Management Plan
for
Pennington Bog
Scientific and Natural Area
Beltrami County, Minnesota

NW ¼ Section 3
Township 146 North, Range 30 West
Pennington Quadrangle

Prepared by
The Scientific and Natural Areas Program
Section of Fish and Wildlife
Minnesota Department of Natural Resources
in cooperation with the
U.S. Forest Service, Chippewa National Forest

April 1983

Approved

by_____
Commissioner of Natural Resources

by_____
Regional Forester

This SCIENTIFIC and NATURAL AREA was established to protect and perpetuate Minnesota's rare and unique natural resources for nature observation, education and research purposes.

Principal activities which are UNLAWFUL in the use of this area are listed below: Further information is available at Department of Natural Resources Offices.

- *Collecting plants, animals, rocks or fossils.*
- *Camping, picnicking and swimming.*
- *Horses, dogs and other pets.*
- *Snowmobiles and other motorized vehicles.*
- *Hunting, trapping, fishing and boating.*
- *Entry into restricted areas and sanctuaries.*

WALK GENTLY

MINNESOTA DEPARTMENT OF NATURAL RESOURCES

PREFACE

Scientific and Natural Areas are established to protect and perpetuate natural features which possess exceptional scientific or educational value. Nominated areas must substantially satisfy a set of rigorously drawn criteria to qualify for designation. Scientific and Natural Areas serve many purposes. They are places for the quiet appreciation and study of nature. They serve as outdoor classrooms for teachers. They are areas against which the effectiveness of resources management techniques employed elsewhere can be evaluated. They also serve as control areas for scientists engaged in furthering our knowledge of natural processes.

However, acquisition alone does not assure long term preservation of natural areas and their endangered species. Many natural areas are declining in quality because they are not properly managed. Management of vegetation, control of foreign species, and management of visitors are important concerns.

Comprehensive planning is the key to effective and successful management. In 1975 the Minnesota legislature passed into law the Outdoor Recreation Act (86A), establishing the Outdoor Recreation System. This act directed managing agencies to prepare master plans for units of the system. This document is part of a planning effort to satisfy the mandates of that act. The goal of this plan is to coordinate a strategy for stewardship that addresses biological management, obligations of ownership, and visitor management.

This plan was prepared by the Department of Natural Resources, Scientific and Natural Areas Program with the assistance of the Commissioner's Advisory Committee on Scientific and Natural Areas, and the cooperation of the U.S. Forest Service, Chippewa National Forest. It was based on a resource inventory prepared by the Natural Heritage Program. Funding was provided by the Legislative Commission on Minnesota Resources.

SUMMARY OF MANAGEMENT PROGRAMS

General Management Considerations

Pennington Bog will receive a moderate level of management activity. Most of the management will be coordinated through the DNR Region 1 Nongame Wildlife Specialist in Bemidji. A permit is required to enter the bog. Up to five permits may be issued per week. Visitors will be informed of the permit requirement through appropriate signing at the site and pre-trip informational materials.

A portion of the bog will be excluded from all visitor use. This are will serve as a control to evaluate impacts of visitor use on the fragile plant community.

A local resident will be identified as volunteer steward for Pennington Bog. Adjacent landowners and local enforcement officials will be informed of the SNA Program and specific use restrictions that apply to this SNA.

There are no significant conflicts between fire suppression programs and the management objectives for Pennington Bog. Periodic cleanup of roadside litter and flagging materials will be necessary.

Structures and Facilities

Very little physical development is needed for this SNA. A 3 to 4 car parking site will be developed just north of the SNA on U.S. Forest Service land. Parking is unsafe and will be prohibited along County Route 39 where it passes through the bog. No trails will be developed until better user data and resource information is available. A trail would be considered if necessary to protect the bog from visitor impacts, and if no other means of managing them are feasible.

Vegetation Management

A comprehensive community analysis of the bog is necessary to define the distribution and habitat affinities of orchids and other herbaceous species. This study would constitute the baseline from which future changes in community structure and composition can be evaluated. Results from the study will guide the location of a "restricted area" and are essential in establishing a program to monitor impacts of visitor use.

Other Resource Management

Exclosures will be constructed to identify effects of white tailed deer and snowshoe hare on the vegetation. In addition the SNA will be annually surveyed for winter deer use.

Water chemistry and hydrology of the bog will be studied and analyzed to

determine correlations between these variables and community composition with the bog.

Adjacent Resources

Approximately 35 acres of the bog occurs west of County Route 39. Twenty acres is swamp trust land and the remaining 15 acres are owned by the U.S. Forest Service. A field survey will be conducted to determine the quality and significance of this portion of the bog. Further protection efforts will await the results that survey.

The northernmost 12 acres of the bog east of the road is also owned by the Forest Service. This area will be designated by the Forest Service as a Botanical Area and managed exactly as the adjoining SNA. User permits and other relevant SNA rules and regulations will be adopted by the Forest Service for this site. This management plan will serve as the "coordination plan" for management of the whole bog (as required by Supplemental Agreement #3 between the Department of Natural Resources and the U.S. Forest Service, Chippewa National Forest).

A few acres of the bog occur on private land south of the SNA. These landowners will be solicited to maintain their portions of the bog in an undisturbed state. The Forst Service land bordering the east side, and the private land bordering the north-east side of the SNA do not contain portions of the bog. No conflicts with these properties are anticipated.

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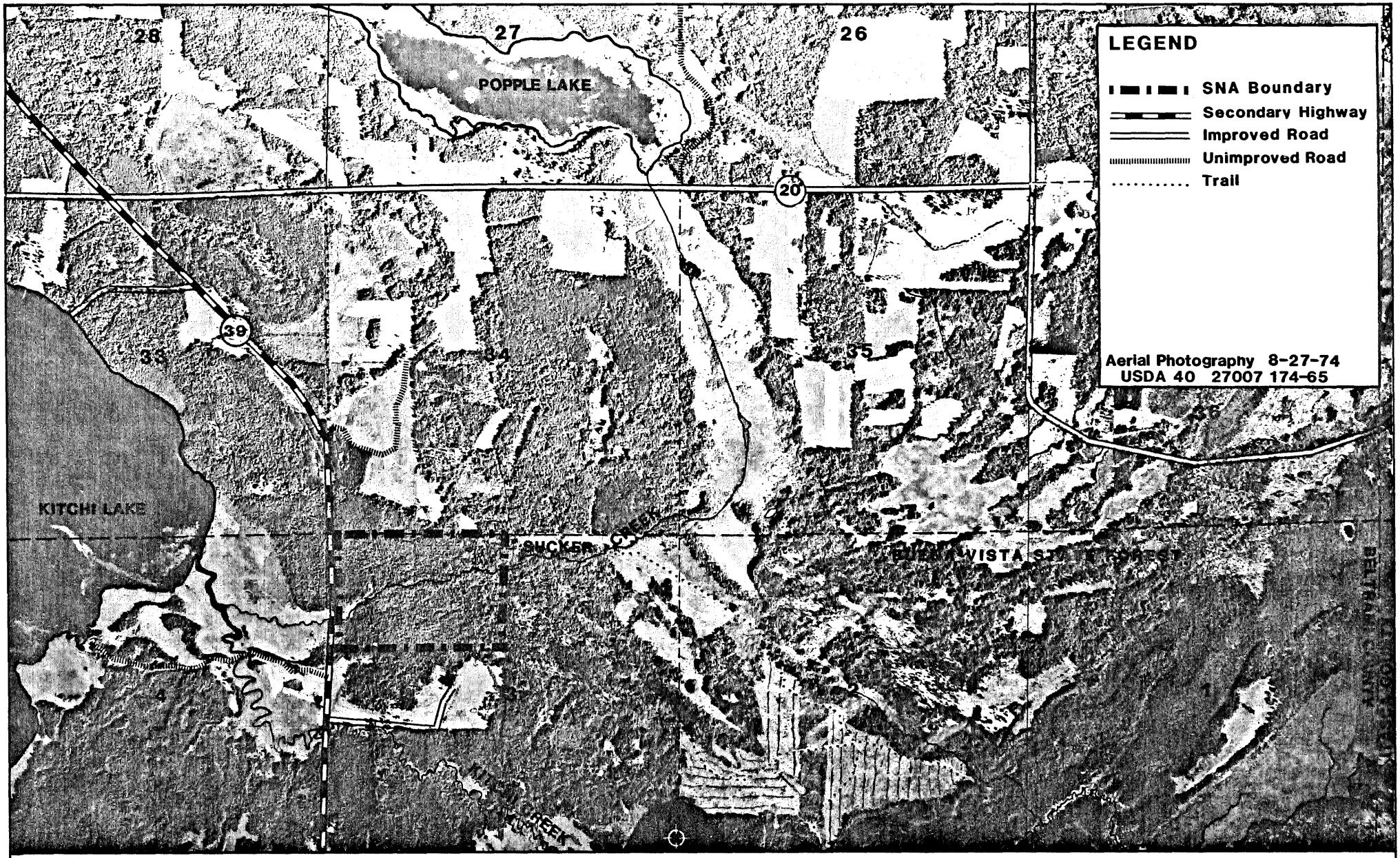


PENNINGTON BOG SNA

VICINITY MAP

OVERVIEW

Introduction

Pennington Bog is a 150 acre conifer swamp in southern Beltrami County, approximately 20 miles east of Bemidji, Minnesota. The area's climate is mid-continental, relatively cool and moist, with warm summers and cold winters. The tract is part of a ground moraine adjacent to extensive areas of outwash deposits. The wet, nearly level area is bisected by a westward flowing intemittent stream flowing into a nearby shallow lake. Poorly drained, mucky and peaty soils have formed at Pennington Bog in glacial drift under coniferous vegetation. Present vegetation is primarily white cedar swamp. Smaller areas of black spruce swamp and mixed upland forest are also present. The designated SNA includes approximately two-thirds of the bog. The rest occurs on private land, National Forest land and state Swamp Trust land.

The flora and fauna of Pennington Bog are mostly typical of natural Minnesota conifer swamp communities. The major significance of this site is the unusual diversity and abundance of the herbaceous flora. Species observed on the tract during the 1979 inventory include: 118 vascular plants, 44 birds, 7 mammals, and 8 amphibians. The natural area lies in an area known for uplpwood and lumber production. Some selective logging was done on the tract prior to preservation.

Preservation Value

This section lists features considered to be important components of Minnesota's natural diversity which qualify the site for SNA designation. Criteria for SNA evalation are enumerated in "Minnesota Department of Natural Resources Policy for Scientific and Natural Areas", dated July 6, 1979.

Pennington Bog is notable as a tract of native vegetation providing habitat for a diverse assemblage of plant species. Many noteworthy plants, including at least 15 species of the family Orchidaceae, protected by Minnesota law, are found at Pennington Bog. Several vegetation types are present, represented by species such as White Cedar (Thuja occidentalis), Blasam Fir (Abies balsamea), Paper Birch (Betula papyrifera), Black Spruce (Picea mariana), Black Ash (Fraxinus nigra), and Trembling Aspen (Populus tremuloides). Noteworthy herb layer species include Showy Lady-slipper (Cypripedium reginae), Dragon's Mouth (Arethusa bulbosa), Calypso (Calypso bulbosa), Round-Leaved Orchis (Habenaria orbiculata), One-Sided Pyrola (Pyrola secunda), Pitcher-Plant (Sarracenia purpurea), and Twinflower (Linnaea borealis). An unusual lichen found at Pennington Bog is Heterodermia casarettiana, a species more typical of the southeastern United States. It had previously been collected only as far north as southern Illinois (Esslinger, 1979).

ORA Classification

The Pennington Bog SNA fully meets the designation criteria for a scientific and natural area as outlined in the Outdoor Recreation Act (86A.05 Subd. 5). The preserve includes: (1) natural features which significantly illustrate an undisturbed plant community, (2) habitat for over fourteen species of orchids; many of which are rare or unusual such as Dragon's Mouth, Fairy Slipper and Rose Pogonia, and (3) an area large enough to permit effective research and educational functions and to preserve the inherent natural values of the area.

Management Philosophy

The factors that account for this SNA's unusual diversity and abundance of plant species are complex and largely unknown. Whereas certain management techniques could be applied to benefit certain species, the effects on the rest of the community are not predictable. The general management philosophy for this unit will be a "hands off" policy. Any human disturbance or manipulation of the area will be discouraged.

Preserve Objectives

These long range objectives describe what is desirable for the SNA Program to accomplish on Pennington Bog SNA during the planning period (10 years). They are essentially qualitative in nature.

These objectives are the basic guides for all programs and activities on the SNA. They form the foundation on which plans, programs and budgets are built. They are necessary to provide continuity of programs through a succession of superivsory and field personnel. They provide standards by which the success of all activities on the SNA are measured.

The preserve objectives are grouped below by priority.

First Priority

- to provide protection against human misuse or overuse

- to identify, monitor and maintain priority species and other significant features

Second Priority

- to provide for the accumulation and distribution of knowledge concerning features and conditions within the SNA

- to identify and pursue protection and compatible management of important lands adjacent to the SNA if:

    a) these lands increase the viability of the preserve to sustain significant elements of natural diversity

b) these lands are vulnerable to land-use activities that would negatively impact the SNA

- to develop local recognition and support for the SNA

I. GENERAL MANAGEMENT CONSIDERATIONS

A. Level of Management Activity

The amount of management that takes place in a SNA is dependent on need and practicality of implementation. The level of management activity at Pennington Bog SNA will be moderate. Some research and management will be conducted but this will be either short term, intensive management; or periodic, low level management. Frequent monitoring or inventory is not practical. Several reasons for this decision are discussed below.

a.1 Distace from St. Paul and Regional Offices

The distance of Pennington Bog from the St. Paul based SNA staff makes frequent management activities difficult. Two new SNAs have been designated in and near Itasca State Park, approximately 60 miles from Pennington Bog. One of these is also a conifer swamp with many of the same species as Pennington Bog. It may be possible to coordinate research between these two sites. The DNR Region I office and Area Wildlife office are located in Bemidji approximately 20 miles away. Most of the management activity will be coordinated through the Region I Nongame Wildlife Specialist in Bemidji.

a.2 Proximity to University Campuses and Research Facilities

Very little research activity has been focused on this SNA to date. A MN State University campus is located in Bemidji. The University of Minnesota has a field biology station at Itasca State Park. The SNA program may be able to solicit some research attention to Pennington Bog SNA from these and other educational institutions.

B. Use Restrictions

b.1. Permits

The designation order for this SNA specifies that use will be allowed by permit only. The current policy is to allow 5 permits to be issued per week (initiated May 1982). The numer of users that visit the SNA each year is unknown. Reports from various sources are conflicting. Some sousrces indicate that there are many visitors per week. Others suggest only a few per month. There are reports that photography clubs take field trips to the preserve and the Youth Conservation Corp program used to bring large groups to see the bog.

Action #1 Monitor the permit-quota system (5 permits/wk; max. 5 persons per permit) for two years (through 1984). Evaluate the results after that period.

Considerations:

Permitting authority - Permits should be issued by a DNR staff person in Bemidji, and by the SNA staff in St. Paul.

Permit Criteria - The only criteria to be used in approving a permit request is the quota system. At this time it is not felt that any specific use activity allowed by existing SNA policy should be restricted. User numbers and individual conduct is suspected to be a greater threat than intended activity (e.g. photography, bird watching, research etc.). All users should be informed of the sensitivity of the preserve and the proper conduct necessary to minimize their disturbance. If evaluation of the permit system and other resources information (Vegetation Management, Action #9) indicates specific problems, requests for use of the SNA for these reasons could be referred to less sensitive areas in the vicinity that would satisfy the user's specific interest.

Displaying the Permit - The permit should be displayed on the front dash of the vehicle while the visitor(s) are in the bog.

Compliance - Any permitting system is only effective if it is enforced. Compliance should be periodically checked. Several alternatives are: student study project, photographic surveillance, and spot surveillance by several agencies that periodically drive by the area (e.g. DNR Wildlife, DNR conservation officer, US Forest Service district ranger).

Visitor Information - Inform visitors of the permit requirement by appropriate signing at the SNA and pre-trip informational materials.

b.2 Use Zoning:

Some portions of the bog may be more sensitive to recreational use than others. Zoning use can be used to protect the most sensitive areas. Sites dominated by feathermosses appear to be more durable than sphagnum moss. The literature concerning the impacts of recreation on vegetation reveals that under most conditions, very low levels of use are responsible for the majority of the damage. Increased levels of use above this threshhold results in relatively small additional changes in the character of the community. The size of the area impacted can be a function of user numbers.

Zoning visitor use on the preserve would involve restricting use from a portion of the bog. The objectives of this would be to: 1) protect the most sensitive area of the bog, 2) establish a

benchmark from which to evaluate visitor impacts on the unrestricted area. and 3) examine the effectiveness of zoning as a visitor control method.

Action #2 Zone a portion of the bog as a "Restricted Area"

Considerations:

Location: The approprite location and size of the restricted area will be determined from information provided by the vegetative community analysis (see action 9).

Boundaries - Boundaries shall be posted and identified on the site map provided on the user permit.

Baseline Data - The area must be sufficiently mapped and described to assure effective long term monitoring.

Restrictions in General - No access to the area will be allowed. Access will be considered only for such cases deemed necessary by the SNA program. A request for access would have to be evaluated and conform to SNA reseach guidelines.

C. Surveillance and Enforcement

Non-conforming uses can damage natural conditions and the aesthetic appearance of natural areas. Because of the value and fragility of nature preserves, their continuing protection and maintenance should be provided on a systematic, rather than haphazard basis. Protection can be accomplished by developing local support and understanding of the SNA. Local citizens would be encouraged to report any signs of non-conforming uses. A local volunteer should be assigned responsibility for scheduled field inspections, answering questions as they arise locally, and preparing an annual status report. Enforcement is the responsibility of local law authorities (Beltrami County Sheriff), the local conservation officer and the SNA staff. The regional Nongame Specialist in Bemidji is the regional DNR contact for SNAs.

Action #3 Inform adjacent landowners and local enforcement authorities about the SNA Program and the specific use restrictions that apply to Pennington Bog SNA. Contact every 2 years.

Action #4 Identify a local person to be volunteer steward. Maintain annual contact.

Considerations:

Inspection schedule - Weekends during May - August. Periodically

through the rest of the year.

Reporting - Report any signs of non-conforming uses especially digging of orchids. Report any maintenance needs (e.g. damaged signs). Record use levels.

D. Fire Protection and Control

Fire protection for the preserve is the responsibility of the U.S. Forest Service, Cass Lake District Forester. The fire risk for the site is low. Fires are set almost annually in the marsh across the road and southwest from the SNA. These marsh fires, however, do not penetrate the lowland forests to any extent. It is difficult to get enough heat generated on the ground to carry a crown fire through this forest type. Hand methods (e.g. pump cans) are generally used to control fires in this area.

It is not clear how a catastrophic fire would affect the orchid assemblage of the bog. Under such fire conditions control efforts would likely be initiated from the road or adjacent uplands, rather than in the bog. In the case of a peat fire there will be sufficient time to contact the SNA program and negotiate a control strategy that will minimally disturb the SNA. To assure preparedness for such situations the SNA program should seasonally follow the "Palmer drought index". This index monitors general trends and would be a practical tool to alert SNA staff to the degree of fire danger at Pennington Bog SNA.

Action #5 Seasonally follow the Palmer drought index.

E. Clean-up

Very little clean-up is required for this unit. Roadside litter should be collected periodically. Flagging and other marking material, not covered by a research permit or used by the SNA Program needs to be removed.

Action #6 Periodically clean-up roadside litter and flagging material.

II. STRUCTURES AND FACILITIES

A. Access

County Route 39 forms the western boundary of the preserve. The shoulder is narrow and steep. Following the planned road improvements to widen the road surface the shoulders will be even narrower. Parking along this shoulder is difficult and could be dangerous.

Visitors presently access the unit along the entire western boundary. Because of the sensitivity of the area's resources, it would be advantageous if visitors would all start from a single area where information about the site and its features could be disseminated.

Action #7 Develop a 3-4 car parking area on National Forest land just north of the bog.

Considerations:

Location - The parking area will be developed cooperatively on the National Forest land just north of the bog.

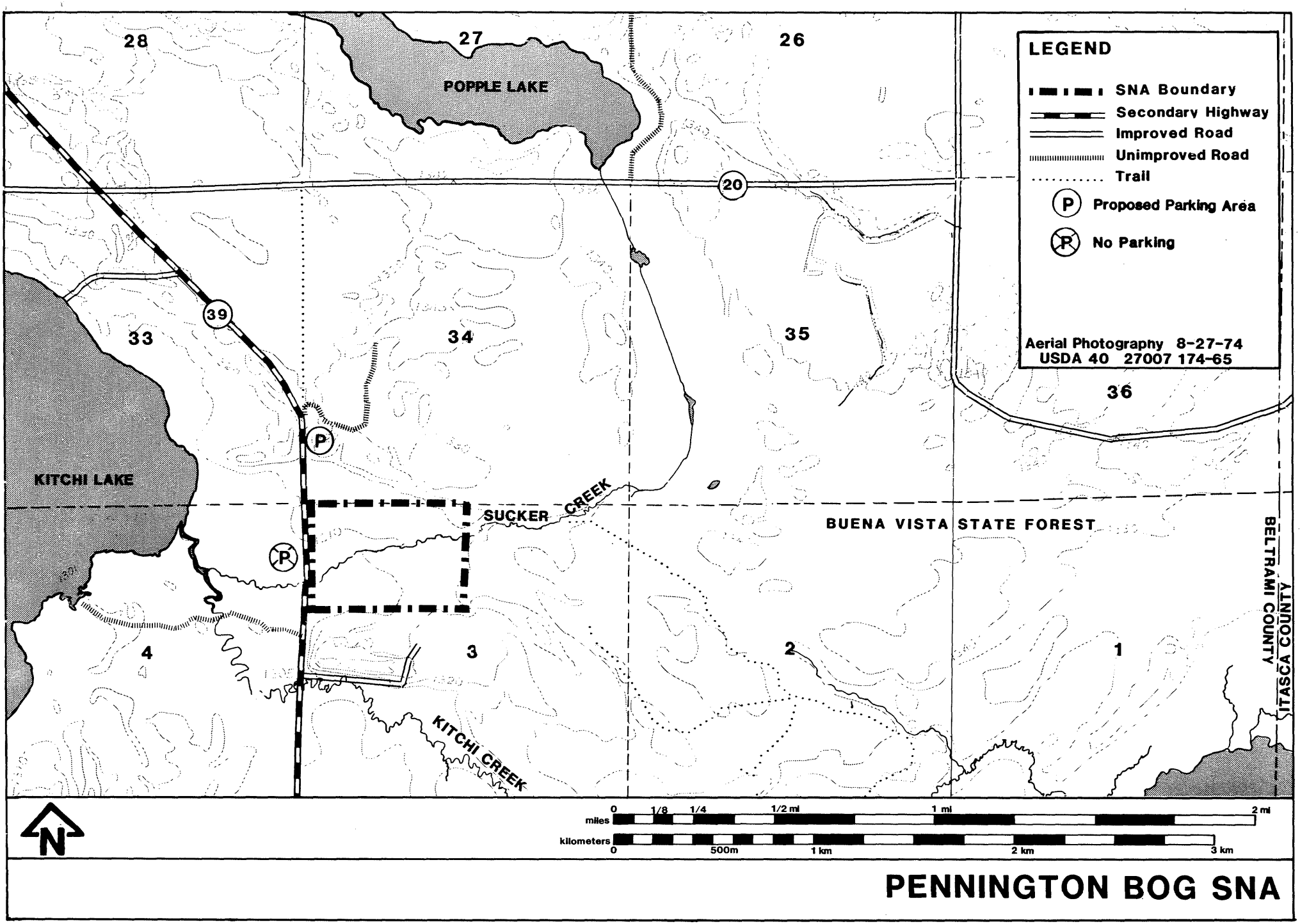
Action #8 Prohibit parking along County Route 39 adjacent the western boundary.

Considerations:

No parking signs - Post both sides of the stretch of road that forms the western boundary as "No Parking". Posting should start just north of the Sucker Creek culvert on the west side of the road, and at the southernmost corner of the SNA on the east side of the road. It should be posted up to FR 3848, or the entrance to the parking area. The Beltrami County Highway Department has given preliminary approval of this action.

B. Trails

No trails will be developed until better user data (see User Restrictions, Action 1) and resource information is available (see Vegetation Management, Action 9; and Other Resource Management Actions 11, 12, 13).



PENNINGTON BOG SNA

II. VEGETATION MANAGEMENT

A. Orchids

A diversity of orchids are present on the SNA. Each species has its own specific habitat requirements. It has been suggested that species distribution correlates strongly to light and moisture. Overstory composition and structures are also important environmental factors.

A variety of disturbances have taken place on the preserve. This is evidenced by age differences between tree stands. It is assumed that logging is responsible for most of the disturbance. Stumps occur throughout many portions of the area.

A common successional model for this type of bog predicts the overstory will become dominated by white cedar and/or balsam fir. This could reduce the abundance and possibly even the presence of shade intolerant species. In response to this anticipated change it has been suggested that selective cutting of overstory trees should be used to maintain the age and composition diversity of overstory cover types.

Another management philosophy maintains that there is something "unusual" about the site that has resulted in this diversity of orchids. Any manipulation of the area is more likely to revert the area to a more common condition than to maintain its "unusualness". There is also some speculation as to whether these lowland forest types would respond to silvicultural methods, such as selective cutting, in a predictable fashion. It may be that cutting or disturbances would accelerate change in the forest community rather than perpetuate the existing conditions.

Action #9 Conduct a quantitative vegetative community analysis of the bog.

Considerations:

Emphasis - This study should emphasize the distribution and habitat affinities of the orchid species.

Purpose - This study will establish base line data from which changes in community structure and composition can be evaluated. This information is needed to make management decisions.

Experimental design - This study should be designed to maximize application of the results to management decisions. The sampling design and anticipated results of this study will be different than the 1979 SNA inventory program. The two are complementary rather than a duplication of effort.

Action #10 Establish a study to evaluate impacts of visitor use.

Considerations:

Scheduling - This can be best designed after the community analysis has been completed. The urgency of this information, however, may necessitate setting something up before then.

IV. OTHER RESOURCE MANAGEMENT

A. Deer

The literature suggests a possible correlation between deer yarding and orchid abundance. The implication has been that the deer's trampling is important in "planting" the orchid seeds. Deer, along with snowshoe here, can also have a significant effect on the vegetation through browsing. Pennington Bog is reported to be a winter yarding area for white tailed deer in winters with heavy snowfall.

Action #11 Annually survey winter deer use.

Action #12 Erect 2-3 deer/hare exclosures.

B. Water

Several springs and a creek occur in the SNA. The relationship between hydrology and water chemistry of the site, and the vegetation (especially orchids) may be important. Base line data is needed.

Action #13 Analyze the hydrology and water chemistry of the SNA.

Considerations:

Adjacent lands - The study should identiry any relationship between the hydrology and water chemistry of the SNA, and land use on adjacent land.

V. ADJACENT RESOURCES

Some areas adjacent to Pennington Bog SNA are important to the preserve because they include an extension of the bog for which the SNA was designated. Changes in land-use (e.g. cutting) could destroy significant natural features occurring on those lands or potentially alter conditions in the bog on the SNA. These areas are delineated on map and discussed below.

Area 1. Swamp Trust Fund Land (Gov. Lot #1 & 2, T146, R30, Sec 4)

Quality: Similar to the SNA portion of the bog. This area is reported to contain many of the same significant plant species. The bog extends north and west onto National Forest land (Area 2). The road has not appeared to cause any gross changes in the vegetation of the bog between the two sides of the road.

Threats: No harvest is presently planned, however this is state trust fund land. Its purpose is to support the trust. Income producing activities could conflict with the retention of this area in an undisturbed status.

Relationship to the SNA: This tract is potentially of the same natural quality as the SNA. It is part of the same bog and contains many of the same important plant species. It may be worthy of the same protection that the SNA portion of the bog receives.

Action #14 Survey the swamp trust land and adjacent National Forest land to determine its quality and significance.

Action #15 Pursue appropriate protection of the swamp trust land based on the results of the survey and SNA program priorities.

Suggestions for Protection:

Alternative 1. Fee title acquisition by reimbursing the trust fund. The SNA portion of the bog was once swamp trust land. It was acquired by reimbursing the trust at a cost of approximately $160/acre in 1979. Only ½ of Area 1 is forested, the rest is sedge meadow-shrub swamp. The cost per acre of this tract then is anticipated to be less than what was paid for the designated portion of the bog.

Alternative 2. Land exchange within the department. The state constitution does not allow for exchanging trust fund lands for other state owned lands. However, should the constitution be amended to permit such exchanges this would be one possibility. Such an alternative would ensure long term protection via SNA designation in state ownership.

Alternative 3. Land exchange with the U.S. Forest Service. If an internal DNR land exchange is not possible, a land exchange between the DNR and the U.S. Forest Service would exchange a parcel of land of equal value for this swamp trust land. The Forest Service would be asked to designate this land as an RNA, or Botanical Area, giving the site greater protection than it had as swamp trust land. The state however would no longer have control over the property.

Alternative 4. Register the site on the Minnesota Natural Heritage Register. This is a statewide registry of important natural areas on public lands. The registry incorporates a voluntary commitment by the land management agency to recognize and protect the natural feature(s) occurring on the partial property.

Alternative 5. Status Quo. No change in the ownership or status of this site would be pursued until a potential threat, e.g. timber harvest, was eminent. Should an immediate threat appear alternative methods of protection would be considered.

Area 2. National Forest land, west of County Route 39.

This part of the bog is contiguous with that on the swamp trust land. Further discussions of protection needs will await results from the survey (Action 14)

Area 3. National Forest Land, east of County Route 39.

Quality: This area is a major extension of the conifer swamp that is centered on the SNA. It contains similar natural features and has probably experienced a similar land-use history.

Threats: None. These black spruce and cedar swamp stands will be designated a Botanical Area by the U.S. Forest Service and signed appropriately.

Relationship to the SNA: The Forest Service portion of the bog will be managed precisely the same as the SNA. This cooperatve management effort will comply to: Supplemental Agreement No. 3 (signed 12-28-76) between the Department of Natural Resources and the U.S. Forest Service, Chippewa National Forest regarding "rare and unique wildlife and vegetation". This management plan will serve as the "coordination plan" required by that agreement. All relevant SNA policies, rules and regulations will be adopted by the Forest Service for this piece of property. Enforcement will continue to be the responsibilities of both agencies for their respective properties. The permit system will be administered by the Department.

Area 4. Private Land

Unless land-use should change significantly, this property should not have any appreciable impact on the preserve.

Area 5. Forest Service Land

This property does not include any portion of the bog. Present land-use plans for this tract (logging) is not anticipated to have any impact on the SNA.

Area 6. Private Lands

Quality: The northern edge of this area includes the southern perimeter of the bog. Some of the significant plant species area anticipated to occur here.

Threat: None at present. Timber cutting is the only activity that could potentially take place on the lowland forested stands.

Relationship to the preserve: It is not anticipated that these lands will have any appreciable impact on the SNA. The lowland areas are contiguous however with the SNA, and some protection of their current condition would be desirable.

Suggestions: Communicate the values of the bog community to the adjacent landowners and request their cooperation in maintaining their portions of the bog in an undisturbed state.

MANAGEMENT COSTS AND IMPLEMENTATION

Actions recommended in this plan have been separated into two categories: 1) administrative and 2) operational. The costs of administrative actions are difficult to itemize because they are included in an SNA staff member's salary. Collectively, increases in administrative responsibility recommended in this and other plans will exceed existing staff capacity. Adequate staffing must be provided to implement these plans as recommended.

Operational actions are on-site activities. These often have both capital and labor costs. Capital costs have been listed. Estimates of labor needs are provided where possible.

Administrative and operational actions are often funded out of different sources. This makes it difficult to present an implementation schedule that equates both types of actions. To accommodate budget planning separate implementation schedules are outlined for each category. It is important, however, to have a mechanism that does allows comparison between all actions in this plan, and between actions from different plans. The system outlined below distinguishes between a) actions needed to improve or maintain the integrity of a site's most important features, b) legal or moral obligations of ownership or land management by SNA, and c) all other actions important for reasons other than above.

Stewardship Group I Actions: These are actions that prevent or reduce the vulnerability of the element to destruction or serious degredation. That is, in the absence of these actions the preservation of the element is threatened on this site. Research, ecological survey and monitoring may be included here if, without such information, it is not known what actions are necessary to maintain the element.

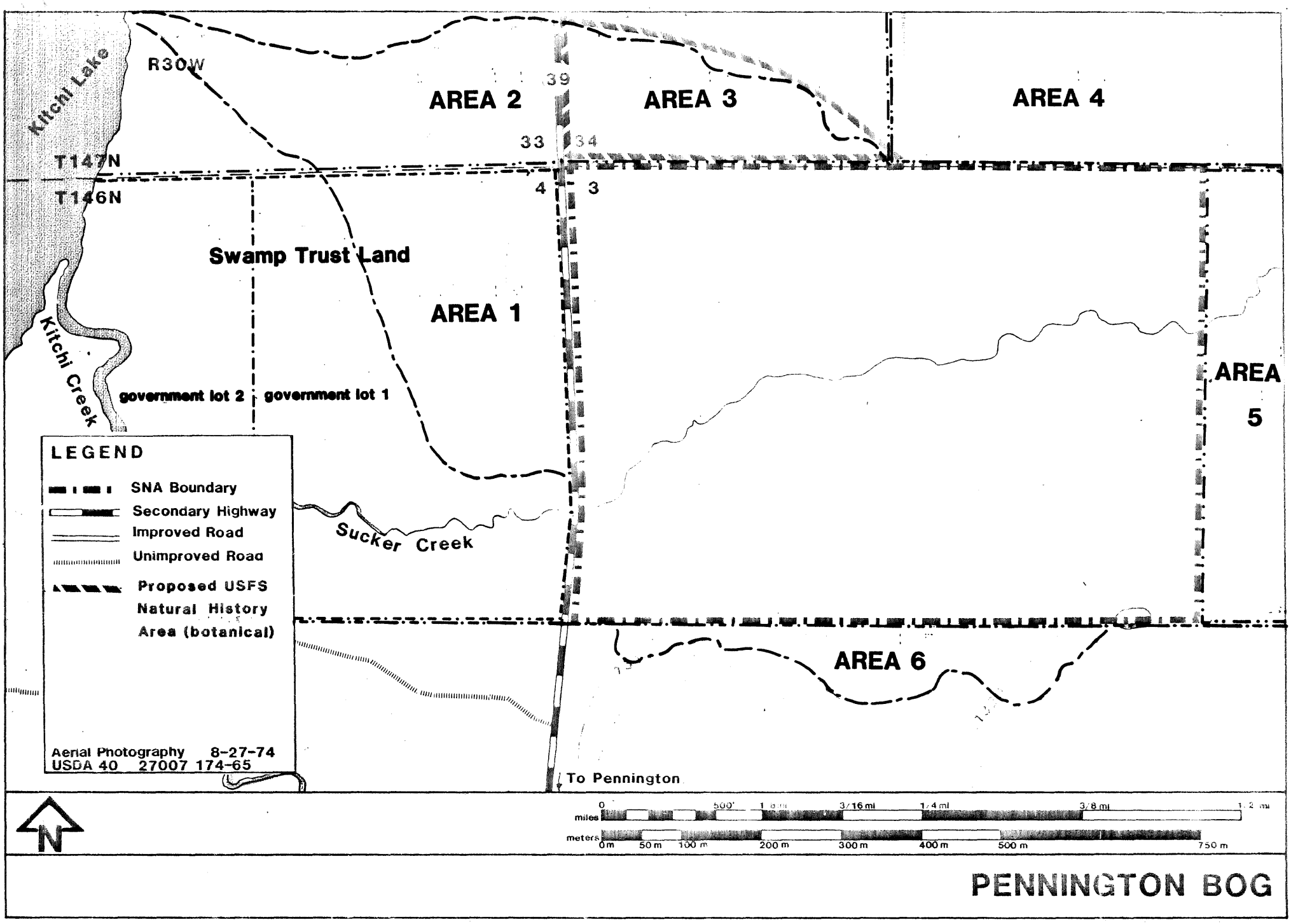
Stewardship Group Ia Actions: These actions are the same as Group I except that they are actions needed by all or the majority of elements on the site.

Stewardship Group II Actions: Actions necessary because they constitute an obligation of land management/ownership by the SNA Program. In some cases, actions may qualify under both Group I and II. For instance, a plant listed on a state noxious weed law may grow on a preserve. Control of the plant may be necessary as an obligation of ownership. If no action is taken, the county agricultural inspector might go in and broadcast spray to control the weed, and this could seriously impact elements on the preserve. In this case, the action to control the weed to avoid the broadcast spraying should be listed under Group I actions. If the weed grew in a road ditch and whateve action taken to control it was unrelated to element protection, weed control would be included under Group II actions. Other examples of actions usually included here are maintenance of road shoulders and litter removal.

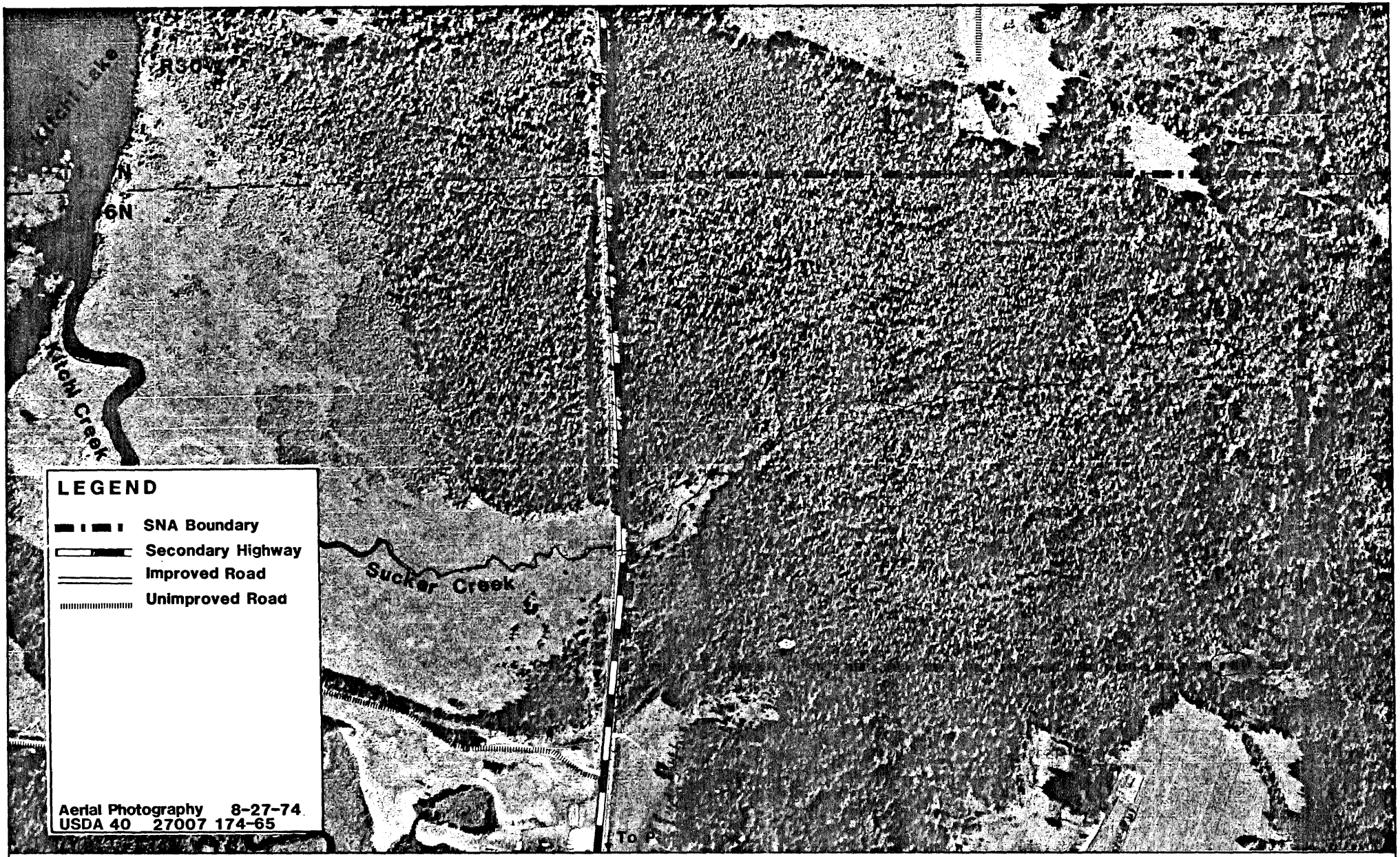
Stewardship Group III Actions: Actions taken for all other reasons. Once again, care should be taken to 'float' actions up to the highest group justified. In many cases, activities such as guided field trips will fall under Group III. If it can be truly said that in the absence of such education activities vandalism or other acts would ensue which would negatively impact element preservation, these stewardship actions could be

listed under Group I. Such arguments should be well supported with background information. In general, actions taken to improve aesthetics, promote or enhance public use, develop trails, derive income and develop facilities will fall under Group III.

The following chart illustrates the scheduling of actions described in the text, and the immediate and on-going capital costs of implementation. The scope of this plan covers a ten year period. The plan should be reviewed every five years to evaluate progress, reassess priorities and refine management techniques. Actions listed under the category "Begin Immediately" need immediate attention. "Phase I" is the first five year period. "Phase II" is the second five year period. Implementation of many actions is dependent on availability of materials, equipment and labor. An action may be initiated sooner than scheduled if circumstances so dictate and earlier scheduled actions will not suffer as a result.



PENNINGTON BOG



PENNINGTON BOG

OPERATIONAL ACTIONS

Action		Stewardship Group	Begin Immediately	Phase I	Phase II	Comments
Action #2	Establish Restricted Use Area	Ia			$200	-Contingent on action #10 -Costs of signing
Action #8	Prohibit parking along County Route 39	Ia	nc			
Action #9	Conduct community study	Ia		$3000-5000		5-8 week study
Action #10	Establish visitor use impact study	Ia				Contingent on action #10
Action #11	Annually survey winter deer use	Ia	nc			On-going
Action #12	Erect deer/hare exclosures	Ia		500/ex		Contingent on action #10
Action #13	Conduct hydrology, water chemistry study	Ia		1000-2000		Should be done concurrent or prior to action #10.
Action #6	Clean up roadside liter	II	nc			On-going
Action #7	Develop parking area	II		2000		
Action #15	Survey bog west of road	III	nc			

ADMINISTRATIVE ACTIONS

Action		Stewardship Group	Begin Immediately	Phase I	Phase II	Comments
Action #1	Monitor user permit system, reevaluate after 2 yrs.	Ia	✓	✓		
Action #16	Pursue appropriate protection for bog west of County Route 39	Ia		✓		Contingent on action #15
Action #3	Contact landowners and enforcement officials every two years	III		✓		On-going
Action #4	Identify volunteer steward, maintain annual contact	III	✓			On-going
Action #5	Seasonally follow the Palmer drought index	III		✓		On-going