

LEGISLATIVE REFERENCE LIBRARY
QH76.5.M6 B5 no. 32
Sather, Nancy. - Results of a survey for polemonium



3 0307 00060 4721

U

LEGISLATIVE REFERENCE LIBRARY
645 State Capitol Building
Saint Paul, Minnesota 55155

QH
76.5
.M6
B5
no.
32

RESULTS OF A SURVEY FOR
Polemonium occidentale var. *lacustre* (Western Jacob's Ladder)
IN THE CHIPPEWA NATIONAL FOREST

by
Nancy Sather
Minnesota Department of Natural Resources
Section of Wildlife – Natural Heritage Program

January, 1991

This document is made available electronically by the Minnesota Legislative Reference Library as part of an ongoing digital archiving project. <http://www.leg.state.mn.us/lrl/lrl.asp>
(Funding for document digitization was provided, in part, by a grant from the Minnesota Historical & Cultural Heritage Program.)



INTRODUCTION

The work included in this report is Part 3 of a Sensitive Plant Survey being conducted by the Minnesota Natural Heritage Program as part of a cooperative cost-share agreement with the Chippewa National Forest. Part 3 of this project is a search for Polemonium occidentale var. lacustre, a federal candidate species (category 2) under review for listing pending further information regarding its status and vulnerability (Federal Register, Vol. 41, No. 117).

Western Jacob's Ladder (Polemonium occidentale var. lacustre) is a midwestern subspecies of a western montane taxon (Davidson, 1950; Wherry, 1945; Wilkin, 1989). Polemonium occidentale var. lacustre is known from only two locations: Valpol Bog in Florence County, Wisconsin (Solheim et al., 1984) and Polemonium Bog in Section 33, T61N, R21W, St. Louis County, Minnesota. The midwestern variety was first documented at its St. Louis County site in 1944 (Lakela, 1947) and reconfirmed at that site in 1988 (Sather, 1989). Despite field searches of 23 other wetlands in St. Louis and northeastern Itasca Counties no additional sites were found in 1988.

The known Minnesota and Wisconsin sites are both typed as cedar bogs with spruce and fir co-dominant in the canopy. Both have been logged within the last 40 years. In both cases the population of both flowering and vegetative Jacob's Ladder plants is concentrated in wet, open areas resulting from logging. Occasional flowering plants and vegetative plants are present in lower densities under more closed canopies of cedar or spruce and fir. (Sather, 1989, 1990).

Portions of the Minnesota site are old-growth and other portions were selectively logged prior to 1961. The population of thousands of flowering plants is concentrated in the area that was selectively logged. The groundlayer is patchy, characterized by a mixture of conifer forest and wetland species depending on the amount of light and apparent availability of groundwater. In addition to the typical circumneutral wetland species found at the known Polemonium site, there are records for four additional rare species: Ranunculus lapponicus (Lakela 19578 in 1956), Utricularia gibba (Lakela 17167 in 1953), Geocaulon lividum (Sather 88-142 in 1988), and Arethusa bulbosa (Lakela 19750 in 1956, confirmed in 1988). Polemonium Bog supports a large number and wide variety of orchids including: Cypripedium reginae, Cypripedium calceolus, Listera cordata, Platanthera dilatata, Pogonia ophioglossoides, Platanthera hyperborea, Orchis rotundifolia, Platanthera orbiculata, and Corallorhiza maculata.

Polemonium Bog lies on St. Louis County land 21 miles (33.8 kilometers) east of the easternmost boundary of the Chippewa National Forest District.

OBJECTIVES OF THIS PROJECT

The objective of the present project was to determine whether additional populations of Polemonium occidentale var. lacustre could be found within the Chippewa National Forest, and if such populations could be located to attempt to define more clearly the species' preferred habitat and associated species.

MAR 26 1991

SURVEY AREA

Stands on the Marcell and Blackduck districts were selected using the U.S. Forest Service's VMIS information system to locate all stands of types 14 (northern white cedar) and 18 (mixed swamp conifer). Because type 14 includes both upland and lowland cedar the VMIS data on LTA and ELT were also obtained in an attempt to differentiate lowland stands. Stand size, density and stand age were used as a guide to help visualize stands in advance. Compartment maps, Chippewa National Forest road maps and topographic maps were used to determine accessibility and locate stands on the ground. In order to maximize the number of stands visited, only stands within a half mile of Forest Service roads were selected for search. In the case of selected stands, aerial photos obtained from the Blackduck and Marcell Districts helped assure that the investigator was really well into the stand in question. With the exception of one stand (Marcell district, Compartment 92, Stand 10) all stands visited were identified using the VMIS printout.

METHODS

Stands were searched by entering them by the most direct route from the nearest forest road or trail and transecting them a minimum of 4 times (more for smaller stands) searching for Polemonium occidentale var. lacustre. Areas of most likely potential habitat, judged by species composition and canopy density, were searched with greater intensity. Dry areas with dense canopy were searched rapidly. In addition to searching for Polemonium, the investigator looked for the possible presence Utricularia gibba, Ranunculus lapponicus, Geocaulon lividum, all small species of Botrychium, and all species of orchids.

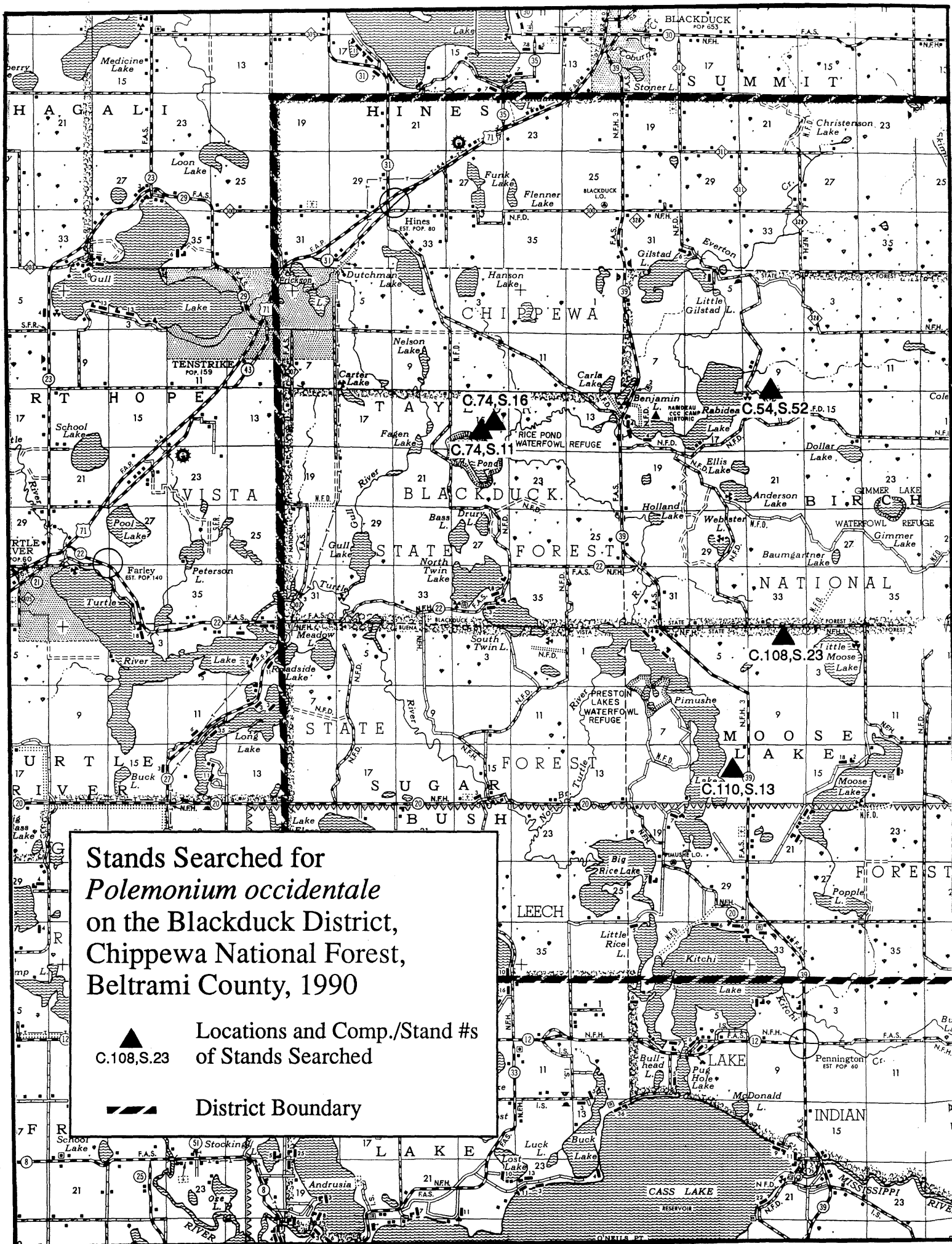
RESULTS

During the first three weeks of July, 1991, 15 conifer wetlands were searched for Polemonium occidentale var. lacustre. Table 1 is a list of all stands searched during this survey. No Polemonium plants were found. A variety of orchids were present at almost all sites, and several sites exhibited a variety of Botrychium species. All orchids and small Botrychium species were vouchered. Table 2 is a list of specimens collected as part of this project. Species on the Chippewa National Forest sensitive species list as of July 1990 are noted with an asterisk. Plants tracked by the Minnesota Natural Heritage Program database are noted with a double asterisk. Vouchers are deposited at the University of Minnesota herbarium.

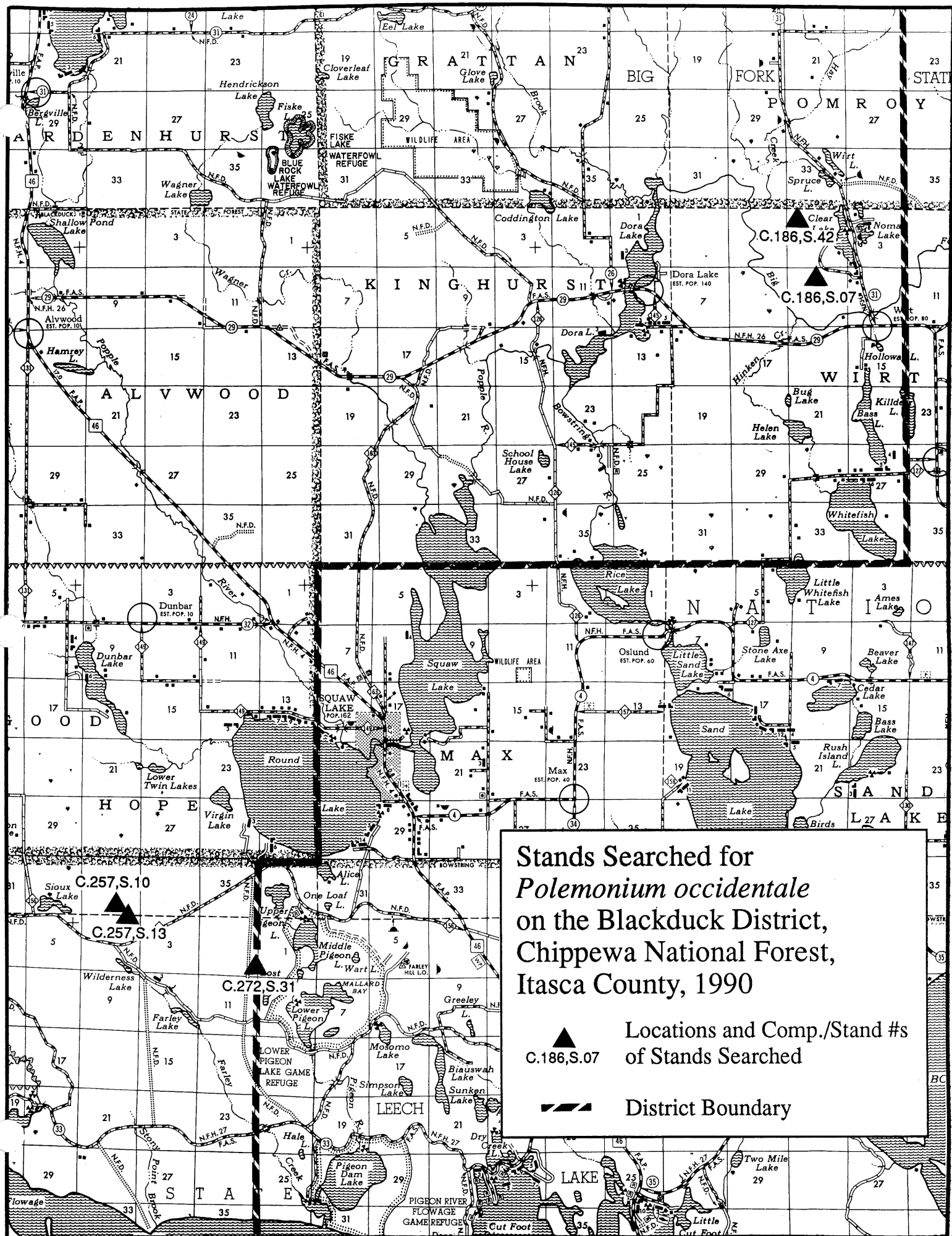
Community data for each stand were recorded following Almendingers (1988) modification of the Braun-Blanquet releve method. Data were collected either from the area with the greatest number of species of special concern or the area with the best developed cedar canopy. Data are entered into the Minnesota Natural Heritage Program's releve database, where they can be used in conjunction with data on cedar stands from throughout northern Minnesota in an effort more clearly to understand the range of variability and floristic affinities of Minnesota's white cedar communities. This database is comparable to the Chippewa National Forest releve database, also developed by the Minnesota Natural Heritage Program, and releves from this project can be imported into the Chippewa Forest Database for purposes of analysis whenever desired. Releves for wetlands visited as part of this project are included in Appendix 1.

REFERENCES

- Almendinger, John C. 1988. A handbook for collecting releve data in Minnesota. pp. 63-100 in Peifer, R. W. ed. Tested studies for laboratory teaching. Proceedings of the ninth workshop/conference of the Association for Biology Laboratory Education (ABLE) in Minneapolis.
- Davidson, John T. 1950. The genus Polemonium (Tournefort) L. University of California Publications in Botany. Vol. 23, No. 5, pp 209-282.
- Federal Register, Vol 41., No. 117. June 16, 1976.
- Lakela, Olga. 1947. Western Polemonium in Minnesota. Rhodora Vol. 49, pp. 118-119.
- Sather, N. P. 1989. Status report on Polemonium occidentale (Western Jacob's Ladder) in Minnesota. Report compiled under contract for USFWS Endangered Species Office. Minnesota Department of Natural Resources, Biological Report No. 4. St. Paul, Minnesota.
- Sather, N. P. 1990. Status of Polemonium occidentale var. lacustre (Western Jacob's Ladder) at Polemonium Bog, St. Louis County, Minnesota. Report compiled under contract for USFWS Endangered Species Office. Minnesota Department of Natural Resources, Biological Report No. 21. St. Paul, Minnesota.
- Solheim, Stephen L. and Emmet J. Judziewicz. 1984. Four noteworthy Wisconsin plants. Phytologia, Vol 54, No.7, pp. 490-492.
- Wherry, E. T. 1945. Supplementary notes on the genus Polemonium. American Midland Naturalist Vol. 34, No. 2, pp 375-380.
- Wilkin, Dieter. 1989. Letter to June Dobberpohl, Wisconsin Natural Heritage Program.



Map 1.



Map 2.

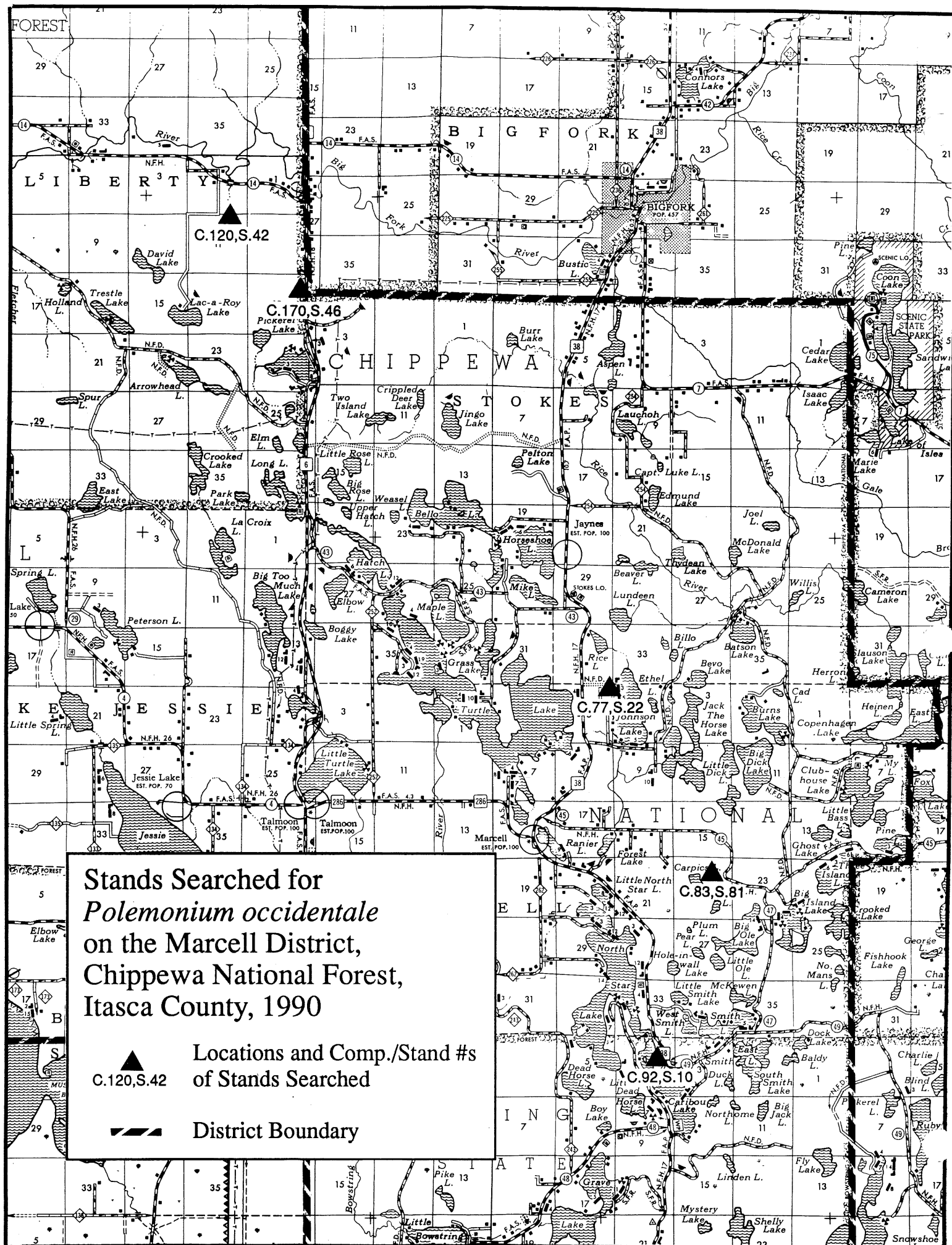


Table 1. Stands visited during 1990 search for Polemonium occidentale

Releve	Twp.	Range	Section	District	Comp./Stand	Date
90-01	T158N,	R27W	NE 11	Marcell	C.120,S.42	7/5/90
90-02	T149N,	R25W	SENE13	Marcell	C.170,S.46	7/5/90
90-03	T149N,	R25W	SENE13	Marcell	C.170,S.46	7/5/90
90-04	T59N,	R26W	NENE05	Marcell	C.77, S.22	7/6/90
90-05	T59N,	R26W	SWNE22	Marcell	C.83, S.81	7/6/90
90-06	T149N,	R26W	NWNW09	Marcell	C.186,S.07	7/9/90
90-07	T149N,	R26W	NWNW04	Marcell	C.186,S.42	7/9/90
90-08	T147N,	R28W	NENE04	Blackduck	C.257,S.13	7/10/90
90-09	T148N,	R28W	SESE33	Blackduck	C.257,S.10	7/10/90
90-10	T147N,	R28W	SESE02	Blackduck	C.272,S.31	7/10/90
90-11	T148N,	R31W	SWNE15	Blackduck	C.74,S.11	7/11/90
90-12	T148N,	R31W	NESW15	Blackduck	C.74,S.16	7/11/90
90-13	T147N,	R30W	NWSE 15	Blackduck	C.110,S.13	7/11/90
90-14	T147N,	R30W	NWNE04	Blackduck	C.108,S.23	7/12/90
90-15	T148N,	R30W	SW 09	Blackduck	C.54, S.52	7/12/90
90-16	T59N,	R26WN	ESW33	Marcell	C.92, S.10	7/27/90

Table 2. Plants collected during the 1990 survey for Polemonium occidentale

Releve	District	Comp./Stand	Date	Species collected
90-01	Marcell	C.120,S.42	7/5/90	Cypripedium calceolus Corallorhiza trifida
90-02	Marcell	C.170,S.46	7/5/90	Cypripedium calceolus Cypripedium reginae
90-03	Marcell	C.170,S.46	7/5/90	Platanthera hyperborea Platanthera obtusata
90-04	Marcell	C.77, S.22	7/6/90	Cypripedium acaule Listera cordata Platanthera hyperborea
90-05	Marcell	C.83, S.81	7/6/90	Platanthera obtusata Platanthera hyperborea Goodyera tessellata *
90-06	Marcell	C.186,S.07	7/9/90	Botrychium matricariaefolium
90-07	Marcell	C.186,S.42	7/9/90	Botrychium matricariaefolium Botrychium multifidum Platanthera hyperborea
90-08	Blackduck	C.257,S.13	7/10/90	Platanthera hyperborea
90-10	Blackduck	C.272,S.31	7/10/90	Platanthera obtusata Cypripedium reginae Cypripedium calceolus Platanthera hyperborea
90-11	Blackduck	C.74,S.11	7/11/90	Cypripedium calceolus Orchis rotundifolia Platanthera hyperborea Corallorhiza striata Listera cordata Corallorhiza trifida Platanthera obtusata
90-12	Blackduck	C.74,S.16	7/11/90	Platanthera obtusata Goodyera tessellata*
90-16	Marcell	C.92, S.10	7/27/90	Goodyera tessellata* Malaxis unifolia Corallorhiza maculata Platanthera obtusata Mitchella repens Halenia deflexa Botrychium multifidum

APPENDIX 1
BRAUN-BLANQUET RELEVES FOR
STANDS SEARCHED FOR POLEMONIUM OCCIDENTALE VAR. LACUSTRE
JULY, 1990

Physiognomic designations:

- E = needleleaf
- B = broadleaf evergreen
- D = deciduous
- H = herbaceous forbs
- G = graminoid

Species are listed within the appropriate physiognomic designation and may be listed redundantly to reflect their cover and abundance in each of the separable height layers in which they occur, as explained below.

Height classes:

- 8 = > 35m
- 7 = 20-35m
- 6 = 10-20m
- 5 = 5-10 m
- 4 = 2-5 m
- 3 = 1/2 - 2 m
- 2 = 10 cm - 1/2 m
- 1 = < 10 cm

Height classes reflect the structure of the vegetation and are lumped according to the units distinguishable at the site in question. For this reason some sites may have low shrub layers that are separable visibly from a tall shrub layer (for example a layer dominated by honeysuckle and another layer dominated by alder), in which case there would be both a D2 layer and a D3 layer. Some investigators list protruding flowering stalks of tall herbs and graminoids as a separate layer. The investigator has chosen to include herbs and graminoids in the layer in which their biomass predominates and not to list protruding inflorescences in a taller height class as well.

After each species name 2 symbols relate to the cover-abundance and sociability of that species within that structural layer.

Cover-abundance key

- r = single occurrence
- + = occasional, cover < 5%
- 1 = plentiful, cover < 5%
- 2 = very numerous, cover 5 - 25%
- 3 = any number of individuals, cover 25 - 50%
- 4 = any number of individuals, cover 50 - 75%
- 5 = any number of individuals, cover 75 - 100%

Sociability key

- 1 = growing singly
- 2 = grouped, few individuals
- 3 = large group, many individuals
- 4 = small colonies, extensive patches, broken mat
- 5 = extensive mat

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #: 90-01 Surveyor's name: N.P. Sather
MN County: Itasca Legal description : T 158N R27W NE Sect.11
Topographic quad:Marcell DNR code : H15c
Latitude: 47 31 30 Longitude: 93 43 57
Date: 7/5/90 Releve size : 20 x 20 m.
Community type:White cedar swamp Stand age: 92
Marcell district, Compartment 120, Stand 42

Species name cover/abundance

E 5-6 i			
Thuja occidentalis	3.2	Geum aleppicum	r.1
		Viola sp.	+2
D 5 b		Botrychium virginianum	+2
Betula papyrifera	r.1	Epilobium angustifolium	+1
		Actaea rubra	+1
		Galium labradoricum	+1
D 3 b			
Corylus cornuta	+1		
Parthenocissus quinquefolia	+1	G 1-2 b	
Betula papyrifera	+1	Carex pensylvanica	+1
Ribes glandulosum	+1	Carex sp. (veg)	+1
Rhamnus alnifolia	+1		
H 1-2 c			
Equisetum sylvaticum	+1		
Dryopteris spinulosa	3.3		
Rubus pubescens	3.3		
Gymnocarpium dryopteris	1.2		
Fragaria virginiana	+2		
Maianthemum canadense	+2		
Coptis groenlandica	1.2		
Circaea alpina	+2		
Galium triflorum	2.2		
Cypripedium calceolus	+2		
Aralia nudicaulis	3.2		
Impatiens capensis	3.2		
Clintonia borealis	1.2		
Ranunculus abortivus	1.1		
Saxifraga pensylvanica	r.1		
Dryopteris cristata	+2		
Mitella nuda	2.2		
Lycopus americanus	+2		
Trientalis borealis	+1		
Cornus canadensis	r.1		
Cystopteris fragilis	1.2		
Caltha palustris	+2		
Solidago uliginosa	+2		
Trillium cernuum	r.1		

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #: 90-02 Surveyor's name: N.P. Sather
MN County: Itasca Legal description: T149N, R25W SENENE Sect.13
Topographic quad: Spring Lake DNR code: H14a
Latitude: 47 43 41 Longitude: 93 46 42
Date: 7/5/90 Releve size: 20 x 20 m
Community type: White cedar swamp Stand age: 112
Marcell District, Compartment 170, Stand 46

Species name cover/abundance

E 6 i

Thuja occidentalis 2.2

E 4 b

Abies balsamea r.1

D 3-5 b

Fraxinus nigra +.2

D 1-2 r

Rosa acicularis +.1

Alnus incana +.1

Ribes glandulosum r.1

Corylus cornuta +.1

Fraxinus nigra +.1

E 1-2 b

Abies balsamea +.1

Thuja occidentalis +.1

H 1-2 c

Rubus pubescens 2.2

Aralia nudicaulis 1.2

Mitella nuda 2.2

Galium triflorum +.2

Cornus canadensis 2.2

Coptis groenlandica 2.2

Trientalis borealis 1.2

Chelone glabra +.1

Dryopteris cristata +.1

Petasites sagittatus +.1

Circaea alpina 1.2

Impatiens capensis +.2

Gymnocarpium dryopteris 2.2

G 1-2 b

Bromus ciliatus +.1

Nearly solid cover of feathermosses

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #:90-03 Surveyor's name: N.P. Sather
MN County:Itasca Legal description: T 149N R25W SENENE Sect 13
Topographic quad:Spring Lake DNR code: H14a
Latitude: 47 43 38 Longitude:93 46 34
Date: 7/05/90 Releve size: 20 x 20
Community type:Cedar swamp Stand age: 112
Marcell District, Compartment 170, stand 46

Species name cover/abundance

E 5-6 i

Abies balsamea 1.2
Thuja occidentalis 3.2

D 3 i

Corylus cornuta r.1
Alnus incana +.1

D 1-2 p

Alnus incana +.1
Lonicera oblongifolia +.1
Ribes glandulosum r.1
Rhamnus alnifolia 1.2
Fraxinus nigra +.1

B 1-2 b

Ledum groenlandicum 1.2

E 1-2 b

Abies balsamea 1.1

H 1-2 i

Mitella nuda 1.2
Cypripedium calceolus +.2
Fragaria virginiana +.1
Smilacina trifolia 1.2
Saxifraga pensylvanica +.1
Rubus pubescens +.2
Coptis groenlandica +.2
Linnaea borealis +.2
Vaccinium oxycoccos +.1
Moneses uniflora +.2
Pyrola asarifolia 1.2
Cornus canadensis +.2
Viola renifolia 1.2
Trientalis borealis +.2
Gaultheria procumbens +.1
Calla palustris +.2
Potentilla palustris +.1

G 1-2-b

Carex pauperula 1.2
Carex disperma 2.2
Cinna latifolia +.1

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #:90-04 Surveyor's name: N.P. Sather
 MN County: Itasca Legal description: T59N R26W SWNE Sect.22
 Topographic quad: Marcell DNR code: H15b
 Latitude: 47 37 42 Longitude: 93 39 44
 Date: 7/6/90 Relleve size: 20 x 20 m
 Community type: Mixed conifer swamp Stand age: 90
 Marcell District, Compartment 77, Stand 22

 Species name cover/abundance

E 5-6 c

Thuja occidentalis 1.1

Larix laricina 2.2

Picea mariana +.1

E 3-4 i

Abies balsamea 2.2

E 3-4 i

Thuja occidentalis 1.1

D 2-3 i

Alnus incana 3.2

Cornus stolonifera 1.2

Ribes glandulosum r.1

Salix bebbiana r.1

D 1 b

Fraxinus nigra +.1

Cornus stolonifera 1.2

Acer spicatum r.1

Salix bebbiana r.1

B 1-2 a

Ledum groenlandicum +.2

H 1-2 c

Rubus pubescens 3.2

Maianthemum canadense 3.2

Smilacina trifolia 3.2

Cornus canadensis 2.2

Galium triflorum 1.2

Lysimachia thrysiflora 1.2

Thelypteris palustris 2.2

Bidens sp. 1.2

Solidago uliginosa +.1

Cypripedium acaule +.2

Gaultheria hispidula +.2

Caltha palustris +.2

Trientalis borealis +.2

Eupatorium sp +.2

Lycopus uniflorus +.2

Impatiens capensis 2.2

Fragaria virginiana 1.2

Athyrium angustum 1.2

Potentilla palustris 1.2

Dryopteris cristata +.1

Streptopus roseus r.1

Gymnocarpium dryopteris 1.2

Vaccinium myrtilloides r.1

Dryopteris spinulosa +.1

Aralia nudicaulis +.2

Circaea alpina +.2

Listera cordata +.1

Menyanthes trifoliata +.2

Aster umbellatus +.1

G 1-2 p

Carex disperma +.2

Carex cf. leptalea +.2

Carex paupercula +.2

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #:90-05 Surveyor's name: N.P. Sather
 MN County: Itasca Legal description:T59N R26W SWNE Sect.22
 Topographic quad: Club House Lake DNR code: H15d
 Latitude: 47 35 03 Longitude: 93 37 36
 Date: 7/6/90 Releve size: 20 x 20 m
 Community type:Mixed conifer swamp Stand age:88
 Marcell District, Compartment 83, Stand 81

Species name	cover/abundance		
E 5-6 c		Linnaea borealis	+2
Thuja occidentalis	+1	Gaultheria procumbens	+2
Picea mariana	1.2	Epilobium glandulosum	+1
Abies balsamea	1.2	Aster macrophyllus	+2
		Thelypteris palustris	+1
D 4-5 b		Thelypteris phegopteris	r.1
Betula papyrifera	+1	Diervilla lonicera	+1
Populus balsamifera	+1	Platanthera obtusata	+1
Acer rubrum	r.1	Clintonia borealis	1.2
Acer spicatum	+1	Vaccinium myrtilloides	+2
		Maianthemum canadense	+2
D 3 i		Equisetum sylvaticum	1.2
Alnus incana	3.2	Aralia nudicaulis	1.2
Corylus cornuta	+1	Athyrium abngustum	+1
Cornus stolonifera	+1		
		G 1-2 a	
E 2-5 p		Carex disperma	+2
Abies balsamea	3.2		
E 1 p			
Abies balsamea	1.2		
B 1-2 b			
Ledum groenlandicum	1.2		
D 1-2 i			
Ribes glandulosum	1.2		
Lonicera hirsuta	+1		
Lonicera canadensis	2.1		
Acer spicatum	1.2		
H 1-2 c			
Lycopodium annotinum	1.2		
Rubus pubescens	3.2		
Cornus canadensis	2.2		
Galium triflorum	+1		
Trientalis borealis	+1		
Coptis groenlandica	1.2		
Gymnocarpium dryopteris	2.2		
Solidago uliginosa	1.2		
Viola renifolia	+2		
Circaea alpina	+1		
Mitella nuda	1.2		
Iris versicolor	+2		
Dryopteris cristata	+1		
Fragaria virginiana	2.1		

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #:90-06

MN County: Itasca

Topographic quad: Wirt

Latitude: 47 44 34

Date: 7/9/90

Community type: Upland white cedar

Blackduck District, Compartment 186, Stand 7

Surveyor's name: N.P. Sather

Legal description: T149N R 26W NWNW Sect.9

DNR code: H14b

Longitude: 93 59 09

Releve size: 20 x 20 m

Stand age: 70

Species name cover/abundance

D 5-6 i		Cystopteris fragilis	r.1
Populus tremuloides	2.1	Petasites sagittatus	r.1
Betula papyrifera	+1	Viola renifolia	+1
		Gymnocarpium dryopteris	1.2
d 4 b		Circaea alpina	+1
Fraxinus nigra	1.2	Streptopus roseus	r.1
		Galium triflorum	+1
E 4-5 i			
Thuja occidentalis	2.2	G 1-2 a	
Abies balsamea	3.3	Carex pensylvanica	+2
		cf. Cinna latifolia	+1
D 1-2 b			
Prunus virginiana	r.1		
Amelanchier sp	r.1		
Viburnum rafinesquianum	r.1		
Ribes glandulosum	1.1		
Lonicera villosa	r.1		
Ribes cynosbati	r.1		
Populus tremuloides	+1		
Rhus radicans	+2		
H 1-2 i			
Aralia nudicaulis	3.2		
Aster macrophyllus	2.2		
Asarum canadense	1.2		
Clintonia borealis	+1		
Rubus pubescens	2.2		
Anemone quinquefolia	+1		
Mitella nuda	1.2		
Petasites palmata	1.1		
Solidago uliginosa	+1		
Botrychium virginianum	1.1		
Actaea rubra	+1		
Equisetum sylvaticum	+2		
Dryopteris spinulosa	+1		
Athyrium angustum	2.2		
Cornus canadensis	r.1		
Trientalis borealis	+1		
Maianthemum canadense	1.2		
Fragaria virginiana	1.2		
Trillium cernuum	r.1		

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #:90-07 Surveyor's name: N.P. Sather
MN County: Itasca Legal description:*t 149N R 26W NWNW Sect. 4
Topographic quad: Pomroy DNR code: G 14 c
Latitude: 47 45 29 Longitude: 93 59 12
Date: 7/9/90 Relleve size: 20 x 20 m
Community type: Upland white cedar Stand age: 70
Blackduck District, Compartment 186, Stand 42

Species name cover/abundance

E 4-5 i		Galium labradoricum	+1
Thuja occidentalis	3.2	Clintonia borealis	+2
		Galium boreale	r.1
E 3 b		Circaea alpina	+2
Abies balsamea		Petasites palmata	+2
		Smilacina trifolia	+1
D 4-5 i		Cornus canadensis	+1
Fraxinus nigra	3.2	Impatiens capensis	1.2
Populus tremuloides	1.2	Botrychium virginianum	+2
		Anemone quinquefolia	1.2
D 1-2 b		Pteridium aquilinum	1.2
Acer spicatum	r.1		
Corylus cornuta	+1	G 1-2 i	
Populus tremuloides	2.1	Oryzopsis asperifolia	r.1
Fraxinus nigra	+1	Carex pensylvanica	1.2
Quercus rubra	+1	Cinna latifolia	3.2
		Hystrix patula	1.2
H 1-2 i		Carex disperma	+1
Aster puniceus	+1		
Aster macrophyllus	1.2		
Aralia nudicaulis	1.2		
Maianthemum canadense	2.2		
Streptopus roseus	1.2		
Rubus pubescens	3.2		
Sanicula marilandica	1.2		
Taraxacum officinale	+1		
Asarum canadense	2.2		
Fragaria virginiana	1.2		
Equisetum sylvaticum	+2		
Cirsium muticum	r.1		
Osmorhiza longistylis	+1		
Mitella nuda	1.2		
Gymnocarpium dryopteris	1.2		
Trientalis borealis	+1		
Trillium cernuum	+1		
unknown seedling	r.1		
Actaea rubra	1.1		
Thalictrum dasycarpum	r.1		

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #:90-08 Surveyor's name: N.P. Sather
MN County:Itasca Legal description: T148N R28W NENE Sect. 4
Topographic quad: Squaw Lake DNR code:H13b
Latitude:47 40 08 Longitude: 94 13 45
Date: 7/10/90 Releve size: 20x20 m.
Community type:Alder swamp Stand age:
Blackduck district, Compartment 257, Stand 10

Species name cover/abundance

E 4-6 b

Thuja occidentalis +.1
Abies balsamea +.1

D 4 b

Betula papyrifera +.1

D 2-3 i

Salix bebbiana 1.2
Cornus stolonifera 1.3
Alnus incana 2.3
Rubus idaeus +.1
Ribes glandulosum +.1
Ribes hirtellum +.1

H 1-2 i

Caltha palustris 1.2
Ranunculus flabellaris +.2
Impatiens capensis 2.2
Equisetum sylvaticum 3.3
Solidago uliginosa 2.2
Lycopus americana +.1
Galium boreale +.2
Sium suave +.1
Stellaria longifolia +.2
Cornus canadensis +.2
Smilacina trifolia +.1
Campanula aparinoides +.2
Athyrium angustum +.2
Rubus pubescens +.2
Lysimachia thrysiflora +.1
Iris versicolor +.2
Scutellaria galericulata +.2
Osmunda cinnomomea +.1
Rumex orbiculatus +.1
Viola renifolia r.1

G 1-2 p

Carex intumescens 2.2
Juncus cf bufonius r.1
Carex stipata 1.2
Carex lacustris 1.2
Carex crinita 2.2
Glyceria striata 3.2
Cinna latifolia 2.2

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #:90-09	Surveyor's name: N.P. Sather
MN County: Itasca	Legal description: T148N R25W SESE33
Topographic quad: Squaw Lake	DNR code:H13b
Latitude: 47 40 30	Longitude: 94 13 44
Date: 7/10/90	Releve size: 20 x 20 m.
Community type: Upland white cedar	Stand age: 90
Blackduck district, Compartment 257, Stand 13	

Species name cover/abundance

E 5-6 c
Thuja occidentalis 3.2

E 4 b
Abies balsamea +.1

D 5-6 b
Betula papyrifera +.1

D 1-2 b
Lonicera canadensis 2.2
Ribes glandulosum +.2
Acer spicatum 2.2
Acer rubrum 2.1
Populus tremuloides +.1
Quercus rubra r.1
Fraxinus nigra 1.2

H 1-2 c
Pteridium aquilinum 3.2
Aralia nudicaulis 3.2
Asarum canadense 2.2
Rubus pubescens 2.2
Maianthemum canadense 2.2
Gymnocarpium dryopteris 1.2
Smilacina trifolia 1.2
Clintonia borealis 1.2
Athyrium angustum 3.2
Trientalis borealis 2.2
Anemone quinquefolia +.1
Streptopus roseus +.2
Aster macrophyllus r.1
Petasites palmatus +.2
Mitella nuda +.2
Circaea alpina +.2
Lycopodium annotinum 1.2

G 1-2 b
cf. Cinna latifolia +.2
Carex pensylvanica 1.2

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #:90-10 Surveyor's name: N.P. Sather
MN County: Itasca Legal description: T147N R28W SESE Sect.2
Topographic quad: Pigeon Dam Lake DNR code: H13c
Latitude: 47 34 44 Longitude:94 11 00
Date: 7/10/90 Releve size: 20 x 20 m
Community type: Upland white cedar Stand age:
Blackduck district, Compartment 272, Stand 31

Species name cover/abundance

E 7 b

Abies balsamea +.1

E 5-6c

Thuja occidentalis 3.3

D 3 b

Populus tremuloides r.1

D 1-2 r

Corylus cornuta +.1

Lonicera canadensis +.1

Populus tremuloides +.1

Fraxinus nigra +.1

Ribes glandulosum +.1

Acer spicatum 2.1

Tilia americana +.1

H 1-2 c

Rubus pubescens 3.2

Coptis groenlandica 3.2

Platanthera obtusata 1.2

Equisetum scirpoides +.1

Mitella nuda 2.2

Trientalis borealis 1.2

Streptopus roseus 1.2

Maianthemum canadense 2.2

Linnaea borealis 1.2

Galium triflorum 1.2

Botrychium virginianum +.1

Viola renifolia 2.2

Lysimachia thrysiflora +.1

Aster ciliolatus r.1

Gymnocarpium dryopteris +.2

Petasites palmata +.2

Vaccinium angustifolium +.1

Cornus canadensis +.2

Moneses uniflora r.1

Pyrola asarifolia +.1

Lycopodium annotinum +.2

Cypripedium calceolus +.1

Pyrola secunda +.1

G 1-2 b

Carex cf disperma (veg) +.2

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #: 90-11 Surveyor's name: N.P. Sather
MN County: Beltrami Legal description: T148N R31W NE Sec.15
Topographic quad: Blackduck DNR code: H11A
Latitude: 47 38 03 Longitude: 94 35 50
Date: 7/11/90 Releve size: 20 x 20 m
Community type: White cedar swamp Stand age: 54
Blackduck District, Compartment 74, Stand 11

Species name cover/abundance

E 3-4 i			
Picea mariana	3.2	Viola renifolia	+2
Thuja occidentalis	3.2	Coptis groenlandica	+2
Abies balsamea	+1	Equisetum fluviatile	r.1
Larix laricina	r.1	Dryopteris cristata	+1
		Geum aleppicum	r.1
		Equisetum sylvaticum	+1
E 1-2 i			
Thuja occidentalis	2.2		
		G 1-2 c	
B 1-2 p		Carex crinita	3.2
Ledum groenlandicum	1.2	Carex lacustris	1.2
		Carex paupercula	+1
D 2-3 p		Carex stipata	+2
Salix petiolaris	1.2	Carex disperma	+1
Salix bebbiana	+1	Eriophorum sp.	r.1
Salix cf. candida	+1	Calamagrostis canadensis	+2
Lonicera oblongifolia	+1		
Cornus stolonifera	+1		
Rhamnus alnifolia	1.2		
D 1 b			
Betula papyrifera	r.1		
H 1.2 c			
Lathyrus ochroleucus	+2		
Smilacina trifolia	3.2		
Caltha palustris	+1		
Pyrola asarifolia	+2		
Orchis rotundifolia	+2		
Trientalis borealis	+2		
Rubus pubescens	3.2		
Vaccinium oxycoccos	1.2		
Campanula aparinoides	+1		
Linnaea borealis	+2		
Galium labradoricum	+2		
Cornus canadensis	+2		
Drosera rotundifolia	+1		
Maianthemum canadense	+2		
Platanthera hyperborea	r.1		
Sium suave	+1		
Stellaria longifolia	+2		
Thelypteris palustris	+1		
Parnassia glauca	+2		
Vicia americana	r.1		
Mitella nuda	+1		

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #:90-12 Surveyor's name: N.P. Sather
MN County: Beltrami Legal description:T148N R 31W NESW Sect.15
Topographic quad: Blackduck DNR code: H11a
Latitude: 47 38 00 Longitude: 93 36 08
Date: 7/11/90 Releve size: 20 x 20 m
Community type: White cedar swamp Stand age:
Blackduck District, Compartment 74, Stand 16

Species name cover/abundance

E 5-6 c		Galium triflorum	1.2
Abies balsamea	1.2	Gymnocarpium dryopteris	1.2
Picea mariana	2.2		
Thuja occidentalis	1.2	Almost continuous cover	
		of feather mosses	
D 5-6 b			
Populus tremuloides	+1		
D 2-3 b			
Populus tremuloides	+1		
E 1-2 b			
Abies balsamea	+1		
D 1 b			
Lonicera canadensis	+2		
Lonicera dioica	+1		
Quercus rubra	r.1		
G 1-2 b			
Carex disperma	+1		
cf. Cinna latifolia	+2		
H 1-2 c			
Mitella nuda	3.2		
Rubus pubescens	3.2		
Dryopteris cristata	+1		
Cornus canadensis	3.2		
Viola renifolia	3.2		
Smilacina trifolia	2.2		
Trientalis borealis	2.2		
Coptis groenlandica	3.2		
Moneses uniflora	+1		
Corallorhiza trifida	+2		
Platanthera obtusata	1.2		
Linnaea borealis	1.2		
Clintonia borealis	+1		
Fragaria virginiana	1.2		
Galium labradoricum	+1		
Maianthemum canadense	1.2		
Athyrium angustum	+2		
Aster macrophyllus	r.1		
Asarum canadense	+2		
Botrychium virginianum	r.1		
Sanicula marilandica	r.1		
Aralia nudicaulis	+2		

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #:90-13 Surveyor's name: N.P. Sather
MN County: Beltrami Legal description:T147N R 30W NWNE Sect.17
Topographic quad: Blackduck DNR code: H11d
Latitude: 47 33 12 Longitude: 93 30 32
Date: 7/11/90 Releve size: 20 x 20 m
Community type: Disturbed white cedar remnant Stand age:
Blackduck District, Compartment 110, Stand 3

Species name	cover/abundance		
E 5-6 c		Aster macrophyllus	+ .2
Thuja occidentalis	3.2	G 1-2 p	
		cf.Cinna latifolia	2.3
D 5-6 b		Carex pensylvanica	+ .1
Betula papyrifera	r.1		
D 3 i			
Tilia americana	+ .2		
D 1-2 b			
Quercus rubra	1.2		
Tilia americana	1.2		
Prunus virginiana	r.1		
Acer spicatum	r.1		
Amelanchier sp.	r.1		
Populus tremuloides	r.1		
Fraxinus nigra	+ .1		
Ribes hirtellum	r.1		
Corylus americana	r.1		
Rhus radicans	1.2		
H 1-2 p			
Botrychium virginianum	2.2		
Aralia nudicaulis	1.2		
Osmorhiza claytoni	1.2		
Equisetum pratense	+ .1		
Sanicula marilandica	1.2		
Impatiens capensis	+ .1		
Mitella nuda	3.2		
Aralia hispida	1.2		
Galium triflorum	1.2		
Trillium cernuum	r.1		
Aster ciliolatus	+ .1		
Taraxacum officinale	+ .2		
Pteridium aquilinum	+ .1		
Maianthemum canadense	+ .1		
Actaea rubra	1.2		
Pyrola asarifolia	+ .1		
Viola renifolia	+ .2		
Thalictrum dioicum	+ .1		
Osmorhiza longistylis	+ .2		
Thelypteris palustris	r.1		
Asarum canadense	r.1		
Streptopus amplexifolius	r.1		
Athyrium angustum	r.1		
Circaea alpina	r.1		

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #: 90-14 Surveyor's name: N.P. Sather
MN County: Beltrami Legal description: T147N R30W NW NE Sect. 4
Topographic quad: Gimmer Lake DNR code: H12C
Latitude: 47 35 05 Longitude: 94 29 00
Date: 7/12/90 Releve size: 20 x 20 m
Community type: Cedar Swamp Stand age:
Blackduck district, Compartment 108, Stand 23

Species name cover/abundance

E 4-6c

Thuja occidentalis	3.3	Linnaea borealis	1.2
Abies balsamea	r.1	Aralia nudicaulis	1.2
		Athyrium angustum	1.2
D5-6 p		Dryopteris spinulosa	+2
Betula papyrifera	r.1	Cystopteris fragilis	+1
		Coptis groenlandica	+2
D 3-4 b		Trientalis borealis	+2
Alnus incana	r.1	Sanicula marilandica	r.1
Corylus cornuta	r.1	Trillium cernuum	r.1
		Clintonia borealis	1.2
E 2.3 p		Asarum canadense	1.2
Abies balsamea	3.2	Equisetum sylvaticum	+1
		Streptopus roseus	+1
E 1 b		Actaea rubra	r.1
Abies balsamea	+1	Osmunda cinnomomea	+2
		Petasites palmata	+2
D 1-2 b		Platanthera hyperborea	r.1
Ribes glandulosum	1.2	Ranunculus hispidus	r.1
Corylus cornuta	+2	Cypripedium calceolus	r.1
Populus tremuloides	+1	Taraxacum officinale	r.1
Fraxinus nigra	+1	Vicia americana	r.1
Ribes cynosbati	r.1	Maianthemum canadense	r.1
Cornus stolonifera	+1	Trillium grandiflorum	r.1
Lonicera canadensis	r.1	Aster umbellatus	r.1
Tilia americana	r.1		
Ribes glandulosum	+1		
Salix sp	r.1	G 1-2 r	
Prunus cf. virginiana	r.1	Glyceria striata	+1
		Carex pensylvanica	+2
H 1-2 c		Carex intumescens	r.1
Gymnocarpium dryopteris	3.2	cf. Cinna latifolia	+1
Botrychium virginianum	1.2	Glyceris grandis	+1
Rubus pubescens	2.2	Carex sp.	+1
Impatiens capensis	+1		
Circaea alpina	3.2		
Cornus canadensis	2.2		
Mitella nuda	+2		
Viola renifolia	+1		
Fragaria virginiana	+1		
cf. Solidago uliginosa	2.1		
Galium boreale	1.2		
Thalictrum dasycarpum	1.2		

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #:90-15 Surveyor's name: N.P. Sather
MN County: Beltrami Legal description: T148N R30W NENE Sect 16
Topographic quad: Decker Lake DNR code: H12b
Latitude:47 38 34 Longitude: 94 29 12
Date: 7/12/90 Releve size: 20 x 20 m.
Community type: Cedar swamp Stand age:
Blackduck district, Compartment 54, stand 52

Species name cover/abundance

E 5-6 p		Athyrium angustum	+2
Thuja occidentalis	2.2	Pyrola secunda	+1
		Scutellaria galericulata	+1
D 5-6 p		Dryopteris spinulosa	r.1
Fraxinus nigra	2.2		
		G 1-2 c	
E 3-4 p		Cinna latifolia	+1
Abies balsamea		Carex lasiocarpa	+1
		Luzula acuminata	+1
D 2-3 p		Carex pensylvanica	+2
Cornus stolonifera	1.2		
Corylus cornuta	+2		
Acer spicatum	+1		
Alnus incana	1.2		
Ostrya virginiana	r.1		
Fraxinus nigra	+1		
Acer rubrum	r.1		
Ribes glandulosum	+2		
Parthenocissus quinquefolia	r.1		
H 1-2 p			
Equisetum pratense	+1		
Lysimachia thrysiflora	1.2		
Caltha palustris	2.1		
Campanula aparinoides	+1		
Circaea alpina	1.2		
Rubus pubescens	3.2		
Smilacina trifolia	3.2		
Cornus canadensis	2.2		
Lycopus americanus	1.2		
Solidago uliginosa	1.2		
Halenia deflexa	+2		
Dryopteris cristata	+2		
Coptis groenlandica	1.2		
Mitella nuda	1.2		
Clintonia borealis	1.2		
Viola renifolia	+2		
Trientalis borealis	+2		
Gymnocarpium dryopteris	+2		
Aster macrophyllus	+2		
Fragaria virginiana	+2		
Cystopteris fragilis	+2		
Galium triflorum	+2		
Moneses uniflora	+2		
Impatiens capensis	+2		

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #:90-16 Surveyor's name: N.P. Sather
MN County: Itasca Legal description:T58N R 26W NE Sect.4
Topographic quad: Marcell DNR code: H15c
Latitude: 47 32 17 Longitude: 93 38 46
Date: 7/27/90 Releve size: 20 x 20 m
Community type: White cedar swamp Stand age:
Marcell District, Compartment 92, Stand 10

Species name cover/abundance

E 6 i

Thuja occidentalis 3.2
Abies balsamea +.1

D 1-2 p

Lonicera canadensis 3.3
Fraxinus nigra +.1
Populus tremuloides r.1
Populus balsamifera +.1
Acer rubrum 2.2
Sorbus americana 2.2

H 1-2 b

Viola renifolia 2.2
Coptis groenlandica 3.2
Gymnocarpium dryopteris 2.2
Clintonia borealis 1.2
Goodyera tessellata +.1
Malaxis unifolia r.1
Botrychium virginianum +.1
Dryopteris cristata +.1
Trientalis borealis 2.2
Pyrola secunda 3.2
Maianthemum canadense +.1
Galium triflorum +.1
Cornus canadensis 2.2
Mitella nuda 3.3
Linnaea borealis +.2
Gaultheria hispidula +.2
Botrychium multifidum +.1
Platanthera obtusata +.1
Athyrium angustum r.1
Rubus pubescens +.1
Vaccinium angustifolium +.1
Aralia nudicaulis +.1
Solidago uliginosa r.1
Moneses uniflora +.1
Halenia deflexa +.2

G 1-2 a

Carex disperma +.2
Carex pensylvanica +.2

RELEVE DATA SHEET
VEGETATION

Surveyor's releve #:90-16 Surveyor's name: N.P. Sather
MN County: Itasca Legal description:T58N R 26W NE Sect.4
Topographic quad: Marcell DNR code: H15c
Latitude: 47 32 17 Longitude: 93 38 46
Date: 7/27/90 Releve size: 20 x 20 m
Community type: White cedar swamp Stand age:
Marcell District, Compartment 92, Stand 10

Species name cover/abundance

E 6 i

Thuja occidentalis 3.2
Abies balsamea +.1

D 1-2 p

Lonicera canadensis 3.3
Fraxinus nigra +.1
Populus tremuloides r.1
Populus balsamifera +.1
Acer rubrum 2.2
Sorbus americana 2.2

H 1-2 b

Viola renifolia 2.2
Coptis groenlandica 3.2
Gymnocarpium dryopteris 2.2
Clintonia borealis 1.2
Goodyera tessellata +.1
Malaxis unifolia r.1
Botrychium virginianum +.1
Dryopteris cristata +.1
Trientalis borealis 2.2
Pyrola secunda 3.2
Maianthemum canadense +.1
Galium triflorum +.1
Cornus canadensis 2.2
Mitella nuda 3.3
Linnaea borealis +.2
Gaultheria hispidula +.2
Botrychium multifidum +.1
Platanthera obtusata +.1
Athyrium angustum r.1
Rubus pubescens +.1
Vaccinium angustifolium +.1
Aralia nudicaulis +.1
Solidago uliginosa r.1
Moneses uniflora +.1
Halenia deflexa +.2

G 1-2 a

Carex disperma +.2
Carex pensylvanica +.2

Natural Heritage and Nongame Wildlife Programs

Biological Report Series

1. Natural Vegetation of Minnesota at the Time of the Public Land Survey: 1847-1907
2. Results of a Survey of *Sparganium glomeratum* (Clustered Bur Reed) in the Chippewa National Forest
3. Status Report on *Poa paludigena* (Bog Bluegrass) in Minnesota
4. Status Report on *Polemonium occidentale* (Western Jacob's Ladder) in Minnesota
5. Old-Growth Forests in Minnesota: a Preliminary Report
6. Status Report on *Napaea dioica* (Glade Mallow) in Minnesota
7. Status Report on *Chrysosplenium iowense* (Golden Saxifrage) in Minnesota
8. Minnesota County Biological Survey: 1988 Bird Surveys
9. Minnesota County Biological Survey: 1988 Herpetological Surveys
10. Minnesota County Biological Survey: 1988 Butterfly Surveys
11. Minnesota County Biological Survey: 1988 Small Mammal Surveys
12. Prairie Bush Clover Inventory and Preserve Design
13. Minnesota Trout Lily: Inventory, Mapping, Census and Monitoring
14. The Uncommon Ones: Minnesota's Endangered Plants and Animals
15. *Platanthera praeclara* in Minnesota: a 1990 Update on Status, Inventory and Monitoring
16. Snakes & Lizards of Minnesota
17. Prairie Bush Clover: A Threatened Midwestern Prairie Plant
18. Minnesota Dwarf Trout Lily
19. Status Report on *Cirsium hillii* (Hill's Thistle) in Minnesota
20. A Preliminary Key to Natural Communities in Minnesota
21. Status Report of *Polemonium occidental* var. *lacustre* (Western Jacob's Ladder) at Polemonium Bog, St. Louis County, Minnesota
22. Nongame Wildlife Program Biennial Report: July 1, 1987-June 30, 1989
23. Minnesota Trout Lily: Mapping, Censusing and Monitoring
24. *Lespedeza leptostachya* in Minnesota: a 1990 Update on Status, Inventory and Monitoring
25. Minnesota trout lily Population Monitoring
26. Field Survey and Distribution of *Botrychium campestre* in Lac Qui Parle, Big Stone, Traverse, Wilkin, Clay and Norman Counties
27. Status Survey and Taxonomic Study of *Viola novae-angliae* (violaceae)
28. Interim Report 1988: Minnesota County Biological Survey
29. Earth Day: Past, Present & Future
30. Protecting Minnesota's Biological Diversity: The Minnesota Natural Heritage Program 1979-1989
31. Interim Report 1990: Minnesota County Biological Survey
32. Results of a Survey for *Polemonium occidentale* var. *lacustre* (Western Jacob's Ladder) in the Chippewa National Forest
33. *Platanthera praeclara* in Minnesota: An Update on Status, Inventory and Monitoring
34. *Lespedeza leptostachya* in Minnesota: A 1991 Update on Status, Inventory and Monitoring

Minnesota Department of Natural Resources, Section of Wildlife
Natural Heritage and Nongame Wildlife Programs
Box 7, 500 Lafayette Road
St. Paul, MN 55155

(612) 296-3344