3. FLORISTICS

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The initial habitat classification as described in Chapter 2 was conducted in 1986 and 1987 based upon field identification of plant species. A field collection of vascular plant species was made during the 1988, 1989, and 1990 summer seasons. The plant species collected were identified and verified in cooperation with the Rocky Mountain Herbarium at the University of Wyoming. Voucher specimens are archived at the Herbarium. A complete set of voucher specimens (one or more for every terrestrial taxon) is also located at the Rocky Mountain Station's Centennial laboratory for use during the field season. A total of 209 vascular plant species (and 213 vascular plant taxa) were collected and identified in 1988, 1989, and 1990 in the higher elevation area of the GLEES (Lost Lake, West Glacier Lake, and East Glacier Lake watersheds). Only 17 taxa initially field identified in the 1986 and 1987 reconnaissance were not collected in 1988, 1989, and 1990.

The life cycle of many of the plant species at the GLEES is short, with growth, flowering, seed set, seed maturation, seed dissemination, and senescence occurring within a few weeks. This strategy allows these species to reproduce and perpetuate themselves in the alpine and subalpine habitats typical of the GLEES, with the short growing season between spring or early summer snowmelt and the first killing frost in the fall. The entire vegetative and reproductive life cycle may be completed within days. Period of flowering may be only a few days or hours in some species in some habitats. Thus, it is expected that additional vascular plant species occur at the GLEES which have not yet been collected and identified.

Only vascular plants from the higher elevation watersheds of the GLEES are currently included in the collections. Ferns have been identified at the GLEES, but their occurrence is uncommon. Some nonvascular plant species have been field identified, but these have not been systematically collected and verified. A large number of lichen species exists at GLEES. Their occurrence is scattered, with numerous species present in some habitats, and fewer in others. They appear to be particularly numerous on the eastern edge of GLEES. Mosses are prevalent in most habitats at the GLEES.

Floristically, the GLEES is characteristic of other subalpine and alpine sites found in the southern Rocky Mountains. Of the plant species collected and verified at the higher elevations of GLEES in 1988, 1989, and 1990, 25.4% are alpine, 13.6% are arctic-alpine, and 22.5% are boreal-montane according to their phytogeographic distribution (table 3.1). Primary references for phytogeographic distributions of these taxa include Rydberg (1914a, 1916, 1919), Great Plains Flora Association (1977, 1986), Harrington (1964), Hitchcock et al. (1955, 1959, 1961, 1964, 1969), Hulten and Fries (1986a,b,c), Komarkova (1979), Martin and Hutchins (1980, 1981), Weber (1967, 1987, 1990), and Welsh et al. (1987). The large number of alpine or arctic-alpine plant species occurring at the GLEES verifies that the area is typical of an alpine environment. These species are tolerant of the harsh environment characteristic of this area, and have a competitive advantage over less tolerant species.

Table 3.1.—Summary of the phytogeographic distributions of the vascular plant taxa of GLEES.

Geographic distribution	Number of taxa	Percent of total flora
Alpine	54	25.4
Arctic-alpine	29	13.6
Boreal-montane	48	22.5
Great Plains	2	0.9
Montane	76	35.7
Ubiquitous	4	1.9
Total	213	100.0

The 209 vascular plant species (213 vascular plant taxa) that were collected and verified in 1988, 1989, and 1990 are distributed in 36 plant families (table 3.2). The four families having the most species at GLEES were Asteraceae with 36 species (36 taxa), followed by Poaceae with 28 species (29 taxa), Cyperaceae with 19 species (19 taxa), and Caryophyllaceae with 14 species (15 taxa). Ten plant families were represented by only one species (one taxon), and two families had only two species (two taxa). Flowering plants comprised 95% of the vascular plant flora of the GLEES (table 3.3). Dicots, encompassing 67% of the vascular plant flora, were the largest major division of the vascular plant taxa present at the GLEES. Monocots comprised 28% of the vascular plant taxa. Only 3% of the vascular plant flora was made up of pteridophytes. The conifers represented the remaining 2% of the GLEES flora.

Only three introduced species have been identified to date at GLEES. They are *Taraxacum officinale* Weber (common dandelion), *Chenopodium atrovirens* Rydb. (dark goosefoot), and *Luzula multiflora* (Retz.) Lej. (many flowered woodrush). None of these three were prevalent at GLEES. The following plant species collected at GLEES are considered poisonous:

Juniperus communis L. var. *depressa* Pursh (common juniper, dwarf juniper)

Picea engelmannii Parry ex Engelm. (Engelmann spruce)

Table 3.2.—The composition of the vascular plant families of GLEES with respect to genera, species, and subspecific taxa.

Family	Number of genera	Number of species	Number of taxa
Asteraceae	14	36	36
Poaceae	10	28	29
Cyperaceae	2	19	19
Caryophyllaceae	7	14	15
Scrophulariaceae	5	9	9
Brassicaceae	4	8	8
Onagraceae	2	8	9
Juncaceae	2	7	7
Ranunculaceae	5	6	6
Rosaceae	3	6	6
Saxifragaceae	4	6	6
Ericaceae	4	5	6
Gentianaceae	4	5	5
Salicaceae	2	5	5
Pinaceae	3	4	4
Polemoniaceae	2	4	4
Polygonaceae	3	4	4
Polypodiaceae	3	3	3
Apiaceae	3	3	3
Boraginaceae	2	3	3
Fabaceae	2	3	3
Liliaceae	3	3	3
Portulacaceae	2	3	3
Violaceae	1	3	3
Crassulaceae	1	2	2
Primulaceae	2	2	2
Isoetaceae	1	1	1
Ophioglossaceae	1	1	1
Selaginellaceae	1	1	1
Cupressaceae	1	1	1
Callitrichaceae	1	1	1
Caprifoliaceae	1	1	1
Chenopodiaceae	1	1	1
Grossulariaceae	1	1	1
Hydrophyllaceae	1	1	1
Orchidaceae	1	1	1
(36 families)	105	209	213

Pinus contorta Dougl. ex Loud. var. *latifolia* Engelm. ex Wats. (lodgepole pine)

Pinus flexilis James (limber pine)

Conioselinum scopulorum (Gray) Coult. & Rose (hemlock parsley)

Sambucus racemosa L. ssp. *pubens* (Michx.) House var. *microbotrys* (Rydb.) Kearn. & Peeb. (scarlet elderberry, red elderberry, Rocky Mountain red elder, mountain red elderberry, red-berried elder)

Arctostaphylos uva-ursi (L.) Spreng. ssp. *uva-ursi* var. *uva-ursi* (common bearberry, kinnikinnick, sandberry, mealberry)

Arctostaphylos uva-ursi (L.) Spreng. ssp. *uva-ursi* var. *stipitata* (Packer & Denford) Dorn (bearberry, kinnikinnick, bearberry manzanita, sandberry)

Kalmia microphylla (Hook.) Heller var. *microphylla* (alpine laurel, alpine bog Kalmia, swamp laurel)

Lupinus argenteus Pursh var. *argenteus* (silvery lupine)

Zigadenus elegans Pursh (mountain death camas)

Anemone patens L. var. *multifida* Pritz. (pasque flower, wild crocus, Easter flower)

Juniperus, *Picea*, *Pinus*, *Arctostaphylos*, and *Kalmia* species are generally unpalatable and, consequently, toxic quantities of them are rarely ingested.

Twelve additional taxa have been found at the GLEES that were not in Burrell E. Nelson's 1984 *Vascular Plants of the Medicine Bow Range*. They are:

Carex bipartita All. (two-parted sedge)

Luzula multiflora (Ehrh.) Lej. (many flowered woodrush, hairy woodrush)

Poa secunda Presl var. *incurva* (Scribn. & Williams ex Scribn.) Beetle (curly bluegrass)

Antennaria rosea Greene (rose pussytoes, rosey pussytoes, pink pussytoes, pink everlasting)

Table 3.3.—Composition of the vascular plant flora of GLEES by major plant groups.

Groups	Families	Genera	Species		Subspecific taxa	
			Number	% of flora	Number	% of flora
Pteridophyta (club mosses, quillworts,horsetails or scouring rushes, and ferns)	4	6	6	2.9	6	2.8
Pinophyta (conifers)	2	4	5	2.4	5	2.3
Magnoliophyta (flowering plants)	30	95	198	94.7	202	94.8
Liliatae (monocotyledons)	5	18	58	27.8	59	27.7
Magnoliatae (dicotyledons)	25	77	140	67.0	143	67.1
Total	36	105	209	100.0	213	99.9

The two varieties of *Arctostaphylos uva-ursi* (L.) Spreng. ssp. *uva-ursi*, var. *uva-ursi* (common bearberry, kinnikinnick, sandberry, mealberry) and var. *stipitata* (Packer & Denford) Dorn (bearberry, kinnikinnick, bearberry manzanita, sandberry)

Epilobium angustifolium L. var. *angustifolium* (fireweed, common fireweed, fireweed willowherb, giant willowherb, blooming Sally)

Epilobium clavatum Trel. (alpine willowherb)

Epilobium lactiflorum Hausskn. (pale willowherb)

Gayophytum decipiens Lewis & Szweyk. (bigflower groundsmoke, spreading groundsmoke)

Polemonium brandegei (Gray) Greene (Brandegee sky pilot, Brandegee Jacobsladder, honey sky pilot, pale sky pilot)

Lewisia triphylla (Wats.) Robins. (threeleaf Lewisia).

It is evident from this large number of additional taxa, obtained during three field seasons of minimal collection, that the flora of GLEES (as well as that of the Medicine Bow Mountains, in general), is incomplete. At least five additional taxa were collected at the higher elevation areas of the GLEES site in 1991. A substantial number of new taxa should be expected in future seasons of work.

Three plant species outside their known range of occurrence have been identified at GLEES. These species were verified by taxonomists at the University of Wyoming Herbarium and can be considered uncommon for this area. *Antennaria aromatica* Evert was collected at GLEES in 1989 and was previously known in Wyoming only from Park County in NW Wyoming. *Lewisia triphylla* (Wats.) Robins. was also collected at GLEES in 1989. It has been reported in Park and Teton Counties and in Yellowstone National Park in NW Wyoming, and in Carbon County, Wyoming, which is closer to GLEES. *Carex bipartita* All., previously known only from Park and Johnson Counties in Wyoming, was collected at GLEES in 1990.

The complete GLEES vascular plant species checklist is presented in Appendix A. The list includes all plant species observed at GLEES from 1986 through 1990. Those plant species field identified in the initial habitat classification in 1986 and 1987, but not collected and identified in 1988–1990, are included in the checklist and specifically labeled as field identified only. They were not included in the calculations in tables 3.1, 3.2, and 3.3. It is expected that these species will be collected at GLEES and verified at a later date. Additional plant species also will likely be identified in the spruce-fir forest area at lower elevations of GLEES east of Brooklyn Lake.

Nomenclature follows that used by the Rocky Mountain Herbarium (Nelson and Hartman 1992). The primary references consulted for identification of plants, their distributions, and common names are listed below.

1) Primary taxonomic references for plant identifications:
Dorn (1988)
Hitchcock et al. (1955, 1959, 1961, 1964, 1969)
Harrington (1964)
Hermann (1970)
Moss (1983)
Nelson and Hartman (1992)

2) Major phytogeographical references:
Rydberg (1914a, 1916, 1919)
Great Plains Flora Association (1977, 1986)
Harrington (1964)
Hitchcock et al. (1955, 1959, 1961, 1964, 1969)
Hulten and Fries (1986 a,b,c)
Komarkova (1979)
Martin and Hutchins (1980, 1981)
Weber (1967, 1987, 1990)
Welsh et al. (1987)

3) Primary references for common names:
Beetle (1970)
Duft and Moseley (1989)
Harrington (1964)
Hitchcock and Cronquist (1973)
Hitchcock et al. (1955, 1959, 1961, 1964, 1969)
Martin and Hutchins (1980, 1981)
Nelson B.E. (1984)
Nelson R.A. (1969)
Porsild (1979)
Rydberg (1954)
Weber (1967, 1976)
Welsh et al. (1987)

Secondary taxonomic literature sources were also used and are listed in the references section of this chapter. Each citation in the reference section is coded to indicate whether that reference was a phytogeographical reference (P), a common name reference (C), and/or a plant identification reference (I).

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