

**FLORISTIC INVENTORY OF SELECTED SITES IN THE  
NULATO HILLS, WESTERN ALASKA  
1997-1998**

April 1999

Carolyn Parker  
Research Assistant  
University of Alaska Museum Herbarium  
Fairbanks, Alaska

under contract to

Bureau of Land Management-Anchorage Field Office  
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**Floristic Inventory of Selected Sites in the Nulato Hills,  
Western Alaska**

Table of Contents

List of Figures	<i>ii</i>
Abstract	<i>iii</i>
Introduction	1
Geologic and Physiographic Setting	3
Regional Vegetation	5
Objectives	6
Methods	6
Floristic Results	7
Summary	17
Comments and Recommendations	18
Acknowledgments	19
Literature Cited	20
Appendix A Vascular Species List	22
Appendix B Cryptogam Species List	44
Appendix C Site Localities	59

**Floristic Inventory of Selected Sites in the Nulato Hills,  
Western Alaska**

**Figures**

Fig. 1. Area included in Nulato Hills floristic survey in 1997-1998.	2
Fig. 2. Vicinity of VABM Cascade, Nulato Hills, Unalakleet Quadrangle.	4
Fig. 3. Summit of Debauch Mountain and adjacent alpine ridges.	4
Fig. 4. <i>Ranunculus auricomus</i> L. Goldilocks Buttercup.	8
Fig. 5. <i>Ranunculus auricomus</i> L. Goldilocks Buttercup, line drawing.	9
Fig. 6. South of vicinity of VABM Cascade, Nulato Hills.	10
Fig. 7. <i>Douglasia beringensis</i> S. Kelso, Jurtzev, & D.F. Murray.	12
Fig. 8. Habitat for <i>Douglasia beringensis</i> .	12

## Abstract

The Nulato Hills region in western Alaska, managed by the Bureau of Land Management-Anchorage Field Office, is very remote and was essentially unknown botanically prior this survey. A botany field crew based at Unalakleet during a portion of the summers of 1997 and 1998 visited select sites in the area including a representative sampling of all upland and alpine habitats as well as sites which were thought likely to support rare plants. The resulting collections, which are now electronically databased and curated at the University of Alaska Museum Herbarium, Fairbanks, document 350 vascular and over 200 non-vascular plant species for the region.

Several floristically significant finds resulted from this survey which may influence management decisions in the future. *Ranunculus auricomus*, the Goldilocks buttercup, was found at two sites, thereby documenting the first known records for this northern Eurasian species in North America. Both buttercup populations were small and a critically imperiled (S1) rank is expected to be assigned to this plant by the Alaska Natural Heritage Program (AKNHP). Three large populations of *Douglasia beringensis*, the Bering Sea douglasia, were also located. This plant was previously known from only two small populations on the Seward Peninsula and is ranked S1. Based on these new findings, its ranking is likely to be changed to imperiled (S2). One collection of *Papaver*, a poppy, is currently being reviewed and may represent an undescribed species. A total of 12 taxa ranked as critically imperiled to rare (S1-S3) by the AKNHP were documented, and many of these records represent considerable extensions of their respective known ranges.

This survey has made an invaluable contribution to our knowledge of both the common and rare flora of central western Alaska. General collection information is available to all concerned agencies and researchers, and more detailed information on rare plants has been shared with AKNHP. Recommendations for future floristic work are offered, plant species lists are included, and the localities surveyed are described.

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**Introduction**

Bureau of Land Management (BLM) recognizes its legal responsibility to prevent rare plant and animal species from becoming threatened or endangered with extinction in the areas under their management. An important aspect of this responsibility is to support inventories in these areas for rare species, determine the localities and habitats in which rare species are likely to occur, and to document known occurrences with permanently curated collections. Sound management decisions that may affect rare taxa can only be made when this information is available to land managers.

The Nulato Hills of central western Alaska (Figure 1) were almost botanically unknown prior to this survey. The few existing plant collections from the region were taken from along the Bering Sea coast and the Yukon River bordering the Hills to the east (ALA-Northern Plant Documentation Center, Hultén 1940) and these collections represent primarily coastal and interior lowland habitats. Canadian botanists A.E. and R. Porsild visited the lowest foothills east of Unalakleet briefly in 1926 and made a few collections now held at the National Museum of Canada (CAN) in Ottawa (Porsild 1939). The northwestern margin of the Nulato Hills is included in two soil and vegetation surveys relating to reindeer range management (Swanson et al. 1985, Van Patten 1990). A river management plan for the Unalakleet River, most of which is designated as a part of the National Wild and Scenic River System, has been published (BLM 1983). A land cover database has been created by BLM primarily using remote sensing techniques which define vegetation cover classes using only a few of the most common and abundant plant species (Meyer and Spencer 1983). There is no record that the upland and alpine areas, which are very remote, have ever been visited by botanists.

This area has the potential to be botanically interesting. Recent floristic surveys sponsored by National Park Service (NPS) on the Seward Peninsula have shown that area to be rich in species narrowly endemic to the Bering Straits region as well as species with a predominantly Asian distribution that barely reach North America (Kelso 1983). Many of these species are rare in Alaska, including some plants categorized as 'species of concern' by the U.S. Fish and Wildlife Service (USFWS) or rare to critically imperiled by the Alaska Natural Heritage Program (AKNHP). In addition, two new species have recently been described from the area (Kelso 1987, Kelso et al. 1994).

The Nulato Hills extend northward toward, and are nearly contiguous with, uplands of the eastern Seward Peninsula. It seems reasonable to suspect that these adjacent subalpine and alpine landscapes, which support the majority of rare plant species in the Seward Peninsula, may act as a 'stepping stone' corridor for migration and hence, some of the same species may be also found in the Nulato Hills. In addition, a similar corridor of uplands exists northward to the Brooks Range, connecting the Nulato Hills

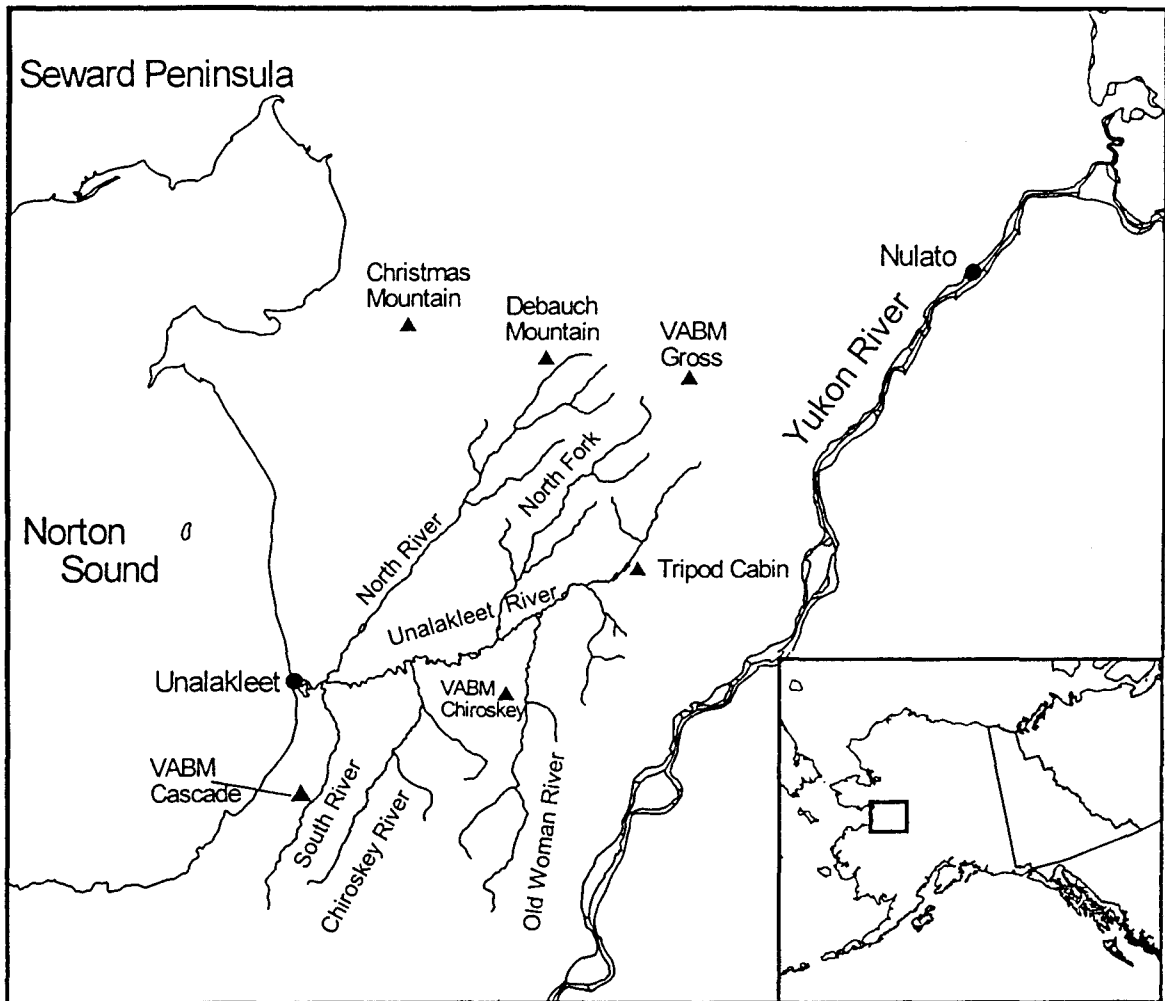


Figure 1. Area included in Nulato Hills floristic survey in 1997 and 1998. Primary collection areas are in vicinity of Debauch Mountain, Christmas Mountain, VABM Chiroiskey, VABM Cascade, middle Unalakleet and North Fork Unalakleet River floodplain valleys, and the ridges above the South, North, and North Fork Unalakleet rivers. Insert at right indicates location of the expanded view.

with the arctic circumpolar flora of northern Alaska. These upland migration routes could potentially have enriched the Nulato Hills with plant species from the distant, endemic-rich arctic region. In contrast, the southern portion of the Nulato Hills extends toward the Yukon-Kuskokwim delta and lowlands, and stands relatively isolated from the Kuskokwim Mountains to the southeast.

### **Geologic and Physiographic Setting**

The Nulato Hills are characterized by rolling hills and ridges with only a few alpine summits reaching above 3000 ft. elevation (915 msm) (Figures 2 and 3). The highest peak is VABM Gross at 3697 ft. (1127 msm) on the northeast margin of the region. Numerous incised, V-shaped drainages produce a well-developed reticulate drainage pattern on the landscape. The entire area was unglaciated during the Quaternary period, although a few perennial snow banks may have persisted at the highest elevations (W.W. Patton, Jr., pers. comm.). The Nulato Hills would have been centrally located within Beringia, the broad, exposed land bridge and biological refugium linking northwestern North America and Asia during the Quaternary full glacials.

The regional country bedrock consists primarily of Cretaceous sedimentary rocks which have been deformed by a complex northeast trending fault and fold system (Patton et al. 1985, 1994, 1996). There are numerous Tertiary and late Cretaceous volcanic intrusions scattered throughout the region which have altered the sedimentary rock along their respective contact zones. Bedrock, and select geomorphic features, varied among the several areas visited during the survey. Plant species composition is often strongly influenced by slope stability, by the occurrence of calcareous rock, and by the relative abundance of fines in the substrate (Parker 1989), hence bedrock at the alpine sites visited are described here in more detail.

The most massive alpine locality visited was Debauch Mountain in the north central area of the Nulato Hills (Figure 3). Bedrock here includes fine-grained to conglomerated volcanic graywacke and fine-grained mudstones (Patton et al. 1994). Active blockslopes in the vicinity of the summit were composed predominantly of blocky debris, but fines were abundant, and often deep, in many widely scattered pockets. Bedrock was primarily of volcanic origin and the substrate was non-calcareous.

VABM Chirokey, an isolated, dark-colored massive dome south of the Unalakleet River and east of the Chirokey River, is composed of a complex of numerous small volcanic intrusives and the associated altered sedimentary country rock (Patton and Moll-Stalcup 1996, Patton et al. 1994). As on Debauch Mountain, active blockslopes in the vicinity of the summit are mostly composed entirely of boulders, but localized pockets of deep fines with scattered cobbles on the surface exist. This site is generally non-calcareous, although pockets of calcareous substrate may exist where sedimentary rocks are exposed.

Alpine ridges and screes visited above the North Fork Unalakleet River drainage south and east of Debauch Mountain seemed to be composed of more fine-grained and platy bedrock relative to the alpine sites noted near the summit. Screes here often consisted of deep, well-weathered fines with scattered coarser fragments. These sites may lie within the fluvial and marine sandstone and shale that is mapped at the regional scale for this



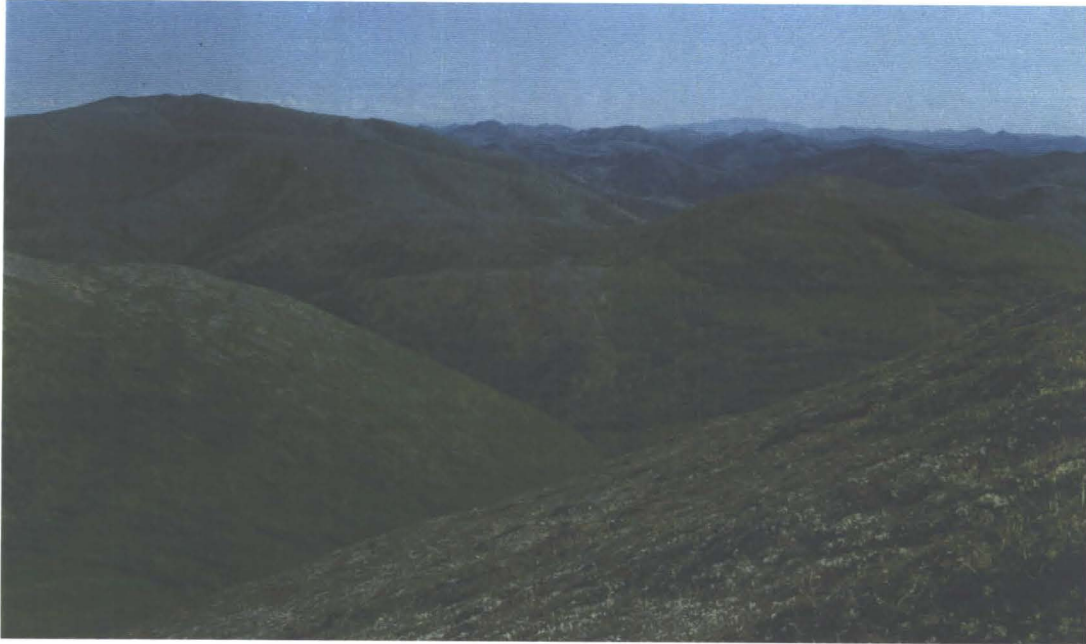


Figure 2. Vicinity of VABM Cascade, Nulato Hills, Unalakleet Quadrangle. View to southeast across rolling, subalpine ridges and slopes above the South and Chirokey river valleys, south of Unalakleet. Alder and willow shrub vegetation dominates lower slopes. Lichen-rich dryas tundra covers upper slopes and ridgetops. Photo by Carl. Roland.



Figure 3. Summit of Debauch Mountain (3411 ft.) and adjacent alpine ridges, Nulato Hills, Norton Bay Quadrangle. Stable slopes are dominated by dryas-lichen or dryas-sedge-dwarf shrub tundra. Active screes support scattered alpine herbs and small patches or stripes of dryas vegetation. Photo by Carolyn Parker.

vicinity (Patton et al. 1994). The substrate, where tested, was non-calcareous.

The subalpine ridge systems on both sides of the South River valley are composed of sandstones, shales, and pebble conglomerates (Patton and Moll-Stalcup 1996, Patton et al. 1994). The active blockslopes exposed at several sites along these ridges were rich in fines and often had a partial mulch of cobbles. The bedrock exposed here originated from shallow marine deposits and is known to contain marine mollusk fossils. The substrate was calcareous at our site (ridges between South R. and Rabbit Cr.) and the species composition, rich in calciphilous taxa, reflected this change in bedrock.

### **Regional Vegetation**

Closed spruce and hardwood forests dominate much of the lowlands, especially along major drainages and on moderate to well-drained lower slopes. The active floodplain immediately adjacent to the Unalakleet River and its major tributaries consist of closed boreal forest, closed alder-willow, or open gravel bars that appear to be frequently disturbed by flooding and support scattered willows and forbes. Extensive, poorly-drained lowland areas beyond the active floodplain support sedge tussock tundra and wet sedge meadow tundra. Lower subalpine slopes are covered with open spruce woodland, open and closed tall alder-willow shrub, and open tall shrub birch-willow shrub vegetation. The tall shrub and woodland vegetation usually had a conspicuously rich fruticose lichen-dominated understory. Young, healthy white spruce were consistently found upwards into the alpine zone at sites visited, suggesting that tree and shrub line is moving up in elevation throughout the region.

Alpine and upper subalpine slopes and ridges above 1500 feet elevation (460 msm) support dryas dwarf scrub where the substrate is relatively stable. Dryas-lichen-dwarf shrub tundra is found on the driest sites, whereas dryas-sedge-dwarf shrub tundra and dryas-dwarf shrub tundra are common on more moist sites. On ridge tops and semi-stable slopes, this vegetation is often broken up into patches by frost boil and downslope processes. Steep, unstable slopes support scattered alpine herbs, often in poorly developed stripes, and smaller, scattered patches of dryas dwarf shrub. Snowmelt meadows and gullies support dryas tundra rich in forbes, as well as both dry and mesic graminoid herbaceous meadows. Most vegetation classes are rich in fruticose lichens and several stabilized, alpine, block slopes are entirely covered with a well-developed mat of fruticose and foliose lichens. The abundance of lichens in all the major vegetation types throughout the region significantly influences the appearance of the regional vegetation and contributes to its being critical winter habitat for caribou and reindeer.

Vegetation types focused on during this floristic survey included those found in the alpine, especially on unstable screes and in snowmelt zones, on unstable and/or lush subalpine slopes and ridges, and along the larger, active floodplains of the major rivers.

## **Objectives**

The primary objectives of this inventory are:

- 1) document the occurrence, habitat, and abundance of all species found that are listed as a 'species of concern' by the USFWS, or ranked as critically imperiled to rare at the state level (S1-S3) by the Alaska Natural Heritage Program (AKNHP).
- 2) conduct a preliminary inventory of the vascular and non vascular flora of the region from a representative sampling of all upland vegetation types while also focusing on habitats suspected of supporting rare and uncommon taxa.
- 3) assemble and maintain a permanent voucher collection of the vascular and non vascular flora to be held at the University of Alaska Museum Herbarium, Fairbanks (ALA).
- 4) create and maintain a database of the collection information with the Northern Plant Documentation Center (NPDC) at ALA which will be available to the BLM-Anchorage Field Office and other public agencies.
- 5) provide detailed information concerning species being tracked by AKNHP for inclusion into their database.

## **Methods**

Field crew was based at Unalakleet and used helicopter support to visit several localities in the Nulato Hills from 9-15 July 1997 and 29 June-4 July 1998. Limited collecting was also done in the vicinity of the Unalakleet airport during both seasons. An effort was made to visit alpine areas whenever weather permitted and to revisit any areas that seemed floristically interesting or were rich in rare taxa. In addition, several low elevation sites were visited during the 1998 survey. At each site the general vegetation was described following Viereck et al. (1992) and plant collections were taken. Each species observed was collected at least once to document its occurrence in the Nulato Hills, and further selective collecting was done at all sites to document unusual plant assemblages and the occurrence of uncommon or sensitive taxa .

Plant specimens were pressed in the field. Final identification, mounting, and data basing using 4th Dimension was undertaken at the University of Alaska Museum Herbarium, Fairbanks (ALA) where collections are now held. Duplicate 1997 collections were sent to the Vascular Plant Herbarium, Biosystematics Research Institute, Ottawa, Canada (DAO) one of the largest arctic research herbaria. In 1998, a duplicate set was sent to the Missouri Botanical Garden (MO), the home herbarium for the Flora of North America Project (FNA). A second duplicate set from both seasons were sent to the University of Alaska Anchorage Biology Department Herbarium. Nomenclature used in this report, and in the accompanying lists, is that currently used at ALA. Synonyms are included when the scientific name used at ALA differs from that used in the 'Flora of Alaska and neighboring territories' (Hultén 1968), the most commonly used reference for Alaska's flora.

## Floristic Results

The vascular flora from the Nulato Hills is documented with 882 herbarium collections representing 350 taxa. These taxa are listed along with their localities, collection numbers, and floristic notes as appropriate, in Appendix A of this report. The non vascular flora (mosses, lichens, hepatics) is documented with 393 collections and several observations representing over 200 taxa, and is listed in Appendix B. Exact locality descriptions for all sites visited during this survey are listed in Appendix C.

No taxa listed as Threatened, Endangered, or a 'species of concern' by USFWS were documented by this survey. Twelve taxa ranked critically imperiled to rare (S1-S3) by the AKNHP and 10 taxa of floristic note are discussed below.

Our collections of *Ranunculus auricomus*, the goldilocks buttercup, represent the first known specimens of this Eurasian taxon from North America. It was found at two localities; below the alpine summit of Debauch Mountain and on an open, mid-elevation slope south of Unalakleet in the vicinity of VABM Cascade. It will probably be ranked as critically imperiled (S1) by the AKNHP (R. Lipkin, pers. comm.).

Three new localities are documented for *Douglasia beringensis*, a rare plant ranked S1 and previously known only from the Seward Peninsula. One collection of *Papaver* (poppy) is a potentially undescribed species and is being reviewed by David Murray at ALA.

Many minor range extensions and range connections (new records located within the gaps of the known range of distribution) are also documented. This is to be expected when a large, botanically unknown region is surveyed for the first time. These minor range extensions, most of which are approximately 150 miles or less in distance, represent extensions of the known range for each species as documented by previous collections at ALA, or by the maps published in Hultén (1968). Among the many taxa having minor range extensions or connections documented by this survey are *Silene repens*, *Eritrichium splendens*, *Carex capillaris*, *Novosieversia glacialis* (= *Geum glacialis*), *Artemisia globularia*, *Phyllodoce coerulea*, *Kobresia sibirica*, *Agrostis trinii*, *Ranunculus gelidus*, *Ranunculus eschscholtzii*, *Oxytropis scammaniana*, *Cardamine microphylla* ssp. *blaisdellii* and *Veratrum album* ssp. *oxysepalum*.

***Ranunculus auricomus* L.**  
(Ranunculaceae, Buttercup Family)  
= *R. monophyllus* Ovcz.

Goldilocks Buttercup

Our collections of this taxon represent the first known record for North America (Figures 4 and 5). One specimen was found in a lush alpine streambed meadow southwest of the summit of Debauch Mountain (Figure C-6). Only a few individuals were observed at this site. Associated species here included *Artemisia tilesii*, *Mertensia paniculata*, and *Anemone richardsonii*. A second specimen was collected in lush meadow patches intermixed with willow thickets (*Salix novae-angliae*) on an open, mid-elevation slope south of VABM Cascade, south of Unalakleet (Figures 6 and C-4). Associated species at this site included *Iris setosa*, *Dryopteris dilatata*, *Angelica lucida*, *Epilobium angustifolium*, *Luzula parviflora*, *Arctagrostis latifolia*, and *Salix reticulata*.

This buttercup belongs to a large species complex which is known to be apomictic (the seeds develop without fertilization, producing maternal clones) and its distribution reaches from eastern Greenland, eastward



Figure 4. *Ranunculus auricomus* L. (= *R. monophyllus* Ovcz.). Goldilocks Buttercup. Image taken from herbarium specimen (Parker et al. 7889, ALA) collected in the vicinity south of VABM Cascade, Nulato Hills. Plant at right is in early fruit. Scale = 1:2.

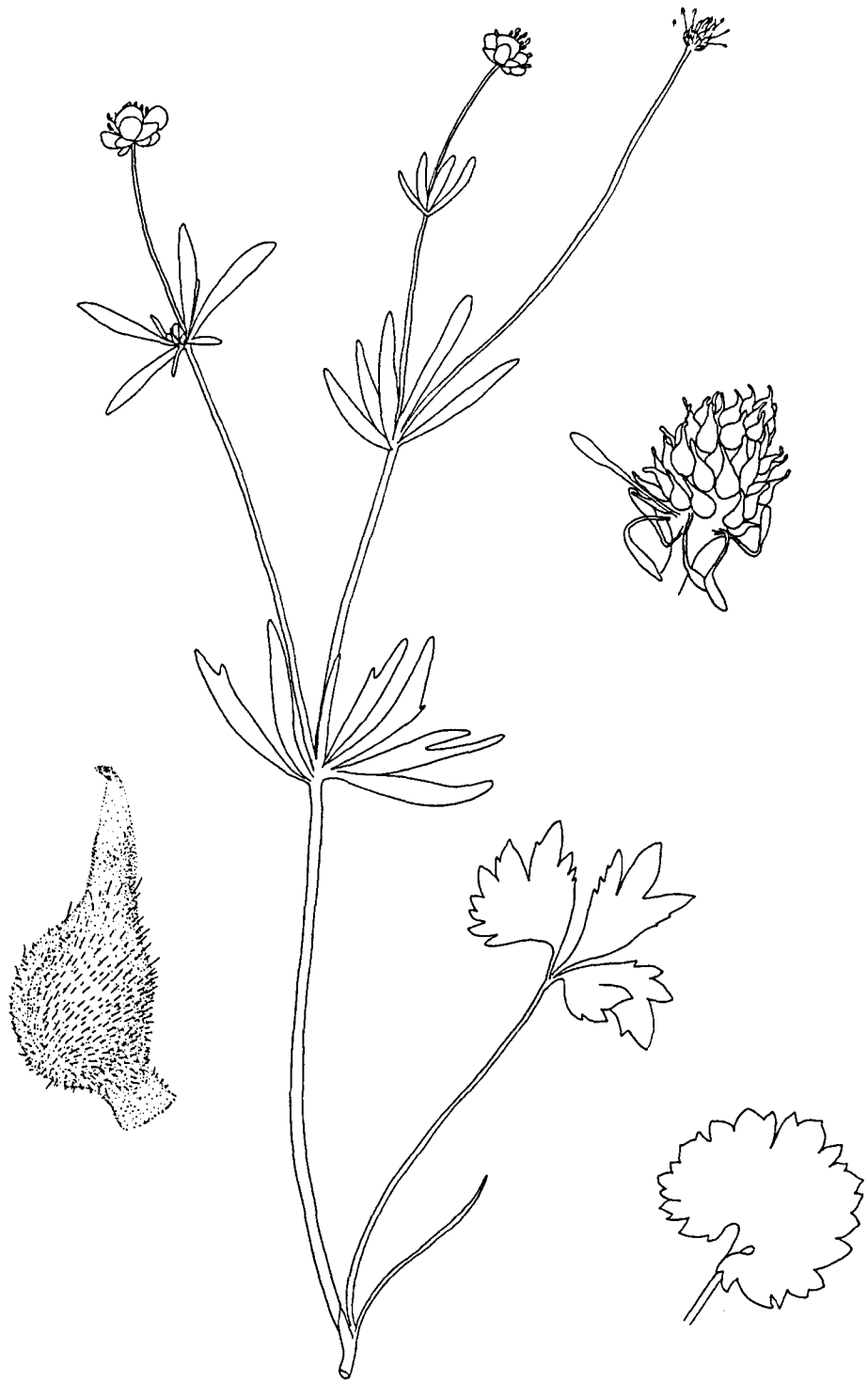


Figure 5. *Ranunculus auricomus* L. (= *R. monophyllus* Ovcz.). Goldilocks Buttercup. Line drawing illustrating some of the diagnostic characters separating this taxon from closely related *R. pedatifidus* ssp. *affinis* including toothed margins on both lobed and unlobed leaves, globose to ovoid seed head, densely pubescent achenes (fruits), and a straight, thickened achene beak. Drawing by D. Collet.



Figure 6. South of vicinity of VABM Cascade, Nulato Hills. Habitat for *Ranunculus auricomus* on south-facing, subalpine slope. Plants were growing in lush meadow patches found among willow (*Salix novae-angliae*) thickets. Associated species included *Iris setosa*, *Dryopteris dilatata*, and *Angelica lucida*. Small black day pack right of center provides scale. Photo by Carl Roland.

across northern Europe and northern Russia to the Bering Sea coast (Flora of North America 1997, Academy of Sciences of the USSR 1937). It is commonly found in moist meadows, along riverbanks, and in open, moist woodland understories. Numerous geographic races or microspecies have been named (Ericsson 1992) but a well-accepted taxonomic treatment for the entire species complex does not exist. One of the larger recognized groups within this complex, to which our Alaskan material clearly belongs, is referred to as *R. monophyllus* by Russian and Scandinavian botanists (Academy of Sciences of the USSR 1937, R. Elven, pers. comm.).

Closely related to *Ranunculus auricomus* is *R. pedatifidus* ssp. *affinis*, a circumpolar arctic-alpine species usually found in dry, moderately disturbed sites in Alaska. The basal leaves of these two taxa are distinctly different, making correct identification easy if they are present on a specimen. However, if basal leaves are missing, more cryptic characters involving cauline leaf pubescence, seed head shape, and achene shape must be used (Figure 5). A thorough search of ALA collections by this author uncovered four additional specimens of *R. auricomus* from the Seward Peninsula which had been misidentified as *R. pedatifidus* ssp. *affinis*. Three collections were from Bluff, a seabird colony site 50 miles (80 km) east of Nome and 120 miles (190 km) west of Debauch Mountain. An additional collection was from Serpentine Hot Springs located approximately 180 miles (290 km) northwest of Debauch Mountain. The habitat at both Seward Peninsula sites was moist to wet meadows.

As a result of this survey, this plant is now known from four localities in western Alaska and will probably be listed as critically imperiled (S1) at the state level by AKNHP (R. Lipkin, pers. comm.).

***Douglasia beringensis* S. Kelso, Jurtzev, & D.F. Murray**  
(Primulaceae, Primrose Family)

Ranked S1, this species was first described from north-central Seward Peninsula (Kelso et al. 1994) (Figure 7) where it was found at two localities growing on exposed marble outcrops. A small, poorly preserved specimen collected in the Kokrines Hills, central interior Alaska, and held at ALA may also represent this species (Kelso, et al. 1994). Our 1997 specimens of this species were collected on a west-facing loose alpine scree below the summit of Debauch Mountain (Figure C-6). This scree was composed of deep fines with pebbles and cobbles on the surface, and supported poorly-developed vegetation and stone stripes. Plants were scattered, but the taxon was common on this large slope with an estimated population size of 1,000-2,000 individuals. Associated species at this site included *Podistera macounii*, *Dryas octopetala*, *Papaver alaskanum*, *Artemisia globularia*, *Luzula* spp., *Poa pseudoabbreviata*, and *Saxifraga bronchialis*.

During the 1998 field season, two additional populations were located on the alpine ridges on opposite sides of the upper North Fork Unalakleet River valley. One of these sites was a southeast-facing slaty scree with poorly-developed vegetation stripes above the east side of the valley (Figure C-7). Individual plants were scattered and growing with *Draba stenopetala*, *Cardamine bellidifolia*, *Phlox alaskensis*, *Saxifraga bronchialis*, and other forbes. At a third site on the west side of this valley, *Douglasia beringensis* was found growing in a variety of rock-dominated habitats (Figures 8 and C-8). Several scattered plants were found on each of three different habitats; a fine, platy, moist, north-facing scree, a northeast-





Figure 7. *Douglasia beringensis* S. Kelso, Jurtzev, & D.F. Murray. Small plant growing on north-facing scree above upper North Fork Unalakleet River valley, Nulato Hills. Other known sites include Debauch Mountain and Seward Peninsula. Clump shown is approximately 3 inches (7.5 cm) across. Photo by Carolyn Parker.



Figure 8. Habitat for *Douglasia beringensis* on north-facing scree above the upper North Fork Unalakleet River valley. Plants at this locality were also found growing on southeast- and west-facing screes and on a northeast-facing rock outcrop. Photo by Carl Roland.

facing rock outcrop, and a pocket of coarse scree within a southeast-facing slope of well-developed *Dryas* stripe vegetation. A fourth population of an estimated several thousand plants was found on a large, southeast-facing, shaly fine scree at the same locality. *D. beringensis* was one of the most common taxa on this scree which supported a rich diversity of scattered alpine forbes including *Dianthus repens*, *Silene acaulis*, *Eritrichium aretioides*, *Saxifraga reflexa*, and *Phlox alaskensis*. Total vegetation cover at all *Douglasia beringensis* sites in the region ranged from 3 to 8%.

This survey has documented robust populations of *D. beringensis* from three new localities in the central Nulato Hills. Based on these findings, its ranking with AKNHP will probably be changed to imperiled (S2) (R. Lipkin, pers. comm.). Individuals at each of these sites are distinctive in displaying a more elongated growth form than was observed at the Seward Peninsula localities where all plants had a small, tight cushion habit. Plant tissue for molecular analysis, and live plants were collected for study by Drs. Elena Conti, University of Alaska-Fairbanks, and Tass Kelso, Department of Biology, Colorado College, Colorado.

***Minuartia biflora* (L.) Schinz & Thell**  
(Caryophyllaceae, Chickweed Family)

A northern circumpolar taxon ranked S2. This tiny chickweed, which may often be overlooked by collectors, was found in a west-facing, alpine snowmelt area on Debauch Mountain (Figure C-6). Only a few plants were noted at this locality.

***Eleocharis kamtschatica* (C. Meyer) V. Komarov**  
(Cyperaceae, Sedge Family)

This amphipacific sedge of coastal and saline marshes is ranked S2 and is very rarely collected in Alaska. Bright purple stem bases and a large tubercle on the achene distinguish this species from the common *E. uniglumis* of interior Alaska. Our specimen was collected in a wet depression within a moist sedge meadow in the vicinity of the Unalakleet airport (Figure C-1).

***Douglasia alaskana* (Colville & Standley) S. Kelso**  
= *Androsace alaskana* Colville & Standley  
(Primulaceae, Primrose Family)

An East Beringian alpine endemic ranked S2S3. Documented from several widely scattered localities in central and coastal Alaska, *D. alaskana* has also been collected from the Seward Peninsula and the Kuskokwim Mountains (ALA, Kelso 1983) therefore its appearance in the Nulato Hills should be expected. Plants were found scattered on unstable, alpine scree below the summit of Debauch Mountain (Figure C-6) in association with *Papaver alaskanum*, *Artemisia globularia*, *Podistera macounii*, and other forbes. An additional population was found on the alpine ridges west of the North Fork Unalakleet River valley (Figure C-8) growing on north-facing shaly scree.

Plant tissue for molecular and morphometric analysis was collected for study by Drs. Elena Conti, University of Alaska-Fairbanks, and Tass Kelso, Department of Biology, Colorado College, Colorado.

***Potentilla rubricaulus* Lehm.**

(Rosaceae, Rose Family)

Ranked S2S3, this plant is part of a circumpolar species complex which includes *P. hookeriana* (Section *Niveae*) and its affiliates and has long been a problematic group for taxonomists. Our specimen, first tentatively identified as *P. furcata* (= *P. hookeriana* ssp. *hookeriana* var. *furcata*) by this author, has since been determined as *P. rubricaulus* by Bente Eriksen, a Swedish botanist working on this group (see Eriksen 1997). Several scattered plants were growing in a northwest-facing lush subalpine meadow on a slope west of the South River valley, south of Unalakleet (Figure C-3). Associated species included *Alnus viridis* ssp. *crispa*, *Salix planifolia*, *Carex podocarpa*, *Heracleum lanatum*, *Epilobium angustifolium*, and *Veratrum album* ssp. *oxysepalum*.

This taxon is very rare in arctic Alaska and our collection represents a southwestward range extension of over 500 miles (800 km). Although it appears to be a North American species, its true range will not be understood until the taxonomy of this group is improved for the entire circumpolar region. Regardless of its eventual taxonomic placement, this collection will remain as a major range extension as no closely related taxa are yet known from this area.

***Festuca lenensis* Drobov**

= *F. ovina* L. ssp. *alaskensis* Holmen in part

(Poaceae, Grass Family)

Beringian endemic ranked S2S3. This grass was collected on a south-facing, subalpine scree east of the South River valley, south of Unalakleet (Figure C-3). Screes here were composed of marine sandstones and shales and had a thick layer of fines under a sparse mulch of platy fragments. These habitats were well vegetated with scattered forbes and supported taxa not common elsewhere within the surveyed area. Several scattered tufts were found growing in association with *Anemone drummondii*, *Smelowskia calycina*, *Dianthus repens*, *Bromopsis pumpehiana* ssp. *arctica*, *Astragalus aboriginum*, *Bupleurum triradiatum*, and *Artemisia borealis*.

*Festuca lenensis*, long familiar to Russian botanists working in arctic and subarctic regions, has only recently been recognized as occurring in the North American flora (Aiken et al. 1997, Aiken and Darbyshire 1990). It had been previously reported within Alaska as *F. ovina* ssp. *alaskana* (Holmen 1964, Hultén 1968) and *F. auriculata* (Frederiksen 1983). It is known from dry, rocky, sandy, and steppe habitats throughout boreal and northern Alaska. Our collection represents the western-most known locality within Alaska, but its occurrence is certainly to be expected considering its occurrence in the Russian Far East.

***Koeleria asiatica* Domin**

(Poaceae, Grass Family)

This is a predominantly arctic, Asian grass whose distribution extends across the north coast of Alaska and Yukon, Canada, but includes a few disjunct localities in interior Yukon as well. Ranked S2S3 as its range is restricted and its occurrence is rare to uncommon in Alaska. The Nulato Hills collection was growing on south-facing, shaly, soft-textured calcareous scree on the subalpine ridges east of the South River valley (Figure C-3). This specimen documents a southwestward range extension of

approximately 200 miles (320 km), expanding its range to well outside its characteristically arctic distribution.

*Cystopteris montana* (Lam.) Bernh.  
(Athyaceae, Lady Fern Family)

A northern circumpolar taxon ranked S3. This dainty fern was collected at Christmas Mountain (Figure C-2) and on the slopes east of the South River valley (Figure C-3). At both localities, several plants were growing in very moist pockets on northward-facing subalpine herbaceous slopes under shrub alders. Its occurrence in western Alaska is rare but not unexpected.

*Zannichellia palustris* L.  
(Potamogetonaceae, Pondweed Family)

A wide spread, cosmopolitan taxon ranked S3 in Alaska due to the few, widely scattered known localities; primarily in south-central and western Alaska. Our specimen was growing with *Potamogeton filiformis* in a shallow pond within the moderately disturbed wet meadows around the Unalakleet airport (Figure C-1).

*Papaver nudicaule* L. ssp. *americanum* Randel ex D.F. Murray  
(Papaveraceae, Poppy Family)

A large-flowered, yellow poppy endemic to East Beringia and ranked S3. Most commonly found in open, gravelly, low elevation sites of interior Alaska, but occasionally found in alpine habitats as well. Our specimen was collected on an east-facing, unstable alpine scree in the vicinity of VABM Chiroskey (Figure C-9) and represents a minor westward range extension for the taxon. Very few plants were growing at this site. Showy cultivars of this species, the 'Iceland Poppy', are frequently seeded along Alaskan highways.

*Taraxacum carneocoloratum* A. Nels.  
(Asteraceae, Aster Family)

East Beringian endemic ranked S3. Known from several widely scattered sites in the Alaska Range, Chugach and Ogilvie mtns., and the southern Kuskokwim Mtns. Our collection was from a south-facing calcareous shaly scree on subalpine ridges east of the South River valley (Figure C-3) and represents a westward range extension of approximately 200 miles (320 km). Associated species included *Anemone drummondii*, *Smelowskia calycina*, *Bupleurum triradiatum*, and *Artemisia borealis*.

*Festuca brevissima* Jurtzev  
(Poaceae, Grass Family)

A small Beringian fescue ranked S3. This taxon is closely related to *F. brachyphylla*, but recent taxonomic treatments (Aiken et al. 1997, Aiken and Darbyshire 1990) have distinguished it from its more common relative based on narrower glumes, fewer spikelets per spike, a shorter flag leaf, and an open branched panicle at anthesis. The distinction remains difficult to make, especially for immature specimens. Our collections came from Debauch Mountain (Figure C-6) and the vicinity of VABM Chiroskey (Figures C-9 and C-10). At both localities, a few plants were found growing on rocky, alpine, semi-stable slopes and ridge tops.

The following species are of floristic note, but are not currently ranked as by the Alaska Natural Heritage Program.

***Papaver* sp.**

(Papaveraceae, Poppy Family)

One specimen (Parker et al. 8057) collected on an alpine scree in the North Fork Unalakleet River headwaters (Figure C-12) has been tentatively identified as *Papaver radicum* ssp. *alaskanum* by the author, but was noted by David Murray (ALA) as differing significantly from that taxon. This specimen, along with several others from southwestern Alaska displaying similar distinctive character traits, will be studied by him in the near future in an effort to determine its correct identification. These specimens may represent a previously undescribed species (D. Murray, pers. comm.).

***Papaver macounii* Greene ssp. *macounii***

(Papaveraceae, Poppy Family)

This robust, large-flowered poppy is endemic to the eastern Bering Sea district, known only from the Pribilof Islands (type locality is St. Paul I.) and from a very few sites along coastal western Alaska. It was found to be abundant on low sandy ridges along the coast immediately north of Unalakleet and in the vicinity of the airport (Figure C-1). It is easily distinguished from *P. macounii* ssp. *discolor*, the common narrow-capsuled poppy found throughout Alaska, by its robust appearance, large blossoms, numerous persistent leaf bases, broad capsule, and hispid leaves.

***Primula anvilensis* S. Kelso**

(Primulaceae, Primrose Family)

This tiny white primrose was first described from the Seward Peninsula (Kelso 1987) where it is known from several localities. Additional records at ALA include populations from the Squirrel and Noatak river valleys in northwestern Alaska. Our collection from Christmas Mountain (Figure C-2) represents a small southeastward range extension of approximately 70 miles (110 km) for this narrowly restricted East Beringian endemic. Plants were growing in the moist, bare soil of frost boils on a north-facing, subalpine slope.

***Cardamine microphylla* Adams ssp. *blaisdellii* (Eastw.) D.F. Murray & S. Kelso**

= *C. blaisdellii* Eastw.

= *C. microphylla* Adams in part

(Brassicaceae, Mustard Family)

This narrowly restricted Beringian endemic was known previously only from Chukotka, the Seward Peninsula, and northwestern Alaska. Our collections from Debauch Mountain (Figure C-6) and the North Fork Unalakleet River headwaters (Figures C-8 and C-12) represent a minor southeastward range extension of approximately 100 miles (160 km). Plants were growing in sheltered, herbaceous alpine snowmelt areas. This nomenclatural combination and taxonomic treatment have been recently published (Murray and Kelso 1997) and it is uncertain if this taxon will be ranked S3 by AKNHP, the current listing for *C. microphylla* s.l.

*Claytonia scammaniana* Hultén  
(Portulacaceae, Spring Beauty Family)

This East Beringian endemic spring beauty was named for Edith Scamman who pioneered collecting in interior Alaska in the 1930's. It is known from a few localities in the Yukon-Tanana uplands, Alaska Range, and southern Kuskokwim Mountains region. Our collection from near the summit of VABM Chiroskey (Figure C-9) represents a northwestward range extension of approximately 250 miles (400 km). Several plants were found growing on a north-facing, shaly, alpine scree associated with other scattered alpine forbes.

*Oxytropis scammaniana* Hultén  
(Fabaceae, Pea Family)

East Beringian endemic also named for Edith Scamman who first collected it at Eagle Summit in the Yukon-Tanana uplands. It is also found in the Alaska Range, Brooks Range, and interior side of St. Elias Range. Our collection was found growing on alpine screes and ridge tops east of the North Fork Unalakleet River valley (Figure C-12) and represents a minor westward range extension

*Agrostis trinii* Turcz.  
(Poaceae, Grass Family)

This Beringian endemic grass is widespread in eastern Russia but only known in Alaska from a few collections in the western Alaska-Bering Sea area. Our collections are from wet meadows near the Unalakleet airport (Figure C-1) and from moist, lichen-*Dryas* tundra in the uplands east of the South River valley (Figure C-3).

*Poa malacantha* V. Komarov  
(Poaceae, Grass Family)

This Beringian endemic grass is more commonly found at low elevations in wet, disturbed soils of arctic and coastal Alaska, but does occasionally appear in the alpine. Our collections were found on disturbed alpine slopes of Debauch Mountain (Figure C-6) and on the ridges east of the North Fork Unalakleet River valley (Figure C-7). They represent a minor range extension into central western Alaska.

*Salix chamissonis* Andersson  
(Salicaceae, Willow Family)

A Beringian endemic dwarf willow that is known from Chukotka, the Seward Peninsula, Brooks Range, and in the Yukon-Tanana uplands. Our collection was from a mesic, lush heath-shrub alpine slope above the North Fork Unalakleet River valley (Figure C-8) and represents a minor southeast range extension into western Alaska.

**Summary**

Alaska's flora is still imperfectly known. The Nulato Hills region is one of the largest areas in Alaska which had remained botanically unexplored prior to this survey. Our inventory has resulted in the first documented collection of vascular and non vascular plants from the upland and alpine habitats of this region. These collections are now data based and curated at the University of Alaska Museum Herbarium, Fairbanks (ALA).

One species new to North America is documented and is expected to be ranked as critically imperiled (S1) by the Alaska Natural Heritage Program (AKNHP). Twelve plants ranked as rare to critically imperiled (S1-S3) by the AKNHP are also documented. These taxa are discussed above and location and habitat information is available through ALA and AKNHP.

As expected when a botanically unknown region is surveyed, several range extensions and range connections are documented. Many of the range extensions into this region include taxa more commonly known from the arctic and the Bering Straits district. As suggested in the introduction, the Nulato Hills flora has possibly been enriched with these taxa through their near-contiguous upland connections to these endemic-rich areas. Less expected were range extensions of taxa best known from the uplands and alpine of interior Alaska. These taxa may have reached this area by way of the Kokrine Hills and other uplands north of the Yukon River, via the northern Kuskokwim Mountains, or along open, exposed floodplains of major drainages.

This inventory has contributed significantly to our knowledge of the range, abundance, and habitat preferences of several of Alaska's rare and sensitive plants. All land owners and managers who might be involved in management decisions effecting any of these taxa within any portion of their Alaskan range will be better able to make sound decisions based on this additional information from the Nulato Hills region.

#### **Comments and Recommendations**

The Nulato Hills extend over 250 miles (400 km) from the Yukon-Kuskokwim Delta to the Selawik River. This inventory covered only a few sites within the central portion of the Hills, hence the species list and floristic notes reported here are still preliminary. The following recommendations are offered for any future floristic work undertaken in the region.

1) Localities visited that were richest in taxa being tracked by AKNHP were the Debauch Mountain summit area, the alpine ridges above both sides of the middle to upper North Fork Unalakleet River valley, and the subalpine ridges east of the South River drainage (see Figure 1 and Appendix C). Habitats where these sensitive taxa were most commonly found include active screes, sheltered, alpine snowmelt meadows, and lush mid-elevation meadows. These were also the sites, and habitats, that supported the majority of Beringian and East Beringian endemics, and where the most range extensions into the region were found. Future inventory efforts should seek out additional similar alpine localities and habitats.

2) The localities for *Ranunculus auricomus* need to be revisited and similar habitats checked carefully for additional populations of this species, now recognized as part of our North American flora and certain to be listed as critically imperiled by the AKNHP. It is important to get more information on this taxon concerning its habitat preferences and abundance in the area.

3)The alpine ridges east and southeast of Debauch Mountain have not been covered adequately by this survey, in part due to their distance from our Unalakleet base. These are some of the highest alpine areas within the Nulato Hills. In addition, geologic mapping at the regional level (Patton et al. 1994) show this area to include some marine (possibly calcareous) bedrock which is very rare to the west. For these reasons, this area should be visited during any future survey efforts. A detailed geologic map for the area will be available in 1999 (Patton, pers. comm.) which will greatly improve our ability to seek out differing bedrock sites. Helicopter access to this area may be facilitated from a base along the Yukon River, or other interior locality, thus avoiding the more unfavorable coastal weather conditions often found in the vicinity of Unalakleet.

4)Incidental collecting on Alaska state-managed land near the Unalakleet airport documented 2 taxa being tracked by AKNHP (*Eleocharis kamtschatica* and *Zannichellia palustris*) and 2 narrowly restricted Bering Sea coast endemics (*Agrostis trinii* and *Papaver macounii* ssp. *macounii*). This strongly suggests that future inventory efforts should include attention to similar lowland coastal habitats within BLM-managed land in the region.

5)Plants are oblivious to land management boundaries. A floristic study of the Nulato Hills should encompass the entire upland area including the northern portion, north of Debauch Mountain, and if possible, the Blackburn Hills. This could be done in cooperation with BLM-Northern Field Office and the state of Alaska which are, respectively, responsible for the management of these regions.

#### **A c k n o w l e d g m e n t s**

Debbie Blank, BLM-Anchorage Field Office, secured funding and a cooperative agreement between BLM and the University of Alaska Museum Herbarium to assure this inventory would become a reality. Our 1997 field crew consisted of Al Batten and Carolyn Parker, University of Alaska Museum Herbarium; Mike Duffy, Jenna Cole, and Marta McWhorter, all volunteers with BLM; and BLM botanist Debbie Blank. In 1998 Blank, Batten and Parker were joined by Carl Roland and Barbara Murray, affiliates with the University of Alaska Museum Herbarium, Robert Lipkin, AKNHP, and Jacqueline D'Auria, BLM volunteer. The staff at Brown's Lodge treated us like family during our stay in Unalakleet both summers, and pilots Paul Walters (TransAlaska Helicopters, 1997) and Bruce Alumbaugh (Kenai Air Alaska, 1998) got us all home for supper every night, no small feat given Bering Sea weather conditions.



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APPENDIX A

NULATO HILLS FLORISTIC INVENTORY - VASCULAR PLANT SPECIES LIST  
1997-1998

Specimens collected during 1997 and 1998 are listed. Collections are data based and held at the University of Alaska Museum Herbarium in Fairbanks (ALA). Scientific nomenclature follows that used at ALA and synonyms are offered where these names differ from those used in Hultén's *Flora of Alaska and Neighboring Territories* (1968). Common names come from a variety of sources. Collection numbers preceded by CR are those of Carl Roland (1998). The remaining numbers are those of the report author.

The format is as follows:

Scientific name		Common name
<i>Synonym</i>		
<i>Floristic comments</i>		
USGS Quadrangle	general locality	collection number(s)
Adoxaceae (Moschatel Family)		
ADOXA MOSCHATELLINA L.		Moschatel
Norton Bay	Tripod Flats, upper Unalakleet R.	7806
Unalakleet	betw. South R. and Rabbit Cr.	7910
Apiaceae (Parsley Family)		
ANGELICA LUCIDA L.		Wild Celery
Unalakleet	vic. S of VABM Chiroscopy	7458
	vic. S of VABM Cascade	7888
BUPLEURUM TRIRADIATUM J.E.Adams		Thoroughwax
<i>Beringian endemic.</i>		
Norton Bay	W of Ungalik R.	7392
	North Fork Unalakleet R.	8021
Unalakleet	South River drainage	7000
	vic. VABM Chiroscopy	7947
HERACLEUM LANATUM Michaux		Cow Parsnip
Unalakleet	vic. VABM Cascade	7475
PODISTERA MACOUNII (J. Coulter & Rose) Mathias & Constance		
= <i>Ligusticum mutillinoides</i> (Crantz) Willar		
Norton Bay	Debauch Mtn.	7241, 7837
Unalakleet	betw. South R. and Rabbit Cr.	7126
	South River drainage	7032
Aspidiaceae (Shield Fern Family)		
DRYOPTERIS DILATATA (Hoffm.) A. Gray		Shield Fern
Norton Bay	vic. Debauch Mtn.	7314
Unalakleet	vic. S of VABM Chiroscopy	7434
	vic. VABM Cascade, S of Unalakleet	7422
	vic. VABM Chiroscopy	7096
DRYOPTERIS FRAGRANS (L.) Schott		Fragrant Fern
Norton Bay	upper Unalakleet R.	8081
Unalakleet	South River drainage	7035
Asteraceae (Aster, Sunflower Family)		
ANTENNARIA ALPINA (L.) Gaertner		
= <i>A. friesiana</i> (Trautv.) Ekman subsp. <i>compacta</i> (Malte) Hultén		
Norton Bay	North Fork Unalakleet R.	8044
ANTENNARIA FRIESIANA (Trautv.) Ekman		Pussy Toes
Norton Bay	E of Ungalik R.	7413
	Debauch Mtn.	7855
Unalakleet	betw. South R. and Rabbit Cr.	7123
	South River drainage	7019

ANTENNARIA MONOCEPHALA DC.		
Norton Bay	vic. Debauch Mtn.	7491
	Debauch Mtn.	7211
ARNICA GRISCOMII Fern. subsp. FRIGIDA (C. Meyer ex Iljin) S. J. Wolf		Frigid Arnica
=A. frigida C. Meyer		
Norton Bay	North Fork Unalakleet R.	8032
	Debauch Mtn. vic.	7876
Unalakleet	vic. VABM Chirokey	7070
	South River drainage	7009
ARNICA LESSINGII E. Greene		Lessing's Arnica
<i>East Beringian endemic.</i>		
Unalakleet	vic. VABM Chirokey	7076
ARTEMISIA ALASKANA Rydb.		Alaska Wormwood
<i>East Beringian endemic.</i>		
Norton Bay	vic. mouth Old Woman R.	7926
	Old Woman Mtn.	7829
ARTEMISIA ARCTICA Less.		Arctic Wormwood
Norton Bay	upper Unalakleet R.	8085
Unalakleet	South River drainage	7017
ARTEMISIA BOREALIS Pallas		
Norton Bay	W of Ungalik R.	7391
	North Fork Unalakleet R. headwaters	8043, 8051
Unalakleet	betw. South R. and Rabbit Cr.	7143
ARTEMISIA FURCATA M.Bieb.		
<i>Beringian endemic.</i>		
Norton Bay	E of Ungalik R.	7396
ARTEMISIA GLOBULARIA Cham. ex Besser		
<i>Beringian endemic.</i>		
Norton Bay	Debauch Mtn.	7251, 7252
	North Fork Unalakleet R. headwaters	8060
ARTEMISIA TILESII Ledeb.		Common Wormwood
Norton Bay	Debauch Mtn.	7216
ASTER SIBIRICUS L.		Siberian Aster
Norton Bay	vic. Debauch Mtn.	7493
	North Fork Unalakleet R.	7915
	middle Unalakleet R.	7915
Unalakleet	betw. South R. and Rabbit Cr.	7178
CREPIS NANA Richardson		Alpine Hawk's Beard
Norton Bay	Debauch Mtn.	7240
	North Fork Unalakleet R. headwaters	8054
ERIGERON ACRIS L.		
Norton Bay	North Fork Unalakleet R.	7977, 7987
	middle Unalakleet R.	7917
ERIGERON HUMILIS Graham		Mountain Fleabane
Norton Bay	vic. Debauch Mtn.	7490
Unalakleet	betw. South R. and Rabbit Cr.	7905
ERIGERON HYPERBOREUS E. Greene		
<i>East Beringian endemic.</i>		
Norton Bay	E of Ungalik R.	7397
Unalakleet	betw. South R. and Rabbit Cr.	7179
PETASITES FRIGIDUS (L.) Franchet		Coltsfoot
Norton Bay	Christmas Mtn.	7368
Unalakleet	W of upper Chirokey R.	7208
SAUSSUREA ANGUSTIFOLIA (Willd.) DC.		
<i>East Beringian endemic.</i>		
Norton Bay	Christmas Mtn.	7343
	Debauch Mtn.	7231
Unalakleet	vic. VABM Chirokey	7111
SAUSSUREA NUDA Ledeb.		
<i>Beringian endemic.</i>		
Unalakleet	Unalakleet	6980

- SENECIO ATROPURPUREUS (Ledeb.) B. Fedtsch. subsp. FRIGIDUS (Richardson) Hultén  
*Beringian endemic.*  
 Norton Bay Christmas Mtn. 7367  
 Unalakleet vic. VABM Chirokey 7116  
 vic. S of VABM Cascade 7879
- SENECIO KJELLMANII A. Pors.  
 =*S. atropurpureus* (Ledeb.) Fedtsch. subsp. *tomentosus* (Kjellm.) Hultén  
*Beringian endemic.*  
 Norton Bay North Fork Unalakleet R. headwaters 8062
- SENECIO LUGENS Richardson  
*East Beringian endemic.*  
 Norton Bay vic. Debauch Mtn. 7510  
 Christmas Mtn. 7373
- SENECIO OGOTORUKENSIS Packer  
 =*S. conterminus* Greenm. in part  
*East Beringian endemic.*  
 Unalakleet betw. South R. and Rabbit Cr. 7137
- SENECIO RESEDIFOLIUS Less. Dwarf Arctic Butterweed  
 = *S. cymbararia* Pursh  
 Norton Bay Debauch Mtn. 7270  
 North Fork Unalakleet R. 8020  
 Unalakleet W of upper Chirokey R. 7207  
 vic. VABM Chirokey 7061  
 South River drainage 7026
- SENECIO TUNDRICOLA Tolm.  
 =*S. fuscatus* (Jord. & Fourr.) Hayek, *S. lindstroemii* (Ostenf.) A.E. Porsild  
 Norton Bay Debauch Mtn. 7225  
 Unalakleet betw. South R. and Rabbit Cr. 7153  
 South River drainage 7007
- SOLIDAGO MULTIRADIATA Aiton Goldenrod  
 Unalakleet vic. VABM Chirokey 7053
- TARAXACUM ALASKANUM Rydb. Alaska Dandelion  
 Norton Bay vic. Debauch Mtn. 7519  
 Debauch Mtn. 7223  
 North Fork Unalakleet R. headwaters 8053  
 Unalakleet vic. VABM Cascade 7465  
 betw. South R. and Rabbit Cr. 7185  
 vic. VABM Chirokey 7095
- TARAXACUM CARNEOCOLORATUM Nelson Flesh-colored Dandelion  
*East Beringian endemic, ranked S3 by AKNHP, northwestward range extension.*  
 Unalakleet betw. South R. and Rabbit Cr. 7899
- TARAXACUM CERATOPHORUM (Ledeb.) DC.  
 Norton Bay Debauch Mtn. 7224, 7259  
 Unalakleet betw. South R. and Rabbit Cr. 7900
- TARAXACUM KAMTSCHATICUM Dahlst.  
*Beringian endemic.*  
 Unalakleet vic. VABM Chirokey 7961
- Athyriaceae (Lady Fern Family)
- CYSTOPTERIS FRAGILIS (L.) Bernh. Fragile Fern  
 Norton Bay Christmas Mtn. 7374  
 Debauch Mtn. 7226, 7265  
 Unalakleet W of upper Chirokey R. 7203  
 vic. VABM Cascade 7427
- CYSTOPTERIS MONTANA (Lam.) Bernh.  
*Ranked S3 by AKNHP, minor range connection.*  
 Norton Bay Christmas Mtn. 7375  
 Unalakleet vic. S of VABM Cascade 7890  
 betw. South R. and Rabbit Cr. 7154
- WOODSIA ILVENSIS (L.) R.Br. Rusty Woodsia  
 Unalakleet betw. South R. and Rabbit Cr. 7148  
 vic. VABM Chirokey 7074, 7107  
 South River drainage 7036

## Betulaceae (Birch Family)

- ALNUS VIRIDIS (Villars) de Candolle subsp. CRISPA (Aiton) Turrill Green Alder  
 =*A. crispa* (Aiton) Pursh  
 Norton Bay Christmas Mtn. 7386
- ALNUS TENUIFOLIA Nutt.  
 Norton Bay North Fork Unalakleet R. 7994  
 Unalakleet middle Unalakleet R. 7943
- BETULA NANA L. Dwarf Birch  
 Norton Bay Tripod Flats, upper Unalakleet R. 7812  
 Unalakleet South River drainage 7041
- BETULA NEOALASKANA Sarg. Paper Birch  
 =*B. papyrifera* Marsh  
 Unalakleet vic. S of VABM Chirokey 7443  
 South River drainage 7040

## Boraginaceae (Borage Family)

- ERITRICHUM ARETIOIDES (Cham.) DC. Dwarf Forget-Me-Not  
*Beringian endemic.*  
 Norton Bay Debauch Mtn. 7246, 7863  
 Unalakleet betw. South R. and Rabbit Cr. 7149, 7187
- ERITRICHUM SPLENDENS Kearney Splendid Forget-Me-Not  
*East Beringian endemic, minor southwestward range extension.*  
 Norton Bay E of Ungalik R. 7401  
 W of Ungalik R. 7393
- MERTENSIA PANICULATA (Aiton) G. Don Bluebells  
 Norton Bay Tripod Flats, upper Unalakleet R. 7807  
 Unalakleet betw. South R. and Rabbit Cr. 7142
- MYOSOTIS ALPESTRIS F. W. Schmidt subsp. ASIATICA Vestergren Forget-Me-Not  
 Unalakleet betw. South R. and Rabbit Cr. 7132

## Brassicaceae (Mustard Family)

- ARABIS LYRATA L. ssp. KAMCHATICA (Fischer) Hultén  
 Norton Bay North Fork Unalakleet R. 7980, 7995  
 middle Unalakleet R. 7821
- BARBAREA ORTHOCERAS Ledeb.  
 Norton Bay North Fork Unalakleet R. 8034
- CARDAMINE BELLIDIFOLIA L.  
 Norton Bay Debauch Mtn. 7291, 7308  
 Unalakleet vic. S of VABM Chirokey 7430  
 vic. VABM Chirokey 7056  
 South River drainage 7004
- CARDAMINE MICROPHYLLA Adams ssp. BLAISDELLII (Eastw.) D.F. Murray & S. Kelso  
 =*C. microphylla* Adams in part  
*Beringian endemic, minor southeastward range extension.*  
 Norton Bay vic. Debauch Mtn. 7497  
 Debauch Mtn. 7305, 7842  
 North Fork Unalakleet R. headwaters 8047, 8077
- CARDAMINE PRATENSIS L. Cuckoo Flower  
 Norton Bay Christmas Mtn. 7360  
 Tripod Flats, upper Unalakleet R. 7809  
 Unalakleet vic. VABM Cascade 7459  
 vic. S of VABM Chirokey 7435  
 betw. South R. and Rabbit Cr. 7180
- CARDAMINE PURPUREA Cham. & Schldl. Purple Bittercress  
*Beringian endemic.*  
 Norton Bay vic. Debauch Mtn. 7496  
 Unalakleet vic. VABM Cascade, S of Unalakleet 7474  
 betw. South R. and Rabbit Cr. 7145
- DRABA FLADNIZENSIS Wulfen  
 Norton Bay Christmas Mtn. 7330, 7388  
 North Fork Unalakleet R. headwaters 8045  
 Debauch Mtn. 7843, 7847  
 Unalakleet betw. South R. and Rabbit Cr. 7183

DRABA GLABELLA Pursh			
= <i>D. hirta</i> auct. non L.			
Norton Bay	Debauch Mtn.	7839, 7859	
Unalakleet	betw. South R. and Rabbit Cr.	7904	
DRABA LONCHOCARPA Rydb.			
<i>Northwestward range extension.</i>			
Norton Bay	North Fork Unalakleet R. headwaters	8052	
DRABA JUVENILIS Kom.			
= <i>D. longipes</i> Raup			
<i>East Beringian endemic.</i>			
Norton Bay	vic. Debauch Mtn.	7502, 7526B	
	North Fork Unalakleet R. headwaters	8070	
DRABA NIVALIS Lilj.			
Norton Bay	Debauch Mtn.	7244	
	North Fork Unalakleet R.	8015	
Unalakleet	betw. South R. and Rabbit Cr.	7151, 7181	
DRABA PALANDERIANA Kjellman			
= <i>D. caesia</i> Adams			
<i>Beringian endemic.</i>			
Norton Bay	E of Ungalik R.	7400	
	Debauch Mtn.	7278	
DRABA STENOPETALA Trautv.			
<i>Beringian endemic.</i>			
Norton Bay	Debauch Mtn.	7257, 7836	
	Old Woman Mtn.	7832	
Unalakleet	W of upper Chirokey R.	7188	
	vic. VABM Chirokey	7950	
	betw. South R. and Rabbit Cr.	7909	
ERYSIMUM CHEIRANTHOIDES L. subsp. ALTUM Ahti			Wormseed Mustard
Unalakleet	Unalakleet	6971	
ERYSIMUM PALLASII (Pursh) Fern.			Pallas Wallflower
Norton Bay	Debauch Mtn.	7287, 7865	
Unalakleet	betw. South R. and Rabbit Cr.	7177	
EUTREMA EDWARDSII R.Br.			
Norton Bay	vic. Debauch Mtn.	7495	
Unalakleet	vic. VABM Cascade, S of Unalakleet	7473, 7894	
PARRYA NUDICAULIS (L.) Regel			Parry's Wallflower
Norton Bay	vic. Debauch Mtn.	7501	
	Debauch Mtn.	7213	
Unalakleet	W of upper Chirokey R.	7195	
	vic. VABM Chirokey	7115	
SMELOWSKIA CALYCINA (Stephan) C. Meyer			
Norton Bay	E of Ungalik R.	7403	
	Debauch Mtn.	7245	
	North Fork Unalakleet R. headwaters	8050	
Unalakleet	betw. South R. and Rabbit Cr.,	7182, 7903	
	vic. VABM Chirokey	7106	
Campanulaceae (Harebell Family)			
CAMPANULA LASIOCARPA Cham.			Mountain Harebell
Unalakleet	South River drainage	7006	
CAMPANULA UNIFLORA L.			One-flowered Harebell
Unalakleet	vic. VABM Chirokey	7065	
	South River drainage	7005	
Caprifoliaceae (Honeysuckle Family)			
LINNAEA BOREALIS L.			Twinflower
Unalakleet	vic. VABM Chirokey	7069	
VIBURNUM EDULE (Michaux) Raf.			Highbush Cranberry
Norton Bay	vic. mouth Old Woman R.	7922	

Caryophyllaceae (Chickweed Family)

- ARENARIA CHAMISSONIS** Maguire  
 = *Arenaria dicranoides* Fenzl  
*Beringian endemic.*  
 Norton Bay Debauch Mtn. 7237, 7868  
 Unalakleet vic. VABM Chirokey 7108  
 betw. South R. and Rabbit Cr. 7902
- CERASTIUM BEERINGIANUM** Cham. & Schidl. Mouse-ear Chickweed  
 Norton Bay E of Ungalik R. 7406  
 North Fork Unalakleet R. 8030  
 Tripod Flats, upper Unalakleet R. 7810  
 Unalakleet South River drainage 7027  
 Unalakleet 6982
- DIANTHUS REPENS** Willd. Wild Carnation  
*Beringian endemic.*  
 Norton Bay Debauch Mtn. 7230  
 Unalakleet W of upper Chirokey R. 7199  
 vic. VABM Chirokey 7105
- GASTROLYCHNIS APETALA** (L.) Tolm. & Kozhanch.  
 = *Melandrium apetalum* (L.) Fenzl  
 Norton Bay Christmas Mtn. 7327  
 Debauch Mtn. 7280  
 Unalakleet betw. South R. and Rabbit Cr. 7898
- GASTROLYCHNIS MACROSPERMA** (A.E.Porsild) Tolm. & Kozhanch.  
 = *Melandrium macrospermum* A.E.Porsild  
 Norton Bay Debauch Mtn. 7841  
 upper Unalakleet R. 8089  
 Unalakleet vic. VABM Chirokey 7081, 7949
- MINUARTIA ARCTICA** (Steven) Böcher Arctic Sandwort  
 Norton Bay Debauch Mtn. 7229  
 Unalakleet betw. South R. and Rabbit Cr. 7152  
 South River drainage 7028
- MINUARTIA BIFLORA** (L.) Schinz & Thell.  
*Ranked S2 by AKNHP, minor range extension.*  
 Norton Bay vic. Debauch Mtn. 7518  
 North Fork Unalakleet R. headwaters 8076
- MINUARTIA ELEGANS** (Cham. & Schlecht.) Schischk.  
 = *M. rossii* (R. Br.) Graebn. in part  
 Norton Bay vic. Debauch Mtn. 7494  
 Christmas Mtn. 7329  
 Unalakleet betw. South R. and Rabbit Cr. 7167
- MINUARTIA MACROCARPA** (Pursh) Ostenf.  
*Beringian endemic.*  
 Norton Bay Debauch Mtn. 7228  
 Unalakleet South River drainage 7010
- MINUARTIA RUBELLA** (Wahlenb.) Graebner  
 Norton Bay Debauch Mtn. 7227, 7833  
 North Fork Unalakleet R. 8028  
 Unalakleet betw. South R. and Rabbit Cr. 7166
- MOEHRINGIA LATERIFLORA** (L.) Fenzl Grove Sandwort  
 Norton Bay North Fork Unalakleet R. 7981  
 Tripod Flats, upper Unalakleet R. 7802  
 Unalakleet betw. South R. and Rabbit Cr. 7138
- SAGINA NIVALIS** (Lindblom) Fries  
 = *S. intermedia* Fenzl  
 Norton Bay North Fork Unalakleet R. 7972, 7999
- SAGINA SAGINOIDES** (L.) Karsten 8068
- SILENE ACAULIS** L. Moss Campion  
 Norton Bay Debauch Mtn. 7249, 7309  
 Unalakleet South River drainage 7001
- SILENE REPENS** Patrin Tall Campion  
*Moderate westward range extension.*  
 Unalakleet betw. South R. and Rabbit Cr. 7173



STELLARIA BOREALIS Bigelow subsp. BOREALIS

=*S. calycantha* (Ledeb.) Bong. *in part*  
Unalakleet vic. S of VABM Chirokey 7436  
middle Unalakleet R. 7942

STELLARIA CALYCANtha (Ledeb.) Bong.

Norton Bay vic. Debauch Mtn. 7522  
middle Unalakleet R. 7819

STELLARIA EDWARDSII R. Br.

Norton Bay middle Unalakleet R. 7931  
Unalakleet vic. S of VABM Cascade 7893

STELLARIA HUMIFUSA Rottb.

Norton Bay North Fork Unalakleet R. 7973, 7990  
Unalakleet 6967, 8093

STELLARIA LONGIPES Goldie

Norton Bay Christmas Mtn. 7347  
North Fork Unalakleet R. 8002  
middle Unalakleet R. 7818  
Unalakleet betw. South R. and Rabbit Cr. 7150  
Unalakleet 6976  
vic. S of VABM Cascade 7893

STELLARIA MONANTHA Hultén

Norton Bay Debauch Mtn. 7286

WILHELMSIA PHYSOIDES (Fischer) McNeill

*Beringian endemic.*

Norton Bay vic. Debauch Mtn. 7515  
middle Unalakleet R. 7824

Wilhelmsia

Cornaceae (Dogwood Family)

CORNUS CANADENSIS L.

Norton Bay Tripod Flats, upper Unalakleet R. CR3118

CORNUS SUECICA L.

Norton Bay vic. Debauch Mtn. 7520  
Unalakleet betw. South R. and Rabbit Cr. 7125

Dwarf Dogwood

Crassulaceae (Stonecrop Family)

RHODIOLA INTEGRIFOLIA Raf.

= *Sedum rosea* (L.) Scop. subsp. *integrifolium* (Raf.) Hultén  
Unalakleet vic. VABM Chirokey 7059

Roseroot

Cyperaceae (Sedge Family)

CAREX AQUATILIS Wahlenb.

Unalakleet vic. S of VABM Chirokey 7448

CAREX ATROFUSCA Schkuhr

Norton Bay Christmas Mtn. 7349  
Unalakleet vic. VABM Chirokey 7962

CAREX BIGELOWII Torrey

Norton Bay Christmas Mtn. 7348  
Unalakleet vic. VABM Cascade, S of Unalakleet 7477

CAREX CANESCENS L.

Norton Bay North Fork Unalakleet R. 7970  
Tripod Flats, upper Unalakleet R. CR3116B  
Unalakleet North River valley 7045

CAREX CAPILLARIS L.

*Minor westward range extension.*

Norton Bay Christmas Mtn. 7353, 7376  
Unalakleet South River drainage 6993

CAREX CRAWFORDII Fern

*Moderate westward range extension.*

Norton Bay North Fork Unalakleet R. 7966, 7985

CAREX ELEUSINOIDES Turcz.

Norton Bay North Fork Unalakleet R. 7985, 8003, 8027  
mouth of Old Woman R. 7928

CAREX GLAREOSA Wahlenb.

Unalakleet Unalakleet 6990

- CAREX GMELINII Hook. & Arn.  
Unalakleet Unalakleet 6981
- CAREX LACHENALII Schkuhr  
Norton Bay vic. Debauch Mtn. 7513  
Debauch Mtn. 7293  
Christmas Mtn. 7362  
North Fork Unalakleet R. headwaters 8071  
Unalakleet vic. VABM Cascade, S of Unalakleet 7414, 7471
- CAREX LIMOSA L.  
Norton Bay Tripod Flats, upper Unalakleet R. CR3116A
- CAREX MACKENZIEI V. Krecz.  
Unalakleet Unalakleet 7538
- CAREX MEDIA R. Br.  
Norton Bay North Fork Unalakleet R. 7969
- CAREX MEMBRANACEA Hook.  
Norton Bay Christmas Mtn. 7350  
North Fork Unalakleet R. 8011  
Unalakleet vic. S of VABM Chiroscopy 7444
- CAREX MICROCHAETA Holm  
Norton Bay Debauch Mtn. 7238, 7295  
Unalakleet W of upper Chiroscopy R. 7204
- CAREX MICROCHAETA Holm subsp. NESOPHILA (Holm) D.F. Murray  
=*C. nesophila* Holm  
Unalakleet vic. S of VABM Chiroscopy 7429, 7439  
vic. VABM Chiroscopy 7050, 7957  
vic. S of VABM Cascade 7895
- CAREX MISANDRA R.Br.  
Norton Bay Christmas Mtn. 7351  
Unalakleet vic. VABM Cascade, S of Unalakleet 7426
- CAREX PODOCARPA R.Br.  
Unalakleet vic. S of VABM Chiroscopy 7453  
betw. South R. and Rabbit Cr. 7117
- CAREX RAMENSKII V. Komarov  
Unalakleet Unalakleet 6974
- CAREX RARIFLORA (Wahlenb.) Smith  
Unalakleet vic. S of VABM Chiroscopy 7447  
Unalakleet 6989
- CAREX ROTUNDATA Wahlenb.  
Unalakleet North River valley 7042
- CAREX RUPESTRIS All.  
Norton Bay Debauch Mtn. 7834
- CAREX SAXATILIS L.  
Norton Bay North Fork Unalakleet R. 7992  
mouth Old Woman R. 7927  
Unalakleet vic. VABM Chiroscopy 7927
- CAREX SCIRPOIDEA Michaux  
Unalakleet betw. South R. and Rabbit Cr. 7168
- CAREX TENUIFLORA Wahlenb.  
Norton Bay Tripod Flats, upper Unalakleet R. 7815
- CAREX VAGINATA Tausch  
Norton Bay Christmas Mtn. 7372  
Unalakleet betw. South R. and Rabbit Cr. 7912
- ELEOCHARIS KAMTSCHATICA (C. Meyer) V. Komarov  
*Beringian endemic, ranked S2 by AKNHP.*  
Unalakleet Unalakleet 6975
- ERIOPHORUM ANGUSTIFOLIUM Honck. Tall Cottongrass  
Norton Bay Debauch Mtn. 7316  
Tripod Flats, upper Unalakleet R. CR3115
- ERIOPHORUM CALLITRIX Cham.  
Norton Bay Christmas Mtn. 7352, 7356  
Unalakleet vic. S of VABM Cascade 7896
- ERIOPHORUM RUSSEOLUM Fries var. ALBIDUM W. Nyl.  
Unalakleet vic. S of VABM Chiroscopy 7452

ERIOPHORUM SCHEUCHZERI Hoppe  
 Norton Bay vic. Debauch Mtn. 7488  
 North Fork Unalakleet R. 7968, 7993

KOBRESIA SIBIRICA Turcz.  
*Minor southwestward range extension.*  
 Norton Bay Christmas Mtn. 7319

Diapensiaceae (Diapensia Family)

DIAPENSIA LAPPONICA L. subsp. OBOVATA (F. Schmidt) Hultén Diapensia  
 Unalakleet South River drainage 7030

Empetraceae (Crowberry Family)

EMPETRUM HERMAPHRODITUM (Lange) Hagerup Crowberry  
 =*E. nigrum* L. subsp. *hermaphroditum* (Lange) Bocher  
 Unalakleet South River drainage 6999

Equisetaceae (Horsetail Family)

EQUISETUM ARVENSE L.  
 Norton Bay vic. Debauch Mtn. 7315  
 Unalakleet vic. S of VABM Chiroscopy 7441  
 vic. VABM Chiroscopy 7066

EQUISETUM FLUVIATILE L. ampl. Ehrh.  
 Unalakleet vic. VABM Chiroscopy 7952  
 middle Unalakleet R. 7944

EQUISETUM PRATENSE Ehrh.  
 Unalakleet betw. South R. and Rabbit Cr. 7171

EQUISETUM SCIRPOIDES Michaux  
 Unalakleet betw. South R. and Rabbit Cr. 7172

EQUISETUM SILVATICUM L.  
 Norton Bay Christmas Mtn. 7378  
 Unalakleet vic. S of VABM Chiroscopy 7433

EQUISETUM VARIEGATUM Schleicher  
 Norton Bay North Fork Unalakleet R. 8000, 8029

Ericaceae (Heath Family)

ANDROMEDA POLIFOLIA L. Bog Rosemary  
 Norton Bay Christmas Mtn. 7337

ARCTOUS ALPINA (L.) Niedenzu Alpine Bearberry  
 =*Arctostaphylos alpina* (L.) Spreng.  
 Unalakleet South River drainage 6997

ARCTOUS RUBRA (Rehder & E. Wilson) Nakai Red Bearberry  
 =*Arctostaphylos rubra* (Rehder & Wilson) Fern.  
 Norton Bay Christmas Mtn. 7346

CASSIOPE TETRAGONA (L.) D. Don Mountain Heather  
 Unalakleet vic. VABM Chiroscopy 7080

LEDUM PALUSTRE L. subsp. DECUMBENS (Aiton) Hultén Labrador Tea  
 Unalakleet South River drainage 6998

LOISELEURIA PROCUMBENS (L.) Desv. Alpine Azalea  
 Norton Bay Debauch Mtn. 7219, 7304  
 Unalakleet South River drainage 7021

OXYCOCCUS MICROCARPUS Turcz. ex Rupr. Bog Cranberry  
 Norton Bay Tripod Flats, upper Unalakleet R. 7814  
 Unalakleet vic. S of VABM Chiroscopy 7450

PHYLLODOCE COERULEA (L.) Bab.  
 Norton Bay North Fork Unalakleet R. headwaters 8045  
 Unalakleet vic. VABM Chiroscopy 7483  
 vic. VABM Cascade, S of Unalakleet 7420

RHODODENDRON CAMTSCHATICUM Pallas  
 Unalakleet vic. VABM Cascade, S of Unalakleet 7421  
 betw. South R. and Rabbit Cr., 7139  
 vic. S of VABM Cascade 7880

VACCINIUM ULIGINOSUM L. Blueberry  
 Unalakleet W of upper Chiroscopy R. 7205

VACCINIUM VITIS-IDAEA L.		Lowbush Cranberry
Norton Bay	vic. Debauch Mtn. 7875	
Unalakleet	vic. S of VABM Chirokey 7449	
Fabaceae (Pea Family)		
ASTRAGALUS ABORIGINUM Richardson		
Norton Bay	Debauch Mtn. 7235	
	North Fork Unalakleet R. headwaters 8063	
Unalakleet	betw. South R. and Rabbit Cr. 7147	
ASTRAGALUS ALPINUS L.		Alpine Milk Vetch
Norton Bay	vic. Debauch Mtn. 7517	
	Debauch Mtn. 7209	
	middle Unalakleet R. 7820	
Unalakleet	Unalakleet 6968	
ASTRAGALUS SEALEI Lepage		
= <i>A. eucosmus</i> Hornem. subsp. <i>sealei</i> (Lepage) Hultén		
Norton Bay	E of Ungalik R. 7405	
ASTRAGALUS UMBELLATUS Bunge		Hairy Alpine Milk Vetch
<i>Beringian endemic.</i>		
Norton Bay	Christmas Mtn. 7324	
	North Fork Unalakleet R. headwaters 8075	
HEDYSARUM ALPINUM L.		Eskimo Potato
Norton Bay	Christmas Mtn. 7365	
	middle Unalakleet R. 7936	
Unalakleet	betw. South R. and Rabbit Cr. 7128	
LUPINUS ARCTICUS S. Watson		Arctic Lupine
Norton Bay	Debauch Mtn. 7317	
	vic. Debauch Mtn. 7872	
Unalakleet	South River drainage 6992	
OXYTROPIS BRYOPHILA (E. Greene) Jurtzev		Blackish Oxytrope
= <i>O. nigrescens</i> (Pallas) Fischer subsp. <i>bryophila</i> (Greene) Hultén		
<i>Beringian endemic.</i>		
Norton Bay	Christmas Mtn. 7389	
	Debauch Mtn. 7256, 7871	
Unalakleet	South River drainage 7031	
	Unalakleet 6988	
	betw. South R. and Rabbit Cr. 7897	
OXYTROPIS MAYDELLIANA Trautv.		Maydell's Oxytrope
Unalakleet	W of upper Chirokey R. 7189	
	betw. South R. and Rabbit Cr. 7186	
	vic. VABM Chirokey 7058	
OXYTROPIS SCAMMANIANA Hultén		Scamman's Oxytrope
<i>East Beringian endemic, minor westward range extension.</i>		
Norton Bay	North Fork Unalakleet R. headwaters 8065	
Fumariaceae (Earth Smoke Family)		
CORYDALIS PAUCIFLORA (Stephan) Pers.		Few-flowered Corydalis
Norton Bay	North Fork Unalakleet R. headwaters 8072	
Unalakleet	vic. VABM Cascade, S of Unalakleet 7460	
	vic. VABM Chirokey 7963	
Gentianaceae (Gentian Family)		
GENTIANA ALGIDA Pallas		Whitish Gentian
Norton Bay	E of Ungalik R. 7408	
	vic. VABM Chirokey 7048	
GENTIANA GLAUCA Pallas		Glaucus Gentian
Norton Bay	Debauch Mtn. 7210	
Unalakleet	vic. VABM Chirokey 7057	
	vic. S of VABM Cascade 7892	
GENTIANA PROSTRATA Haenke		Moss Gentian
Norton Bay	vic. Debauch Mtn. 7506	

GENTIANELLA PROPINQUA (Richardson) J. M. Gillett = <i>Gentiana propinqua</i> Richardson Unalakleet	betw. South R. and Rabbit Cr. 7158 vic. VABM Chiroiskey 7068	Four-parted Gentian
LOMATOGONIUM ROTATUM (L.) E. Fries Unalakleet	Unalakleet 7530	Marsh Felswort
MENYANTHES TRIFOLIATA L. Norton Bay	Tripod Flats, upper Unalakleet R. CR3113	Buckbean
Grossulaceae (Gooseberry Family)		
RIBES TRISTE Pallas Norton Bay Unalakleet	mouth of Old Woman R. 7923 betw. South R. and Rabbit Cr. 7133 vic. VABM Chiroiskey 7923	Northern Red Current
Haloragaceae (Water Milfoil Family)		
HIPPERUS VULGARIS L. Norton Bay	North Fork Unalakleet R. 8012	Mare's Tail
Iridaceae (Iris Family)		
IRIS SETOSA Pallas Norton Bay Unalakleet	North Fork Unalakleet R. 8010 vic. S of VABM Chiroiskey 7442	Iris
Juncaceae (Rush Family)		
JUNCUS BIGLUMIS L. Norton Bay Unalakleet	Christmas Mtn. 7334 W of upper Chiroiskey R., SE of Unalakleet 7196 vic. S of VABM Cascade 7882	
JUNCUS CASTANEUS Smith Norton Bay Unalakleet	North Fork Unalakleet R. 7976 W of upper Chiroiskey R. 7194	
JUNUS FILIFORMIS L. <i>Minor northwestward range extension.</i> Norton Bay	North Fork Unalakleet R. 7965	
JUNCUS TRIGLUMIS L. Norton Bay	Christmas Mtn. 7333, 7355	
LUZULA ARCUATA (Wahlenb.) Sw. subsp. UNALASCHCENSIS (Buchenau) Hultén Norton Bay	Christmas Mtn. 7357 Debauch Mtn. 7260 South River drainage 6994	
LUZULA CONFUSA Lindeb. Norton Bay Unalakleet	Christmas Mtn. 7380 betw. South R. and Rabbit Cr. 7131 vic. VABM Chiroiskey 7072 South River drainage 7012	
LUZULA KJELLMANIANA Miyabe & Kudo = <i>L. multiflora</i> (Retz.) Lej. subsp. <i>multiflora</i> var. <i>kjellmaniana</i> Miyabe & Kudo Norton Bay	Christmas Mtn. 7361 Debauch Mtn. 7290 North Fork Unalakleet R. headwaters 8079 vic. VABM Chiroiskey 7099	
LUZULA MULTIFLORA (Retz.) Lej. Norton Bay Unalakleet	Debauch Mtn. 7236 vic. S of VABM Chiroiskey 7446 W of upper Chiroiskey R. 7191 betw. South R. and Rabbit Cr. 7124 South River drainage 6995	
LUZULA PARVIFLORA (Ehrh.) Desv. Norton Bay	Christmas Mtn. 7379	
LUZULA RUFESCENS Fischer Norton Bay	vic. Debauch Mtn. 7512 North Fork Unalakleet R. 8005 Tripod Flats, upper Unalakleet R. 7801	

- LUZULA WAHLENBERGII Rupr.  
Norton Bay Christmas Mtn. 7354
- Juncaginaceae (Arrowgrass Family)
- TRIGLOCHIN PALUSTRE L.  
Unalakleet Unalakleet 7531
- Lentibulariaceae (Bladderwort Family)
- PINGUICULA VILLOSA L. Bog Violet, Butterwort  
Norton Bay Old Woman Mtn. 7831  
Unalakleet vic. S of VABM Chiroscopy 7445
- PINGUICULA VULGARIS L.  
Norton Bay Christmas Mtn. 7336
- Liliaceae (Lily Family)
- LLOYDIA SEROTINA (L.) Rchb. Alp Lily  
Norton Bay vic. Debauch Mtn. 7500  
Christmas Mtn. 7390  
North Fork Unalakleet R. headwaters 8074  
Unalakleet South River drainage 7014
- STREPTOPUS AMPLEXIFOLIUS (L.) DC. Twisted Stauk  
Unalakleet vic. VABM Chiroscopy 7955
- TOFIELDIA COCCINEA Richardson False Asphodel  
Unalakleet South River drainage 7008
- TOFIELDIA PUSILLA (Michaux) Pers.  
Norton Bay Christmas Mtn. 7328
- VERATRUM ALBUM L. subsp. OXYSEPALUM (Turcz.) Hultén  
*Beringian endemic, minor southeastward range extension.*  
Norton Bay vic. Debauch Mtn. 7516  
Debauch Mtn. 7307  
Unalakleet betw. South R. and Rabbit Cr. 7174  
vic. VABM Chiroscopy 7964
- ZYGADENUS ELEGANS Pursh Death Camus  
Unalakleet betw. South R. and Rabbit Cr. 7176
- Lycopodiaceae (Clubmoss Family)
- HUPERZIA HALEAKALAE (Brackenridge) Holub Fir Clubmoss  
*=Lycopodium selago L.*  
Unalakleet South River drainage 7003
- LYCOPODIUM ALPINUM L.  
Norton Bay Debauch Mtn. 7310  
Unalakleet vic. S of VABM Chiroscopy 7456  
vic. VABM Chiroscopy 7063
- LYCOPODIUM ANNOTINUM L. Stiff Clubmoss  
Norton Bay Christmas Mtn. 7385  
Unalakleet vic. VABM Chiroscopy 7062
- LYCOPODIUM CLAVATUM L.  
Norton Bay E of Ungalik R. 7411
- Onagraceae (Evening Primrose Family)
- EPILOBIUM ANAGALLIDIFOLIUM Lam.  
Norton Bay vic. Debauch Mtn. 7521  
Unalakleet vic. VABM Cascade, S of Unalakleet 7467
- EPILOBIUM ANGUSTIFOLIUM L. Tall Fireweed  
Unalakleet vic. VABM Chiroscopy 7047
- EPILOBIUM DAVURICUM Fischer  
Norton Bay Christmas Mtn. 7331
- EPILOBIUM HORNEMANNII Rchb. subsp. HORNEMANNII  
Norton Bay vic. Debauch Mtn. 7507  
Unalakleet vic. S of VABM Chiroscopy 7437  
vic. VABM Chiroscopy 7482  
vic. VABM Cascade, S of Unalakleet 7466

- EPILOBIUM LATIFOLIUM L.** Dwarf Fireweed  
 Unalakleet betw. South R. and Rabbit Cr. 7156
- EPILOBIUM PALUSTRE L.**  
 Unalakleet vic. VABM Cascade, S of Unalakleet 7478  
 Unalakleet 6977
- Ophioglossaceae (Adder's Tongue Family)
- BOTRYCHIUM BOREALE (Fries) Milde** Moonwort  
 Norton Bay vic. Debauch Mtn. 7509B  
 North Fork Unalakleet R. headwaters 8040  
 Unalakleet vic. VABM Cascade, S of Unalakleet 7418, 7468  
 betw. South R. and Rabbit Cr. 7163
- BOTRYCHIUM LUNARIA (L.) Sw.**  
 Norton Bay vic. Debauch Mtn. 7509A
- Orchidaceae (Orchid Family)
- CORALLORRHIZA TRIFIDA Chatel.** Coral Root Orchid  
 Unalakleet betw. South R. and Rabbit Cr. 7913  
 vic. S of VABM Cascade 7881
- PLATANThERA OBTUSATA (Pursh) Lindley**  
 Norton Bay Christmas Mtn. 7382  
 North Fork Unalakleet R. 7996  
 middle Unalakleet R. 7825
- Orobanchaceae (Broomrape Family)
- BOSCHNIAKIA ROSSICA (Cham. & Schldl.) B. Fedtsch.**  
 Norton Bay Christmas Mtn. 7383  
 Unalakleet betw. South R. and Rabbit Cr. 7164
- Papaveraceae (Poppy Family)
- PAPAVER sp.**  
*Unusual specimen, set aside for study by David F. Murray (ALA).*  
 North Fork Unalakleet R. headwaters 8057
- PAPAVER LAPPONICUM (Tolm.) Nordh.**  
 Norton Bay Christmas Mtn. 7387
- PAPAVER MACOUNII E. Greene subsp. DISCOLOR (Hultén) Rändel ex D.F. Murray**  
 Norton Bay Christmas Mtn. 7377  
 Unalakleet betw. South R. and Rabbit Cr. 7134
- PAPAVER MACOUNII E. Greene subsp. MACOUNII**  
*East Beringian endemic.*  
 Unalakleet 6985, 8096
- PAPAVER NUDICAULE L. subsp. AMERICANUM Rändel ex D.F. Murray**  
*East Beringian endemic, ranked S3 by AKNHP.*  
 Unalakleet vic. VABM Chirokey 7078
- PAPAVER RADICATUM Rott. ssp. ALASKANUM (Hultén) J.P. Anderson**  
 =*Papaver alaskanum* Hultén  
*Beringian endemic.*  
 Norton Bay Debauch Mtn. 7275, 7867  
 upper Unalakleet R. 8087  
 North Fork Unalakleet R. 8024  
 Old Woman Mtn. 7828  
 Unalakleet vic. VABM Chirokey 7092, 7945
- Plumbaginaceae (Leadwort Family)
- ARMERIA MARITIMA (Miller) Willd.**  
 Norton Bay E of Ungalik R. 7398
- Poaceae (Grass Family)
- AGROSTIS MERTENSII Trin.**  
 =*A. borealis* Hartm.  
 Unalakleet vic. VABM Chirokey 7956
- AGROSTIS SCABRA Willd.**  
 Norton Bay North Fork Unalakleet R. 7978

- AGROSTIS TRINII Turcz.  
*Beringian endemic, rare in Alaska.*  
 Unalakleet South River drainage 7016  
 Unalakleet 6983
- ALOPECURUS ALPINUS Smith  
 Norton Bay vic. Debauch Mtn. 7487
- ARCTAGROSTIS LATIFOLIA (R.Br.) Griseb. Polar Grass  
 Norton Bay North Fork Unalakleet R. 7998  
 Unalakleet vic. S of VABM Chirokey 7454
- ARCTOPHILA FULVA (Trin.) Andersson  
 Unalakleet middle Unalakleet R. 7940
- BROMOPSIS PUMPELLIANA (Scribn.) Holub subsp. ARCTICA (Shear) A. Löve & D. Löve  
 =*Bromus pumpellianus* Scribn. var. *arctica* (Shear) A.E. Porsild  
 Unalakleet betw. South R. and Rabbit Cr. 7118
- CALAMAGROSTIS CANADENSIS (Michaux) P.Beauv.  
 Unalakleet vic. S of VABM Chirokey 7438
- CALAMAGROSTIS DESCHAMPSIOIDES Trin.  
 Unalakleet Unalakleet 6973, 8097
- CALAMAGROSTIS LAPPONICA (Wahlenb.) Hartman F.  
 Norton Bay Christmas Mtn. 7384  
 Unalakleet vic. VABM Chirokey 7067
- ELYMUS TRACHYCAULUS (Link) Gould ex Shinners  
 Norton Bay middle Unalakleet R. 7919
- ELYMUS TRACHYCAULUS (Link) Gould ex Shinners  
 subsp. VIOLACEUS (Hornem.) A. Loeve & D. Loeve  
 Norton Bay North Fork Unalakleet R. 7979, 7988  
 middle Unalakleet R. 7933
- FESTUCA ALTAICA Trin.  
 Norton Bay Debauch Mtn. 7234  
 Unalakleet vic. VABM Cascade, S of Unalakleet 7424  
 vic. VABM Chirokey 7051
- FESTUCA BRACHYPHYLLA Schult.  
 Norton Bay Debauch Mtn. 7294  
 North Fork Unalakleet R. 8019
- FESTUCA BREVISSIMA Jurtzev  
*Beringian endemic, ranked S3 by AKNHP.*  
 Norton Bay Debauch Mtn. 7297, 7856  
 Unalakleet vic. VABM Chirokey 7071, 7109, 7951
- FESTUCA LENENSIS Drobov  
 =*F. ovina* L. subsp. *alaskana* Holmen in part  
*Beringian endemic, ranked S2S3 by AKNHP.*  
 Unalakleet betw. South R. and Rabbit Cr. 7120, 7901
- FESTUCA RUBRA L.  
 Norton Bay North Fork Unalakleet R. 7989  
 middle Unalakleet R. 7920
- FESTUCA VIVIPARA (L.) Smith  
 Norton Bay Christmas Mtn. 7335
- HIEROCHLOE ALPINA (Sw.) Roemer & Schultes Alpine Holy Grass  
 Unalakleet W of upper Chirokey R. 7192  
 South River drainage 7015
- KOELERIA ASIATICA Domin  
*Arctic-Asian species, ranked S2S3 by AKNHP.*  
 Unalakleet betw. South R. and Rabbit Cr. 7119
- POA ALPINA L.  
 Norton Bay vic. Debauch Mtn. 7504  
 North Fork Unalakleet R. 7986  
 middle Unalakleet R. 7932
- POA ARCTICA R.Br.  
 Norton Bay Christmas Mtn. 7363  
 Debauch Mtn. 7217, 7267A, 7292  
 North Fork Unalakleet R. 8001  
 middle Unalakleet R. 7934



- Unalakleet South River drainage 7013  
vic. VABM Cascade, S of Unalakleet 7415  
vic. VABM Chirokey 7098  
Unalakleet 8092
- POA EMINENS Presl  
Unalakleet Unalakleet 6978, 7529
- POA GLAUCA M. Vahl  
Norton Bay W of Ungalik R. 7395  
Debauch Mtn. 7221, 7222, 7282, 7846  
Unalakleet W of upper Chirokey R. 7200  
betw. South R. and Rabbit Cr. 7122, 7175
- POA MALACANTHA V. Komarov  
Beringian endemic, minor range extension.  
Norton Bay North Fork Unalakleet R. 8023  
Debauch Mtn. 7845
- POA PAUCISPICULA Scribn. & Merr.  
Norton Bay Debauch Mtn. 7267B, 7288  
vic. Debauch Mtn. 7528  
Unalakleet vic. VABM Cascade, S of Unalakleet 7464  
vic. VABM Chirokey 7084
- POA PRATENSIS L.  
Norton Bay North Fork Unalakleet R. 7961, 7991, 7997  
middle Unalakleet R. 7918
- POA PSEUDOABBREVIATA Roshev.  
Norton Bay Debauch Mtn. 7296, 7864  
North Fork Unalakleet R. 8018
- PUCCINELLIA PHRYGANODES (Trin.) Scribn. & Merr.  
Unalakleet Unalakleet 6972, 8095
- TRisetum SPICATUM (L.) K. Richter subsp. MOLLE (Michaux) Hultén  
Norton Bay Debauch Mtn. 7289  
North Fork Unalakleet R. 8022  
Unalakleet Unalakleet 6984
- TRisetum SPICATUM (L.) K. Richter subsp. SPICATUM  
Unalakleet W of upper Chirokey R. 7193

Polemoniaceae (Polemonium Family)

- PHLOX ALASKENSIS Jordal Alaska Phlox  
=*P. sibirica* L. var. *alaskana* (Jordal) J. Boivin  
Beringian endemic.  
Norton Bay Debauch Mtn. 7242, 7858, 7877  
North Fork Unalakleet R. 8022, 8026  
Unalakleet betw. South R. and Rabbit Cr. 7170
- POLEMONIUM ACUTIFLORUM Willd. Jacob's Ladder  
Norton Bay Christmas Mtn. 7320  
middle Unalakleet R. 7937  
Unalakleet vic. VABM Chirokey 7079
- Polygonaceae (Buckwheat Family)
- BISTORTA PLUMOSA (Small) E. Greene Pink Bistort  
=*Polygonum bistorta* L. subsp. *plumosum* (Small) Hultén  
Unalakleet South River drainage 7011
- BISTORTA VIVIPARA (L.) Gray Alpine Bistort  
=*Polygonum viviparum* L.  
Norton Bay W of Ungalik R. 7394  
Unalakleet South River drainage 7020
- OXYRIA DIGYNA (L.) Hill Mountain Sorrel  
Norton Bay Debauch Mtn. 7274  
Unalakleet vic. VABM Cascade, S of Unalakleet 7417  
vic. VABM Chirokey 7085
- POLYGONUM ALASKANUM (Small) W. Wight Alaska Wild Rhubarb  
=*Aconogonon hultenianum* (Jurtez) Tzvel.  
Norton Bay middle Unalakleet R. 7929  
Unalakleet vic. VABM Chirokey 7064

RUMEX ACETOSA L.

Norton Bay E of Ungalik R. 7410  
vic. Debauch Mtn. 7869  
Unalakleet W of upper Chirokey R. 7197  
betw. South R. and Rabbit Cr. 7127

RUMEX ARCTICUS Trautv.

Norton Bay Christmas Mtn. 7345  
Unalakleet vic. S of VABM Chirokey 7455  
middle Unalakleet R. 7939

Portulacaceae (Purslane Family)

CLAYTONIA ACUTIFOLIA Pallas

Norton Bay Christmas Mtn. 7322  
Unalakleet betw. South R. and Rabbit Cr. 7160  
vic. S of VABM Cascade 7887

CLAYTONIA SARMENTOSA C. Meyer

Norton Bay Christmas Mtn. 7321  
Debauch Mtn. 7279  
Unalakleet North Fork Unalakleet R. 8017  
betw. South R. and Rabbit Cr. 7129

Spring Beauty

CLAYTONIA SCAMMANIANA Hultén

*East Beringian endemic, westward range extension.*  
Unalakleet vic. VABM Chirokey 7480

Scamman's Spring Beauty

CLAYTONIA TUBEROSA Pallas

Norton Bay Christmas Mtn. 7358

MONTIA FONTANA L.

Unalakleet Unalakleet 6979

Potamogetonaceae (Pondweed Family)

POTAMOGETON FILIFORMIS Pers.

Unalakleet Unalakleet 6987

ZANNICHELLIA PALUSTRIS L.

*Ranked S3 by AKNHP.*

Unalakleet Unalakleet 6986

Primulaceae (Primrose Family)

ANDROSACE CHAMAEJASME Host

Norton Bay vic. Debauch Mtn. 7485  
Debauch Mtn. 7255, 7873  
Unalakleet North Fork Unalakleet R. headwaters 8042  
W of upper Chirokey R. 7202  
South River drainage 7039

Rock Jasmine

DODECATHEON FRIGIDUM Cham. & Schldl.

Norton Bay Debauch Mtn. 7215  
Unalakleet vic. VABM Chirokey 7094

Shooting Star

DOUGLASIA ALASKANA (Coville & Standley) S. Kelso

*=Androsace alaskana Coville & Standley*

*East Beringian endemic, ranked S2S3 by AKHNP.*

Norton Bay Debauch Mtn. 7250  
North Fork Unalakleet R. 8039, 8061

DOUGLASIA BERINGENSIS S. Kelso, Jurtzev & D.F. Murray

*East Beringian endemic, minor southeastward range extension, ranked S1 by AKHNP.*

Norton Bay Debauch Mtn. 7248, 7840  
North Fork Unalakleet R. 8017  
North Fork Unalakleet R. headwaters 8035, 8036, 8037, 8038, 8098

PRIMULA ANVILENSIS S. Kelso

*Minor southeastward range extension.*

Norton Bay Christmas Mtn. 7332

PRIMULA BOREALIS Duby

Unalakleet Unalakleet 7537, 8091

PRIMULA NUTANS Georgi

*=P. sibirica Jacq.*

Unalakleet Unalakleet 6966, 7536, 8090

TRIENTALIS EUROPAEA L.		Starflower
Norton Bay	Tripod Flats, upper Unalakleet R. 7803	
Unalakleet	vic. VABM Cascade, S of Unalakleet 7479	
Pyrolaceae (Wintergreen Family)		
MONESSES UNIFLORA (L.) A. Gray		
Norton Bay	Christmas Mtn. 7381	
	North Fork Unalakleet R. 8006	
PYROLA GRANDIFLORA Radius		Large-flowered Pyrola
Norton Bay	Christmas Mtn. 7323	
	upper Unalakleet R. 8084	
Unalakleet	vic. S of VABM Cascade 7883	
PYROLA MINOR L.		
Norton Bay	vic. Debauch Mtn. 7484	
	North Fork Unalakleet R. 8009	
	middle Unalakleet R. 7916	
Unalakleet	vic. VABM Cascade, S of Unalakleet 7416	
Ranunculaceae (Buttercup Family)		
ACONTITUM DELPHINIFOLIUM DC.		Monkshood
Norton Bay	Debauch Mtn. 7218	
Unalakleet	vic. VABM Chirokey 7055	
ANEMONE MULTICEPS (Greene) Standley		Blue Anemone
= <i>A. drummondii</i> S. Watson sensu Hulten in part		
<i>East Beringian endemic.</i>		
Norton Bay	vic. Debauch Mtn. 7862	
	Old Woman Mtn. 7860	
	upper Unalakleet R. 8083	
Unalakleet	vic. VABM Chirokey 7100	
	South River drainage 7029	
ANEMONE NARCISSIFLORA L. var. MONANTHA de Candolle		Narcissus-flowered Anemone
Norton Bay	Debauch Mtn. 7318, 7852	
Unalakleet	vic. VABM Chirokey 7073	
	South River drainage 7022	
ANEMONE PARVIFLORA Michaux		
Unalakleet	vic. VABM Chirokey 7101	
ANEMONE RICHARDSONII Hook.		Yellow Anemone
Norton Bay	Christmas Mtn. 7326	
	Debauch Mtn. 7302	
	middle Unalakleet R. 7826	
Unalakleet	vic. VABM Chirokey 7958	
CALTHA PALUSTRIS L.		Marsh Marigold
Norton Bay	vic. Debauch Mtn. 7486	
	middle Unalakleet R. 7827	
DELPHINIUM CHAMISSONIS Pritzel		Larkspur
= <i>D. brachycentrum</i> Ledeb.		
<i>Beringian endemic.</i>		
Norton Bay	Debauch Mtn. 7261	
Unalakleet	betw. South R. and Rabbit Cr. 7140	
DELPHINIUM GLAUCUM S. Watson		Tall Larkspur
Norton Bay	mouth of Old Woman R. 7921	
RANUNCULUS AURICOMUS L.		Goldilocks Buttercup
= <i>R. monophyllus</i> Ovcz.		
<i>First known record for North America, anticipate S1 or S2 listing with AKNHP.</i>		
Norton Bay	Debauch Mtn. 7857	
Unalakleet	vic. S of VABM Cascade 7889	
RANUNCULUS CYMBALARIA Pursh		
Unalakleet	Unalakleet 7534	
RANUNCULUS ESCHSCHOLTZII Schlechter		Mountain Buttercup
Norton Bay	vic. Debauch Mtn. 7523	
RANUNCULUS GELIDUS Karelin & Kir.		
Norton Bay	Debauch Mtn. 7233, 7835	
	North Fork Unalakleet R. headwaters 8055	

- RANUNCULUS HYPERBOREUS Rottb.  
Unalakleet Unalakleet 7535
- RANUNCULUS NIVALIS L.  
Norton Bay Christmas Mtn. 7370  
Debauch Mtn. 7269, 7300, 7850  
vic. Debauch Mtn. 7514, 7524  
Unalakleet vic. VABM Cascade, S of Unalakleet 7462  
vic. VABM Chiroscopy 7083
- RANUNCULUS PYGMAEUS Wahlenb.  
Norton Bay Debauch Mtn. 7301  
vic. Debauch Mtn. 7511  
Unalakleet North Fork Unalakleet R. 8073  
vic. VABM Cascade, S of Unalakleet 7463  
vic. VABM Chiroscopy 7959
- RANUNCULUS TRICHOPHYLLUS Chaix  
Norton Bay North Fork Unalakleet R. 8013
- THALICTRUM ALPINUM L. Alpine Meadow Rue  
Norton Bay Christmas Mtn. 7339  
North Fork Unalakleet R. headwaters 8078  
Unalakleet betw. South R. and Rabbit Cr. 7184
- THALICTRUM SPARSIFLORUM Turcz.  
Unalakleet middle Unalakleet R. 7938
- Rosaceae (Rose Family)
- ACOMASTYLIS ROSSII (R.Br.) E. Greene Ross's Avens  
=*Geum rossii* (R.Br.) Ser.  
Norton Bay Debauch Mtn. 7266, 7299, 7860  
North Fork Unalakleet R. headwaters 8067  
Unalakleet vic. VABM Chiroscopy 7088  
vic. S of VABM Cascade 7886
- COMARUM PALUSTRE L.  
=*Potentilla palustre* (L.) Scop  
Unalakleet vic. S of VABM Chiroscopy 7440
- DRYAS ALASKENSIS A.E.Porsild  
=*D. octopetala* L. subsp. *alaskensis* (A.E. Porsild) Hultén  
Norton Bay Debauch Mtn. 7212  
North Fork Unalakleet R. headwaters 8069
- DRYAS INTEGRIFOLIA M. Vahl  
Norton Bay Christmas Mtn. 7325, 7342
- DRYAS OCTOPETALA L. Eight-petaled Avens  
Unalakleet betw. South R. and Rabbit Cr. 7161  
South River drainage 7034
- NOVOSIEVERIA GLACIALIS (J.E.Adams) F. Bolle Glacial Avens  
=*Geum glaciale* J.E. Adams  
*Beringian endemic, minor southward range extension.*  
Norton Bay Debauch Mtn. 7284, 7861  
Unalakleet vic. VABM Chiroscopy 7087  
vic. S of VABM Cascade 7885
- PENTAPHYLLOIDES FLORIBUNDA (Pursh) A. Löve Tundra Rose  
=*Potentilla fruticosa* L.  
Norton Bay vic. Debauch Mtn. 7503  
Christmas Mtn. 7341  
Unalakleet betw. South R. and Rabbit Cr. 7908
- POTENTILLA BIFLORA Willd. ex Schldl.  
Norton Bay Christmas Mtn. 7366
- POTENTILLA HYPARCTICA Malte  
Norton Bay Debauch Mtn. 7277  
North Fork Unalakleet R. headwaters 8064  
upper Unalakleet R. 8082  
Unalakleet vic. VABM Chiroscopy 7103
- POTENTILLA RUBRICAULIS Lehm.  
*Southward range extension, ranked S2S3 by AKNHP.*  
Unalakleet betw. South R. and Rabbit Cr. 7146

- POTENTILLA UNIFLORA Ledeb.  
 Norton Bay E of Ungalik R. 7404  
 Debauch Mtn. 7276, 7844  
 Unalakleet betw. South R. and Rabbit Cr. 7144, 7914  
 vic. VABM Chiroscopy 7075, 7110  
 South River drainage 7024
- POTENTILLA VIRGULATA Nelson  
 Norton Bay E of Ungalik R. 7399  
 Unalakleet Unalakleet 6991, 8094
- RUBUS ARCTICUS L. subsp. ARCTICUS Nagoon Berry  
 Norton Bay Tripod Flats, upper Unalakleet R. 7805  
 Unalakleet betw. South R. and Rabbit Cr. 7136
- RUBUS CHAMAEMORUS L. Cloudberry  
 Unalakleet W of upper Chiroscopy R. 7198
- SANGUISORBA OFFICINALIS L.  
 Unalakleet betw. South R. and Rabbit Cr. 7162
- SIBBALDIA PROCUMBENS L. Burnet  
 Unalakleet vic. VABM Chiroscopy 7481
- SPIRAEA STEVENII (C. Schneider) Rydb. Alaska Spiraea  
 =*S. beauverdiana* C. Schneider  
 Unalakleet vic. VABM Chiroscopy 7049, 7948
- Rubiaceae (Madder Family)
- GALIAM BOREALE L. Northern Bedstraw  
 Unalakleet betw. South R. and Rabbit Cr. 7169
- GALIAM TRIFIDUM L.  
 Unalakleet Unalakleet 7532
- Salicaceae (Willow Family)
- POPULUS TREMULOIDES Michaux Quaking Aspen  
 Norton Bay vic. Debauch Mtn. 7313  
 Tripod Flats, upper Unalakleet R. CR3117
- SALIX ALAXENSIS (Andersson) Coville Feltleaf Willow  
 Norton Bay vic. Debauch Mtn. 7527
- SALIX ARBUSCULOIDES Andersson  
 Unalakleet middle Unalakleet R. 7941
- SALIX ARCTICA Pallas Dwarf Arctic Willow  
 Norton Bay E of Ungalik R. 7409  
 North Fork Unalakleet R. headwaters 8048  
 Unalakleet between South R. and Rabbit Cr. 7146
- SALIX BARCLAYI Andersson  
 Norton Bay mouth of Old Woman R. 7925  
 Unalakleet vic. VABM Cascade, S of Unalakleet 7425
- SALIX CHAMISSONIS Andersson  
*Beringian endemic, minor southward range extension.*  
 Norton Bay North Fork Unalakleet R. headwaters 8049
- SALIX FUSCESCENS Andersson  
 Norton Bay Tripod Flats, upper Unalakleet R. 7813, CR3114  
 Unalakleet vic. S of VABM Chiroscopy 7457  
 North River valley 7044  
 Unalakleet 6969
- SALIX HASTATA L.  
 Norton Bay vic. Debauch Mtn. 7526A
- SALIX NOVAE-ANGLIAE Andersson  
 =*S. myrtillifolia* Andersson *in part*  
 Norton Bay North Fork Unalakleet R. 8004  
 Unalakleet vic. S of VABM Cascade 7891
- SALIX PHLEBOPHYLLA Andersson  
*Beringian endemic.*  
 Norton Bay Debauch Mtn. 7232, 7283  
 Unalakleet vic. VABM Cascade, S of Unalakleet 7423  
 ridges W of upper Chiroscopy R. 7201  
 South River drainage 7023  
 betw. South R. and Rabbit Cr. 7906

<b>SALIX PLANIFOLIA</b> Pursh subsp. <b>PULCHRA</b> (Cham.) Argus		Diamond-leaf Willow
= <i>S. pulchra</i> Cham.		
Norton Bay	vic. Debauch Mtn. 7312	
	Debauch Mtn. 7262	
	middle Unalakleet R. 7935	
	Tripod Flats, upper Unalakleet R. 7800	
Unalakleet	vic. VABM Cascade, S of Unalakleet 7476	
	vic. VABM Chirokey 7093, 7954	
	North River valley 7043	
<b>SALIX POLARIS</b> Wahlenb.		
Norton Bay	vic. Debauch Mtn. 7525	
<b>SALIX PSEUDOMONTICOLA</b> C. Ball		
= <i>S. padophylla</i> Rydb.		
<i>Minor northwestward range extension.</i>		
Norton Bay	North Fork Unalakleet R. 8014	
<b>SALIX RETICULATA</b> L.		
Unalakleet	betw. South R. and Rabbit Cr. 7159	
Saxifragaceae (Saxifrage Family)		
<b>BOYKINIA RICHARDSONII</b> (Hook.) A. Gray		Bearflower
<i>East Beringian endemic.</i>		
Norton Bay	Debauch Mtn. 7268	
Unalakleet	betw. South R. and Rabbit Cr. 7911	
<b>CHRYSOSPLENIUM TETRANDRUM</b> (N. Lund) T. C. E. Fries		
Norton Bay	vic. Debauch Mtn. 7489	
	middle Unalakleet R. 7823	
Unalakleet	vic. VABM Cascade, S of Unalakleet 7469	
<b>CHRYSOSPLENIUM WRIGHTII</b> Franchet & P. A. L. Savat.		
Norton Bay	Debauch Mtn. 7254	
	North Fork Unalakleet R. headwaters 8059	
<b>PARNASSIA KOTZEBUEI</b> Cham. & Schldl.		
Norton Bay	Christmas Mtn. 7364	
	Debauch Mtn. 7306	
Unalakleet	vic. S of VABM Cascade 7884	
<b>PARNASSIA PALUSTRIS</b> L.		
Norton Bay	North Fork Unalakleet R. 7975	Grass of Parnassus
Unalakleet	North River valley 7046	
<b>SAXIFRAGA BRONCHIALIS</b> L.		
Unalakleet	vic. VABM Chirokey 7091	Yellow-spotted Saxifrage
	South River drainage 7033	
<b>SAXIFRAGA CERNUA</b> L.		
Norton Bay	Debauch Mtn. 7239	Bulblet Saxifrage
	North Fork Unalakleet R. headwaters 8058	
	North Fork Unalakleet R. 8031	
<b>SAXIFRAGA ESCHSCHOLTZII</b> Sternb.		
<i>Beringian endemic.</i>		
Norton Bay	E of Ungalik R. 7402	
	Debauch Mtn. 7253, 7838	
Unalakleet	vic. VABM Chirokey 7082	
<b>SAXIFRAGA FLAGELLARIS</b> Willd.		
Norton Bay	E of Ungalik R. 7407	
Unalakleet	South River drainage 7018	
<b>SAXIFRAGA HIERACIFOLIA</b> Waldst. & Kit.		
Norton Bay	Christmas Mtn. 7371	Stiff-stemmed Saxifrage
	Debauch Mtn. 7243	
	upper Unalakleet R. 8088	
Unalakleet	betw. South R. and Rabbit Cr. 7155	
<b>SAXIFRAGA HIRCULUS</b> L.		
Unalakleet	betw. South R. and Rabbit Cr. 7141	Bog Saxifrage
<b>SAXIFRAGA NELSONIANA</b> D. Don		
= <i>S. punctata</i> L. subsp. <i>nelsoniana</i> (D. Don) Hultén		
Norton Bay	Debauch Mtn. 7281	Brook Saxifrage
	Tripod Flats, upper Unalakleet R. 7804	
Unalakleet	vic. VABM Chirokey 7090, 7113	

SAXIFRAGA NIVALIS L.		
Norton Bay	Debauch Mtn.	7247, 7848, 7874
SAXIFRAGA OPPOSITIFOLIA L.		Purple Mountain Saxifrage
Norton Bay	Christmas Mtn.	7338
SAXIFRAGA REFLEXA Hook.		
Norton Bay	Debauch Mtn.	7214, 7870
Unalakleet	vic. VABM Chiroscopy	7060
SAXIFRAGA RIVULARIS L.		
Norton Bay	vic. Debauch Mtn.	7492
	Debauch Mtn.	7264
	North Fork Unalakleet R. headwaters	8066
Unalakleet	vic. VABM Cascade, S of Unalakleet	7470
	vic. VABM Chiroscopy	7097
SAXIFRAGA SERPYLLIFOLIA Pursh		
Norton Bay	Debauch Mtn.	7271
	upper Unalakleet R.	8086
Unalakleet	vic. VABM Chiroscopy	7089
SAXIFRAGA SPICATA D. Don		Spiked Saxifrage
Norton Bay	Debauch Mtn.	7263
Unalakleet	vic. VABM Chiroscopy	7102, 7112
Scrophulariaceae (Figwort Family)		
CASTILLEJA CAUDATA (Pennell) Rebrist.		Yellow Paintbrush
Norton Bay	North Fork Unalakleet R.	7974
Unalakleet	W of upper Chiroscopy R.	7190
	South River drainage	7002
	Unalakleet	6970
CASTILLEJA ELEGANS Malte		Elegant Paintbrush
Norton Bay	Debauch Mtn.	7272, 7298
	North Fork Unalakleet R. headwaters	8041, 8056
EUPHRASIA DISJUNCTA Fern. & Wieg.		
Unalakleet	betw. South R. and Rabbit Cr.	7157
LAGOTIS GLAUCA P. Gaertner		Weasel Snout
Norton Bay	vic. Debauch Mtn.	7499
	Christmas Mtn.	7344
Unalakleet	betw. South R. and Rabbit Cr.	7130
PEDICULARIS CAPITATA J.E. Adams		Capitate Lousewort
Norton Bay	Debauch Mtn.	7273, 7303
Unalakleet	South River drainage	6996
PEDICULARIS INTERIOR (Hultén) Molau & D.F. Murray		
= <i>P. sudetica</i> Willd. subsp. <i>interior</i> Hultén		
Norton Bay	Christmas Mtn.	7340
PEDICULARIS LABRADORICA Wirs.		
Norton Bay	Tripod Flats, upper Unalakleet R.	7811
Unalakleet	South River drainage, 25 km SE of Unalakleet	7038
PEDICULARIS LANATA Cham. & Schidl.		Wooley Lousewort
= <i>P. kanei</i> Durand		
Norton Bay	Christmas Mtn.	7359
Unalakleet	vic. VABM Chiroscopy	7077
PEDICULARIS LANGSDORFFII Fischer ex Steven		
Norton Bay	Debauch Mtn.	7258
Unalakleet	Unalakleet	7533
	vic. S of VABM Chiroscopy	7451
	vic. VABM Chiroscopy	7114
PEDICULARIS OEDERI M. Vahl		
Unalakleet	betw. South R. and Rabbit Cr.	7907
PEDICULARIS VERTICILLATA L.		
Norton Bay	vic. Debauch Mtn.	7505
	Tripod Flats, upper Unalakleet R.	7808
Unalakleet	vic. VABM Chiroscopy	7054
VERONICA WORMSKJOLDII Roemer & Schultes		Speedwell
Norton Bay	vic. Debauch Mtn.	7508

Selaginellaceae (Spikemoss Family)

SELAGINELLA SIBIRICA (Milde) Hieron.  
Norton Bay Debauch Mtn. 7220  
Unalakleet vic. VABM Chiroscopy 7104

Thelypteridaceae (Marsh Fern Family)

THELYPTERIS PHEGOPTERIS (L.) Slosson  
Unalakleet vic. S of VABM Chiroscopy 7428

Valerianaceae (Valerian Family)

VALERIANA CAPITATA Pallas  
Norton Bay mouth Old Woman R. 7924  
Unalakleet betw. South R. and Rabbit Cr. 7135  
vic. VABM Chiroscopy 7086

Capitate Valerian

Violaceae (Violet Family)

VIOLA BIFLORA L.  
Norton Bay Debauch Mtn. 7854  
Unalakleet vic. VABM Cascade, S of Unalakleet 7419  
vic. VABM Chiroscopy 7052  
South River drainage 7037

Yellow Violet

VIOLA EPIPSILA Ledeb. subsp. REPENS (Turcz.) W.Becker  
Norton Bay Debauch Mtn. 7853  
middle Unalakleet R. 7822  
Unalakleet vic. VABM Cascade, S of Unalakleet 7461  
vic. S of VABM Chiroscopy 7432

VIOLA LANGSDORFFII Fischer  
Unalakleet vic. S of VABM Chiroscopy 7431



## APPENDIX B

### NULATO HILLS FLORISTIC INVENTORY - NON-VASCULAR SPECIES LIST 1998

This list is the result of a preliminary inventory of lichens and lichen allies, hepatics, and mosses. Most collections and all observations (ca. 475) were made by Barbara Murray over a period of three days. Because time was limited, emphasis was placed on common and conspicuous taxa in one major habitat: dry noncalcareous mountain tundra. Identifications may be provisional since there was time for little more than field determinations, and many taxa require microscopic or chemical study. In such cases taxa may be determined only to genus, or the tentative nature of the identification is indicated by cf. preceding the genus or species name. This list must be considered preliminary only and should not be referenced in publication without first consulting the report author or Barbara Murray at the University of Alaska Museum Herbarium.

Collections that include a number are documented by a specimen held at the Herbarium of the University of Alaska Museum (ALA). Listings lacking numbers document observations (sight records) for easily recognized taxa at the locality indicated. All specimens and observations are databased. The scientific nomenclature used here follows that currently used at ALA.

The format is as follows:

Scientific name	USGS Quadrangle	locality	number(s)
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## MOSSES

### Amblystegiaceae

#### DREPANOCLADUS s. lat.

Norton Bay	Debauch Mtn.	98-51	
	North Fork of Unalakleet R.	98-373	
Unalakleet	VABM Chirokey vicinity	98-346, 98-367	
		98-362	

#### HYGROHYPNUM cf. COCHLEARIFOLIUM (Venturi ex De Not.) Broth.

Unalakleet	VABM Chirokey vicinity	98-338	
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### Andreaeaceae

#### ANDREAEA RUPESTRIS Hedw.

Norton Bay	Debauch Mtn.	98-17, 98-61	
Unalakleet	between Chirokey R. and South R.	98-213, 98-225	
	VABM Chirokey vicinity	98-296, 98-337, 98-365	

### Aulacomniaceae

#### AULACOMNIUM PALUSTRE (Hedw.) Schwägr.

Unalakleet	between Chirokey R. and South R.	98-276	
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#### AULACOMNIUM TURGIDUM (Wahlenb.) Schwägr.

Unalakleet	between Chirokey R. and South R.	98-205	
	VABM Chirokey vicinity		

### Bartramiaceae

#### BARTRAMIA ITHYPHYLLA Brid.

Unalakleet	between Chirokey R. and South R.	98-257	
	VABM Chirokey vicinity	98-360	

#### CONOSTOMUM TETRAGONUM (Hedw.) Lindb.

Unalakleet	between Chirokey R. and South R.	98-155	
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### Brachytheciaceae

#### BRACHYTHECIUM

Norton Bay	North Fork of Unalakleet R.	98-439, 98-445	
Unalakleet	between Chirokey R. and South R.	98-201	

#### CIRRIPHYLLUM CIRROSUM (Schwägr.) Grout

Unalakleet	between Chirokey R. and South R.	98-207	
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### Bryaceae

#### BRYUM

Norton Bay	Debauch Mtn.	98-94, 98-102	
	North Fork of Unalakleet R.	98-372, 98-393, 98-445(cf.)	
Unalakleet	between Chirokey R. and South R.	98-166, 98-169, 98-206	
		98-220B (long neck)	
	VABM Chirokey vicinity	98-315, 98-317, 98-339, 98-341, 98-344	
		98-345 (red)	

#### BRYUM ARGENTEUM Hedw.

Norton Bay	Debauch Mtn.	98-95	
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#### POHLIA

Unalakleet	VABM Chirokey vicinity	98-314	
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#### POHLIA cf. CRUDA (Hedw.) Lindb.

Norton Bay	Debauch Mtn.	98-114	
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#### POHLIA cf. DRUMMONDII (Müll.Hal.) A.L.Andrews

Norton Bay	Debauch Mtn.	98-25	
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Climaciaceae

CLIMACIUM DENDROIDES (Hedw.) F.Weber & D.Mohr  
 Norton Bay North Fork of Unalakleet R. 98-376

Dicranaceae

CYNODONTIUM

Unalakleet between Chirokey R. and South R. 98-177, 98-220A  
 VABM Chirokey vicinity 98-316  
 Norton Bay North Fork Unalakleet R. 98-432

CNESTRUM cf. SCHISTI (F.Weber & D.Mohr) I.Hagen

Norton Bay Debauch Mtn. 98-72

cf. DICRANOWEISIA

Norton Bay Debauch Mtn. 98-30

DICRANOWEISIA CRISPULA (Hedw.) Lindb. ex Milde

Unalakleet VABM Chirokey vicinity 98-348

DICRANUM

Norton Bay Debauch Mtn. 98-116  
 North Fork of Unalakleet R. 98-379  
 Unalakleet between Chirokey R. and South R. 98-160, 98-171, 98-222, 98-243  
 VABM Chirokey vicinity 98-323, 98-325

DICRANUM ELONGATUM Schleich. ex Schwägr.

Unalakleet between Chirokey R. and South R.

Ditrichaceae

cf. CERATODON

Norton Bay Debauch Mtn. 98-115  
 North Fork Unalakleet R. 98-433

CERATODON PURPUREUS (Hedw.) Brid.

Norton Bay North Fork of Unalakleet R. 98-450

DISTICHIMUM cf. CAPILLACEUM (Hedw.) Bruch & Schimp.

Unalakleet between Chirokey R. and South R. 98-172

DISTICHIMUM cf. INCLINATUM (Hedw.) Bruch & Schimp. in Bruch, Schimp. & W.Gümbel

Unalakleet between Chirokey R. and South R. 98-236

cf. DITRICHUM

Norton Bay Debauch Mtn. 98-100

Encalyptaceae

ENCALYPTA

Norton Bay Debauch Mtn. 98-29

ENCALYPTA BREVICOLLA (Bruch & Schimp. in Bruch, Schimp. & W.Gümbel) Bruch ex Ångstr.

Norton Bay Debauch Mtn. 98-89A, 98-104C(cf.)

ENCALYPTA BREVIPES Schljakov

Norton Bay Debauch Mtn. 98-104A, 98-90B  
 Unalakleet between Chirokey R. and South R. 98-219

ENCALYPTA cf. CILIATA Hedw.

Norton Bay Debauch Mtn. 98-89B

ENCALYPTA cf. RHAPTOCARPA Schwägr.

Norton Bay Debauch Mtn. 98-104B, 98-90A  
 Unalakleet between Chirokey R. and South R. 98-152

Entodontaceae

ENTODON CONCINNUS (De Not.) Paris

Unalakleet between Chirokey R. and South R. 98-175

Grimmiaceae

- GRIMMIA  
 Unalakleet between Chiroskey R. and South R. 98-233, 98-260
- GRIMMIA cf. REFLEXIDENS Müll.Hal.  
 Norton Bay Debauch Mtn. 98-35
- RACOMITRIUM ERICOIDES (F.Weber ex Brid.) Brid.  
 Norton Bay North Fork of Unalakleet R. 98-449(cf.)
- RACOMITRIUM LANUGINOSUM (Hedw.) Brid.  
 Norton Bay Debauch Mtn. 98-65  
 North Fork Unalakleet R. 98-436  
 Unalakleet between Chiroskey R. and South R.
- SCHISTIDIUM  
 Unalakleet between Chiroskey R. and South R. 98-195, 98-229
- SCHISTIDIUM APOCARPUM s. lat.  
 Norton Bay Debauch Mtn. 98-56B  
 Unalakleet between Chiroskey R. and South R. 98-265
- SCHISTIDIUM cf. RIVULARE (Brid.) Podp.  
 Unalakleet VABM Chiroskey vicinity 98-340

Hylocomiaceae

- HYLOCOMIASTRUM PYRENAICUM (Spruce) M.Fleisch.  
 Norton Bay North Fork of Unalakleet R. 98-378
- HYLOCOMIUM SPLENDENS (Hedw.) Schimp. in Bruch, Schimp. & W.Gümbel  
 Norton Bay Debauch Mtn. 98-101  
 North Fork of Unalakleet R. 98-377  
 Unalakleet between Chiroskey R. and South R.  
 VABM Chiroskey vicinity
- PLEUROZIUM SCHREBERI (Brid.) Mitt.  
 Unalakleet VABM Chiroskey vicinity 98-326
- RHYTIDIADELPHUS TRIQUETRUS (Hedw.) Warnst.  
 Norton Bay North Fork of Unalakleet R. 98-382

Hypnaceae

- HYPNUM  
 Norton Bay Debauch Mtn. 98-56A, 98-77  
 Unalakleet between Chiroskey R. and South R. 98-245(cf.)
- HYPNUM cf. REVOLUTUM (Mitt.) Lindb.  
 Norton Bay Debauch Mtn. 98-63
- PTILIMUM CRISTA-CASTRENSIS (Hedw.) De Not.  
 Unalakleet between Chiroskey R. and South R. 98-232
- PYLAIISIELLA POLYANTHA (Hedw.) Grout  
 Norton Bay North Fork of Unalakleet R. 98-401

Mniaceae

- cf. MNIUM  
 Unalakleet between Chiroskey R. and South R. 98-204, 98-221  
 VABM Chiroskey vicinity 98-350
- MNIUM cf. SPINOSUM (Voit) Schwägr.  
 Norton Bay North Fork of Unalakleet R. 98-392
- RHIZOMNIUM  
 Norton Bay North Fork of Unalakleet R. 98-380  
 Unalakleet between Chiroskey R. and South R. 98-251(cf.)

Orthotrichaceae

- ORTHOTRICHUM cf. OBTUSIFOLIUM Brid.  
 Norton Bay North Fork of Unalakleet R. 98-399, 98-431

Polytrichaceae

- OLIGOTRICHUM FALCATUM** Steere  
 Unalakleet VABM Chiroscopy vicinity 98-277, 98-319, 98-369
- POGONATUM**  
 Norton Bay Debauch Mtn. 98-112, 98-75  
 Unalakleet between Chiroscopy R. and South R. 98-244
- POLYTRICHUM**  
 Norton Bay Debauch Mtn. 98-52
- POLYTRICHUM cf. COMMUNE** Hedw.  
 Unalakleet VABM Chiroscopy vicinity 98-328
- POLYTRICHUM HYPERBOREUM** R.Br.  
 Unalakleet VABM Chiroscopy vicinity 98-318
- POLYTRICHUM JUNIPERINUM** Hedw.  
 Unalakleet between Chiroscopy R. and South R. 98-157 (or strictum)  
 98-203  
 VABM Chiroscopy vicinity
- POLYTRICHUM PILIFERUM** Hedw.  
 Unalakleet between Chiroscopy R. and South R. 98-224

Pottiaceae

- BRYOERYTHROPHYLLUM RECURVIROSTRUM** (Hedw.) P.C.Chen  
 Unalakleet between Chiroscopy R. and South R. 98-153, 98-170, 98-196(cf.)
- TORTELLA FRAGILIS** (Drumm.) Limpr.  
 Unalakleet between Chiroscopy R. and South R. 98-151, 87-197, 98-253
- TORTELLA TORTUOSA** (Hedw.) Limpr.  
 Unalakleet VABM Chiroscopy vicinity 98-324
- cf. **TORTULA**  
 Norton Bay Debauch Mtn. 98-91, 98-92M 98-93(cf.)  
 Unalakleet between Chiroscopy R. and South R. 98-259
- TORTULA LEUCOSTOMA** (R.Br.) Hook. & Grev.  
 Norton Bay Debauch Mtn. 98-106

Pterigynadraceae

- MYURELLA**  
 Unalakleet between Chiroscopy R. and South R. 98-256

Rhytidiaceae

- RHYTIDIUM RUGOSUM** (Hedw.) Kindb.  
 Norton Bay Debauch Mtn. 98-62  
 North Fork Unalakleet R. 98-437  
 Unalakleet between Chiroscopy R. and South R.  
 VABM Chiroscopy vicinity

Seligeriaceae

- SELIGERIA cf. DIVERSIFOLIA** Lindb.  
 Unalakleet between Chiroscopy R. and South R. 98-254

Sphagnaceae

- SPHAGNUM**  
 Unalakleet between Chiroscopy R. and South R. 98-241
- SPHAGNUM cf. GIRGENSOHNII** Russow  
 Unalakleet VABM Chiroscopy vicinity 98-321
- SPHAGNUM cf. LENENSE** H.Lindb. in Pohle  
 Unalakleet VABM Chiroscopy vicinity 98-335

Splachnaceae

TETRAPLODON

Unalakleet between Chirokey R. and South R. 98-199, 98-218

TETRAPLODON MNIOIDES (Hedw.) Bruch & Schimp. in Bruch, Schimp. & W.Gümbel

Unalakleet between Chirokey R. and South R. 98-200

Thuidiaceae

ABIETINELLA ABIETINA (Hedw.) M.Fleisch.

Norton Bay Debauch Mtn. 98-64

Unalakleet between Chirokey R. and South R.

Timmiaceae

TIMMIA AUSTRIACA Hedw.

Norton Bay North Fork of Unalakleet R. 98-375

Unalakleet between Chirokey R. and South R. 98-258(cf.)







Mycocaliciaceae

- CHAENOTHECOPSIS cf. SAVONICA (Räsänen) Tibell  
 Norton Bay North Fork of Unalakleet R. 98-406  
 STENOCYBE cf. PULLATULA (Ach.) Stein  
 Norton Bay North Fork of Unalakleet R. 98-415

Nephromataceae

- NEPHROMA ARCTICUM (L.) Torss.  
 Unalakleet VABM Chiroscopy vicinity 98-363  
 NEPHROMA BELLUM (Spreng.) Tuck.  
 Norton Bay Debauch Mtn. 98-109(cf.)  
 98-85D(cf.)  
 Unalakleet between Chiroscopy R. and South R. 98-246  
 NEPHROMA EXPALLIDUM (Nyl.) Nyl.  
 Norton Bay Debauch Mtn. 98-82  
 NEPHROMA PARILE (Ach.) Ach.  
 Norton Bay Debauch Mtn. 98-81  
 North Fork of Unalakleet R. 98-397 (cf.)

Ophioparmaceae

- OPHIOPARMA LAPPONICA (Räsänen) Hafellner & R.W.Rogers  
 Norton Bay Debauch Mtn. 98-97  
 Unalakleet between Chiroscopy R. and South R.  
 VABM Chiroscopy vicinity

Pannariaceae

- cf. PANNARIA  
 Unalakleet between Chiroscopy R. and South R. 98-261B  
 PSOROMA HYPNORUM (Vahl) Gray  
 Norton Bay Debauch Mtn. 98-98

Parmeliaceae

- ARCTOPARMELIA SEPARATA (Th.Fr.) Hale  
 Norton Bay Debauch Mtn. 98-55  
 Unalakleet VABM Chiroscopy vicinity 98-284  
 ASAHINEA CHRYSANTHA (Tuck.) W.L.Culb. & C.F.Culb.  
 Norton Bay Debauch Mtn. 98-79  
 Unalakleet between Chiroscopy R. and South R. 98-240  
 VABM Chiroscopy vicinity  
 ASAHINEA SCHOLANDERI (Llano) W.L.Culb. & C.F.Culb.  
 Unalakleet between Chiroscopy R. and South R. 98-174  
 VABM Chiroscopy vicinity  
 BRYOCAULON DIVERGENS (Ach.) Kärnefelt  
 Unalakleet between Chiroscopy R. and South R. 98-158  
 VABM Chiroscopy vicinity 98-282  
 BRYORIA  
 Norton Bay Debauch Mtn. 98-113(cf.)  
 North Fork of Unalakleet R. 98-413  
 cf. CETRARIA  
 Unalakleet between Chiroscopy R. and South R. 98-214  
 VABM Chiroscopy vicinity 98-286  
 CETRARIA ISLANDICA (L.) Ach.  
 Norton Bay Debauch Mtn. 98-88  
 Unalakleet between Chiroscopy R. and South R. 98-216  
 VABM Chiroscopy vicinity  
 CETRARIA LAEVIGATA Rass.  
 Norton Bay Debauch Mtn.  
 Unalakleet between Chiroscopy R. and South R.

CETRARIA cf. NIGRICANS Nyl.  
 Unalakleet VABM Chiroskey vicinity 98-320

DACTYLINA  
 Norton Bay Debauch Mtn. 98-16

DACTYLINA ARCTICA (Richardson) Nyl.  
 Norton Bay Debauch Mtn.  
 Unalakleet between Chiroskey R. and South R. 98-228

DACTYLINA cf. RAMULOSA (Hook.) Tuck.  
 Norton Bay Debauch Mtn. 98-23

FLAVOCETRARIA CUCULLATA (Bellardi) Kärnefelt & Thell  
 Norton Bay Debauch Mtn.  
 Unalakleet between Chiroskey R. and South R. 98-239  
 VABM Chiroskey vicinity

FLAVOCETRARIA NIVALIS (L.) Kärnefelt & Thell subsp. NIVALIS  
 Norton Bay Debauch Mtn.  
 North Fork of Unalakleet R. 98-390  
 Unalakleet between Chiroskey R. and South R. 98-202  
 VABM Chiroskey vicinity

HYPOGYMNIA  
 Norton Bay North Fork of Unalakleet R. 98-381A  
 98-414

HYPOGYMNIA cf. AUSTEROIDES (Nyl.) Räsänen  
 Norton Bay North Fork of Unalakleet R. 98-408

HYPOGYMNIA BITTERI (Lyngé) Ahti  
 Norton Bay North Fork of Unalakleet R. 98-412

HYPOGYMNIA PHYSODES (L.) Nyl.  
 Unalakleet VABM Chiroskey vicinity 98-332(cf.)  
 Norton Bay North Fork of Unalakleet R. 98-407(cf.)  
 98-440

HYPOGYMNIA SUBOBSCURA (Vain.) Poelt  
 Norton Bay Debauch Mtn. 98-110  
 Unalakleet between Chiroskey R. and South R.

MELANELIA  
 Norton Bay Debauch Mtn. 98-41 (hepatizon group)  
 North Fork of Unalakleet R. 98-396, 98-416

MELANELIA cf. HEPATIZON (Ach.) Thell  
 Unalakleet between Chiroskey R. and South R.  
 VABM Chiroskey vicinity 98-297, 98-298

PARMELIA OMPHALODES (L.) Ach.  
 Norton Bay Debauch Mtn. 98-36  
 Unalakleet between Chiroskey R. and South R.  
 VABM Chiroskey vicinity

PARMELIA cf. SAXATILIS (L.) Ach.  
 Unalakleet between Chiroskey R. and South R. 98-235

PARMELIA SKULTII Hale  
 Unalakleet between Chiroskey R. and South R. 98-263

PARMELIA cf. SQUARROSA Hale  
 Norton Bay North Fork of Unalakleet R. 98-409A

PARMELIA SULCATA Taylor  
 Norton Bay North Fork of Unalakleet R. 98-370(cf.)  
 98-409B(cf.)  
 98-410  
 98-420(cf.)  
 98-428  
 98-443

PSEUDEPHEBE  
 Unalakleet VABM Chiroskey vicinity 98-299, 98-368

- VULPICIDA PINASTRI (Scop.) Mattson & M.J.Lai  
 Unalakleet between Chirokey R. and South R. 98-247
- VULPICIDA TILESII (Ach.) Mattson & M.J.Lai  
 Norton Bay headwaters of North Fork of Unalakleet R. 98-453, 98-454
- XANTHOPARMELIA  
 Norton Bay Debauch Mtn. 98-70  
 98-96  
 North Fork of Unalakleet R. 98-444  
 Unalakleet between Chirokey R. and South R. 98-262  
 98-182  
 VABM Chirokey vicinity 98-313  
 98-329, 98-356

#### Peltigeraceae

- PELTIGERA  
 Norton Bay Debauch Mtn. 98-84  
 North Fork of Unalakleet R. 98-422
- PELTIGERA APHTHOSA (L.) Willd. var. APHTHOSA  
 Norton Bay Debauch Mtn. 98-111, 98-85C  
 North Fork of Unalakleet R. 98-374, 98-447  
 Unalakleet between Chirokey R. and South R. 98-212  
 VABM Chirokey vicinity 98-357(cf.)
- PELTIGERA DIDACTYLA (With.) J.R.Laundon  
 Norton Bay Debauch Mtn. 98-108  
 Unalakleet between Chirokey R. and South R.
- PELTIGERA DIDACTYLA (With.) J.R.Laundon var. DIDACTYLA  
 Norton Bay Debauch Mtn. 98-85B
- PELTIGERA cf. ELISABETHAE Gyeln.  
 Norton Bay Debauch Mtn. 98-103
- PELTIGERA LEPIDOPHORA (Nyl. ex Vain.) Bitter  
 Norton Bay Debauch Mtn. 98-85A
- PELTIGERA MEMBRANACEA (Ach.) Nyl.  
 Unalakleet VABM Chirokey vicinity 98-351(cf.)  
 98-355
- PELTIGERA PRAETEXTATA (Flörke ex Sommerf.) Zopf  
 Norton Bay North Fork of Unalakleet R. 98-448
- PELTIGERA cf. RUFESCENS (Weiss) Humb.  
 Norton Bay Debauch Mtn. 98-57
- PELTIGERA VENOSA (L.) Hoffm.  
 Norton Bay Debauch Mtn. 98-73  
 North Fork of Unalakleet R. 98-383
- SOLORINA CROCEA (L.) Ach.  
 Norton Bay Debauch Mtn.

#### Pertusariaceae

- OCHROLECHIA  
 Norton Bay Debauch Mtn. 98-42  
 Unalakleet between Chirokey R. and South R. 98-179
- OCHROLECHIA FRIGIDA (Sw.) Lyngé  
 Unalakleet between Chirokey R. and South R. 98-150, 98-173  
 VABM Chirokey vicinity 98-306
- OCHROLECHIA FRIGIDA (Sw.) Lyngé forma THELEPHOROIDES (Th.Fr.) Lyngé  
 Unalakleet VABM Chirokey vicinity 98-283
- OCHROLECHIA SUBPLICANS (Nyl.) Brodo  
 Norton Bay Debauch Mtn. 98-78  
 Unalakleet between Chirokey R. and South R.
- OCHROLECHIA UPSALIENSIS (L.) A.Massal.  
 Unalakleet between Chirokey R. and South R. 98-238

**PERTUSARIA**

Norton Bay	Debauch Mtn.	98-26 98-33, 98-50 98-86 98-99
	North Fork of Unalakleet R.	98-411 98-426
Unalakleet	between Chiroscopy R. and South R.	98-167A, 98-223, 98-237, 98-255, 98-294 98-168B 98-227
	VABM Chiroscopy vicinity	98-300

**PERTUSARIA cf. BRYONTHA (Ach.) Nyl.**

Norton Bay	Debauch Mtn.	98-21, 98-38, 98-66
Unalakleet	between Chiroscopy R. and South R.	98-165

**Physciaceae**

**PHAEOPHYSCIA**

Norton Bay	North Fork of Unalakleet R.	98-394
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**PHAEOPHYSCIA CONSTIPATA (Norrl. & Nyl.) Moberg**

Unalakleet	between Chiroscopy R. and South R.	98-261A
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**PHYSCIA AIPOLIA (Ehrh. ex Humb.) Fűrnr.**

Norton Bay	North Fork of Unalakleet R.	98-427
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**PHYSCONIA**

Norton Bay	North Fork of Unalakleet R.	98-402
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**RINODINA**

Norton Bay	Debauch Mtn.	98-47
	North Fork of Unalakleet R.	98-429

**Placynthiaceae**

**POLYCHIDIUM cf. MUSCICOLA (Sw.) Gray**

Norton Bay	Debauch Mtn.	98-107
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**Psoraceae**

**LECIDOMA cf. DEMISSUM (Rutstr.) Goth.Schneid. & Hertel**

Unalakleet	between Chiroscopy R. and South R.	98-167C
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**PSORA cf. RUBIFORMIS (Ach.) Hook.**

Unalakleet	between Chiroscopy R. and South R.	98-168A
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**Ramalinaceae**

**cf. RAMALINA**

Norton Bay	North Fork of Unalakleet R.	98-381B 98-404A 98-405, 98-421
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**Rhizocarpaceae**

**RHIZOCARPON GEOGRAPHICUM (L.) DC.**

Unalakleet	VABM Chiroscopy vicinity	
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**Sphaerophoraceae**

**SPHAEROPHORUS FRAGILIS (L.) Pers.**

Norton Bay	Debauch Mtn.	
Unalakleet	between Chiroscopy R. and South R.	98-183(cf.)
	VABM Chiroscopy vicinity	

**SPHAEROPHORUS GLOBOSUS (Huds.) Vain.**

Norton Bay	Debauch Mtn.	
Unalakleet	between Chiroscopy R. and South R.	
	VABM Chiroscopy vicinity	

Sphinctrinaceae

SPHINCTRINA TURBINATA (Pers.) De Not.  
 Unalakleet between Chirokey R. and South R. 98-168C

Stereocaulaceae

PILOPHORUS VEGAE Krog

Norton Bay Debauch Mtn. 98-20, 98-22  
 Unalakleet between Chirokey R. and South R. 98-226  
 VABM Chirokey vicinity 98-293

STEREOCAULON

Norton Bay Debauch Mtn. 98-28, 98-39, 98-48, 98-58, 98-59  
 North Fork of Unalakleet R. 98-446  
 Unalakleet between Chirokey R. and South R. 98-208, 98-210  
 VABM Chirokey vicinity 98-301

STEREOCAULON APOCALYPTICUM Nyl.

Norton Bay Debauch Mtn. 98-53  
 Unalakleet VABM Chirokey vicinity 98-303, 98-304

STEREOCAULON cf. SYMPHYCHEILUM I.M.Lamb

Norton Bay Debauch Mtn. 98-19, 98-27, 98-60  
 Unalakleet VABM Chirokey vicinity 98-285

Teloschistaceae

CALOPLACA

Norton Bay Debauch Mtn. 98-69, 98-83  
 North Fork of Unalakleet R. 98-398, 98-430  
 Unalakleet between Chirokey R. and South R. 98-234

CALOPLACA cf. CERINA (Hedw.) Th.Fr.

Norton Bay Debauch Mtn. 98-87

Trapeliaceae

PLACOPSIS CRIBELLANS (Nyl.) Räsänen

Norton Bay Debauch Mtn. 98-34  
 Unalakleet between Chirokey R. and South R.  
 VABM Chirokey vicinity

PLACOPSIS GELIDA (L.) Linds.

Norton Bay Debauch Mtn.

Umbilicariaceae

UMBILICARIA

Norton Bay Debauch Mtn. 98-105, 98-49  
 Unalakleet between Chirokey R. and South R. 98-180  
 VABM Chirokey vicinity 98-366

UMBILICARIA CAROLINIANA Tuck.

Unalakleet VABM Chirokey vicinity 98-302

UMBILICARIA HYPERBOREA (Ach.) Hoffm.

Norton Bay Debauch Mtn.  
 Unalakleet between Chirokey R. and South R.

UMBILICARIA PROBOSCIDEA (L.) Schrad.

Norton Bay Debauch Mtn.  
 Unalakleet between Chirokey R. and South R.  
 VABM Chirokey vicinity

UMBILICARIA TORREFACTA (Lightf.) Schrad.

Norton Bay Debauch Mtn.

OMPHALODISCUS VIRGINIS (Schaer.) Schol.

Unalakleet VABM Chirokey vicinity 98-352

Uncertain lichen family

THAMNOLIA VERMICULARIS (Sw.) Ach. ex Schaer.  
Norton Bay            Debauch Mtn.    98-45  
Unalakleet            between Chiroskey R. and South R.  
                                 VABM Chiroskey vicinity

Verrucariaceae

DERMATOCARPON ARNOLDIANUM Degel.  
Unalakleet            VABM Chiroskey vicinity    98-343

## APPENDIX C

### NULATO HILLS FLORISTIC INVENTORY - SITE LOCALITIES 1997-1998

All localities surveyed in the Nulato Hills are shown here on USGS topographic map images and maps included are listed on the following page. Routes taken by field crew are indicated by lines and areas covered more thoroughly are indicated by shading. Not shown are a few brief additional collecting stops including those along the road system leading out of Unalakleet, ridges west of the Ungalik River, and floodplain sites along the North Fork Unalakleet River. Few collections and no sensitive plants were recorded from these sites. All lands are under BLM management unless otherwise noted. Scale varies slightly for each figure, but the distance between grid lines on each is 1 mile.



## APPENDIX C

### NULATO HILLS FLORISTIC INVENTORY - SITE LOCALITIES 1997-1998

Figure C-1	Unalakleet vicinity	61
Figure C-2	Christmas Mountain	62
Figure C-3	Between Chiroskey and South River valleys	63
Figure C-4	VABM Cascade vicinity	64
Figure C-5	Upper Unalakleet River valley, BLM Tripod Cabin	65
Figure C-6	Debauch Mountain and vicinity	66
Figure C-7	Upper North Fork Unalakleet River valley	67
Figure C-8	Upper North Fork Unalakleet River valley, west side	68
Figure C-9	VABM Chiroskey vicinity, north of summit	69
Figure C-10	VABM Chiroskey vicinity, south of summit	70
Figure C-11	Old Women Mountain vicinity	71
Figure C-12	VABM Gross vicinity	72



Figure C-1.

U.S.G.S. Unalakleet Quadrangle (D4). Vicinity of Unalakleet. 63°52'N, 160°47'W. Areas surveyed include the semi-disturbed moist to wet graminoid meadows and raised roadways adjacent to the airport. Taxa of floristic note found here include *Eleocharis kamtschatica* (S2), *Zannichellia palustris* (S3), *Papaver macounii* ssp. *macounii*, and *Agrostis trinii*. Visited July 9 and 16, 1997 and July 4-5, 1998. Land surrounding the airport belongs to State of Alaska.

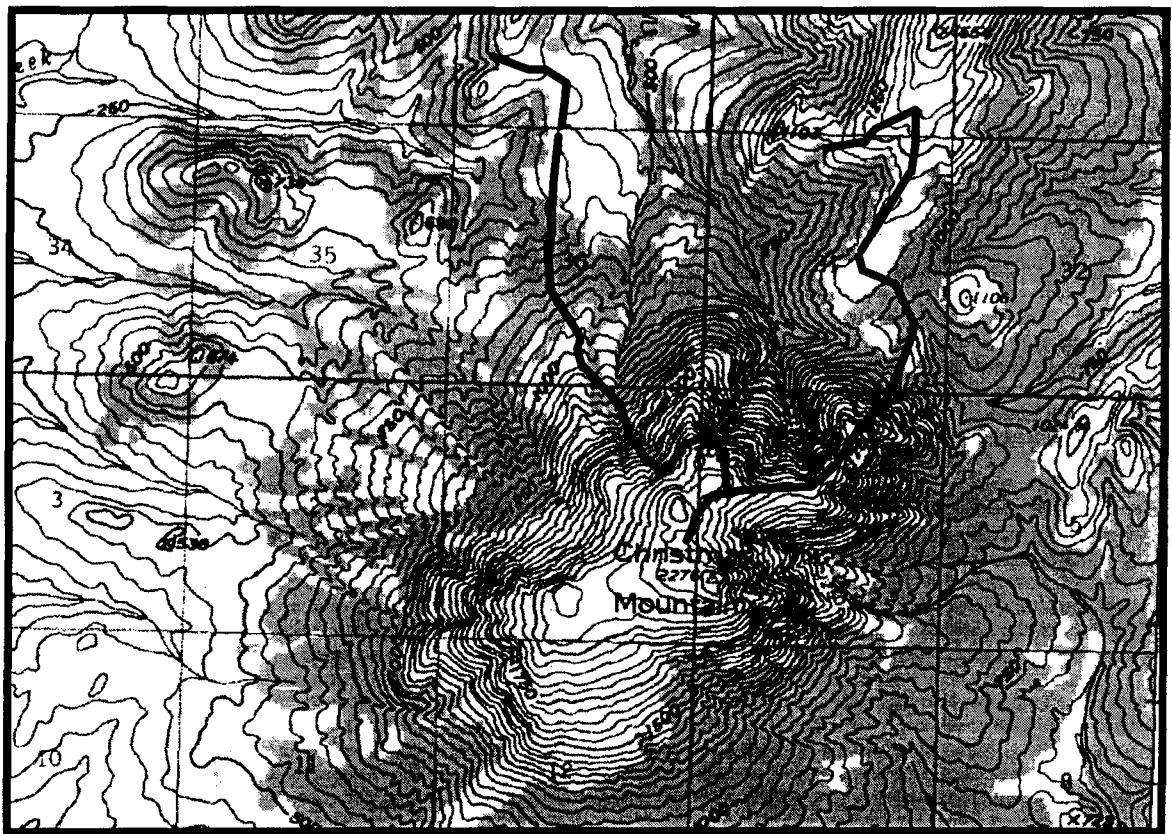


Figure C-2.

U.S.G.S. Norton Bay Quadrangle (C4). Christmas Mountain, 80 km (50 miles) NNW of Unalakleet. Summit is located at 64°34'N, 160°34'W. Site visited July 13, 1977. *Cystoperis montana* (S3) and *Primula anvilensis* were found on the sub-alpine ridge 1 mile NNE from the summit.

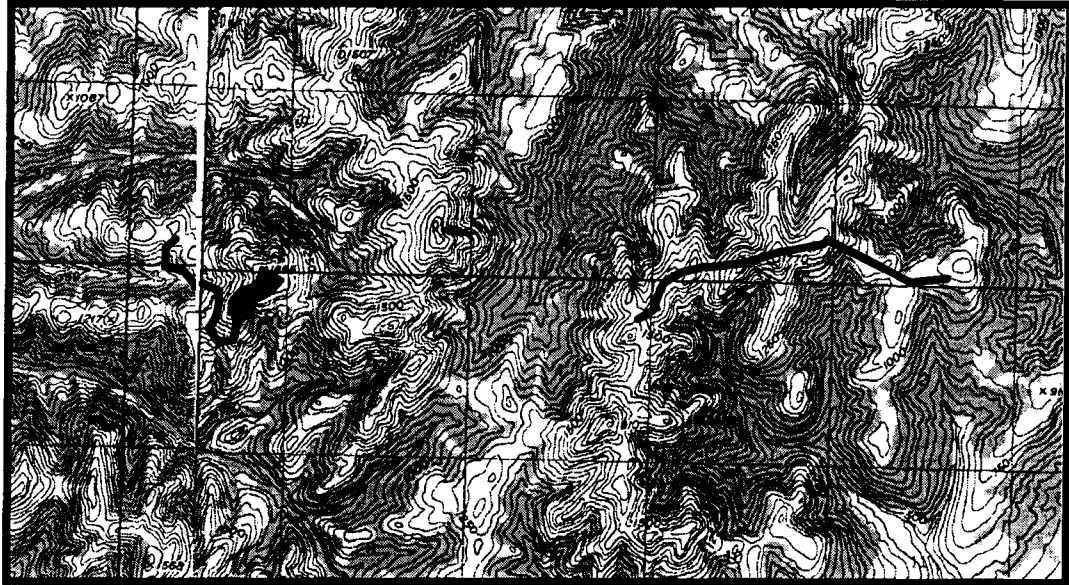


Figure C-3.

U.S.G.S. Unalakleet Quadrangle (D3,D4). Nulato Hills, ridges between Chiroskey and South River valleys, 21 km (12 miles) SE of Unalakleet. Rabbit Creek drains to the N from central portion of the image. Site indicated at left is at 63°47'N, 160°29'W. *Potentilla rubricaulus* (S2S3) was found at the westernmost end of this route. Calcareous bedrock was exposed as a talus slope within the shaded area and supported several taxa not found elsewhere in region including *Festuca lenensis* (S2S3), *Koeleria asiatica* (S2S3), and *Taraxacum careneocoloratum* (S3). Sites were visited July 11, 1997. The western site was revisited June 30, 1998.

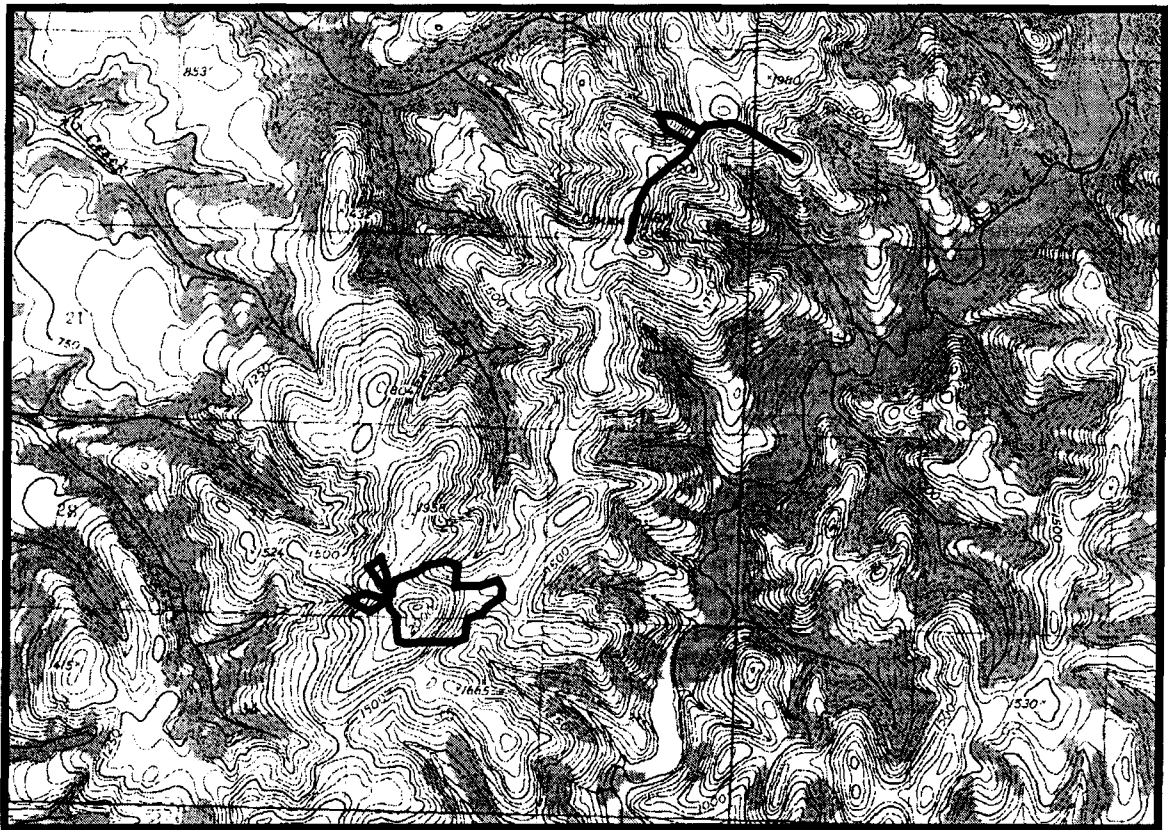


Figure C-4.

U.S.G.S. Unalakleet Quadrangle (C4). Nulato Hills, vicinity of VABM Cascade, 26 km (16 miles) SSE of Unalakleet and W of South River valley. VABM Cascade is located in the upper central portion of image at 63°40'N, 160°41'W. Northern route indicated was visited July 14-15, 1997. Route SSW of VABM Cascade was visited June 30, 1998. *Ranunculus auricomus* was growing at the head of small valley draining to SE from SE portion of route shown for June 30, 1998.

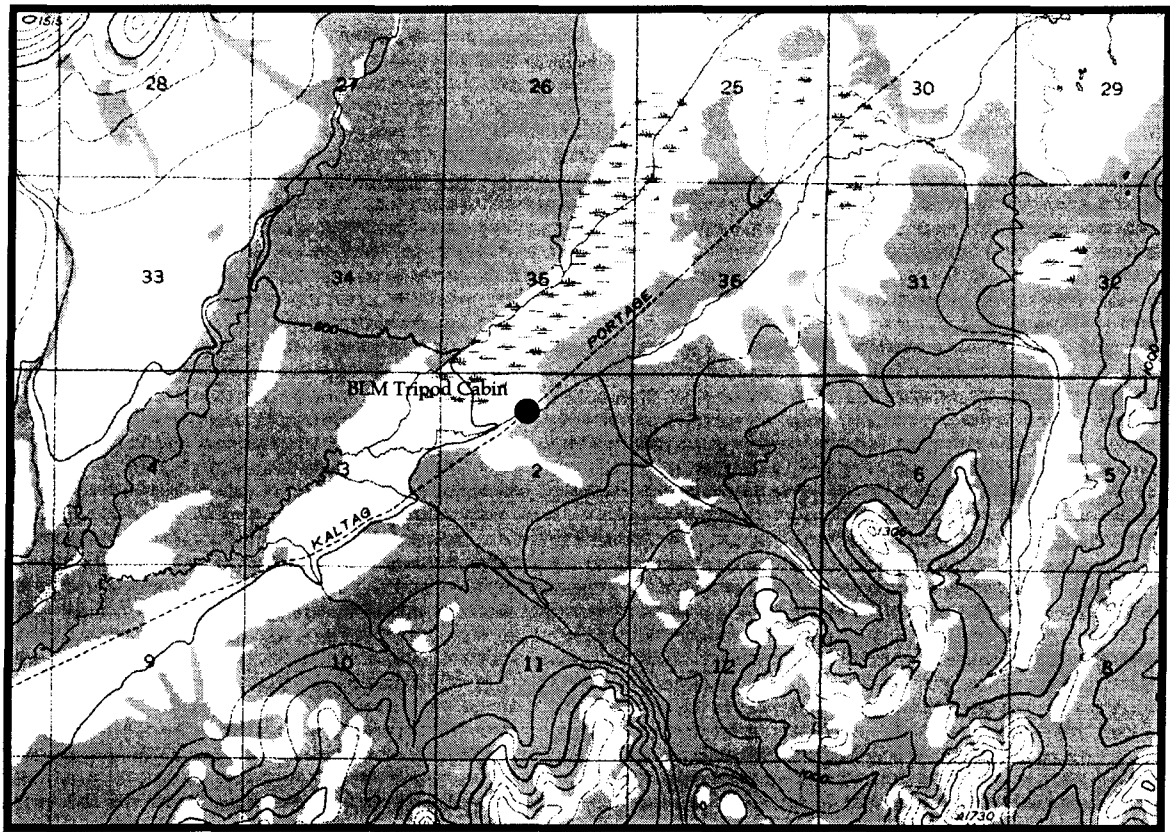


Figure C-5.

U.S.G.S. Norton Bay Quadrangle (A1). Upper Unalakleet River valley, vicinity of BLM Tripod Cabin, 64°08'N, 159°25'W. Collections were made in the immediate vicinity of the cabin on June 29 and July 1, 1998. Unalakleet River runs through upper left corner of figure. Cabin is located on a major tributary of the Unalakleet River that heads eastward toward the Kaltag River drainage.

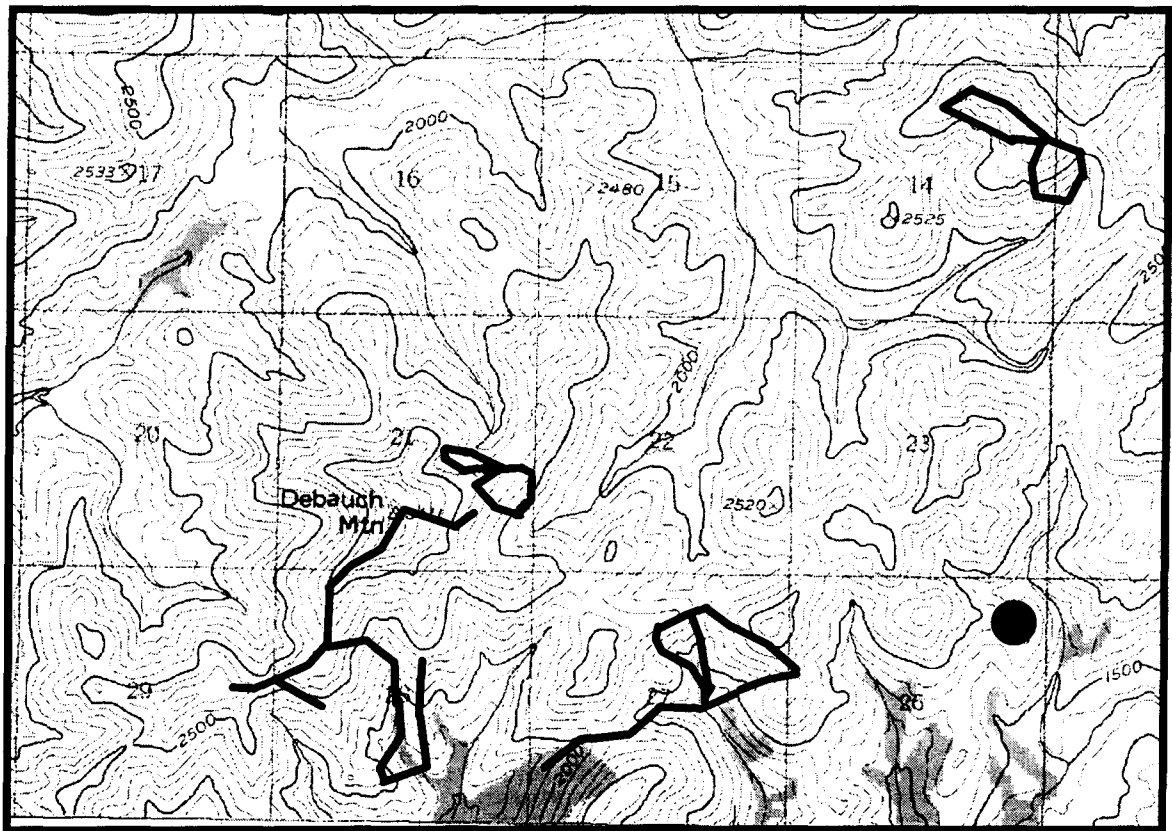


Figure C-6.

U.S.G.S. Norton Bay Quadrangle (C2). Nulato Hills, Debauch Mountain, 102 km (64 miles) NE of Unalakleet. Summit located at 64°31'N, 159°53'W. Routes indicated near the summit and on ridges heading to SW were visited July 12, 1997 and June 29, 1998. Taxa of floristic interest found here include *Douglasia beringensis* (S1), *D. alaskana* (S2S3), *Festuca brevissima* (S3), and *Poa malacantha*. A small population of *Ranunculus auricomus* was found at the head of the small drainage at southernmost end of this route in 1998.

The lower slopes 2 km ESE of the summit were visited July 15, 1997. *Minuartia biflora* (S2) and *Cardamine microphylla* ssp. *blaisdellii* were found here. The point site in the SE corner of the image and the 2 looped routes indicated NE of the summit in sections 21 and 14 present brief stops made June 30, 1998.

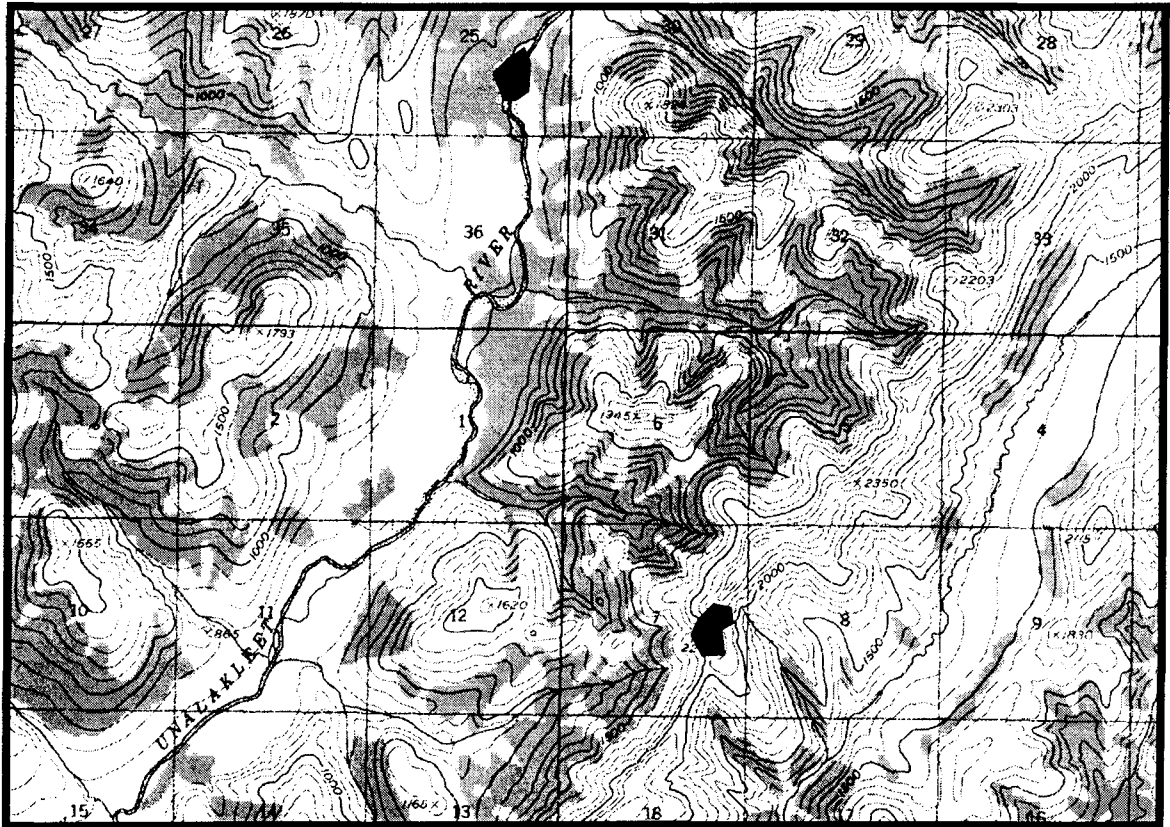


Figure C-7.

U.S.G.S. Norton Bay Quadrangle (A2). Nulato Hills, upper North Fork Unalakleet River valley. Alpine ridge site indicated E of river at 64°12'N, 159°43'W was visited July 2, 1998. *Douglasia beringensis* (S1) and *Poa malacantha* were found here. River floodplain site 5 km (3 miles) to N was one of 5 river bottom sites visited along the North Fork Unalakleet River on July 2, 1998.



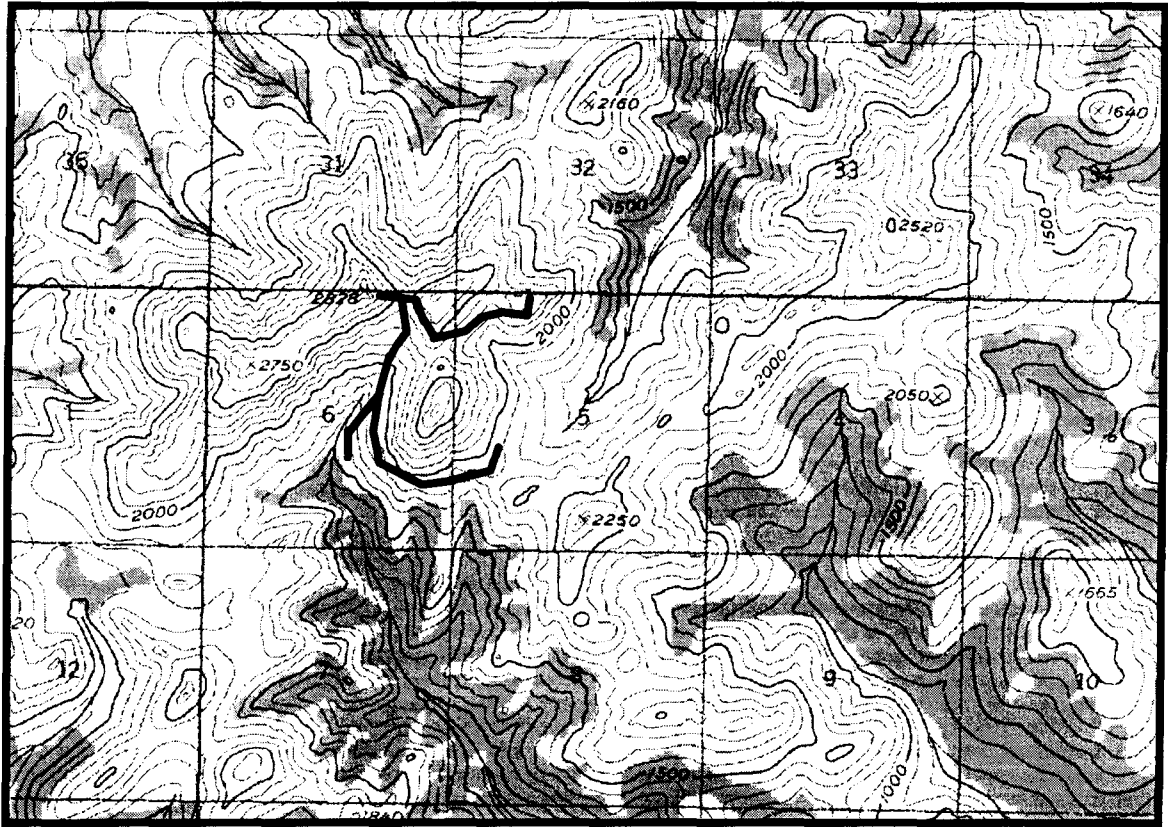


Figure C-8.

U.S.G.S. Norton Bay Quadrangle (A2). Nulato Hills, west side of upper North Fork Unalakleet River valley. Streams in lower right of figure flow to North Fork of Unalakleet River. Route indicated is located at 64°13'N, 159°55'W and was visited July 3, 1998. Taxa of interest found here included *Douglasia beringensis* (S1), *D. alaskana* (S2S3), *Cardamine microphylla* ssp. *blaisdellii*, and *Salix chamissonis*. *Douglasia beringensis* was found growing on small scree and rock outcrops throughout the area and a very large population was located on the SE-facing slope at the SE end of route.

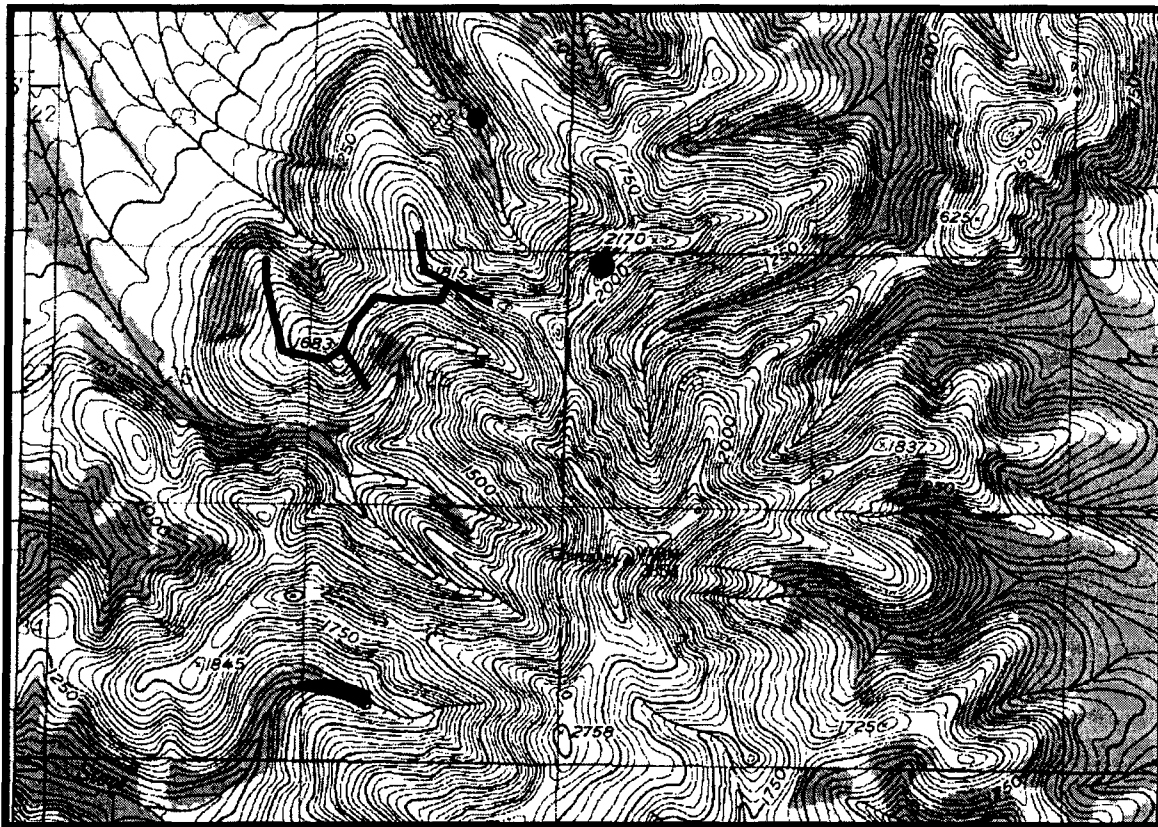


Figure C-9.

U.S.G.S. Unalakleet Quadrangle (D2). Nulato Hills, VABM Chirokey vicinity. Peak is at 63°54'N, 159°55'W. Summit area and slopes N of summit. Route indicated NW of summit was visited July 10, 1997. The three additional sites were visited on July 1, 1998. Taxa of interest found in this area include *Papaver nudicaule* ssp. *americanum* (S3) and *Festuca brevissima* (S3). *Claytonia scammaniana* was found just S of the summit during a brief, unmarked, stop on July 15, 1997.

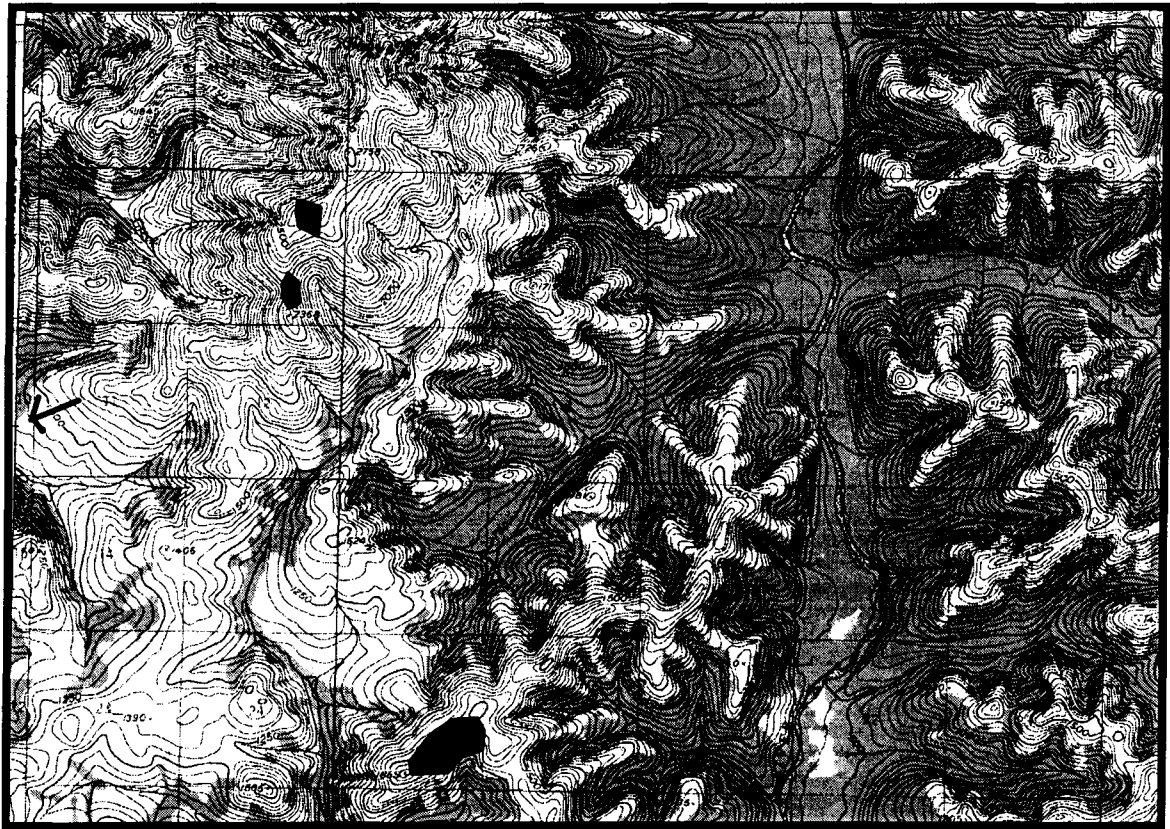


Figure C-10

U.S.G.S. Unalakleet Quadrangle (D2). Nulato Hills, VABM Chirokey and vicinity. Ridges and slopes S of summit. Peak is at 63°54'N, 159°55'W. Three sites indicated in upper left of figure, including arrow showing one site at edge of map, were visited July 10, 1997. *Festuca brevissima* (S3) was found in the two alpine sites. The subalpine site at lower edge of figure was visited July 14, 1997.

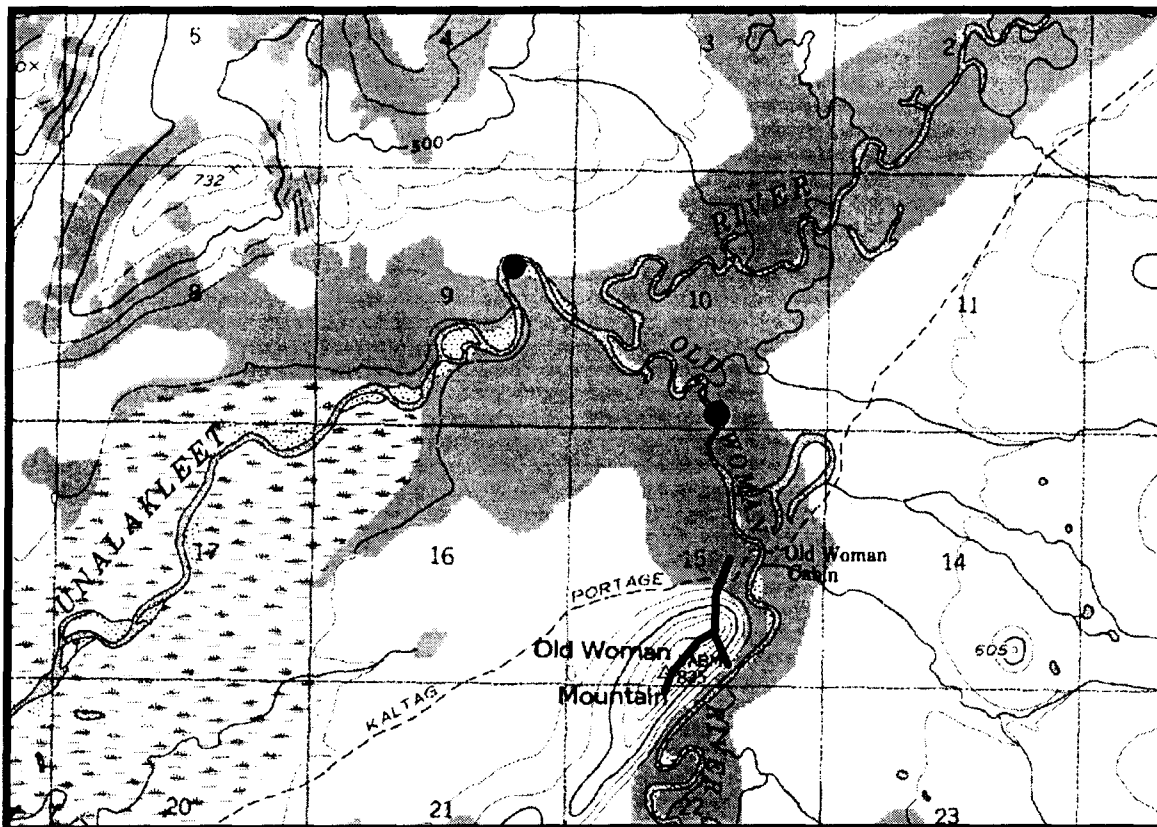


Figure C-11  
 U.S.G.S. Norton Bay Quadrangle (A2). Unalakleet River Valley, vicinity of Old Woman Mountain and confluence of Old Woman and Unalakleet rivers. Old Woman Mountain is at 64°01'N, 159°50'W. The summit and base of Old Woman Mountain were visited June 29, 1998. The two floodplain sites indicated were visited July 1, 1998.

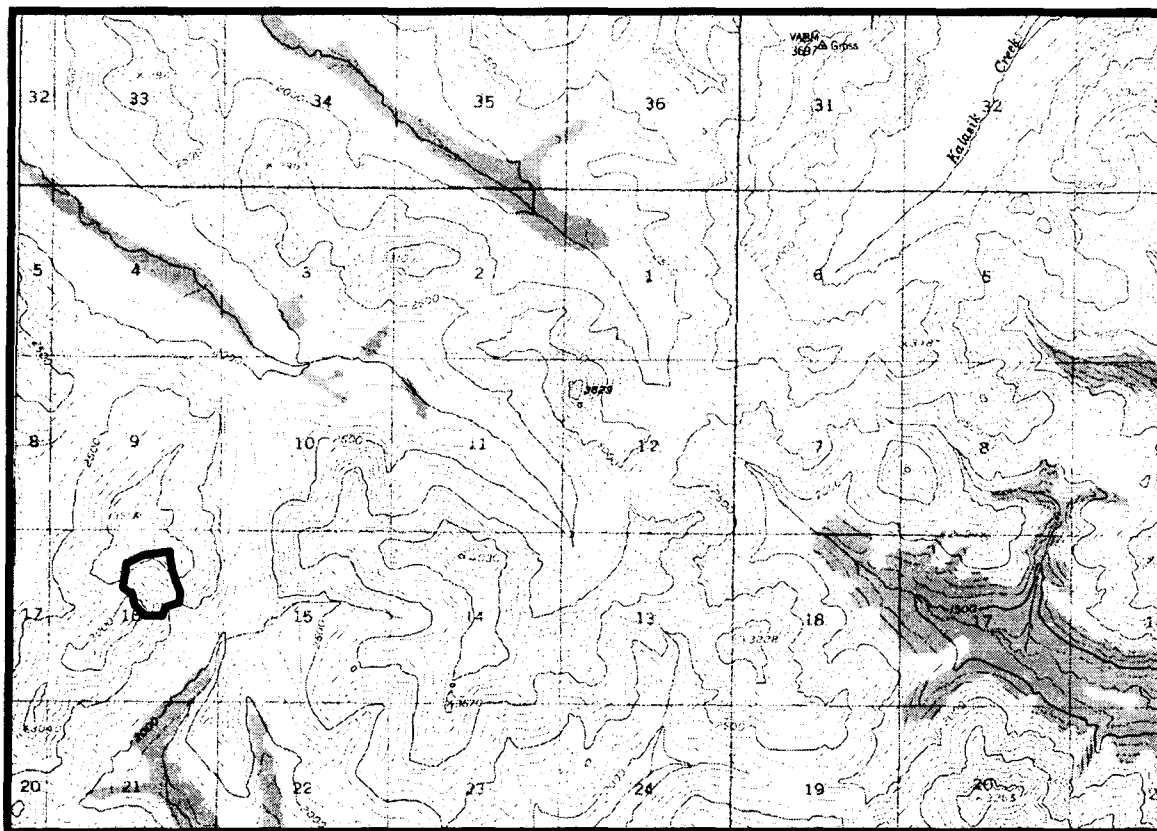


Figure C-12

U.S.G.S. Norton Bay (B1). Nulato Hills, approximately 5 miles SW of VABM Gross, headwaters of North Fork Unalakleet and Nulato rivers. Site on 'Peak 3351' is located at 64°27'N, 159°29'W and was visited July 3, 1998. Taxa of interest found here include *Oxytropis scammaniana*, *Papaver* sp., and *Cardamine microphylla* ssp. *blaisdellii*.