNR RESPONSE: For all practical purposes, the agricultural exemption for wetlands drainage eliminates all other options. Next step - complete EIS. Then, obtain Natural Resource Board approval.

7. Last paragraph under option status quo, first sentence.

The WRAC considers an expenditure of over one million dollars a considerable obstacle with the shrinking of grant monies. Another point if inflation continues, the stated figure may be doubled before long.

8. Reduce the proposed boundary.

This may be the only solution left considering all of the problems existing and on the horizon today.

9. General observation.

The WRAC finds the charts accompanying the text very adequate for interpretation.

By: Forest Stearns

Representing: Scientific Areas Preservation Council

Date: June 25, 1980

We have reviewed the Joel Marsh Wildlife Area Concept Master Plan and support the goal and objectives proposed. Our natural area inventory of Polk County included no sites within the Joel Marsh boundary.

By: John Porter - Bob Dries - Steve Miller - S. Bergquist

Representing: DNR at Public Meeting

Date: February 25, 1980

Location: American Legion Hall, Turtle Lake

Attendance: 50

The presentation stimulated the following questions and responses:

Q. Would the roads to the various dikes be open to the public?

DNR: Only for service vehicles of the DNR.

Q. Would the land be "open to the public" after the DNR purchased it?

DNR: Yes, for all legal and designated uses, such as hunting, trapping, fishing, nature study, etc.

Q. Will there be a refuge?

DNR: At this time none is contemplated, but should conditions warrant one, it would be considered.

Q. God did a good job - why do we think we can do better?

DNR: The marsh has been altered by man and we feel management can restore it to top productivity for wildlife.

The questions of taxes arose, and Mr. Porter went into a lengthy discussion on the impacts of public land purchase on the tax base, payments in lieu of taxes, etc. Ms. Susan Bergquist (BEI) then addressed the crowd and told them that when the EIS was prepared, the tax impact would be fully considered as would all economic impacts associated with purchase of farm land.

Mr. Porter added that the procedures of land purchase would be on a willing buyer - willing seller basis only.

Q. Can we sell to anyone after the project boundaries are established or must we sell to the DNR if we want to sell?

DNR: You can sell to anyone you choose, and that being inside the purchase boundaries of a DNR project was an asset, since the state is immediately available should a landowner decide to sell.

Q. What about homesites - must we sell them to DNR?

DNR: No, parts of a farm, all the farm, or all the farm except the homesite could be sold to DNR, as the landowner and DNR could decide. In some cases, purchase of the homesites is not really important to reach the goals of the project.

The subject of crop damage by wildlife was then discussed, as was the very real likelihood that the wildlife damage payments will end in March, 1980. Mr. Miller added that ducks do not destroy rowing crops although they will eat waste corn in stubble fields. Geese are the real problem to newly sprouted crops but the project is not designed to produce large numbers of geese.

Q. Could this be a sportsmen's club or a county project?

DNR: The scope and size of the proposal is such that it would not be financially feasible for either the county or for citizen groups.

Steve Miller discussed the productivity of the area and how management would increase wildlife species. (A member of the audience added that flowages would prevent wildfires from roaring across the marsh as now occurs.)

Mr. Porter agreed and added that we would probably use fire in our management under controlled conditions.

Mr. Dreis described the master planning process and how the input from this group would be considered as the plan proceeded to the Madison office, through further reviews and eventually through the EIS process and to the board for final approval and decision on what would be done and how it would be done.

A discussion then occurred on permitting procedures, and related subjects.

Ms. Susan Bergquist then went through the EIS process, the information that would be in the document, the public hearing on the document and the value of the public's input into the document.

Mr. Porter then asked for a hand show of whether the group approved the project or not. The group appeared to approve the proposal by roughly a 2 to 1 margin. Those opposed were not militantly so and were very friendly. One man said the costs involved would "make those ducks mighty expensive" - which is true.

Afterwards, Ms. Quick (Amery Free Press) asked Dreis questions about the DNR's wetlands purchasing. She was told that the DNR felt it had a mandate via Chapters 30 and 31 through its permitting procedures to protect wetlands and the DNRB had given the DNR direction through its policies to purchase wetlands and develop them for wildlife.

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