

2004 RARE PLANT SURVEY
at the PolyMet Mine Site
located in T59N R13W

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INTRODUCTION

A rare plant survey of a portion of the PolyMet mine site, located in T59N R13W, St. Louis County, Minnesota, was conducted from 1 July to 25 July 2004. A majority of sections 3, 4, 9, and 10 were surveyed for Minnesota endangered, threatened, special concern, and tracked species, in addition to U.S. Forest Service/Superior National Forest Region 9 (R9) rare species. Proposed Mine Pit 1, and Stockpile 1, are located within these sections. Lands east of this area, and south of Dunka Road were surveyed by another crew. Botrychium ferns were flagged for Cindy Johnson-Groh to study and identify.

Weather in 2004 was unusual. Spring 2004 was dry, resulting in low water tables and dry ponds. Many ponds in the study area had dry, cracked mud in its basin, where water normally should be standing. Habitats affected by the change in moisture, could possibly be habitats for such species as clustered bur-reed (*Sparganium glomeratum*), neat spike-rush (*Eleocharis nitida*), Gmelin's buttercup (*Ranunculus gmelinii*), Lapland buttercup (*Ranunculus lapponicus*), Torrey's Manna-Grass (*Torreyochloa pallida*), and other species. In addition to the dry spring, the 2004 growing season was recorded by weather officials to be one of the coolest seasons on record, with some areas of northern Minnesota recording frost in July.

DESCRIPTION OF AREA

Plant class communities found in the survey area are as follows:

- APn80a1. Northern Spruce Bog/Black Spruce Bog Type, Treed Subtype.
- FDn43. Northern Mesic Mixed Forest.
- FDn43b. Northern Mesic Mixed Forest, Aspen-Birch Forest Type.
- FPn62a. Northern Rich Spruce Swamp, Rich Black Spruce Swamp Type.
- FPn63a. Northern Cedar Swamp, White Cedar Swamp Type.
- FPn73a. Northern Alder Swamp, Alder Swamp Type.
- FPn82a. Northern Rich Tamarack Swamp, Rich Tamarack - (Alder) Swamp Type.
- MHn44c. Northern Wet-Mesic Boreal Hardwood-Conifer Forest, Aspen-Fir Forest Type.
- MRn83a. Northern Mixed Cattail Marsh, Cattail - Sedge Marsh Type.
- MRn83b. Northern Mixed Cattail Marsh, Cattail Marsh Type.
- MRn93a. Northern Bulrush-Spikerush Marsh, Bulrush Marsh Type.
- MRn93b. Northern Bulrush-Spikerush Marsh, Spikerush - Bur Reed Marsh Type.
- WFn53b. Northern Wet Cedar Forest, Lowland White Cedar Forest Type.
- WFn64. Northern Very Wet Ash Swamp.
- WMn82a. Northern Wet Meadow/Carr, Willow - Dogwood Shrub Swamp Type.
- WMn82b. Northern Wet Meadow/Carr, Sedge Meadow Type.

DESCRIPTION OF PLANT COMMUNITIES PRESENT

Apn80a1. Northern Spruce Bog/Black Spruce Bog Type, Treed Subtype. This plant community consists of a canopy of stunted black spruce (*Picea mariana*), with and understory of black spruce (*Picea mariana*). Common low shrubs present are dominated by Labrador tea (*Ledum groenlandicum*), with leatherleaf (*Chamaedaphne calyculata*), bog laurel (*Kalmia polifolia*), and small bog cranberry (*Vaccinium oxycoccus*). Common graminoids are three-fruited bog sedge (*Carex trisperma*) and cottongrass (*Eriophorum sp.*). Three-leaved Solomon's-seal (*Smilacina trifolia*) is common in the forb layer. Sphagnum and non-sphagnum mosses are present. This plant community is present north of Mine Pit 1 and Stockpile 1, near the Partridge River, within sections 3 and 4.

FDn43. Northern Mesic Mixed Forest. This plant community can be divided into two major types, one which is dominated by an overstory of jack pine (*Pinus banksiana*), and one which is dominated by quaking aspen (*Populus tremuloides*) and paper birch (*Betula papyrifera*). That which is dominated by aspen and birch may be typed as FDn43b1, Aspen-Birch Forest, Balsam Fir Subtype (see Fdn43b1). The jack pine community may have been planted or seeded artificially, or possibly, there may be a lack of information collected in the past which document jack pine communities with a shrub layer of Labrador tea. Therefore this community may not be accurately typed according to the key to native plant communities (Minnesota Department of Natural Resources, 2003). Because jack pine canopy cover is greater than 75 percent in most areas, this is classified as forest and not woodland, and therefore cannot be further typed.

This jack pine (*Pinus banksiana*) community covers approximately 50 percent of the area surveyed, found mostly in the eastern half of the survey area, in section 3. The plant community is characterized by a canopy of jack pine (*Pinus banksiana*), with some black spruce (*Picea mariana*), quaking aspen (*Populus tremuloides*), and paper birch (*Betula papyrifera*). The subcanopy contains balsam fir (*Abies balsamea*) in some places. The shrub layer is dominated by Labrador tea (*Ledum groenlandicum*), which has approximately 75 to 95 percent coverage in most areas, except where large boulders of 0.3 meters in diameter and greater are encountered. Northern bush-honeysuckle (*Diervilla lonicera*) is also a common shrub in this community. Running clubmoss (*Lycopodium clavatum*) is present in the ground layer.

Fdn43b1. Northern Mesic Mixed Forest, Aspen-Birch Forest Type, Balsam Fir Subtype. The western portions of the survey area are dominated by this type and subtype forest on the higher, drier lands. Overall, this forest cover accounts for approximately 30 percent of the area studied. The canopy is dominated by quaking aspen (*Populus tremuloides*), some paper birch (*Betula papyrifera*), and balsam fir (*Abies balsamea*), with a subcanopy of balsam fir (*Abies balsamea*). The main component of the shrub layer is mountain maple (*Acer spicatum*), with scattered mountain ash (*Sorbus sp.*). Characteristic species in the ground layer include rosy twisted stalk (*Streptopus roseus*), one-sided pyrola (*Pyrola*

secunda), running clubmoss (*Lycopodium clavatum*), twinflower (*Linnaea borealis*), groundpine (*Lycopodium dendroideum*), dwarf raspberry (*Rubus pubescens*), and Starflower (*Trientalis borealis*).

FPn62a. Northern Rich Spruce Swamp, Rich Black Spruce Swamp Type. This plant community consists of an overstory of black spruce (*Picea mariana*), with a few paper birch (*Betula papyrifera*) and tamarack (*Larix laricina*). Present in the understory is balsam fir (*Abies balsamea*), paper birch (*Betula papyrifera*), black spruce (*Picea mariana*), and white cedar (*Thuja occidentalis*). The tall shrub layer consists of tag alder (*Alnus incana* ssp. *rugosa*) with scattered mountain-ash (*Sorbus* spp.). Low shrubs are dominated by Labrador tea (*Ledum groenlandicum*), with creeping snowberry (*Gaultheria hispidula*) and bog laurel (*Kalmia polifolia*). Present in the forb layer are blue-bead lily (*Clintonia borealis*), bunchberry (*Cornus canadensis*), woodland horsetail (*Equisetum sylvaticum*), twinflower (*Linnaea borealis*), dwarf raspberry (*Rubus pubescens*), and starflower (*Trientalis borealis*). Three-fruited bog sedge (*Carex trisperma*) is the dominant graminoid. The moss layer is dominated by sphagnum (*Sphagnum* spp.). Northern comandra (*Geocaulon lividum*) was found in this community type.

FPn63a. Northern Cedar Swamp, White Cedar Swamp Type. This plant community has a canopy of white cedar (*Thuja occidentalis*), with some balsam fir (*Abies balsamea*) and black spruce (*Picea mariana*). The understory consists of white cedar (*Thuja occidentalis*) and balsam fir (*Abies balsamea*), with some black ash (*Fraxinus nigra*) and paper birch (*Betula papyrifera*). The tall shrub layer consists of tag alder (*Alnus incana* ssp. *rugosa*) and red-osier dogwood (*Cornus sericea*). Short shrubs present are creeping snowberry (*Gaultheria hispidula*), Labrador tea (*Ledum groenlandicum*), and dwarf raspberry (*Rubus pubescens*). Common graminoids are soft-leaved sedge (*Carex disperma*) and bladder sedge (*Carex intumescens*). Forbs present are goldthread (*Coptis trifolia*), lesser rattlesnake orchid (*Goodyera repens*), shining firmoss (*Huperzia lucidula*), twinflower (*Linnaea borealis*), bristly clubmoss (*Lycopodium annotinum*), naked mitrewort (*Mitella nuda*), and starflower (*Trientalis borealis*). Sphagnum (*Sphagnum* spp.) and liverworts are common in the moss layer.

FPn73a. Northern Alder Swamp, Alder Swamp Type. This plant community has scattered trees of paper birch and black ash among a dense tall shrub layer of tag alder (*Alnus incana* ssp. *rugosa*) and red-osier dogwood (*Cornus sericea*). A low shrub layer consists of skunk currant (*Ribes glandulosum*), swamp gooseberry (*Ribes hirtellum*), swamp red currant (*Ribes triste*), red raspberry (*Rubus ideaus*), dwarf raspberry (*Rubus pubescens*), common blueberry (*Vaccinium angustifolium*), and velvet-leaf blueberry (*V. myrtilloides*). Common forbs are red-stem aster (*Aster puniceus*), wild calla lily (*Calla palustris*), marsh marigold (*Caltha palustris*), bunchberry (*Cornus canadensis*), spinulose shield fern (*Dryopteris carthusiana*), crested fern (*Dryopteris cristata*), northern bugleweed (*Lycopus uniflorus*), false lily-of-the-valley (*Maianthemum canadense*),

Tall Meadow Rue (*Thalictrum dasycarpum*), and starflower (*Trientalis borealis*). Common graminoids are Canada bluejoint (*Calamagrostis canadensis*), soft-leaved sedge (*Carex disperma*), and fowl manna grass (*Glyceria striata*).

FPn82a. Northern Rich Tamarack Swamp, Rich Tamarack - (Alder) Swamp Type.

This plant community has a canopy of tamarack (*Larix laricina*), with some black spruce (*Picea mariana*) and white cedar (*Thuja occidentalis*), with an understory of balsam fir (*Abies balsamea*), paper birch (*Betula papyrifera*), tamarack (*Larix laricina*), black spruce (*Picea mariana*), and white cedar (*Thuja occidentalis*). Tall shrubs consist of tag alder (*Alnus incana* ssp. *rugosa*), bog willow (*Salix pedicellaris*), and red-osier dogwood (*Cornus sericea*). Low shrubs consist of Labrador tea (*Ledum groenlandicum*), small bog cranberry (*Vaccinium oxycoccus*), leatherleaf (*Chamaedaphne calyculata*), bog rosemary (*Andromeda glaucophyllum*), and dwarf raspberry (*Rubus pubescens*). Common forbs are marsh marigold (*Caltha palustris*), blue-bead lily (*Clintonia borealis*), bunchberry (*Cornus canadensis*), crested fern (*Dryopteris cristata*), tufted loosestrife (*Lysimachia thyrsiflora*), false lily-of-the-valley (*Maianthemum canadense*), marsh cinquefoil (*Potentilla palustris*), great water dock (*Rumex orbiculatus*), three-leaved Solomon's seal (*Smilacina trifolia*), and northern marsh fern (*Thelypteris palustris*). The graminoid layer is predominantly Canada bluejoint (*Calamagrostis canadensis*) and soft-leaved sedge (*Carex disperma*). Sphagnum (*Sphagnum* spp.) and non-sphagnum species are present in the moss layer.

MHn44c. Northern Wet-Mesic Boreal Hardwood-Conifer Forest, Aspen-Fir Forest Type.

This forest type is found on the lower elevations of the study area, primarily in the western portion of the study area. The canopy is dominated by quaking aspen (*Populus tremuloides*), balsam fir (*Abies balsamea*), paper birch (*Betula papyrifera*), and black ash (*Fraxinus nigra*). The subcanopy is dominated by balsam fir (*Abies balsamea*) and black ash (*Fraxinus nigra*). The shrub layer is dominated by mountain maple (*Acer spicatum*), with some juneberry (*Amelanchier* spp.). Included in the ground cover is wild sarsaparilla (*Aralia nudicaulis*), red-stemmed aster (*Aster puniceus*), three-flowered bedstraw (*Galium triflorum*), false lily-of-the-valley (*Maianthemum canadense*), and dwarf raspberry (*Rubus pubescens*).

MRn83a. Northern Mixed Cattail Marsh, Cattail - Sedge Marsh Type. This community type is an emergent marsh dominated by cattails (*Typha* spp.), with a significant component of sedges (*Carex* spp.), woolgrass (*Scirpus cyperinus*), and bluejoint (*Calamagrostis canadensis*). Occasional willows (*Salix* spp.) are present. Common forbs are tufted loosestrife (*Lysimachia thyrsiflora*), marsh cinquefoil (*Potentilla palustris*), and willow-herbs (*Epilobium* spp.). Floating and submergent vegetation include duckweeds (*Lemna* spp.), greater duckweed (*Spirodela polyrhiza*), and common bladderwort (*Utricularia vulgaris*). Pedicellate bulrush (*Scirpus pedicellatus*) was found in some of these areas during the

survey. This community can be found throughout the survey area, but most common in the western portions of the survey area.

MRn83b. Northern Mixed Cattail Marsh, Cattail Marsh Type. This community type is an emergent marsh dominated by cattails (*Typha* spp.). Sedges and grasses are a minor component. Common forbs are marsh cinquefoil (*Potentilla palustris*), tufted loosestrife (*Lysimachia thyrsiflora*), and willow-herbs (*Epilobium* spp.). Floating and submergent vegetation include duckweed (*Lemna* spp.), greater duckweed (*Spirodela polyrhiza*), common bladderwort (*Utricularia vulgaris*). This community can be found throughout the survey area, but most common in the western portions of the survey area.

MRn93a. Northern Bulrush-Spikerush Marsh, Bulrush Marsh Type. This community type is an emergent marsh dominated by bulrushes (*Scirpus* spp.). The forb layer contains some broad-leaved arrowhead (*Sagittaria latifolia*). Graminoids are dense patches of bulrushes (*Scirpus* spp.) and spikerushes (*Eleocharis* spp.). Floating and submergent aquatic plants include pondweeds (*Potamogeton* spp.), duckweeds (*Lemna* spp.), common bladderwort (*Utricularia vulgaris*), and northern watermilfoil (*Myriophyllum sibiricum*). Pedicellate bulrush (*Scirpus pedicellatus*) was found in this type of community. These areas are found in the western portion of the survey area, and along the Dunka Road, where there is standing water throughout the summer season.

MRn93b. Northern Bulrush-Spikerush Marsh, Spikerush - Bur Reed Marsh Type. This community type is an emergent marsh dominated by bulrushes (*Scirpus* spp.). The forb layer is dominated by broad-leaved arrowhead (*Sagittaria latifolia*) and bur-reeds (*Sparganium* spp.). Graminoids are dense patches of bulrushes (*Scirpus* spp.) and spikerushes (*Eleocharis* spp.). Floating and submergent aquatic plants include pondweeds (*Potamogeton* spp.), duckweeds (*Lemna* spp.), common bladderwort (*Utricularia vulgaris*), and northern watermilfoil (*Myriophyllum sibiricum*). Clustered bur-reed (*Sparganium glomeratum*) and pedicellate bulrush (*Scirpus pedicellatus*) were found in this type of community. These areas are found in the western portion of the survey area, and along the Dunka Road, where there is standing water throughout the summer season.

WFn53b. Northern Wet Cedar Forest, Lowland White Cedar Forest Type. The canopy is dominated by white cedar (*Thuja occidentalis*), with black ash (*Fraxinus nigra*). The subcanopy contains a few black ash (*Fraxinus nigra*) and occasional balsam fir (*Abies balsamea*). The shrub layer is dominated by mountain maple (*Acer spicatum*) and tag alder (*Alnus incana* ssp. *rugosa*). Common in the ground layer species are lady fern (*Athyrium angustum*), enchanter's nightshade (*Circea alpina*), oak fern (*Gymnocarpium dryopteris*), creeping snowberry (*Gaultheria hispidula*), twinflower (*Linnea borealis*), false lily-of-the-valley (*Maianthemum canadense*), interrupted fern (*Osmunda*

claytoniana), swamp currant (*Ribes triste*), and fern (*Thelypteris phegopteris*). This type of community may be found in the western areas of the study area.

WFn64c. Northern Very Wet Ash Swamp, Black Ash - Alder Swamp. The canopy and subcanopy are dominated by black ash (*Fraxinus nigra*). The shrub layer is primarily tag alder (*Alnus incana* ssp. *rugosa*), with some mountain maple (*Acer spicatum*). The ground layer includes swamp currant (*Ribes triste*), marsh marigold (*Caltha palustris*), dwarf raspberry (*Rubus pubescens*), lady fern (*Athyrium angustum*), bugleweed (*Lycopus uniflorus*), mitrewort (*Mitella nuda*), three-leaved Solomon's-seal (*Smilacina trifolia*), skullcap tea (*Scutellaria laterifolia*), Canada bluejoint (*Calamagrostis canadensis*), manna grass (*Glyceria striata*), and graceful sedge (*Carex gracillima*). This type of community may be found in the western portions of the study area, oftentimes bordering nearby white cedar (*Thuja occidentalis*) swamps.

WMn82a. Northern Wet Meadow/Carr, Willow - Dogwood Shrub Swamp Type. This community type has occasional trees of black ash (*Fraxinus nigra*) among dense shrubs of willow (*Salix* spp.), red-osier dogwood (*Cornus sericea*), and tag alder (*Alnus incana* ssp. *rugosa*). Common forbs present are marsh bellflower (*Campanula aparinoides*), tufted loosestrife (*Lysimachia thyrsiflora*), skullcap tea (*Scutellaria galericulata*), water dock (*Rumex orbiculatus*), northern marsh fern (*Thelypteris palustris*), willow herb (*Epilobium* spp.), marsh cinquefoil (*Potentilla palustris*). Graminoids include Canada bluegrass (*Calamagrostis canadensis*), lakebank sedge (*Carex lacustris*), tussock sedge (*Carex stricta*). This community type is common in the western portions of the study area.

WMn82b. Northern Wet Meadow/Carr, Sedge Meadow Type. This community type is dominated by forbs, grasses, and sedges. Common forbs are marsh bellflower (*Campanula aparinoides*), tufted loosestrife (*Lysimachia thyrsiflora*), skullcap tea (*Scutellaria galericulata*), water dock (*Rumex orbiculatus*), northern marsh fern (*Thelypteris palustris*), willow herb (*Epilobium* spp.), marsh cinquefoil (*Potentilla palustris*), and cattails (*Typha* spp.). Graminoids include Canada bluegrass (*Calamagrostis canadensis*), lakebank sedge (*Carex lacustris*), and tussock sedge (*Carex stricta*). This community type may be found in the western portions of the study area.

METHODS

Maps were provided by Barr Engineering with UTM coordinates of the area to be surveyed for rare species. A variety of habitats were visited, with several of the same habitats to represent a good sample of habitat types. Garmin GPS Map76 global positioning units were used to determine locations when rare species were found or collected. Photographs were taken of specimens in their habitat when possible, and locations flagged with plastic tape. Representative specimens were collected of each

potential rare species. Specimens were pressed and dried for microscopic identification and macrophotographs. Specimens will later be deposited into the Olga Lakela Herbarium (DUL) in Duluth, and/or the Bell Herbarium (MIN) in St. Paul.

RESULTS

Moonwort and grapeferns (*Botrychium spp.*), northern comandra (*Geocaulon lividum*), pedicellate bulrush (*Scirpus pedicellatus*), clustered bur-reed (*Sparganium glomeratum*), and New England violet (*Viola novae-angliae*) were found during the July 2004 survey. Specimens from some locations were not collected either because of the small population size or because of the many sight occurrences of pedicellate bulrush (*Scirpus pedicellatus*). The area around a large pond, specifically near a beaver dam, was searched extensively for small shinleaf (*Pyrola minor*), after a possible sighting. *Pyrolas* found in the vicinity were *P. asarifolia*, *P. chlorantha*, *P. elliptica*, and *P. rotundifolia*. Photographs of the above species are included at the end of this report.

The following species were found at the locations (UTM's) noted. Locations marked with an asterisk (*) were not collected, but confirmed in the field.

Moonwort and Grape ferns (*Botrychium spp.*) were found in the NE1/4 of the NE1/4 Section 10, NW1/4 of SE1/4 Section 10, and SE1/4 of SW1/4 Section 10, of T59N R13W, at the following locations along Dunka Road:

Site #70 577104E, 5273110N *
Site #71 577257E, 5273221N *
Site #72 576511E, 5272864N *

Northern Comandra (*Geocaulon lividum*), MN Special Concern; SNF species of concern, was found in the SE1/4 of NE1/4, Section 3, of T59N R13W, at the following location, in black spruce.

Site #73 577447E, 5274887N

Pedicellate Bulrush (*Scirpus pedicellatus*), MN tracked species; SNF species of concern were found in the NE1/4 of SW1/4 Section 3; NE1/4 of SE1/4 Section 9; SE1/4 of SE1/4 Section 9; NE1/4 of NW1/4 Section 10; SW1/4 of NE1/4 Section 10; and NE1/4 of NE1/4 Section 16; within T59N R13W, at the following locations along paths, roads, and road ditches:

Site #74 576767E, 5274034N
Site #75 576726E, 5273944N
Site #76 575929E, 5272608N
Site #77 577363E, 5273288N *
Site #78 575745E, 5272355N *
Site #79 575759E, 5272889N *

Site #80 575726E, 5272933N *
Site #81 575696E, 5272995N *
Site #82 575640E, 5273076N *
Site #83 575589E, 5273178N *
Site #84 576784E, 5274402N *

Clustered Bur-reed (*Sparganium glomeratum*), MN Special Concern; USFS Region 9 Sensitive Species were found in the SW1/4 of SW1/4 Section 9; NE1/4 of SW1/4 Section 10; and NW1/4 of NW1/4 Section 16, within T59N R13W, in roadside ditches and/or ponds adjacent to Dunka Road:

Site #74 576767E, 5274034N
Site #75 576726E, 5273944N
Site #85 574634E, 5272419N
Site #86 576748E, 5272962N
Site #87 574818E, 5272322N

New England Violet (*Viola novae-angliae*), MN Tracked species, was found in the NE1/4 of SE1/4 Section 3, of T59N R13W, along a forest road junction:

Site #88 577429E, 5274474N

REFERENCES CITED OR USED IN IDENTIFICATION

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- Ownbey, G.B. and T. Morley. 1991. Vascular Plants of Minnesota: a checklist and atlas. University of Minnesota Press, Minneapolis.
- United States Forest Service, Superior National Forest. 2004. Superior National Forest Rare Plant List.



Botrychium spp., collected 18 July through 23 July 2004, by D.L. Pomroy (DLP 1981, DLP 1983, DLP 1984).

Upper left: Specimen DLP 1981 found at zone 15T, 577104E, 5273110N.

Upper right: Specimen DLP1983 found at zone 15T, 577257E, 5273221N.

Lower left: Specimen DLP 1984 found at zone 15T, 576511E, 5272864N. All locations along Dunka Road, roadside.



Left: *Botrychium* sp. Right: *Geocaulon lividum* Richards.



Geocaulon lividum (Richards.) Fern., collected 8 July 2004, by D.L. Pomroy (DLP 1950). Left: whole plant. Right: close-up showing fruit in axils. Location of this specimen: zone 15T, 577447E, 5274887N. In black spruce swamp.



Scirpus pedicellatus Fern., collected 18 July 2004, by D.L. Pomroy (DLP 1978).
Left: upper portion of plant. Right: close-up showing pedicellate spikelets.
Location of this specimen: zone 15T, 575896E, 5272669N. Along old (winter
only) trail through lowland black spruce.



Scirpus pedicellatus Fern., collected 23 July 2004, by D.L. Pomroy (DLP 1994).
Left: upper portion of plant. Right: close-up showing pedicellate spikelets.
Location of this specimen: zone 15T, 576726E, 5273944N. At edge of pond.



Left: *Scirpus pedicellatus* Fern. Right: *S. pedicellatus* habitat along old winter forest road through black spruce stand.



Sparganium glomeratum Laest., collected 18 July 2004, by D.L. Pomroy (DLP 1975). Left: whole plant. Right: close-up of fruit showing closely glomerate, sessile heads. Location of this specimen: zone 15T, 576726E, 5273944N. At edge of pond in shallow water.



Sparganium glomeratum Laest., collected 18 July 2004, by D.L. Pomroy (DLP 1976). Left: whole plant. Right: close-up of fruit showing closely glomerate, sessile heads. Location of this specimen: zone 15T, 576767E, 5274034N. At edge of pond in shallow water.



Sparganium glomeratum Laest., collected 23 July 2004, by D.L. Pomroy (DLP 2002). Left: whole plant. Right: close-up of fruit showing closely glomerate, sessile heads. Location of this specimen: zone 15T, 576726E, 5273944N. At edge of pond in shallow water.



Sparganium glomeratum Laest., collected 24 July 2004, by D.L. Pomroy (DLP 2003). Left: whole plant. Right: close-up of fruit showing closely glomerate, sessile heads. Location of this specimen: zone 15T, 576748E, 5272962N. In shallow water, roadside.



Sparganium glomeratum Laest., collected 24 July 2004, by D.L. Pomroy (DLP 2006). Left: whole plant. Right: close-up of fruit showing closely glomerate, sessile heads. Location of this specimen: zone 15T, 574634E, 5272419NN. In small, mostly dry pond.



Left: *Sparganium glomeratum* Laest. Right: *Viola novae-angliae* House.



Viola novae-angliae House, collected 23 July 2004, by D.L. Pomroy (DLP 1986). Whole plants showing arrowhead-shaped leaves. Location of these specimens: zone 15T, 577429E, 5274474N. In clearing along U.S. Forest Road 108.