COLD SPRING HERON COLONY SCIENTIFIC AND NATURAL AREA

MANAGEMENT PLAN AND RESOURCE INVENTORY

The Scientific and Natural Areas Program...
Protecting and Managing
the Best of Minnesota's
Natural World

COLD SPRING HERON COLONY SCIENTIFIC AND NATURAL AREA

MANAGEMENT PLAN AND RESOURCE INVENTORY

A Public Use Unit

Permitted Uses Include:

.Research - Programs conducted by qualified scientists and college graduate and post-graduate students (permit required)

.Education - Primary, secondary and college programs

.Public Use - Interpretive programs and nature observation

Division of Fish and Wildlife
Minnesota Department of Natural Resources

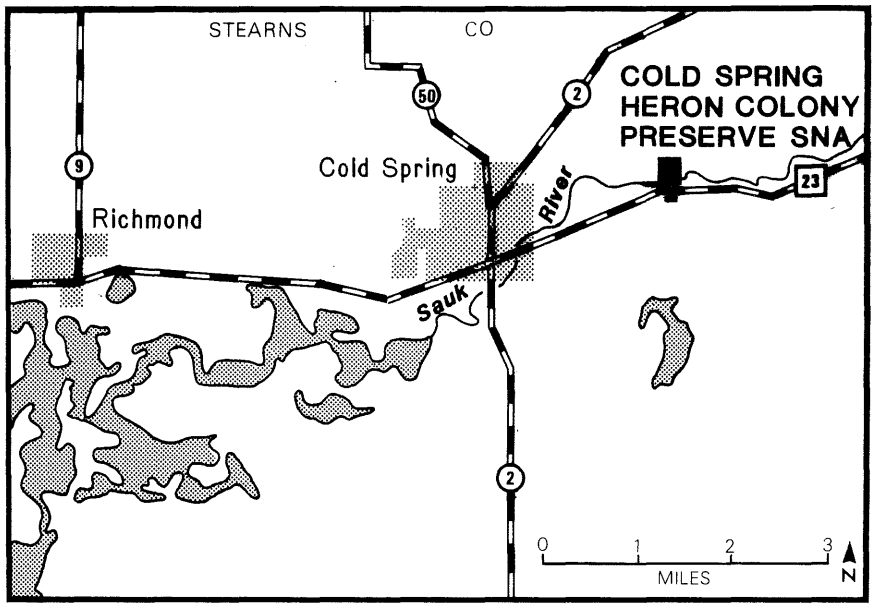
COLD SPRING HERON COLONY

MANAGEMENT PLAN

MINNESOTA CHAPTER
OF
THE NATURE CONSERVANCY

DECEMBER, 1979

draft copy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Cold Spring
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COLD SPRING HERON COLONY SNA
JUNE 1987

SUMMARY OF MANAGEMENT PROGRAMS

General Management Guidelines

Management of this SNA will be a cooperative effort of the SNA Program and The Nature Conservancy (TNC). TNC will have the primary responsibility for implementation of the management plan.

Structures and Facilities

The boundaries of the site will be posted with SNA signs and rules and regulations signs, which will be continuously maintained. A registration box will be erected on the hill. Fencing around the hill should be maintained. The stairway up the hillside should be extended and improved. A site parking plan should be developed and implemented. A sign should be erected and maintained on Highway 23 indicating the location of the parking area.

Management of Natural Features

A prescribed burning program will be conducted on the prairie portion of the Observation Hill and consideration should be given to implementing a prescribed burning program form the open sedge marsh north of the river. Sumac on the hill area should be controlled by cutting.

Survey and Monitoring of Natural Features

An inventory of the sand bar, submerged and emergent aquatic communities should be conducted. Additional data on the preserve's flora should be collected. Further inventory work should be initiated for the bird population and the heron colony should be monitored for population changes. A survey of butterfly species which use the observation hill should also be initiated. Dr. Max Partch has utilized a monitoring system since 1954 and therefore this system should be continued.

MANAGEMENT IMPLEMENTATION

Actions recommended in this plan have been separated into two categories: (1) administrative and (2) operational. The costs of administration actions are difficult to itemize because they are included in an SNA staff member's salary.

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 budget 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 allow comparison between all actions in this plan and between actions from different plans. The system outlined below distinguishes between actions needed to improve or maintain the integrity of a site's most important features called elements, legal or moral obligations of ownership or land management by the Department and all other actions important for reasons other than above.

Group I Actions: Actions that prevent or reduce the vulnerability of the element to destruction or serious degradation. 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.

Group II Actions: Actions necessary because they constitute an obligation of land management/ownership by the Department. These may be legal obligations, departmental, or SNA program standard requirements.

Group III Actions: Actions taken for all other reasons. For example, actions taken to provide for public use, acquire supplementary resource information, administrative coordination, etc.

The following chart illustrates the scheduling of actions described in the text, and the immediate 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 or are a continuation of an existing program. "Phase I" is the first five year period. "Phase II" is the second five year period. Implementation of many actions depend 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. Under the "comments" column, the DNR unit with the primary responsibility for carrying out the action is noted. The SNA program will secure development funds and prepare annual work plans to schedule and coordinate management activities described in this plan.

COLD SPRING HERON COLONY SNA
SUMMARY OF MANAGEMENT ACTIONS - 1987

ADMINISTRATION ACTIONS		STEWARDSHIP GROUP	BEGIN IMMEDIATELY	PHASE I	PHASE II	COMMENTS	RESP. UNIT
Action 1	Implement Wildfire suppression plan	I	X				TNC/SNA/FOR
Action 3	Study the possibility of burning areas in addition to the observation hill	II					
Action 15	Expand and update brochure	III		X			
OPERATIONAL ACTIONS							
Action 2	Prescribed burn - hill	I	X			Two fire units pre May 1 to maintain prairie	TNC
Action 4	Inventory amphibians and reptiles	I		X			NG
Action 5	Inventory river communities	I		X			NHP
Action 6	Collect additional vegetation data	I		X			TNC/NHP
Action 8	Inventory area south of Sauk River for butterflies	I					TNC/NG
Action 21	Maintain contact with volunteer manager	I		X			TNC
Action 26	Monitor vegetation	I		X			
Action 28	Monitor heron population	I	X				NG
Action 29	Request MPCA to sample Sauk River water	I		X			SNA/MPCA
Action 31	Acquire land east of tract (area 1)	I		X			TNC/SNA
Action 34	Cut sumac along boundaries of hill and on hill	I				Recommend in 1986	TNC
Action 10	Determine east and west boundaries south of river	II	X				
Action 11	Maintain fence around hill	II		X			TNC
Action 13	Post boundaries	II	X			Walk & post north unit	TNC
Action 20	Clean up litter	II	X				
Action 27	Monitor area for illegal use	II	X			no permit	
Action 32	Remove old TNC signs	II	X				TNC
Action 33	Post rules & regulations signs	II	X				
Action 14	Erect registration box on hill	III		X			TNC
Action 14a	Erect informational sign	III		X			TNC
Action 16	Develop & implement a parking plan	III	X				TNC/SNA/DOT
Action 17	Erect sign directing visitors to use culvert highway crossing	III					TNC/SNA
Action 18	Improve and extend stairs uphill	III		X			TNC

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INTRODUCTION

Cold Spring Heron Rookery was acquired by The Nature Conservancy (TNC) because knowledgeable individuals reported that the heron rookery was an important element of Minnesota's natural heritage. The 1977 inventory has documented the occurrence of this element and provided the basis for developing a site management plan.

The purpose of this part of the master plan is to describe the specific management actions which will be taken in managing Cold Spring Heron Rookery. Section I. describes general considerations which affect the management of Cold Spring Heron Rookery. First, management implementation strategies are addressed. Then TNC management guidelines are outlined followed by a description of the Minnesota Scientific & Natural Area (SNA) Program, its policies, objectives, rules and regulations. State laws and The Nature Conservancy-Department of Natural Resources (TNC-DNR) lease are also outlined. Section II. describes the site-specific actions to be implemented on Cold Spring Heron Rookery. Finally, guidelines for modifying and reviewing the plan are noted in Section III.

I. MANAGEMENT CONSIDERATIONS

Introduction

Presently Cold Spring Heron Colony is being managed by The Nature Conservancy staff and volunteers. TNC's strategy for Cold Spring Heron Colony is to explore mechanisms by which public agencies and institutions can be included in management implementation. Our goal here is not to relinquish active TNC stewardship, but rather to develop a cooperative alliance consisting of TNC, local citizens, and one or more public agencies or institutions for preserve stewardship. This combination, we believe, provides maximum assurance that proper stewardship will be provided in perpetuity for Cold Spring Heron Colony.

The Scientific and Natural Area (SNA) Program of the Minnesota Department of Natural Resources (DNR) was created by legislative statute in 1969. It's goal is to:

> Preserve and perpetuate the ecological diversity of Minnesota's natural heritage, including landforms, fossil remains, plant and animal communities, rare and endangered species, or other biotic features and geological formations for the scientific study and public edification as components of a healthy environment.
> (DNR Policy on Scientific & Natural Areas 7/6/79)

(The SNA Program is described in detail below.)

Since the Scientific & Natural Areas Program objectives and philosophy so closely parallel those of The Nature Conservancy, it is appropriate to involve the Scientific & Natural Area Program as one member of the cooperative alliance in the stewardship of Cold Spring Heron Colony. In order to enable state

and federal funds to be expended for evaluating and managing Cold Spring Heron Colony a ten year renewable lease was signed by The Nature Conservancy on 25 July 1979 and by the Department of Natural Resources on 9 August 1979. This lease calls for the review of Cold Spring Heron Colony by the Minnesota Natural Heritage Program for possible designation as a Scientific & Natural Area. If Cold Spring Heron Colony is not designated a Scientific & Natural Area within two years of the signing of the lease either party may terminate the agreement. If Cold Spring Heron Colony is designated a Scientific & Natural Area it will be managed in accordance with Scientific & Natural Area rules and regulations. The lease also specifies procedures for the review and approval of a management plan and describes other aspects of administering the property.

Presently the Minnesota Natural Heritage Program is in the preliminary stages of reviewing Cold Spring Heron Colony as a possible Scientific & Natural Area. A decision will not be made on the site until at least June, 1980.

Since it is not presently known whether Cold Spring Heron Colony will be designated a Scientific & Natural Area, and since implementation concerns are dependent on this decision, this plan does not examine the means of implementing specific management actions. Until such time as public resources are made available, management actions will be undertaken by The Nature Conservancy staff and volunteers and funded out of the Minnesota Chapter's preserve management account. All annual reports, survey data, research proposals, registration sheets, information requests, etc., should be

directed to:

Mr. Mark Heitlinger
Minnesota Coordinator of Preserve Management
The Nature Conservancy
328 East Hennepin Ave.
Minneapolis, MN 55414 (612-379-2134)

If Cold Spring Heron Colony is designated a Scientific & Natural Area, implementation responsibilities will be specified in a letter of agreement between The Nature Conservancy and the Department of Natural Resources, as called for in the lease.. If the preserve is not designated a Scientific & Natural Area then other disposition and management options must be explored by The Nature Conservancy.

The Nature Conservancy's Management Guidelines

The Nature Conservancy's management guidelines govern what management actions will be implemented on Cold Spring Heron Colony.

The two primary Nature Conservancy stewardship objectives are as follows:

> The primary objective is to maintain areas so that they sustain species, communities, and natural features that make significant contributions to the preservation of natural diversity. The secondary objective is to determine and promote land uses compatible with the preservation of natural diversity on the preserve, in order to foster local support for individual preserves and recognition by the general public of the values of natural diversity preservation.
>
> (Stewardship guide for preserve committee, 1978)

The primary or ecological objective is closely tied to determining which of the preserve's resources are most significant for preservation. The Minnesota Heritage Program will play a major role in identifying which elements are most

significant. This assessment in turn determines how the preserve will be managed. For example, if an endangered species is the most significant element on the tract and that species requires a successional plant community, then management might be directed at perpetuating the successional stage in order to preserve the endangered species. If,on the other hand, a climax plant community is the most significant element on the tract then a different management program is necessary.

Management may be directed at species, communities, natural features, etc. In January 1978 the Minnesota Chapter of The Nature Conservancy developed a manual for stewardship of Nature Conservancy lands in Minnesota. The following guidelines are taken from this document.

If the occurrence of one or more species is determined to be significant on a preserve The Nature Conservancy will:

1. MAINTAIN POPULATION LEVELS SO THAT THE SPECIES' CHANCES OF LONG-TERM SURVIVAL ON THE TRACT REMAIN STABLE OR ARE IMPROVED.

Management to increase the population of any species should be integrated with perpetuating other native species and maintaining the tract as a diverse and naturally functioning system. There may be important ecological factors regulating the population size of significant species and it may not be desirable in all cases to attempt to increase populations.

2. MANAGEMENT OF SPECIES' POPULATIONS WILL BE ACCOMPLISHED PRINCIPALLY THROUGH MANAGEMENT OF THE SPECIES' NATURAL HABITAT AND THROUGH PROTECTION OF THE SPECIES FROM VANDALISM, POACHING AND SIMILAR THREATS.

Thus managers generally will not use artificial means, such

as direct control of natural predation, manipulation of food supply through food plots, or improvement of nesting habitat through plantings or artificial shelters to manage populations. Exceptions to this policy should only be made in certain circumstances when special actions are necessary for the survival of a species (e.g., endangered or threatened species) or to redress an imbalance due to a factor such as preditor extinction.

Management of plant communities should also be guided by an assessment of the preserve's communities. Where management is directed toward plant communities The Nature Conservancy will:

3. MAINTAIN OR RESTORE SELECTED PLANT COMMUNITIES AS NEAR AS POSSIBLE TO THE CONDITIONS THEY WOULD BE IN TODAY HAD NATURAL ECOLOGICAL PROCESSES NOT BEEN DISRUPTED. THIS GUIDELINE WILL BE ACHIEVED, TO THE EXTENT FEASIBLE BY:
   A) PERPETUATING AND AS NECESSARY RE-ESTABLISHING NATURAL ECOLOGICAL PROCESSES; AND
   B) MINIMIZING IMPACTS OF CHEMICAL, MECHNICAL AND SIMILAR ARTIFICIAL PROCESS ASSOCIATED WITH HUMAN INFLUENCES.

Some preserves will be protected because they contain significant geological, hydrological or other natural features. The same Heritage Program methodology used to evaluate species and plant communities should be used to assess the importance of these features. The Nature Conservancy will:

4. MAINTAIN NATURAL FEATURES IN PRISTINE CONDITION AND PROTECT THEM FROM UNNATURAL CORROSION AND DETERIORATION. THIS WILL BE ACCOMPLISHED PRIMARILY THROUGH REGULATING THE LEVELS AND TYPES OF HUMAN USE AND IMPACTS THAT ACCELERATE CORROSION AND DETERIORATION.

In special instances steps may be taken to prevent or diminish even natural processes of deterioration in order to perpetuate

significant natural features and other natural elements.

The secondary or social objective of Nature Conservancy stewardship is to foster local support for preserves and recognition by the general public of the value of natural diversity preservation. The future preservation of natural areas depends upon a constituency of users and supporters. The Nature Conservancy should foster the development of such a constituency by encouraging the appropriate use of preserves by educators, students, researchers and other members of the general public. The management plan should identify appropriate types and levels of use, and specify programs to facilitate such use.

To achieve the above stewardship objective The Nature Conservancy will:

5. INVOLVE LOCAL RESIDENTS, USERS, AND OTHER INTERESTED MEMBERS OF THE PUBLIC IN DISCUSSIONS ABOUT STEWARDSHIP PLANNING AND IMPLEMENTATION.

6. PROVIDE INFORMATION ABOUT THE PURPOSE AND NATURAL QUALITIES OF THE PRESERVE TO THE LOCAL COMMUNITIES AND PRESERVE USERS.

7. KEEP THE PRESERVE AS FREE FROM HAZARDS TO USERS AS POSSIBLE.

8. CONDUCT STEWARDSHIP ACTIVITIES IN A WAY THAT MINIMIZES UNNECESSARY ANNOYANCES AND HAZARDS TO RESIDENTS NEAR THE PRESERVE.

9. UTILIZE PRESERVE DESIGN, SUCH AS THE PLACEMENT OF TRAILS, SIGNS, AND PARKING AREAS, TO BOTH OPTIMIZE ACCESSIBILITY OF THE PRESERVE AND MINIMIZE UNDESIRABLE HUMAN IMPACTS TO THE EXTENT THAT SUCH DESIGN MEASURES DO NOT CONFLICT WITH OTHER PRESERVE OBJECTIVES.

10. PROMOTE APPROPRIATE RESEARCH AND EDUCATIONAL USE OF THE PRESERVE.

The two major stewardship goals--ecological and social--

may at times conflict with each other. People crush vegetation, erode and compact soil, alter the behavior of wildlife and transport onto preserves the seeds of unwanted plants that stick to shoes and clothing. It is the Nature Conservancy's position that:

> 11. ECOLOGICAL CONSIDERATIONS SHOULD BE WEIGHED MORE HEAVILY THAN HUMAN CONSIDERATIONS WHEN THERE IS A THREAT THAT SIGNIFICANT NATURAL ELEMENTS ON A PRESERVE WILL BE ALTERED OR SIGNIFICANTLY DAMAGED.

The Minnesota Scientific & Natural Area (SNA) Program

Since the Scientific & Natural Area Program may also be involved in the stewardship of Cold Spring Heron Colony a description of the Scientific & Natural Area Program management policies, rules and regulations and pertinent legislation is included here. If and when Cold Spring Heron Colony is designated a Scientific & Natural Area it will be managed in accordance with these statutes, policies and rules and regulations.

The Scientific & Natural Area Program is located in the Minnesota Department of Natural Resource's (DNR) Division of Parks. The Scientific & Natural Areas Act (M.S.A.84.033) of 1969 created the Program. It authorized the Commissioner of the Department of Natural Resources to acquire, designate and maintain Scientific & Natural Areas, and to adopt pertinent rules and regulations governing the use of the areas.

The Department of Natural Resources issued rules and regulations governing the Scientific & Natural Areas (Minnesota Reg NR 300-303) in 1973. The rules and regulations,

still in effect, cover permitted and restricted uses of Scientific & Natural Areas, provide for environmental protection, prohibit certain uses and acts, and establish legal penalties for violations. The rules and regulations also state that the Commissioner of the Department of Natural Resources can restrict: 1) travel within the unit; 2) the hours of visitation; and 3) the number of visitors within the area at any given time.

In 1975 the Scientific and Natural Areas Act was ammended by the Outdoor Recreation Act (ORA: M.S.A. 86A.05). This statute further defined and more adequately funded the program. It included Scientific & Natural Areas within the Minnesota Outdoor Recreation System, delineated resource and site qualifications, provided for administration of the units, and classified Scientific & Natural Areas into one of three "use designations": Research, Education and Public Use. The law states that only scientific, educational or public uses which do not impair or threaten the preservation objectives are to be allowed. Physical development is limited to facilities absolutely necessary for protection, research and education projects,and when appropriate for interpretive services. Finally, the Outdoor Recreation Act requires plans be drawn up for each Scientific & Natural Area. No development funds can be spent by the Department of Natural Resources until these plans have been approved.

In order to be designated as a Scientific & Natural Area a site must: 1) contain elements of "exceptional scientific and educational value," and 2) "be large enough to preserve

their inherent natural values and permit effective research or educational functions." The Scientific & Natural Area designation process begins when an individual or group nominates an area. The SNA staff notifies the Department of Natural Resources Commissioner's Advisory Committee (CAC) on SNA's and the Minnesota Heritage Program of all new nominations. The SNA staff then is responsible for conducting a field survey of the site to determine the site's qualities, vulnerability, extent of man-made disturbances and management practices which may be needed. The results of this field survey are forwarded to the Heritage Program which then evaluates the significance of the site's elements. Using the field survey data and the Heritage Program evaluation, the Commissioner's Advisory Committee assesses the site and sends a recommendation to the SNA Program. Based on the CAC recommendation, the priorities for protection as established by the Heritage Program, and on other considerations, such as the opportunity to acquire the area, the SNA Program sets a priority for designating the area as a SNA. Recommended proposals are next sent to the Director of the Division of Parks for approval. Finally the proposal is passed on to the Commissioner of the DNR. If the Commissioner approves the site the land is acquired either by fee simple purchase, lease (as is the case with Cold Spring Heron Rookery tract), donation, or conservation easement. Once the Commissioner determines sufficient land rights have been acquired to administer the area

as a SNA it is formally designated. The formal designation includes the classification of the site as either a Research, Educational or Public Use unit.

If and when Cold Spring Heron Colony is designated a Scientific & Natural Area the Outdoor Recreation Act requires that a master plan for the area be completed and approved. The Scientific & Natural Area Program is responsible for completing this plan. After the Scientific & Natural Area draft plan is completed the Commissioner's Advisory Committee and the Department of Natural Resources review and approve it. An announcement is then made to the public and other state agencies regarding the existence of the plan. Interested persons and agencies are invited to review and comment on the plan within thirty days of the announcement. Comments received by the Department of Natural Resources are reviewed and appropriate changes are made in the plan. Finally the revised plan is submitted to the State Planning Agency for review. After the Department of Natural Resources reviews this agency's recommendations, and makes the necessary changes, the plan is officially approved.

In July 1979 the Department of Natural Resources issued a policy statement on Scientific & Natural Areas. These policies will affect the management of Cold Spring Heron Colony if and when it is designated. The policies are divided into Designation, Resource Management and Human Use Management. To ensure

the preservation of the Scientific & Natural Area's elements of natural diversity it is the Department of Natural Resources' policy to:

1. IDENTIFY AND CATALOG THE NATURAL FEATURES OF THE AREA.

2. ENSURE THAT RESOURCE MANAGEMENT IS DIRECTED TOWARD PRESERVATION AND MAINTENANCE OF ALL SIGNIFICANT ELEMENTS OF THE AREA.

3. MANAGE THE AREA IN SO FAR AS POSSIBLE, TO PERPETUATE OR ESTABLISH NATURAL PROCESSES AND LIMIT THE EFFECTS OF HUMAN ACTIVITIES.

4. PROMOTE WISE STEWARDSHIP WITH USERS, LOCAL RESIDENTS AND SPECIAL INTEREST GROUPS.

To fulfill these general policies the Department of Natural Resources will:

5. MONITOR AND EVALUATE SCIENTIFIC & NATURAL AREA MANAGEMENT PERIODICALLY TO DETERMINE IF MANAGEMENT OBJECTIVES ARE BEING ACHIEVED.

6. USE MANAGEMENT METHOD(S) CONSIDERED MOST NATURAL AND APPROPRIATE TO THE TOTAL ENVIRONMENT OF THE AREA AND:
   A. NOT USE COST ALONE TO DICTATE SELECTION OF THE APPROPRIATE MANAGEMENT METHODS.
   B. DESIGN MANAGEMENT PLANS TO ADDRESS THE ECOLOGICAL INTEGRITY OF THE AREA TO PREVENT MISMANAGEMENT.
   C. REMOVE EXISTING DEVELOPMENTS OR UNNATURAL OBJECTS UNLESS THEY ARE UNOBTRUSIVE AND NOT DETRIMENTAL TO THE PURPOSES FOR WHICH THE AREA WAS DESIGNATED OR OF HISTORIC VALUE.

7. PROHIBIT THE FOLLOWING:
   A. CUTTING OF GRASS, BRUSH, OR OTHER VEGETATION, THINNING OF TREES, REMOVAL OF DEAD WOOD AND WINDFALLS, OPENING OF SCENIC VISTAS, OR PLANTING EXCEPT AS PROVIDED FOR IN THE MANAGEMENT PLAN.
   B. INTRUSIONS OF DEVELOPMENT ON, THROUGH OR OVER SCIENTIFIC & NATURAL AREAS UNLESS ESSENTIAL TO THE MANAGEMENT OF THE UNIT.
   C. MINERAL EXTRACTION, PEAT HARVESTING AND WATER INUNDATION OR APPROPRIATION.
   D. COLLECTION OF PLANT, ANIMAL, HISTORIC OR GEOLOGICAL SPECIMENS (EXCEPT BY PERMIT) OR ANY CONSUMPTIVE USE OF NATURAL RESOURCES.

E. INTRODUCTION OF PLANT, ANIMAL OR OTHER OBJECTS, INCLUDING LIVE SEEDS OR DISEASE ORGANISMS, UNLESS EXPRESSLY PROVIDED FOR IN THE MANAGEMENT PLAN.

8. PROVIDE THE FOLLOWING:
   A. SPECIAL MANAGEMENT TO TRANSIENT SPECIES ONLY WHEN THERE IS A WELL DEFINED NEED.
   B. SPECIAL MANAGEMENT FOR BALD EAGLE NESTS AND COLONIAL WATER BIRD NESTING SITES WHERE APPROPRIATE.
   C. REVIEW OF DEPARTMENT OF NATURAL RESOURCES PERMITS AND ACTIONS TO MINIMIZE ADVERSE EFFECTS ON A DESIGNATED SCIENTIFIC & NATURAL AREA.

9. INVOLVE USERS, LOCAL RESIDENTS, AND SPECIAL INTEREST GROUPS IN THE MANAGEMENT OF THE SCIENTIFIC & NATURAL AREA AND ENFORCEMENT OF RULES.

10. ESTABLISH A WORKING RELATIONSHIP WITH ADJACENT LANDOWNERS SO AS TO MINIMIZE OR ELIMINATE THOSE LAND USE PRACTICES HAVING AN ADVERSE IMPACT ON THE SCIENTIFIC & NATURAL AREA.

To ensure the preservation of Scientific & Natural Area resources and provide for use of the area it is the Department of Natural Resources' policy to:

11. LIMIT HUMAN USE ON SCIENTIFIC & NATURAL AREAS TO THE AMOUNT THE RESOURCE CAN TOLERATE WITHOUT DAMAGE TO SPECIAL FEATURES.

12. PROVIDE FOR THE INTERPRETATION OF THE SPECIAL FEATURES AND THEIR MANAGEMENT.

13. SEEK INPUT FROM USERS, LOCAL RESIDENTS AND SPECIAL INTEREST GROUPS IN DECISIONS REGARDING MOST SUITABLE USE(S).

14. REQUIRE USERS ENGAGED IN SCIENTIFIC STUDY TO MAKE INFORMATION OBTAINED ON THE SCIENTIFIC & NATURAL AREA AVAILABLE TO DEPARTMENT OF NATURAL RESOURCES AND ENCOURAGE USERS TO MAKE THEIR STUDIES AVAILABLE TO THE SCIENTIFIC COMMUNITY THROUGH REPORTS OR PUBLISHED ARTICLES.

To fulfill these general policies the Department of Natural Resources will:

15. ENCOURAGE:
   A. ACTIVITIES WHICH CAN OCCUR EQUALLY WELL ON LESS VULNERABLE OUTDOOR AREAS TO BE CONDUCTED

ELSEWHERE.
B. SCIENTIFIC STUDIES, PHOTOGRAPHY, AND KEEPING OF PHENOLOGICAL RECORDS AND FAUNAL AND FLORAL LISTS FOR LONG TERM RESEARCH AND EDUCATIONAL BENEFITS.
C. APPROPRIATE USERS AND PUBLIC SUPPORT RATHER THAN UNRESTRICTED PUBLIC USE.

16. PROHIBIT THE FOLLOWING ACTIVITIES UNLESS NECESSARY FOR MANAGEMENT PURPOSES OR SPECIFICALLY AUTHORIZED BY THE MANAGEMENT PLAN: COLLECTING PLANTS & ANIMALS, HUNTING, FISHING, CAMPING, PICNICKING, HORSEBACK RIDING, MOTORIZED VEHICLE USE WITH THE EXCEPTION OF PARKING FACILITIES AND SIMILAR ACTIVITIES.

17. ASSURE STRUCTURES, TRAILS AND SIGNS ARE AS SPECIFIED IN THE MANAGEMENT PLAN AND IN KEEPING WITH THE NATURAL SURROUNDINGS AND PRESENT ONLY SO FAR AS REQUIRED FOR RESOURCE PROTECTION AND PROVISION OF BASIC USER NEEDS.

18. ADAPT INTERPRETIVE TECHNIQUES AND MATERIALS TO THE USER.

19. LIMIT OR EXCLUDE USE FROM AN AREA FOR AN APPROPRIATE PERIOD OF TIME WHEN IMPORTANT NATURAL FEATURES ARE THREATENED AS A RESULT OF SUCH USE.

20. CLEARLY POST THE PROCESS FOR OBTAINING A VISITOR USE PERMIT, WHEN REQUIRED, AT THE ENTRANCE TO THE SCIENTIFIC & NATURAL AREA.

21. NOTIFY ADJACENT LANDOWNERS AND INTERESTED PARTIES PRIOR TO IMPLEMENTING MAJOR MANAGEMENT ACTIONS.

22. ERECT BOUNDARY SIGNS AS SPECIFIED IN THE MANAGEMENT PLAN TO DISCOURAGE ENCROACHMENT AND TRESPASS ONTO THE SCIENTIFIC & NATURAL AREA AND ONTO ADJACENT PROPERTY BY SCIENTIFIC & NATURAL AREA USERS.

23. REQUIRE A "PACK OUT WHAT YOU BRING IN" LITTER PHILOSOPHY AND ENFORCE LITTER REGULATIONS.

24. FENCE ONLY WHEN NECESSARY TO CORRECT PERSISTENT ENCROACHMENT OR TRESPASS PROBLEMS TO SCIENTIFIC & NATURAL AREA OR ADJACENT PROPERTY.

25. REGULATE USE BY EMPLOYING, SINGLY OR IN COMBINATION, METHODS THAT INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:
A. NO ACCESS RESTRICTIONS.
B. ACCESS BY PERMIT ONLY.
C. ACCESS ON DESIGNATED TRAIL ONLY.
D. TEMPORAL OR SPATIAL ZONING.

26. REQUIRE:
    A. REVIEW OF ALL RESEARCH PROPOSALS FOR THE SCIENTIFIC & NATURAL AREA WITH EMPHASIS ON THE PROPOSED RESEARCH METHODOLOGY.
    B. IF NECESSARY, BONDING OF RESEARCHERS TO GUARANTEE CLEAN UP FOLLOWING COMPLETION OF THE PROJECT(S).

Other Management Considerations

The Cold Spring Heron Colony lease will also affect management while the lease is in effect (for at least the next two years). Under the provisions of The Nature Conservancy-Department of Natural Resources lease:

1. Management planning is a joint and cooperative responsibility of the Department of Natural Resources and the Nature Conservancy.

2. The Department of Natural Resources will notify the Nature Conservancy thirty days prior to any proposed change in the rules and regulations. The Conservancy will then notify the Department of Natural Resources within thirty days if the change is acceptable or not.

3. The Department of Natural Resources will not cause or permit to be caused any act constituting waste or destruction of the unit.

4. The Department of Natural Resources shall not apply or permit application of any chemicals, including herbicide and insecticide, unless it has been provided for in the management plan or unless written permission has been first obtained from the Conservancy.

5. If consistent with the management plan a permanent recognition sign shall be erected by the Department of Natural Resources on the unit.

6. Upon request the Department of Natural Resources shall provide The Nature Conservancy with an annual report on use and management of the unit.

7. The Conservancy shall have access to the unit at any time.

8. The Nature Conservancy may, with the consent of the Department of Natural Resources, lease all or any portion of the unit for purposes consistent with the management plan.

9. Both The Nature Conservancy and the Department of Natural Resources can terminate the lease when there is a breach of the lease contents or if there is an irreconcilable difference regarding management of the area.

Finally, several Minnesota statutes may affect the management.

They include:

1. Collecting and taking of wild animals:
Under state law (M.S. 98.48) special permits are required from the Division of Fish & Wildlife for the collection or taking of protected wild animals.

2. Endangered species:
The Endangered Species Act (M.S. 97.488) states that no endangered wild animal may be taken except under special circumstances. The Division of Fish & Wildlife may undertake program or promulgate rules and regulations which also affect the management of endangered or threatened species.

3. Conservation of certain flowers:
Under state law (M.S. 17.23) no member of the Orchid or Trillium families, or any species of Lotus (Nelumbo lutea) Gentian (Gentiana), Arbutus (Epigaea repens), or lily (Lilium) can be taken or gathered in any manner from public land without the permission of the Commissioner of Agriculture - and then only for scientific and herbarium purposes.

4. Control of noxious weeds:
It is the duty of all land owners, according to state law (M.S. 18.181), to eradicate or otherwise destroy all noxious weeds. Section 18.315 also states that towns and cities may take steps to control noxious weeds on state lands within the territorial limits of the towns or cities provided that the managing agency fails to take action within fourteen days of receiving notice to cut or control the weeds. The following plants are considered noxious weeds statewide: Field Bindweed; Hemp; Poison Ivy; Leafy Spurge; Perennial Sowthistle; Bull Thistle; Canada Thistle; Musk Thistle; and Plumeless Thistle. In addition, about thirty plants are considered noxious weeds in particular counties. In Stearns County Cockleburr, Wild Mustard, Sunflower and Velvet Leaf are all classified as noxious weeds.

II. MANAGEMENT ACTIONS FOR COLD SPRING HERON COLONY

Introduction

This section described the specific actions to be implemented on Cold Spring Heron Colony. The actions are grouped into three broad categories: resource management actions, use management actions and monitoring actions.[1] The resource management actions, in general, are primarily directed at preserving, perpetuating and restoring the tract's natural resources. Use management actions are directed primarily at the problems caused by, and needs of, the visitors. Monitoring actions are directed at insuring that both resource and use management actions are being effectively implemented, identifying unforeseen changes occurring on the site, and recording the results of management implementation. Under each management action there is a brief statement expanding on the action and the need for the action. In parentheses there is a numerical reference to the various Nature Conservancy guidelines and Scientific & Natural Area policies each action is designed to carry out. Since the actions usually implement more than one guideline or policy there are usually several numbers in parentheses.

Within each of the resource, use and monitoring action categories the actions are subgrouped when possible according to function. The actions are <u>not</u> listed in order of priority.

1. It should be noted that these categories are artificial: user management actions affect resource management actions and vice versa. However, for the purposes of discussion it is convenient to follow this convention.

Ownership modifications are of special concern to adjacent land owners, managing agencies, users and interested parties. Ownership modifications, including fee title purchase and conservation easements are therefore noted separately after the management actions have been outlines. The purpose of these ownership modifications is either to protect resources, facilitate management, enhance use on the tract, or protect 'new' resource(s) outside the tract.

Resource Management actions

Action 1. Develop and implement a wild fire suppression plan (Nature Conservancy guidelines 4 and 8; Scientific & Natural Area policies 3 and 4).

Local fire authorities, the fire chief of the nearest fire department (Cold Spring) and the Department of Natural Resources area forester, should be contacted annually about control methods to use should a wild fire start on or spread into the area. Fire control should be to prevent the spread of the fire outside of the tract's boundaries and be designed to minimize the damage produced by fire suppression activities -- the practices used to suppress the fire are generally more damaging than the fire to the natural resources. During extreme fire danger periods visitors and neighbors should be alerted to prevent man-caused fires. In the event a fire does occur natural fire breaks or backfires should be used to keep the fire from spreading outside of the tract. Heavy equipment and fire plows should not be used on the tract.

Action 2. Periodically burn Observation Hill (Nature Conservancy guidelines 3 and 4; Scientific & Natural Area policies 2, 3, and 6).

Areas like Observation Hill are thought to have burned regularly prior to European settlement.[1] After settlement, however, fire was suppressed. Prescription burning is necessary on Observation Hill's prairie to: reinstate a natural ecological process and regulate plant succession; maintain the open character of the prairie;suppress brush; restore disturbed areas; remove built-up fuel and thereby reduce the wild fire hazard;suppress alien (non-native) species; perpetuate fire-dependent plants;and improve the habitat for animals. The hill should be treated as one burn unit.[2] It should be burned for three successive years around May 1 and then once every four years as soon after snowmelt as possible.

Nature Conservancy procedures for prescription burning should be followed for all planned burns: 1) a prescribed burning proposal must be prepared and approved by authorized Nature Conservancy personnel; 2) all conditions described in the proposal, including the crew, fire boss, equipment, weather, fire breaks, Department of Natural Resources permits, notifications and publicity, must be in effect for the burn to occur. Following the burn a prescribed burning report must be submitted to the Nature Conservancy office (See Appendix III, Procedures for prescription burning, in the Manual for stewardship of Nature Conservancy lands in Minnesota, for more information).

1. See J.T. Curtis, The Vegetation of Wisconsin (Madison: University of Wisconsin Press, 1959).
2. The following prescription burn plan was developed by Mark Heitlinger, Minnesota Coordinator of Preserve Management, The Nature Conservancy, and was based on: 1) his knowledge and experience in burning similar areas; 2) an assessment of the tract's vegetation and species composition; and 3) the conditions required to safely burn the area.

Action 3. Study the possibility of burning other areas on the tract (Nature Conservancy guidelines 3 and 4; Scientific & Natural Area policies 2,3, and 6).

The large open Sedge Marsh, north of the river, lies behind a natural levee and gives way to the forest as the land rises to the north. This was a natural open area and in 1977 was noted to be quite weedy (mostly Urtica dioica and Cirsium arvense), the result of past grazing and mowing. Burning would probably help keep this open by reducing the Willows and the weeds, allowing the Sedges and grasses to recover their former condition. This would have to be done when the herons are not present, in the fall. Closer to the river, on the back slope of the levee, Willows, Ash and Bur Oak are invading what once was a Wet Meadow. Burning could be instituted here to maintain the area as a meadow. Both the feasibility of burning these areas, and the effects of the burns, should be examined in this study.

Action 4. Erect several artificial platforms in the woods for the herons to nest on (Nature Conservancy guidelines 1 and 2; Scientific & Natural Area policies 2 and 8(B)).

This action should initially be taken on a limited experimental basis. In the past trees have been observed dying where the herons nested. If enough of the trees die the herons will no longer nest in their present location. Placing the artificial platforms in the forest will hopefully encourage the herons to continue nesting at their present location.[1] Only a few platforms should be initially erected when the herons aren't there (in the fall). If the herons do nest on the

1. This procedure has been used successfully for colonial nesting birds according to Carrol Henderson, Department of Natural Resources Non-game Wildlife Supervisior.

platforms, and if the nesting trees continue to die, then more platforms might be erected. The Department of Natural Resources regional wildlife biologist, Dr. Max Partch, St. Cloud State University, and Carrol Henderson, Supervisior of the Department of Natural Resources Non-game Wildlife Program, should be consulted prior to taking this action, and be involved in implementing the action.

Action 5. Inventory Cold Spring Heron Colony's amphibians and reptiles (Scientific & Natural Area policy 1).

Actions 5-10 are necessary in order to identify significant and sensitive resources, obtain baseline data and identify opportunities, problems and trends for management. The data are also valuable for research purposes. The 1977 inventory did not examine the tract's amphibians and reptiles. This information will result in a more complete resource baseline for the site. The inventory should follow the methodology and procedures outlined in the 1977 Scientific & Natural Area inventories.

Action 6. Inventory the sandbar, submerged and emergent aquatic communities of the river (Scientific & Natural Area policy 1).

These communities were not analyzed in the 1977 inventory, although their presence was noted. They should be described and their dominant species noted.

Action 7. Collect additional information on Cold Spring Heron Colony's flora (Scientific & Natural Area policy 1).

The 1977 inventory did not thoroughly survey all of the tract's vegetation. Most of the spring vascular plants had finished flowering and were inconspicuous when sampling began; some plants were probably overlooked; other species were observed

prior to 1977, but not in 1977. Thus another survey of the tract's vascular flora should be conducted, with an emphasis on the spring flora. Also the tract's early spring phenology should be recorded, and the site's non-vascular plants, such as lichens and mosses, and aquatic plants should be noted. Any plants not recorded in the tract's 1977 annotated plant list should be added to the list.

Action 8. Collect additional information on the tract's bird population (Scientific & Natural Area policy 1).

The 1977 inventory did not adequately distinguish between which bird species pass through the area and which species actually reside on the tract. It also may have missed some birds due to a limited field season. This supplementary inventory will provide a more complete resource baseline for the tract. The inventory shall follow the methodology and procedures outlined in the 1979 Scientific & Natural Area inventories.

Action 9. Inventory the south side of the Sauk River (i.e., Observation Hill) for butterflies. (Scientific & Natural Area Policy 1).

This area was not inventoried in 1977. It should be surveyed to determine what butterflies reside here. An additional three to five species, not recorded in 1977, may occur south of the river due to differences in habitat.

Action 10. Survey Cold Spring Heron Colony's water quality and hydrology (Scientific & Natural Area policy 1).

Presently there is no information on the site's water quality and hydrology. The depth of the groundwater can be measured

using the method described by Turnock & Lawrence (1953).[1] Water quality data can be obtained using the Hach Chemical Company's DR-EL/1 and DR-EL/1a Environmental Laboratory water Test Kits, or similar equipment. It would also be desirable to test the water periodically for pesticides and other pollutants. Data obtained from this research will provide a more complete resource baseline and will alert managers on whether upstream pollution is affecting the site's resources.

Action 11. Determine the tract's east and west boundaries south of the river (Nature Conservancy guidelines 4 and 8; Scientific & Natural Area policies 1, 2, 3, and 4).

These boundaries need to be defined in order to prevent encroachment by adjacent land owners and to prevent stewardship and user activities from impacting on adjacent property. The above boundary lines should be walked with adjacent land owners to be sure all parties agree on the boundary location. Minor disagreements should be resolved on the spot to avoid antagonizing preserve neighbors over insignificant issues. The county surveyor may also be asked to help resolve boundary questions. A professional survey is expensive, but if necessary should be done.

Action 12. Maintain the tract's boundary fences. (Nature Conservancy guidelines 3, 4, and 9; Scientific & Natural Area policies 2,3, 7(E), 17 and 24).

A four-strand barbed wire fence must be maintained around Observation Hill to prevent grazing by livestock. Fences should be inspected monthly to determine that no objects are leaning

1. William Turnock & Donald B. Lawrence, Measurement of the level of the groundwater at the Cedar Creek Forest (Mimeo, 1953). For more information contact the Sherburne National Wildlife Refuge where this method was also used.

on the fences, brush is not covering the fences, posts are firm and wires are adequately strung.

Action 13. No effort should be made to control or remove diseased plants from the tract (Nature Conservancy guidelines 3,4, and 11; Scientific & Natural Area policies 3,6, and 7(A)).

There is possibly some Dutch Elm disease on the tract. However, some of the techniques used to remove or control trees with this disease are more disruptive to the vegetative community than allowing the trees to die and rot. Therefore no action should be taken to control trees infected.

Use Management Actions

Action 14. Post all boundaries of the tract, except for the river, and maintain the posts and signs (Nature Conservancy guidelines 4,7,8, and 9; Scientific & Natural Area policies 3,7,16 and 22).

The east and west boundaries south of the river and the Observation Hill boundary need to be posted to prevent inadvertent encroachment by adjacent land owners, minimize unauthorized activities, (e.g. hunting) and to identify the area's boundaries to managers. The Nature Conservancy posts and signs must meet the state of Minnesota's legal requirements for posting. Two inch letters must be on the signs. Posts should be set no more than one-tenth mile apart; if visability is obstructed they should be set closer together. At corners posts should be set so that the signs are nearly touching and at the same angle as the boundary lines. If and when Cold Spring Heron Colony is designated a Scientific & Natural Area, official Scientific & Natural Area signs should be placed on all the boundaries; all Nature Conservancy signs will be phased out. The signs and posts should be checked

annually and replaced or repaired when necessary. The river should not be posted because it is felt this would invite use from recreational boaters that would disturb the nesting herons.

Action 15. Maintain the main recognition sign, the registration box, and the registration box's supplies (Nature Conservancy guidelines 4,6,7,9 and 10; Scientific & Natural Area policies 3,4,7,9,12,13, 15,16, and 26).

Both of these structures are already present on the tract. If and when Cold Spring Heron Colony is designated a Scientific & Natural Area, the main recognition sign should be replaced with a Department of Natural Resources sign which states that the land was acquired by The Nature Conservancy and managed by the Department of Natural Resources as a Scientific & Natural Area. The sign should be annually touched up with Olympic wood stain and the sign's letters should be repainted. Other maintainence actions should be taken as required.

The registration box should be checked weekly during the spring, summer and fall to see that adequate copies of brochures, registration sheets and other relevent information notes (including notes on upcoming special events, the nearest Department of Natural Resources or volunteer information source, the Scientific & Natural Area rules and regulations (if appropriate) and/or Nature Conservancy rules and regulations) are present. It is particularly important that registration sheets be collected and kept for analysis. The registration box should also be annually touched up with Olympic wood stain, and repaired when necessary.

Action 16. Expand and update the Cold Spring Heron Colony brochure (Nature Conservancy guidelines 4, 6, 7, 9, and 10; Scientific & Natural Area policies, 3,4,7,9,12,15,16, and 23).

Several additional informational items should be added to the present brochure, including: a discussion of the impacts caused by people, a description of the Nature Conservancy-Scientific & Natural Area program (if appropriate), and a listing of the Nature Conservancy and/or Scientific & Natural Area rules and regulations governing use, including the requirement that all researchers obtain a permit prior to conducting research on the area. The brochure should also identify people to contact for more information about the site, encourage visitors to register, provide comments and become involved in managing the area, and promote a "pack out what you bring in" litter philosophy. The map in the brochure should be revised if the tract's boundaries change (See Ownership Modifications). Periodically the information on the growth of the heron colony should also be updated.

Action 17. Develop and implement a parking plan for Cold Spring Heron Colony (Nature Conservancy guidelines 9 and 10; Scientific & Natural Area policies 12, 15(C) and 25).

The present parking arrangement on the tract is unsatisfactory: access to the parking area from the east is difficult and hazardous to the public safety. A sign should be erected and maintained on Highway 23 indicating the location of the parking area. The present parking area should also be posted, surfaced with gravel and surrounded by a barrier (either gates or fences). The DNR's Bureau of Engineering and the Minnesota Department of Transportation should be

consulted about the parking area location, design, surfacing and access.

Action 18. Erect and maintain a sign near the parking area directing visitors to use the culvert to cross the highway (Nature Conservancy guideline 7; Scientific & Natural Area policy 25(C)).

This action is necessary to prevent visitors from crossing Highway 23, causing a possible public safety hazard. All visitors crossing the highway should use the culvert to get to and from the Observation Hill. The sign should be annually touched up with Olympic wood stain and repaired as necessary.

Action 19. Build and maintain steps and water bars along the path to the observation hilltop (Nature Conservancy guidelines 4 and 9; Scientific & Natural Area policies 3 and 17).

If steps and water bars are not installed erosion along the present path may become a problem. The Department of Natural Resources regional trails coordinator should be consulted on the type of steps to be installed, and the specific construction and maintenance practices to be followed.

Action 20. Conduct litter clean-up operations (Nature Conservancy guidelines 4 & 7; Scientific & Natural Area policies 3, 6(C) and 23).

Litter is unsightly and detrimental to the purposes the area serves. Presently there is not a litter problem on Cold Spring Heron Colony. However, users and managers will be encouraged to look for and dispose of litter properly.

Action 21. Inform local,middle,and secondary schools about the site (Nature Conservancy guidelines 6 & 10; Scientific & Natural Area policies 4, 9, 12 and 15).

All secondary schools in the vicinity of the tract should at least know of the existence of the heron rookery and its educational potential for teaching such topics as ornithology,

prairie flora and fauna, ecology and geology. An effort should be made to annually meet with all teachers who express an interest and encourage them to visit the Observation Hill. The sensitivity of the resource and teacher responsibility in caring for the land must be stressed in these meetings. Before a school group comes to the site teacher workshops should be held so that the teachers are trained and well-informed about the area. When the class comes to the site managers or scientists should, if possible, also be present to assist the teachers.

Action 22. Consult with and inform regional higher educational institutions and researchers on the site's resources and management (Nature Conservancy guidelines 4, 6, and 10; Scientific & Natural Area policies 1,2,3,4,5,12,13,14,15 and 26).

St. Cloud State and St. John's Universities, the College of St. Benedict, Willmar Community College, and other scientific research groups or individuals who express a research interest should be annually contacted. The purpose of these meetings is to inform the researchers about the area (including Nature Conservancy's rules and regulations; all researchers should know that a permit is required for all research conducted on the tract), and to promote education and research possibilities such as the effect of the herons on vegetation and soils. However, only research pertinent to the tract, causing no significant disturbance to the herons should be allowed; no researchers should be allowed in the colony during the nesting season (March-July 15) unless it is related to the herons. Data gathered from scientific studies are also important for monitoring the site. Thus all researchers conduct-

ing studies are to be consulted about their data and conclusions. Researchers should inform managers immediately of important natural changes and human impacts they discovered. Researchers should furthermore be consulted and encouraged to offer input into managing the tract. Finally, research information should be accumulated, stored in a site file, and shared with interested researchers.

Action 23. Conduct field trips to the Observation Hill (Nature Conservancy guidelines 5,6, and 10; Scientific & Natural Area policies 4,12,13 and 15(C)).

This action will help acquaint and involve people with the area and its management. The number of conducted tours depends on time and money limitations, and the impact of the tours on the area. An effort should be made to lead trips in May and June when the herons are present. News releases should be sent to the local media to publicize the walks, and a reporter(s) should be periodically asked to participate in the field trips. In addition to educating visitors about Cold Spring Heron Colony's resources, guides should make a special effort to answer questions, inform visitors about the Nature Conservancy-Scientific & Natural Area Program (if appropriate), obtain feedback on management, and make visitors feel like land stewards -- involved in managing the site and responsible for its well-being.

Monitoring Actions

Action 24. Recruit a local volunteer manager preferably living within three to four miles of the tract (Nature Conservancy guidelines 4,5,6,7,8, and 10; Scientific & Natural Area policies 1,2,3,4,5,7,9,10,13,15, 16, and 21).

The volunteer manager must have the time, interest and commitment

to become intimately involved with the protection and management of the site. His/her job is primarily to: 1) maintain the registration box supplies and collect registration sheets; 2) periodically monitor the tract for signs of misuse or management problems and communicate them to managers (a"watchdog" function); 3) facilitate communications between managers, local residents and other parties; 4) aid managers when requested; and 5) orient new managers to the site and the local community.

Action 25. Periodic meetings will be held by managers for local residents (Nature Conservancy guidelines 5,6,7,8, and 10; Scientific & Natural Area policies 3,4,5,9, 10,13 and 21).

Meetings will be publicized through news releases sent to the local media (a reporter might also be asked to attend). They will be held at least once per year at a time and place convenient for local residents, perhaps in conjunction with a field trip or other activity; special circumstances, such as the implementation of a major management action, may warrant more than one meeting. These meetings can be used to enlist support for project work (e.g., monitoring), as a forum to discuss management actions, decisions and problems, or to encourage land owners to adopt various practices. It is particularly important that adjacent land owners and frequent users be present at these meetings since their activities can have a large impact on the tract and vice versa. All comments regarding management should be recorded.

Action 26. Develop and implement a vegetation monitoring program for Cold Spring Heron Colony (Nature Conservancy guidelines 1,2,3 and 4; Scientific & Natural Area policies 1,2,3,5 and 11).

A monitoring program should be developed to record changes occurring on the tract, such as changes in plant succession or species diversity. Permanent releves and photopoints should be set up in each of the tract's vegetative communities following the guidelines and procedures described in the 1979 Scientific & Natural Area inventories. Dr. Lax Partch, St. Cloud State University, should be consulted about using his quadrats in this regard. Color IR aerial photographs should also be taken of the site once every five years.

Action 27. Periodically inspect the site (Nature Conservancy guidelines 1,2,3,4,7 and 8; Scientific & Natural Area policies 1,2,3,5,6(C), 7,11,16 and 23).

The tract shall be thoroughly inspected at least once per month for human impacts (e.g., vandalism, trail widening, new unauthorized trails, trampling of plants, littering, erosion), signs of violations in rules and regulations (e.g., hunting, snowmobiling, horseback riding), natural changes in the tract (e.g., tree blow-downs, insect infestations), and the need for an effect of management actions (e.g., burning, erosion control). This is also an opportunity to gather feedback from users in the area concerning the site and management actions. On randomly selected days of high use the number of visitors in the area could be counted for a comparison with the number that registered. Visitors observed violating rules and regulations should be tactfully asked to correct their behavior, e.g., remove rubbish dumped on the site. Serious problems requiring immediate attention should be referred to the Department of Natural Resources Conservation Officer or County Sherrif. A report should be submitted to

The Nature Conservancy if further action is advisable.

Action 28. Monitor the Great Blue Heron population (Nature Conservancy guidelines 1 and 4; Scientific & Natural Area policies 2,3, and 5).

The heron colony is the major reason this area is a Nature Conservancy preserve and is the probably the most significant element on the site. Thus it warrants special attention. The colony's population should be carefully monitored to determine whether the population size is changing and if so what factors are related to the population change (e.g., dying trees, pollutants in the water, loss of solitude). Whenever managers, student workers or researchers are on the site they should be on the lookout for the herons (and other colonial nesting birds on the site, such as egrets). An annual record should be kept of the tract's population, its size, structure, and trends. Since Dr. Max Partch has been keeping such a record since 1954, his monitoring system should be continued. Dr. Partch's monitoring system should be recorded, and managers should work with him so they will be familiar with the system.

Action 29. Contact the local Department of Natural Resources Conservation Officer (C.O.) and request his assistance in managing the site (Nature Conservancy guidelines 2,3, and 4; Scientific & Natural Area policies 3,4,7,16, and 23).

This action should be taken at least once per year. Since the C.O. is the primary natural resource enforcement officer it is important to bring the site to his attention and familiarize him with its resources and problems. This action is also necessary to obtain advice on management, such as posting, and on enforcement activities.

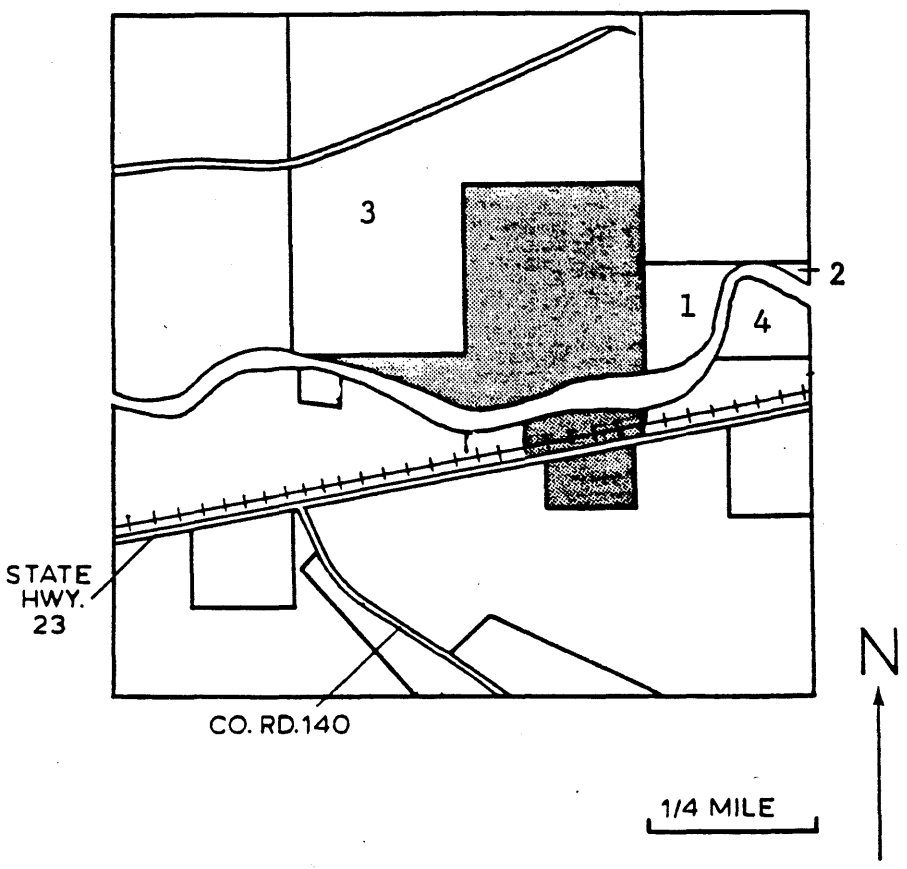
Action 30. Submit an annual written report to The Nature Conservancy and the Scientific & Natural Area program (if appropriate) (Nature Conservancy guidelines 1,2,3 and 4; Scientific & Natural Area policies 1,2,3,5,11,13,14,15 and 26).

The annual report shall note completed resource and use management actions, progress made in implementing other actions, number of users and violations (compared against preceeding years), solicited and unsolicited comments regarding management, research proposals and studies underway, changes in the resources, problems identified by managers, local residents and researchers, and recommendations for changes in the plan. Actions which are taken but which are not included in this plan should be described in detail in the report.

Ownership Modifications

The Cold Spring Heron Colony management plan calls for the fee title acquisition of two parcels and the acquisition of several conservation easements. Figure 1 outlines the areas of concern.[1] The area to the east of the tract, north of the river should receive top priority for fee title acquisition. Area #1 is an extension of the flood plain meadow that borders the colony on the south. This area is used extensively by large numbers (300+) of herons during March and April to escape inclement weather. They usually congregate below the levee that marks the northern border of this area. Area #2 has a moderate priority for fee title acquisition.

1. The following proposals are based on an assessment made by Dr. Richard Reifer, University of Minnesota.



PROPOSED ADDITIONS

Area 1 - Highest priority for fee title acquisition

Area 2 - Second priority for fee title acquisition

Area 3 - Conservation easement

Area 4 - Conservation easement

Figure 1. Proposed ownership modifications at Cold Spring Heron Colony. Area 2 includes a few acres of woods extending east off the map.

This area will provide more habitat for the herons, and provide a buffer zone for the colony. Acquiring fee title here will also prevent any developments from occurring.

Probably the greatest potential threat to the colony is residential development. The area shown north of the river in Figure 1 is a possible area which could be developed; the area enclosed in black shows the most likely place houses would be erected. Although the likelihood of residential development is presently remote, due to the value of this area as agricultural land, a conservation easement should nevertheless be acquired to insure that the present agricultural land use continues.

Another conservation easement should be acquired for the area bordering the Sauk River in the south. Although this area is part of the flood plain, and probably will not see residential development the easement should be sought to provide additional buffer area for the colony.

III. REVIEW OF THE PLAN

The actions outlined in this plan must be considered provisional, not definitive, and should be reviewed periodically to see that they are still relevant in light of current conditions. Changes in the site's resources, users and other management considerations are bound to occur. If warranted, the plan's management actions can and should be modified so that they more effectively and/or efficiently implement The Nature Conservancy guidelines and Scientific & Natural Area policies (if the site is designated). All proposed actions should be primarily directed at protecting and preserving elements that are a significant part of Minnesota's natural diversity. In any event the plan should be thoroughly reviewed and updated at a minimum of every ten years.

Management Plan Summary for Cold Spring Heron Colony 1979

TNC's strategy for Cold Spring Heron Colony is to develop a cooperative management alliance, consisting of TNC, local citizens, and the DNR's Scientific & Natural Area (SNA) Program (See the Ripley Esker management summary). The following 30 actions have been proposed for Cold Spring Heron Colony. The actions are listed in outline form and are not listed in order of priority.

Resource Management Actions:

1. Develop and implement a wildfire suppression plan.
2. Periodically burn Observation Hill.
3. Study the possibility of burning the open sedge marsh, north of the river (in the fall), and the former wet meadow on the back slope of the levee.
4. On an experimental basis, erect several artifical platforms in the woods for the herons to nest on.
5. Inventory the tract's amphibians and reptiles.
6. Inventory the sandbar, submerged and emergent aquatic communities on the river.
7. Collect additional information on the tract's spring flora and non-vascular plants (not done in 1977).
8. Collect additional information on the site's bird population.
9. Inventory Observation Hill for its butterflies (not done in 1977).
10. Survey the tract's water quality and hydrology (not done in 1977).
11. Accurately determine the tract's east and west boundaries south of the river. These boundaries are not presently accurately known.
12. Maintain the tract's boundary fences.
13. No effort should be made to control or remove diseased plants from the site. (There is possibly some Dutch Elm disease on the tract.)

Use Management Actions:

14. Post new signs on all the tract's boundaries, except for the river, and maintain the signs. These new signs will be more attractive and less negative than the old TNC signs they replace. (the signs have not yet been designed)
15. Maintain the main recognition sign, the registration box and its supplies. The box should contain adequate copies of maps,brochures,comment cards, etc.
16. Expand and update the site brochure.
17. Develop and implement a parking plan. Parking signs should be erected on Highway 23,and the parking area should be posted,surfaced with gravel and surrounded by a barrier. Additional work will be needed (to be developed).

18. Erect and maintain a sign near the parking area to direct visitors to use the culvert to cross the highway.

19. Build and maintain steps and water bars along the path to the Observation Hill top. This is necessary to prevent erosion from occurring.

20. Encourage local secondary schools,regional education institutions and researchers to use the site if appropriate.

21. Conduct field trips to the Observation Hill.

Monitoring Actions:

22. Recruit a local volunteer manager preferably living within 4 miles of the site.

23. Develop and maintain a close relationship with local and regional governmental officals,natural resource professionals and other appropriate individuals.

24. Maintain close contact with all scientists who are using the site.

25. Maintain close contact with the DNR Conservation Officer.

26. Hold periodic meetings for local residents.

27. Develop and implement a vegetative monitoring program which includes setting up permanent releves and photopoints,and taking color IR aerial photographs.

28. Periodically inspect the site for human impacts,signs of violations in rules,natural changes in the tract,and to evaluate management actions.

29. Monitor the Great Blue Heron population. An annual record should be kept of the site's population,its size,structure and trends.

30. Submit an annual written report to TNC and the SNA Program (if appropriate).

Ownership Modifications:

The fee title to two parcels and several conservation easements should be acquired. The area to the east of the tract,north of the river, should receive top priority for fee title acquisition. The other area,a small triangle east of area #1, has moderate priority for fee title acquisition. The conservation easements to the northwest and southeast of the tract are to prevent development and provide more buffer for the colony.

June, 1980

COLD SPRING HERON COLONY PRESERVE
INVENTORY ERRATA SHEET

I. Substantive Changes

The name of the tract should be changed to Cold Spring Heron Colony Preserve.

Page 20, Par. 2, lines 8-11 should read: "...material swept downstream by floodwaters and deposited on the tract.

Pages 23 and 24, table: The Collegeville soil series should go before the Alluvial Soils. There is some question as to whether the Collegeville and Brooton soils are correctly identified. The present vegetation of the Estherville soil series should read grasses and woody vegetation.

Page 34, line 8: Add Footnote 2: "Black Ash (Fraxinus nigra) is reported here by Dr. Max Partch."

Page 35, Par. 2 lines 3-4: "Black Ash (Fraxinus nigra) is less common."

Par. 3 lines 2-4 should read: "...mineral soil where Hackberry (Celtis occidentalis) and Ironwood (Ostrya virginiana) are found;"

line 7: Add footnote 1, stating: Dr. Max Partch agrees that the community on the levee is distinctive. The trees, shrubs, and herbs all differ from the bog forest and floodplain forest. He has identified Euonymus, Staphylea and Ellisia on the levee.

Par. 4: Strike "Floodplain"

line 2: should read: "woods. It occurs on..."

Page 36, Par. 1, lines 2-3 should read: "...shrub observed here in fairly open wooded areas. Dr. Max Partch reports it on the levee as well."

Page 56, Footnote 1. Add at the end: "Richard Peifer has also seen Bald Eagle, Great Horned Owl, Kestral and Pheasant on the tract."

Page 58, Par. 1, line 7: Add Footnote 1. Great Egrets, Chickadees, House Wrens, and Robins have been observed by Dr. Max Partch to nest on the tract.

Page 64: Add to the Footnote: Dr. Max Partch also has a photograph of a mink coming out of a hole at the base of a large Elm on the levee.

Page 69, Par. 1, line 2: Change "spring" to fall.

Par. 4, lines 4-5 should read: Now the herons fly to the Mississippi River, Little Rock Lake and Wright County (Peifer, 1975; reference on page 62 of this report.)

lines 8-9 should read: "...emery and shot steel (used for grinding)."

Page 71, Par. 2, line 3: change "fourteen" to twenty-six. Add: The last few years have seen a significant increase in use due to organized field trips and publicity (Partch, pers. comm.).

PLEASE NOTE: Additional grammatical, typographical, and miscellaneous errors have been compiled for this inventory. A list of these errors can be obtained by contacting The Nature Conservancy's Minnesota Chapter Office.

June, 1980

COLD SPRING HERON COLONY PRESERVE MANAGEMENT PLAN ERRATA

The title of the preserve has been changed from Cold Spring Heron Colony to Cold Spring Heron Colony Preserve. All references to the tract in the text should therefore be changed.

Pages 2-3, Par. 3, line 5+ should read: "...Colony Preserve. A ten year renewable lease was therefore signed by TNC on 25 July 1979 and by the DNR on 9 August 1979. This lease calls for...."

Page 15, Par. 2 should read:

If Cold Spring Heron Colony Preserve is designated an SNA the Nature Conservancy-DNR lease will affect management of the site. Under the provisions of the lease:"

Page 18, Par. 2: replace Action 1 with the following:

Action 1. Implement a wildfire suppression plan (TNC guideline 8; SNA policy 4).

Wildfires may threaten human health and property adjacent to the tract. However, the practices used to suppress wildfires may be more damaging to the site than the fire itself. Fire control should be to safely prevent the spread of the fire outside of the tract's boundaries, and be designed to minimize the damage produced by fire suppression activities. Several steps will be taken to achieve this goal.

Local fire authorities, the fire chief of the local fire department and the DNR area forester, should be annually contacted about control methods to use should a wildfire start on or spread into the tract. These authorities should be made aware of the nature of the tract and TNC's concern about what suppression methods are used on the site. They should be asked to consider using natural fire breaks and back-fires, rather than heavy equipment and fire plows, to contain the fire. The fire authorities should have the names and telephone numbers of the local volunteer manager and TNC preserve management coordinator to contact for assistance in the event of a fire. A map should be provided showing the tract's boundaries, access points, and fire breaks.

Adjacent landowners should also be provided with the names and phone

numbers of the local fire department, volunteer manager, and TNC preserve management coordinator to contact in case of a fire. If a wildfire does occur on the tract the neighbors can serve as an "early warning network", alerting the proper individuals. During extreme fire danger periods neighbors, and visitors, should be alerted to prevent man-caused fires and to be on the lookout for fires.

Page 20, Par. 2: delete Action 4. (NOTE: all subsequent actions should be renumbered.)

Page 23, Par. 1: omit lines 4-8 starting with "It would also be desirable ...."; insert (See also Action 29) after the period on line 4.

Par. 3: change Action 12 to read:"Action 11. Maintain the boundary fences around Observation Hill...."

Page 24, Par. 3: replace Action 14 with the following:

Action 13. Post new signs on all the tract's boundaries, except for the river, and maintain the signs (TNC guidelines 3,4,7,8,9, and 10; SNA policies 3,7,15,16, and 22).

The tract's boundaries should be posted to prevent inadvertent encroachment by adjacent landowners, to minimize unauthorized activities (e.g., hunting), and to identify the area's boundaries to users and managers. If the tract is not designated an SNA in the near future, new signs will be posted on an experimental basis on all the tract's boundaries except for the river. These new signs will be more attractive and less negative than the old TNC signs they replace. (TNC's present signs emphasize what activities are prohibited on the tract.) The new signs will help promote TNC's cause to the local community and help form a positive image of the tract and its managers. The signs should be set no more than one-tenth mile apart; if visibility is obstructed they should be set closer together. At corners posts should be set so that signs are nearly touching and at the same angle as the boundary line. All signs and posts should be checked annually and repaired when necessary.

As noted above, the new signs are an experiment: if problems develop on the tract then the signs may have to be changed. No signs should be posted on the river because it is felt this would invite use from recreational boaters that would disturb the nesting herons.

Page 25, Par. 3, line 1: change "weekly" to biweekly.

Page 25, Par. 3: delete lines 8-11 starting with "It is particularly important...." Insert the following new paragraph:

Two sets of 5x7 standardized comment cards will also be kept in the box. One set of cards will be available for users to write comments on management and use of the tract (e.g., problems observed on the site, proposals for management, evaluation of the managers). The other set of cards will be available for visitors to write observations on the site's natural features. These cards will ask: the observer's name and address; what species were observed; the number of individuals seen; where the species were observed (space can be left for a sketch); and other remarks (e.g., presence of nesting activity, territorial behavior, identifying marks of unknown species). The back of the cards will have instructions and note the purpose of the cards. A list of those species which are of particular interest to managers and scientists could also be included here. The registration sheets and the comment/observation cards can provide valuable monitoring data to managers. It is therefore important to collect the cards and the registration sheets, and keep them for analysis.

Finally, the registration box should be annually touched up with Olympic wood stain. Other maintenance actions should be taken as required.

Page 26, Par. 2: Action 17 should be changed to read:

Action 16. Develop and implement a parking plan for the tract (Nature Conservancy guidelines 7,9, and 10;Scientific & Natural Area policies 15(C) and 25).

The present parking arrangement on the tract is unsatisfactory: access to the parking area from the east is difficult and hazardous to the public safety because of the sharp angle of approach. Before any action is taken on parking, however, the Minnesota Department of Transportation and the DNR's Bureau of Engineering should be consulted on various options (and costs) which TNC could pursue to rectify the situation. The analysis should cover parking area location, design, and surfacing.

If the above analysis shows that parking could continue on the north side of Highway 23 (with various alterations in the approach), then TNC

should post the parking area and surface the area with gravel where necessary. A barrier or bumper posts should be erected and maintained on the road beyond the parking area to prevent vehicle access to the river from the parking area. Signs indicating the location of the parking area should also be erected and maintained on Highway 23.

If the analysis shows that parking should occur on the south side of Highway 23 then a new parking area will have to be developed. (It would then be desirable to close off the north access from the highway.) This option would eliminate the hazardous approach as well as the need to cross the highway. It would, however, entail the cooperation of the adjacent landowner--the fee title or an easement would have to be purchased so parking could occur here (See Ownership Modifications). The parking area should be big enough to accommodate twelve cars. It probably will have to be fenced and posted to control access. Further details will have to be worked out concerning parking area design, surfacing, etc.

Page 27, Par. 2: change Action 18 to read:

Action 17. Erect and maintain signs near the parking area and on both sides of the railroad tracks warning visitors of the possible safety hazards (Nature Conservancy guideline 7; Scientific & Natural Area policy 25(C)).

Action 17 will not be necessary if the parking area is moved (see Action 16). The signs are otherwise necessary to prevent visitors from crossing Highway 23, and to use caution when crossing the railroad tracks. Both of these transportation corridors present possible public safety hazards. All visitors going from the parking area to the Observation Hill should be encouraged to use the culvert. Before the signs are erected on the railroad tracks the permission of the Burlington Northern Railroad should be obtained. All of the signs should be annually touched up with Olympic wood stain and repaired as necessary.

Page 27, Par. 3, line 1: omit "and water bars".

line 5: omit "and water bars".

line 6: insert the following sentence: "...may become a problem. Railroad ties could be used here as steps. The Department...."

Page 27, Par. 4: delete Action 20. (NOTE: all subsequent actions should be renumbered.)

Pages 27-28: replace Action 21 with the following:

Action 19. Encourage local middle and secondary schools, regional education institutions and researchers to use the site if appropriate (Nature Conservancy guidelines 6 and 10; Scientific & Natural Area policies 4,12, and 15).

All local secondary schools, the Minnesota Environmental Education Board's regional coordinator, St. Cloud State University, St. John's University, the College of Saint Benedict, Willmar Community College, and other scientific research groups should at least know of the site's existence and its potential for teaching such topics as native flora and fauna, ecology, and geology, and whom to contact for more information (e.g., the local volunteer manager, TNC preserve management coordinator, DNR regional naturalist). An effort should be made to meet annually with all teachers and researchers who epxress an interest in the site. Educational and research opportunities can be promoted at these meetings. (One possible research project would be to observe how the herons adapt to the loss of nesting trees. This information will be useful for managing heron colonies throughout the state.) However, the sensitivity of the resources and user responsibility in caring for the land must be stressed at these meetings. Educational use should only be encouraged on the Observation Hill, and then only if appropriate, i.e., if such use cannot occur equally well on less vulnerable areas. Only authorized research use will be allowed in the floodplain woods. All teachers and researchers should be aware of the site rules & regulations, such as the need to obtain a permit prior to collecting or conducting research in the area, before they enter the site. Before a class comes to the tract teacher workshops should be held so that the teachers are trained and well-informed about the area. When the class comes to the site managers or scientists should, if possible, also be present to assist the teachers.

Pages 28-29: delete Action 22 (NOTE: all subsequent actions should be renumbered.)

Page 29, Par. 3: change Action 24 to read as follows:

Action 21. Maintain contact with John Brewer, the local volunteer manager (Nature Conservancy guidelines 1,2,3,...)

Mr. Brewer lives on a farm near Cold Spring. Volunteer managers must must have....

Page 30, Par. 1, line 9: add to the end of the paragraph:

"...local community. If and when Mr. Brewer feels he cannot adequately serve in this role then another volunteer manager should be recruited. The new manager will preferably live within 3-4 miles of the site.

Page 30: add the following action after Par. 1 (Action 21):

Action 22. Develop and maintain a close relationship with local and regional government officials, natural resource professionals, and other appropriate individuals (Nature Conservancy guidelines 5,6, and 8; Scientific & Natural Area policies 4,5,9, 13, and 21).

Local and regional governmental officials (e.g., the mayor, county assessor, county board members) and resource management professionals (e.g., the county extension agent, DNR area wildlife managers, Soil Conservation district conservationist, U.S. Fish & Wildlife Service managers) should be contacted annually and informed about the site. These individuals are all concerned with natural resources in their respective capacities. They should be aware of the site, its importance, and major management actions which are planned for or being implemented on the tract. This action can help eliminate public suspicions and misconceptions, build trust and rapport, and increase community support. It is also another way of monitoring what the public feels about the site and the managers.

Keeping in close contact with local and regional professional resource managers is also important. These individuals, if they are aware of the site and interested in its preservation, can provide valuable expertise and manpower, and lend equipment if needed for management. As local residents they can help generate community support for the tract. Cooperative management efforts can also sometimes be used to solve problems which affect (or could affect) several sites in the area, including the preserve.

Pages 30-33: The actions listed on these pages are incorrectly numbered and are out of order. Several new actions have also been added. The

correct order is as follows:

Action 23. Maintain close contact with all scientists who are using the site for educational and research purposes (Nature Conservancy guidelines 4,5, and 6; Scientific & Natural Area policies 1, 2,3,4,5,9,12,13, and 15).

Scientists, as trained observers, can provide valuable information and insights for managing the site. Data gathered from scientific studies are also important for monitoring the site. Thus all scientists using the site will be contacted annually. Researchers conducting studies will be consulted about their data and conclusions. Researchers should inform TNC and the DNR (if appropriate) immediately of important natural changes and human impacts they discover. Researchers should furthermore be consulted and encouraged to offer input into managing the tract. Finally, research information should be accumulated, stored in a site file, and shared with interested researchers.

Action 24. Contact the local DNR conservation officer....(See page 32).

Action 25. Hold periodic meetings for local residents.... (See page 30).

Action 26. Develop and implement a vegetation monitoring program...(See pages 30-31).

Add the following sentence to line 8 on page 31: "...in this regard. Records should be kept of tree growth and mortality since changes in the trees will affect the heron colony (See also Action 28).

Action 27. Periodically inspect the site.... (See pages 31-32).

Change line 7 to read:"If urgent action is required on the site TNC should be contacted immediately. Otherwise, records should be kept of observations for the annual status report.
The inspections are also an opportunity...."

Action 28. Monitor the Great Blue Heron population (See page 32).

Add footnote 1 to the period on line 13:

1. Dr. Max Partch should also be consulted about the forest population dynamics (i.e., regeneration of nesting trees), and how the herons are adapting to the loss of nesting trees.

Action 29. Request the Minnesota Pollution Congrol Agency to periodically sample the Sauk River on the tract and analyze the tract's

water quality (Nature Conservancy guidelines 1 and 4; Scientific and Natural Area policies 2,3,5, and 8(B)).

The Sauk River is probably carrying pollutants through the tract (the Cold Spring sewage plant discharges into the river upstream of the colony). These pollutants may affect the herons. Thus it would be desirable to periodically test the water for pesticides and other pollutants. Data gathered from the state will alert managers if upstream pollution is affecting the site's resources. (See also Action 9.)

Action 30. Submit an annual written report.... (See Page 33).

lines 13-14: delete the sentence beginning "Actions which are not...."

Page 34: Figure 1 has several errors. First, Dr. Partch notes the road in Area 3 does not end as is shown. Second, a dotted line is missing south of the road in Area 3. This area is most likely to be developed. The dotted line runs roughly parallel to the road. Finally, Area 3 should be labeled:"Conservation easement (and an easement for foot access)"in the key.

Page 35, Par. 2 should be changed to read:

Probably the greatest potential threat to the colony is residential development. Area 3, north of the river in Figure 1, is an area which could be developed for residential housing. A conservation easement should be acquired here to insure that the present agricultural land use continues.

TNC presently does not have legal access to the tract from the north. An easement for foot access in Area 3 should therefore be sought. The easement should run from the road, through the field, and end at the site's boundary.

Page 35, Par. 3, line 2 should read: "...in the south (Area 4)."

Add a new paragraph to the end of page 35:

Finally, it may be desirable to work out an arrangement with the adjacent landowner so visitors could park on the south side of Highway 23. Either an easement or fee title could be purchased for parking purposes.

PLEASE NOTE: Additional editorial, grammatical, spelling and miscellaneous changes have been compiled for this plan. A list of these errors can be obtained by contacting The Nature Conservancy's Minnesota Chapter Office.

ERRATA & ADDITIONS

Action 1. Implement a wildfire suppression plan (TNC guideline 8; SNA policy 4).

Wildfires may threaten human health and property adjacent to the tract. However, the practices used to suppress wildfires may be more damaging to the site than the fire itself. Fire control should be to safely prevent the spread of the fire outside of the tract's boundaries, and be designed to minimize the damage produced by fire suppression activities. Several steps will be taken to achieve this goal.

Local fire authorities, the fire chief of the local fire department and the DNR area forester, should be contacted annually about control methods to use should a wildfire start on or spread into the tract. These authorities should be made aware of the nature of the tract and TNC's concern about what suppression methods are used on the site. They should be asked to consider using natural fire breaks and backfires, rather than heavy equipment and fire plows, to contain the fire. The fire authorities should have the names and telephone numbers of the local volunter manager and TNC Preserve Management Coordinator to contact for assistance in the event of a fire. A map should be provided showing the tract's boundaries, access points, and fire breaks.

Adjacent landowners should also be provided with the names and phone numbers of the local fire department, volunter manager, and TNC Preserve Management Coordinator to contact in case of a fire. If a wildfire does occur on the tract the neighbors can serve as an "early warning network", alerting the proper individuals. During extreme fire danger periods neighbors, and visitors, should be alerted to prevent man-caused fires and to be on the lookout for fires.

Action 14. Post new signs on all the tract's boundaries, except for the river, and maintain the signs (TNC guidelines 3,4,7,8,9, and 10; SNA policies 3,7,15,16, and 22).

The tract's boundaries should be posted to prevent inadvertent encroachment by adjacent landowners, to minimize unauthorized activities (e.g., hunting), and to identify the area's boundaries to users and managers. TNC's present signs only state what activities are prohibited on the tract; they do not state what activities are allowed or encouraged. Therefore, if the tract is not designated a SNA in the near future, new signs will be posted on an experimental basis on all the tract's boundaries except for the river. These new signs will be more attractive and less negative than the old TNC signs they replace, helping to promote TNC's cause to the local community and forming a positive image of the tract and its managers. The signs should be set no more than one-tenth mile apart; if visability is obstructed they should be set closer together. At corners posts should be set so that signs are nearly touching and at the same angle as the boundary line. All signs and posts should be checked annually and repaired when necessary.

As noted above, the new signs are an experiment: if problems develop on the tract then the signs may have to be changed. No signs should be posted on the river because it is felt this would invite use from recreational boaters that would disturb the nesting herons.

Actions 2-2. Encourage local middle and secondary schools, regional higher education institutions and researchers to use the site if appropriate (TNC guidelines 6 and 10; SNA policies 4,12,14,15 & 26).

All local secondary schools, St. Cloud State and St. John's Universities, the College of St. Benedict, Brainerd Community College, Willmar Community College, and other scientific research groups should at least know of the site's existence, its potential for teaching such topics as native flora and fauna, ecology and geology, and who to contact for more information (e.g., the local volunter manager, TNC preserve management coordinator, DNR regional naturalist). An effort should be made to meet annually with all teachers and researchers who express an interest in the site. Educational and research opportunities can be promoted at these meetings. However, the sensitivity of the resources and user responsibility in caring for the land must be stressed at these meetings. Use should only be encouraged if appropriate, i.e., if such use cannot occur equally well on less vulnerable areas. All teachers and researchers should be aware of the site rules & regulations, such as the need to obtain a permit prior to collecting or conducting research in the area before they enter the site. Before a class comes to the tract teacher workshops should be held so that the teachers are trained and well-informed about the area. When the class comes to the site managers or scientists should, if possible, also be present to assist the teachers.

Action 31 . Develop and maintain a close relationship with local and regional government officals, natural resource professionals and other appropriate individuals (TNC guidelines 5,6, and 8; SNA policies 4,5,9,13, and 21).

Local and regional governmental officals (e.g., the mayor, county assessor, county board members) and resource management professionals (e.g., the county extension agent, DNR area wildlife manager, Soil Conservation Service district conservationist, U.S. Fish & Wildlife managers) should be annually contacted and informed about the site. These individuals are all concerned with natural resources in their respective capacities. They should be aware of the site, its importance, and major management actions which are planned for or being implemented on the tract. This action can help eliminate public suspicions and misconceptions, build trust and rapport, and increase community support. It is also another way of monitoring what the public feels about the site and the managers.

Local and regional resource management professionals are another important group to keep in close contact with. These individuals, if they are aware of the site and interested in its preservation, can provide valuable expertise and manpower, and lend equipment if needed for management. As local residents they can help generate community support for the tract. Cooperative management efforts can also sometimes be used to solve problems which affect (or could affect) several sites in the area, including the preserve.

Action 32 .. Maintain close contact with all scientists who are using the site for educational and research purposes (TNC guidelines 4, 5, and 6; SNA policies 1,2,3,4,5,9,12,13, and 15).

Scientists, as trained observers, can provide valuable information and insights for managing the site. Data gathered from scientific studies are also important for monitoring the site. Thus all scientists using the site will be annually contacted. Researchers conducting studies will be consulted about their data and conclusions. Researchers should inform TNC and the DNR (if appropriate) immediately of important natural changes and human impacts they discover. Researchers should furthermore be consulted and encouraged to offer input into managing the tract. Finally, research information should be accumulated, stored in a site file, and shared with interested researchers.

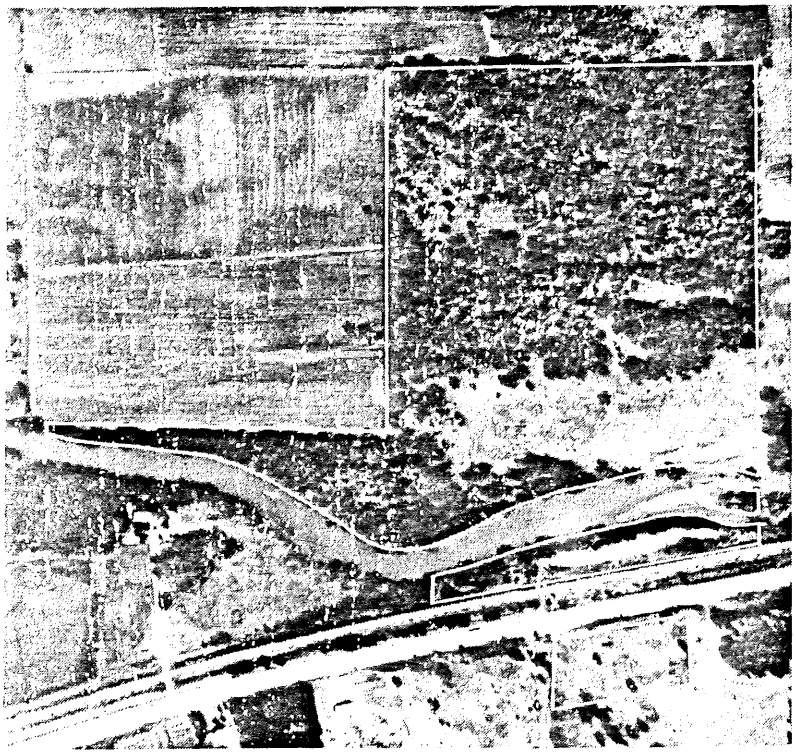
The 1977 Inventory of Cold Spring Heron Rookery Stearns County, Minnesota

Portions of: the NW 1/4 SE 1/4, and
the SW 1/4 NE 1/4, and
the SE 1/4 all in Section 13,
Township 123 North,
Range 30 West
Cold Spring Quadrangle

Prepared by
The Minnesota Chapter of The Nature Conservancy
and
The Scientific and Natural Area Section
Division of Parks and Recreation
Minnesota Department of Natural Resources

December, 1979

Draft Copy



Aerial photograph of Cold Spring Heron Colony, taken in 1965. Scale: approximately 8": 1 Mile. Source: USDA-ACSC.

TABLE OF CONTENTS

INTRODUCTION

Scope and Organization

The primary purpose of this document is to provide data necessary for the Heritage Program to evaluate the significance of the Cold Spring Heron Rookery. This evaluation will be used to determine if the tract qualifies as a Scientific & Natural Area (SNA). In addition, the inventory provides information on the site's viability, notes man-made disturbances, identifies fragile, sensitive resources, and provides a temporal baseline from which changes in the area can be identified. This information is useful to the Heritage Program evaluators, to scientists who may study the area, and to SNA managers should the site be designated a Scientific & Natural Area.

The Cold Spring Heron Rookery inventory is divided into eleven sections covering climate, the unit's physical resources (geology, soils, water resources), plant communities and the various biological subdivisions (flora, butterflies, birds and mammals).[1] In addition to identifying and cataloging the tract's natural features each section describes the inventory methods used, highlights elements which researchers have labled "significant", and points out additional inventory data which could be collected on the site.

The final two sections of the inventory are concerned with human activities on and adjacent to the site. The land use history section describes how the tract has been changed

1. No information was collected by the 1977 inventory team on the site's amphibians and reptiles. Thus no information is presented in this document on these animals.

through human activities, where known, and identifies adjacent land uses. The natural area visitor section points out regional population centers, educational and research centers and groups which may be sources of users.

The Cold Spring Heron Rookery inventory represents the culmination of many individual efforts. The inventory was completed in the summer of 1977 by six Nature Conservancy (TNC) student interns: Kathryn Bolin, Robert Dana, Erik Englebretson, Steve Hansen, Ross Siemers and Hagdis Tschunko. These individuals did all the research and preliminary writing. Each member of the team was responsible for completing a part of the inventory in which they had expertise. Approximately 153 hours were spent on the unit by the researchers. At least two to three times that amount of time was spent in preparation of specimens, researching the literature, processing and analyzing data and writing. Mr. Mark Heitlinger, TNC Coordinator of Preserve Management, Minnesota Chapter, helped supervise and edit the inventories. Michael Rees, SNA Research Writer, prepared the final document. Other individuals who assisted in the preparation of the inventory are noted in the appropriate sections. Their help is gratefully acknowledged.

Overview of Cold Spring Heron Colony

Cold Spring Heron Colony is a sixty-two acre natural area in a predominately agricultural area. It is located in Stearns County, eighty-three miles north of the Twin Cities and 11.7 miles west of St. Cloud on Minnesota State Highway 23 in central Minnesota. The tract, shaped by glaciers, and the Sauk River, includes a flat river floodplain, a gently sloping river terrace, and a sharply rising moranic hill. The site's elevation ranges from approximately 1060 feet at the water's edge on the Sauk River to about 1155 feet at the top of moranic hill. Thus the maximum relief of the tract is approximately ninety-five feet. Except for the Sauk River there are no permanent bodies of water on the site.

Six distinct vegetative communities were distinguished and surveyed in the 1977 inventory: Elm-Ash Bog Forest; Elm-Ash Floodplain Forest; Oak-Basswood Floodplain Woods; Sedge Meadow (or Slough); Wet Mixed Meadow; and Dry-Mesic Grassland. The Elm-Ash Bog Forest is the largest vegetative community on the tract. A total of 156 plant species have been identified growing in these vegetative communities, of which ninety-one species were identified in 1977. Of the ninety-one species observed twelve were not native to Minnesota . Thirty-two butterfly, forty-five bird and ten mammal species were also observed in the area.

Cold Spring Heron Colony's biotic communities have all been disturbed in varying degrees by past human activities. Parts of the tract have been grazed, mowed and logged.

The Great Blue Heron rookery located in the Elm-Ash Bog Forest is probably the most significant feature of the tract. Cold Spring Heron Colony is one of the largest of approximately 115-125 active Great Blue Heron rookeries in the state. In 1974 this colony supported 1584 nests, but since then the colony size has been gradually dropping. Rookeries like the Cold Spring colony are significant because conditions suitable for such large concentrations of birds in a relatively small area are relatively rare in the state, and they are susceptible to disturbance. Also, the Cold Spring Heron Colony is one of the most intensively studied colonies in the state. It has been monitored and researched since 1954. Finally, the site offers an excellent opportunity for visitors to observe a heron rookery at close range without disturbing the colony, unlike other rookeries in the state.

CLIMATE

Climate has a major influence on the biotic and physical resources of the Cold Spring Heron Rookery. Species diversity, density and distribution, soil type, erosion, hydrology and land use are all affected by temperature, precipitation and wind.

Methods

Climatological data were gathered by researching National Oceanic and Atmospheric Administration and Minnesota Agricultural Experimental Station reports. Since Cold Spring Heron Rookery doesn't have a weather station, data were gathered from the St. Cloud NOAA weather station.

Regional Climate[1]

Cold Spring Heron's climate is subject to marked changes in temperature which characterize all of Minnesota. The area experiences frequent periods of cold Arctic air during the winter months. A typical winter has five to ten days with temperatures ranging from -20 to -30 degrees Fahrenheit. Although winters are cold, strong winds and high humidities are generally absent on the coldest days.

The region's growing season is fairly short, extending from mid-May to the end of September, averaging 140 days per year. Since the Gulf of Mexico air masses seldom reach this far northward, prolonged periods of hot and humid weather are infrequent in this area. Only once in every five to ten years does the temperature exceed 100 degrees Fahrenheit, and then usually for only one day.

1. The following information is taken from NOAA 1976 local climatological data: Annual summary . . . .

Approximately 60% of the region's average 26.8 inches of precipitation (water equivalent) falls during the months of May through September; June is the wettest month of the year. The principal source of rain during this season is thunderstorms. Average annual snowfall is 43.1 inches, with the heaviest snow falls occurring in March.

Damaging storms such as severe blizzards, tornados and ice storms, occur infrequently in the region. The occurrence of ice storms, causing extensive damage to trees, averages less than once per year. However, heavy rains, winds and hail associated with thunderstorm line squalls occurs each year in the region.

Table I is a summary of selected temperature and precipitation data for the St. Cloud area.

Sources of Information

Baker, D.G., and J.H. Strub, Jr. 1963a. Climate of Minnesota: Part I. Probability of occurrence in spring and fall of selected low temperatures. Minnesota Agr. Exp. Sta. Tech. Bull. 243, 40p.

_____1963b. Climate of Minnesota: Part II. The agricultural and minimum-temperature-free seasons. Minnesota Agr. Exp. Sta. Tech. Bull. 245. 32p.

_____1965. Climate of Minnesota: Part III. Temperature and its applications: Mn. Agr. Exp. Sta. Tech. Bull. 248. 64p.

National Oceanic and Atmospheric Administration, Environmental Data Service. 1976. Local climatological data: Annual summary with comparative data, St. Cloud, Minnesota. National Climatic Center, Asheville, N.C.

Table 1. Selected Weather Data for St. Cloud.[a]

TEMPERATURE	°F	°C
Mean annual temperature:	41.7	5.4
Mean annual daily maximum temperature:	52.4	11.3
Mean annual daily minimum temperature:	31.0	-0.6
Highest temperature recorded (July, 1940, Aug., 1947):	103.0	39.4
Lowest temperature recorded (Jan., 1951):	-40.0	-40.0
Average temperature warmest month (July):	70.2	21.2
Average daily maximum--July:	81.8	27.7
Average daily minimum--July:	58.6	14.8
Average temperature coldest month (January):	8.9	-12.8
Average daily maximum--January:	19.2	-7.1
Average daily minimum--January:	-1.4	-18.6
Average date last occurrence 32°F (0°C) or less (spring):	c. 5 May[b]	
Average date first occurrence 32°F (0°C) or less (fall):	c. 1 Oct.[c]	
Average number days in growing season (period free of 32°F (0°C) or less):	c. 140[d]	
Average growing degree days, T_b = 40°F (4.4°C):	4102[e]	
Average growing degree days, T_b = 50°F (10.0°C):	2377[e]	

PRECIPITATION	in.	cm.
Average annual precipitation (water equivalent):	26.84	68.17
Average annual snowfall:	43.10	109.47
Average precipitation wettest month (June):	4.64	11.78
Average precipitation (water equivalent) driest month (Jan.)	0.76	1.93
Average snowfall heaviest month (March):	9.9	25.15

[a]All data except that noted otherwise is from National Oceanic and Atmospheric Administration, Environmental Data Service. 1976. Local Climatological Data: Annual Summary with Comparative Data, St. Cloud, Minnesota. National Climatic Center, Asheville, N. C.

[b]Based on Figure 3. Baker, D. G., and J. H. Strub, Jr. 1963a. Climate of Minnesota: Part I. Probability of Occurrence in Spring and Fall of Selected Low Temperatures. Minnesota Agr. Exp. Sta. Tech. Bull. 243.

[c]Based on Figure 4. Baker and Strub, 1963a.

[d]Based on Figure 16. Baker, D. G., and J. H. Strub, Jr. 1963b. Climate of Minnesota: Part II. The Agricultural and Minimum-Temperature-Free Seasons. Minnesota Agr. Exp. Sta. Tech. Bull. 245.

[e]From Appendix Table 2. Baker, D. G., and J. H. Strub, Jr. 1965. Climate of Minnesota: Part III. Temperature and Its Applications. Minnesota Agr. Exp. Sta. Tech. Bull. 248.

Growing degree days = $\Sigma(\overline{T} - T_b)$ where $\overline{T}$ = mean daily temperature and T_b = selected baseline temperature (40° F or 50° F).

GEOLOGY

The earth's rocks, minerals and topography form the physical landscape we see today. The type of bedrock and glacial drift affects the soil and groundwater, which in turn influence the vegetation. The land's relief, slope and aspect affect hydrology, microclimate, soil formation and the biotic community. Some geological formations are visually striking, illustrating geological processes; other features are more subtle, such as fossils showing how life has developed on the earth. Protecting examples of geological features is one important part of preserving natural diversity in Minnesota.

Methods

Geologic information was primarily obtained through a literature search. Field surveys using topographic maps aided in interpretation.[1]

Historical Geology

Cold Spring Heron Colony is situated in the St. Croix Moraine Complex (See Figure 1). However, the colony in fact is partly on the Sauk River floodplain, partly on a higher glacial river terrace, and partly on the hills of the St. Croix Moraine (See Figures 2 and 3).

The hilly upland areas on the south side of the Sauk River, including Observation Hill, are part of the St. Croix Moraine. Approximately 20,500 years ago the Rainy and Superior glacial lobes descended from Canada and covered much of east central Minnesota. One sublobe of these ice sheets, the

1. Professor George Shurr, geologist at St. Cloud State University, was consulted during the course of this research.

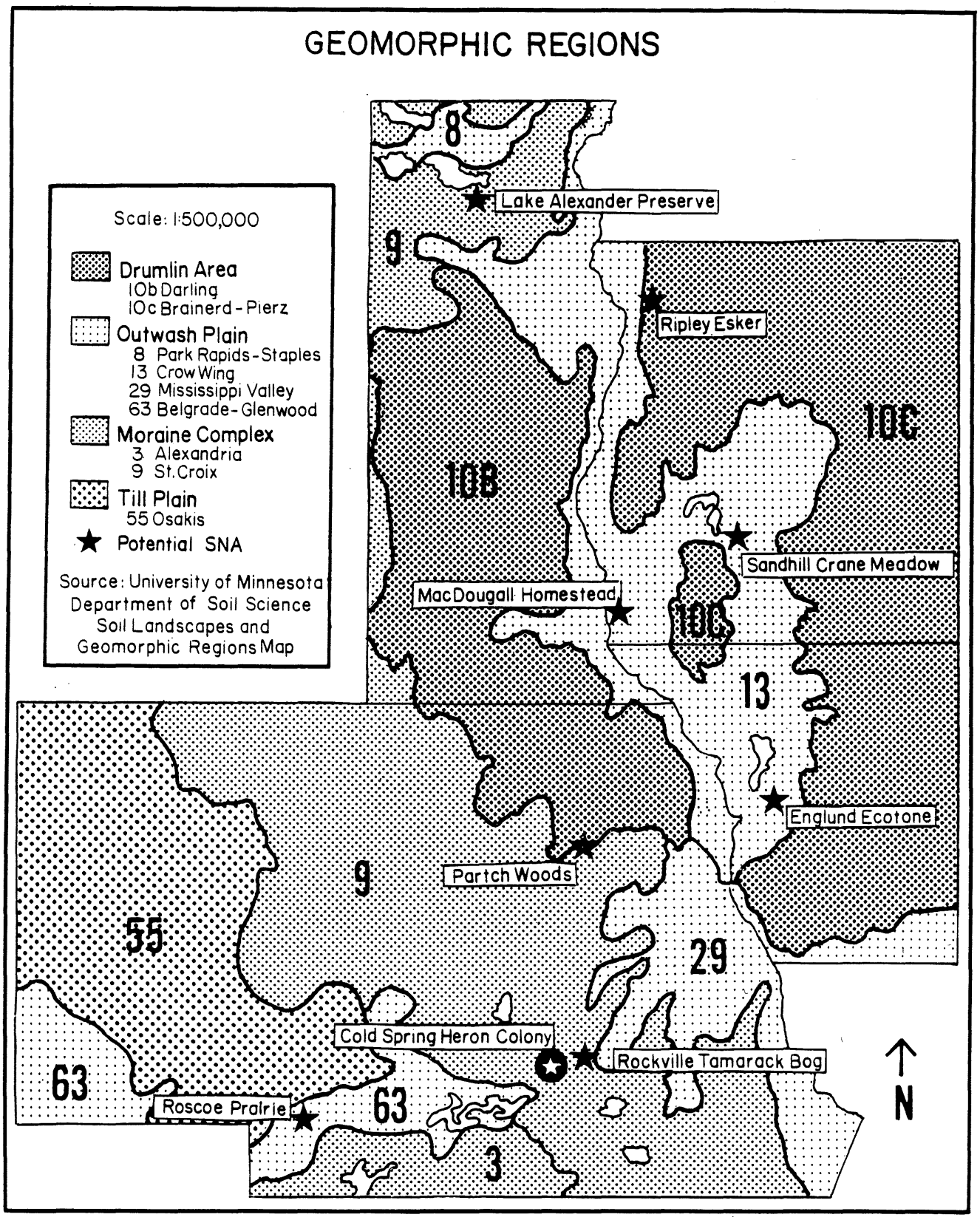


Figure 1. Cold Spring Heron Rookery and nearby potential Scientific & Natural Areas in relation to geomorphic regions in central Minnesota (Benton, Morrison and Stearns Counties).

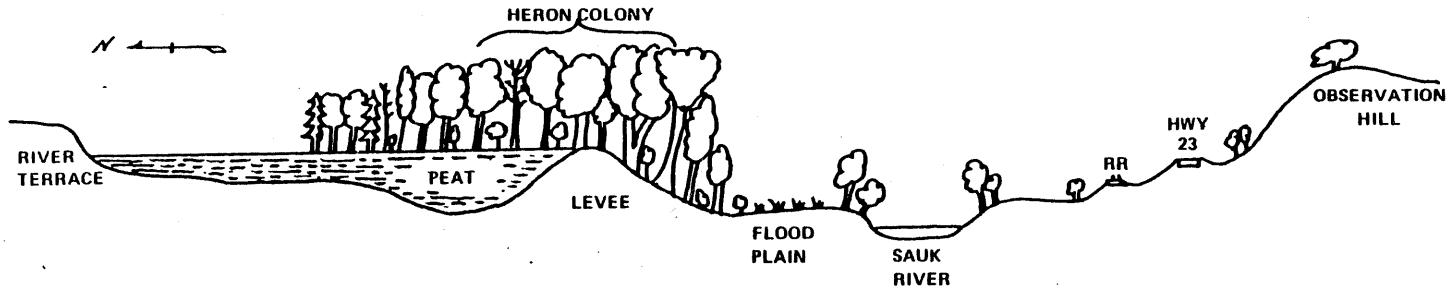


Figure 3. Geologic profile of Cold Spring Heron Colony. The figure is not drawn to scale. Source: Dr. Max Partch, TNC's Cold Spring Heron Colony Natural Area brochure, 1972.

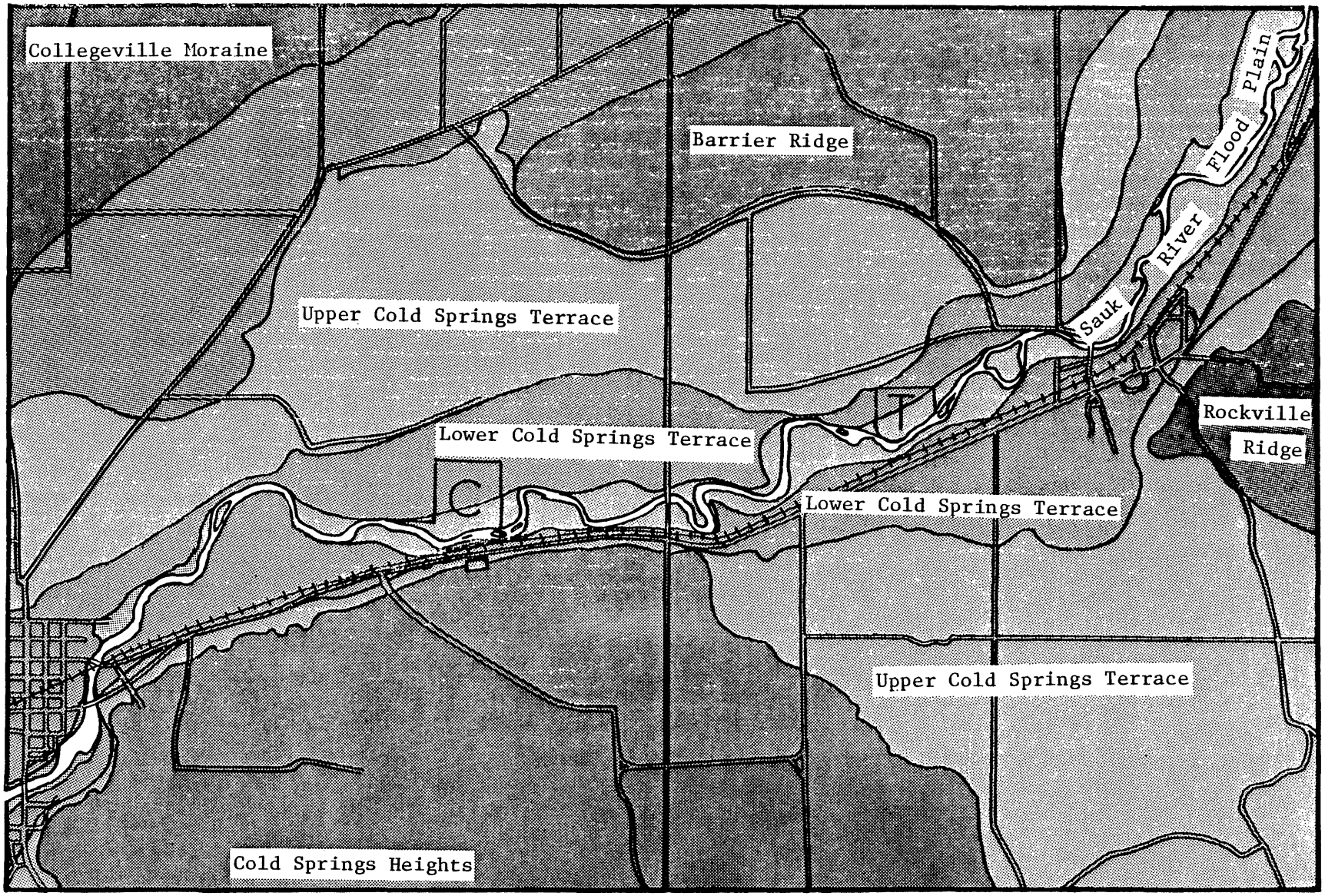


Figure 2. Terraces in the vicinity of the Sauk River near Cold Spring, Minnesota. 'C' is Cold Spring Heron Colony, while 'T' is Rockville Tamarack Bog. The terrace locations are based on information supplied by G.R. Ahlquist, 1955.

Pierz Sublobe, reached its terminus in the Cold Spring area. As this ice sheet began to retreat it formed part of the St. Croix terminal moraine, a series of high hills and ridges of glacial drift marking the furthest point to which the ice advanced.

On the north side of the Sauk River, there are a number of terraces which formed as a result of another more recent ice sheet. (See Figure 3). Approximately 16,000 years ago the Grantsburg Sublobe of the Des Moines Lobe flowed into the vicinity of Cold Spring. This ice sheet broke through approximately three kilometers of the St. Croix Complex near Cold Spring. Sediments carried by meltwaters from the ice sheet were deposited and mixed in varying degrees with the older glacial sediments, forming an outwash plain on which the tract partly sits. As the volume of meltwaters flowing through the gap in the St. Croix Moraine decreased and the amount of sediments carried by the waters decreased a series of river terraces were scoured and/or deposited by the ancient river (See Figure 3).

The oldest and highest of these terraces, Jacobs Prairie Terrace, is north of the tract; County Highway 2 follows the lower rim of this terrace for part of its length. The second terrace, the Upper Cold Spring Terrace, formed more recently as the meltwaters cut through the Jacobs Prairie Terrace. The gravel road just north of the tract follows the lower edge of the Upper Cold Spring Terrace. Cold Spring Heron Colony sits partly on a third river terrace, the Lower Cold Spring Terrace. There is an old levee at the lower edge

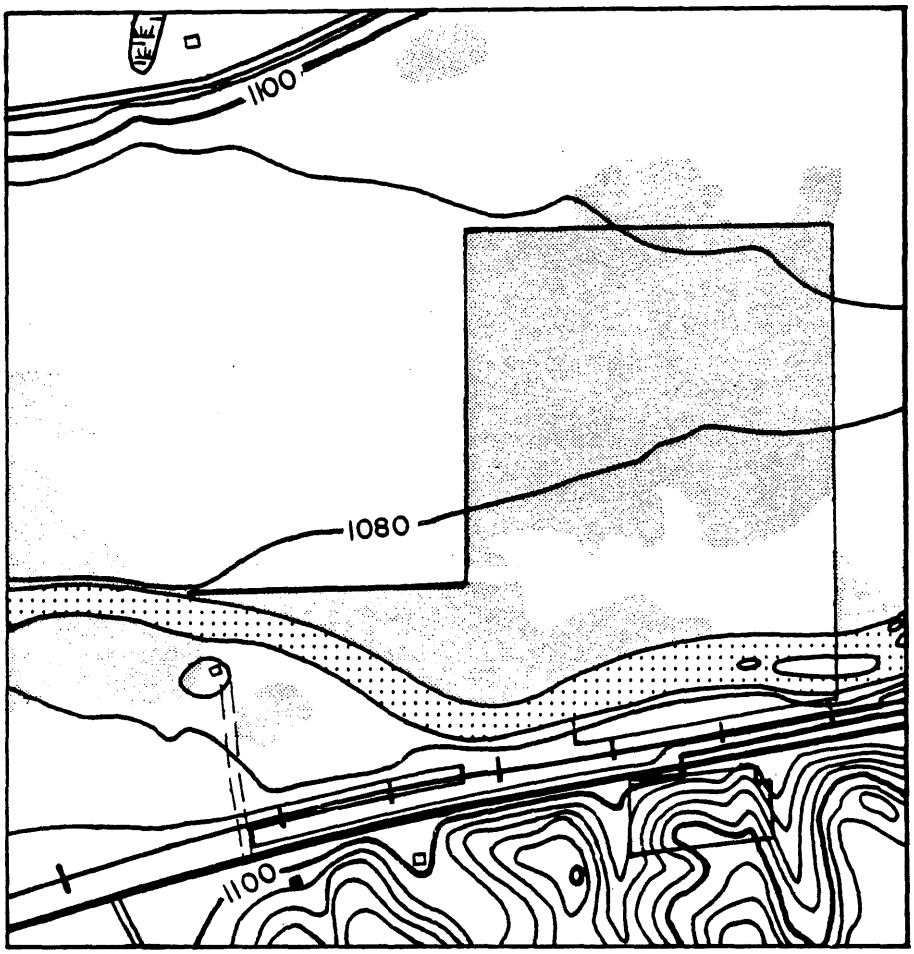
of this terrace which was formed as the glacial waters diminished. Seepage from the higher terraces and hills flowed into the terrace behind this levee and turned the marshy lowland into an extensive bog (Partch, 1972). Most of the bog outside the tract, however, has now been drained and cleared for cultivation.

The Sauk River has continued to shape the tract's landscape. It has cut into the Lower Cold Spring Terrace and formed its present riverbed and floodplain. Thus both the Wisconsin glaciers of the Pleistocene Epoch and the Sauk River are responsible for the present configuration of Cold Spring Heron Colony.

Topography & Bedrock of Cold Spring Heron Colony

Figure 4 shows the topography of the site. The site can be divided into three distinct topographic areas: the river floodplain, the Lower Cold Spring Terrace, and the Observation Hill area on the south side of the river. The floodplain is fairly flat. The elevation at the water's edge in the Sauk River is about 1060 feet above mean sea level, the lowest point on the site. The floodplain elevations vary slightly, about 1070 feet on the slight levee along the river's edge and dropping a bit north of this (forming the sedge slough) before rising to about 1080 feet at the lower boundary of the Lower Cold Spring Terrace. This terrace rises gently to about 1090 feet at the tract's northern border. Thus the elevation increases twenty feet from the top of the river bank to the tract's northern boundary.

South of the river the land slopes up to Minnesota Highway



KEY

WOODS

WATER (SAUK RIVER)

WETLAND

SCALE: 8": 1 MILE

N

Figure 4. Cold Spring Heron Colony's topography. Elevations are in feet above mean sea level. Adapted from the U.S. Geological Survey, Cold Spring Quadrangle, 1:24,000, 1967.

23 at about 1100 feet and then rises sharply to form a hilly highland above the river. The summit of Observation Hill, the highest point on the site, is between 1150 and 1160 feet, some sixty to ninety feet above the flood plain and terrace across the river.

Cold Spring Heron Colony is underlined by the Stearns Magma Series (See Figure 5). This is a group of granites including St. Cloud Gray Granite at Rockville, the St. Cloud Reds and various combinations of the two all dated at approximately 1.6 to 1.8 billion years old (Goldich et al., 1961). Depth to bedrock on the tract ranges from 0 to 100 feet with the greatest depth being south of the river beneath Observation Hill.

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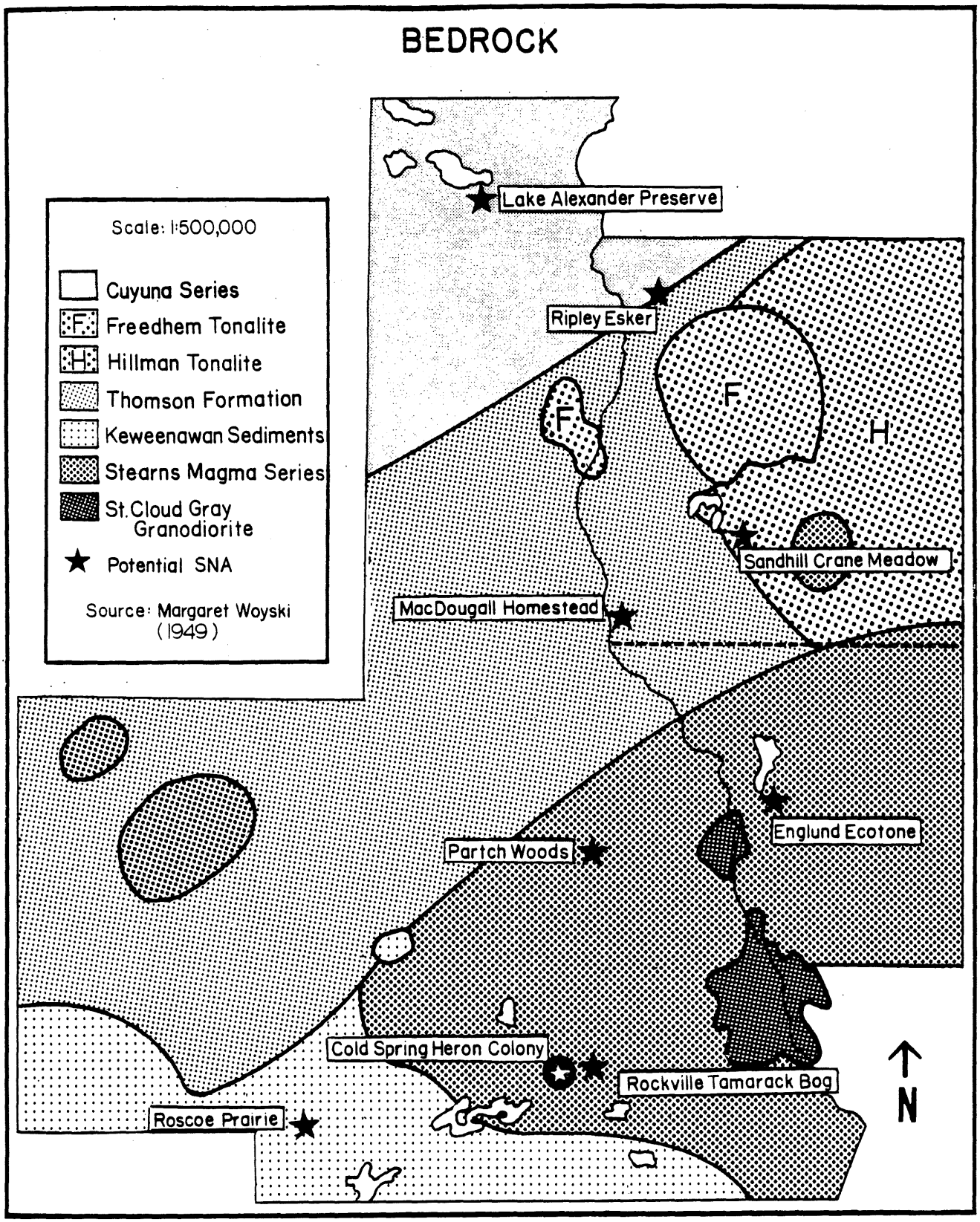

Figure 5. Bedrock formations in the area of Cold Spring Heron Colony and nearby potential Scientific & Natural Areas in central Minnesota (Benton, Morrison and Stearns Counties).

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SOILS

Soils are one of the earth's most important resources. The decomposition of organic material, recycling of nutrients, ground water recharge, erosion and drainage are all affected by the soils. Plants depend on the soils for their anchoring medium, water, minerals and nutrients. Soils are also an indicator of past and present climate, bedrock, topography and vegetation. Soil inventories are necessary to help determine the above information, to identify rare soils, and to establish a baseline so changes occurring in the soil over time can be monitored.

Methods

Soil information for this inventory was obtained from the literature and from a detailed soil survey.[1] The U.S. Soil Conservation Service surveyed and mapped the tract in early June, 1977. A soil map of the site was then enlarged from the S.C.S. map (scale of 3.2 inches: 1 mile or 1:20,000) using an opaque projector.

All of the tract's soils north of the river were tested for pH. (degree of acidity or alkalinity). Test sites were selected to include areas of high and low heron nesting density on both soils in the nesting area. Soil pH tests were done

1. The following individuals were consulted and gave valuable help during the course of the inventory: Kevin Adleman (U.S. Soil Conservation Service, Foley), Dr. Harold Arneman (Dept. of Soil Science, University of Minnesota, St. Paul), R.R. Finney (Minnesota State Soil Coordinator, St. Paul), Dr. Clifton Halsey (Dept. of Soil Science and Extension Conservationist, University of Minnesota, St. Paul), Lynn Olson (Douglas Co. Engineer, Alexandria), Warren W. Southward (Civil Engineer, Schoell & Madsen Inc., Hopkins) and Charles K. Sutton (Soil Scientist, U.S. Soil Conservation Service, St. Cloud).

in the field using a Truog Soil Testing Kit which generally has an accuracy within .5. Tests were performed twice at various depths at each site.

Cold Spring Heron Colony's Soils

Cold Spring Heron Colony lies near the north boundary of a broad area of outwash gaps in the western St. Croix Moraine Complex. This location is a zone of transition between the dark colored soils further west where prairie was the dominant vegetative influence in soil formation, and lighter colored soils to the east and north where forest predominated. In this transitional area dark soils which formed under prairie are primarily found on the level to gently undulating areas of glacial outwash. The soils of the rolling, hilly moranic areas are predominantly lighter colored soils which formed under forests, although some soils are indicative of open savanna (Arneman, 1963; Univ. of Minnesota, 1975).

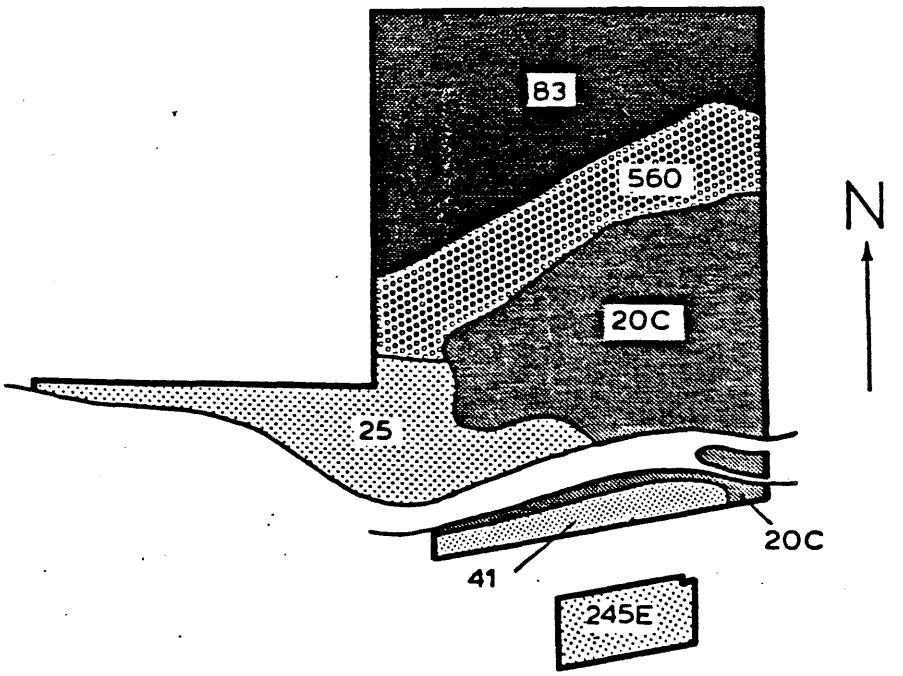
The tract is included in the area of Stearns County mapped as the Estherville-Hubbard soil association (USDA-SCS, 1973), or the Estherville-Hubbard-Pickman association (Sutton, pers. comm.). The soil series included in this association are generally dark, well drained soils which formed in level to undulating loamy and sandy Des Moines Lobe outwash. They are found along terraces bordering the Sauk, Mississippi and Clearwater Rivers, (USDA-SCS, 1973). There are small areas of organic soils on the Lower Cold Spring Terrace. Observation Hill soils are classified in the Collegeville Series, a minor soil series formed in non-calcareous Rainy Lobe till (USDA-SCS, 1973).

Figure 6 and Table 2 show the site's soils and soil characteristics.[1] Five soil series are present on the tract. The very poorly drained alluvial soils which border the Sauk River are subject to frequent spring floods. Flooding results in the deposition of fine sands, silts and clays in bands or seams making it difficult to classify these soils by texture.

The moderately well-drained to well-drained Becker soils are also found bordering the Sauk River, but they are on somewhat higher ground than the alluvial soils. Becker soils typically have a black, very fine to fine sandy loam A Horizon. However, the A Horizon of a small area of the Becker soils on the tract had a bright reddish or brown color to a depth ranging from five to seven or eight inches. This unusual color was probably due to material discharged by the Cold Spring Granite Company, approximately 1-3/4 miles upstream, which was swept downstream by floodwaters and deposited on the tract (Partch, pers. comm.). The B Horizon of the Becker soils is a dark brown, fine sandy loam over a fine sand to sandy C Horizon.

The Brooten soils are in an old levee extending in a northeasterly direction across the tract. These soils are moderately well-drained and have a black loamy surface layer over dark, grayish-brown generally loamy sand which in turn overlies gravelly coarse sand. Surface pH values for this soil series were markedly lower (i.e., the surface was more

1. A table listing the soil characteristics of nine potential Scientific & Natural Areas, including Cold Spring Heron Colony, is on file, The Nature Conservancy, Minnesota Chapter.



KEY

SYMBOL	SOIL SERIES	LOCATION
20C	Alluvial	River floodplain (2-6% slope)
25	Becker	River floodplain
41	Estherville	River floodplain
83	Markney	Old river terrace
245E	Collegeville	Moranic hill (6-25% slope)
560	Brooten	Old levee

SCALE: 8": 1 MILE

Figure 6. Cold Spring Heron Colony's soils. The figure is based on information supplied by the USDA; Soil Conservation Service.

Table 2. Soil Characteristics of Cold Spring Heron Colony.

Key to Table 2.

TEXTURE: Relative proportions of various soil separate (silt, sand, clay) in a soil.

Topsoil: "surface soil"; in uncultivated soils, a depth of 3 or 4 to 8 or 10 inches; in agriculture, refers to the layer of soil moved in cultivation.

Subsoil: soil below the topsoil, from 8 or 10 to 60 inches.

DRAINAGE CLASS: Soil drainage refers to natural frequency and duration of saturation which exists during soil development. Soil drainage classes are those used in making detailed soil maps (Arneman & Rust, 1975; USDA-SCS & Mn. Agr. Expt. Sta., 1977).

VPD - Very Poorly Drained--water table remains at or near surface (above 18 inches) greater part of the time. Soils wet nearly all the time, with or without mottling.

PD - Poorly Drained--water table seasonally near surface for prolonged intervals. Water table from 18 to 36 inches. Soils wet for long periods, generally with mottles.

MWD - Moderately Well Drained--water table usually below 5 feet. Soils are wet for small but significant part of time. Mottling in lower B horizon.

WD - Well Drained--water is removed from soil readily but not rapidly. Soils are nearly free of mottling.

SWED - Somewhat Excessively Drained--water is removed rapidly and soils are without mottles.

COMPONENT IN STATE: Extent of acreage in state.

M - Major: 100,000 acres or more
m - Minor: 10,000 acres or less

Table 2. Soil Characteristics of Cold [illegible]ing Heron Colony

	SOIL SERIES (Mapping Unit)	DRAINAGE CLASS	DEPTH TO WATER TABLE	PARENT MATERIAL	LANDSCAPE POSITION	TEXTURE		VEGETATION		COMPONENT IN STATE	LOCATION IN STATE
						Topsoil	Subsoil	Original	Present		
PRAIRIE SOILS	ESTHERVILLE (41)	SWED	6'	Des Moines lobe glacial alluvium	stream terraces & outwash plains 0-25% slopes	sandy loam	sand & gravel	tall grass prairie	willow-sedge, grasses	M	South Central, Southeast
PRAIRIE SOILS	BROOTEN (560)	MWD	4-8'	Rainy & Des Moines lobe till	level to concave areas of outwash plains 0-2% slopes	loamy sand	sandy loam	mixed prairie	ash, elm	m	Central
PRAIRIE TRANSITION SOILS	BECKER (25)	WD	4-10'	alluvium over sands	bottomlands & river flats 1-4% slopes	fine sandy loam	fine sandy loam	oak savanna	ash, elm, willow	m	Central, East Central
	ALLUVIAL	P-VPD	0-3'	alluvium	bottomlands adjacent to rivers 0-3% slopes	too variable to rate	too variable to rate	sedges, water tolerant grasses, shrubs	sedge-willow, nettle	m	all over

Table 2. Soil Characteristics of Cold Spring Heron Colony.

SOIL CLASSES (Mapping Unit)		DRAINAGE CLASS	DEPTH TO WATER TABLE	PARENT MATERIAL	LANDSCAPE POSITION	TEXTURE		VEGETATION		COMPONENT IN STATE	LOCATION IN STATE
						Topsoil	Subsoil	Original	Present		
FOREST SOILS	COLLEGE-VILLE (245)	WD	6'	Rainy lobe till (glacial)	side slopes of ground moraines 2-40% slopes 20-40% usual	sandy loam	loamy coarse sand	mixed deciduous coniferous forest	oak, grasses, prairie species	m	Central
ORGANIC SOILS	MARKEY (Mu) (83, 543)	VPD	0-2'	organic	outwash plain depressions 2% slopes	saprIc peat	sand	shrub, marsh, water tolerant grasses	elm, ash, grass	M	Northwest, East Central

acidic) where there were heron nests in the trees above. However, this effect was greatly diminished at six inches depth and disappeared at the greater depths tested.

The Markey soils occur northwest of the levee on the site. They are organic soils with a very dark brown sapric (organic matter at least two-thirds decomposed) layer about thirty to thirty-two inches deep over gray sand. The Markey soils, like the Brooten soils, display markedly lower surface pH values where there are heron nests.

Estherville soils occur in a narrow strip parallel to the river on its south side. These soils are somewhat excessively drained with a dark brown to brownish-black sandy loam surface layer over a brown sandy loam. The unusual reddish color discovered in the Becker soils was also present in the Estherville soils. The embankment on this side of the river is higher, however, and these soils are probably not flooded as often as the Becker soils on the river's north side.

The Observation Hill soils are in the Collegeville Series. They have a dark brown fine sandy loam surface layer over light brown very fine sandy loam. Underlying these two layers is a coarse sandy loam filled with numerous cobbles, stones and rocks.

Additional Inventory/Research Needs

One possible research project would be to study and monitor the effects of the heron droppings on the soil and the vegetation.

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WATER RESOURCES

Water is another of the key resources which affects the landscape. Besides adding diversity to the physical landscape water nourishes plants and animals, provides habitat for aquatic organisms, and affects soils and erosion. Possible changes in water chemistry, water table depth and drainage can drastically modify the biotic community. Water resources are also studied to identify significant and fragile wet areas, and to help classify the areas.

Methods

The major source of information on water resources was the literature. Field surveys using a topographic map were also conducted on the area.[1]

Cold Spring Heron Colony's Water Resources

The tract is located in the Sauk River watershed, part of the Mississippi Watershed Unit (Helgesen, 1975). All drainage from the area flows directly into the Sauk River. There are no permanent bodies of water on the tract although the low areas on the floodplain between the levee along the river's edge and the Lower Cold Spring Terrace may contain standing water during part or all of the year (depending on precipitation). Water draining into the low area behind the levee and below the first terrace (the Sedge Slough) appears to be impounded there, but it may flow east through the meadow beyond the tract's boundaries to reach the river. Some runoff from the cultivated land west of the tract flows eastward

1. H.J. Hopwood, St. Cloud State University, provided information on water pollutants to the researchers.

along the inner slope of the levee along the river and enters the tract, crossing through some woods and emptying into the Sedge Slough.

Additional Inventory/Research Needs

The 1977 inventory did not measure the site's surface and subsurface water flow rates or the site's water quality. Data from gauging stations up and downstream indicate there is considerable pollution,especially nitrate, from agriculture and from the towns along the river. Data could be collected on these variables to obtain a more complete hydrologic baseline, and to determine what effect, if any, these pollutants are having on the site's water resources and the herons.

Sources of Information

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VEGETATIVE COMMUNITIES

Vegetative communities are often one of the primary reasons for designating an area as a Scientific & Natural Area. The most significant plant communities are those that provide exceptional examples of the state's plant communities or natural processes, are relict communities persisting from an earlier period, and/or harbor significant species. Indeed, all significant biotic elements are dependent on the vegetative communities' characteristics: plant communities affect soils, hydrology, microclimate and individual plant species. They also provide food, cover, and shelter habitat for the area's animal populations. The primary means of holistically viewing and classifying an area's biotic elements is through the plant communities.

Methods

Cold Spring Heron Colony's vegetative communities were catagorized according to their cover type. Color infrared 1976 aerial photographs were used to delineate the boundaries of each community. Each plant community was checked in the field by walking through the community and recording the dominant species present. Dominant species were determined by noting which species appeared to be most numerous. Historical vegetative changes were determined through a literature review.

Overview of Regional Plant Communities

Cold Spring Heron Colony is located at the juncture of four landscape regions: Big Woods, Blue Hills, Leaf Hills and the Mississippi River Sand Plains (See Figure 7).

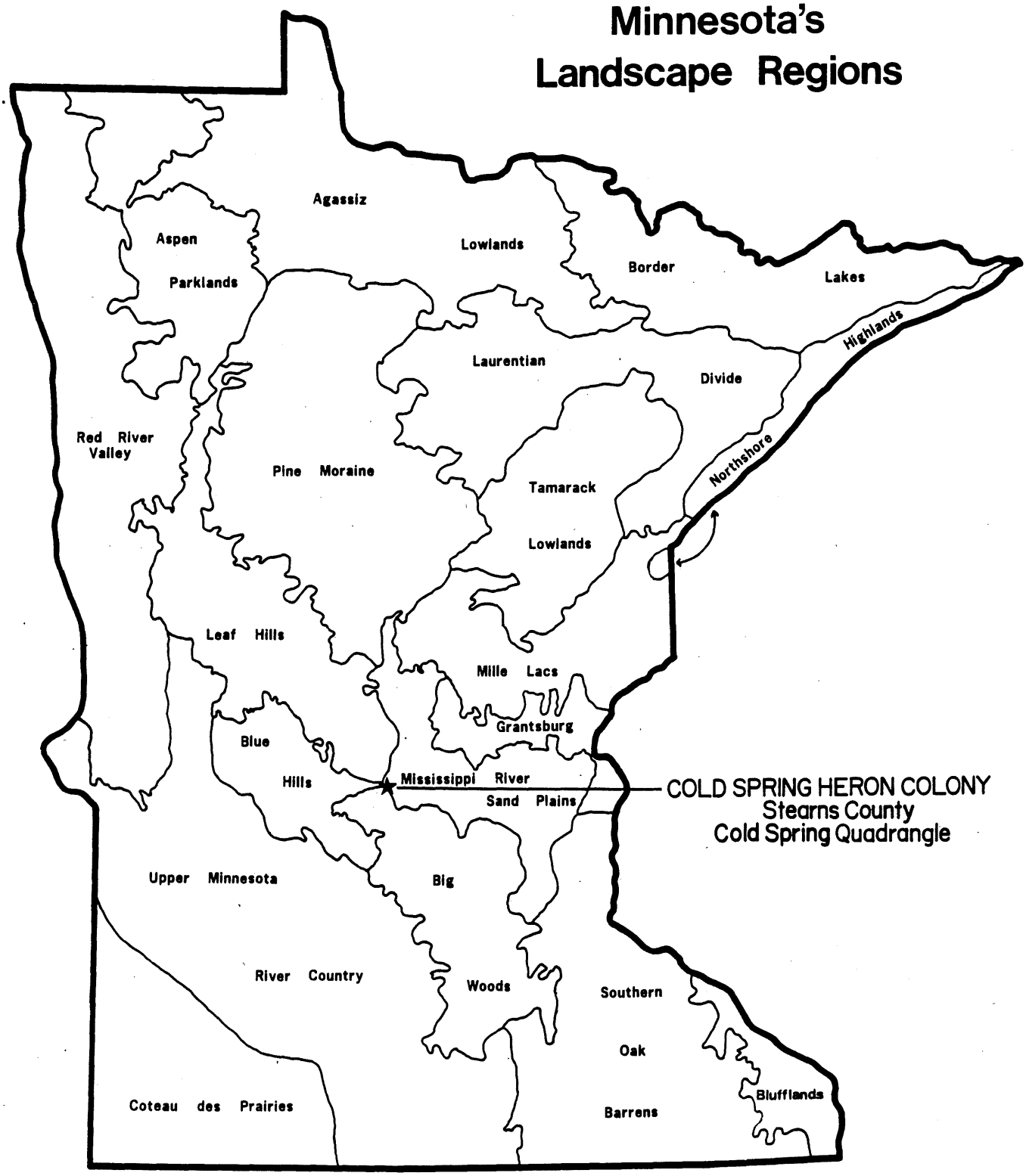


Figure 7. Cold Spring Heron Colony in relation to Minnesota's landscape regions. Adapted from T. Kratz and G.L. Jensen, An ecological geographic division of Minnesota (Unpublished, 1977).

The prairie, deciduous and coniferous forests, all come together in this general area. Figure 8 shows the vegetation of central Minnesota prior to European settlement. Based on Marshner's (1930) map and on analysis of the soils, a general picture of the tract's pre-European vegetative communities can be inferred. The higher river terraces in the vicinity of the tract originally supported tall-grass prairie, while the moranic hills supported a mixture of hardwood forest, savanna and prairie openings. The Lower Cold Spring Terrace, well-supplied with water from seepage and runoff which was partially impounded by the old levee along its lower margin, supported a bog community of open sedge and tamaracks. Peat accumulation mixed with alluvial deposits near the levee's lower margin. This led to successional development of mixed hardwood forest similar to that found below the terrace on the floodplain.

The floodplain was a mosaic of open sedge-dominated meadows and floodplain forest. With European settlement, however, these communities have been altered in varying degrees.

Cold Spring Heron Colony's Vegetative Communities[1]

Cold Spring Heron Colony's vegetative communities are displayed in Figure 9. Six vegetative communities were

1. The 1977 inventory team also conducted detailed vegetative analysis of the grassland communities on the Observation Hill portion of the tract. The results of this analysis are not included in this report but are on file, The Nature Conservancy Minnesota Chapter.

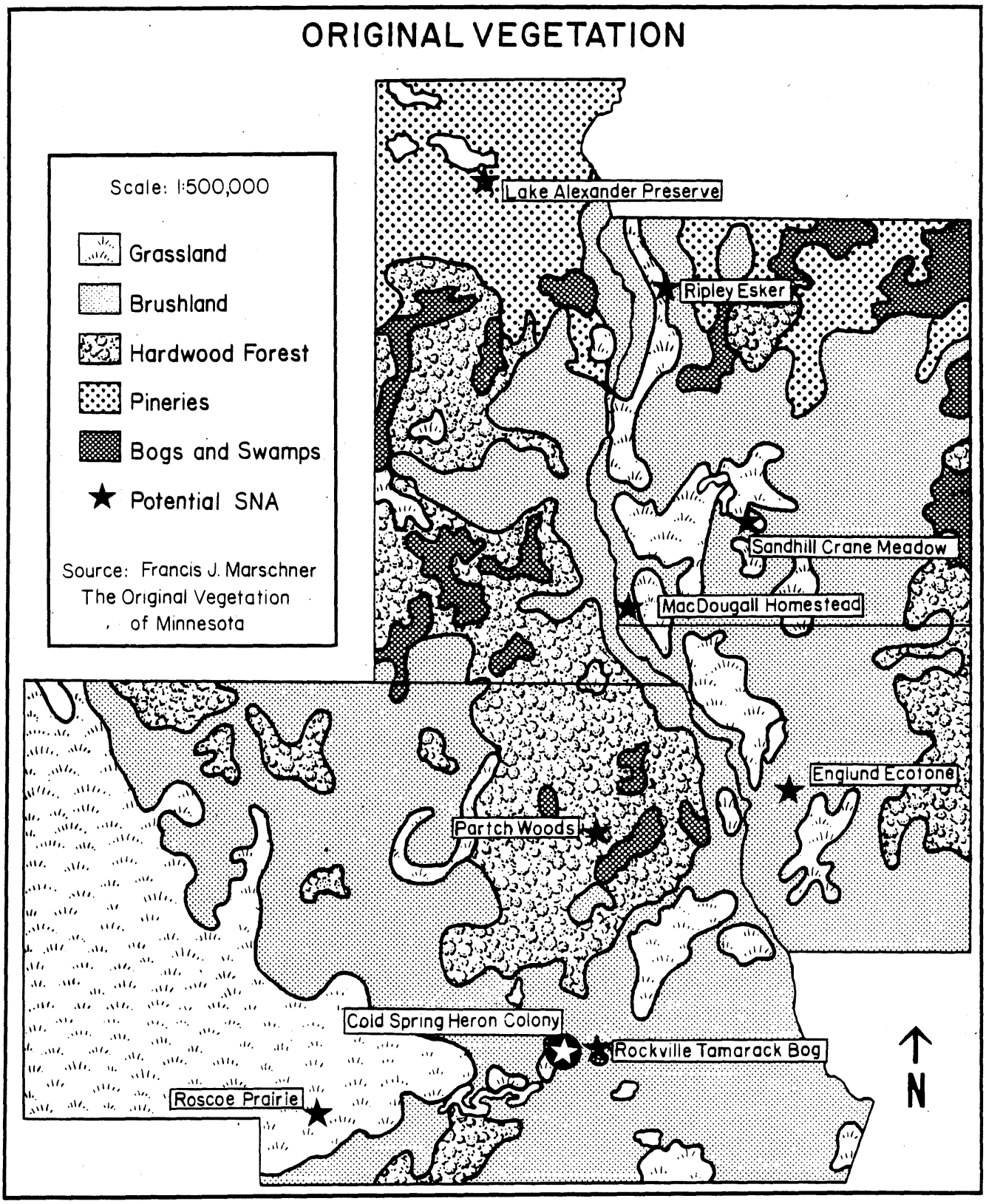
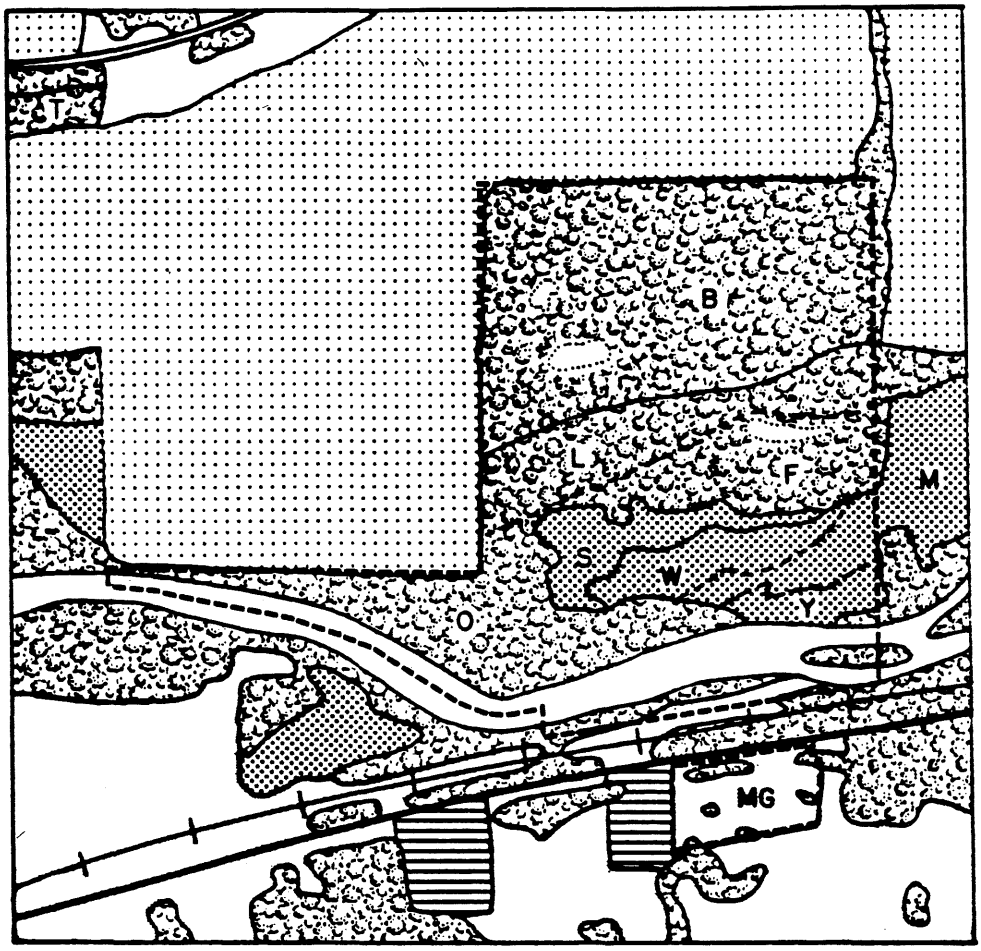


Figure 8. The original vegetation of Cold Spring Heron Colony and nearby potential Scientific & Natural Areas in central Minnesota (Benton, Morrison and Stearns Counties). Scale: 1: 500,000.



SCALE: 8": 1 MILE

B	Elm/Ash Bog Forest	S	Sedge Meadows (or Slough)
L	Elm/Ash Woods on the Old Levee.	M	Wet Mixed Meadows
F	Elm/Ash Floodplain Forest	W	Willow Thicket
O	Oak-Basswood Floodplain Forest	Y	Area where succession to woods appears to be occurring
T	Tamarack Woods		Wet area outside of the site
	Wooded area outside of the preserve	MG	Grassland
	Open areas (character varies; some appear to be logged areas, other areas are wet meadows)		Open upland, outside the tract
	Residential/Commerical		Farmland

Figure 9. Vegetative communities identified on Cold Spring Heron Rookery in 1977. The figure is based on a 1976 color infrared aerial photograph.

distinguished and studied in the 1977 inventory: Elm/Ash Bog Forest; Elm-Ash Floodplain Forest; Oak-Basswood Floodplain Woods; Sedge Meadow or Slough; Wet Mixed Meadow; and Dry-Mesic Grassland.[1] The Elm-Ash Bog Forest is the largest vegetative community present and occurs on the peat soil on the terrace. Tree species include American Elm (Ulmus americana) and Green Ash (Fraxinus pensylvanicus), which are common, and Basswood(Tilia americana) which is less so. Two trees, Paper Birch (Betula papyrifera) and Tamarack (Larix laricina) occur only in this unit. However, no reproduction of either of these species was observed; only old Birch and just a few Tamarack were noted (although there were many stumps according to Dr. Max Partch). Big-toothed Aspen (Populus grandidentata)and Trembling Aspen (Populus tremuloides) also appear to be confined to this area. Pagoda Dogwood (Cornus alternifolia), an understory shrub or small tree, appears to occur only in this area. Common Nettle (Urtica dioica) is a common

1. The division of the vegetation into these units and the descriptions of them are based on field observation during 1977 supplemented by information from Dr. Max Partch, St. Cloud State University. Dr. Partch has conducted extensive investigations on this tract beginning in the early 1950's. Although the herons have been the focus of this work Dr. Partch has done quadrat studies of the vegetation in the colony. His assistance in preparing this inventory is gratefully acknowledged.

   In addition to the above communities several other communities could be distinguished on the tract, but none of these were studied in the 1977 inventory. These communities include the submerged and emergent aquatic communities of the river, and species found along the sandy margins of the river and on emergent sandbars (e.g. Sandbar Willow, Salix interior).

herb species here, especially in open areas where trees have died or been cut. Other herbs which seem to be confined to this community include Jack-in-the-Pulpit (Arisaema triphyllum), Wild Sarsaparilla (Aralia Nudicaulis), Starflower (Trientalis borealis), Wild Lily-of-the-Valley (Maianthemum canadense), and Lesser Enchanter's Nightshade (Circaea alpina).

The Elm-Ash Floodplain community is found north of the river. American Elm and Green Ash are clearly the dominant canopy species here. Black Ash (Fraxinus nigra), which is less common, appears to be confined to this community. Red Elderberry (Sambucus pubens) is a common shrub species especially under nesting trees of the heron colony. Wood Nettle (Laportea canadensis) is a common herb species, but no other information is available on understory elements.

Between the floodplain and the higher terrace there is an old levee of better-drained mineral soil where several distinctive species are found, including Hackberry (Celtis occidentalis) and Ironwood (Ostrya virginiana); Ironwood is restricted to this levee. Further study may justify segregating the assemblage of plants on this levee as a distinctive community.

The Oak-Basswood Floodplain Woods is a second-growth woods on the better-drained sandy levee along the present river channel, intergrading at its eastern end with the Elm-Ash community. Common tree species include Basswood, Green Ash, and Bur Oak (Quercus macrocarpa). Bur Oak occurs mainly as young trees although there are a few larger individuals.

Hackberry is also present but it is not common. Wahoo (Euonymus atropurureus), an understory shrub observed nowhere else on the site, occurs in a fairly open area in this woods. Herbaceous species which appeared to be confined to this community included Long-beaked Sedge (Carex sprengellii; clearly a dominant), Virginia Waterleaf (Hydrophyllum virginianum; also common), Bloodroot (Sanguinaria canadensis), Bottlebrush Grass (Hystrix patula), Mountain Rice (Oryzopsis racemosa), and False Melic (Schizachne purpurascens). Wood Nettle is common in places near the east end of this community.

The Sedge Meadow or Slough is a low area adjacent to the floodplain woods where in normal years there is probably standing water during part of the season. Sedges (Carex spp.) dominate this community, with tussock-forming species predominating in places and non-cespitose ones in others. Grasses include what was identified as Bluejoint (Calamagrostis canadensis; no specimen was verified), and Reed Canary Grass (Phalaris arundinacea) which formed pure stands in places. There were scattered Gooseberry shrubs (Ribes sp.) and some Red Osier Dogwood (Cornus stolonifera). Forbs include Common Nettle, (which was common perhaps as a result of the unusually dry conditions), Vetchling (Lathyrus palustris), Marsh Bellflower (Campanula aparinoides), Swamp Milkweed (Asclepias incarnata), Panicled Aster (Aster simplex), Joe-Pye-Weed (Eupatorium maculatum), Boneset (Eupatorium perfoliatum), Late Goldenrod (Solidago gigantea), and Ironweed (Vernonia fasciculata). All of these forbs, except the Nettle, appeared to be confined to this community. There was also a large

stand of Canada Thistle (Cirsium arvense), indicating past disturbance.

A Wet Mixed Meadow community occurs on slightly sloping and better-drained soils on the levee along the present river channel adjacent to the Sedge Slough with which it intergrades. The zone where these two communities intergrade is presently covered by a thicket of Willow (Salix sp.). Sedges are present (none identified), but they do not dominate the aspect here; grasses and forbs are much more prominent. Prairie Cord Grass (Spartina pectinata), the most distinctive grass species of this community, is common, as is Reed Canary Grass; Smooth Brome (Bromus inermis) covers some of the highest areas close to the river. Goldenrod (Solidago spp.) appeared to be the dominant forb. Other species noted here but not in the Sedge Slough were Canada Anemone (Anemone canadensis), Common Milkweed (Asclepias syriaca), Goldenglow (Rudbeckia laciniata), and Ox-eye (Heliopsis helianthoides).

Parts of this community appear to be succeeding to woods. There are many young tree saplings present, mostly Green Ash and American Elm, but some Bur Oaks are found at the west end near a large tree in the adjacent woods. It may be that this part of the present meadow was originally wooded, cleared and then kept open by mowing.

A Grassland occurs in an area of former pasture on the hills south of Minnesota Highway 23 (Observation Hill). There are a few scattered open-grown Bur Oaks and some small Box Elder (Acer negundo), as well as one or two small clusters of young Quaking Aspen. Two native perennial grasses which

are major elements of dry-mesic prairie communities, Big Bluestem (Andropogon gerardi) and Needlegrass (Stipa comata or spartea), are common in some parts of this area. The grasses which dominate most of the community are non-native pasture grasses including Kentucky Bluegrass (Poa pratensis), Smooth Brome, and Timothy (Phleum pratense). The weedy introduced annual grass, Foxtail (Setaria glauca), is also present, along with Three-awn Grass (Aristida basiramea).

A number of species characteristic of native prairie and savanna communities are present, mostly found together in a restricted portion towards the hill's west end. One of these is Leadplant (Amorpha canescens), a low shrub; New Jersey Tea (Ceanothus americanus), another shrub found frequently in prairie and oak savanna communities is present although it is rare. Prairie forbs include Purple Prairie Clover (Petalostemum purpureum) and White Prairie Clover (Petalostemum candidum), Tall Cinquefoil (Potentilla arguta), Alum Root (Heuchera richardsonii), Veiny Pea (Lathyrus venosus), and Showy Tick-trefoil (Desmodium canadense). Some shrubs found on this part of the preserve are Smooth Sumac (Rhus glabra), and Wolfberry (Symphoricarpos occidentalis). Common Dogbane (Apocynum androsaemifolium) is a common forb in the "prairie" area. A number of weedy forbs are found throughout this community, including Pepper-grass (Lepidium densiflorum), and the introduced Hoary Alyssum (Berteroa incana), Butter- and Eggs (Linaria vulgaris), and Goat's Beard (Tragopogon dubius).

The open grassy area between the Sauk River and the railroad is also included under the Grassland community although the species diversity here is somewhat less than on the slopes south of the highway.

All of the plant communities on this tract are degraded to some extent. Similar examples of these communities can be found throughout this part of Minnesota. There may be a possibility for restoration of something like the original Oak Savanna on the Observation Hill.

Additional Inventory Research Needs

The sandbar and aquatic communities could be inventoried since they weren't studied in the 1977 survey.

Sources of Information

Curtis, J.T. 1959. The Vegetation of Wisconsin. Univ. of Wisconsin Press, Madison. 657pp.

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FLORA

Plant species are one of the primary components of the state's natural heritage. Plants indicate the diversity of an area, the type of biotic community present, and changes occurring in the area including the degree of human disturbance. Rare plant species may be one reason for designating a site as a Scientific & Natural Area.

Methods

Cold Spring Heron Colony was visited on a weekly basis, when weather conditions permitted, from 1 June to 29 August 1977. Each major vegetative community was randomly sampled during these visits. Plants that were encountered in fruit or flower were collected, identified and pressed. Usually whole specimens were collected, but with some large plants only flowers and leaves were collected. Rootstocks of uncommon species were left undisturbed. After the plants had been positively identified they were given a catalog number and deposited in both the St. John's University Herbarium, Collegeville, and in the University of Minnesota Herbarium, Department of Botany, St. Paul.

A phenological record of the site's flowering plants was also kept. The phenological record began on the first visit and ended on the last visit to the area. The first time a species was encountered in flower was taken to be the start of the flowering period. These dates were then extended on subsequent visits until floral senescence was noted.

Plants were identified through several sources (cited at the end of this section). Dr. John W. Moore, retired

botanist, University of Minnesota verified seventy-two specimens. Sixteen specimens were lost and could not be verified. Several species were observed but not collected.

Cold Spring Heron Colony's Vascular Flora

Table 3 is an annotated list of the vascular plants identified on the tract.[1] A total of 156 species, representing fifty-seven families, have been identified on the tract, of which ninety-one species, (forty-three families) were observed in 1977. The majority of plants identified in 1977 were forbs: ninety-nine species, accounting for 65.1% of the total number of species present, were recorded. Shrubs, including woody vines, were the next most frequent group observed with twenty species (13.2% of the total), followed by the grasses with fourteen species (9.2%) and thirteen species of trees (8.6%). There were only four sedge species (2.6%) positively identified in 1977 due to the difficulty of identifying these species; there are probably more than four sedge species on the tract. Two species of ferns and their allies (1.3%) were also identified. Nine of the species collected in 1977 had not been previously collected from Stearns County and deposited in the University of Minnesota Herbarium. Twelve

1. Table 3 incorporates the plants identified in the 1977 inventory with several other plants lists. Entries credited to Dr. Max Partch, St. Cloud State University, are taken from species lists prepared by him on file in The Nature Conservancy, Minnesota Chapter, office. Other entries are based on sight records reported by Robert Dana, an intern studying insects in the 1977 inventory. Fifty-nine species and thirteen families were added based on these lists. However, the analysis which follows is only concerned with those species identified in the formal 1977 plant inventory.
Nomenclature in Table 3 is according to Gleason & Cronquist (1963). Additional plant lists alphabetically organized by common names, scientific name and family are on file, The Nature Conservancy Minnesota Chapter.

Table 3. Annotated Flora List of Cold Spring Heron Colony.

Format: Scientific name. Common name. Collection number of voucher specimen. Parentheses around collection number indicates specimen was lost prior to verification. A (+) indicates species was noted but not collected. "Introduced" if not native to Minnesota. Community in Cold Spring Heron Colony in which specimen collected. Asterisk (*) if first collection of the species from Stearns County in the University of Minnesota Herbarium. Entries entirely enclosed in parentheses are interpolations from the source noted (see text).

I. PTERIDOPHYTA - Spore-bearing Plants

(EQUISETACEAE - Horsetail Family)
(Equisetum spp. - Horsetail. Partch.)

OPHIOGLOSSACEAE - Adder's Tongue Family
Botrychium virginianum - Rattlesnake Fern. #43. Basswood-Oak Woods.

II. SPERMATOPHYTA - Seed Plants

A. GYMNOSPERMAE - Gymnosperms

PINACEAE - Pine Family
(Larix laricina - Tamarack. Dana. Elm-Ash Bog Woods.)

B. ANGIOSPERMAE - Angiosperms

1. MONOCOTYLEDONEAE - Monocots

ALISMATACEAE - Water-Plantain Family
Sagittaria latifolia - Arrowhead. #66. River Shoreline. *

CYPERACEAE - Sedge Family
Carex brevior - Fescue Sedge. #23. Sedge Meadow.
Carex pensylvanica - Pennsylvania Sedge. #97. Elm-Ash Woods.
Carex sprengelii - Long-beaked Sedge. #19. Sedge Meadow.
Carex sychnocephala - Many-headed Sedge. #37A. Sedge Meadow.

GRAMINEAE - Grass Family
Andropogon gerardi - Big Bluestem. #88. Observation Hill.
Aristida basiramea - Three-awn Grass. #84. Observation Hill.
Bromus inermisi - Smooth Brome Grass. #87. Introduced. Observation Hill.
(Elymus canadensis - Canada Wild Rye. Dana. Elm-Ash Woods edge.)
(Elymus villosus - Villous Wild-Rye. Dana. Elm-Ash Floodplain Woods.)
(Elymus virginicus - Terrell Grass. Dana. Elm-Ash Floodplain Woods.)
(Hystrix patula - Bottle-Brush Grass. Partch, Dana. Basswood-Oak Woods.)
(Oryzopsis racemosa - Mountain-Rice. Dana. Basswood-Oak Woods.)
Phalaris arundinacea - Reed Canary Grass. #17. Sedge Meadow.
Phleum pratense - Timothy. #59. Introduced. Observation Hill.
Poa pratensis - Kentucky Blue Grass. #89. Introduced. Observation Hill.
(Schizachne purpurascens - False Melic. Dana, Partch. Basswood-Oak Woods.
Setaria glauca - Foxtail Grass. #58. Introduced. Observation Hill.
(Spartina pectinata - Prairie Cord Grass. Dana. Mixed Wet Meadow.

LILIACEAE - Lily Family
Allium stellatum - Prairie Onion. #90. Observation Hill.
(Allium tricoccum - Wild Leek. Partch. Woods.)
(Maianthemum canadense - Wild Lily-of-the-Valley. Partch. Woods.)
Polygonatum biflorum - Solomon's Seal. #3. Elm-Ash Woods.
(Polygonatum pubescens - Solomon's Seal. Partch.)
Smilacina racemosa - False Solomon's Seal. (#18) Elm-Ash Woods.
Smiliacina stellata - Starry False Solomon's Seal. #13. Elm-Ash Woods.
(Smilax ecirrhata - Greenbriar. Partch. Woods.)
Smilax herbacea - Carrion Flower. #5. Elm-Ash Woods.
Trillium cernuum - Nodding Trillium. #9. Elm-Ash Woods.
Uvularia grandifloria - Large-flowered Bellwort. #4. Elm-Ash Woods.

2. DICOTYLEDONEAE - Dicots

ACERACEAE - Maple Family
Acer negundo - Boxelder. #31. Elm-Ash Woods. *

ANACARDIACEAE - Cashew Family
Rhus glabra - Smooth Sumac. #44. Grassy River Bank.
Rhus radicans - Poison Ivy. (+). Grassy River Bank.

APOCYNACEAE - Dogbane Family
Apocynum androsaemifolium - Common Dogbane. (#30). Basswood-Oak Woods.
Apocynum cannabinum - Indian Hemp. (#39). Basswood-Oak Woods.

ARACEAE - Arum Family
(Arisaema triphyllum - Jack-in-the-Pulpit. #92. Elm-Ash Woods.)

(ARALIACEAE - Ginseng Family)
(Aralia nudicaulis - Wild Sarsaparilla. Partch. Woods.)
(Aralia racemosa - Spikenard. Partch. Woods.)

ASCLEPIADACEAE - Milkweed Family
(Asclepias incarnata - Swamp Milkweed. Dana. Sedge Meadow.)
Asclepias syriaca - Common Milkweed. #65. Mixed Wet Meadow. #57. Observation Hill.

BALSAMINACEAE - Touch-me-not Family
Impatiens biflora - Jewel Weed. #77. Elm-Ash Woods.

BERBERIDACEAE - Barberry Family
Caulophyllum thalictroides - Blue Cohosh. #10. Elm-Ash Woods.

BETULACEAE - Birch Family
(Betula lutea - Yellow Birch. Partch. Woods.)
Betula papyrifera - Paper Birch. #33. Elm-Ash Woods.
Corylus cornuta - Beaked Hazel-nut. (#37). Elm-Ash Woods. *
(Ostrya virginiana - Ironwood. Partch. Woods.)

CAMPANULACEAE - Harebell Family
(Campanula aparinoides (C. uliginosa in Fernald, 1950) - Marsh Bellflower.
Dana. Sedge Meadow.)
Campanula rotundifolia - Harebell. (#24). Observation Hill.

CAPRIFOLIACEAE - Honeysuckle Family
Sambucus pubens - Red-berried Elder. #12. Elm-Ash Woods.
Symphoricarpos occidentalis - Wolfberry. #53. Observation Hill.
Viburnum rafinesquianum - Downy Arrow-wood. #40. Elm-Ash Woods.

CARYOPHYLIACEAE - Pink Family
Stellaria longifolia - Long-leaved Chickweed. #15. River shoreline.

(CELASTRACEAE - Staff-tree Family)
(Celastrus scandeus - Bittersweet. Partch. Woods.)
(Euonymus atropurpureus - Wahoo. Dana. Basswood-Oak Woods.)

(CHENOPODIACEAE - Goosefoot Family)
(Chenopodium album - Lamb's Quarters. Partch.)
(Chenopodium hybridum - Maple-leaved Goosefoot. Partch.)

COMPOSITAE - Composite Family
Achillea millefolium ssp. lanulosa - Yarrow. #25. Observation Hill. #64. Sedge Meadow.
Aster sagittifolius - Arrow-leaved Aster. #86. Observation Hill.
(Aster simplex - Panicled Aster. Dana. Sedge Meadow.)
Cirsium arvense - Canada Thistle. (#90). Introduced. Observation Hill.
Cirsium discolor - Field Thistle. #48. Sedge Meadow.
(Cirsium vulgare - Bull Thistle. Partch.)
Eupatorium maculatum - Joe-Pye-Weed. #76. Sedge Meadow.
Eupatorium rugosum - White Snakeroot. #81. Elm-Ash Woods.
Erigeron strigosus - Daisy Fleabane. #46. Observation Hill.
Heliopsis helianthoides - Ox-Eye. #63. Mixed Wet Meadow.
(Prenanthes alba - Rattlesnake-root. Partch.)
Rudbeckia laciniata - Goldenglow. #75. Mixed Wet Meadow.
Solidago flexicaulis - Zig-zag Goldenrod. #71. Elm-Ash Woods.
Solidago gigantea - Late Goldenrod. #70. Elm-Ash Woods.
Tragopogon dubius - Goat's Beard. (+). Introduced. Observation Hill.
Vernonia fasciculata - Ironweed. #74. Sedge Meadow. *

CONVOVULACEAE - Morning-glory Family
Convovulus sepium - Hedge-Bindweed. #60. Sedge Meadow.

CORNACEAE - Dogwood Family
(Cornus alternifolia - Pagoda Dogwood. Partch. Woods.)
Cornus stolonifera - Red Osier. #14. Elm-Ash Woods.

CRUCIFERAE - Mustard Family
Berteroa incana - Hoary Alyssum. #52. Introduced. Observation Hill.
(Cardamine bulbosa - Spring Cress. Partch.)
Lepidium densiflorum - Pepper-grass. #50. Observation Hill. *

CUCURBITACEAE - Gourd Family
Echinocystis lobata - Wild Cucumber. #78. Elm-Ash Woods.

FABACEAE - Bean Family
Amorpha canescens - Leadplant. #54. Observation Hill.
Desmodium canadense - Showy Tick-trefoil. #56. Observation Hill.
(Lathyrus palustris - Vetchling. Dana. Sedge Meadow.)
Lathyrus venosus - Veiny Pea. #27. Observation Hill.
Melilotus officinalis - Yellow Sweet Clover. #45. Introduced. Observation Hill.
Petalostemum candidum - White Prairie Clover. (+). Observation Hill.
Petalostemum purpureum - Purple Prairie Clover. #49. Observation Hill.
Trifolium pratense - Red Clover. #85. Introduced. Observation Hill.

FAGACEAE - Beech Family
Quercus macrocarpa - Bur Oak. #83. Basswood-Oak Woods.

FUMARTACEAE - Fumitory Family
Curydalis zurea - Golden Curydalis. #98. Elm-Ash Woods.

(GERANIACEAE - Geranium Family)
(Geranium maculatum - Wild Geranium. Partch.)

(HYDROPHYLIACEAE - Waterleaf Family)
(Hydrophyllum virginianum - Virginia Waterleaf. Dana. Basswood-Oak Woods.)

LABIATAE - Mint Family
(Nepeta cataria - Catnip. Partch. Introduced.)
Stachys palustris - Woundwort. #61. Elm-Ash Woods.

MALVACEAE - Mallow Family
Callirhoe triangulata - Poppy-Mallow. #29. Observation Hill.

(MENISPERMACEAE - Moonseed Family)
(Menispermum canadense - Moonseed. Partch.)

(MORACEAE - Mulberry Family)
(Humulus lupulus - Hops. Partch.)

NYCTAGINACEAE - Four-O'Clock Family
Oxybaphus nyctagineus - Umbrella-wort. #41. (Mirabilis nyctaginea in Fernald, 1950.) Basswood-Oak Woods.

OLEACEAE - Olive Family
Fraxinus nigra - Black Ash. #34. Elm-Ash Woods.
Fraxinus pennsylvanica - Green Ash. (*). Elm-Ash Woods.

ONAGRACEAE - Evening-Primrose Family
(Circeae alpina - Lesser Enchanter's Nightshade. Partch. Woods.)
Circeae quadrisulcata var. canadensis - Enchanter's Nightshade. #82. Elm-Ash Woods.

PAPAVERACEAE - Poppy Family
Sanguinaria canadensis - Bloodroot. #6. Elm-Ash Woods.

PHRYMACEAE - Lopseed Family
Phryma leptostachya - Lopseed. #72. Elm-Ash Woods.

POLYGONACEAE - Smartweed Family
Rumex acetosella - Red Sorrel. #51. Observation Hill.
Rumex orbiculatus - Great Water Dock. #68. Sedge Meadow.

PRIMULACEAE - Primrose Family
Lysimachia ciliata - Fringed Loosestrife. #62. Elm-Ash Woods.
(Trientalis borealis - Starflower. Partch. Woods.)

RANUNCULACEAE - Crowfoot Family
(Actea sp. - Baneberry. Partch.)
Anemone cylindrica - Long-headed Thimbleweed. (#26). Elm-Ash Woods.
Anemone quinquefolia - Wood Anoemone. #99. Elm-Ash Woods.
Caltha palustris - Marsh Marigold. #92. Open wet areas in Elm-Ash Woods.
Ranunculus abortivus - Small-flowered Crowfoot. #95. Elm-Ash Woods.
Thalictrum dasycarpum - Tall Meadow Rue. #8. Elm-Ash Woods.

RHAMNACEAE - Buckthorn Family
Ceanothus americanus - New Jersey Tea. #55. Observation Hill.

ROSACEAE - Rose Family
(Fragaria sp. - Strawberry. Partch.)
(Geum canadense - White Avens. Partch. Woods.)
Potentilla argentia - Silvery Cinquefoil. #47. Introduced. Observation Hill.
Potentilla arguta - Tall Cinquefoil. (*) Observation Hill.
Prenus virginiana - Choke Cherry. #35. Elm-Ash Woods.
(Rubus pubescens - Dwarf Blackberry. Partch.)

RUBIACEAE - Madder Family
(Galium aparine - Cleavers. Partch.)
Galium boreale - Northern Bedstraw. (#22). Observation Hill.
Galium triflorum - Sweet-scented Bedstraw. (#2). Elm-Ash Woods.

TUTACEAE - Rue Family
Zanthoxylum americanum - Prickly-Ash. #20. Elm-Ash Woods.

(SALICACEAE - Willow Family)
(Populus grandidentata - Big-toothed Aspen. Partch. Woods.)
(Populus tremuloides - Trembling Aspen. Partch. Woods.)
(Salix ssp. - Willow. Dana. Sedge Meadow.
(Salix interior Sandbar Willow. Dana. Sandbar in river.)

SAXIFRAGACEAE - Saxifrage Family
Heuchera richardsonii var. hispidior - Alum-root. #21. Observation Hill.
(Mitella nuda - Bishop's Cap. Partch. Woods.)
(Ribes americana - Wild Black Currant. Partch.)
(Ribes cynosbati - Dogberry. Partch.)
(Ribes triste - Red Currant. Partch.)
(Saxifraga pensylvanica - Swamp Saxifrage. Partch.)

SCROPHULARIACEAE - Figwort Family
Linaria vulgaris - Butter-and-Eggs. (#28). Introduced. Observation Hill.
Mimulus ringens - Monkey Flower. #69. River shoreline.

TILIACEAE - Linden Family
Tilia americana - Basswood. #42. Basswood-Oak Woods.

ULMACEAE - Elm Family
Celtis occidentalis - Hackberry. #30. Elm-Ash Woods. *
Ulmus americana - American Elm. #73. Elm-Ash Woods.

(UMBELLIFERAE - Parsley Family)
(Cryptotaenia canadensis - Honewort. Partch Woods.)
(Osmorhiza claytoni - Sweet Cicely. Partch. Woods.)
(Osmorhiza longistylis - Anise-root. Partch. Woods.)

URTICACEAE - Nettle Family
Laportea canadensis - Wood-Nettle. #80. Elm-Ash Woods.
(Parietaria pensylvanica - Pellitory. Partch. Woods.)
Urtica dioica - Stinging Nettle. (*) Elm-Ash Woods.

VERBENACEAE - Vervain Family
Verbena hastata - Blue Verbain. #67. River shoreline.

(VIOLACEAE - Violet Family)
(*Viola conspersa* - American Dog-Violet. Partch.)
(*Viola pubescens* - Downy Yellow Violet. Partch.)
(*Viola* sp. (*pallens*?) - Violet. Partch.)

(VITACEAE - Grape Family
(*Parthenocissus* sp. - Virginia-Creeper. Partch. Woods.)
(*Vitis riparia* - Frost Grape. Partch.)

of the species were introduced, and not native to the area.

Figure 10 records when Cold Spring Heron Colony's plants flowered in 1977.[1] The peak number of species in bloom during a single week was twenty-two, occurring the week of 10-16 July 1977.

Additional Inventory/Research Needs

The 1977 inventory did not provide an exhaustive accounting of the tract's vascular flora: most spring species had finished flowering and were inconspicuous when sampling began, and many others were overlooked. Although data from other sources were incorporated into the flora list to make it more complete some species may have still been missed. Thus another survey of the tract's vascular flora could be conducted. Also, the tract's early spring flora and spring phenology should be recorded. Finally, the 1977 inventory did not survey the site's nonvascular plants, such as lichens and mosses, or aquatic plants. A survey of these plants could be done in the future.

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Fernald, M.L. 1950. Gray's Manual of Botany. American Book Company, New York.

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Gleason, H.A. and A. Cronquist. 1963. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. Van Nostrand Rheinhold Co., N.Y. 810 pp.

Heitlinger, Mark. 1977. Checklist of selected vascular plants of Minnesota including uncommon species. Unpublished. The Nature Conservancy, Minnesota Chapter.

1. A list of the flowering periods of species found on the site is on file, The Nature Conservancy Minnesota Chapter.

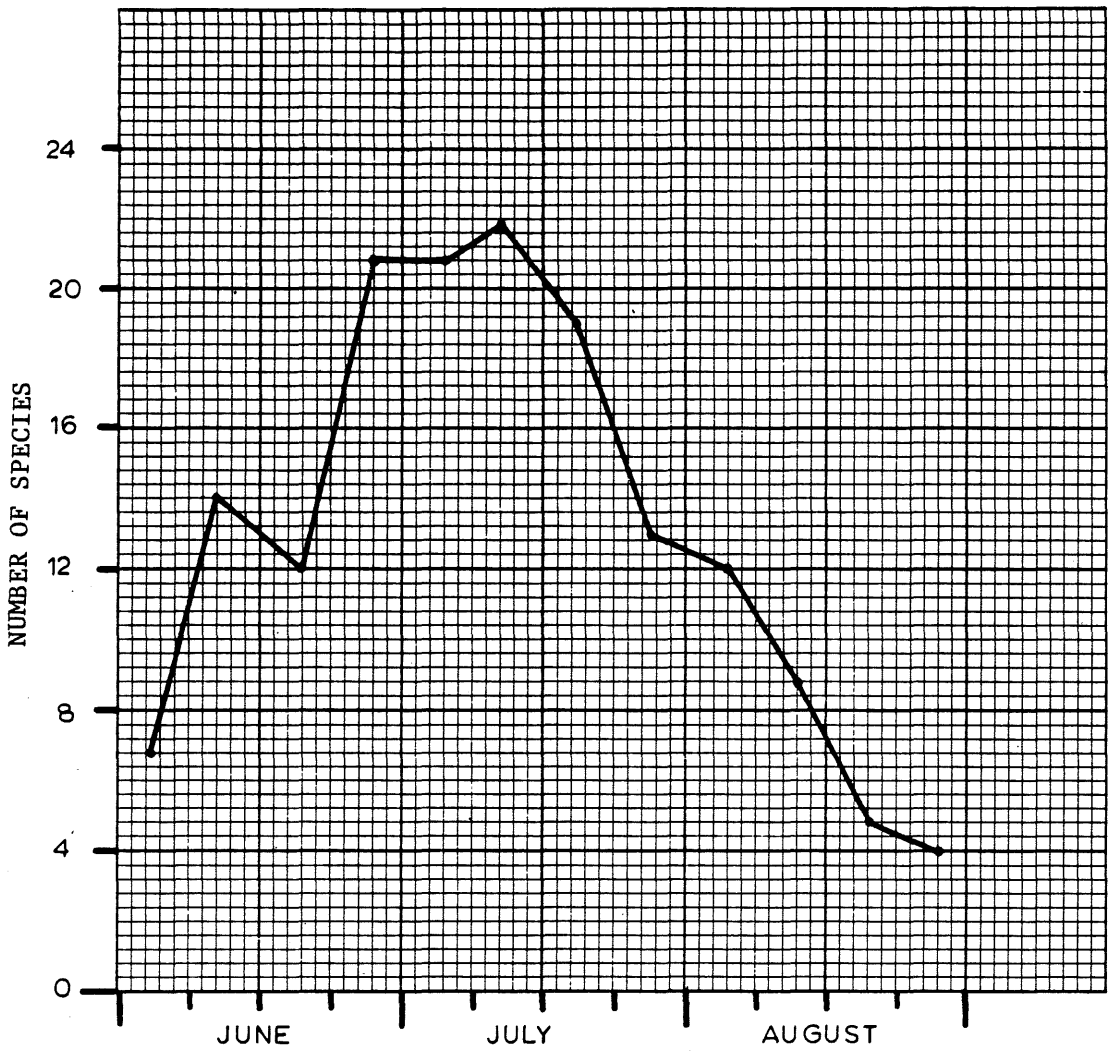


Figure 10. Numbers of plant species observed in bloom at Cold Spring Heron Colony. Observations were recorded from 1 June to 1 September 1977.

House, Homer D. 1935. Wild Flowers. Mac Millan, New York.

Morley, T. 1972. Rare or endangered plants of Minnesota with the counties in which they have been found. Unpublished mimeo. 13pp.

BUTTERFLIES[1]

Butterflies are found in virtually all of Minnesota's natural areas. They are insect herbivores which feed on and pollinate plants and affect plant distribution and abundance. Butterflies as primary consumers provide sustenance for animals higher up on the food chains. A butterfly inventory is necessary to document an area's natural diversity, to identify rare species needing special protection, and to gain a better understanding of many species which are poorly known. Finally, some butterflies are sensitive ecological indicators, providing useful information on changes occurring in the area.

Methods

In 1977 a detailed inventory of Cold Spring Heron Colony's butterflies was carried out.[2] Biweekly visits were made to the site from the second week in May through the third week in September. The first intensive butterfly sampling, however, was begun during the second week in June. Visits were made, when feasible, during hours and weather conditions favorable for butterfly activity. Sampling was guided principally by the researcher's expectation of where significant butterfly activity was likely to be. Sampling was concentrated in the meadow areas in the floodplain and the immediately adjoining

1. The term butterflies in this document refers both to the true butterflies (Papilionoidea) and the Skippers (Hesperiodea).

2. The assistance of Mr. Ron Huber, Zoology Assistant, Science Museum of Minnesota, St. Paul, is gratefully acknowledged.

woods. The portion of the tract south of the Sauk River ("Observation Hill") was not sampled during this study.

Observations of adult and immature butterflies were recorded together with the location, habitat type and associated plant species. A rough estimate of each species' frequency was also made.[1] Butterflies were usually identified by sight, but a standard butterfly net was employed to capture the insects for identification when necessary. All captured insects were released except when reliable identification required a prepared specimen, or when a voucher specimen was desired. All specimens were deposited in the Department of Entomology, Fisheries & Wildlife collection, University of Minnesota, St. Paul.

Scientific and common names used here are taken from Huber (1975), with the addition of some subspecific names based on Howe (1975). Subspecific names are given only when the populations could clearly be assigned to a subspecies other than the nominate. In unclear classes the subspecific name is followed by "ssp" ("subspecies").

Butterflies of Cold Spring Heron Rookery

Table 4 lists in alphabetical order the butterflies observed on the tract. Thirty-two butterflies species were recorded including eight skipper species. Of these, one is a more southern butterfly which rarely occurs in Minnesota (Huber, unpubl. data), one probably wandered onto the site

1. For information on abundance, adult behavior, larval food plants and other relevant comments, see Robert Dana, Department of Entomology, Fisheries & Wildlife, University of Minnesota, St. Paul.

Table 4. Butterflies identified on Cold Spring Heron Colony in 1977.

Ancyloxypha numitor (Least Skipper)
Atrytone delaware (Delaware Skipper)
Celastrina argiolus pseudargiolus (Spring Azure)
Cercyonis pegala ssp. (Wood Nymph)
Chlosyne harrisii ssp. (Harris' Checkerspot)
Chlosyne nycteis (Silvery Checkerspot)
Coenonympha tullia inornata (Inornate Ringlet)
Colias eurytheme (Alfalfa Butterfly)
Danaus plexippus (Monarch)
Euphyes conspicua ssp. (Black Dash)
Euphyes dion (Dion Skipper)
Euphyes vestris metacomet (Dun Skipper)
Euptychia cymela (Little Wood Satyr)
Lethe anthedon (Pearly Eye)
Lethe appalachia leeuwi (Appalachian Brown)
Lethe eurydice ssp. (Eyed Brown)
Libytheana bachmanii (Snout Butterfly)
Limenitis archippus (Viceroy)
Limenitis arthemis ssp. (Banded Purple)
Lycaena thoe (Bronze Copper)
Nymphalis antiopa (Mourning Cloak)
Nymphalis milberti (Milbert's Tortoiseshell)
Phyciodes tharos (Pearl Crescent)
Pieris rapae (European Cabbage Butterfly)
Poanes hobomok (Hobomok Skipper)
Polites coras (Peck's Skipper)
Polites mystic (Broken Dash)
Polygonia comma (Comma)
Satyrium acadica (Acadian Hairstreak)
Satyrium calanus falacer (Banded Hairstreak)
Speyria cybele (Great Spangled Fritillary)
Vanessa atalanta rubria (Red Admiral)

from suitable breeding habitat elsewhere in the area, and two breed in agriculture areas in the vicinity from which they range widely. The remaining twenty-eight species are all breeding residents of the site and are typical for this part of the state. None of the butterflies identified is dependent on this tract for its survival in the area.

The Dion Skipper and the Black Dash are related skippers of similar habits and distribution in Minnesota. Both occur locally and usually in small numbers in sedge meadow habitats (Dana, pers. obs.). A fairly good colony of the Dion Skipper was observed here, but only a single male of the Black Dash was seen.

The Harris' Checkerspot is another butterfly which is generally uncommon and found locally in moist to wet meadows. However, this butterfly is probably not a breeding resident of the site -- only one very flight-worn individual was encountered and the obligate larval host plant was not seen on the tract. The butterfly's breeding habitat probably occurs east of the tract on the terrace just above the floodplain in boggy meadows. This location is on the extreme southwestern limit of the insect's range (Huber, unpub. date).

The Snout Butterfly is reported to periodically "migrate" northward, but rarely reaches Minnesota on the evidence of the infrequency of its collection here (Huber, unpubl. data). One of the two adults seen here was freshly emerged from the pupal state indicating that migrants arrived early enough to reproduce locally. This is probably a rare occurrence in this part of the state.

The Appalachian Brown, a butterfly of shady swampy habitats, was found in the floodplain woods adjacent to the open sedge meadows where its congener, the Eyed Brown, was fairly common. These two butterflies are "sibling species", so close in appearance that they were not recognized as distinct species until a few years ago. Very little is yet known of the extent of the Appalachian Brown's range in Minnesota or its abundance.

The abundance of Nettles (Utrica dioica) makes this area excellent habitat for several species that feed as larvae on it, including Milbert's Tortoiseshell, the Comma, and the Red Admiral. The Red Admiral does not appear to overwinter in this area, but migrates in from further south every year (Clench, 1975, and Dana, pers. observ.). In 1977 a quite abnormally large immigration of Red Admirals was evident with great numbers of the insect congregating at this site.

Additional Inventory/Research Needs

The south side of the Sauk River (i.e., Observation Hill) should be surveyed to determine what butterflies reside here -- an additional three to five species may occur south of the river due to differences in habitat.

Sources of Information

Clench, H.K. 1975. Genus VANESSA Fabricius, pp. 202-207 . In: W.H. Howe (co-ord. ed.), The Butterflies of North America. Doubleday, Garden City, N.Y.

Howe, W.H. (co-ord. ed.). 1975. Butterflies of North America. Doubleday, Garden City, N.Y. 633 p.

Huber, R.L. 1975. No title. (Revision of Huber, R.L., J.S. Nordin & O.R. Taylor, Jr. 1966. A systematic checklist of Minnesota Rhopalocera (butterflies & skippers). Science Museum of Minn., St. Paul. Unpub. mimeo. 10 p.

Klots, A.B. 1957. A Field Guide to the Butterflies of North America East of the Great Plains, Houghton-Mifflin Co., Boston. 349p.

BIRDS

Birds are another biotic component which add to the natural diversity of an area and the state. Indeed, there are more bird species than all other vertebrates on Cold Spring Heron Colony. An inventory is needed to record species diversity, identified endangered, rare or sensitive species, and recognize changes in species composition.

Methods

A bird census was made by walking through the area on four occasions: 24 May, 9 June, 22 June and 12 July 1977. Birds were identified by sight, sound, or a combination thereof. Identification was aided by the use of a pair of binoculars and a bird field guide.

Cold Spring Heron Colony's Birds

Table 5 lists the birds identified on the tract in 1977 in phylogenetic order. Forty-five birds were identified at least once on, over or near Cold Spring Heron Colony.[1] Most of these species are common residents of the state's wetlands, fresh water, open deciduous woods, fields, brush areas, and deciduous and mixed wood habitats. The absence of many birds typical of dry prairie communities from the dry-mesic grassland on Observation Hill is probably due to its small size. The Red-eyed Vireo was heard along the river but not seen, while the Indigo Bunting was observed at the northern edge of the woods just off the tract. Purple Martins,

1. The location and dates the birds were observed are on file, The Nature Conservancy Minnesota Chapter. The Eastern Kingbird was not seen on the tract, but an unoccupied nest was found on Observation Hill. It is not included in the above total.

Table 5. Birds identified at Cold Spring Heron Colony in 1977.

Ardea herodias (Great Blue Heron)
Butorides virescens (Green Heron)
Casmerodius albus (Great Egret)
Buteo jamaicensis (Red-tailed Hawk)
Charadrius vociferus (Killdeer)
Actitis macularia (Spotted Sandpiper)
Zenaida macroura (Mourning Dove)
Archilochus colubris (Ruby-throated Hummingbird
Megaceryle alcyon (Belted Kingfisher)
Colaptes auratus (Common Flicker)
Melanerpes erythrocephalus (Red-headed Woodpecker)
Dendrocopos villosus (Hairy Woodpecker)
Dendrocopos pubescens (Downy Woodpecker)
Tyrannus tyrannus (Eastern Kingbird)*
Myiarchus crinitus (Great Crested Flycatcher)
Sayornis phoebe (Eastern Phoebe)
Contopus virens (Eastern Wood Pewee)
Riparia riparia (Bank Swallow)
Stelgidopteryx ruficollis (Rough-winged Swallow)
Hirundo rustica (Barn Swallow)
Progne subis (Purple Martin)
Cyanocitta cristata (Blue Jay)
Corvus branchrhynchos (Common Crow)
Parus atricapillus (Black-capped Chickadee)
Sitta carolinensis (White-breasted Nuthatch)
Troglodytes aedon (House Wren)
Dumetella carolinensis (Gray Catbird)
Toxostoma rufum (Brown Thrasher)
Turdus migratorius (American Robin)
Bombycilla cedrorum (Cedar Waxwing)
Sturnus vulgaris (Starling)
Vireo olivaceus (Red-eyed Vireo)
Dendroica petechia (Yellow Warbler)
Oporornis philadelphia (Mourning Warbler)
Geothlypis trichas (Common Yellowthroat)
Agelaius phoeniceus (Red-winged Blackbird)
Icterus galbula (Northern Oriole)
Quiscalus quiscula (Common Grackle)
Molothrus ater (Brown-headed Cowbird)
Piranga ludoviciana (Scarlet Tanager)
Cardinalis cardinalis (Cardinal)
Peucticus ludovicianus (Rose-breasted Grosbeak)
Passerina cyanea (Indigo Bunting)*
Spinus tristis (American Goldfinch)
Spizella pallida (Clay-colored Sparrow)
Melospiza melodia (Song Sparrow)

*Not observed on the tract.

Killdeer, Barn Swallows and a Red-tailed Hawk were all observed in flight over the site. Six birds were observed nesting on the tract, including Great Blue Herons, Mourning Doves, Eastern Phoebes, Starlings, Red-winged Blackbirds (which attempted to nest on the island on the Sauk River), and Northern Orioles. Bank and Rough-winged Swallows were observed nesting in a bank off the site just west of Observation Hill.

Significance of Cold Spring Heron Rookery Birds

The Great Blue Heron rookery present in the Elm/Ash Forest north of the open meadows is the primary reason this tract was acquired by the Nature Conservancy and nominated as a potential state Scientific & Natural Area. Great Blue Herons have nested in the Cold Spring vicinity since at least the 1800's according to area residents. About 1905-1906 they started nesting to the north of the present site. When the Tamaracks died, due to the area being tiled and drained, the herons moved south to the present location. About fifty-five pairs of herons were reported in this colony in 1933 (Partch, 1972). Since 1954, when Dr. Max Partch, St. Cloud State University, first began keeping detailed records of the area, the number of nests has more than tripled as has the area occupied by the nesting colony (See Figures 11 and 12). In 1954 there were 386 nests in 102 trees occupying an area equal to about 5-1/2 acres (the entire Nature Conservancy property north of the Sauk River is fifty-seven acres). By 1970 there were 1317 nests in 367 trees occupying an area equal to about 13-1/2 acres (Partch, 1972). The largest number of herons recorded on the tract in one season was in

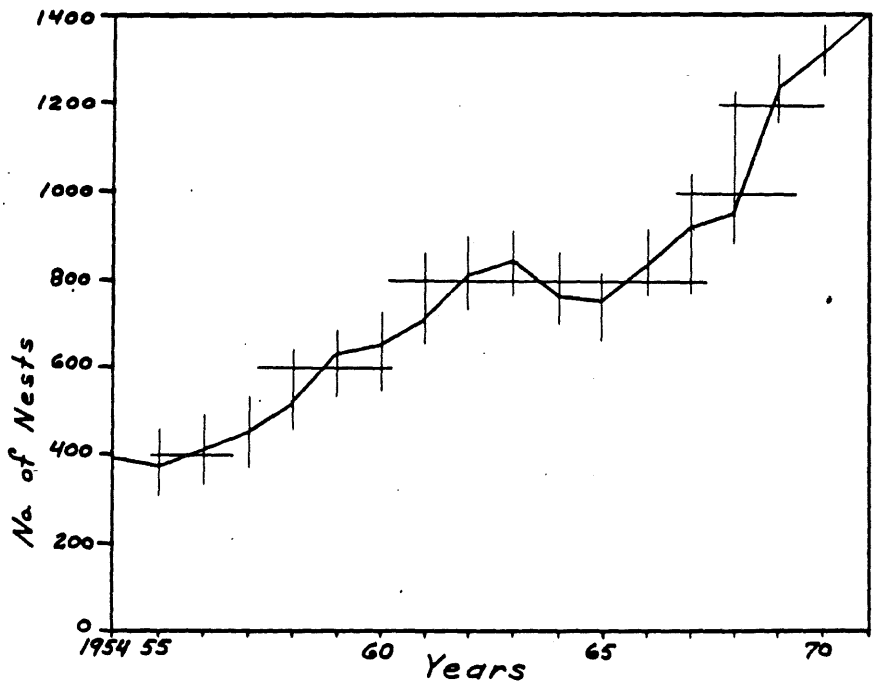


Figure 11. Growth of the Cold Spring Heron Colony from 1954 through 1971. Source: Dr. Max Partch, TNC's Cold Spring Heron Colony Natural Area brochure, 1972.

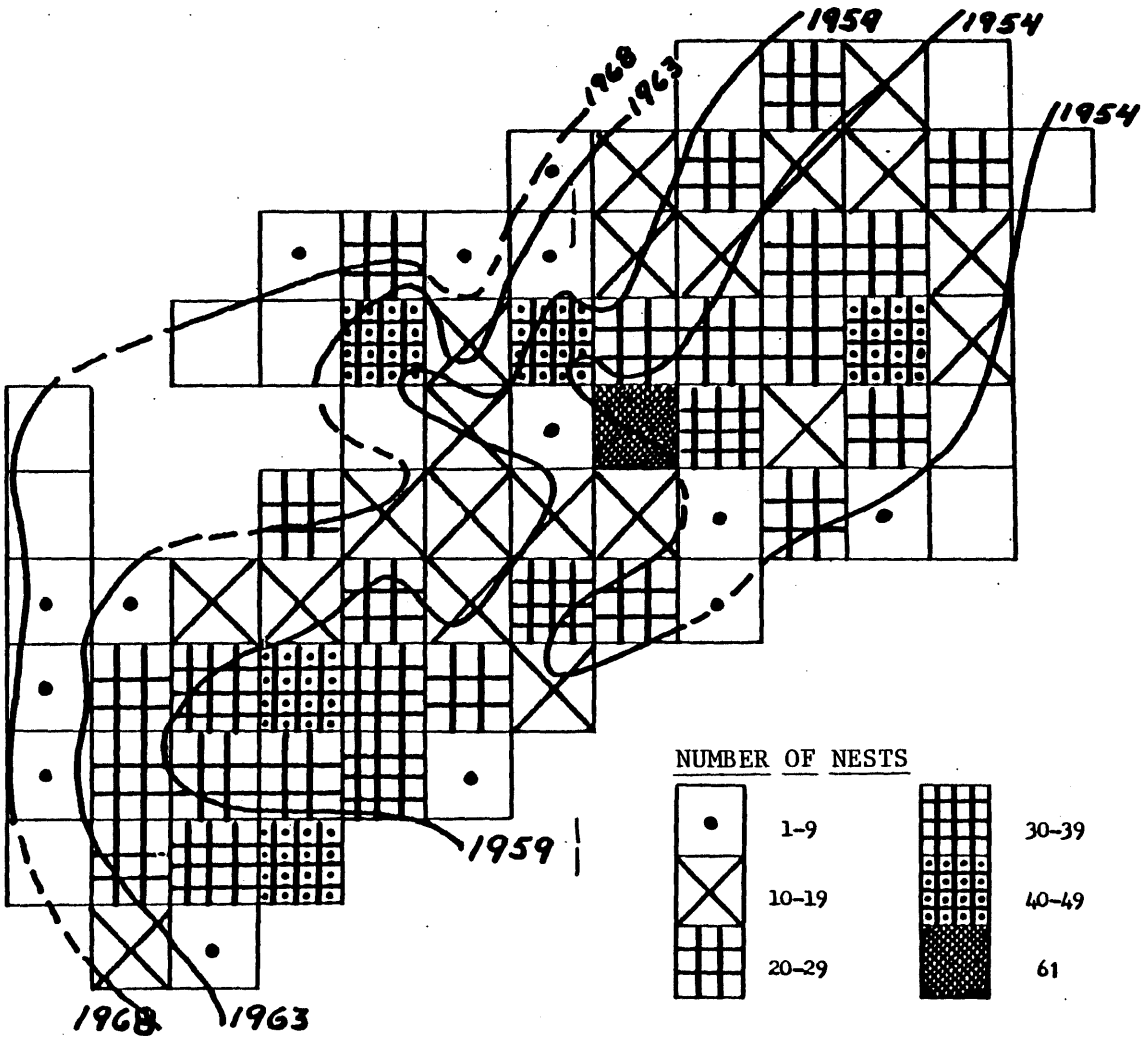


Figure 12. Expansion of the Cold Spring Heron Colony from 1954-1968. Source: Dr. Max Partch, TNC's Cold Spring Heron Colony Natural Area brochure, 1972.

1974 when 1584 nests were recorded by Dr. Max Partch. Indications are that this is one of the largest Great Blue Heron rookeries in the state. Since 1974, however, the number of herons nesting in the rookery has dropped.[1]

Great Blue Herons are protected birds. Rookeries like the Cold Spring Colony are significant because such large concentrations of birds in a relatively small area are susceptible to disturbance and nesting areas are limited. There are presently an estimated 115-125 active Great Blue Heron rookeries in the state.[2]

Cold Spring Heron Colony is also significant because it has been studied and monitored for many years. As noted above, Dr. Max Partch has studied the colony since 1954. He has published reports periodically in The Loon. Beginning in 1974 Rick Peifer studied this heron colony as part of his M.A. thesis research. He also published an article on the herons in 1975 in The Loon (Peifer, 1975).

Additional Inventory/Research Needs

The herons nesting on the tract could be monitored yearly to determine any changes occurring in the population. Also, due to a limited field season the 1977 bird inventory may be incomplete for the spring birds. Thus another inventory could be conducted to record these birds.

1. In 1979 Dr. Partch recorded 1125 nests in the rookery.
2. This information is from the records of Carrol Henderson, DNR, Non-game Wildlife Program Supervisor.

Sources of Information

Green, Janet C. and Robert B. Janssen. 1975. Minnesota Birds. University of Minnesota Press. Minneapolis.

Partch, Max. 1971. The 1971 spring migration at the Cold Spring Heron Colony. The Loon. 43(3): 75-77.

_____. 1972. Cold Spring Heron Colony Natural Area. Brochure prepared for The Nature Conservancy, Minnesota Chapter, Minneapolis. 11pp.

Peifer, Richard W. 1975. The Loon 47(4): 156-159.

_____. 1977. Capturing, tagging and radio telemetry monitoring Great Blue Herons (Ardea herodias L.) in central Minnesota. Unpub. M.A. Thesis, St. Cloud State University, St. Cloud, Minnesota. 65 pp.

MAMMALS

Mammals must be inventoried to: 1) record the unit's natural diversity; 2) to obtain baseline data so changes in species composition can be discerned; and 3) to identify rare or sensitive species.

Methods

Small mammals on the north side of the river were censused using eighty live traps placed on two parallel lines set fifty feet apart. Each line consisted of twenty stations set at intervals of fifty feet. Each station contained a 2x2x6 Sherman live trap and a Longworth live trap. A peanut butter-oatmeal mixture was used to bait the traps. The traplines ran from the Sauk River north into the woods. The end stations on the western line of traps were permanently marked with metal conduit. The other stations on the same line were temporarily marked with bamboo stakes during the trapping period.

An additional east-west line of five stations, two traps per station, was set on Observation Hill. This line used 2x2x6 homemade traps.

The traps were all set on 12 August 1977 and were checked at 8:50 AM on 13 August and at 8:20 AM on 14 August, at which time they were pulled. Specimens were deposited in the James Ford Bell Museum of Natural History, University of Minnesota, Minneapolis.

Large mammals were censused only through direct or indirect observation during the bird census.

Cold Spring Heron Colony's Mammals

Ten mammals were identified visually, by trap, or by other signs on the site in 1977 (See Table 6).[1] In addition, Racoon and Whitetail Deer tracks were observed in the cornfield just to the west of the colony. Virtually all of the mammals are widespread in Minnesota. However, Moyle (1975) lists the Shorttail Weasel as a species of concern in the state. The presence of Plains Pocket Gophers was indicated by mounds observed on the Observation Hill. The Eastern Chipmunk, Red Squirrel, and Meadow Jumping Mouse were not observed during the formal mammal inventory.

Sources of Information

Gunderson, Harvey L. and James R. Beer. 1953. The Mammals of Minnesota. The University of Minnesota Press. Minneapolis.

Moyle, John. 1975. The uncommon ones. Minnesota Dept. of Natural Resources. St. Paul.

1. The location, dates and numbers of mammals recorded are on file, The Nature Conservancy Minnesota Chapter.

Table 6. Mammals observed at Cold Spring Heron Colony in 1977.

Blarina brevicauda (Shorttail Shrew)
Clethrionomys gapperi (Red-backed Vole)
Geomys bursarius (Plains Pocket Gopher)
Microtus pennsylvanicus (Meadow Vole)
Mustela erminea (Shorttail Weasel)
Odocileus virginianus (Whitetail Deer)*
Peromyscus leucopus (White-fotted Mouse)
Procyon lotor (Racoon)*
Tamias striatus (Eastern Chipmunk)
Tamiascirus hudsonicus (Red Squirrel)

*Tracks observed on the cornfield just to the west of the colony.

LAND USE HISTORY

Virtually all "natural areas" have been affected to some degree by the past activities of people. Farming, grazing, logging, hunting, drainage of wetlands and the prevention of fire are some of the ways people have affected the land. Knowledge of historical land use practices helps explain the present condition of the land and its resources, and the origin of human impacts on the area. Surrounding land use practices also affect the viability of all natural areas.

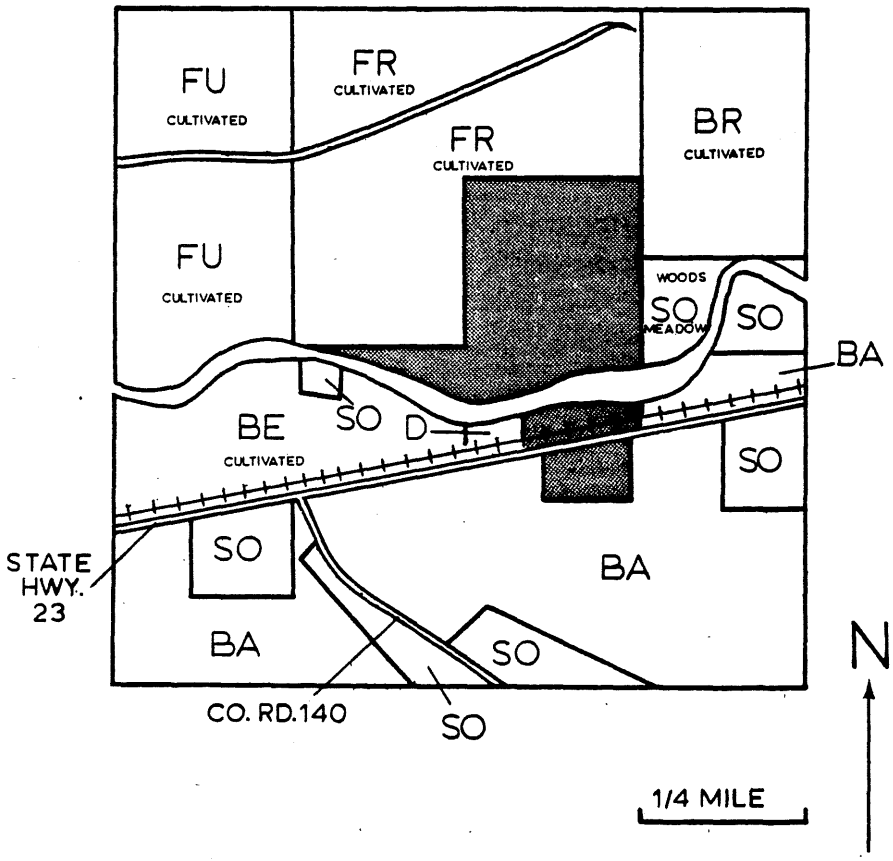
Methods

Most of the land use information presented here is based on interviews with former owners, neighbors and local residents who are familiar with the area.

Recent Land Use History

The St. Cloud region was first settled by Europeans in the middle of the nineteenth century. Most of the land was cleared for farming and grazing or used for timber production. Today Cold Spring Heron Colony is virtually surrounded by cultivated fields and pastures. Figures 13 and 14 show the owners and the land uses adjacent to the Nature Conservancy land.

The colony itself has been affected in many ways by the activities of people. Although none of the tract was ever cultivated the lowland north of the river was grazed by cattle before 1940. The land between the river and Minnesota Highway 23, and the hill was grazed as far back as the 1920s. Approximately between 1911-1940 a farmer mowed the slough north of the river whenever it was not flooded. A 1938 aerial photograph



KEY

BA	John Bauer, Cold Spring, MN 56320
BE	David Bell, 1233 S. 1st St., Cold Spring, MN 56320
BR	Roman F. & Bertha Braegelmann, Rt. 1, Cold Spring, MN 56320
D	Donald & Erma Denn, Rt. 1, Cold Spring, MN 56320
FR	Froehle Brothers, Box 388, Cold Spring, MN 56320
FU	Valerian N. & Alvera Fuchs, Cold Spring, MN 56320
SO	Small owners (no more than 20 acres, generally less than 10)
	Cold Spring Heron Colony
	Road
	Railroad

Figure 13. Land uses and landowners adjacent to Cold Spring Heron Colony. Names and addresses are from the Stearns County Auditor's Office, Register of Deeds, and John Bauer.

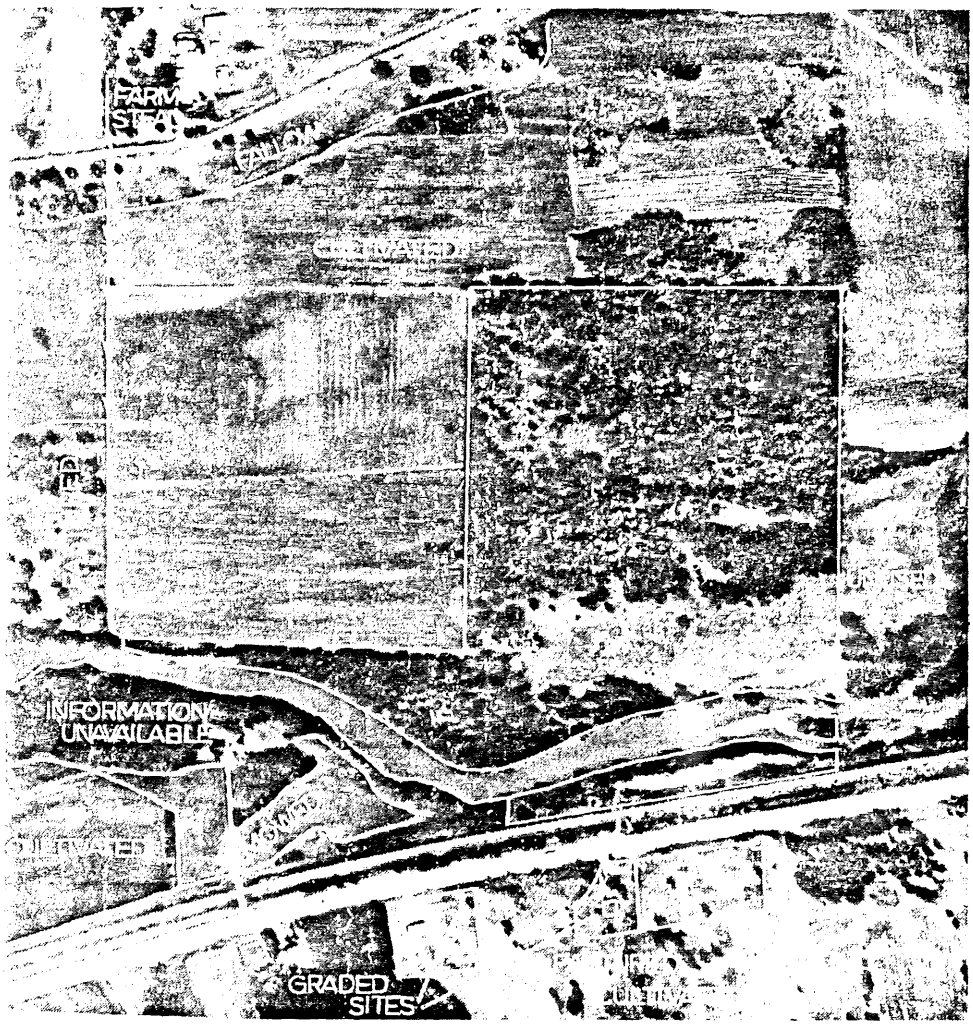


Figure 14. 1965 aerial photograph showing recent land uses adjacent to Cold Spring Heron Colony.

showed hay stacks there. At first this area was mowed twice a year. Later it was mowed only in the spring. The haying stopped because of the decrease in farm horses. Between the river and Highway 23 hay was cut twice a year until 1968.

The lowland north of the river was burned frequently by the former owners. Whenever a summer proved to be too wet to hay there it was burned the following spring to eliminate the heavy vegetation. After haying stopped around 1940, the lowland was burned every fall. In August 1969 some of the area between the railroad and the Sauk River was burned.

The land north of the river has also been logged. Most of the timber was cut in the floodplain below the bog on the terrace. Dead trees and underbrush were also taken out for fuel. The following are examples of some of the big trees cut for lumber: Tamaracks were made into barn beams measuring 10 inches x 10 inches x 40 feet; one Rock Elm provided boards twenty-two inches wide; another tree provided 760 square feet of lumber. Trees were last cut in the area in 1947-1948.

The heron colony has also been affected by actions of people outside the area. Effluents from the Cold Spring Granite Company are apparently responsible for the herons no longer feeding on the Sauk River. Now the herons fly as far as Horseshoe and Big Fish Lakes above Richmond. The granite company started in 1920 at a location 3/4 mile upstream of the colony. The runoff from the company's operations contained rouge (a red-colored polishing compound), emory and shot (used for cutting). Some of the sludge was carried as far as St. Cloud. The company was discharging sixteen tons per

day of effluent, including water, when this practice was discontinued in 1969. In that year the worst flood in seventy-five years occurred, and the Nature Conservancy land was flooded. Since then there have been no flooding problems. According to the local historian flooding seems to have decreased on the river since 1930.

In 1970 the Tamarack pasture north of the tract was bulldozed up to the boundary of the colony. The following year the herons used some of the branches for nesting material.

History of Preservation Efforts

Dr. Max Partch, St. Cloud State University, had been studying the herons for fourteen years when he saw a newspaper advertisement which listed the heron colony land for sale. He informed the Nature Conservancy about the land and its value, and on 30 September 1968 the land north of the river was sold to The Nature Conservancy. The next year, on 6 August 1969, the land to the south of the river, including Observation Hill, was sold to The Nature Conservancy.

NATURAL AREA VISITORS

Knowledge of the number of visitors and visitor characteristics is necessary to determine who is using the natural area and what problems (if any) are being caused by various user groups. Potential users should be identified to help predict future trends and problems.

Visitors were not surveyed in the 1977 inventory. However, the colony has been used by researchers from St. Cloud State University for over fourteen years.

Many potential users exist for Cold Spring Heron Colony. The site offers an excellent opportunity for visitors to see a heron rookery at close range without disturbing the herons, unlike other colonies in the state. Due to its close proximity to St. Cloud a large increase in use could occur when certain segments of the population become aware of the area. In addition to St. Cloud State University, St. John's University in Collegeville and the College of St. Benedict in St. Joseph, are within half an hour's drive of the area and could use the site for educational and research purposes. Eighteen public middle and secondary schools in Stearns County plus schools in Benton and Morrison counties could utilize the area for environmental education purposes. Some users might also come up from the Twin Cities area which is approximately 1-1/2 hours driving time from the site.

Appendix I. Legal Description of Cold Spring Heron Colony

A. North of the River:

The Southwest Quarter of the Northeast Quarter (SW1/4 NE 1/4) of Section Thirteen (13); containing Forty Acres; ALSO That part of the Northwest Quarter of the Southeast Quarter (NW 1/4 SE 1/4) of Section Thirteen (13), lying North of the middle line of the Sauk River, containing Eleven Acres; ALSO That part of the Northeast Quarter of the Southwest Quarter (NE 1/4 SW 1/4) of Section Thirteen (13), lying Northerly of the middle line of the Sauk River, containing 4.62 Acres; ALL Being in Township One Hundred Twenty-three (123), North of Range Thirty (30) West of the Fifth Principal Meridian; all in Stearns County, Minnesota; and hereby conveying 55.62 Acres.

B. South of the River:

That part of the Southeast quarter (SE 1/4) of Section 13, Township 123 North, Range 30 West, Stearns County, Minnesota, described as follows: Commencing at the Southwest corner of Section 13, Township 123 North, Range 30 West; Thence North 00° 01' East on the West line of said Section 13 a distance of 1137.0 feet to its intersection with the centerline of State Trunk Highway #23; Thence North 72° 47' East on said centerline 1,440.0 feet; Thence Northeasterly on said centerline on a curve to the right the central angle of which is 07° 17' and whose radius is 11,459.19 feet a distance of 1,456.7 feet; Thence North 80° 04' East on said centerline a distance of 30.5 feet; Thence North 152.28 feet to the Northerly right-of-way line of the Great Northern Railway Co. for point of beginning; Thence North 80° 04' East on said right-of-way line a distance of 1,098.80 feet; Thence North to the thread of the stream of the Sauk River; Thence Westerly on said thread of stream to a point due North of the point of beginning; Thence South to the point of beginning.

That past of the Northwest quarter of the Southeast quarter (NW 1/4 SE 1/4) of Section 13, Township 123 North, Range 30 West, Stearns County, Minnesota, described as follows: Commencing at the Southwest corner of Section 13, Township 123 North, Range 30 West; Thence North 00° 01' East on the West line of said Section 13 a distance of 1137.0 feet to its intersection with the centerline of State Trunk highway #23; Thence North 72° 47' East on said centerline 1,440.0 feet; Thence Northeasterly on said centerline on a curve to the right the central angle of which

is 07° 17' and whose radius is 11,459.19 feet a distance of 1,456.7 feet; Thence North 80° 04' East on said centerline a distance of 423.79 feet; Thence South 01° 26' East a distance of 60.67 feet to the Southerly right-of-way line of State Trunk Highway #23 for point of beginning; Thence continue South 01° 26' East 260.0 feet; Thence North 80° 04' East parallel to said State Trunk Highway #23 a distance of 537.29 feet; Thence North 07° 36' West 207.32 feet to said Southerly right-of-way line of State Trunk Highway #23; Thence South 80° 04' West on said right-of-way line 27.78 feet; Thence North 99° 56' West on said right-of-way line 50.0 feet; Thence South 80° 04' West on said right-of-way line 479.53 feet to the point of beginning.