# LICHEN INVENTORY AND STATUS ASSESSMENT FOR GATES OF THE ARCTIC NATIONAL PARK AND PRESERVE, ALASKA

PETER NEITLICH AND LINDA HASSELBACH

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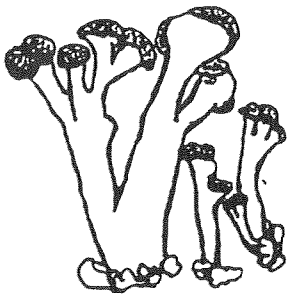

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*National Park Service*
*Gates of the Arctic National Park*
*Fairbanks, Alaska*

National Park Service, 201 First Avenue, Doyon Bldg., Fairbanks, AK 99701

# LICHEN INVENTORY AND STATUS ASSESSMENT FOR GATES OF THE ARCTIC NATIONAL PARK AND PRESERVE, ALASKA[1]

*National Park Service/Gates of the Arctic National Park/Fairbanks, Alaska*
**Peter Neitlich and Linda Hasselbach**
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## ABSTRACT

Two field seasons of macrolichen inventory were conducted in Gates of the Arctic National Park and Preserve (GAAR), Alaska. Findings from these two years were combined with all existing lichen records for the park. A total of 260 macrolichens are now reported from GAAR. Of these, 41 species are new records for GAAR, with 39 species new records for the Brooks Range, and 4 species new records for Alaska. Abundance ratings and range data are reported for macrolichen species. A total of 180 crustose lichens is also reported from consolidated literature reports. A database has been constructed with detailed location and habitat data for each species.

## INTRODUCTION

Lichens are a highly significant component of many arctic ecosystems (Viereck 1992, Thomson 1984). In Gates of the Arctic National Park and Preserve (GAAR) in the central Brooks Range of arctic Alaska, nonvascular plants probably account for more than 50% of the species and a high proportion of the overall biomass of tundra communities (GAAR 1989). Lichens constitute the major winter food source for the caribou migrating through the park (Moser et al. 1979; Boertje 1984), and serve are important sources of fixed nitrogen, antibiotic nesting material, and food for arthropods (Sharnoff 1992). The park is charged with conserving the lichen biodiversity within its boundaries, but has had little sense of which species warrant special concern.

Several previous studies have inventoried lichens in GAAR or have made brief forays into the park as part of a larger arctic study (e.g., Murray 1974; Cooper 1983; Moser et al. 1979; Thomson 1979 & 1984; Neitlich and Hasselbach 1996). This study combines extensive field work in 1996-7 with review of all existing literature in order to make a comprehensive list of macrolichens known from the park. The study then attempts to place known holdings in perspective by assessing parkwide abundance both qualitatively and quantitatively, and placing the more unusual species in context of their parkwide, statewide, and global ranges.

The taxonomy of crustose lichens is poorly known in comparison to that of macrolichens; consequently the range status of many crustose species is also poorly known, and frequently suspect due to taxonomic inconsistencies. For these reasons, we have consolidated earlier reports of crustose species (Table 7) but did not otherwise evaluate the status of these species in this report. Location records for crustose and macrolichens can be accessed in the new GAAR Lichen Database (Neitlich and Hasselbach 1998a).

## METHODS

### *Inventory*

Macrolichen collection was undertaken at 65 locations (Fig. 1, Table 1) in July and August of 1996 and 1997. Identifications were performed using Thomson (1979 and 1984), McCune and Goward (1995), Goward et al. (1994), and Brodo and Hawksworth (1977). Most determinations were made by Peter Neitlich, using collections at GAAR (Gates of the Arctic National Park Herbarium, Fairbanks, AK) and

[1] Gates of the Arctic National Park Headquarters: 201 1st Ave. Fairbanks, AK 99701. (907) 456-0281

ALA (University of Alaska at Fairbanks Herbarium) for verification. Questionable or problem specimens were sent to taxonomists including Ted Esslinger, Bruce McCune, Sam Hammer, John W. Thomson, and Trevor Goward. Nomenclature follows Esslinger and Egan (1995) with the exception of new treatments in the genera *Cetraria* and *Coelocaulon*, which follow nomenclature in McCune (1995).

### *Abundance Detection Plots*

Eleven plots were conducted in order to assess parkwide abundance of the more common species (Appendix 1). Three plots were done in spruce-lichen woodland, three in southern alpine tundra and five in northern alpine tundra. (See Table 1 for exact locations and habitats of plots). Plots were time-based rather than area-based in order to accommodate the demands of a travel-intensive inventory and to cover a broad cross-section of habitats with relatively few plots.

Abundance was rated from 1 to 4 for all species encountered in two hours as follows: 1) encountered 1-3 times; 2) encountered 4-10 times; 3) encountered > 10 times but covering less area than rating 4; 4) covering more than 25% of all area on the substrate normally occupied by that species. In this scheme, ratings of 2 and 3 were common, 1 occasional and 4 infrequent. Most species rated were identifiable in the field and not backed by voucher collections; less common species were vouchered.

### *Data Analysis*

Species abundance data was analyzed both for frequency of occurrence and for exploratory detection of community gradients. Community gradients were analyzed using the software PC-ORD (McCune and Mefford 1995). A community matrix of 11 plots by 162 species was analyzed using Nonmetric Multidimensional Scaling (a minimally-distorting ordination algorithm), Cluster Analysis for detection of groups, and Multi-Response Permutation Procedures (MRPP: a nonparametric, multivariate test of group similarity) to test Cluster and ordination groupings.

### *Parkwide Abundance Ratings*

Abundance was rated for each species in the park in a two step process. First, species recorded in abundance detection plots were grouped according to parkwide frequency scores. Preliminary groupings were: Abundant: >0.85; Common: 0.31-0.85; Occasional: 0.10-0.30; and Uncommon: <0.10. Species rated as Occasional, Common or Abundant were recorded as such in Table 3. Species rated as Uncommon, or species not found in plots were rated according to a second scale: Occasional: found at >3 locations in the park (as per GAAR Lichen Database: Neitlich and Hasselbach 1998a), often with specialized habitats or patchy distribution; Uncommon: rarely encountered, found at only 1-3 locations in the GAAR Lichen Database.

## RESULTS

### *Inventory*

This inventory synthesizes the records of lichens which were collected in 76 locations in Gates of the Arctic National Park and Preserve (Table 1, Fig. 1) by 18 sources (Table 2). A total of 260 macrolichen taxa were documented from our field work and that of 16 other projects between 1950 and present (Table 3). Five of the 260 taxa are varieties of already listed species, while the other 255 represent species and subspecies. Field work in 1996-7 yielded over 900 collections totaling 201 species, or 80% of the species known from the park. Of the additional 59 species found either in the previous park database (USDI 1989) or newly searched literature, 5 represent varieties or subspecies unrecognized in current literature (Egan and Esslinger 1995), and 6 others are likely misidentifications. Of the latter, most are now thought to be absent from Alaska and a few thought to be absent from North America entirely. Therefore, the total number of currently known park macrolichens is likely to be 249. Detailed records of each known collection in the park are cited in the GAAR Lichen Database (Neitlich and Hasselbach 1998a).

Four species--*Anaptychia ulotrichodes, Phaeophyscia decolor, Phaeophyscia kairamoi, Psora tuckermanii*--are new records for Alaska. Forty-one species (16% of the park's macrolichen flora) are new records for the park, with 39 species new records for the Brooks Range. Additional locations were found for 26 species previously known from a single location in the park. Twenty-six percent of the species listed in Table 3 represent notable extensions of formerly known ranges.

Crustose lichens were also collected, but have not yet been identified. The park's currently known crustose lichen flora is detailed in Table 7 and the GAAR Lichen Database (Neitlich and Hasselbach 1998a).

***Status Assessment***

Of the 260 lichens cited above, 5% are "abundant" (Table 4; Table 3 bottom), with nearly 50% "common" to "occasional" and 40% "uncommon". Some of the uncommon species warrant special attention. Of the 39 species which are new records for Alaska and/or for the Brooks Range, many are northern disjuncts of species more widely distributed in the southern portion of their range. Several, however, are rare throughout their range.

Some notes on species of concern follow:

*Anaptychia bryorum* Poelt. is possibly undercollected and easily confused with *Phaeophyscia*. Its range is under investigation, but is suspected to be rare. Additional investigation of this species' range will be presented in Neitlich and Hasselbach (1998b). Determined by T. Esslinger.

*Anaptychia ulotrichodes* (Vainio) Vainio is also possibly undercollected and appears superficially similar to *Physconia thomsonii*. . Its range is under investigation, but is suspected to be uncommon to rare. Additional investigation of this species' range will also be presented in Neitlich and Hasselbach (1998b). Determined by T. Esslinger.

*Cladonia subcervicornis* (Vainio) Kernst. is considered absent from North America (Esslinger and Egan 1995), but has been verified by J. W. Thomson in 1997, who also reports this species from a few locations in Alaska. It may represent a variation from *C. macrophyllodes*. Materials will be sent out for further study.

*Cladonia thomsonii* Ahti appears to be globally rare, and occurs only in Alaska and the Northwest Territories. It is reported by several sources as present in GAAR. Some material we have called *C. turgida* on the basis of chemistry has been previously annotated by J. W. Thomson as *C. thomsonii*, which differs in chemistry. Sam Hammer agreed with our chemical determination of *C. turgida* for some of the material. Subsequent retesting upheld our original determination. We will send some of this material out for further study.

*Collema glebulentum* (Nyl. *ex* Crombie) Degel. appears to be fairly sparse to rare throughout most of its range, though it is likely to be circumpolar and is known from several other locations in Alaska.

*Melanelia olivaceoides* (Krog) Essl. appears to be extremely rare in Alaska and North America. It also has some disjuncts far south in the southern hemisphere.

*Phaeophyscia ciliata* (Hoffm.) Moberg is probably circumpolar but scarce throughout its range, and rare in western North America. It has been collected in southeast Alaska, and the Alaska Peninsula (Neitlich and Hasselbach 1996) but is otherwise unknown in the state. Verified by T. Esslinger.

*Phaeophyscia constipata* (Norrlin & Nyl.) Moberg is an uncommonly reported species which becomes rare in the northern portion of its range. It is a North American and European species which has been reported as occasional to "frequent" over calcareous rock in intermountain British Columbia and the Northern Rocky Mountains (Goward et al. 1994; McCune 1995). It appears to be known in Alaska only from one other location in southcentral. Determined by T. Esslinger.

*Phaeophyscia decolor* (Kashiw) Essl. is included by many authors in *P. endococcinea*, which is also rare in Alaska. This is the only collection reported for Alaska, but some material reported as *P. endococcinea*, may be this species. Verified by T. Esslinger. Both of these species become slightly more common to the south in the Northern Rockies and British Columbia (McCune and Goward 1994, Goward et al. 1994).

*Phaeophyscia kairamoi* (Vainio) Moberg is uncommon in North America and previously unknown in published literature for Alaska. It has been reported by Neitlich and Hasselbach (1996) from the Alaska Peninsula, where it is also rare.

*Physcia phaea* (Tuck.) J. W. Thomson is fairly widespread in eastern North America, but is known in Alaska only from one other location along the eastern Yukon (Thomson and Ahti 1994).

*Psora tuckermanii* R. Anderson *ex* Timdal, a new record for Alaska, is fairly widespread in dry intermountain areas of western North America.

Some of the species reported as "Uncommon" may be misidentifications, e.g., *Peltigera collina* and *P. membranacea*. These species have been reported from earlier sources, but are now doubtful in light of the greatly improved taxonomy of this genus in the past decade. This problem is typical of the other species given (?ed.) status in Table 3.

***Range status***

The majority of range extensions in the park appear to be northward extensions of ranges in circumboreal, temperate, eastern or western North American ranges (Table 5). Beringian radiants are common in the park, but were underrepresented in range extensions. The high proportion of species widespread in Alaska reflects the modest previous amount of sampling in the Brooks Range compared to other areas.

**Table 5. Biogeographic affinities of 67 range extensions reported for Gates of the Arctic National Park and Preserve, Alaska.**

| Predominant Range | Number of Species |
|---|---|
| Widespread south/east of northern AK, primarily circumboreal/temperate | 34 |
| High arctic | 1 |
| Beringia | 2 |
| Not widespread, but frequent to infrequent throughout AK other than Brooks Range | 16 |
| Rare or unknown due to rare reporting | 14 |

Sixty-two percent of the 39 species representing new records for Alaska and/or the Brooks Range were epiphytes and another 7 percent were ligniphytes (i.e., growing on dead wood). Fully 50% of the total number of range extensions (i.e., including new park records or second sites) were epiphytes or ligniphytes. *Nephroma bellum, N. helveticum* and *N. resupinatum*, are fairly representative of other large range extensions in Table 3 in that they are epiphytes widely distributed in the Pacific Northwest, but become increasingly rare in the northern part of their range. Additional inventory should certainly look closely at epiphytes as many species probably await detection and because taxonomically difficult epiphytic genera including *Bryoria* and *Usnea* have received inadequate attention in this and other studies.

***Community Analysis***

Quantitative Exploration

A lichen community analysis of 11 time-based plots was conducted in order to allow for better interpretation of abundance data as well as to generate hypotheses about major lichen community gradients

in the park. After deletion of species occurring in fewer than 2 plots, the matrix of 11 plots by 107 macrolichen species was analyzed. Cluster analysis detected the presence of three major groups: 1) forested plots (n=3), 2) northern alpine plots (n=5), and 3) southern alpine plots (n=3). MRPP was conducted to test for multivariate differences in species-space between combined northern and southern alpine plots vs. forested plots. The test concluded that alpine plots occupied a very different region of species-space than forested plots (p= 0.0004). Subsequent testing with MRPP also revealed distinct, though less dramatic, differences between northern alpine and southern alpine plots (p=0.01). Testing of the matrix using a randomly assigned grouping variable found no detectable differences (p=0.58); similarly, testing of the alpine plots using high elevation v. low elevation, rather than latitude, found no detectable differences (p=0.51).

Ordination of the reduced-species matrix was conducted using Nonmetric Multidimensional Scaling (NMS). After rotating the graph to align major plant community type (i.e., forested v. alpine) with Axis 1, the ordination explained 87% of the variation in the data with 71% loaded on Axis 1. As expected, the "percent of plot covered by forest" variable was strongly correlated with Axis 1 (r=0.94) and the closely related "latitude" variable was strongly negatively correlated with Axis 1 (r=-0.74). These variables are related because forested plots occurred only in the southern tier of the park. Axis 2 yielded little interpretable result either in terms of environmental variables or species correlations with this axis.

The species most strongly correlated with Axis 1 were those which occurred exclusively to predominantly in forests, e.g., *Bryoria lanestris* (r=0.94), *Ramalina dilacerata* (r=0.91), and *Parmeliopsis hyperopta* (r=0.97). The species most strongly negatively correlated with Axis 1 were those strongly associated with alpine communities, e.g., *Dactylina ramulosa* (r=0.88), *Masonhalea richardsonii* (r=0.77), and *Sphaerophorus globosus* (r=0.95). It is likely that a higher number of alpine plots would have allowed better discrimination in ordination between northern alpine and southern alpine plots. It is also likely that fixed-area plots in different landforms within these two regions would have been detectable.

Hypothesized Major Lichen Communities in GAAR

This study was primarily an inventory rather than an ecological study of lichen communities. Still, field observations suggest a great deal about the potential lichen communities in the park which remain to be quantified and tested for difference. At least 15 plant communities or environments are likely to host distinct lichens communities (Table 6). To detect these differences statistically, a probable minimum of 5-8 plots per community type would be needed, totaling 75 to 120 plots.

## DISCUSSION AND CONCLUSIONS

### *Need for Statewide Database*

The database constructed in the course of this project (Neitlich and Hasselbach 1998) includes all of the species and most of the associated location records in GAAR. The database, together with the abundance and range data provided in this report, creates the framework within which to assess the rarity and potential sensitivity to impacts of each known species. This represents a far more systematic approach to the lichen species than previously available. Since none of these species is endemic to GAAR, we have attempted to place the range and rarity status of the park's lichens in regional (and where appropriate, global) context. Quick or easy approaches to this task are difficult because published floras (e.g., Thomson 1984) are out of date, published lists are quite numerous, and many unpublished collections are unrecorded. To move to a higher level of sophistication in our lichen knowledge and conservation planning, we need a statewide database that consolidates all known lichen collection records in Alaska. In many states, such lists are maintained by the Natural Heritage Program network. Since this agency is understaffed in Alaska, however, such a project may need to be funded by a consortium of federal public land agencies and state universities.

*Lichen Protection and Restoration at GAAR*
Resource managers at GAAR have long been aware of the fragility of lichen communities in areas such as Arrigetch Peaks, but have had little data to evaluate impacts.

Two management recommendations:
1. *Lichen knolls and other rocky tundra environments* contain a large number of lichen species and high lichen biomass. Unlike some areas with high biomass but low diversity of species (e.g., granite talus fields), the few lichen knolls we visited (at Walker Lake, Arrigetch Peaks, Reed River) appeared to host a high diversity of lichens. These would be excellent areas in which to focus additional inventory, and to study from a community perspective.

The lichen knolls in the Arrigetch have been degraded to the point where lichens are scarce on the knolltops and present only on the steep-sloped sides. While only one unusual species, *Peltigera kristinsonii*, was found on an Arrigetch knoll, it is likely that others await discovery. To the maximum extent possible, lichen knolls should be protected from further injury and restored using a propagule mixture from a wide variety of lichen species. Propagules can be obtained by crushing a moderate volume of mixed fruticose lichen species with an adherent agent (such as the fibrous material used by hydroseeders) and applying generously. Based on lichen growth rates of common fruticose species (Pegau 1968), it is likely that a heavily degraded area, if restored and protected, could be fairly well covered by lichens in less than 30 years and fully recovered in under 100 years.

2. *Calcareous, rocky tundras, scree and fellfields* are likely to host the greatest proportion of rare and unusual species in the park. Species including *Anaptychia ulotrichodes, Phaeophyscia kairamoi, Physcia phaea, Phaeophyscia decolor, Phaeophyscia endococcinea*, and *Psora tuckermanii* are all found on calcareous rock or soil, or on siliceous rocks in a highly calcareous zones. Such environments occur in vicinities including Kurupa Lake, Anaktuvuk Pass, Cocked Hat Mountain, Walker Lake, and the ridge system in the vicinity of Pingo Lake on the Noatak River. The areas of greatest interest are predominantly alpine and above 750 m in elevation. Calcareous areas, though not typically as high in lichen biomass or diversity as acidic zones, have a vastly different flora and will be important areas to visit in additional sampling. While impacts cannot be characterized as heavy in these areas, there has been a visible removal of lichens from rocks by boots along well-traveled routes such as the Hidden Valley. It should be noted that impacts to lichens in granitic areas, while they may be more obvious, are likely to be less biotically significant than impacts in calcareous zones.

*Community Studies*
Although at least one major study has classified the vegetation communities in a small area within GAAR (Cooper 1983), basic quantitative data is lacking on the lichen communities of the central Brooks Range and their distribution. Further study is needed to classify the major lichen communities according to primary environmental gradients and to map their distribution. In addition to providing valuable baseline data, this would allow insight into less common lichen communities (e.g., those on substrates with limited distribution) and into likely sites to find uncommon and rare lichen species.

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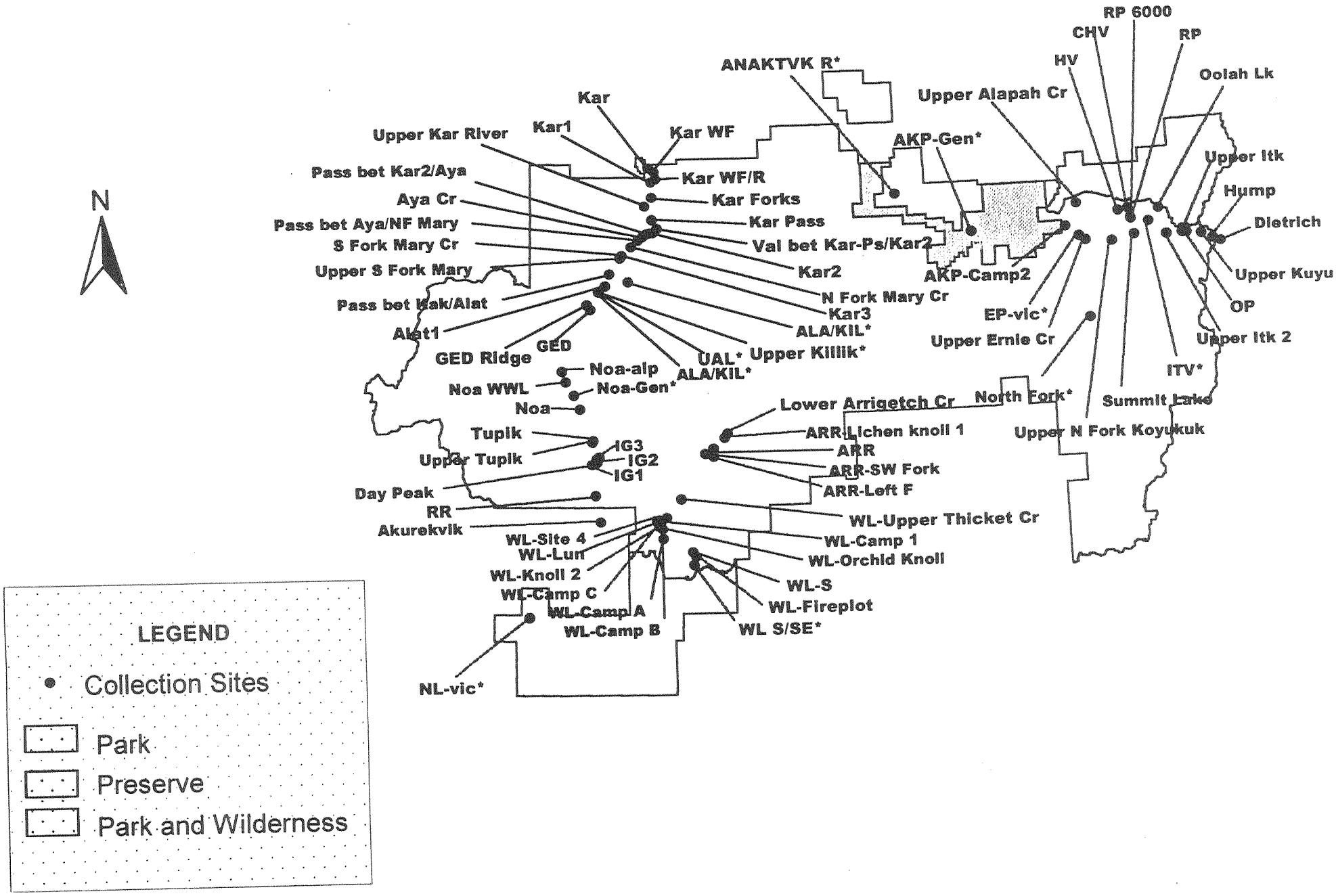


...l Gates of the Arctic National Park and Preserve, Alaska. Sites followed by an asterisk (*) are

reported from sources other than Neitlich & Hasselbach 1998.

**Table 1. Lichen collection locations in Gates of the Arctic National Park and Preserve (GAAR), Alaska.** Location Codes correspond to those in Table 2 and the GAAR lichen database. Locations presented in boldface type are from Neitlich and Hasselbach 1996-7. Other locations, shown in italics are from other sources. The locations from these other sources were taken off small-scale range maps or imprecise published data, and are thus approximate. Location points from sources "NH1996" or "NH1998" shown only to seconds, rather than hundredths of seconds, were obtained from 15' USGS topographic quadrangles. Sources are listed in Table 2. NH1998=Neitlich and Hasselbach collections, 1997; NH1996=Neitlich and Hasselbach 1996; JWT79=Thomson 1979; JWT84=Thomson 1984; MU=Murray 1974; CT=Cooper 1983; CH=Christiansen 1988. Latitude and Longitude are presented in Decimal Degree (DD) and Degree-Minute-Second (DMS) formats. Habitat codes shown after descriptions correspond to Viereck (1992) classifications.

| Location Code | Source | Location | Habitat | Elev (m) | Lat DD | Long DD | Lat DMS | Long DMS |
|---|---|---|---|---|---|---|---|---|
| **AKP-Camp2** | NH1998 | CHANDLER LAKE QUAD: Anaktuvuk River 3 km E of confluence with Graylime Cr. | Dwarf Dryas and Salix scrub tundras (IID1, IIC2) with riparian Salix thickets (IIB2) | 900 | 68.11623 | -151.04240 | 68 06 58.43 | 151 02 32.65 |
| *AKP-Gen* | JWT84, JWT79 | CHANDLER LAKE QUAD: Anaktuvuk Pass vicinity | Alpine tundra, open low scrub and wetlands | >750 | 68.11666 | -151.85000 | 68 07 | 151 51 |
| **Akurekvik** | NH1998 | SURVEY PASS QUAD: Akurekvik Lake and Pass into Reed River drainage | Open Picea glauca-Alnus crispa woodland (IA3) with patchy closed low Salix scrub (IIB2) | 250 | 67.20810 | -155.03218 | 67 12 29.16 | 155 01 55.84 |
| *ALA/KIL* | MU | SURVEY PASS AND KILLIK RIVER QUADS: Alatna/Killik Rivers | Alpine tundra, open low scrub and wetlands | >900 | 67.95000 | -155.03333 | 67 57 | 155 02 |
| **Alat1** | NH1998 | SURVEY PASS QUAD (D-4): Upper Alatna Lakes: 2nd northeasternmost lake | Low Ericaceous scrub (IID2) and Dryas tundra (IID1) | 1100 | 67.97020 | -154.97455 | 67 58 12.72 | 154 58 28.38 |
| *ANAKTVK R* | JWT84 | CHANDLER LAKE QUAD: Anaktuvuk River N of Anaktuvuk Pass (Possibly N of Park Boundary) | Alpine tundra, open low scrub and wetlands | >750 | 68.25000 | -152.48333 | 68 15 | 152 29 |
| *ARR* | CT | SURVEY PASS QUAD: Arrigetch Creek valley--locations various; specified in Cooper 1983 | Picea glauca forest (IA3), Alnus and Salix thickets (IIB), and Dryas and Ericaceous dwarf scrub tundras (ID1&2) | 450-1800 | 67.44198 | -154.08788 | 67 26 31.13 | 154 05 16.37 |
| **ARR-L Fork** | NH1998 | SURVEY PASS QUAD: South Fork of Upper Arrigetch Creek and glacial cirque at headwall of valley | Dryas and Ericaceous dwarf scrub tundras (IID1&2) and wet graminoid marshes (IIA3) | 1250 | 67.41486 | -154.09000 | 67 24 54 | 154 05 20 |
| **ARR-Lichen knoll 1** | NH1998 | SURVEY PASS QUAD: Major campsite on lower Arrigetch Creek | Open Picea glauca -lichen forest (1A3) | 450 | 67.47601 | -153.99374 | 67 28 34 | 153 59 38 |
| **ARR-SW Fork** | NH1998 | SURVEY PASS QUAD: North Fork of Upper Arrigetch Creek | Dryas and Ericaceous dwarf scrub tundras (IID1&2 | 1100 | 67.42428 | -154.15976 | 67 25 28 | 154 09 35 |

| Location Code | Source | Location | Habitat | Elev (m) | Lat DD | Long DD | Lat DMS | Long DMS |
|---|---|---|---|---|---|---|---|---|
| **Aya Cr** | NH1998 | KILLIK RIVER QUAD: Ayakalak Cr ca 13 km NW of confl. w/ Killik River; ca. 6 km NW of lowermost confluence | Dryas dwarf scrub tundra (IID1), open low scrub (IIC2) and riparian gravels | 900 | 68.13023 | -154.65374 | 58 07 49 | 154 39 13 |
| **B/t Kar2-Aya Cr** | NH1998 | KILLIK RIVER QUAD: Small drainage N of Ayakalak Cr ca 13 km NW of confl. w/ Killik River | Mixed shrub tussock tundra (IIC2) | 1200 | 68.13892 | -154.61814 | 68 08 20 | 154 37 05 |
| **CHV** | NH1998 | CHANDLER LAKE QUAD (A-1): Valley between Cocked Hat Mountain and Oolah Lake | Open low scrub (Betula glandulosa-Vaccinium uliginosum), and Ericaceous (Arctostaphylos) dwarf scub (IID2) | 1150 | 68.16282 | -150.50172 | 68 09 46 | 150 30 06 |
| **Day Peak** | NH1998 | SURVEY PASS QUAD: 1550 m peak 6km W-WSW of Mt. Igikpak | Mosaic of alpine talus fields, Dryas dwarf scrub (IID1) and dry graminoid herbaceous areas (IIIA1) | 1200-1550 | 67.39260 | -155.10129 | 67 23 49 | 155 06 04 |
| **Dietrich** | NH1998 | PHILLIP SMITH MOUNTAINS QUAD (A-5): Dietrich River at MP 231 of Dalton Hwy (4 km S of Chandalar Shelf) | Open Picea glauca-Populus balsamifera forest (IC2) | 775 | 68.03380 | -149.72995 | 68 02 02 | 149 43 48 |
| *EP-vic* | JWT84 | CHANDLER LAKE QUAD: Ernie Pass vicinity, possibly including Summit Lake area | Alpine tundra, open low scrub and wetlands | >900 | 68.08333 | -150.93333 | 68 05 | 150 56 |
| **GED** | NH1998 | SURVEY PASS QUAD (D-5): Southern- most Upper Alatna Lake ("Geadecke's Lake"), ca. 9 km N of Cravens Peak | Dryas dwarf scrub tundra (IID1) and open low Ericaceous scrub (IIC2), and Salix thickets (IIB2) | 870 | 67.89334 | -155.10233 | 67 53 36.03 | 155 06 08.38 |
| **GED Ridge** | NH1998 | SURVEY PASS QUAD: Ridge due W of Southernmost Upper Alatna Lake ("Geadecke's Lake"), ca. 9 km N of Cravens Peak | Mosaic of alpine scree, Dryas dwarf scrub (IID1) and Dry graminoid herbaceous areas (IIIA1) | 1050-1300 | 67.90797 | -155.13200 | 67 54 28.68 | 155 07 55.21 |
| **Hump** | NH1998 | PHILLIP SMITH MOUNTAINS QUAD (A-5): Low pass bet tributary entering Dietrich (4 km S of Chandalar Shelf) and Kuyuktuvuk Cr (8 km E of Oolah Pass) | Mixed shrub tussock tundra (IIC2) | 1200 | 68.04641 | -149.79327 | 68 02 47 | 149 47 36 |
| **HV** | NH1998 | CHANDLER LAKE QUAD: Hidden Valley: perched, E-W, 3 km long alpine valley beginning w/glacier on E slope of Cocked Hat Mountain | Alpine calcareous talus and ledges with Dryas tundra (IID1) | 1200-1500 | 68.15707 | -150.58451 | 68 09 26 | 150 35 04 |
| **IG1** | NH1998 | SURVEY PASS QUAD: Upper Reed River adjacent to Mt. Igikpak, ca.7 km south of Angiak Pass. | Dryas tundra (IID1), open low Ericaceous scrub w/Vaccinium, Ledum and riparian Salix thickets (IIC2) | 850 | 67.40073 | -155.05582 | 67 24 02.64 | 155 03 20.94 |

Table 1-2

| Location Code | Source | Location | Habitat | Elev (m) | Lat DD | Long DD | Lat DMS | Long DMS |
|---|---|---|---|---|---|---|---|---|
| IG2 | NH1998 | SURVEY PASS QUAD: Upper Reed River adjacent to Mt. Igikpak, ca. 7km south of Angiak Pass. | Dryas tundra (IID1), open low Ericaceous scrub w/Vaccinium, Ledum and riparian Salix thickets (IIC2) | 850 | 67.41742 | -155.03787 | 67 25 02.7 | 155 02 16.32 |
| IG3 | NH1998 | SURVEY PASS QUAD: Upper Reed River adjacent to Mt. Igikpak, ca. 5 km south of Angiak Pass. | Dryas tundra (IID1), open low Ericaceous scrub w/Vaccinium, Ledum and riparian Salix thickets (IIC2) | 900 | 67.40977 | -155.06133 | 67 24 35.16 | 155 03 40.8 |
| *ITV* | JWT84 | CHANDLER LAKE QUAD: Oolah Lake vicinity | Alpine tundra, open low scrub and wetlands | >750 | 68.11666 | -150.33333 | 68 07 | 150 20 |
| Kar | NH1998 | KILLIK RIVER QUAD (B-3): Kurupa Lake: SE-most lakeshore and vic. near SE tip | Dryas-dwarf Salix tundra (IID1) with scattered tussock tundra (IIC2) and gravelly lakeshore | 925 | 68.35325 | -154.59567 | 68 21 11.17 | 154 35 44.4 |
| Kar Forks | NH1998 | KILLIK RIVER QUAD: Primary fork in Kurupa Lake's primary inlet creek to S | Dryas-dwarf Salix tundra (IID1) with scattered tussock tundra (IIC2) | 1050 | 68.25749 | -154.57128 | 68 15 32.17 | 154 34 16.73 |
| Kar Pass | NH1998 | KILLIK RIVER QUAD (A-3): Pass bet. W fork of Kurupa Lake's primary inlet cr to S and S-draining E Fork of Ayakalak Cr | Alpine talus fields with scattered Dryas-dwarf Salix tundra (IID1) | 1400-1800 | 68.18546 | -154.57280 | 68 11 07.67 | 154 32 22.09 |
| Kar WF | NH1998 | KILLIK RIVER QUAD: Waterfall at head of small valley 2.5 km ESE of Kurupa Lake's SE tip | Alpine Dryas-dwarf Salix tundra (IID1) and large calcareous cliffs and outcrops | 1100 | 68.34154 | -154.54628 | 68 20 29.54 | 154 32 46.61 |
| Kar WF/R | NH1998 | KILLIK RIVER QUAD (B-3): Waterfall at head of small valley 2.5 km ESE of Kurupa Lake's SE tip and ridge system to S | Alpine Dryas-dwarf Salix tundra (IID1), large calcareous cliffs and outcrops, and sparsely vegetated calcareous fell fields | 1100-1300 | 68.31667 | -154.53333 | 68 19-21 | 154 32 |
| Kar1 | NH1998 | KILLIK RIVER QUAD: Along Kurupa Lake's primary inlet creek to S, ca 6 km S of lake | Dryas-dwarf Salix tundra (IID1) with scattered tussock tundra (IIC2) and open low Salix thickets (IIC2) | 960 | 68.30685 | -154.57417 | 68 20 | 154 32 |
| Kar2 | NH1998 | KILLIK RIVER QUAD (A-3): Low pass between primary E and W forks of Ayakalak Cr | Ericaceous low scrub (IIC2) with scattered tussock tundra (IIC2) and low Salix scrub | 1200 | 68.14223 | -154.56917 | 68 08 32.04 | 154 34 9.0 |
| Kar3 | NH1998 | KILLIK RIVER QUAD: Upper S Fork Mary Creek, ca. 4 km S of confluence with Mary Cr's N Fork | Mesic sedge-herb meadows (IIIA2) with some higher gravelly knobs and scattered tussock tundra (IIC2) | 1100 | 68.06100 | -154.84822 | 68 03 39.6 | 154 50 53.58 |
| Lower Arrigetch Cr | NH1998 | SURVEY PASS QUAD: Lower Arrigetch Creek, 3-5 miles from confluence w/ Alatna River | Picea glauca woodlands (IA3) with extensive open low Betula glandulosum-Ledum-Vaccinium scrub (IIC2) | 450 | 67.48935 | -153.96932 | 67 29 22 | 153 58 10 |

Table 1-3

| Location Code | Source | Location | Habitat | Elev (m) | Lat DD | Long DD | Lat DMS | Long DMS |
|---|---|---|---|---|---|---|---|---|
| **N Fork Mary Cr** | NH1998 | KILLIK RIVER QUAD (A-3): N Fork Mary Creek, bet. 0-4 km N of confluence w/ Mary Cr's S Fork | Ericaceous low scrub (IIC2) with scattered tussock tundra (IIC2) and low Salix scrub | 1000-1200 | 68.09815 | -154.75472 | 68 05 53.32 | 154 45 16.99 |
| *NL-vic* | JWT84 | HUGHES QUAD: Vicinity of Narvak Lake, Probably in Preserve | Picea glauca woodland to various | >200 | 66.90000 | -155.61667 | 66 54 | 155 37 |
| **Noa** | NH1998 | SURVEY PASS QUAD: Noatak River in vicinity of Twelvemile Creek | Mesic graminoid-Salix meadows and thick Vaccinium uliginosum scrub (IIC2) on wide floodplain | 600 | 67.57270 | -155.19803 | 67 34 | 155 12 |
| **Noa-alp** | NH1998 | SURVEY PASS QUAD: Peak 4376 and flanks down to Otkurak Creek north of Pingo Lake on the Noatak River. | Alpine Vaccinium low scub (IIC2), Dryas dwarf scrub tundras, and calcareous scree | 900-1350 | 67.69373 | -155.34913 | 67 41 38 | 155 20 57 |
| *Noa-Gen* | JWT84 | SURVEY PASS QUAD: Noatak River vicinity (Probably W of 12 Mile) | Alpine tundra, open low scrub and wetlands | >550 | 67.61666 | -155.25000 | 67 37 | 155 15 |
| **Noa-NWL** | NH1998 | SURVEY PASS QUAD: Otkurak Creek vicinity, ca. 5 km E of Pingo Lake along the Noatak River. | Open Populus balsamifera stand along creek surrounded by wet sedge meadows and thick Vaccinium uliginosum scrub (IIC2) | 700 | 67.66052 | -155.31769 | 67 39 38 | 155 19 04 |
| *North Fork* | JWT84 | WISEMAN QUAD: North Fork of Koyukuk River | Picea glauca woodland to various | Unknown | 67.81666 | -150.88333 | 67 49 | 150 53 |
| **Oolah Lk** | NH1998 | CHANDLER LAKE QUAD: Oolah Lake, Upper Itkillik River: large lake ca 19 km E of Cocked Hat Mountain | Open Betula glandulosa-Vaccinium uliginosum low scrub, and Arctostaphylos/Dryas dwarf scub (IID2) w/ siliceous erratics | 825 | 68.15588 | -150.24069 | 68 09 21 | 150 14 27 |
| **OP** | NH1998 | CHANDLER LAKE QUAD (A-1): Oolah Pass: Pass between E Fork of Upper Itkillik River and Upper Kuyuktuvuk Cr | Alpine fell fields intermixed with mixed low and dwarf scrub tundras | 1300-1375 | 68.07057 | -150.01083 | 68 04 14 | 150 00 39 |
| **Pass b/t Aya NF Mary** | NH1998 | KILLIK RIVER QUAD (A-3): Pass bet. Ayakalak Cr and N Fork Mary Cr | Ericaceous low scrub (IIC2) with scattered tussock tundra (IIC2) and low Salix scrub | 1000-1200 | 68.11974 | -154.69567 | 68 07 11 | 154 41 44 |
| **Pass b/t Kar2/Aya** | NH1998 | KILLIK RIVER QUAD: Low pass between primary E and W forks of Ayakalak Cr, ca. 1-2 km N of Ayakalak Cr | Ericaceous low scrub (IIC2) with scattered tussock tundra (IIC2) and low Salix scrub | 1300 | 68.14168 | -154.59261 | 68 08 30 | 154 35 33 |
| **Pass Bet Kak/Alat** | NH1998 | KILLIK RIVER QUAD (A-4 & Survey Pass D-4): Pass bet. Kakivilak Cr (6 km W of confl. w/ Killik River) and Upper Alatna Lakes | Ericaceous low scrub (IIC2) with scattered tussock tundra (IIC2) and low Salix scrub | 1000 | 68.00853 | -154.94160 | 68 00 30.71 | 154 56 29.77 |

Table 1-4

| Location Code | Source | Location | Habitat | Elev (m) | Lat DD | Long DD | Lat DMS | Long DMS |
|---|---|---|---|---|---|---|---|---|
| **RP** | NH1998 | CHANDLER LAKE QUAD (A-1): "Relaxation Peak": Peak 6860, ca 9 km E (100 deg) of Cocked Hat Mountain | Alpine siliceous talus fields mixed with Dryas dwarf tundra (IID1) and mixed low scrub (IIC2) | 1300-1800 | 68.12803 | -150.48051 | 68 07 41 | 150 28 50 |
| **RP 6600** | NH1998 | CHANDLER LAKE QUAD (A-1):"Relaxation Peak" Summit (2100m): Peak 6860, ca 9 km E (100 deg) of Cocked Hat Mountain | Alpine siliceous talus fields | 2075 | 68.13199 | -150.48290 | 68 07 55.16 | 150 28 58.44 |
| **RR** | NH1998 | SURVEY PASS QUAD: Reed River from 3-18 km N of Akurekvik Pass | Picea glauca-lichen forests with Alnus thickets (IIB1), riparian Salix thickets (IIB2), talus fields and Ericaceous mixed low scrub (IIC2) | 450-600 | 67.29257 | -155.06970 | 67 15-17' | 155 04 |
| **S Fork Mary Cr** | NH1998 | KILLIK RIVER QUAD (A-3): South Fork of Mary Creek, from 1-4 km S of confl. with Mary Cr's N Fork | Ericaceous low scrub (IIC2) with extensive Salix thickets (IIC2) | 1000-1100 | 68.06941 | -154.83452 | 68 04 9.87 | 154 50 4.26 |
| **Summit Lake** | NH1998 | CHANDLER LAKE QUAD: Summit Lake, at base of Snowheel Mt along Upper N Fork of Koyukuk River | Mixed shrub tussock tundra (IIC2) | 1075 | 68.07592 | -150.46364 | 68 04 33 | 150 27 49 |
| **Tupik** | NH1998 | SURVEY PASS QUAD: Tupik Cr ca 2.5 km N of Angiak Pass | Ericaceous low scrub, riparian salix thickets (IIC2), and large boulders | 900 | 67.47152 | -155.08733 | 67 28 17.46 | 155 05 14.39 |
| *UAL* | JWT84 | SURVEY PASS QUAD: Upper Alatna Lakes and adjacent Upper Killik River | Alpine tundra, open low scrub and wetlands | >900 | 67.95000 | -155.03333 | 67 57 | 155 02 |
| **Upper Alapah Cr** | NH1998 | CHANDLER LAKE QUAD: Upper Alapah Cr, ca 7-10 km N of Alapah Mt | Fell fields intermixed with mixed low and dwarf scrub tundras | 1250 | 68.18895 | -150.93721 | 68 11 20 | 150 56 14 |
| **Upper Ernie Cr** | NH1998 | CHANDLER LAKE QUAD: Upper Ernie Cr, ca 2 km S of Ernie Pass | Mixed shrub tussock tundra (IIC2) | 900 | 68.06817 | -150.87613 | 68 04 06 | 150 52 34 |
| **Upper Itk** | NH1998 | CHANDLER LAKE QUAD (A-1): Upper E Fork Itkillik River, ca 5 km W of Oolah Pass | Mixed Ericaceous-Salix low scrub tundra (IIC2) with scattered Salix thickets (IIB2) | 1200 | 68.07113 | -150.18702 | 68 04 16 | 150 11 13 |
| **Upper Itk2** | NH1998 | CHANDLER LAKE QUAD: Upper E Fork Itkillik River, ca 11 km W of Oolah Pass | Mixed Ericaceous-Salix low scrub tundra (IIC2), and mesic sedge meadows (IIIA2) with scattered riparian Salix thickets (IIB2) | 1000 | 68.07237 | -150.05172 | 68 04 21 | 150 03 06 |
| **Upper Kar River** | NH1998 | KILLIK RIVER QUAD: Upper W Fork of inlet drainage to Kurupa Lake, ca. 0-3 km from lake at headwall of valley | Fell fields intermixed with mixed low and dwarf scrub tundras | 1200 | 68.22883 | -154.63160 | 68 13 43.8 | 154 37 53.77 |

Table 1-5

| Location Code | Source | Location | Habitat | Elev (m) | Lat DD | Long DD | Lat DMS | Long DMS |
|---|---|---|---|---|---|---|---|---|
| *Upper Killik* | JWT84 | KILLIK RIVER QUAD: Upper Killik River vicinity | Alpine tundra, open low scrub and wetlands | >900 | 67.98333 | -154.78333 | 67 59 | 154 47 |
| **Upper Kuyuktuvuk** | NH1998 | PHILLIP SMITH MOUNTAINS QUAD (A-5): Upper Kuyuktuvuk Creek, 1-6 km E of Oolah Pass | Ericaceous low scrub (IIC2), Dryas dwarf scrub (IID1) and Salix low scrub (IIC2) | 1050-1200 | 68.06438 | -149.88973 | 68 03 52 | 149 53 23 |
| **Upper N Fork Koyukuk** | NH1998 | CHANDLER LAKE QUAD: Upper N Fork of Koyukuk River ca. 2-4 km E of Peregrine Pass | Fellfields with open Salix thickets and scattered shrub tussock tundra (IIC2) | 1150 | 68.06083 | -150.65613 | 68 03 39 | 150 39 22 |
| **Upper S Fork Mary Cr** | NH1998 | KILLIK RIVER QUAD: Upper S Fork Mary Cr, ca. 5 km S of confluence w/ Mary Cr's N Fork | Mesic sedge-herb meadows (IIIA2) with some higher gravelly knobs and scattered tussock tundra (IIC2) | 1100 | 68.06202 | -154.84788 | 68 03 43 | 154 50 52 |
| **Upper Tupik** | NH1998 | SURVEY PASS QUAD: Upper Tupik Creek ca 1 km N of Angiak Pass | Wet sedge-herb meadows (IIIA2) with scattered tussock tundra (IIC2) | 1050 | 67.46497 | -155.09674 | 67 27 54 | 155 05 48 |
| **Val bet Kar-Ps/Kar2** | NH1998 | KILLIK RIVER QUAD: Primary E Fork of Ayakalak Cr, due S of glaciers draining into Kurupa Lake | Fellfields with Dryas dwarf scrub (IID1) and Ericaceous low scrub (IIC2) | 1200-1500 | 68.15729 | -154.53106 | 68 09 26 | 154 31 52 |
| *WL S/SE* | CH | SURVEY PASS QUAD: Walker Lake southeast and southern bordering areas | Picea glauca woodland to various | 200 | 67.06666 | -154.26666 | 67 04 | 154 16 |
| **WL-Camp A** | NH1996 | SURVEY PASS QUAD: Walker Lake: Ridge system due W of central portion of lake. | Alpine dwarf Dryas and Salix tundras (IID1,2) with mesic graminoid/herbaceous meadows (IIIA2) | 975 | 67.15200 | -154.51867 | 67 09 07.2 | 154 31 07.2 |
| **WL-Camp B** | NH1996 | SURVEY PASS QUAD: Walker Lake: Ridge system due W of central portion of lake. | Alpine dwarf Dryas and Salix tundras (IID1,2) with mesic graminoid/herbaceous meadows (IIIA2) | 1000 | 67.15067 | -154.51767 | 67 09 02.4 | 154 31 3.6 |
| **WL-Camp C** | NH1996 | SURVEY PASS QUAD: Walker Lake: Western shoreline ca. 5 km from nothernmost point on lake. | Open Picea glauca woodland (IA3) with scattered talus | 200 | 67.18417 | -154.52100 | 67 11 03.01 | 154 31 15.6 |
| **WL-Camp1** | NH1996 | SURVEY PASS QUAD: Walker Lake: Eastern shoreline on 2nd peninsula from N, ca. 2.5 km S of northern tip of lake | Open Picea glauca woodland (IA3) and mixed ericaceous-Betula glandulosa low scrub (IIC2) | 200 | 67.20033 | -154.53700 | 67 12 01.2 | 154 32 13.2 |
| **WL-Fireplot** | NH1996 | SURVEY PASS QUAD: Walker Lake: Bench along E shore at far southern end of lake, ca 2 km from outlet | Recently burned area with regenerating lichens and mosses | 250 | 67.09350 | -154.24967 | 67 04 | 154 18 |

Table 1-6

| Location Code | Source | Location | Habitat | Elev (m) | Lat DD | Long DD | Lat DMS | Long DMS |
|---|---|---|---|---|---|---|---|---|
| **WL-Knoll 2** | NH1996 | SURVEY PASS QUAD: Walker Lake: Knoll above western shoreline ca 2.5 km S of northern tip of lake | Ledum-Vaccinium-bryoid heath (IIC2) with scattered Picea glauca | 250 | 67.19296 | -154.54683 | 67 11 34.66 | 154 32 48.59 |
| **WL-Lun** | NH1996 | SURVEY PASS QUAD: Walker Lake: Western shoreline ca 1 km S of northern tip of lake | Salix and Alnus crispa thickets (IIB1) | 200 | 67.20800 | -154.56750 | 67 12 28.8 | 154 34 03 |
| **WL-Orchid Knoll** | NH1996 | SURVEY PASS QUAD: Walker Lake: Knoll above western shoreline ca 2 km S of northern tip of lake | Ledum-Vaccinium-bryoid heath (IIC2) with scattered Picea glauca | 250 | 67.19055 | -154.54639 | 67 11 26 | 154 32 47 |
| **WL-S** | NH1996 | SURVEY PASS QUAD: Walker Lake: Eastern shoreline S of last immed. adjacent ridge to E, ca 4 km S of peninsula adj. to Swan Is. | Open Picea glauca woodland (IA3), ericaceous-Betula glandulosa low scrub (IIC2), graminoid-scrub wetlands, and talus | 200 | 67.10819 | -154.27662 | 67 06 30 | 154 16 36 |
| **WL-Site4** | NH1996 | SURVEY PASS QUAD: Walker Lake: Wetland at northern tip of lake at Kaluluktok Cr inlet | Carex saxatilis-Distichilus wetland with scattered Salix | 200 | 67.21283 | -154.55150 | 67 12 46 | 154 33 05 |
| **WL-Thicket Cr** | NH1996 | SURVEY PASS QUAD: Walker Lake: W-draining Cr entering lake 2.5 km from northern tip of lake: ca. 1-5 miles up drainage | Dense, closed Salix and Alnus crispa thickets (IIB1) | 275-600 | 67.22023 | -154.48436 | 67 13 13 | 154 29 04 |
| **WL-Upper Thicket Cr** | NH1996 | SURVEY PASS QUAD: Walker Lake: headwaters of W-draining Cr entering lake 2.5 km from northern tip of lake: ca 12 km up drainage | Alpine low Ericaceous/Salix scrub (IID2) and Dryas tundra (IID1) | 1000-1500 | 67.27915 | -154.36578 | 67 16 45 | 154 21 57 |

Table 1-7

**Table 2. Sources for lichen data in Gates of the Arctic National Park and Preserve.** Data from GAAR Lichen Database "LICHEN.MDB": Table: "SOURCE" (Neitlich and Hasselbach 1998a).

| Source | Full Reference | Notes |
|---|---|---|
| CH | Christiansen, J. S. A spruce-lichen woodland in northern Alaska: post-fire regeneration and community dynamics. M. S. Thesis, University of Washington. | Study Area: Walker Lake |
| CT | Cooper, D. J. 1983. Arctic-alpine tundra ecosystems of the Arrigetch Creek Valley, central Brooks Range, Alaska. Ph. D. Thesis, University of Colorado, Boulder. 827 pp. | Available at NPS-YUGA. Data obtained from GAAR 1989. |
| DK | Dahl, E. and H. Krog. 1970. On the distribution of Cladonia luteoalba Wils & Wheld. Nytt. Mag. for Bot. 17: 143-144. | |
| ESSL95 | Esslinger, T. L. and R. A. Egan. 1995. A sixth checklist of the lichen-forming, lichenicolous, and allied fungi of the continental United States and Canada. Bryologist 98(4): 467-549. | Used to update nomenclature and occasionally to discount taxa from North America. |
| EV | Evans, A. W. 1955. Notes on North American Cladoniae. Bryologist 58: 93-112. | |
| FP | Firepro collections 1984-87. Many were apparently to assist Janet Christiansen (Source CH) in research at Walker Lake. | Data obtained from GAAR Plant Database, 1989. |
| HER | Gates of the Arctic Herbarium. Sources vary, but most are Firepro and represent duplicate records of FP. Reported in GAAR Plant Database, 1989. | Data obtained from GAAR Plant Database, 1989. |
| JWT79 | Thomson, J. W. 1979. Lichens of the Alaskan Arctic Slope. Toronto: University of Toronto Press. | |
| JWT84 | Thomson, J. W. 1984. American Arctic Lichens. 1: The Macrolichens. New York: Columbia University Press. | |
| KR1 | Krog, H. 1962. A contribution to the lichen flora of Alaska. Arkiv for Bot. Ser. 2 (4): 489-513 | Data obtained from GAAR Plant Database, 1989. |
| KR2 | Krog, H. 1968. The Macrolichens of Alaska. Norsk Polar-Institutt Skrift. Nr. 144. 180 pp. | Data obtained from GAAR Plant Database, 1989. |
| LL1 | Llano, G. A. 1950. A monograph of the lichen family Umbilicariaceae in the western hemisphere. ONR. Navexos p-831. Dept. Navy, Washington, D.C. 281pp. Reported in GAAR Plant Database, 1989. | Data obtained from GAAR Plant Database, 1989. |
| LL2 | Llano, G. A. 1951. A contribution to the lichen flora of Alaska. J. Wash. Acad. Sci. 41: 196-200. Reported in GAAR Plant Database, 1989. | Data obtained from GAAR Plant Database, 1989. |
| MO79 | Moser, T. J., Nash, T. N. and Thomson J. W. 1979. Lichens of Anaktuvuk Pass, Alaska, with emphasis on the impact of caribou grazing. Bryologist 82(3):393-408 | |
| MU | Murray, D. F. 1974. Notes on the botany of selected localities in the Alatna and Killik River Valleys, central Brooks Range, Alaska. Final Report, Contract No. CX-9000-3-0125 from NPS to UAF. Reported in GAAR Plant Database, 1989. | Lichens and bryophytes section prepared by B. M. Murray. Available at NPS-YUGA. Data obtained from GAAR Plant Database, 1989. |
| NH1996 | Neitlich, P. and L. Hasselbach. 1996. Vascular and nonvascular vegetation reconnaissance of Walker Lake National Natural Landmark, Alaska. Prepared for Gates of the Arctic National Park and the National Natural Landmark Program. | |
| NH1998 | Neitlich, P. and L. Hasselbach. 1998. Lichen Inventory and Status Assessment for Gates of the Arctic National Park and Preserve, Alaska. Prepared for Gates of the Arctic National Park, Fairbanks, Alaska. | |
| RA | Rausch, R. 1951. Notes on the Nunamuit Eskimo and mammals of the Anaktuvuk Pass region, Brooks Range, Alaska. Arctic 4: 147-195. Reported in GAAR Plant Database, 1989. | Data obtained from GAAR Plant Database, 1989. |

**Table 3. Macrolichen species found in Gates of the Arctic National Park and Preserve, Alaska.** Species shown boldface were collected by Neitlich and Hasselbach, 1996-7. Those shown in regular type were collected by any of the following: T. Nash (Moser et al. 1979), D. Cooper (1983), J. W. Thomson (1979 & 1984), B. Murray (1974), J. Christiansen (1988), H. Krog (1962 & 1968), G. Llano (1950 & 1951). For complete information on sources, see GAAR Lichen Database (Neitlich and Hasselbach 1998). Taxa in the Taxon field followed by "(?ed.)" are reports from the previous GAAR database which are doubtful or in need of verification. Range Status symbols are as follows: ••• = New record for Alaska; ••=New record for Brooks Range; •=New record for park; ‡=Second known collection from park. Abundance Codes are as follows: A=Abundant (found abundantly in most locations and >85% frequency in plot data); C=Common (widespread, found in most locations, and between 31-84% frequency in plot data); O=Occasional (found in > 3 locations, often with specialized habitats or patchy distribution, between 10-30% frequency in plot data), U=Uncommon (encountered only 1-3 times in park and with < 10% frequency in plot data); ?=not enough data or collections to assess. Locations mentioned in the Comments field are found in Table 1. Voucher numbers are specified for Uncommon taxa as well as for all range extensions, and are Neitlich/Hasselbach collection numbers. Voucher numbers for other taxa are found in the database. The Records in the GAAR Database are a composite of Neitlich/Hasselbach vouchers located at GAAR, vouchers located elsewhere, and in a few cases of common species, field observations.
Please see GAAR Lichen Database (Neitlich and Hasselbach 1998) for more complete information.

| Taxon | Range Status | Abun-dance | Comments | Substrate | Voucher No.'s | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| **Alectoria nigricans** | | C | | Tundra, occasionally forest floor | 1797, 1985 | 8 |
| **Alectoria ochroleuca** | | C | | Alpine tundra, Humus | 1789 | 9 |
| **Allantoparmelia almquistii** | | C | | Siliceous rock in alpine | 2491, 2473, 2492, et al. | 18 |
| **Allantoparmelia alpicola** | | O | | Ca+ rock in alpine | 2457, 2490 | 5 |
| **Anaptychia bryorum** | •• | U | Known in AK from two other sites in South Central. Locs: Kar. | Alpine tundra | 2134 | 1 |
| **Anaptychia ulotrichoides** | ••• | U | New to AK; known from Northern Rocky Mountains. Locs: Noa-alp. | Ca+ rock in alpine | 2089 | 1 |
| **Arctoparmelia centrifuga** | | A | | Rock in low to mid elevation | 2324, 2081, 2082, 2445, et al. | 14 |
| **Arctoparmelia incurva** | | O | Widespread in AK; undercollected in GAAR? Locs: AKP, RP, EP-vic, ARR, HV. | Rock in mid to high elevation | 2079, 2080 | 5 |
| **Arctoparmelia separata** | | C | | Rock-widespread | 1826, 1981, 1818, 2083 et al. | 18 |
| **Asahinea chrysantha** | | C | | Dry alpine tundra | 1788 | 9 |
| **Asahinea scholanderi** | | C | | Rock in mid to high elevation | 2035, 2487, 2519 et al. | 16 |
| Baeomyces placophyllus | | U | One coll. in GAAR from Arrigetch (ARR) | Wet granitic sands in glacial cirque | | 1 |

| Taxon | Range Status | Abundance | Comments | Substrate | Voucher No. | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| Baomyces carneus | | U | One coll. in GAAR at Walker Lake (WL S/SE) | Picea forest | | 1 |
| **Brodoa oroarctica** | | O | | Siliceous rock in mid to upper elevation | 2020, 2224 et al. | 11 |
| **Bryocaulon divergens** | | C | | Alpine tundra and open Picea woodland | | 10 |
| Bryoria chalybeiformis | | O | Some Firepro collections misidentifications of B. lanestris | Soil at low and mid elevation | | 5 |
| **Bryoria lanestris** | ‡ | C | Very common in spruce woodlands, but undercollected. | Picea | | 7 |
| **Bryoria nadvornikiana** | •• | U | Known in AK from Denali and SE | On Picea in forest | 1808 | 1 |
| **Bryoria nitidula** | | C | | Alpine tundra and sod over rock or soil | | 9 |
| **Bryoria simplicior** | • | U | Widespread in AK; known from S and N of GAAR; probably undercollected. | Picea in woodland | 1805 | 1 |
| **Bryoria sp. (fuscescens?)** | | ? | | | | 1 |
| **Cetraria andrejevii** | | O | | Alpine ground in wet areas, often intermixed with C. delisii | | 8 |
| **Cetraria commixta** | | C | | On mid to upper elevation rocks | | 8 |
| **Cetraria cucullata** | | A | | Tundra and woodland floors | | 9 |
| **Cetraria delisii** | | C | | Riparian, late snowmelt and other wet areas | | 50 |
| **Cetraria ericetorum** | | O | Difficult to distinguish from C. islandica in the field, thus abundance probably underrated. | Tundra and forest floor | | 8 |
| Cetraria fastigata | | U | | Tundra | | 2 |
| **Cetraria hepatizon** | | C | | Rock at mid to high elevations | | 6 |
| **Cetraria inermis** | | U | Three locations in GAAR and few in Alaska. Reported incorrectly last year as C. subalpina | Alpine shrub bases | 1778 | 4 |
| **Cetraria islandica** | | A | | Tundra and forest floor | | 21 |

| Taxon | Range Status | Abun-dance | Comments | Substrate | Voucher No. | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| **Cetraria kamczatica** | | C | | Alpine tundra, talus and dry riparian soil | | 13 |
| **Cetraria laevigata** | | C | | Tundra and forest floor | | 8 |
| **Cetraria nigricans** | | C | | Alpine rock, soil and sod | | 26 |
| Cetraria nigricascens | | U | Collected at 2 locations in GAAR: Arrigetch and Upper Alatna Lakes | Betula twigs and soil | | 2 |
| **Cetraria nivalis** | | A | | Alpine tundra and forest floor | | 13 |
| Cetraria odentella (? ed.) | | ? | Probably Cetraria nigricans. | | | 1 |
| **Cetraria pinastri** | | C | | Bark and dead wood | | 8 |
| **Cetraria sepincola** | ‡ | O | Probably undercollected, but fairly widespread. | Betula glandulosa twigs | | 6 |
| **Cetraria tilesii** | | C | | Calcareous alpine sod and soils | | 10 |
| **Cladina arbuscula** | | C | Very common and widespread | Tundra and forest floor | | 14 |
| Cladina ciliata var. tenuis (? ed.) | | ? | Questionable determination. Collected by T. Nash at AKP. | Tundra | | 1 |
| **Cladina mitis** | | C | | Tundra and forest floor | | 9 |
| Cladina portentosa (?ed.) | | ? | Questionable determination of coastal species. Collected by T. Nash at AKP. | | | 1 |
| **Cladina rangiferina** | | A | | Tundra and forest floor | | 15 |
| **Cladina stellaris** | | A | One of most abundant species in park. | Tundra and forest floor | | 10 |
| **Cladina stellaris var. aberrans** | | U | Possibly a chemotype of C. stellaris | Tundra and forest floor | | 3 |
| **Cladonia acuminata** | | O | | Soil at mid to high elevation | | 2 |
| **Cladonia acuminata var. norrlinii** | | O | Locs: UAL, HV, ARR, AKP | Humic soil at mid to high elevation | | 1 |

Table 3-3

| Taxon | Range Status | Abundance | Comments | Substrate | Voucher No.'s | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| **Cladonia alaskana** | | O | Locs: AKP, EP, CHV, Kar1, U Kuyuk, | Tundra and humic soil at mid to upper elevations | | 6 |
| **Cladonia amaurocraea** | | A | | Tundra and polsters on rock | | 36 |
| **Cladonia bacillaris** | •• | U | Cosmopolitan species known in AK only from Seward Pen and Fairbanks. Locs: WL-S, CHV | Dead wood and humus | 1929, [2226] | 1 |
| **Cladonia bacilliformis** | | O | | Rotting wood and humus | | 7 |
| **Cladonia bellidiflora** | | C | | Soil and tundra | | 14 |
| **Cladonia botrytes** | ‡ | O | Circumboreal species. Locs: IG3, IG1, WL-S. | Tundra, rotting wood and humus | 1873, 2561 | 5 |
| **Cladonia cariosa** | | O | | Alpine humus | | 8 |
| **Cladonia carneola** | | O | | Alpine humus and rotting wood | | 8 |
| **Cladonia cenotea** | | O | Common only in Alnus thickets | Mosses on alder or humus | | 12 |
| **Cladonia cervicornis** | | O | | Soil in talus and alpine tundra | | 7 |
| Cladonia cervicornis ssp. verticillata | | U | Possibly undercollected; some of C. cervicornis may also be this subsp. | Soil in talus and alpine tundra | | 2 |
| **Cladonia chlorophaea** | | O | Fairly common in forest | Dead wood and soil in woodlands | | 6 |
| **Cladonia coccifera** | | C | | Tundra and soil at most elevations | | 14 |
| Cladonia coccifera var. stemmatina | | ? | Var. unknown in recent literature | | | 1 |
| **Cladonia coniocraea** | •• | U | Pacific Northwest species more common in southcentral AK. Locs: WL-Camp1 | Dead wood in forest | 1993 | 1 |
| **Cladonia cornuta** | | C | | Tundra and forest floor | | 8 |
| **Cladonia crispata** | | C | | Tundra and soil in talus | | 25 |
| **Cladonia cryptochlorophaea** | •• | U | Circumboreal and temperate species known from Fairbanks and eastern Yukon River. Loc: RR | Humic soil | 2246 | 1 |

| Taxon | Range Status | Abundance | Comments | Substrate | Voucher No.'s | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| **Cladonia cyanipes** | | O | | Sod and humus | | 6 |
| Cladonia decorticata | | U | Few locations known in AK. | Soil | | 3 |
| **Cladonia deformis** | | O | | Rotting wood and humus | | 7 |
| **Cladonia digitata** | •• | U | Circumboreal species known from southcentral AK and southern interior. Locs: RR, Upper Kuyuktuvuk, WL-Knoll 2 | Tundra, humus, moss over Alnus | 2169, 2274, 1914 | 3 |
| **Cladonia ecmocyna** | | O | | Tundra and forest floor | | 11 |
| **Cladonia ecmocyna ssp. intermedia** | • | O | Current range of subspecies unknown | Alpine tundra | 1882 | 1 |
| **Cladonia fimbriata** | | O | | Picea woodland floor, shrub thickets and tundra | | 9 |
| Cladonia c.f. furcata | | | | | | 2 |
| **Cladonia gracilis ssp. gracilis** | | A | | Picea woodland floor and tundra | | 6 |
| **Cladonia gracilis ssp. turbinata** | | O | | Picea woodland floor and tundra | | 5 |
| Cladonia gracilis var. dilitata | | ? | | | | 1 |
| **Cladonia grayi** | •• | U | Circumboreal species with large eastern population; known in AK from AK Pen., Seward Pen., and NW Territories. Locs: IG1, WL-S, WL-Camp C | Moss over siliceous rock and rotting wood in forest | 2401, 1945, 1906 | 3 |
| **Cladonia kanewskii** | ‡ | U | Beringian radiant known from Seward Pen. and southcentral AK. A problem set of specimens from IG1 has been given this name pending further study. | Mid-elevation tundra | 2201, 2160, 2159, 2219 | 4 |
| Cladonia luteoalba | | U | | Tundra | | 1 |
| **Cladonia macrophylla** | | C | | Soil and humus over rock | | 19 |
| **Cladonia macrophyllodes** | •• | U | An alpine circumpolar species known in AK from Seward Pen. and southcentral. Locs: RR, Upper Tupik, OP | Soil in forest and tundra | 2221, 2181, 2265 | 3 |

Table 3-5

| Taxon | Range Status | Abundance | Comments | Substrate | Voucher No. | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| **Cladonia maxima** | | C | | Tundra and forest floor | | 10 |
| **Cladonia metacorallifera** | | O | | Humus over talus | | 10 |
| Cladonia nipponica | | U | | | | 2 |
| **Cladonia c.f. norvegica** | [**] | U | Known in AK from Southeast. Loc: WL-Camp1 | Rotting wood in forest | 1888 | 1 |
| **Cladonia ochrochlora** | •• | U | Known from Pacific Northwest and southcentral AK. Locs: [RR], Thicket Cr | Rotting Alnus and Salix bases | 1885, 2207 | 1 |
| **Cladonia phyllophora** | | C | | Soil in talus, tundra and forest floor | | 11 |
| **Cladonia pleurota** | | O | | Soil in forest and tundra | | 5 |
| **Cladonia pocillum** | | C | | Calcareous soils in tundra and forest | | 12 |
| **Cladonia pyxidata** | | C | | Soil, duff, tundra | | 12 |
| **Cladonia scabriuscula** | ‡ | U | Circumboreal species known in AK from southcentral. | Low elevation tundra | 1887 | 3 |
| **Cladonia squamosa** | | O | | Soil, tundra and alpine sod; mostly mid elevation | | 8 |
| **Cladonia stricta** | | O | | Humic soil/sod over talus | | 7 |
| **Cladonia subcervicornis** | •• | U | This species has been considered absent from North America by Esslinger and Egan 1995, but is reported from Alaska by Thomson (1984). Loc: Noa | Soil/gravel | 2155 | 1 |
| **Cladonia subfurcata** | | O | | Soil in talus and tundra | | 8 |
| Cladonia subulata | | U | Sparsely distributed throughout AK. Locs: ARR, Upper Killik, AKP-Gen | Humus | | 3 |
| **Cladonia sulphurina** | | C | | Humus, tundra | | 22 |
| **Cladonia c.f. symphycarpa** | | | | - | | 1 |

| Taxon | Range Status | Abun-dance | Comments | Substrate | Voucher No.'s | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| Cladonia thomsonii | | U | | Sod, tundra | | 5 |
| **Cladonia turgida** | •• | U | Circumpolar temperate species known in AK from Seward Pen. and southcentral. Locs: IG3, Tupik | Tundra, sod at mid elevation | 2163, 2174, [2149] | 1 |
| **Cladonia uncialis** | | C | | Tundra | | 16 |
| **Cladonia verruculosa** | •• | U | Known from southeast AK and western North America. Locs: WL-Camp1, ARR-Lichen Knoll 1 | Tundra and soil | 1920, 1921, 1991 | 3 |
| **Cladonia wainioi** | ‡ | U | Sparsely distributed species of boreal North Am. Locs: IG1, IG3, WL-Camp C | Tundra at low to mid elevation | 1934, 2158, 2147 | 4 |
| **Cladonia 3 spp.** | | ? | | | | 3 |
| Coccocarpia erythroxyli | | U | Disjunct pantropical species with two records in AK. Collected once at ANAKTVK-R. | Tundra | | 1 |
| **Coelocaulon aculeatum** | ‡ | O | | Soil, rock crevices, forest floor | | 10 |
| Coelocaulon muricata | | U | Sparsely collected species worldwide. Locs: ARR, [ALA/KIL] | | | 1 |
| Collema ceraniscum | | U | Poorly known species in AK and elsewhere. Loc: AKP-Gen | Detritus | | 1 |
| Collema fuscovirens | | U | | Calcareous rock | | 1 |
| **Collema glebulentum** | ‡ | U | Poorly known species in AK and elsewhere. Loc: AKP-Gen, Kar WF | Calcareous rock | 2564 | 2 |
| Collema multipartitum | | U | Loc: AKP-Gen | Calcareous rock | | 2 |
| Collema polycarpon | | U | Loc: EP-vic, AKP-Gen | Calcareous rock | | 2 |
| **Collema undulatum var. granulosum** | ‡ | O | Sparsely collected in Europe and North America. Locs: Kar WF/R, CHV, AKP-Gen | Calcareous rock | 2554, 2557, 2565, 2567, 2566 | 6 |
| **Collema spp.** | | ? | | Soil, mosses | | 2 |
| **Dactylina arctica** | | C | | Tundra and open woodland floor | | 14 |
| **Dactylina beringica** | | C | | Tundra and open woodland floor | | 10 |

Table 3-7

| Taxon | Range Status | Abundance | Comments | Substrate | Voucher No.? | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| **Dactylina madreporiformis** | | U | Circumpolar species known from arctic AK. Locs: AKP-Gen, ARR, Kar R | Alpine tundra and calcareous soil | 2038 | 1 |
| **Dactylina ramulosa** | | C | | Alpine soils, especially calcareous | | 14 |
| Dendriscocaulon umhausense | | U | Poorly known species. Loc: AKP-Gen | Wet mosses | | 1 |
| **Evernia mesomorpha** | •• | O | Widespread boreal species not previously known in Brooks Range. Locs: WL-S, WL-Camp1, RR | Picea and Betula papyrifera | 2050, 1749, 1751, 1975 | 4 |
| Evernia perfragilis | | U | High arctic species known only from AKP-Gen | Soil | | 1 |
| **Hypogymnia austerodes** | | O | | Picea and mosses | | 7 |
| **Hypogymnia bitteri** | | C | | Picea, Betula papyrifera and rock | | 10 |
| **Hypogymnia physodes** | | C | | Picea, tundra and rock | | 11 |
| **Hypogymnia subobscura** | | O | | Soil and humus | | 11 |
| **Hypogymnia vittata** | •• | U | Circumpolar species known in AK from southcentral, interior and west coast. Loc: Kar1. | R/s | 2025 | 1 |
| **Imshaugia aleurites** | •• | U | European/North American species known in AK from southcentral and eastern Yukon. Loc: WL-S | Hardwood | 1754 | 1 |
| **Lasallia pensylvanica** | | O | | Siliceous rock | | 1 |
| **Leptogium lichenoides** | | O | | Mosses and detritus | | 4 |
| **Leptogium saturninum** | ‡ | O | Widespread species known from eastern Brooks Range and southcentral AK. | Hardwood bark, soil, calcareous rock | 2531, 2529, 2532, 2533 et al. | 12 |
| **Leptogium sp.** | | ? | | | | 1 |
| Lobaria kurokawae | | U | Asian species known from a few points in AK. Loc: ALA/KIL | | | 1 |
| **Lobaria linita** | | C | | Alpine tundra and spruce woodland | | 12 |
| Lobaria pseudopulmonaria | | U | Asian species known from a few points in AK. Loc: NL-vic | Soil and mosses | | 1 |

| Taxon | Range Status | Abundance | Comments | Substrate | Voucher No.s | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| **Lobaria scrobiculata** | ‡ | U | Circumboreal species scattered throughout AK. Locs: AKP-Gen, RR, WL-Orchid Knoll | Picea, wood, soil | | 5 |
| **Masonhalea richardsonii** | | C | | Vagrant | | 11 |
| **Massalongia carnosa** | •• | U | Widespread alpine species known in AK only arctic. Loc: WL-S | Rock and duff | 1868 | 1 |
| **Melanelia disjuncta** | ‡ | O | Circumboreal/temperate species. Locs: Noa-alp, Kar1, AKP-Gen, Kar WF/R | Siliceous rock | 2482, 250, 2489, 2107, 2507 | 6 |
| **Melanelia exasperatula** | | O | | Bark and rock at low to mid elevations | | 7 |
| Melanelia infumata | | U | European/North American species. Locs: AKP-Gen, ALA/KIL | Rock | | 3 |
| **Melanelia olivacea** | | C | | Betula papyrifera bark | | 7 |
| **Melanelia olivaceoides** | •• | U | Boreal austral species with bipolar distribution. Two previous points in AK on eastern Yukon. | Populus balsamifera bark | 2113, 2489, 2111 | 3 |
| **Melanelia panniformis** | ‡ | O | Previously undercollected species with park-wide distribution. | Siliceous rock | | 11 |
| **Melanelia septentrionalis** | | O | | Hardwood shrub bark | | 7 |
| **Melanelia sorediata** | [+] | U | Circumboreal species. Locs: GED Ridge, ANAKTVK R | Siliceous rock | 2073 | 2 |
| **Melanelia stygia** | | C | | Alpine rocks | | 17 |
| **Melanelia tominii** | | O | | Siliceous rocks in alpine | | 11 |
| **Nephroma arcticum** | | C | | Tundra, heath and woodland floor | | 11 |
| **Nephroma bellum** | •• | U | Circumboreal species known in AK from southeast and southcentral. Locs: RR, Tupik, WL-Thicket Cr | Alnus and Salix in thickets | 2427, 2049, 2047, 2057, 1722 | 5 |
| **Nephroma expallidum** | | C | | Alpine tundra | | 12 |
| **Nephroma helveticum** | •• | U | Circumboreal species known in AK from southeast and southcentral. Locs: WL-S, WL-Camp B, WL-Orchid Knoll | Alnus and Salix in thickets | 1724, 1729, 1774, 1747 | 4 |

Table 3-9

| Taxon | Range-Status | Abun-dance | Comments | Substrate | Voucher No.'s | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| **Nephroma parile** | | O | | Hardwood bases and siliceous rock | | 10 |
| **Nephroma resupinatum** | •• | U | Circumboreal/temperate species, known from southcentral AK. Locs: RR, Noa, WL-Thicket Cr | Hardwood bases | 1828, 2055, 2048, 2056 | 4 |
| Pannaria conoplea | | U | Circumboreal species with no other known sites in AK. Loc: AKP-Gen | Detritus | | 1 |
| **Pannaria pezizoides** | | U | Probably undercollected; widespread in AK and circumpolar/boreal. | Tundra, soil, mosses | 1834 | 4 |
| **Parmelia fraudans** | ‡ | U | Circumboreal/alpine species; more common southcentral AK. Locs: AKP-Gen, RP, S Fork Mary Cr | Siliceous rock | 2064, 2076 | 4 |
| **Parmelia omphalodes** | | A | | Siliceous rock | | 11 |
| **Parmelia omphalodes ssp. pinnatifida** | •• | U | Unusual highly dissected ssp. Distribution unknown. Locs: RP, IG1 | Siliceous rock | 2063, 2065 | 2 |
| **Parmelia saxatilis** | | O | Probably undercollected in this inventory. | Siliceous rock | | 4 |
| **Parmelia sulcata** | | C | | Rock and bark, widespread | | 14 |
| **Parmeliopsis ambigua** | ‡ | O | Much undercollected. Fairly common on south side of park. Locs: WL-Camp1, WL-S, AKP-Gen | Alnus bark | 1756, 1757, 1760 | 4 |
| **Parmeliopsis hyperopta** | | O | Much undercollected. Very common on south side of park. | Hardwood bark | | 10 |
| **Peltigera aphthosa** | | A | | Mosses, tundra, forest floor | | 13 |
| **Peltigera canina** | | C | | Mosses, tundra, soil at mid elevations | | 14 |
| Peltigera collina (?editor) | | U | Needs verification. | | | 3 |
| **Peltigera didactyla** | | O | | Soil, mosses, hardwood bases | | 5 |
| Peltigera horizontalis | | U | | Soil, mosses | | 4 |
| **Peltigera kristinsonii** | •• | U | Known in AK from AK Pen., southeast. Loc: ARR-Lichen Knoll 1. | Tundra | 1994 | 1 |

| Taxon | Range Status | Abundance | Comments | Substrate | Voucher No.'s | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| Peltigera lepidophora | | U | Circumboreal species, possibly undercollected. Loc: AKP-Gen | Soil, mosses | | 2 |
| **Peltigera leucophlebia** | | O | | Tundra and mosses | | 4 |
| **Peltigera malacea** | | A | | Tundra, mosses, forest floor | | 8 |
| Peltigera membranacea (? ed.) | | U | Needs verification based on current taxonomy. | Mosses | | 1 |
| **Peltigera polydactyla** | | O | | Soil, mosses, humus | | 7 |
| **Peltigera praetextata** | ‡ | U | Range unknown due to treatment in Thomson (1984) as f. of P. canina. Locs: AKP-Gen, Noa | Mosses | | 2 |
| **Peltigera rufescens** | | C | | Soil and forest floor, mostly alpine | | 9 |
| **Peltigera scabrosa** | | C | | Mosses on tundra | | 9 |
| Peltigera venosa | | O | | Moist soil | | 6 |
| **Phaeophyscia ciliata** | •• | U | Probably circumpolar but scarce. Known in AK from southeast; also Alberta and BC. Loc: Dietrich | Populus bark | 2114, 2131 | 2 |
| **Phaeophyscia constipata** | •• | U | Infrequent arctic and alpine species, rare in northern part of range. Known in AK from southcentral. Loc: Noa-alp | Calcareous rock | 2522 | 1 |
| **Phaeophyscia decolor** | ••• | U | Included in P. endococcinea by some authors. Range unknown. | Bone and rock | 2128, 2472 | 2 |
| **Phaeophyscia endococcinea** | ‡ | U | Very rare in AK; but known from southeast. Locs: AKP-Gen, Kar | Rock | 2123 | 3 |
| **Phaeophyscia kairamoi** | ••• | U | North American and Eurasian species, not known from AK. Locs: Noa-alp, AKP-Camp2 | Mossy soil and calcareous rock | 2121, 2167 | 2 |
| **Phaeophyscia sciastra** | ‡ | O | Fairly widespread in arctic AK. Locs: Noa-alp, CHV, Noa-Gen | Rock and mosses over rock | 2127, 2096, 2098, 2105, 2468 | 6 |
| **Physcia adscendens** | ‡ | U | Circumboreal species, uncommon in AK. Locs: AKP-Gen, OP | Salix | 2497 | 3 |
| **Physcia aipolia** | | C | | Hardwood bark and rocks | | 10 |

Table 3-11

| Taxon | Range Status | Abun-dance | Comments | Substrate | Voucher No.s | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| **Physcia caesia** | ‡ | C | Common in calcareous zones, previously underreported in park and AK. | Calcareous rock | 2125, 2122 et al. | 14 |
| **Physcia dubia** | ‡ | O | Not common in AK, but circumboreal. Locs: OP, Noa-alp, GED, Kar. | Rock and caribou antler | 2130, 2110, 2109, 2118 | 6 |
| **Physcia phaea** | •• | U | Eastern species known from only one other area (eastern Yukon) in AK. Locs: Noa-NWL, Noa-alp, [AKP-Gen?] | Rock | 2108, 2106, 2126 | 4 |
| **Physconia muscigena** | | O | Common in calcareous areas | Alpine calcareous soil, mosses, bird perches | | 23 |
| **Pilophorus robustus** | | U | Disjunct species with sparse representation in AK. Locs: ALA/KIL, AKP-Gen, Alat1 | Soil and rock | 2074 | 4 |
| Placynthium asperellum | | U | Circumpolar species. Loc: AKP-Gen | Rock | | 2 |
| Placynthium nigrum | | U | Circumboreal species. Loc: AKP-Gen | Rock | | 1 |
| **Pseudephebe miniscula** | | C | | Alpine rock and scree | | 8 |
| **Pseudephebe pubescens** | | C | | Alpine rock and scree | | 7 |
| Psora decipiens | | U | Circumboreal, temperate species. Loc: ARR. | | | 1 |
| Psora rubiformis | | U | Circumpolar arctic-alpine species. Loc: ARR, AKP-Gen | | | 2 |
| **Psora tuckermanii** | ••• | U | Western North American species. Locs: WL-Camp B, Kar WF | Soil and crevice in calcareous rock | 1933, 2577 | 2 |
| **Psoroma hypnorum** | | O | | Humus, tundra | | 6 |
| Ramalina almquistii | | U | Coastal species | Soil | | 1 |
| **Ramalina dilacerata** | •• | O | Previously overlooked species known from Pacific Northwest and southeast AK. | Picea | 1733, 1720, 1771, 2033 et al. | 6 |
| **Ramalina roesleri** | •• | U | Circumboreal species known in AK from southcentral and southeast. Locs: WL-S, Lower Arrigetch Cr | Picea | 1772, 1752, 1869 | 3 |
| **Rhizoplaca chrysoleuca** | ‡ | O | Circumboreal/temperate in dry sites. Previously undercollected. | Rock and N-enriched bird perches | | 5 |

| Taxon | Range Status | Abundance | Comments | Substrate | Voucher No.'s | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| **Rhizoplaca melanophthalma** | •• | U | Circumboreal/temperate in dry sites. Locs: Karl, Upper Itk | Rock | 2443, 2136 | 2 |
| Solorina bispora | | U | Widespread in AK; probably undercollected. Locs: ALA/KIL, ARR. | | | 2 |
| **Solorina crocea** | | C | | Tundra, soil | | 8 |
| Solorina octospora | | U | Probably circumpolar arctic, sporadic. Locs: ARR, ALA/KIL | | | 2 |
| **Solorina saccata** | | O | | Sod over Rock | | 8 |
| Solorina spongiosa | | U | Circumpolar arctic, calciphilous. Locs: ALA/KIL, AKP-Gen | Calcareous habitats | | 2 |
| **Sphaerophorus fragilis** | | C | | Rock in alpine | | 15 |
| **Sphaerophorus globosus** | | C | | Rock in alpine | | 11 |
| **Stereocaulon alpinum** | | C | | Tundra, soil, mosses | | 8 |
| **Stereocaulon apocalyptum** | ‡ | U | Beringian species more common on Seward Pen. Locs: NL-vic, Day Peak. | Humus | 2238 | 2 |
| Stereocaulon botryosum | | U | Sporadic in AK. Locs: ARR, UAL | Rock | | 2 |
| **Stereocaulon dactylophyllum** | | U | Eastern species rare in AK. Locs: ARR, [WL-Camp1?] | Forest floor | [2006] | 1 |
| Stereocaulon glareosum | | O | | Soil, mosses | | 4 |
| Stereocaulon glareosum var. brachyphylloides | | ? | Variety name unknown in recent literature. | | | 1 |
| **Stereocaulon grande** | | O | | Rocky soil | 1960 | 4 |
| **Stereocaulon paschale** | | O | | Soil, mosses | 2001 | 6 |
| Stereocaulon paschale var. erectum | | ? | Variety name unknown in recent literature. | | | 1 |
| **Stereocaulon rivulorum** | | U | Widespread; possibly undercollected. Locs: ARR, WL-Camp1 | Soil | [1970] | 3 |

Table 3-13

| Taxon | Range Status | Abun-dance | Comments | Substrate | Voucher No.'s | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| **Umbilicaria cylindrica** | ‡ | O | Previously reported as rare, this species is often found in alpine talus. | Alpine rock | | 13 |
| Umbilicaria decussatus | | U | Circumpolar arctic alpine species. Locs: EP-vic, AKP-Gen | Alpine rock | | 2 |
| **Umbilicaria deusta** | ‡ | U | Circumboreal species uncommon in AK. Locs: WL-Camp A, AKP-Gen | Siliceous rock | 1856, 1935, 1864 | 4 |
| Umbilicaria hirsuta | | U | Uncommon species, rare in AK. Locs: EP-vic, AKP-Gen | Rock | | 4 |
| **Umbilicaria hyperborea** | | C | | Rock at all elevations | | 12 |
| Umbilicaria krascheninnikovii | | U | Circumpolar arctic species, rare in AK. Loc: AKP-Gen | Rock | | 2 |
| Umbilicaria lyngei | | O | | Rock | | 4 |
| **Umbilicaria proboscidea** | | A | | Rock at mid to upper elevations | | 12 |
| Umbilicaria rigida | | U | Circumpolar species, widespread in AK. Locs: ARR, ALA/KIL, AKP-Gen, EP-vic | Rock | | 5 |
| Umbilicaria scholanderi | | U | Western mountain species; occasional in AK. Loc: AKP-Gen | Rock | | 2 |
| **Umbilicaria torrefacta** | | O | | Rock in alpine | | 6 |
| **Umbilicaria vellea** | | O | | Rock in mid elevations | | 7 |
| Umbilicaria virginis | | U | Circumpolar alpine and arctic species with small representation in AK. Locs: ARR, AKP-Gen, EP-vic | Rock | | 3 |
| **Usnea lapponica** | •• | O | Probably fairly abundant in boreal forest; circumboreal. Loc: WL-S | Picea | 1977, 1978, 1980 | 3 |
| **Usnea scabrata** | •• | U | Differences with ssp. nylanderiana need further study. Loc: WL-S | Picea | 1979 | 1 |
| **Usnea scabrata ssp. nylanderiana** | •• | O | Probably undercollected. Northern range extension of boreal/temperate species. Known in AK from southeast.Loc: | Picea | 1871, 1872 | 2 |
| **Usnea subfloridana** | •• | O | Probably undercollected. Circumboreal/temperate species known in AK from eastern Yukon. Loc: Akurekvik | Picea glauca | 2570 | 1 |
| **Vestergrenopsis isidiata** | [+] | U | Sporadically known boreal/arctic species with few localities in AK. Locs: AKP-Gen, [Kar WF] | Calcareous rock faces with seeps | [2576] | 1 |

| Taxon | Range Status | Abundance | Comments | Substrate | Voucher No.'s | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| **Stereocaulon c.f. saviczii** | | [U] | | Soil | [1969] | 1 |
| **Stereocaulon saxatile** | | U | Eastern species. Locs: ARR, WL-Upper Thicket Cr | Siliceous rock | 1963 | 2 |
| Stereocaulon subcoralloides | | U | Circumboreal species. Locs: ARR, Upper Killik | Rock | | 2 |
| Stereocaulon symphycheilum | | U | Circumboreal species uncommon in AK. Loc: ARR | | | 1 |
| **Stereocaulon tomentosum** | | C | | Tun, forest floor, mosses | | 9 |
| Stereocaulon wrightii (?ed.) | | [U] | Probably a misidentification. Not known from N. America (Esslinger & Egan 1995). | | | 1 |
| **Stereocaulon sp.** | | | | | | 1 |
| Sticta weigelii | | U | Arctic disjunct of Pacific Northwest and southeast US species. | Salix | | 2 |
| **Thamnolia subuliformis** | | C | | Tundra, mosses | | 6 |
| **Thamnolia vermicularis** | | C | | Tundra, mosses | | 7 |
| **Tuckermanopsis americana** | •• | U | Boreal North American species. Known in AK from eastern Yukon only. Locs: WL-S, WL-Camp1. | Picea twigs | 1770, 1725 | 2 |
| **Tuckermanopsis chlorophylla** | •• | U | Circumboreal/temperate species N of known range. Known in AK from southeast and southcentral. Loc: WL-S | Betula papyrifera | 1796 | 1 |
| Umbilicaria angulata | | U | Western North American species uncommon in AK. Loc: NL vic | Rock | | 1 |
| **Umbilicaria arctica** | | O | | Rock | | 4 |
| Umbilicaria arctica ssp. diomedensis (?ed.) | | ? | Variety unknown in current literature | Rock | | 1 |
| **Umbilicaria caroliniana** | | C | | Rock | | 11 |
| **Umbilicaria cinereorufescens** | | C | | Alpine rock | | 16 |

Table 3-14

| Taxon | Range Status | Abun-dance | Comments | Substrate | Voucher No.'s | Rec. in GAAR Database |
|---|---|---|---|---|---|---|
| **Xanthoparmelia coloradoensis** | •• | U | Western North American species known from southcentral AK. Locs: Noa-alp, GED Ridge, GED | Alpine scree | 2058, 2059, 2060, 2061 | 4 |
| **Xanthoria candelaria** | | O | | Calcareous rock | | 4 |
| **Xanthoria elegans** | | C | | Rock, esp. calcareous or N-enriched | | 6 |
| **Xanthoria sorediata** | ‡ | U | Circumpolar arctic/boreal species with some localities in northern AK. | Calcareous rock | 1790 | 2 |
| | | | | | | |
| **Range Extension** | **Total** | **% of Total Taxa** | | | | |
| New to AK | 4 | 2 | | | | |
| New to Brooks Range | 39 | 15 | | | | |
| New to GAAR | 41 | 16 | | | | |
| Second Record at GAAR | 26 | 10 | | | | |
| Total Range extensions | 67 | 26 | | | | |
| | | | | | | |
| **Abundance Rating** | **Total** | | | | | |
| Total A | 12 | | | | | |
| Total C | 60 | | | | | |
| Total O | 68 | | | | | |
| Total U | 103 | | | | | |
| Total ? | 19 | | | | | |

Table 3-16

**Table 4. Lichen frequency in eleven abundance detection plots, Gates of the Arctic National Park, Alaska.** Raw data for detection plots is reported in Appendix 1. Alpine plots are a composite of northern and southern plots above treeline. Total possible abundance = 44.

| | Taxon | Freq. in Forested Plots | Freq. in Alpine Plots | Total Freq. | Total Abundance |
|---|---|---|---|---|---|
| Abundant | Cetraria nivalis | 1.00 | 1.00 | 1.00 | 34 |
| | Cladonia amaurocraea | 1.00 | 1.00 | 1.00 | 33 |
| | Cladonia gracilis ssp. gracilis | 1.00 | 1.00 | 1.00 | 31 |
| | Arctoparmelia centrifuga | 0.67 | 1.00 | 0.91 | 30 |
| | Cetraria cucullata | 1.00 | 0.88 | 0.91 | 29 |
| | Cetraria islandica | 1.00 | 0.88 | 0.91 | 30 |
| | Cladina rangiferina | 1.00 | 0.88 | 0.91 | 28 |
| | Cladina stellaris | 1.00 | 0.88 | 0.91 | 32 |
| | Parmelia omphalodes | 0.67 | 1.00 | 0.91 | 28 |
| | Peltigera aphthosa | 1.00 | 0.88 | 0.91 | 27 |
| | Peltigera malacea | 1.00 | 0.88 | 0.91 | 26 |
| | Umbilicaria proboscidea | 0.67 | 1.00 | 0.91 | 30 |
| Common | Arctoparmelia separata | 0.67 | 0.88 | 0.82 | 27 |
| | Cladonia coccifera | 1.00 | 0.75 | 0.82 | 22 |
| | Nephroma arcticum | 1.00 | 0.75 | 0.82 | 26 |
| | Stereocaulon alpinum | 0.67 | 0.88 | 0.82 | 26 |
| | Thamnolia subuliformis /vermicularis | 0.33 | 1.00 | 0.82 | 26 |
| | Umbilicaria hyperborea | 1.00 | 0.75 | 0.82 | 27 |
| | Bryocaulon divergens | 0.67 | 0.75 | 0.73 | 23 |
| | Cetraria nigricans | 0.33 | 0.88 | 0.73 | 22 |
| | Cladina arbuscula/mitis | 1.00 | 0.63 | 0.73 | 23 |
| | Cladonia crispata | 0.67 | 0.75 | 0.73 | 20 |
| | Cladonia pyxidata/pocillum | 0.67 | 0.75 | 0.73 | 24 |
| | Cladonia sulphurina | 1.00 | 0.63 | 0.73 | 24 |
| | Dactylina arctica/beringica | 0.67 | 0.75 | 0.73 | 23 |
| | Dactylina ramulosa | 0.00 | 1.00 | 0.73 | 18 |
| | Lobaria linita | 0.33 | 0.88 | 0.73 | 21 |
| | Melanelia stygia | 0.33 | 0.88 | 0.73 | 24 |
| | Sphaerophorus globosus | 0.00 | 1.00 | 0.73 | 22 |
| | Alectoria ochroleuca | 0.00 | 0.88 | 0.64 | 20 |
| | Asahinea chrysantha | 0.00 | 0.88 | 0.64 | 20 |
| | Cetraria commixta/hepatizon | 0.00 | 0.88 | 0.64 | 21 |
| | Cetraria delisii | 0.33 | 0.75 | 0.64 | 19 |
| | Cetraria tilesii | 0.00 | 0.88 | 0.64 | 18 |
| | Masonhalea richardsonii | 0.00 | 0.88 | 0.64 | 21 |
| | Alectoria nigricans | 0.33 | 0.63 | 0.55 | 15 |
| | Bryoria nitidula | 0.00 | 0.75 | 0.55 | 17 |
| | Cetraria laevigata | 0.33 | 0.63 | 0.55 | 10 |
| | Cladonia cornuta | 0.67 | 0.50 | 0.55 | 17 |
| | Cladonia uncialis | 0.67 | 0.50 | 0.55 | 15 |
| | Parmelia sulcata | 1.00 | 0.38 | 0.55 | 14 |
| | Peltigera canina | 0.33 | 0.63 | 0.55 | 15 |
| | Stereocaulon tomentosum | 0.67 | 0.50 | 0.55 | 18 |
| | Umbilicaria caroliniana | 1.00 | 0.38 | 0.55 | 16 |
| | Allantoparmelia almquistii | 0.00 | 0.63 | 0.45 | 14 |
| | Asahinea scholanderi | 0.00 | 0.63 | 0.45 | 14 |
| | Cladonia macrophylla | 0.33 | 0.50 | 0.45 | 12 |
| | Cladonia phyllophora | 0.67 | 0.38 | 0.45 | 9 |

| Taxon | Freq. in Forested Plots | Freq. in Alpine Plots | Total Freq. | Total Abundance |
|---|---|---|---|---|
| Hypogymnia bitteri | 1.00 | 0.25 | 0.45 | 12 |
| Hypogymnia physodes | 1.00 | 0.25 | 0.45 | 11 |
| Sphaerophorus fragilis | 0.00 | 0.63 | 0.45 | 13 |
| Xanthoria elegans | 0.00 | 0.63 | 0.45 | 15 |
| Cetraria pinastri | 0.67 | 0.25 | 0.36 | 8 |
| Cetraria sepincola | 0.67 | 0.25 | 0.36 | 8 |
| Cladonia bellidiflora | 0.33 | 0.38 | 0.36 | 9 |
| Cladonia gracilis ssp. turbinata | 1.00 | 0.13 | 0.36 | 8 |
| Cladonia maxima | 0.67 | 0.25 | 0.36 | 11 |
| Nephroma expallidum | 0.00 | 0.50 | 0.36 | 10 |
| Nephroma parile | 0.67 | 0.25 | 0.36 | 7 |
| Parmeliopsis hyperopta | 1.00 | 0.13 | 0.36 | 10 |
| Peltigera scabrosa | 0.33 | 0.38 | 0.36 | 8 |
| Physcia aipolia | 0.00 | 0.50 | 0.36 | 9 |
| Solorina crocea | 0.00 | 0.50 | 0.36 | 12 |
| Brodoa oroarctica | 0.00 | 0.38 | 0.27 | 6 |
| Bryoria lanestris | 1.00 | 0.00 | 0.27 | 12 |
| Cetraria kamczatica | 0.00 | 0.38 | 0.27 | 6 |
| Cladonia cenotea | 0.67 | 0.13 | 0.27 | 7 |
| Cladonia chlorophaea | 1.00 | 0.00 | 0.27 | 5 |
| Cladonia ecmocyna | 0.67 | 0.13 | 0.27 | 3 |
| Cladonia fimbriata | 0.33 | 0.25 | 0.27 | 4 |
| Coelocaulon aculeatum | 0.33 | 0.25 | 0.27 | 6 |
| Evernia mesomorpha | 1.00 | 0.00 | 0.27 | 7 |
| Hypogymnia austerodes | 1.00 | 0.00 | 0.27 | 7 |
| Melanelia exasperatula | 0.67 | 0.13 | 0.27 | 7 |
| Melanelia septentrionalis | 0.67 | 0.13 | 0.27 | 7 |
| Nephroma bellum | 1.00 | 0.00 | 0.27 | 7 |
| Parmelia saxatilis | 0.33 | 0.25 | 0.27 | 3 |
| Parmeliopsis ambigua | 1.00 | 0.00 | 0.27 | 9 |
| Physcia caesia | 0.00 | 0.38 | 0.27 | 7 |
| Ramalina dilacerata | 1.00 | 0.00 | 0.27 | 7 |
| Stereocaulon glareosum | 0.33 | 0.25 | 0.27 | 9 |
| Umbilicaria cinereorufescens | 0.00 | 0.38 | 0.27 | 9 |
| Umbilicaria cylindrica | 0.00 | 0.38 | 0.27 | 8 |
| Usnea lapponica | 1.00 | 0.00 | 0.27 | 9 |
| Cladonia bacilliformis | 0.67 | 0.00 | 0.18 | 3 |
| Cladonia botrytes | 0.33 | 0.13 | 0.18 | 2 |
| Cladonia carneola | 0.67 | 0.00 | 0.18 | 2 |
| Cladonia coniocraea | 0.67 | 0.00 | 0.18 | 3 |
| Cladonia cyanipes | 0.00 | 0.25 | 0.18 | 3 |
| Cladonia metacorallifera | 0.33 | 0.13 | 0.18 | 2 |
| Cladonia squamosa | 0.33 | 0.13 | 0.18 | 4 |
| Cladonia stricta | 0.33 | 0.13 | 0.18 | 6 |
| Cladonia wainioi | 0.33 | 0.13 | 0.18 | 2 |
| Hypogymnia subobscura | 0.00 | 0.25 | 0.18 | 5 |
| Leptogium sp. | 0.33 | 0.13 | 0.18 | 4 |
| Melanelia olivacea | 0.67 | 0.00 | 0.18 | 6 |
| Melanelia tominii | 0.00 | 0.25 | 0.18 | 5 |
| Nephroma helveticum | 0.67 | 0.00 | 0.18 | 2 |
| Nephroma resupinatum | 0.67 | 0.00 | 0.18 | 2 |

Occasional

Table 4 - 2

| Taxon | Freq. in Forested Plots | Freq. in Alpine Plots | Total Freq. | Total Abundance |
|---|---|---|---|---|
| Peltigera rufescens | 0.33 | 0.13 | 0.18 | 3 |
| Physconia muscigena | 0.00 | 0.25 | 0.18 | 6 |
| Pseudephebe pubescens | 0.00 | 0.25 | 0.18 | 6 |
| Rhizoplaca chrysoleuca | 0.00 | 0.25 | 0.18 | 6 |
| Stereocaulon paschale | 0.33 | 0.13 | 0.18 | 5 |
| Tuckermanopsis americana | 0.67 | 0.00 | 0.18 | 2 |
| Umbilicaria deusta | 0.00 | 0.25 | 0.18 | 4 |
| Usnea scabrata | 0.67 | 0.00 | 0.18 | 6 |
| Arctoparmelia incurva | 0.00 | 0.13 | 0.09 | 3 |
| Bryoria simplicior | 0.33 | 0.00 | 0.09 | 1 |
| Cetraria chlorophylla | 0.33 | 0.00 | 0.09 | 1 |
| Cetraria inermis | 0.00 | 0.13 | 0.09 | 1 |
| Cladonia boryi | 0.00 | 0.13 | 0.09 | 3 |
| Cladonia cariosa | 0.00 | 0.13 | 0.09 | 1 |
| Cladonia deformis | 0.33 | 0.00 | 0.09 | 1 |
| Cladonia ochrochlora | 0.33 | 0.00 | 0.09 | 2 |
| Cladonia pleurota | 0.33 | 0.00 | 0.09 | 1 |
| Cladonia scabriuscula | 0.33 | 0.00 | 0.09 | 1 |
| Cladonia subfurcata | 0.00 | 0.13 | 0.09 | 3 |
| Cladonia thomsonii | 0.00 | 0.13 | 0.09 | 2 |
| Cladonia verruculosa | 0.33 | 0.00 | 0.09 | 2 |
| Collema undulatum var. granulosum | 0.00 | 0.13 | 0.09 | 3 |
| Dactylina madreporiformis | 0.00 | 0.13 | 0.09 | 3 |
| Hypogymnia vittata | 0.00 | 0.13 | 0.09 | 1 |
| Imshaugia aleurites | 0.33 | 0.00 | 0.09 | 1 |
| Lasallia pensylvanica | 0.00 | 0.13 | 0.09 | 2 |
| Leptogium saturninum | 0.00 | 0.13 | 0.09 | 2 |
| Lobaria scrobiculata | 0.33 | 0.00 | 0.09 | 3 |
| Melanelia disjuncta | 0.00 | 0.13 | 0.09 | 2 |
| Melanelia panniformis | 0.00 | 0.13 | 0.09 | 2 |
| Pannaria pezizoides | 0.33 | 0.00 | 0.09 | 1 |
| Parmelia fraudans | 0.00 | 0.13 | 0.09 | 1 |
| Peltigera didactyla | 0.00 | 0.13 | 0.09 | 1 |
| Peltigera leucophlebia | 0.33 | 0.00 | 0.09 | 1 |
| Peltigera polydactyla | 0.00 | 0.13 | 0.09 | 1 |
| Phaeophyscia endococcinea | 0.00 | 0.13 | 0.09 | 1 |
| Physcia dubia | 0.00 | 0.13 | 0.09 | 3 |
| Physcia phaea | 0.00 | 0.13 | 0.09 | 2 |
| Pseudephebe miniscula | 0.00 | 0.13 | 0.09 | 3 |
| Psora tuckermanii | 0.00 | 0.13 | 0.09 | 3 |
| Psoroma hypnorum | 0.00 | 0.13 | 0.09 | 3 |
| Ramalina roesleri | 0.33 | 0.00 | 0.09 | 2 |
| Rhizoplaca melanophthalma | 0.00 | 0.13 | 0.09 | 3 |
| Solorina saccata | 0.00 | 0.13 | 0.09 | 1 |
| Umbilicaria vellea | 0.00 | 0.13 | 0.09 | 1 |
| Xanthoria candelaria | 0.00 | 0.13 | 0.09 | 2 |
| Xanthoria sorediata | 0.00 | 0.13 | 0.09 | 1 |

Potentially Uncommon

**Table 6. Plant communities and environments likely to harbor major distinct lichen communities in Gates of the Arctic National Park and Preserve, Alaska.** Dominant associated lichen species are listed in hypothesized order of frequency, with only the most frequently occurring species (ca. > 50%) in each community type listed. Communities are assumed to encompass single microhabitat types. For example, rock species are listed only on rock environments even though these may be nested within large alpine tundra plots.

| Plant Community or Environment | Dominant Lichen Species | Primary Floristic Features |
|---|---|---|
| *Picea glauca* woodland mixed with *Alnus* or *Salix* | *Cladina stellaris, Cladonia amaurocraea, Cladina spp., Cetraria islandica, Peltigera aphthosa, Cetraria nivalis, Cetraria cucullata, Cladonia gracilis, Cladonia maxima, C. crispata, Bryoria lanestris, Peltigera malacea, Hypogymnia bitteri, H. physodes, H. austerodes, Parmelia sulcata, Usnea spp., Cetraria pinastri, Cladonia chlorophaea, Evernia mesomorpha, Stereocaulon spp.* | Large complement of terrestrial tundra lichens and epiphytes. Closed woodland floor more dominated by mosses and *Peltigera*; open woodland floors intergrading with rich mossy tundra. |
| *Picea mariana* wooded bogs or heaths | *Cladina rangiferina, Peltigera aphthosa, Cladonia gracilis, Cladina arbuscula, Bryoria lanestris, Hypogymnia bitteri, H. austerodes, H. physodes, Cladonia maxima, Peltigera malacea, Parmelia sulcata, Usnea spp., Cetraria pinastri, Peltigera canina* | Same epiphytes as *Picea glauca* woodland. Terrestrial spp. moisture tolerant, i.e., more *Peltigera* spp., fewer fruticose *Cetraria*'s. |
| *Betula papyrifera* woodlands | *Cladina stellaris, Cladina spp., Cladonia gracilis, Cetraria (fruticose) spp., Melanelia olivacea, Parmelia sulcata, Hypogymnia bitteri, Parmeliopsis spp., Bryoria lanestris, Evernia mesomorpha, Usnea spp., Cetraria sepincola, Melanelia septentrionalis, Stereocaulon spp.* | Forest floor similar to *Picea glauca* woodland. Many epiphytes specific. Forest floor species sometimes diminished in dense stands due to leaf drop. |
| Mixed, open *Alnus crispa* - *Salix* spp. | *Cladina rangiferina, Cladina spp., Cladonia amaurocraea, Cladonia gracilis, Cladonia maxima, Peltigera aphthosa, Cladonia cenotea, Parmelia sulcata, Melanelia septentrionalis, Nephroma bellum, N. helveticum, N. resupinatum, Peltigera canina* | Epiphytes high in hardwood-associated spp. and cyanolichens. Terrestrial lichens intergrading with rich tundra spp. |
| Closed *Alnus* or *Salix* thickets | *Cladina rangiferina, Cladonia amaurocraea, Cladina arbuscula, Cladonia cenotea, Parmelia sulcata, Melanelia septentrionalis, Nephroma bellum, N. helveticum, N. resupinatum, Cladonia chlorophaea, C. fimbriata,* | Epiphytes same as open thickets. Terrestrial lichens impoverished due to mosses and leaf drop. |
| Riparian *Populus* forests | Epiphytes: *Leptogium saturninum, Physcia aipolia, Phaeophyscia ciliata, Parmelia sulcata, Cladonia fimbriata, C. chlorophaea* | Epiphytes fairly specialized |
| Wet *Eriophorum* tussock tundra | *Cladonia amaurocraea* f. *celotea, Peltigera aphthosa, Peltigera spp., Cladina rangiferina, Cladonia gracilis* | Poor lichen community due to saturation/inundation |
| Well-drained to rocky *Dryas* tundra | *Cladina stellaris, Cladina rangiferina, Cladonia amaurocraea, Cetraria cucullata, Cetraria nivalis, Thamnolia spp., Alectoria ochroleuca, A. nigricans, Bryolcaulon divergens, Bryoria nitidula, Masonhalea richardsonii, Cetraria islandica, Asahinea chrysantha, Dactylina arctica/beringica., Cladonia gracilis, Cladonia coccifera, Hypogymnia subobscura, Peltigera aphthosa, P. canina, P. rufescens, Stereocaulon alpinum, S. tomentosum, Cetraria nigricans, Cladonia pyxidata* | *Cladina stellaris* often dominant on south side; *Cetraria nivalis* and *C. cucullata* more dominant on north side. This community is well represented on low to mid-elevation rocky ridges and lichen knolls below the high alpine. |

| Plant Community or Environment | Dominant Lichen Species | Primary Floristic Features |
|---|---|---|
| Poor, open low scrub tundra (non-ericaceous: primarily *Dryas*, dwarf *Salix*) | *Cetraria cucullata, C. nivalis, C. islandica, Masonhalea richardsonii, Cladina rangiferina, Cladina stellaris, Cladina spp., Cladonia amaurocraea, Cladonia gracilis, Peltigera aphthosa, Cladonia spp., Thamnolia sp., Dactylina arctica, D. beringica, Peltigera canina, Cladonia pyxidata* | Mostly north slope |
| Rich, mossy ericaceous open low scrub tundra (with or without low *Salix* spp.) | *Cladina stellaris, Cladina spp., Cladonia amaurocraea, Cladonia maxima, Cladonia gracilis, Cladonia crispata, Thamnolia sp., Dactylina arctica, D. beringica, Cetraria cucullata, C. nivalis, C. islandica, Masonhalea richardsonii, Nephroma arcticum, Cladonia sulphurina, Peltigera aphthosa, P. canina, Lobaria linita* | Predominantly south side of continental divide, less frequent on north side; not known from north slope. Richer in cyanolichens (Nephroma spp., Lobaria linita) than drier, rockier tundra |
| Fellfields and alpine talus (siliceous) | *Cetraria nivalis, Cladonia gracilis, Cetraria nigricans, Cladonia sulphurina, Alectoria ochroleuca, Alectoria nigricans, Sphaerophorus globosus, Sphaerophorus fragilis, Melanelia stygia, Dactylina ramulosa, Cetraria commixta/hepatizon, Pseudephebe miniscula, P. pubescens, Allantoparmelia almquistii, Cladonia uncialis, Cladonia pyxidata, Cladonia spp., Peltigera rufescens, Bryoria nitidula, Bryocaulon divergens* | Calcareous fellfields will also host *Physconia muscigena, Cetraria tilesii, Physcia caescia, Physcia phaea.* Granite talus has lower diversity (though usually higher dominance) than other siliceous types. *Melanelia stygia, Cetraria hepatizon* and *C. commixta* are typically absent from granite. |
| Siliceous rock outcrops | *Umbilicaria proboscidea, Arctoparmelia separata, A. centrifuga, Umbilicaria caroliniana, Umbilicaria hyperborea, Asahinea scholanderi, Umbilicaria cinereorufescens, Melanelia stygia, Melanelia panniformis, Cetraria commixta/hepatizon, Parmelia omphalodes, Allantoparmelia almquistii, Sphaerophorus globosus, Sphaerophorus fragilis, Umbilicaria cylindrica, Melanelia disjuncta* | |
| Calcareous rock outcrops | *Arctoparmelia separata, Arctoparmelia centrifuga, Parmelia omphalodes, Cetraria commixta/hepatizon, Melanelia stygia, Physcia caesia, Xanthoria elegans, Asahinea scholanderi, Physconia muscigena, Cetraria nigricans, Arctoparmelia incurva, Xanthoria candelaria, Rhizoplaca chrysoleuca, Phaeophyscia spp., Xanthoria candelaria* | Richer in *Physciod* and *Xanthoria* species than siliceous outcrops. |
| Riparian areas | *Cetraria delisii, Stereocaulon spp.* | |
| Late snowmelt zones in alpine tundra | *Cetraria delisii, C. nivalis, C. andrejevii, C. kamczatica, C. cucullata, C. islandica, Cladina stellaris, C. spp., Cladonia spp.* | Similar to other tundra types, but typically wet or seepy. Some species specific to this zone. |

**Table 7. Crustose lichen species reported from Gates of the Arctic National Park and Preserve, Alaska.** Reports are consolidated records from Murray (1974), Moser et al. (1979), Thomson (1979), and Cooper (1983). Full lichen records for each of these species can be found in the GAAR lichen database (Neitlich and Hasselbach 1998a).

| Taxon | No. of Records in GAAR Database |
|---|---|
| Acarospora schleicheri | 1 |
| Amandinea punctata | 1 |
| Amygdalaria elegantior | 3 |
| Amygdalaria panaeola | 2 |
| Arthrorhaphis alpina | 1 |
| Arthrorhapsis citrinella | 1 |
| Aspicilia aquatica | 1 |
| Aspicilia caesiocinerea | 1 |
| Aspicilia cinerea | 2 |
| Aspicilia elevata | 1 |
| Aspicilia c.f. myrinii | 1 |
| Aspicilia nikrapensis | 1 |
| Aspicilia plicigera | 1 |
| Aspicilia sublapponica | 1 |
| Aspicilia supertegens | 1 |
| Bacidia bagliettoana | 1 |
| Bacidia subincompta | 1 |
| Bacidia trachona | 1 |
| Bellemerea cinereorufescens | 1 |
| Biatora sphaeroides | 2 |
| Biatora vernalis | 2 |
| Bryonora castanea | 2 |
| Buellia aethalea | 1 |
| Buellia papillata | 1 |
| Caloplaca ammiospila | 2 |
| Caloplaca cerina | 2 |
| Caloplaca fraudans | 2 |
| Caloplaca granulosa | 1 |
| Caloplaca holocarpa | 2 |
| Caloplaca jungermanniae | 1 |
| Caloplaca pinicola | 1 |
| Caloplaca tetraspora | 1 |

| Taxon | No. of Records in GAAR Database |
|---|---|
| Caloploaca tiroliensis | 1 |
| Candelariella athallina | 1 |
| Candelariella aurella | 1 |
| Candelariella lutella | 1 |
| Candelariella placodizans | 2 |
| Candelariella terrigena | 2 |
| Candelariella vitellina | 1 |
| Candelariella xanthostigma | 1 |
| Carbonea vorticosa | 1 |
| Catapyrenium lachneum | 1 |
| Chaenotheca furfuracea* | 1 |
| Chrysothrix chlorina | 1 |
| Cyphellium tigillare | 1 |
| Dibaeis baeomyces | 1 |
| Dimelaena oreina | 1 |
| Diploschistes muscorum ssp. muscorum | 1 |
| Diploschistes scruposus | 2 |
| Epilichen scabrosus** | 2 |
| Euopsis pulvinata | 1 |
| Farnoldia hypocrita | 1 |
| Farnoldia jurana | 1 |
| Fulgensia bracteata | 1 |
| Fulgensia c.f. bracteata | 1 |
| Fuscidea c.f. mollis | 1 |
| Fuscopannaria praetermissa | 1 |
| Glypholecia scabra | 1 |
| c.f. Gyalecta sp. | 1 |
| Gyalecta foveolaris | 1 |
| Hymenelia euplotica | 1 |
| Hymenelia heteromorpha | 1 |
| Hymenelia melanocarpa | 1 |

| Taxon | No. of Records in GAAR Database |
|---|---|
| Icmadophila ericetorum | 5 |
| Japewia tornoensis | 2 |
| Lecanora cenisea | 1 |
| Lecanora circumborealis | 1 |
| Lecanora coilocarpa | 1 |
| Lecanora dispersa | 1 |
| Lecanora epibryon | 2 |
| Lecanora geophila | 1 |
| Lecanora hagenii | 1 |
| Lecanora luteovernalis | 1 |
| Lecanora marginata | 1 |
| Lecanora nordenskioeldii | 1 |
| Lecanora polytropa | 2 |
| Lecanora rugosella | 1 |
| Lecanora rupicola | 1 |
| Lecanora symmicta | 1 |
| Lecanora vegae | 1 |
| Lecidea atrobrunnea | 1 |
| Lecidea auriculata | 2 |
| Lecidea confluens | 1 |
| Lecidea diducens | 1 |
| Lecidea lapicida | 3 |
| Lecidea picea | 1 |
| Lecidea ramulosa | 1 |
| Lecidea tesselata | 1 |
| Lecidella euphora | 1 |
| Lecidella euphorea | 1 |
| Lecidella stigmatea | 1 |
| Lecidella wulfenii | 1 |
| Lepraria sp. | 1 |
| Lopadium pezizoideum | 2 |
| Megaspora verrucosa | 3 |

| Taxon | No. of Records in GAAR Database |
|---|---|
| Micarea assimilata | 2 |
| Micarea melaena | 1 |
| Miriquidica instrata | 1 |
| Miriquidica leucophaea | 2 |
| Muellerella pygmaea | 1 |
| Mycobilimbia berengeriana | 1 |
| Mycobilimbia hypnorum | 1 |
| Mycobilimbia lobulata | 2 |
| Mycobilimbia microcarpa | 1 |
| Mycobilimbia tetramera | 1 |
| Mycoblastus affinis | 1 |
| Mycoblastus sanguianarius | 1 |
| Mycoblastus sanguinarius | 2 |
| Normandina pulchella | 1 |
| Ochrolechia androgyna | 1 |
| Ochrolechia frigida | 3 |
| Ochrolechia grimmiae | 1 |
| Ochrolechia inaequatula | 2 |
| Ochrolechia subplicans | 1 |
| Ochrolechia upsaliensis | 3 |
| Ophioparma lapponica | 3 |
| Orphniospora moriopsis | 1 |
| Pertusaria bryontha | 3 |
| Pertusaria coriacea | 2 |
| Pertusaria dactylina | 5 |
| Pertusaria geminipara | 1 |
| Pertusaria panyrga | 1 |
| c.f. Placidiopsis (cervinula??) | 1 |
| Placopsis gelida | 2 |
| Placynthiella uliginosa | 1 |
| Polyblastia gothica | 1 |
| Polyblastia hyperborea | 1 |
| Polyblastia sendtneri | 2 |
| Polyblastia terrestris | 1 |
| Polyblastia theleodes | 1 |
| Porpidea flavocaerulescens | 1 |

| Taxon | No. of Records in GAAR Database |
|---|---|
| Porpidia crustulata | 1 |
| Porpidia glaucophaea | 1 |
| Porpidia macrocarpa | 2 |
| Porpidia speirea | 1 |
| Protoblastenia calva | 1 |
| Protoblastenia rupestris | 1 |
| Protoparmelia badia | 3 |
| Psilolechia lucida | 1 |
| Rhizocarpon chioneum | 1 |
| Rhizocarpon copelandii | 1 |
| Rhizocarpon disporum | 2 |
| Rhizocarpon eupetraeoides | 2 |
| Rhizocarpon eupetraeum | 1 |
| Rhizocarpon geographicum | 4 |
| Rhizocarpon grande | 2 |
| Rhizocarpon hochstetteri | 1 |
| Rhizocarpon inarense | 1 |
| Rhizocarpon intermediellum | 1 |
| Rhizocarpon polycarpum | 1 |
| Rhizocarpon pusillum | 1 |
| Rhizocarpon riparium | 1 |
| Rhizocarpon rittokense | 1 |
| Rhizocarpon superficiale ssp. boreale | 1 |
| Rhizoplaca chrysoleuca | 1 |
| Rinodina calcigena | 1 |
| Rinodina hyperborea | 1 |
| Rinodina laevigata | 1 |
| Rinodina roscida | 1 |
| Rinodina turfacea | 2 |
| Ropalospora lugubris | 1 |
| Sarcogyne regularis | 1 |
| Schaereria cinereorufa | 2 |
| Spilonema revertens | 1 |
| Sporastatia testudinea | 1 |
| Squamarina lentigera | 2 |

| Taxon | No. of Records in GAAR Database |
|---|---|
| Staurothele fissa | 1 |
| Tephromela aglaea | 2 |
| Tephromela armeniaca | 1 |
| Tephromela atra | 2 |
| Thelidium minutulum | 1 |
| Toninia caeruleonigricans | 1 |
| Toninia sedifolia | 1 |
| Toninia tristis | 2 |
| Trapeliopsis granulosa | 2 |
| Tremolecia atrata | 2 |
| Verrucaria calciseda | 1 |
| Verrucaria devergescens | 1 |
| Verrucaria margacea | 1 |
| Verrucaria nigrescens | 1 |
| Total Number of Crustose Species | 180 |

* Caliciales

** Lichenicolous fungus

Table 7-2

**Appendix 1. Abundance scores in 11 lichen abundance detection plots, Gates of the Arctic National Park and Preserve, Alaska.** "Plots" were 2 hour surveys without fixed area. Abundance ratings were as follows: 1) encountered 1-3 times; 2) encountered 3-10 times; 3) encountered > 10 times but covering less area than rating 4; 4) covering more than 25% of all area on the substrate normally occupied by that species.

| | Forested | | | Northern Alpine | | | | | Southern Alpine | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Taxon** | 5 (RR) | 11 (WL-S) | 10 (WL Camp1) | 1 (Kur Lk/WF/R) | 7 (RP-H) | 6 RP-L | 8(UPP ITK) | 4 (Oolah LK/Up ITK) | 9 (WL-Alp) | 3 (IG) | 2 (RR Forks) |
| *Alectoria nigricans* | | | 2 | | | 3 | 3 | | 3 | 1 | 3 |
| *Alectoria ochroleuca* | | | | | 3 | 3 | 3 | 3 | 3 | 2 | 3 |
| *Allantoparmelia almquistii* | | | | 2 | 3 | 3 | 3 | 3 | | | |
| *Arctoparmelia centrifuga* | 3 | 3 | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| *Arctoparmelia incurva* | | | | | 3 | | | | | | |
| *Arctoparmelia separata* | 3 | | 3 | 3 | 3 | 3 | 3 | 3 | | 3 | 3 |
| *Asahinea chrysantha* | | | | 3 | | 3 | 3 | 3 | 3 | 3 | 2 |
| *Asahinea scholanderi* | | | | 3 | | 3 | 3 | 2 | | 3 | |
| *Brodoa oroarctica* | | | | 2 | 3 | | | 1 | | | |
| *Bryocaulon divergens* | | 3 | 3 | | 2 | | 3 | 3 | 3 | 3 | 3 |
| *Bryoria lanestris* | 4 | 4 | 4 | | | | | | | | |
| *Bryoria nitidula* | | | | | 2 | 3 | 3 | 3 | 3 | 3 | |
| *Bryoria simplicior* | | 1 | | | | | | | | | |
| *Cetraria chlorophylla* | | 1 | | | | | | | | | |
| *Cetraria commixta/hepatizon* | | | | 3 | 3 | 3 | 3 | 3 | 3 | | 3 |
| *Cetraria cucullata* | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 3 |
| *Cetraria delisii* | 2 | | | | 3 | 2 | 3 | 3 | | 3 | 3 |
| *Cetraria inermis* | | | | | | | | | 1 | | |
| *Cetraria islandica* | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 3 | 3 | 3 |
| *Cetraria kamczatica* | | | | 2 | | | | | | 2 | 2 |
| *Cetraria laevigata* | | 1 | | | 1 | 2 | 2 | | | 2 | 2 |
| *Cetraria nigricans* | 2 | | | 3 | 3 | 3 | 2 | | 3 | 3 | 3 |
| *Cetraria nivalis* | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 4 | 3 |
| *Cetraria pinastri* | 3 | | 3 | | | | | 1 | | | 1 |
| *Cetraria sepincola* | 3 | 3 | | | | | | 1 | 1 | | |
| *Cetraria tilesii* | | | | 3 | 3 | 3 | 2 | 2 | 3 | | 2 |
| *Cladina arbuscula/mitis* | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | 2 |
| *Cladina rangiferina* | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | | 3 |
| *Cladina stellaris* | 4 | 3 | 3 | 1 | 3 | 4 | 3 | | 3 | 4 | 4 |
| *Cladonia amaurocraea* | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| *Cladonia bacilliformis* | 1 | 2 | | | | | | | | | |
| *Cladonia bellidiflora* | 3 | | | | | | | | 3 | 1 | 2 |
| *Cladonia boryi* | | | | | | | | | | 3 | |
| *Cladonia botrytes* | | 1 | | | | | | | | 1 | |
| *Cladonia cariosa* | | | | | | | | | | 1 | |
| *Cladonia carneola* | 1 | 1 | | | | | | | | | |
| *Cladonia cenotea* | 3 | | 3 | | | | | | | 1 | |
| *Cladonia chlorophaea* | 2 | 1 | 2 | | | | | | | | |
| *Cladonia coccifera* | 2 | 1 | 3 | | 3 | 3 | 3 | 2 | | 3 | 2 |
| *Cladonia coniocraea* | 2 | | 1 | | | | | | | | |
| *Cladonia cornuta* | 3 | | 3 | | 3 | 3 | | 3 | | | 2 |
| *Cladonia crispata* | 3 | | 3 | | 3 | 3 | 1 | 1 | | 3 | 3 |
| *Cladonia cyanipes* | | | | | | | | | | 2 | 1 |
| *Cladonia deformis* | | 1 | | | | | | | | | |
| *Cladonia ecmocyna* | 1 | | 1 | | | | | | | 1 | |
| *Cladonia fimbriata* | | | 2 | | | | | | 1 | 1 | |

| Taxon | Forested | | | Northern Alpine | | | | | Southern Alpine | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5 (RR) | 11 (WL-S) | 10 (WL Camp1) | 1 (Kur Lk/WF/R) | 7 (RP-H) | 6 RP-L | 8(UPP ITK) | 4 (Oolah LK/Up ITK) | 9 (WL-Alp) | 3 (IG) | 2 (RR Forks) |
| *Cladonia gracilis ssp. gracilis* | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 |
| *Cladonia gracilis ssp. turbinata* | 3 | 1 | 3 | 1 | | | | | | | |
| *Cladonia macrophylla* | 3 | | | 1 | | | 2 | | | 3 | 3 |
| *Cladonia maxima* | 3 | | 3 | | | | 2 | | | | 3 |
| *Cladonia metacorallifera* | | 1 | | | | | | | | 1 | |
| *Cladonia ochrochlora* | 2 | | | | | | | | | | |
| *Cladonia phyllophora* | 3 | | 3 | | | | 1 | | 1 | 1 | |
| *Cladonia pleurota* | | 1 | | | | | | | | | |
| *Cladonia pyxidata/pocillum* | 3 | | 3 | 3 | | | 3 | 3 | 3 | 3 | 3 |
| *Cladonia scabriuscula* | | | 1 | | | | | | | | |
| *Cladonia squamosa* | 2 | | | | | | | | | 2 | |
| *Cladonia stricta* | 3 | | | | | | | | | | 3 |
| *Cladonia subfurcata* | | | | | | | | | | | 3 |
| *Cladonia sulphurina* | 3 | 3 | 3 | | 3 | 3 | 3 | | 3 | | 3 |
| *Cladonia thomsonii* | | | | | | | | | | 2 | |
| *Cladonia uncialis* | 3 | | 3 | 2 | | | | | 3 | 1 | 3 |
| *Cladonia verruculosa* | | | 2 | | | | | | | | |
| *Cladonia wainioi* | | | 1 | | | | | | | 1 | |
| *Coelocaulon aculeatum* | | | 1 | 3 | | | | | 2 | | |
| *Collema undulatum var.* | | | | 3 | | | | | | | |
| *Dactylina arctica/beringica* | | 2 | 3 | 3 | | 3 | 3 | 3 | 3 | | 3 |
| *Dactylina madreporiformis* | | | | 3 | | | | | | | |
| *Dactylina ramulosa* | | | | 3 | 3 | 3 | 1 | 3 | 3 | 1 | 1 |
| *Evernia mesomorpha* | 1 | 3 | 3 | | | | | | | | |
| *Hypogymnia austerodes* | 1 | 3 | 3 | | | | | | | | |
| *Hypogymnia bitteri* | 3 | 3 | 3 | | | | 2 | 1 | | | |
| *Hypogymnia physodes* | 3 | 3 | 3 | 1 | | 1 | | | | | |
| *Hypogymnia subobscura* | | | | 3 | | | 2 | | | | |
| *Hypogymnia vittata* | | | | 1 | | | | | | | |
| *Imshaugia aleurites* | | 1 | | | | | | | | | |
| *Lasallia pensylvanica* | | | | | | | | 2 | | | |
| *Leptogium saturninum* | | | | 2 | | | | | | | |
| *Leptogium sp.* | | | 1 | 3 | | | | | | | |
| *Lobaria linita* | | | 3 | 3 | 1 | 2 | 3 | 3 | 3 | | 3 |
| *Lobaria scrobiculata* | 3 | | | | | | | | | | |
| *Masonhalea richardsonii* | | | | 3 | | 3 | 3 | 3 | 3 | 3 | 3 |
| *Melanelia disjuncta* | | | | 2 | | | | | | | |
| *Melanelia exasperatula* | | 3 | 3 | 1 | | | | | | | |
| *Melanelia olivacea* | 3 | 3 | | | | | | | | | |
| *Melanelia panniformis* | | | | 2 | | | | | | | |
| *Melanelia septentrionalis* | 3 | 3 | | | | | | | 1 | | |
| *Melanelia stygia* | | 3 | | 3 | 3 | 3 | 3 | 3 | 3 | | 3 |
| *Melanelia tominii* | | | | 3 | | | | 2 | | | |
| *Nephroma arcticum* | 3 | 3 | 3 | 2 | | 3 | 3 | 3 | 3 | | 3 |
| *Nephroma bellum* | 3 | 2 | 2 | | | | | | | | |
| *Nephroma expallidum* | | | | 3 | | 3 | 3 | | | | 1 |
| *Nephroma helveticum* | | 1 | 1 | | | | | | | | |
| *Nephroma parile* | 1 | 3 | | | | | 1 | 2 | | | |
| *Nephroma resupinatum* | 1 | | 1 | | | | | | | | |
| *Pannaria pezizoides* | | | 1 | | | | | | | | |
| *Parmelia fraudans* | | | | | | 1 | | | | | |

| Taxon | Forested | | | Northern Alpine | | | | | Southern Alpine | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5 (RR) | 11 (WL-S) | 10 (WL Camp 1) | 1 (Kur Lk/WF/R) | 7 (RP-H) | 6 RP-L | 8(UPP ITK) | 4 (Oolah LK/Up ITK) | 9 (WL-Alp) | 3 (IG) | 2 (RR Forks) |
| *Parmelia omphalodes* | 3 | | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 |
| *Parmelia saxatilis* | | | 1 | 1 | | | 1 | | | | |
| *Parmelia sulcata* | 3 | 3 | 3 | 2 | | | 1 | | 2 | | |
| *Parmeliopsis ambigua* | 3 | 3 | 3 | | | | | | | | |
| *Parmeliopsis hyperopta* | 3 | 3 | 3 | | | | | | | 1 | |
| *Peltigera aphthosa* | 3 | 3 | 3 | 3 | | 3 | 3 | 3 | 3 | 1 | 3 |
| *Peltigera canina* | | | 2 | 3 | | 3 | 3 | 3 | | | 1 |
| *Peltigera didactyla* | | | | | | | | | | 1 | |
| *Peltigera leucophlebia* | | 1 | | | | | | | | | |
| *Peltigera malacea* | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | | 2 |
| *Peltigera polydactyla* | | | | | | | | | | 1 | |
| *Peltigera rufescens* | | | 1 | | 2 | | | | | | |
| *Peltigera scabrosa* | 1 | | | 1 | | | 3 | | | | 3 |
| *Phaeophyscia endococcinea* | | | | 1 | | | | | | | |
| *Physcia aipolia* | | | | 1 | | | 3 | 3 | 2 | | |
| *Physcia caesia* | | | | 3 | | | | | 3 | 1 | |
| *Physcia dubia* | | | | 3 | | | | | | | |
| *Physcia phaea* | | | | | | | | 2 | | | |
| *Physconia muscigena* | | | | 3 | | | | | 3 | | |
| *Pseudephebe miniscula* | | | | 3 | | | | | | | |
| *Pseudephebe pubescens* | | | | 3 | 3 | | | | | | |
| *Psora tuckermanii* | | | | | | | | | 3 | | |
| *Psoroma hypnorum* | | | | | | | 3 | | | | |
| *Ramalina dilacerata* | 2 | 2 | 3 | | | | | | | | |
| *Ramalina roesleri* | | 2 | | | | | | | | | |
| *Rhizoplaca chrysoleuca* | | | | | | | 3 | 3 | | | |
| *Rhizoplaca melanophthalma* | | | | | | | 3 | | | | |
| *Solorina crocea* | | | | | 3 | | | 3 | 3 | | 3 |
| *Solorina saccata* | | | | | | | | | 1 | | |
| *Sphaerophorus fragilis* | | | | 3 | 3 | 3 | 1 | | 3 | | |
| *Sphaerophorus globosus* | | | | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 3 |
| *Stereocaulon alpinum* | | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 3 |
| *Stereocaulon glareosum* | 3 | | | | 3 | 3 | | | | | |
| *Stereocaulon paschale* | | 2 | | | | | | 3 | | | |
| *Stereocaulon tomentosum* | 3 | | 3 | 3 | | | 3 | 3 | | | 3 |
| *Thamnolia subuliformis* | | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |
| *Tuckermanopsis americana* | | 1 | 1 | | | | | | | | |
| *Umbilicaria caroliniana* | 3 | 3 | 1 | | | | | | 3 | 3 | 3 |
| *Umbilicaria cinereorufescens* | | | | 3 | | 3 | | 3 | | | |
| *Umbilicaria cylindrica* | | | | | 3 | | 2 | 3 | | | |
| *Umbilicaria deusta* | | | | 1 | | | | | 3 | | |
| *Umbilicaria hyperborea* | 3 | 3 | 3 | 3 | | | 3 | 3 | 3 | 3 | 3 |
| *Umbilicaria proboscidea* | 2 | 3 | | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 |
| *Umbilicaria vellea* | | | | | | 1 | | | | | |
| *Usnea lapponica* | 3 | 3 | 3 | | | | | | | | |
| *Usnea scabrata* | | 3 | 3 | | | | | | | | |
| *Xanthoria candelaria* | | | | | | | 2 | | | | |
| *Xanthoria elegans* | | | | 3 | | 3 | 3 | 3 | 3 | | |
| *Xanthoria sorediata* | | | | | | | | | 1 | | |
| **Plot Totals** | 60 | 55 | 62 | 65 | 40 | 47 | 60 | 51 | 52 | 48 | 53 |