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

by  
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## 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. Occassional 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 Corallorrhiza 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.

## 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.

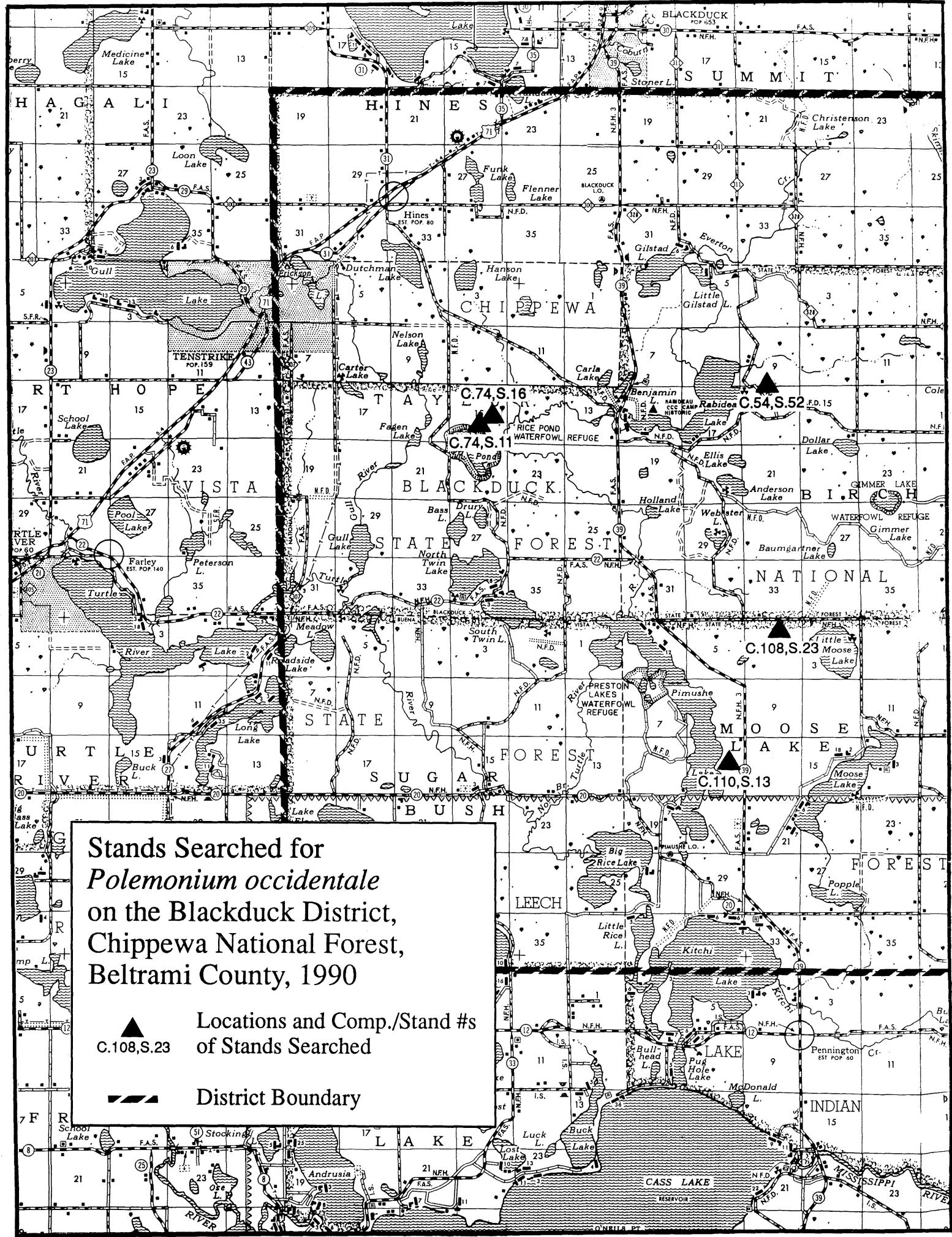
## RESULTS

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 relevés from this project can be imported into the Chippewa Forest Database for purposes of analysis whenever desired. Relevés for wetlands visited as part of this project are included in Appendix 1.

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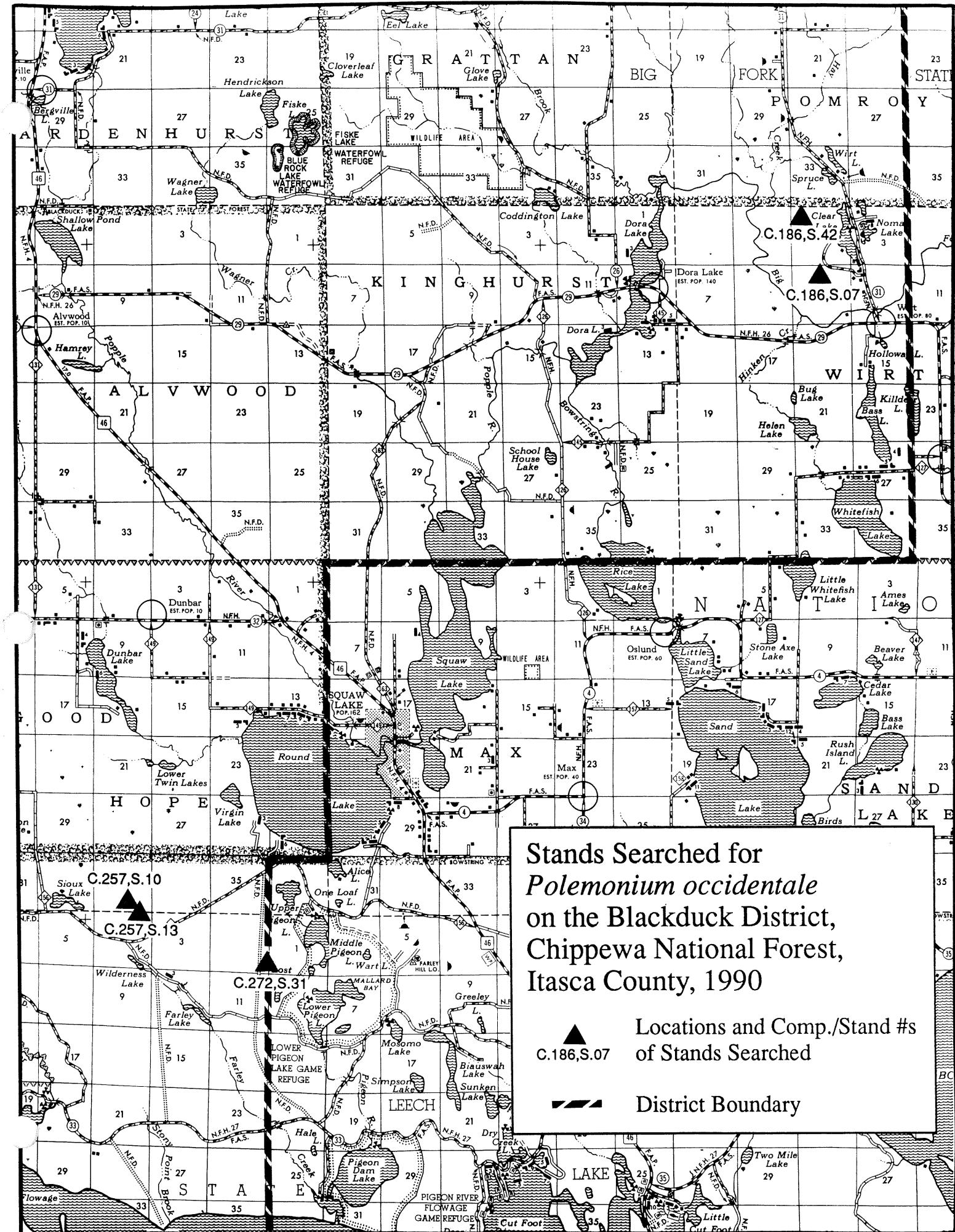


Stands Searched for  
*Polemonium occidentale*  
on the Blackduck District,  
Chippewa National Forest,  
Beltrami County, 1990

**C.108,S.23 Locations and Comp./Stand #s  
of Stands Searched**

## District Boundary

**Map 1.**

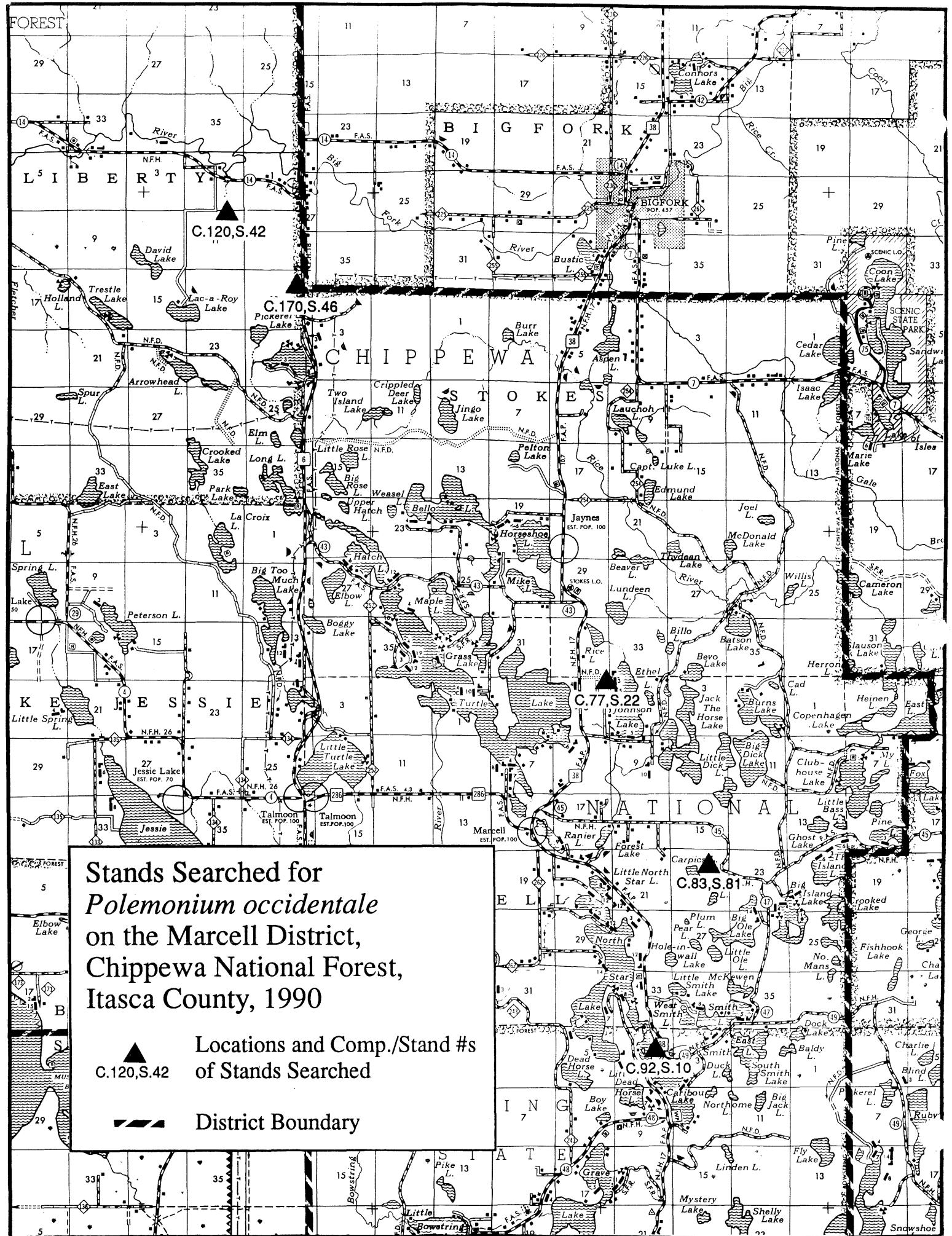


Stands Searched for  
*Polemonium occidentale*  
on the Blackduck District,  
Chippewa National Forest,  
Itasca County, 1990

▲ Locations and Comp./Stand #s  
of Stands Searched

— District Boundary

Map 2.



Map 3.

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	SENENE13		Marcell	C.170,S.46	7/5/90
90-03	T149N, R25W	SENENE13		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	<i>Cypripedium calceolus</i> <i>Corallorrhiza trifida</i>
90-02	Marcell	C.170,S.46	7/5/90	<i>Cypripedium calceolus</i> <i>Cypripedium reginae</i>
90-03	Marcell	C.170,S.46	7/5/90	<i>Platanthera hyperborea</i> <i>Platanthera obtusata</i>
90-04	Marcell	C.77, S.22	7/6/90	<i>Cypripedium acaule</i> <i>Listera cordata</i> <i>Platanthera hyperborea</i>
90-05	Marcell	C.83, S.81	7/6/90	<i>Platanthera obtusata</i> <i>Platanthera hyperborea</i> <i>Goodyera tesselata *</i>
90-06	Marcell	C.186,S.07	7/9/90	<i>Botrychium matricariaefolium</i>
90-07	Marcell	C.186,S.42	7/9/90	<i>Botrychium matricariaefolium</i> <i>Botrychium multifidum</i> <i>Platanthera hyperborea</i>
90-08	Blackduck	C.257,S.13	7/10/90	<i>Platanthera hyperborea</i>
90-10	Blackduck	C.272,S.31	7/10/90	<i>Platanthera obtusata</i> <i>Cypripedium reginae</i> <i>Cypripedium calceolus</i> <i>Platanthera hyperborea</i>
90-11	Blackduck	C.74,S.11	7/11/90	<i>Cypripedium calceolus</i> <i>Orchis rotundifolia</i> <i>Platanthera hyperborea</i> <i>Corallorrhiza striata</i> <i>Listera cordata</i> <i>Corallorrhiza trifida</i> <i>Platanthera obtusata</i>
90-12	Blackduck	C.74,S.16	7/11/90	<i>Platanthera obtusata</i> <i>Goodyera tesselata*</i>
90-16	Marcell	C.92, S.10	7/27/90	<i>Goodyera tesselata*</i> <i>Malaxis unifolia</i> <i>Corallorrhiza maculata</i> <i>Platanthera obtusata</i> <i>Mitchella repens</i> <i>Habenaria deflexa</i> <i>Botrychium multifidum</i>

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

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Species name      cover/abundance

E 5-6 i

<i>Thuja occidentalis</i>	3.2	<i>Geum aleppicum</i>	r.1
		<i>Viola sp.</i>	.2
D 5 b		<i>Botrychium virginianum</i>	.2
<i>Betula papyrifera</i>	r.1	<i>Epilobium angustifolium</i>	.1
		<i>Actaea rubra</i>	.1
D 3 b		<i>Galium labradoricum</i>	.1
<i>Corylus cornuta</i>	.1		
<i>Parthenocissus quinquefolia</i>	.1	G 1-2 b	
<i>Betula papyrifera</i>	.1	<i>Carex pensylvanica</i>	.1
<i>Ribes glandulosum</i>	.1	<i>Carex sp. (veg)</i>	.1
<i>Rhamnus alnifolia</i>	.1		

H 1-2 c

<i>Equisetum sylvaticum</i>	.1
<i>Dryopteris spinulosa</i>	3.3
<i>Rubus pubescens</i>	3.3
<i>Gymnocarpium dryopteris</i>	1.2
<i>Fragaria virginiana</i>	.2
<i>Maianthemum canadense</i>	.2
<i>Coptis groenlandica</i>	1.2
<i>Circaeа alpina</i>	.2
<i>Galium triflorum</i>	2.2
<i>Cypripedium calceolus</i>	.2
<i>Aralia nudicaulis</i>	3.2
<i>Impatiens capensis</i>	3.2
<i>Clintonia borealis</i>	1.2
<i>Ranunculus abortivus</i>	1.1
<i>Saxifraga pensylvanica</i>	r.1
<i>Dryopteris cristata</i>	.2
<i>Mitella nuda</i>	.2
<i>Lycopus americanus</i>	.2
<i>Trientalis borealis</i>	.1
<i>Cornus canadensis</i>	r.1
<i>Cystopteris fragilis</i>	1.2
<i>Caltha palustris</i>	.2
<i>Solidago uliginosa</i>	.2
<i>Trillium cernuum</i>	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

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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  
*Circaeа 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

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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 oxycoccus*      +.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 paupercula*      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 Releve size: 20 x 20 m  
 Community type:Mixed conifer swamp Stand age:90  
 Marcell District, Compartment 77, Stand 22

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Species name cover/abundance

E 5-6 c

<i>Thuja occidentalis</i>	1.1	<i>Athyrium angustum</i>	1.2
<i>Larix laricina</i>	2.2	<i>Potentilla palustris</i>	1.2
<i>Picea mariana</i>	+.1	<i>Dryopteris cristata</i>	+.1
		<i>Streptopus roseus</i>	r.1
		<i>Gymnocarpium dryopteris</i>	1.2
E 3-4 i		<i>Vaccinium myrtilloides</i>	r.1
<i>Abies balsamea</i>	2.2	<i>Dryopteris spinulosa</i>	+.1
E 3-4 i		<i>Aralia nudicaulis</i>	+.2
<i>Thuja occidentalis</i>	1.1	<i>Circaeа alpina</i>	+.2
D 2-3 i		<i>Listera cordata</i>	+.1
		<i>Menyanthes trifoliata</i>	+.2
		<i>Aster umbellatus</i>	+.1

<i>Alnus incana</i>	3.2
<i>Cornus stolonifera</i>	1.2
<i>Ribes glandulosum</i>	r.1
<i>Salix bebbiana</i>	r.1

G 1-2 p	
<i>Carex disperma</i>	+.2
<i>Carex cf. leptalea</i>	+.2
<i>Carex paupercula</i>	+.2

D 1 b

<i>Fraxinus nigra</i>	+.1
<i>Cornus stolonifera</i>	1.2
<i>Acer spicatum</i>	r.1
<i>Salix bebbiana</i>	r.1

B 1-2 a

<i>Ledum groenlandicum</i>	+.2
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H 1-2 c

<i>Rubus pubescens</i>	3.2
<i>Maianthemum canadense</i>	3.2
<i>Smilacina trifolia</i>	3.2
<i>Cornus canadensis</i>	2.2
<i>Galium triflorum</i>	1.2
<i>Lysimachia thrysiflora</i>	1.2
<i>Thelypteris palustris</i>	2.2
<i>Bidens</i> sp.	1.2
<i>Solidago uliginosa</i>	+.1
<i>Cypripedium acaule</i>	+.2
<i>Gaultheria hispidula</i>	+.2
<i>Caltha palustris</i>	+.2
<i>Trientalis borealis</i>	+.2
<i>Eupatorium</i> sp	+.2
<i>Lycopus uniflorus</i>	+.2
<i>Impatiens capensis</i>	2.2
<i>Fragaria virginiana</i>	1.2

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, Compartent 83, Stand 81

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Species name cover/abundance

E 5-6 c		
<i>Thuja occidentalis</i>	+.1	<i>Linnaea borealis</i> +.2
<i>Picea mariana</i>	1.2	<i>Gaultheria procumbens</i> +.2
<i>Abies balsamea</i>	1.2	<i>Epilobium glandulosum</i> +.1
D 4-5 b		<i>Aster macrophyllus</i> +.2
<i>Betula papyrifera</i>	+.1	<i>Thelypteris palustris</i> +.1
<i>Populus balsamifera</i>	+.1	<i>Thelypteris phegopteris</i> r.1
<i>Acer rubrum</i>	r.1	<i>Diervilla lonicera</i> +.1
<i>Acer spicatum</i>	+.1	<i>Platanthera obtusata</i> +.1
D 3 i		<i>Clintonia borealis</i> 1.2
<i>Alnus incana</i>	3.2	<i>Vaccinium myrtilloides</i> +.2
<i>Corylus cornuta</i>	+.1	<i>Maianthemum canadense</i> +.2
<i>Cornus stolonifera</i>	+.1	<i>Equisetum sylvaticum</i> 1.2
E 2-5 p		<i>Aralia nudicaulis</i> 1.2
<i>Abies balsamea</i>	3.2	<i>Athyrium abngustum</i> +.1
G 1-2 a		
E 1 p		
<i>Abies balsamea</i>	1.2	<i>Carex disperma</i> +.2
B 1-2 b		
<i>Ledum groenlandicum</i>	1.2	
D 1-2 i		
<i>Ribes glandulosum</i>	1.2	
<i>Lonicera hirsuta</i>	+.1	
<i>Lonicera canadensis</i>	2.1	
<i>Acer spicatum</i>	1.2	
H 1-2 c		
<i>Lycopodium annotinum</i>	1.2	
<i>Rubus pubescens</i>	3.2	
<i>Cornus canadensis</i>	2.2	
<i>Galium triflorum</i>	+.1	
<i>Trientalis borealis</i>	+.1	
<i>Coptis groenlandica</i>	1.2	
<i>Gymnocarpium dryopteris</i>	2.2	
<i>Solidago uliginosa</i>	1.2	
<i>Viola renifolia</i>	+.2	
<i>Circaeа alpina</i>	+.1	
<i>Mitella nuda</i>	1.2	
<i>Iris versicolor</i>	+.2	
<i>Dryopteris cristata</i>	+.1	
<i>Fragaria virginiana</i>	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 Stand age: 70

Blackduck District, Compartment 186, Stand 7

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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

Species name cover/abundance

D 5-6 i

*Populus tremuloides* 2.1

*Betula papyrifera* +.1

*Cystopteris fragilis* r.1

*Petasites sagittatus* r.1

*Viola renifolia* +.1

*Gymnocarpium dryopteris* 1.2

d 4 b

*Fraxinus nigra* 1.2

*Circaeа alpina* +.1

*Streptopus roseus* r.1

*Galium triflorum* +.1

E 4-5 i

*Thuja occidentalis* 2.2

*Abies balsamea* 3.3

G 1-2 a

*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  
MN County: Itasca  
Topographic quad: Pomroy  
Latitude: 47 45 29  
Date: 7/9/90  
Community type: Upland white cedar  
Blackduck District, Compartment 186, Stand 42

Surveyor's name: N.P. Sather  
Legal description: \*t 149N R 26W NWNW Sect. 4  
DNR code: G 14 c  
Longitude: 93 59 12  
Releve size: 20 x 20 m  
Stand age: 70

Species name      cover/abundance

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

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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 americanus*      +.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 thyrsiflora*      +.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  
MN County: Itasca  
Topographic quad: Squaw Lake  
Latitude: 47 40 30  
Date: 7/10/90  
Community type: Upland white cedar  
Blackduck district, Compartment 257, Stand 13

Surveyor's name: N.P. Sather  
Legal description: T148N R25W SESE33  
DNR code: H13b  
Longitude: 94 13 44  
Releve size: 20 x 20 m.  
Stand age: 90

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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  
*Circaeа 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

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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 thyrsiflora*      +.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  
MN County: Beltrami  
Topographic quad: Blackduck  
Latitude: 47 38 03  
Date: 7/11/90  
Community type: White cedar swamp  
Blackduck District, Compartment 74, Stand 11

Surveyor's name: N.P. Sather  
Legal description: T148N R31W NE Sec.15  
DNR code: H11A  
Longitude: 94 35 50  
Releve size: 20 x 20 m  
Stand age: 54

Species name cover/abundance

E 3-4 i

<i>Picea mariana</i>	3.2	<i>Viola renifolia</i>	+.2
<i>Thuja occidentalis</i>	3.2	<i>Coptis groenlandica</i>	+.2
<i>Abies balsamea</i>	+.1	<i>Equisetum fluviatile</i>	r.1
<i>Larix laricina</i>	r.1	<i>Dryopteris cristata</i>	+.1
		<i>Geum aleppicum</i>	r.1
		<i>Equisetum sylvaticum</i>	+.1

E 1-2 i

<i>Thuja occidentalis</i>	2.2
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G 1-2 c

<i>Carex crinita</i>	3.2
<i>Carex lacustris</i>	1.2
<i>Carex paupercula</i>	+.1
<i>Carex stipata</i>	+.2
<i>Carex disperma</i>	+.1
<i>Eriophorum sp.</i>	r.1
<i>Calamagrostis canadensis</i>	+.2

B 1-2 p

<i>Ledum groenlandicum</i>	1.2
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D 2-3 p

<i>Salix petiolaris</i>	1.2
<i>Salix bebbiana</i>	+.1
<i>Salix cf. candida</i>	+.1
<i>Lonicera oblongifolia</i>	+.1
<i>Cornus stolonifera</i>	+.1
<i>Rhamnus alnifolia</i>	1.2

D 1 b

<i>Betula papyrifera</i>	r.1
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H 1.2 c

<i>Lathyrus ochroleucus</i>	+.2
<i>Smilacina trifolia</i>	3.2
<i>Caltha palustris</i>	+.1
<i>Pyrola asarifolia</i>	+.2
<i>Orchis rotundifolia</i>	+.2
<i>Trientalis borealis</i>	+.2
<i>Rubus pubescens</i>	3.2
<i>Vaccinium oxycoccus</i>	1.2
<i>Campanula aparinoides</i>	+.1
<i>Linnaea borealis</i>	+.2
<i>Galium labradoricum</i>	+.2
<i>Cornus canadensis</i>	+.2
<i>Drosera rotundifolia</i>	+.1
<i>Maianthemum canadense</i>	+.2
<i>Platanthera hyperborea</i>	r.1
<i>Sium suave</i>	+.1
<i>Stellaria longifolia</i>	+.2
<i>Thelypteris palustris</i>	+.1
<i>Parnassia glauca</i>	+.2
<i>Vicia americana</i>	r.1
<i>Mitella nuda</i>	+.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

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Species name      cover/abundance

E 5-6 c			
Abies balsamea	1.2	Galium triflorum	1.2
Picea mariana	2.2	Gymnocarpium dryopteris	1.2
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		
Corallorrhiza 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  
MN County: Beltrami  
Topographic quad: Blackduck  
Latitude: 47 33 12  
Date: 7/11/90  
Community type: Disturbed white cedar remnant  
Blackduck District, Compartment 110, Stand 3

Surveyor's name: N.P. Sather  
Legal description: T147N R 30W NWNE Sect. 17  
DNR code: H11d  
Longitude: 93 30 32  
Releve size: 20 x 20 m  
Stand age:

Species name	cover/abundance	
E 5-6 c		Aster macrophyllus +.2
Thuja occidentalis	3.2	G 1-2 p
D 5-6 b		cf. Cinna latifolia 2.3
Betula papyrifera	r.1	Carex pensylvanica +.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	
Osmorrhiza 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	
Osmorrhiza longistylis	.2	
Thelypteris palustris	r.1	
Asarum canadense	r.1	
Streptopus amplexifolius	r.1	
Athyrium angustum	r.1	
Circaeae alpina	r.1	

RELEVE DATA SHEET  
VEGETATION

Surveyor's releve #: 90-14  
MN County: Beltrami  
Topographic quad: Gimmer Lake  
Latitude: 47 35 05  
Date: 7/12/90  
Community type: Cedar Swamp  
Blackduck district, Compartment 108, Stand 23

Surveyor's name: N.P. Sather  
Legal description: T147N R30W NW NE Sect. 4  
DNR code: H12C  
Longitude: 94 29 00  
Releve size: 20 x 20 m  
Stand age:

Species name cover/abundance

E 4-6c

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

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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 thyrsiflora	1.2		
Caltha palustris	2.1		
Campanula aparinoides	.1		
Circaeа 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  
MN County: Itasca  
Topographic quad: Marcell  
Latitude: 47 32 17  
Date: 7/27/90  
Community type: White cedar swamp  
Marcell District, Compartment 92, Stand 10

Surveyor's name: N.P. Sather  
Legal description: T58N R 26W NE Sect. 4  
DNR code: H15c  
Longitude: 93 38 46  
Releve size: 20 x 20 m  
Stand age:

-----  
Species name cover/abundance

E 6 i

<i>Thuja occidentalis</i>	3.2
<i>Abies balsamea</i>	+.1

D 1-2 p

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

H 1-2 b

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

G 1-2 a

<i>Carex disperma</i>	+.2
<i>Carex pensylvanica</i>	+.2

RELEVE DATA SHEET  
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<i>Populus tremuloides</i>	r.1
<i>Populus balsamifera</i>	+.1
<i>Acer rubrum</i>	2.2
<i>Sorbus americana</i>	2.2

H 1-2 b

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

G 1-2 a

<i>Carex disperma</i>	+.2
<i>Carex pensylvanica</i>	+.2

C  
C

# Natural Heritage and Nongame Wildlife Programs

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Minnesota Department of Natural Resources, Section of Wildlife

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