Tenderfoot Creek Experimental Forest (TCEF) was established in 1961 on the Lewis and Clark National Forest for the purpose of watershed research. TCEF is situated 40 km due north of the town of White Sulfur Springs in Meagher County, Montana in the Little Belt Mountains which are 120 km east of the Continental Divide. TCEF is located at approximately 46°55′N latitude and 110°52′W longitude and includes portions of T13–14N, R6–7E. TCEF encompasses the headwaters of Tenderfoot Creek, a west flowing tributary of the Smith River, and consists of 3693 ha at elevations between 1840 and 2420 m (Schmidt and Friede 1996). The watershed comprises seven subdrainages running north-south in a dendritic pattern (Barrett 1993). Included within TCEF is the Onion Park Research Natural Area (RNA) which was established in 1991. Onion Park RNA comprises 474 ha dominated by a floristically rich wet meadow complex in the upper portion of the watershed (Layser 1992). The RNA also includes surrounding forests and a majority of Quartzite Ridge (Fig. 1). Schmidt and Friede (1996) details the climate, geology, and soils of TCEF.

According to Schmidt and Friede (1996), TCEF is dominated by a continental climate influenced by the mountainous topography. Rainfall averages 880 mm with a range of 594 to 1050 mm from the lowest to the highest elevations. Precipitation usually peaks during the winter months at 100 to 125 mm per month and averages 50 to 60 mm per month during July through October. Temperatures can go below freezing every month of the year, thus the average growing season is fairly short. The season averages a low of 30 to 45 days on the higher ridges and 45 to 75 days at lower elevations (Schmidt and Friede 1996).

Geology and Soils

Schmidt and Friede (1996) describe TCEF as characterized by igneous intrusive sills of quartz porphyry, Wolsey shales, Flathead quartzite, and granite gneiss. The northern part of TCEF occupies the highest elevations and steepest upland topography and is underlain by igneous intrusive granitic rocks. The arched bedrock in the area was formed from metasediments of Cambrian Age consisting mainly of argillites and quartzites. Glaciation has influenced the landform, producing broad basins in which the streams are beginning to regain a water-carved dendritic pattern. Tenderfoot Creek has carved the deepest pattern and is entrenched in a steep canyon with prominent bedrock cliffs. The most
extensive soil groups are the loamy skeletal, mixed Typic Cryochrepts and clayey, mixed Aquic Cryoboralfs. Rock talus slopes are prominent on the perimeter, but rock outcrops are confined chiefly to areas adjacent to main stream channels. Grassland parks are prominent at the heads of the drainages. Soils in the parks range from well to poorly drained. Seeps and springs are common.

Plant Communities

The study area falls within the subalpine or Hudsonian life zone of Merriam and is dominated by lodgepole pine, which covers about 3366 ha. Other habitats of considerable size include 125 ha of floristically-rich wet meadows and 54 ha of open, grassy or rocky slopes (Schmidt and Friede 1996). Forested communities are domi-
nated by even-age lodgepole pine stands with low species diversity. Late seral or more mesic stands may have a significant component of subalpine fir and/or Engelmann spruce in the understory or overtopping the lodgepole pine.

Five forested habitats described by Pfister et al. (1977) account for the majority of the area in TCEF. These five types in order of abundance are:

1. *Abies lasiocarpa/Vaccinium scoparium* habitat type—occurs on most well-drained, mid to upper slopes.
2. *Abies lasiocarpa/Vaccinium globulare* habitat type—occurs on slopes at low to mid elevations.
3. *Abies lasiocarpa/Calamagrostis canadensis* habitat type—occurs on moist swales, slopes and draws.
4. *Abies lasiocarpa—Pinus albicaulis/Vaccinium scoparium* habitat type—limited mainly to the ridge on the northeast border above 2380 m.
5. Forested Scree—occurs mainly along Quartzite Ridge and on other slopes scattered throughout the drainage. This may better be described as *Abies lasiocarpa/scree* habitat type in most of the study area.

In addition to the five types mentioned, twelve grassland or riparian types have been mapped by Layser (1992) in Onion Park RNA. Most, if not all, of the non-forested sites in TCEF would fall into these vegetation types. However, the nomenclature of a few of the species that define the types mapped by Layser is now considered out of date. *Agropyron caninum* is called *Elymus trachycaulis* in most newer floras, including Dorn (1984), and *Carex utriculata* is the updated name for the taxa previously referred to as *Carex rostrata* throughout much of the west. The true *Carex rostrata* is a boreal species and is rare in Montana (Reznicek 1997). Types with either of these names could be relabeled with their currently accepted names, though we have retained the original nomenclature herein. The non-forested types mapped by Layser are:

3. *Festuca idahoensis/Agropyron caninum* habitat type, *Geranium viscosissimum* phase—more mesic than the typic phase, probably limited in distribution to Onion Park and Dry Park. Described by Meuggler & Stewart (1980).
4. *Eriophorum chamissonis/Carex spp.* community type—occurs in very wet sites, limited to Onion Park and Sun Creek areas. Previously undescribed type in Montana (Layser 1992).
8. *Festuca idahoensis/Agropyron caninum/Me- lica spectabilis* habitat type—minor type in Onion Park and probably elsewhere in TCEF. Previously undescribed type, but would key to *Festuca idahoensis/Agropyron caninum* habitat type in Meuggler & Stewart (1980).
9. *Carex rostrata/Deschampsia cespitosa* habitat type—occurs in wet areas adjacent to streams or springs on in seeps. Described by Hansen et al. (1995).
10. *Salix geyerii/Carex rostrata* habitat type—occurs adjacent to streams, springs, seeps and rivulets. Would now key to *Salix drummondiana/Carex rostrata* habitat type in Hansen et al. (1995).
11. *Salix geyerii/Calamagrostis canadensis* habitat type—occurs adjacent to streams, springs, seeps and rivulets. Would now key to *Salix drummondiana/Calamagrostis canadensis* habitat type in Hansen et al. (1995).
12. *Picea engelmannii/Salix spp./Carex spp.* community type—occurs adjacent to streams, springs, seeps and boggy areas. Would now key to *Picea spp./Calamagrostis canadensis* community type in Hansen et al. (1995).

**Development of Flora**

The flora is mainly based on collections and field observations made in 1996–1999 by Scott A. Mincemoyer and 2003–2005 by Jennifer L. Birdsall. Collection dates in 1996 included time spans throughout the field season. 1997 collecting was limited to June 23–26 and August 13–15. 1998 was limited to June 27–28 and August 8–9. 1999 was limited to July 13–15. 2003 was limited to July 28–30. 2004 was limited to August 17–19. 2005 was limited to August 23–25. Collections by Earle F. Layser in August, 1992 in Onion Park RNA are included in the flora as are collections made by Jessica E. Fultz during the summers of 2002 and 2003.
Floristic Summary

The vascular flora of TCEF consists of 312 species, representing 162 genera and 44 families (Tables 1–3). Twenty-seven exotic species occur on the experimental forest. These are: Arabis glabra, Artemisia absinthium, Bromus inermus, Carduus nutans, Centaurea maculosa, Chrysanthemum leucanthemum, Cirsium arvense, Cirsium vulgare, Dactylis glomerata, Filago arvensis, Lactuca serriola, Medicago lupulina, Melilotus officinalis, Phleum pratense, Poa pratensis, Polygonum convolvulus, Rumex acetosella, Sonchus arvensis, Spergularia rubra, Tanacetum vulgare, Taraxicum laevigatum, Taraxicum officinale, Thlaspi arvense, Tragopogon dubius, Trifolium hybridum, Trifolium pratense, and Trifolium repens. The nativity of two species, Festuca rubra and Poa palustris, is uncertain. Centaurea maculosa, Chrysanthemum leucanthemum, Cirsium arvense, and Tanacetum vulgare are listed as noxious weeds by the Montana Department of Agriculture. Their distributions in TCEF are limited to a few scattered individuals or small clumps mainly along roads and in meadows adjacent to roads. Phlox kelseyi var. missoulensis is the only documented rare species in TCEF and is listed by the USDA Forest Service Northern Region as a sensitive plant and by the Montana Natural Heritage Program as a Species of Concern in the state. This study, though attempting to be comprehensive, almost certainly has missed taxa that occur within the study area, and several small meadows and openings remain basically unsurveyed.

Floristic Affinities

The ecology and floristic diversity of an area may be better understood by looking at the floristic affinities of the species comprising the flora of the area in question. Insights into colonization events and migration patterns may also be gained by conducting analyses and summaries of floristic affinities. A species is considered to have an affinity with a particular floristic province when its distribution largely corresponds with that particular region (Gleason and Conquist 1964; Lesica 2002). TCEF itself sits near the boundary of two floristic provinces, the Cordilleran and the Great Plains (Grassland).

For the TCEF flora, we assigned species to the floristic provinces described by Gleason and Cronquist (1964). The flora of TCEF is dominated by species from two floristic provinces, the Boreal (Northern Conifer) and the Cordilleran. Approximately 47% of the species in the flora have a predominantly Cordilleran affinity and 25% have a Boreal affinity. This is not unexpected for an area such as TCEF, which occurs within the Cordilleran province at moderate to high elevations of the Northern Rocky Mountains and is dominated by subalpine conifer forests. Of the remaining species, the majority are widely distributed across two or more floristic regions and cannot be assigned to a specific province (18% are classified as widespread). Although elevations in the study area are not high enough to support an alpine life zone, a few meadows and exposed areas have conditions similar enough to alpine zones to support a few species from the Arctic-alpine province. Six species or roughly 2% of the flora fall into this category, including Poa alpina and Sibbaldia

Table 1. Summary of Tenderfoot Creek Experimental Forest Flora.

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Families</th>
<th>Genera</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferns and fern allies</td>
<td>3</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Poaceae</td>
<td>2</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Magnoliopsida</td>
<td>34</td>
<td>115</td>
<td>211</td>
</tr>
<tr>
<td>Liliopsida</td>
<td>5</td>
<td>36</td>
<td>86</td>
</tr>
<tr>
<td>Totals</td>
<td>44</td>
<td>162</td>
<td>312</td>
</tr>
</tbody>
</table>

Table 2. Largest Families of Tenderfoot Creek Experimental Forest Flora.

<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asteraceae</td>
<td>57</td>
</tr>
<tr>
<td>Poaceae</td>
<td>39</td>
</tr>
<tr>
<td>Cyperaceae</td>
<td>19</td>
</tr>
<tr>
<td>Rosaceae</td>
<td>16</td>
</tr>
<tr>
<td>Scrophulariaceae</td>
<td>16</td>
</tr>
<tr>
<td>Ericaceae</td>
<td>12</td>
</tr>
</tbody>
</table>

Table 3. Largest Genera of Tenderfoot Creek Experimental Forest Flora.

<table>
<thead>
<tr>
<th>Genera</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carex</td>
<td>17</td>
</tr>
<tr>
<td>Poa</td>
<td>8</td>
</tr>
<tr>
<td>Salix</td>
<td>8</td>
</tr>
<tr>
<td>Juncus</td>
<td>7</td>
</tr>
<tr>
<td>Aster</td>
<td>6</td>
</tr>
<tr>
<td>Erigeron</td>
<td>6</td>
</tr>
</tbody>
</table>
procumbens. The remaining 8% of species are exotic to North America and do not fall into one of the floristic provinces. Many of the exotics were not collected during surveys in the 1990s but were observed in the 2003–2005 surveys, mainly along roads and in meadows adjacent to roads. Introductions of these species may be arising from increased human activity in the area. Currently, these exotics are a small component of the flora in terms of their area of extent and their contribution to floristic diversity. In comparison, the percent of the TCEF flora composed of exotics is slightly less but similar to the percent of exotics found in two other recent Montana floras from Flathead National Forest and Glacier National Park which cover larger and more diverse areas (Lesica 2002; Mantas 1999). No species with Great Plains affinities occur in TCEF probably because of the relatively high elevations of the study area. Species with Great Plains affinities do occur along the lower slopes of the Little Belt Mountains.

ACKNOWLEDGMENTS

We would like to thank Dr. Matt Lavin and Cathy Seibert at MONT for their assistance verifying collections by Earle Layser; Rob Ahl for producing the included map; Peter Lesica for providing data and assistance on assignment of floristic provinces; and Colin Hardy and Cameron Johnston at the USFS, Rocky Mountain Research Station, Fire Sciences Laboratory for granting the time to collect and process specimens. Finally, we give special thanks to Peter Stickney of MRC for assistance and guidance on all aspects of this project including identification of difficult taxa, specimen curation and review of early drafts.

LITERATURE CITED


APPENDIX I

ANNOTATED CHECKLIST

The checklist is arranged by division and class, then alphabetically by family and species. Nomenclature generally follows Dorn (1984). Common names are generally from Hitchcock and Cronquist (1973). Exotic species are preceded by an asterix (*). Festuca rubra and Poa palustris are preceded by double asterisks (**) since their nativity is uncertain. Geographic abundance is included in the checklist using the following scale suggested by Palmer, Wade and Neal (1995):

Abundant—Dominant or codominant in one or more common habitats.

Frequent—Easily found in one or more common habitats, but not dominant in any common habitat.

Occasional—Widely scattered, but not difficult to find.

Infrequent—Difficult to find with few individuals or colonies, but found in several locations.

Rare—Very difficult to find and limited to one or very few locations.

In conjunction with an abundance category, the generalized habitats in which a species usually occurs are provided. Specific locations are provided for some species when they are only known to occur in one or two distinct areas. Collection numbers, listed at the end of each entry, are Scott Mincemoyer’s unless otherwise
noted. Mincemoyer’s collections are deposited at the MRC herbarium (Rocky Mountain Research Station, Forestry Sciences Laboratory, Missoula, MT) with some duplicates deposited at the MONT herbarium (Montana State University, Bozeman, MT). Taxa lacking collection numbers were identified by Scott Mincemoyer during field observations. Collections by Jennifer Birdshall are denoted by the initials JLB followed by a collection number and are deposited at MONT. Collections by Jessica Fultz are denoted by the initials JLF followed by a collection number and are on file at MRC. Collections by Earle Layser are distinguished by Layser followed by a collection number and are deposited at MONT. Some additional specimens and duplicates are also included and are identified as such.

Division Equisetophyta
Equisetaceae
Equisetum arvense L. common horsetail. Infrequent. Wet meadows and streambanks. 245.

Division Pterophyta
Polypodiaceae
Athrixylum filix-femina (L.) Roth. Lady fern. Rare. Passionate Creek. 403.

Selaginellaceae
Selaginella densa Rydb. selaginella. Rare. Open ridge-top above gravelpit. 296.

Division Pinophyta
Cupressaceae
Juniperus communis L. common juniper. Occasional. Upland forests. 264.
Juniperus scopulorum Sarg. Rocky Mt. juniper. Rare. Steep, south slope near bottom of drainage. 337.

Pinaceae
Abies lasiocarpa (Hook.) Nutt. subalpine fir. Abundant.
Pinus albicaulis Engelm. whitebark pine. Frequent. Mature individuals at higher elevations and scattered seedlings and saplings elsewhere.
Pinus contorta Dougl. lodgepole pine. Abundant.
Pinus flexilis James. limber pine. Rare. Steep, south slope near bottom of drainage. 350.
Pinus ponderosa Dougl. ponderosa pine. Rare. Steep, south slope near bottom of drainage. 349.

Division Magnoliophyta
Class Magnoliopsida
Aceraceae

Apiaceae

Lomatium cous (Wats) Coulter & Rose. cous biscuitroot. Infrequent. Dry Park and possibly in other dry meadows. 92, 278.
Lomatium dissectum (Nutt.) Math. & Cronst. fern-leaved lomatium. Rare. Steep, south slope near bottom of drainage. 216.
Lomatium triternatum (Push.) Coulter & Rose. nine-leaf lomatium. Rare. Lower portion of drainage along roadside. 253.

Apocynaceae
Apocynum androsaemifolium L. spreading dogbane. Rare. Steep, south slope near bottom of drainage. 344.

Asteraceae
Agoseris aurantiaca (Hook.) Greene. orange agoseris. Infrequent. Roadsides and drier meadows. 70, 118, 309.
Antennaria anaphaloides Rydb. tall pussy-toes. Rare. Open ridge-top above gravelpit. 307.
Antennaria corymbosa E. Nelson meadow pussy-toes. Rare. Wet meadows; Sun Creek area. 122; Layser 3289, 3337.
Antennaria microphylla Rydb. rosy pussy-toes. Infrequent. Dry meadows. 305, 419 (A. rosea of some authors).
Antennaria parvifolia Nutt. Nuttall’s pussy-toes. Rare. Open slope just west of Passionate Creek. 366 (MONT).
Antennaria racemosa Hook. woods pussy-toes. Frequent. Upland forests. 21; Clark 36.
Arnica cordifolia Hook. heartleaf arnica. Infrequent. Upland forests, more common at lower elevations.
Arnica rydbergii Greene. Rydberg’s arnica. Frequent. Upland forests; Sun Creek area. TCEF 004 (MONT).
Artemisia ludoviciana Nutt. gray sagewort. Rare. Steep, south slope near bottom of drainage. 348 (MRC, Dupl. MONT).
Aster ciliolatus Lindl. Lindley aster. Rare. Steep, south slope near bottom of drainage. 351.
Aster conspicus Lindl. showy aster. Infrequent. Tenderfoot Creek. 365.
Aster foliacus Lindl. leafy aster. Infrequent. Moist meadows and streamside. 56.

Aster hesperius Gray. western willow aster. Frequent. Stream banks and meadows; Sun Creek area. *TCEF 006 (MONT).


Aster modestus Lindl. few-flowered aster. Rare. Lower portion of Tenderfoot Creek. 358.

Aster occidentalis (Nutt.) T. & G. western aster. Frequent. Moist meadows and moist, open forests. 43, 75, 137, 313 (MONT), 327 (MONT); Layser 3288, 3302.


*Chamaecrista fasciculata* (Hook.) A. Nels. hoary chamaecrista. Rare. Lower portion of drainage along road.


*Hieracium oregonicum* (L.) Tenore. Western yellowhawkweed. Infrequent. Dry meadows and open slopes. 15, 316 (MONT).


*Taraxacum laevis* (Willd.) DC. red-seeded dandelion. Rare. Roadsides.


*Tragopogon dubius* Scop. yellow salsify. Rare. Steep, south slope near bottom of drainage. 341.

Berberidaceae

Mahonia repens (Lindl.) G. Don. creeping Oregongrape. Infrequent. Forests and open areas in lower portion of drainage. 263.

Betulaceae


Boraginaceae


Mertensia viridis (A. Nels.) A. Nels. green bluebells. Rare. Infrequent. Meadows; Onion Park area. 229.

Brassicaceae

Arabis confinis Wats. spreading pod rockcress. Rare. Open areas in lower portion of drainage. 272 (MONT).


*Arabis glabra* (L.) Bernh. towermustard. Rare. Meadows; Onion Park area. 78.


Barbarea orthoceras Ledeb. wintercress. Infrequent. Moist meadows and streamside. 44.


Draba stenoloba Ledeb. slender draba. Occasional. Open areas in meadows and along streams. 93.

Rorippa curvisiliqua (Hook.) Bessey. western yellowcress. Rare. Vernally inundated depressions in meadows; one collection from small meadow east of Spring Park. 104.


Senecio triangularis Hook. arrowleaf groundsel. Frequent. Riparian forests, wet meadows and streamside.

Solidago canadensis L. Canada goldenrod. Rare. Lower portion of Tenderfoot Creek. 405.

Solidago missouriensis Nutt. Missouri goldenrod. Infrequent. Steep, south slope near bottom of drainage. 345 (MRC, Dupl MONT).

Solidago multiradiata Ait. northern goldenrod. Infrequent. Dry meadows and open slopes. 316 (MONT).


Senecio pseudaureus L. Canada goldenrod. Rare. Lower portion of drainage along road. 345 (MRC, Dupl MONT).

*Solidago multiradiata* Ait. northern goldenrod. Infrequent. Dry meadows and open slopes. 15, 316 (MONT).


Taraxacum laevis* (Willd.) DC. red-seeded dandelion. Rare. Roadsides.


Tragopogon dubius* Scop. yellow salsify. Rare. Steep, south slope near bottom of drainage. 341.
Campanulaceae


Caprifoliaceae

*Linnnea borealis* L. twinflower. Rare. Moist forests. 74.


*Sambucus racemosa* L. elderberry. Infrequent. Forests; heavily browsed by deer and elk. 244.

Caryophyllaceae


*Arenaria lateriflora* L. Bluntest leaf sandwort. Infrequent. Meadows; Onion Park area. 223.

*Cerasart arvense* L. field chickweed. Infrequent. Meadows; Onion Park area. 141, 246.


*Stellaria sitchana* Steud. northern starwort. Rare. Moist depressions of forests. 40.

Crassulaceae

*Sedum lanceolatum* Torr. lanceleaf stonecrop. Rare. Dry meadows and rocky slopes. 277, 294.

Ericaceae


*Chimaphila umbellata* (L.) Bart. prince’s pine. Frequent. Upland forests.

*Hyopitys monotropa* Crantz. pinesap. Rare. Upland forests.

*Ledum glandulosum* Nutt. Labrador-tea. Rare. Wet meadows associated with *Sphagnum* spp.; upper portion of Sun Creek.

*Pyrola asarifolia* Michx. pink wintergreen. Rare. Moist forests; Onion Park area. 362; Layser 3287.

*Pyrola chlorantha* Sw. green wintergreen. Occasional. Upland forests.

*Pyrola minor* L. lesser wintergreen. Rare. Forests. 133, 400 (MONT).

*Pyrola secunda* L. one-sided wintergreen. Occasional. Upland forests.


*Vaccinium globulare* Rydb. globe huckleberry. Frequent. Moist forests; plants are diminutive in stature throughout TCEF. 242, 283, 368.

*Vaccinium myrtillus* L. dwarf bilberry. Abundant. Upland forests.


Fabaceae


*Hedysarum occidentale* Greene. western hedsarum. Rare. Lower portion of Tenderfoot Creek. 252, 369.


*Medicago lupulina* L. black medic. Rare. Roadsides. JLB 8.

*Melilotus officinalis* (L.) Pallas. common yellow sweet-clover. Rare. Disturbed site near flume in gravel. JLB 20.

*Oxytropis cusickii* Green. Rare. Open ridgetop above gravelpit. 276.


*Trifolium repens* L. white clover. Rare. Meadows and roadsides.

Gentianaceae


Geraniaceae

*Geranium bicknellii* Britt. Bicknell’s geranium. Rare. Dry meadows; Sun Creek and Onion Park. *TCEF* 003 (MONT).

*Geranium richardsonii* Fisch. & Trautv. white geranium. Frequent. Moist to wet meadows and streamsides. 95, 261 (MONT).


Grossulariaceae


*Ribes viscosissimum* Pursh. sticky currant. Occasional. Rocky slopes and open areas along road parallelising Tenderfoot Creek. 262.

Hydrophyllaceae

*Phacelia hastata* Dougl. silverleaf phacelia. Rare. Steep, south slope near bottom of drainage. 340.

*Phacelia sericea* (Grah.) Gray. silky phacelia. Rare. Scree slope approx. ¼ mile SE of Dry Park and N of Road 839. 333 (MRC, Dupl. MONT).

Lamiaceae

*Prunella vulgaris* L. self-heal. Rare. Meadows and forest edges; west edge of Onion Park. 117.

Onagraceae

*Epilobium anagallidifolium* Lam. alpine willow-herb. Infrequent. Wet meadows and streamsides. 112, 308 (MRC, Dupl. MONT); Layser 3321, 3332.

*Epilobium angustifolium* L. fireweed. Occasional. Roadsides and open forests.

*Epilobium ciliatum* Raf. common willow-herb. Frequent. Streamsides and wet meadows. 41; Layser 3322, 3327.
**Epilobium paniculatum** Nutt. ex T. & G. tall annual willow-herb. Rare. Steep, south slope near bottom of drainage. 339.

**Plantaginaceae**

**Plantago major** L. common plantain. Infrequent. Roadsides. JLB 18.

**Polygonaceae**

**Collomia linearis** Nutt. narrow-leaf collomia. Occasional. Dry meadows and rocky slopes.


**Polemonium pulcherrimum** Hook. skunk-leaved polemonium. Infrequent. Dry, open areas. 88.

**Eriogonum flavum** Nutt. yellow buckwheat. Rare. Scree slopes approx. ¼ mile SE of Dry Park and No. Road 839, 328 (MONT).

**Eriogonum umbellatum** Torr. sulfur buckwheat. Rare. Open ridgetop above gravel-pit. 298.


*Polygonum convolvulus* L. black bindweed. Rare. Roadsides. JLB 11.

**Polygonum douglasii** Greene. Douglas’s knotweed. Infrequent. Meadows and dry, open areas. 103, 302 (MONT); Layser 3325.


**Rumex paucifolius** Nutt. mountain sorrel. Infrequent. Meadows; Onion Park. 317; Layser 3285; Clark 37.

**Portulaceae**

**Claytonia lanceolata** Pursh. western springbeauty. Frequent. Forests at higher elevations. 94.

**Primulaceae**

**Androsace septentrionalis** L. northern androsace. Infrequent. Barren areas along streams and in meadows. 101.

**Dodecatheon pulchellum** (Raf.) Merrill. few-flowered shooting star. Frequent. Meadows. 84, 105, 226 (MONT), 274.

**Ranunculaceae**

**Actaea rubra** (Ait.) Willd. baneberry. Rare. Shaded streambanks. 273.

**Delphinium bicolor** Nutt. low larkspur. Rare. Meadows; Onion Park.

**Ranunculus eschscholtzii** Schlecht. subalpine buttercup. Rare. Rivulets in wet meadows; Onion Park. 226.

**Ranunculus inamoenus** Greene. unlovely buttercup. Infrequent. Streamside and wet meadows. 96, 418.

**Ranunculus uncinatus** D. Don ex G. Don. little buttercup. Infrequent. Streamside and wet meadows. 97.

**Thalictrum occidentale** Gray, western meadowrue. Frequent. Moist forests. 232.


**Rosaceae**

**Amelanchier alnifolia** Nutt. serviceberry. Rare. Lower portion of drainage. 249.

**Fragaria virginiana** Duchesne. blueleaf strawberry. Frequent. Forest openings, meadows and roadsides. 265.

**Geum macrophyllum** Willd. large-leaved avens. Infrequent. Mois to wet meadows.

**Geum rivale** L. water avens. Rare. Mois to wet meadows; Onion Park. TCEF 007 (MONT).

**Geum triflorum** Pursh. prairie smoke. Infrequent. Drier meadows; Onion and Dry Parks. 279.

**Potentilla diversifolia** Lehm. diverse-leaved cinquefoil. Frequent. Meadows, moist forests and streamside. 231.

**Potentilla glandulosa** Lindl. sticky cinquefoil. Occasional. Rocky slopes along lower portion of Tenderfoot Creek. 63, 269.

**Potentilla gracilis** Dougl. soft cinquefoil. Occasional. Meadows and forest openings. 119.

**Prunus pensylvanica** L. f. pin cherry. Rare. Steep, south slope near bottom of drainage. 343.

**Prunus virginiana** L. common chokecherry. Rare. South slope near bottom of drainage. 342.

**Rosa acicularis** Lindl. prickly rose. Lower portion of Tenderfoot Creek. 86, 254, 347 (MONT).

**Rubus idaeus** L. red raspberry. Occasional. Scree slopes and rocky areas; Quartzite Ridge.

**Rubus parviflorus** Nutt. thimbleberry. Rare. Passionate Creek. 402.

**Sibbaldia procumbens** L. creeping sibbaldia. Infrequent. Roadsides and other exposed areas. 50.

**Sorbus scopulina** Greene. Cascade mountain ash. Rare. Upland forests; one individual found on north slope. 59.

**Spiraea betulifolia** Pall. shiny-leaf spirea. Frequent. Upland forests.

**Rubiacae**


**Galium triflorum** Michx. sweet-scented bedstraw. Rare. Moist areas in lower portion of drainage. 359 (MONT).

**Salicaceae**

**Populus balsamifera** L. spp. trichocarpa (Torr. & Gray. ex Hook.) Brayshaw. black cottonwood. Rare. One individual found along lower portion of Tenderfoot Creek. 215.

**Populus tremuloides** Michx. quaking aspen. Infrequent. Lower portion of drainage on rocky slopes. 338.

**Salix barclayi** Anders. Barclay’s willow. Frequent. Streamside and wet meadows along rivulets. 89, 113; Layser 3283, 3315.

**Salix bebbiana** Sarg. Bebb willow. Rare. Lower portion of drainage. 255 (MRC, Dupl. MONT), 256.

**Salix boothii** Dorn. Booth’s willow. Occasional. Lower portion of drainage along Tenderfoot Creek. 243, 257, 376, 379. (MRC, Dupl. MONT).

**Salix drummondiana** Barratt. Drummond willow. Frequent. Streamside and wet meadows along rivulets. 30, 377 (MONT); Layser 3303, 3320.

**Salix geyeriana** Anders. Geyer’s willow. Infrequent. Lower portion of drainage along Tenderfoot Creek. 388.

**Salix lasiandra** Benth. Pacific willow. Rare. Lower portion of drainage along Tenderfoot Creek. 404.

**Salix melanopis** Nutt. Infrequent. dusky willow. Lower portion of drainage along Tenderfoot Creek. 389, 390.
Salix scouleriana Barratt. Scouler willow. Occasional. Lower portion of drainage along Tenderfoot Creek and in forest openings. 378 (MONT), 387 (MRC, Dupl. MONT).

Saxifragaceae


Mitella pentandra Hook. alpine mitrewort. Occasional. Shaded stream banks. 130, 270 (MONT).

Mitella trifida Grah. Three parted mitrewort. Rare. Moist forests. 424.


Saxifraga ocidentalis Wats. western saxifrage. Infrequent. Meadows; Onion Park. 100.


Scrophulariaceae


Castilleja cusickii Greenm. Cusick’s paintbrush. Infrequent. Dry meadows; Dry Park and Onion Park. 29, 131; Layser 3298.


Pedicularis parryi Cronq. single-spike sedge. Rare. Open ridgetop above gravelpit. 281.

Pedicularis bracteosa Benth. bracted lousewort. Occasional. Moist meadows, usually associated with Sphagnum spp.; Onion Park and Sun Creek areas. 312 (MONT).


Penstemon procerus Dougl. ex Hook. Small-flowered penstemon. Rare. Open slopes and meadows. 140.

Veronica americana Schwein. American speedwell. Rare. Standing or flowing water; Sun Creek area. 36.

Veronica serpyllifolia L. var. humifusa (Dickson) Vahl. thyme-leaved speedwell. Rare. Vernally inundated depressions in meadows; one collection from small meadow east of Spring Park. 126. (Hitchcock and Cronquist 1973).

Veronica wormskjoldii Roem. & Schult. alpine speed well. Infrequent. Moist meadows.

Urticaceae

Urtica dioica L. stinging nettle. Rare. Open areas along streams; Stringer Creek.


Juncus ensifolius Wikst. dagger-leaf rush. Occasional. Wet meadows and streamside. 360; Layser 3307.

Juncus longistylis Torr. long-styled rush. Rare. Wet meadows; Sun Creek area. 76.


Juncus nevadensis Wats. Sierra rush. Infrequent. Wet meadows. 45.

Luzula campestris (L.) DC. field woodrush. Infrequent. Moist meadows. 227 (MONT), 303 (MRC, Dupl. MONT).


Liliaceae


Allium cernuum Roth. nodding onion. Rare. Dry, open slopes. 306, 335 (MONT).


Camassia quamash (Pursh) Greene. common camas. Frequent. Wet meadows; primarily Onion Park.

Erythronium grandiflorum Pursh. glacier lily. Frequent. Upland, forests. 238.

Fritillaria pudica (Pursh) Spreng. yellow bell. Infrequent. Meadows: along tree lines; Sun Creek and Onion Park. TCEF 001 (MONT).

Smilacina stellata (L.) Desf. starry false Solomon’s seal. Rare. Shaded streambanks and moist forests. 55.

Streptopus amplexifolius (L.) DC. twisted-stalk. Rare. Shaded streambanks.

Veratr um viride Ait. green false hellebore. Frequent. Moist forest openings and wet meadows.

Zigadenus elegens Pursh. mountain death camas. Infrequent. Wet meadows and moist forest openings.

Orchidaceae

Calypso bulbosa (L.) Oakes. fairy-slipper. Rare. One individual found in moist forested bottom. 268.

Corallorhiza maculata (Raf.) Raf. spotted coral-root. Rare. Moist forests.

Corallorhiza wisteriana Conrad. spring coral-root. Rare. One individual observed in a Pinus contorta forest.


Habenaria dilatata (Pursh) Hook. white bog orchid. Occasional. Wet meadows. 241; Layser 3292.


Spiranthes romanzoffiana Cham. hooded ladies-tresses. Rare. Wet meadows; Onion Park. 116.

Poaceae

Agrostis exarata Trin. spike bentgrass. Infrequent. Moist meadows. 37, 48 (MRC, Dupl. MONT); Layser 3304, 3334.

Agrostis idahoensis Nash. Idaho bentgrass. Rare. Moist meadows. 57; Layser 3312.

Agrostis scabra Wild. tickle grass. Frequent. Meadows, roadsides and rocky slopes. 12; Layser 3286.


Calamagrostis canadensis (Michx.) Beauv. bluejoint reedgrass. Abundant. Moist forests and wet meadows. 371; Layser 3294, 3314.

Calamagrostis purpurascens R. Br. purple reedgrass. Infrequent. Dry, rocky slopes. 324.

Calamagrostis rubescens Buckl. pinegrass. Occasional. Upland forests, usually on drier slopes. 408.

Cinna latifolia (Trevir.) Griseb. woodreed. Infrequent. Streambanks; lower portion of drainage. 396.

*Dactylis glomerata L. orchard-grass. Occasional. Roadsides, meadow and forest openings.

Danthonia intermedia Vasey. timber oatgrass. Frequent. Meadows and dry, rocky slopes. 11, 322 (MONT).

Deschampsia cespitosa (L.) Beauv. tufted hairgrass. Abundant. Moist to wet meadows. 60, 121, 139, 248 (MONT).

Deschampsia elongata (Hook.) Munro. slender hairgrass. Rare. Roadsides, along Road 586. 407.

Elymus elymoides (Raf.) Swezey. bottlebrush squirreltail. Rare. SE of Dry Park just below scree slope. 354 (MRC, Dupl. MONT).

Elymus glaucus Buckl. blue wildrye. Frequent. Moist forests, wet meadows and streambanks. 32.

Elymus spicatus (Pursh) Gould. bluebunch wheatgrass. Rare. Sleep, south slope near bottom of drainage. 353.


Festuca idahoensis Elmer. Idaho fescue. Infrequent. Dry meadows; Dry Park and Onion Park. 10, 325 (MONT).

**Festuca rubra L. red fescue. Rare. Moist, open areas. 354.

Festuca scabrella Torr. rough fescue. Infrequent. Dry meadows; Dry Park. 9.

Glyceria elata (Nash ex Rydb.) Jones. tall managrass. Infrequent. Tenderfoot Creek. 356 (MRC, Dupl. MONT), 397 (MONT).

Koeleria macrantha (Ledeb.) Schultes. prairie juneegrass. Rare. Open ridgetop above gravelpit. 311.

Melica spectabilis Scribn. showy oniongrass. Frequent. Meadows and streambanks. 33.

Phleum alpinum L. alpine timothy. Frequent. Meadows and moist, forest openings.


Poa alpina L. alpine bluegrass. Occasional. Meadows and forest openings. 69, 123, 142.


Poa interior Rydb. inland bluegrass. Infrequent. Open area along Tenderfoot Creek. 331 (MONT), 370.

Poa leptocoma Trin. bog bluegrass. Infrequent. Wet meadows; Onion Park. 259; Layser 3331.

*Poa palustris* L. fowl bluegrass. Infrequent. Streambanks, lower portion of Tenderfoot Creek. 598 (MONT).

*Poa pratensis* L. Kentucky bluegrass. Infrequent. Roadsides and meadows. 51.

*Poa secunda* Presl. Sandberg bluegrass. Rare. Open ridgetop above gravelpit. 299.

*Puccinellia pauciflora* (Presl.) Munz. weak alkali grass. Infrequent. Standing or flowing water. 35.

*Stipa nelsonii* Scribn. western needlegrass. Infrequent. Meadows and forest openings; Onion Park area. 315 (MRC, Dupl. MONT).


*Trisetum wolfii* Vasey. Wolf’s trisetum. Occasional. Moist to wet meadows. 34, 49, 82; Layser 3326.

APPENDIX II

NONCONFIRMED TAXA

The following taxa have been reported for TCEF or Onion Park RNA by others but are not included in the main body of the flora since no voucher specimens were collected and some reported taxa are believed to be outside the boundary of the experimental forest.

**Apiaceae**

*Zizia aptera* (Gray) Fern.

**Asteraceae**

*Agoseris heterophylla* (Nutt.) Greene
*Cirsium scariosum* Nutt.
*Crepis elegans* Hook.
*Senecio dimorphophyllus* Greene
*Senecio pauperculus* Michx.

**Brassicaceae**

*Arabidopsis thaliina* L. Heynh.
*Cardamine oligosperma* Nutt.

**Caprifoliaceae**

*Symphoricarpus albus* (L.) Blake.

**Caryophyllaceae**

*Silene douglasii* Hook.
*Stellaria crassifolia* Ehrh.
*Stellaria umbellata* Turcz. ex Kar. & Kir.

**Chenopodiaceae**

*Chenopodium album* L.

**Crassulaceae**

*Sedum stenopetalum* Pursh.

**Cyperaceae**

*Carex aurea* Nutt.

*Carex pellita* Muhl. ex Willd.
*Carex praegracilis* W. Boott
*Eleocharis pauciflora* (Lightf.) Link

**Elaeagnaceae**

*Shepherdia canadensis* (L.) Nutt.

**Equisetaceae**

*Equisetum palustre* L.

**Gentianaceae**

*Gentiana calycosa* Griseb.

**Liliaceae**

*Xerophyllum tenax* (Pursh) Nutt.

**Orchidaceae**

*Habenaria hyperborea* (L.) R. Br.
*Habenaria viridis* (L.) R. Br.

**Poaceae**

*Bromus vulgaris* (Hook.) Shear

**Polygonaceae**

*Linanthus nuttallii* (Gray) Greene ex Milliken
*Linanthus septentrionalis* Mason

**Polemoniaceae**

*Polygonum viviparum* L.

**Ranunculaceae**

*Anemone multifida* Poir.
*Anemone macounii* Britt.

**Saxifragaceae**

*Salix farriae* Ball.
*Salix lutea* Nutt.

**Saxiciferae**

*Lithophragma parviflora* (Hook.) Nutt. ex Torr. & Gray Mitella brevleri Gray.

**Scrophulariaceae**

*Castilleja occidentalis* Torr.
*Veronica cusickii* Gray

**Solanaceae**

*Hyoscyamus niger* L.

Appendix III

Synonyms and Excluded Names

**Boraginaceae**

*Mertensia lanceolata* (Pursh) DC. Synonymous with *Mertensia viridis* (A. Nels.) A. Nels.

**Onagraceae**

*Epilobium halseanum* Hausskn. Included under *Epilobium ciliatum* Raf.
*Epilobium lactiformum* Hausskn. Included under *Epilobium anagallidifolium* Lam.

**Salicaceae**

*Salix monticola* Bebb. Name misapplied: specimens belong to *Salix barclayi* Anderrrs.