

# Native Seed Collection Project Boise National Forest



Idaho Conservation  
Data Center  
Idaho Department of  
Fish and Game  
PO Box 25  
Boise, Idaho  
83707



Jennifer J. Miller  
Steven K. Rust

2005



## Table of Contents

Introduction.....	1
Methods.....	1
Results.....	2
Discussion.....	4
Literature Cited.....	8
Figures.....	10
Tables.....	21
Appendix 1.....	34

## INTRODUCTION

Native species are essential to our environment and without them we lose the true identity of natural ecosystems. Today it is all too common to see the landscape filled with exotic species instead of native species. A significant number of native species have a difficult time reestablishing after disturbance, therefore allowing more invasive exotic species to flourish in areas of popular recreation, common roadsides, or previously burned areas.

Native species are species that occur in specific regions, ecosystems, and habitats without direct or indirect human actions (Richards et al. 1998). When considering native species that are indigenous to North America, we generally think of "how" the landscape appeared in historical conditions prior to European settlement. It is known that plants (native) interact dependently both physically and biologically with the environment. When an area is disturbed and invaded by other (exotic) species, then the relationship between plant (native) and environment is disrupted. The invasion of exotic species into native plant communities can lead to altered fire regimes, invasion of noxious weed species, and lead to insect infestations (Dodson 2002).

This multi-year project is being conducted by Idaho Department of Fish and Game (IDFG), Idaho Conservation Data Center (IDCDC) as part of a larger ongoing vegetation restoration program by the U S Forest Service (USFS), Boise National Forest (BNF), Lucky Peak Nursery, and Boise Forest Sciences Laboratory, Rocky Mountain Research Station. Specific project objectives are to (1) identify seed collection sites, (2) document species habitat relations, (3) collect seed of native species targeted for propagation at Lucky Peak Nursery, and (4) collect 750 pounds of unprocessed seed by 2006.

Overall, the project is aimed at developing information on the habitat relations of species selected for restoration, for rehabilitation projects, and to document local sources for these species on the Boise National Forest. The BNF is a mixture of forested and non-forested land approximately 2,612,000 acres in size, and is located in west central Idaho. The majority of mountainous landscape is situated on top of the cretaceous pluton of the Idaho batholith.

The study is on going. In 2003, seed was collected on BNF with an emphasis in the Rabbit Creek drainage approximately 9 miles northeast of Idaho City, Idaho (Miller and Rust 2003). However, seed was also collected from established collection sites (from a previous project) on the southern part of BNF (Miller and Rust 2002).

Seed was collected by IDFG employees and volunteers, and delivered to the Lucky Peak Nursery in bulk for drying, cleaning and storage.

## METHODS

The USFS BNF staff, in consultation with IDCDC, has compiled a continuing targeted list of native species that includes grasses and sedges, shrubs, and forbs. These species are important to the ecosystem and may be out competed by exotics following disturbance.

Seed was collected from random established collection sites in the southern and eastern portions of the Forest, and in the Rabbit Creek Drainage. Seed was also collected from new random collection sites in the eastern, southern, and central portions of the Forest. New project areas targeted for species collection included Amber, Rock Creek, Silver Creek Plunge, Six Shooter, Deadwood, and Bear Valley. All seed collection took place June through November 2004. Ample supplies of seed from targeted species were collected from a representative cross-section of each species' environmental distribution.

Potential native seed collection sites were identified by evaluating the habitat relations of targeted species (Table 1), and evaluating the distribution of appropriate habitats on the BNF. It was our intent to offer a good representation of each species through distribution and elevation on the

forest. Field reconnaissance was conducted to locate seed collection sites and monitor plant phenology. A minimum of 50 plants of a species was required to be present at a site. Sites were also selected on the basis of access and presence of multiple targeted species.

To document species habitat relations, we recorded plant composition and environmental relations at selected sites on 0.0405 ha (0.1 acre) fixed-area plots using standard plant community ecology methods (Bourgeron et al. 1991; USDA Forest Service 1992), and on stand level point observation plots. These techniques identified plant associations within their respective community for each potential native seed collection site. The location of sites were determined in the field using navigation grade geographical positioning system (GPS) units (e.g., Garmin 12XL) and by hand on 1:24,000 USGS quadrangles.

Collection and documentation protocols identified by BNF, Rocky Mountain Research Station, or Lucky Peak Nursery were employed. Voucher specimens were collected in both flower and fruit, and photographs of each targeted species and its associated habitat were taken at each collection site. Subsequent visits to each collection site were made to monitor the status of seed ripening and for seed collection. Species were identified using Hitchcock and Cronquist (1973).

## RESULTS

Seeds from 24 species (7 grasses and sedges, 6 shrubs, and 11 forbs) of the 30 listed on the general target species list were collected during the 2004 field season (Table 1). Five additional species were collected, that were not on the general targeted species list, but were specific to the Bear Valley project. The combined unprocessed seed weight of grasses and sedges, shrubs, and forbs collected totaled 364.14 kg (802.80 lbs), which was then divided into the total weight of each life form; 183.13 kg (403.73 lbs), 136.45 kg (300.77 lbs), and 44.60 kg (98.32 lbs) respectively. The individual weights of each species were documented. The combined weight of native seed collected in and outside of the Rabbit Creek drainage during the 2003 field season totaled 79.03 kg (174.24 lbs). Individual life form weight totals were sedges and grasses 1.42 kg (3.13 lbs), shrubs 85.27 kg (188.0 lbs), and forbs 24.09 kg (53.11 lbs) (Table 3).

The combined total weight of all unprocessed seed collected to date is 534.86 kg (1179.16 lbs), and the individual totals are; 194.02 kg (427.75 lbs) grasses and sedges, 89.09 kg (196.40 lbs) forbs, and 251.75 kg (555.01 lbs) shrubs.

A detailed list of species collected during the 2004 field season, individual seed weights, total seed weight per life form, collection site, and combined total weight are documented in Table 2. Seeds were collected from June 07, 2004 through November 20, 2004. Species collected from June 30 to December 3, during the 2003 field season (not assigned to the Rabbit Creek drainage project, but may have been collected there), are documented in Table 3. Collection dates for individual species differ within life forms.

Specific elevation zones for each targeted species were assigned this field season (Table 1). A few species (*Festuca idahoensis* (Idaho Fescue), *Agropyron spicatum* (bluebunch wheatgrass), *Bromus carinatus* (California brome), *Arnica cordifolia* (heartleaf arnica), *Aster conspicuus* (showy aster), *Penstemon wilcoxii* (Wilcox's penstemon), and *Lonicera utahensis* (Utah honeysuckle)) had no elevation zone restrictions. Elevation zones for all other targeted species were respected when reconnoitering for general collection sites. However, elevation zones were dismissed when collecting within assigned project areas.

Assigned project collection areas for the 2004 field season include; Amber (Idaho City Ranger District (RD)), Rock Creek, Bear Valley, and Lower Deadwood (Lowman RD), Six Shooter and Silver Creek Plunge (Emmett RD), and Upper Middle Fork Payette River and Long Prong (Cascade RD). All project areas were collected from except those within the Cascade RD. Plots

set up for seed collection outside the above mentioned areas are referred to as general collection sites.

Figure 1 shows the distribution of plots (seed collection sites) on and off the forest. There were 60 plots collected from during the 2004 field season, 36 of which were newly established in 2004. The previously established plots were selected by matching targeted species and elevation zone. In 2003, seed was collected from 13 plots, 5 of which were established in 2002. The distribution of plots is mostly concentrated on the southern portion of the Forest (Figure 1). Table 4 provides a tabular summary of Figure 1.

Species collected on the BNF during the 2004 field season and outside of a specific project area ranged in elevation from 1024 m (3360 ft) to 1835 m (6020 ft). *Arnica cordifolia* was collected at the lowest elevation, and *Penstemon humilis* collected at the highest. Neither of these species had an elevation zone restriction (Table 1). The project area with the lowest elevation (1183 m (3880 ft)) was Deadwood, and the Bear Valley project area had the highest elevation at 1951 m (6400 ft). Targeted species of all life forms were collected from multiple collection sites, however the elevation of collection sites, in and out of the project areas, does not differ greatly due to the elevation zone restrictions. Species that were not collected from multiple collection sites are: 6 grasses and sedges, 4 shrubs, and 2 forbs (*Carex utriculata*, *C. aquatilis*, *C. microptera*, *Elymus glaucus*, *Koeleria cristata*, *Stipa thurberiana*, *Cornus sericea*, *Artemisia tridentata vaseyana*, *Prunus emarginata*, *P. virginiana*, *Penstemon deustus*, and *Lupinus sericeus*).

Twelve grasses and sedges were collected this field season, and the total weight was 183.26 kg (404.02 lbs). Of the 12 graminoids, 5 were sedges. The 2 most abundant graminoids observed and collected were *Carex geyeri* (Geyer's sedge) and *Agropyron spicatum*. Two sedges (not previously collected) - *Carex utriculata* (beaked sedge) and *C. aquatilis* (water sedge) - were collected specifically for and within the Bear Valley project area. Both sedges are common and found in wet meadows, swamps, and on streambanks from lowlands to moderate elevations (Hurd et al. 1998). Three grass species (not previously collected) found in abundance in Poker and Ayers Meadows, which is within the Bear Valley project area, include *Koeleria cristata* (prairie junegrass), *Stipa thurberiana* (Thurber's needlegrass), and *Danthonia intermedia* (timber oatgrass). The total weight for each grass was less than 0.11 kg (0.25 lbs).

Vegetative clumps of *Calamagrostis rubescens* (pinegrass) and *Carex geyeri* were collected in the Silver Creek Plunge, Six Shooter, Amber, and Rabbit Creek project areas. The total weight was 175.49 kg (386.90 lbs) (Table 5). The vegetative clumps will be used for growing plugs at Lucky Peak Nursery. *C. geyeri* seeds were also gathered at the following collection sites; 030610-1111 (Rabbit Creek project area), and 040607-1001 and 040607-1257 (Amber project area).

*Agropyron spicatum* was collected at 10 sites ranging in elevation from 1158 m (3800 ft) to 1603 m (5260 ft). The ecological condition of all collection sites ranged from pristine, little evidence of post-industrial human-caused disturbance, to little post-industrial human-caused disturbance. Five graminoids: *Elymus glaucus* (blue wildrye), *Stipa thurberiana*, *Carex aquatilis*, *C. utriculata*, and *Koeleria cristata* were collected at 1 site only. *Elymus glaucus* was collected in the Deadwood project area, and the remaining were collected in Bear Valley (Table 5, Figure 3).

*Purshia tridentata* (bitterbrush) was collected at 4 sites (SouthFork Boise, Windy Gap, and 2 within the Rock Creek Project area) differing slightly in elevation, 1292 m (4240 ft) to 1560 m (5120 ft) (Table 5, Figure 4). Collection sites were located either on westerly or southeasterly aspects. A site (plot id. 040630-1502, elevation 1091 m (3580 ft)) located west of Lowman near Little Gallagher Creek was established for future *P. tridentata* seed collection. *Prunus emarginata* (bittercherry) and *Cornus sericea* (red-osier dogwood) were collected at 1 site each: 040721-0802 and 030612-1340, respectively. Both sites are within project areas. *Lonicera involucrata* (black twin-berry) and *Sorbus scopulina* (mountain ash) were collected at 2 sites each.

The majority of the total shrub weight collected was *Artemisia tridentata vaseyana* 86.18 kg (190.0 lbs) and *Purshia tridentata* 38.28 kg (84.39 lbs). All *Artemisia tridentata vaseyana* seed was collected from Highland Summit. The previously established collection site is located off Highway 21 south of Lucky Peak Nursery at 1172 m (3845 ft) elevation (plot id. 021112-1427). Plans to collect *A. tridentata vaseyana* seed at 2 other collection sites (plot id. 040629-1130 and 020725-0849; Table 6) were cancelled because seed was lost due to bad weather.

*Lonicera utahensis* (Utah honeysuckle) was seen sporadically throughout the Rock Creek project area near or in draws, but was not distributed with other general targeted species. Therefore collection sites were not established for this species. Shrub species gathered at collection sites with less than 50 individuals are shown in Table 5.

No seed was collected from the following shrub species: *Prunus virginiana*, *Acer glabrum*, *Spiraea betulifolia*, and *Chrysothamnus nauseosus*. However, established sites do exist for some of these species and new sites were established within the Six Shooter and Amber Project areas, as well as general collection site, plot id. 040630-1804.

The total collected seed weight of targeted forb species was 44.60 kg (98.32 lbs). Forbs were collected from 26 newly established plots (Tables 2 and 6; Figure 4). One forb, *Penstemon humilis* (low beardtongue) collected from plot 040831-1533, was outside of its restricted elevation zone at 1835 m (6020 ft). However, it was also collected within its restricted elevation zone from 4 previously established collections sites in the Rabbit Creek Project area. Multiple forb species were collected from 11 plots (Table 4 and 6; Figure 4). Collection site, plot id. 040629-1735, in the Rock Creek Project area at 1426 m (4680 ft), was the lowest elevation from which multiple forb species were collected (*Arnica cordifolia*, *Balsamorhiza sagittata*, and *Achillea millefolium*). The lowest elevation a single forb species (*Arnica cordifolia*) was collected was 1024 m (3360 ft) in the Bunch Creek area, plot id. 040616-1805. *A. cordifolia* had no restrictions on elevation. *Eriogonum umbellatum* and *Penstemon humilis* were collected at the highest elevation 1835 m (6020 ft) within the Upper Shirts Creek area. Multiple species of forbs were collected from the following: 2 *Eriogonum* spp and 5 *Penstemon* spp. Forbs that are plentiful in the southern portion of the BNF are *Balsamorhiza sagittata*, *Arnica cordifolia*, and *Penstemon wilcoxii*. Each genus was collected from 10, 6, and 9 plots, respectively. Another forb that is plentiful throughout the project area is *Achillea millefolium* (7 plots). *Aster conspicuus* (showy aster) was seen throughout the Forest, but not in abundance at any one location, or in flower.

Seed collected from each species is documented to its associated habitat, elevation, slope, and aspect in Table 5. Seed was collected from 36 associations ranging from forested to perennial forb habitats. The highest elevation ecological plot is an ERUM-BASA association at 1835 m (6020 ft), and the lowest elevation ecological plot is a PSME/SYAL association at 1024 m (3360 ft).

## DISCUSSION

Several factors can contribute to the success or failure of seed collection. Weather elements can delay and/or speed up seed dispersal or cause seed to abort. This field season, the weather (which I believed to be a hard frost) appeared to have effected the fruit production of *Prunus virginiana*, *P. emarginata*, and *Cornus sericea*. Early in the growing season a hard frost hit areas within the elevation range of 1372 to 1676 m (4500 to 5500 ft). Established collection sites (in the Rabbit Creek Project area) that produced abundant fruit last year, bore no fruit this year. This was also apparent during reconnaissance of a new project (Six Shooter Project) and general collection areas. Seed collection sites for our initial field reconnaissance proved to inhabit targeted species, however some of them had very little or no seed production. The hardest hit shrubs appeared to be 2 *Prunus* species. *Artemisia tridentata vaseyana* produced plenty of seed this field season, however hard rains in late November knocked seed off of plants in the Mountain Home collection site area, and snow fall prevented collection at the Gold Fork plot.

Other factors include competition for certain species from domestic stock, wildlife, and commercial pickers. The last 2 years, commercial pickers have been collecting seed near our established collection site in the Mountain Home area, and were observed collecting seed off of Bogus Basin Road in 2002. These factors contributed to the need to check and re-check the status of native plant populations selected for seed collection.

Additional species from which we anticipated seed collection or a larger quantity of seed collected include the following: *Purshia tridentata*, *Lonicera utahensis*, *L. involucrata*, *Aster conspicuus*, *Spiraea betulifolia*, and *Lupinus sericeus*. Reconnaissance of new areas on the Forest in both the southern portion and areas further north, proved to inhabit all of these species. In particular, *P. tridentata* can be found in a range of habitat types from sagebrush-grass communities in southern Idaho to forested communities dominated by *Pinus ponderosa* and/or *Pseudotsuga menziesii* in south-central Idaho. However, it was observed that when *P. tridentata* is a component of the understory in forest communities, less seed is produced. This is likely due to the fact that *P. tridentata* is shade intolerant (Zlatnik 1999). In collection sites located on open slopes, seed has been abundant. *P. tridentata* also has a short window of opportunity for collection.

*Lonicera utahensis*, as mentioned earlier, was not found in abundance in any area on the Forest. It is most commonly found, in central Idaho, as a major or minor shrub component within *Abies grandis*/*Acer glabrum* habitat types. This type of community was not observed during the 2004 field season, however *L. utahensis* may also be found in *Pseudotsuga menziesii* and *Pinus contorta* habitat types at low to mid elevations (Pavek 1993). When *L. utahensis* was observed within the Rock Creek Project area, it was sparsely distributed in or near draws in *Pseudotsuga menziesii* dominated communities.

*Lonicera involucrata* is a species that is seen sparsely distributed across the BNF near streams. A new collection site was established this year in a PIEN/COSE association within the Ten Mile Campground area. Although very little seed was collected from the 2 established sites, the new site does have multiple targeted species present.

The forb, *Aster conspicuus*, was found throughout the south-central portion of the BNF in forested communities. Species associated with *A. conspicuus* are *Arnica cordifolia*, *Spiraea betulifolia*, *Calamagrostis rubescens*, and *Carex geyeri*. All populations observed had less than 50 individuals and were not in flower. According to Reed (1993), *Aster conspicuus*, when present in later seral stands where there is more shade than sun, will produce more vegetative growth and less flowering stems.

Two species seen throughout the forest, but with very little to no seed collected were *Spiraea betulifolia* and *Lupinus sericeus*. Numerous collection sites were established in forested communities with *Spiraea betulifolia* as a major understory component. In spite of this, *S. betulifolia* was rarely observed with flowers, especially within the Six Shooter Project area. *Lupinus sericeus* was also targeted in collection sites within the Rock Creek, Six Shooter, and Silver Creek Plunge Project areas. Unfortunately, due to timing of collections, only 0.073 kg (0.160 lbs) was collected within the Silver Creek Plunge Project area. Seed must be collected before the first part of September.

*Carex geyeri* and *Calamagrostis rubescens* are species that are not easily collected in the field for reasons such as, location, scarcity of plants, low seed production, and/or seed dispersal. Both tend to be poor seed producers in the field, and primarily reproduced by rhizome growth. Production of seed is usually extremely low and can lay dormant in the soil for long periods of time prior to germination. Equally, these graminoids seem to have a higher germination rate after disturbance (Snyder 1992 and Matthews 2000). Because of these characteristics, *Carex geyeri* and *Calamagrostis rubescens* vegetation of the species was collected for Lucky Peak Nursery. Lucky Peak Nursery will then grow plugs of these 2 species in a controlled environment.

*Agropyron spicatum* is the abundant grass species in the southern to south-central portion of the study area. It is primarily found on south easterly to south westerly aspects, in the understory of open canopies. It is found in abundance with *Festuca idahoensis* in the Danskin Mountains near Lime Creek (elevation ~1219 m (~4000 ft)). Collections for these 2 species, in this area, may have been too late. Field observation showed that the majority of *F. idahoensis* had already dispersed, and consequently, collection of this species was abandoned. *Agropyron spicatum* was collected, however Lucky Peak Nursery reported a low yield of clean viable seed from this area. Lime Creek is an excellent collecting area due to easy access and abundance of plants at this elevation. *A. spicatum* was collected at 6 other collection sites. *Festuca idahoensis*, other than in the Lime Creek area, has been difficult to find on the Forest. Both species, *F. idahoensis* and *Agropyron spicatum*, appear to be more abundant and established on slopes with open canopies. Steele et al. (1981) has described forest habitats in central Idaho with either *Festuca idahoensis* or *Agropyron spicatum* as the dominant understory species. These forested communities are either dominated by *Pinus ponderosa* and/or *Pseudotsuga menziesii* as the dominant overstory species. None of these communities have been observed during field reconnaissance. In fact, the further north we have traveled, *Carex geyeri* and/or *Calamagrostis rubescens* become the dominant graminoid species observed.

The start date for this project was appropriate. Again, we were able to collect targeted species whose seed ripens early in the year. *Balsamorhiza sagittata* was collected in abundance 10.28 kg (22.66 lbs) from 11 sites, 8 of which were established in 2004. *B. sagittata* collection was restricted to 1219 and 1524 m (4000 and 5000 ft). At some collection sites we found that the solitary flower heads were completely gone, and/or the majority of seed had already dispersed.

*Bromus carinatus*, *Elymus glaucus*, *Penstemon* spp., *Achillea millefolium*, *Lupinus sericeus*, were found in (but not limited to) highly disturbed areas and road cuts. These areas were chosen as seed collection sites due to the ease of access and plant abundance. Some road cuts within the study area were steeper than desired which made some species difficult to collect. However, the opportunity to collect seed from multiple targeted species, in one area, increased the efficiency of both field reconnaissance and collection efforts.

It was often difficult to find stands of greater than 50 plants of a selected species, in one area. In order to obtain seed from these select species, this parameter was set aside, and seed was collected from plots that had less than 50 plants. Vegetative plugs of *Carex geyeri* and/or *Calamagrostis rubescens* fit this parameter (Table 5).

The information regarding associated habitat, elevation, slope, and aspect for each collected species should prove valuable for planting (Table 6). Knowing the type of habitat (i.e. shrubland/grassland or forested area), aspect, slope, and elevation in which a species thrives, is extremely helpful in the preliminary stages of reconnaissance. Having such data will provide a useful foundation to future seed collection projects. Appendix 1, which shows plant associations (4 letter code, scientific and common names) documented at collection sites on and off of the BNF, has also been added.

Volunteers play a large role in seed collection, and it is easier to get them involved when collection sites; 1) inhabit numerous targeted species and/or targeted species is in abundance, 2) sites can be visited on a day trip from Boise or Mountain Home, and 3) sites have gentle slopes and are near a main road. Figures 2 and 3 show that most collection sites are located next to an established Forest Service road or State highway. We have 2 sources of volunteers. One group is based in Boise and the other in Mountain Home. This approach has worked out nicely for us, however volunteers played less of a role this year than they have in previous years. The further north we establish collection sites within the BNF, the harder it is to get volunteers involved in collections. For example, several plots have been established in the Bear Valley Project area, but it is not entirely practical to make numerous day trips from Boise, especially during field reconnaissance. Therefore, we have eliminated day trips from Boise during field reconnaissance.



Limitations to consider when using volunteers are length of workday, weather, and environmental factors of collection sites. These factors were taken into account during the field reconnaissance phase. Extreme heat can make seed collection more difficult for volunteers, and because of this, the length of the workday is usually shortened. Again, coordination between volunteers and plant phenology seems to be the most challenging aspect of seed collection. Last year, having alternative collection sites on any given day proved extremely valuable. But, this year was more difficult due to the distance from Boise to newly established collection sites.

A goal for this project is to collect from the geographic range of the species of interest on BNF and adjacent land. Species have not yet been collected in the northern portion of the Forest for several reasons, including time required for reconnaissance and the logistics of using volunteers. Planned field reconnaissance to locate sites and monitor phenology takes time, and although subsequent unplanned visits to further monitor plant phenology are necessary and time consuming, they have been limited resulting in the loss of some seed. However, the weight requirement of this project has been accomplished. Native species have difficulty competing with exotics and often lose in post disturbance competition. A variety of species within each life form were collected throughout the Boise National Forest in and out of designated project areas. The objective weight of 340.19 kg (750 lbs) has been exceeded by 194.66 kg (429.16 lbs) resulting in the total weight of 534.86 kg (1179.16 lbs). It is recommended that the primary focus for next field season be solely in the northern portion of the Forest. In doing so, all requirements for the project will have been met.

## LITERATURE CITED

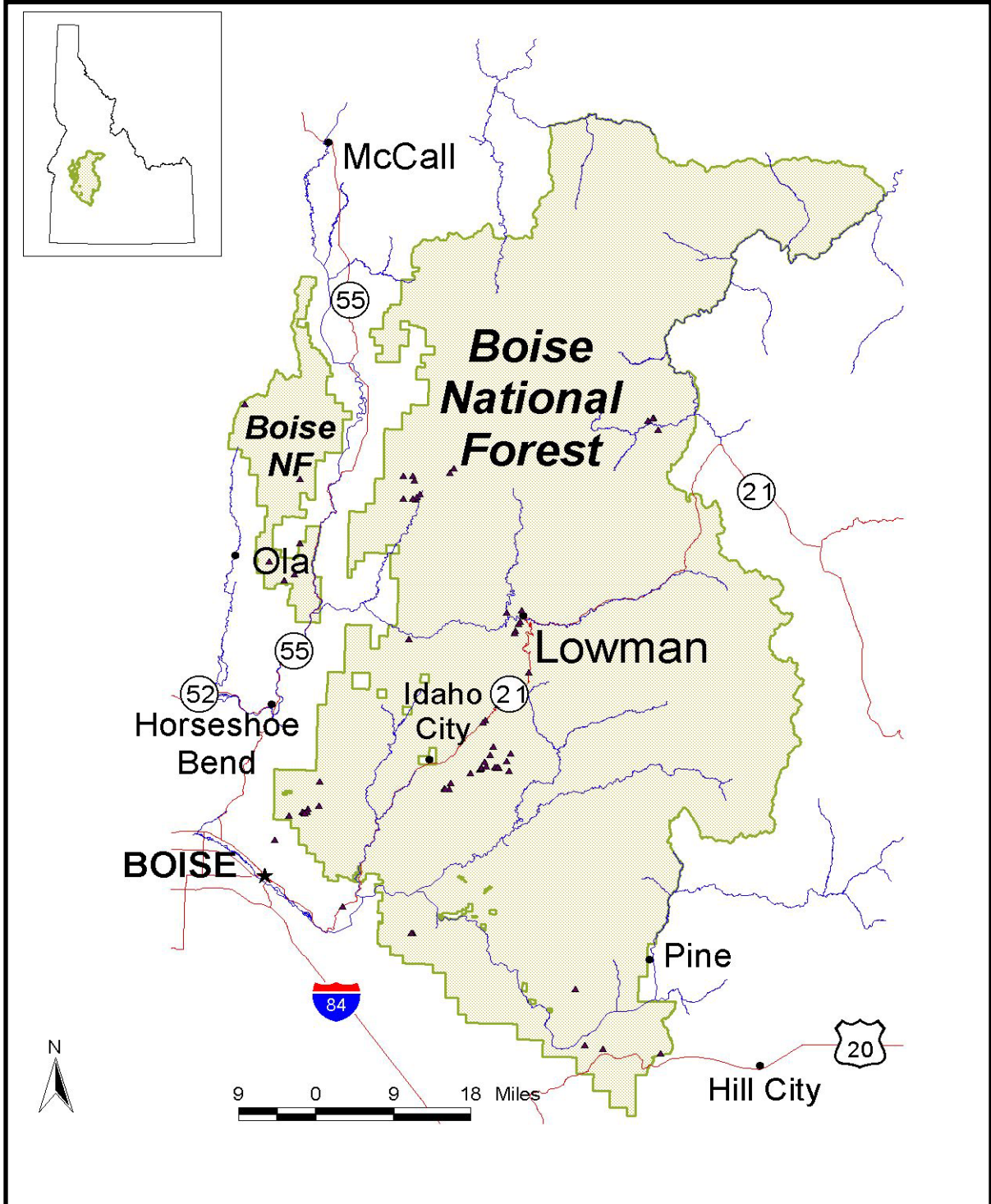
- Bourgeron, P.S., R.L. DeVelice, L.D. Engelking, G. Jones, and E. Muldavin. 1991. WHTF site and community survey manual. Version 92B. Western Heritage Task Force, the Nature Conservancy, Boulder, Co. 24pp.
- Dodson, S. 2002. Origin of the Species: Native versus non-native Rangeland Plants. Article created as part of the Integrated Management Class at the University of Idaho. Available: <http://www.cnr.uidaho.edu/range456/hot-topics/native-plants-debate.htm>
- Hansen, P.L., R.D. Pfister, K. Boggs, B.J. Cook, J. Joy, and D.K. Hinckley. 1995. Classification and Management of Montana's Riparian and Wetland Sites. Montana Forest and Conservation Experiment Station, School of Forestry, Missoula, MT. 646 pp.
- Hironaka, M., M. A. Fosberg, and A. H. Winward. 1983. Sagebrush-grass habitat types of southern Idaho. Forestry, Wildlife, and Range Experiment Station Bulletin Number 15, University of Idaho, Moscow. 44 pp.
- Hitchcock, C. L., and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle, WA.
- Hurd, E. G.; Shaw, Nancy L.; Mastrogiuseppe, Joy; Smithman, Lynda C.; Goodrich, Sherel. 1998. Field guide to Intermountain sedges. Gen. Tech. Rep. RMRS-GTR-10. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 282 p.
- Jankovsky-Jones, M., C. Murphy, and C. Coulter. 2001. Riparian and wetland plant associations of southwestern Idaho with a focus on the Bureau of Land Management's Lower Snake River District. Miscellaneous Report BLM/ID/ST-01/001+1730. Bureau of Land Management, Boise, ID. 191 pp. plus appendices.
- Johnson, C. G.; Simon, Steven A. 1987. Plant associations of the Wallowa-Snake province. R6-ECOL-TP-255B-86. Baker City, OR: U.S. Department of Agriculture, Forest Service, Wallowa-Whitman National Forest. 272 pp. plus appendices.
- Kovalchik, B. L. 1993. Riparian plant associations on the national forests of eastern Washington- Draft version 1. USDA Forest Service, Colville National Forest, Colville, WA. 203 pp.
- Manning, M. E., and W. G. Padgett. 1995. Riparian community type classification for the Humboldt and Toiyabe National Forests, Nevada and eastern California. USDA Forest Service, Intermountain Region Ecology and Classification Program, Ogden, UT. 274 pp.
- Matthews, R. F. 2000. Calamagrostis rubescens. In: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2002, September). Fire Effects Information System,[Online]. Available: <http://www.fs.fed.us/database/feis/>
- Miller, J. J. and S. K. Rust. 2002. Native Seed Collection Project - Boise National Forest. Unpublished report prepared for the USDA Forest Service, Boise National Forest. Idaho Conservation Data Center, Department of Fish and Game, Boise. 22 pp.
- Miller, J. J. and S. K. Rust. 2003. Native Seed Collection Project - Boise National Forest. Unpublished Report prepared for the USDA Forest Service, Boise National Forest. Idaho Conservation Data Center, Department of Fish and Game, Boise. 22 pp.

- Pavek, D. S. 1993. *Lonicera utahensis*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2004, December 28].
- Reed, W. R. 1993. *Aster conspicuus*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2004, December 28].
- Richards, Rebecca T., Jeanne C. Chambers, and Christopher Ross. 1998. "Use of native plants on federal lands: Policy and practice." In *Journal of Range Management*. 51 (6), pp. 625-632.
- Snyder, S. A. 1992. *Carex geyeri*. In: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2002, September). Fire Effects Information System, [Online]. Available: <http://www.fs.fed.us/database/feis/>
- Steele, R., R. D. Pfister, R. A. Ryker, and J. A. Kittams. 1981. Forest habitat types of central Idaho. USDA Forest Service General Technical Report INT-114. Intermountain Forest and Range Experiment Station, Ogden, UT. 138 pp.
- Steele, R., S. V. Cooper, D. M. Ondov, D. W. Roberts, and R. D. Pfister. 1983. Forest habitat types of eastern Idaho-western Wyoming. General Technical Report INT-144. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT. 122 pp.
- USDA Forest Service. 1992. Ecosystem Inventory and Analysis Guide (7/92). Northern Region, Missoula, MT.
- Zlatnik, E. 1999. *Purshia tridentata*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2004, December 28].

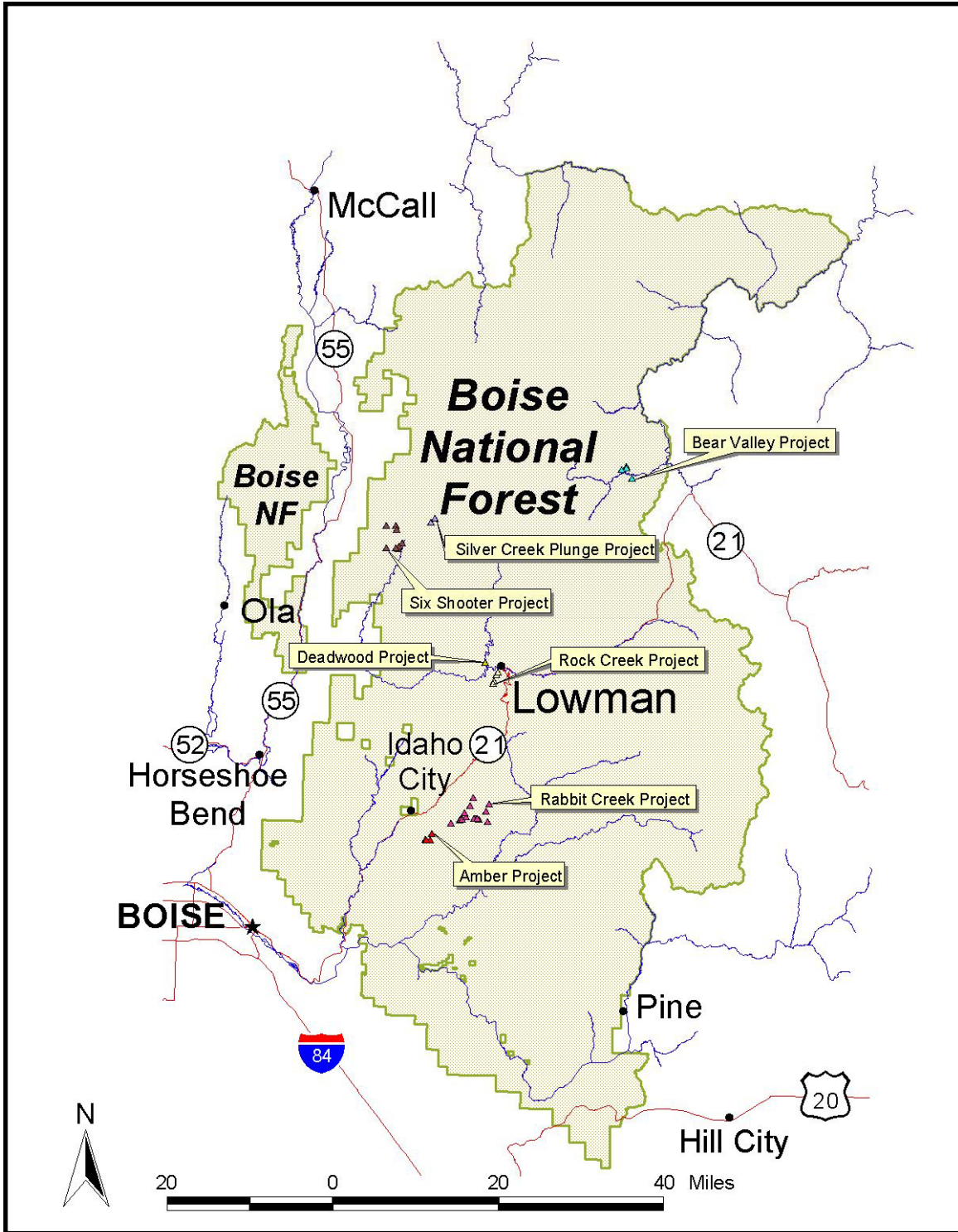
## Figures

### List of Figures

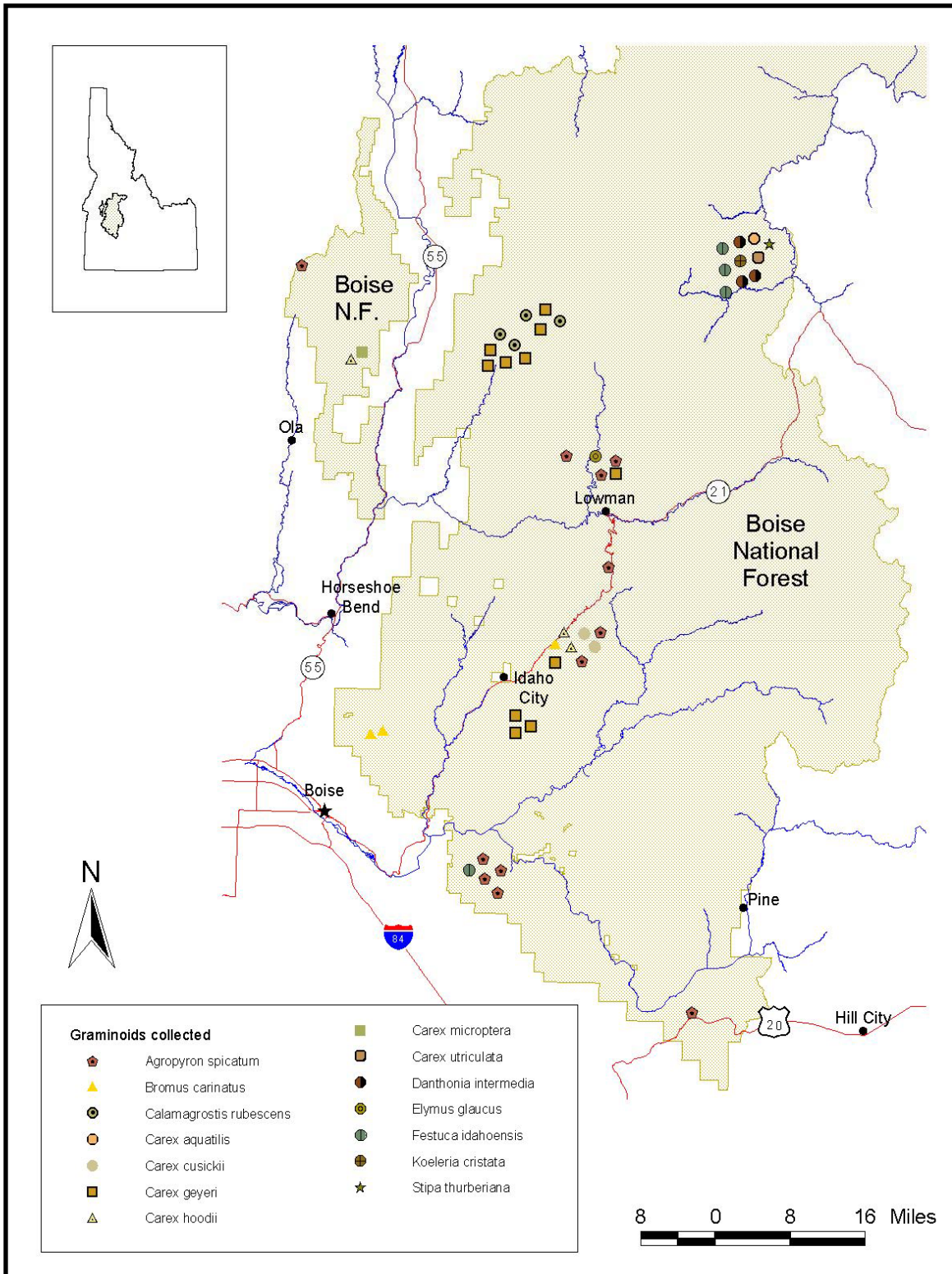
- Figure 1.** Study area, Boise National Forest, 2004. Illustrates location of sites, on and off the Boise National Forest, collected from during the 2004 field season.
- Figure 2.** Location of Boise National Forest project areas collected from during the 2004 field season.
- Figure 3.** Approximate plot location of graminoid species collected during the 2003 to 2004 field season. This excludes species collected for the 2003 Rabbit Creek Study.
- Figure 4.** Approximate plot location of forb and shrub species collected during the 2003 to 2004 field season. This excludes species collected for the 2003 Rabbit Creek Study.
- Figure 5.** *Penstemon wilcoxii*
- Figure 6.** *Sorbus scopulina*
- Figure 7.** *Balsamorhiza sagittata*
- Figure 8.** *Achillea millefolium*
- Figure 9.** *Eriogonum umbellatum*
- Figure 10.** *Purshia tridentata*
- Figure 11.** An *Agropyron spicatum*/*Balsamorhiza sagitta* association located on a south-facing slope within the Rock Creek project area.
- Figure 12.** A *Pseudotsuga menziesii*/*Symphoricarpos albus*, *Pinus ponderosa* association found within the Silver Creek Plunge project area. *Carex geyeri* and *Calamagrostis rubescens* plugs were collected from this plot.
- Figure 13.** *Prunus emarginata* collected from plot 040721-0802, which located within the Six Shooter Project area. It was not a good seed collecting year for *P. emarginata*.
- Figure 14.** *Calamagrostis rubescens* collected in the Six Shooter and Silver Creek Plunge Project areas. *C. rubescens* and *Carex geyeri* are very common throughout these areas.
- Figure 15.** *Agropyron spicatum* collected throughout the Boise National Forest. This is the most common grass observed in the southern portion of the Forest.
- Figure 16.** *Lupinus sericeus* collected in the Silver Creek Plunge Project area.



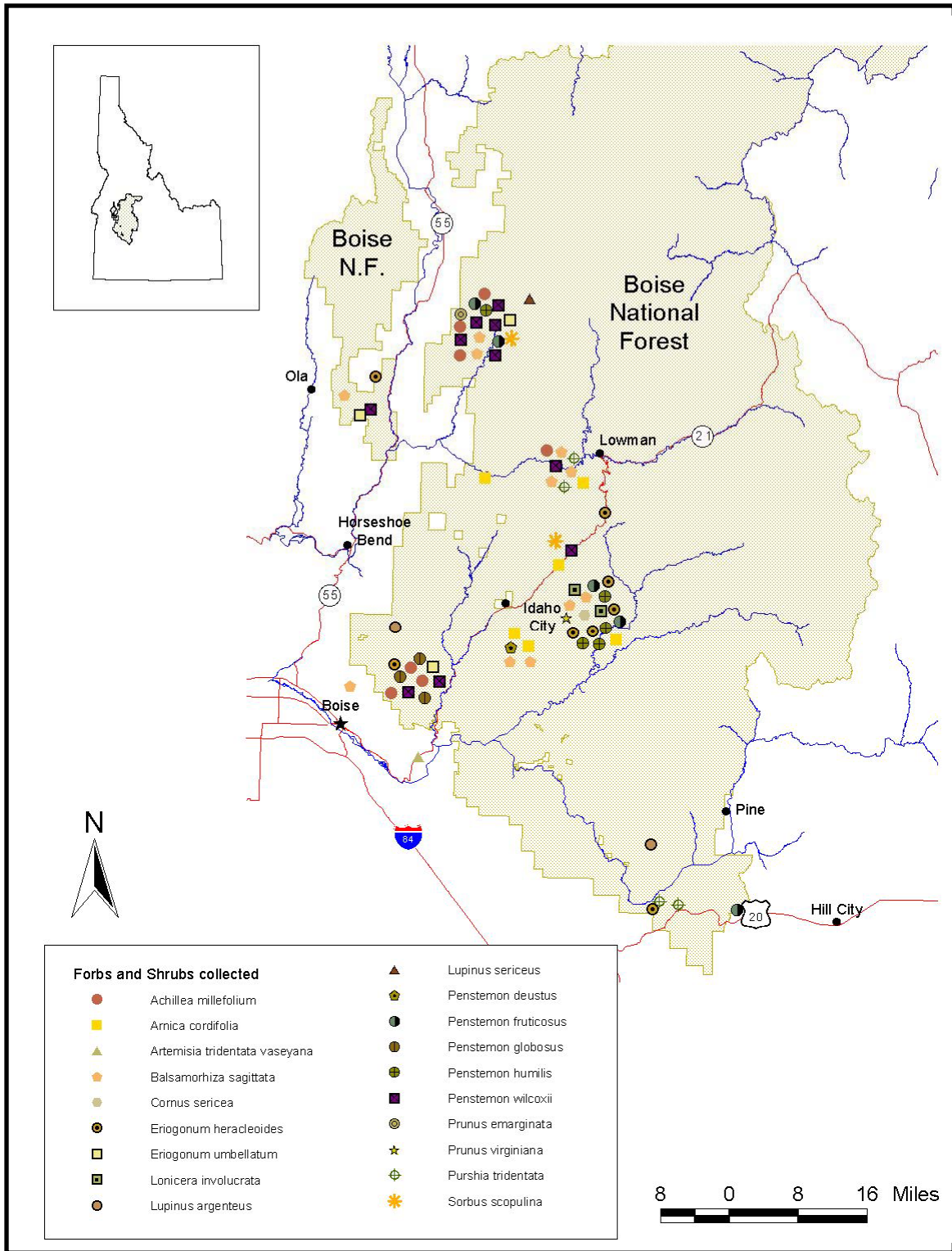
**Figure 1.** Study area, Boise National Forest, 2004. Location of seed collection sites, on and off Boise National Forest, collected from during the 2003 and 2004 field seasons. Locations of seed collection sites utilized in the 2003 and 2004 field seasons are shown in relation to the National Forest boundary, major rivers, highways, and towns.



**Figure 2.** Location of Boise National Forest project areas collected from during the 2004 field season. Project areas are shown in relation to the National Forest boundary, major rivers, highways, and towns.



**Figure 3.** Approximate plot location of graminoid species collected during the 2003 to 2004 field season. This excludes species collected for the 2003 Rabbit Creek Study. Plot locations are shown in relation to the National Forest boundary, major rivers, and towns.



**Figure 4.** Approximate plot location of forb and shrub species collected during the 2003 to 2004 field season. This excludes species collected for the 2003 Rabbit Creek Study. Plot locations are shown in relation to the National Forest boundary, major rivers, and towns.





**Figure 5.** *Penstemon wilcoxii* collected from plot 040701-1650 on Dry Buck Summit. The area has been previously disturbed and cut stumps present.



**Figure 6.** *Sorbus scopulina* collected at 4670 feet elevation on a northeast-facing slope in the Six Shooter project area.



**Figure 7.** *Balsamorhiza sagittata* collected from plot 040607-1521 in the Amber project area near Idaho City.



**Figure 8.** *Achillea millefolium* collected from the Six Shooter project area near the middle fork of the Payette River.



**Figure 9.** *Lonicera involucrata* collected at 4875 feet elevation from the Ten Mile Campground site off of Highway 21. It was found on a northwest-facing slope along a small stream.



**Figure 10.** *Purshia tridentata* collected from plot 040629-1515, which is located on a southeast-facing aspect in the Rock Creek project area.



**Figure 11.** An *Agropyron spicatum*/*Balsamorhiza sagitta* association located on a south-facing slope within the Rock Creek project area.



**Figure 12.** A *Pseudotsuga menziesii*/*Symphoricarpos albus*, *Pinus ponderosa* association found within the Silver Creek Plunge project area. *Carex geyeri* and *Calamagrostis rubescens* plugs were collected from this plot.



**Figure 13.** *Prunus emarginata* collected from plot 040721-0802, which located within the Six Shooter Project area. It was not a good seed collecting year for *P. emarginata*.



**Figure 14.** *Calamagrostis rubescens* collected in the Six Shooter and Silver Creek Plunge Project areas. *C. rubescens* and *Carex geyeri* are very common throughout these areas.



**Figure 15.** *Agropyron spicatum* collected throughout the Boise National Forest. This is the most common grass observed in the southern portion of the Forest.



**Figure 16.** *Lupinus sericeus* collected in the Silver Creek Plunge Project area.

## Tables

### List of Tables

**Table 1.** Summary of targeted species and their respected elevation zones.

**Table 2.** Detailed list of species collected, weights, total weight per life form, combined total weight, and collection date.

**Table 3.** Detailed list of species collected during the 2003 field season, weights, total weight per life form, combined total weight, and collection date.

**Table 4.** Detailed list of collection sites with species collected during the 2003 (outside of Rabbit Creek drainage) and 2004 field seasons. The "Site Name" is the most distinguishable land feature near the seed collection site that is recognized on 7.5 minute topographical quadrangle maps from which all sites are located. Or the plot is listed under the project area name.

**Table 5.** Documentation of seed collected from species with < 50 plants per seed collection site.

**Table 6.** Documentation of species seed collected, elevation, slope, aspect, and associated habitat.

**Table1.** Summary of targeted species and their respected elevation zones.

<b>TARGETED SPECIES</b>	<b>ELEVATION ZONE</b>
<b>Shrubs-</b>	
<i>Acer glabrum</i> (Rocky Mountain maple)	1371.6 and 1524 m (4500 and 5000 ft)
<i>Artemisia tridentata</i> (sagebrush-various varieties)*	1219.2-1828.8 m (4000-6000 ft)
<i>Chrysothamnus nauseosus</i> (rabbitbrush)	below 1676.4 m (5500 ft)
<i>Cornus sericea</i> (red-osier dogwood)*	1371.6-1828.8 m (4500-6000 ft)
<i>Lonicera involucrata</i> (twinberry honeysuckle)*	1371.6-1828.8 m (4500-6000 ft)
<i>Lonicera utahensis</i> (Utah honeysuckle)	all zones
<i>Prunus virginiana</i> (chokecherry)	1371.6 m and 1828.8 m (4500 and 6000 ft)
<i>Prunus emarginata</i> (bittercherry)	1371.6-1676.4 m (4500-5500 ft)
<i>Purshia tridentata</i> (bitterbrush)*	1066.8 m and 1524 m (3500 and 5000 ft)
<i>Sorbus scopulina</i> (mountain ash)*	1524 1676.4 m (5000-5500 ft)
<i>Spiraea betulifolia</i> (white spiraea)*	1219.2 m; 1371.6-1524 m (4000; 4500-5000 ft)
<b>Forbs-</b>	
<i>Achillea millefolium</i> (yarrow)*	1219.2 m; 1371.6-1828.8 m (4000 and 5500-6000 ft)
<i>Arnica cordifolia</i> (heartleaf arnica)*	all zones
<i>Aster conspicuous</i> (showy aster)	all zones
<i>Balsamorhiza sagittata</i> (arrowleaf balsamroot)*	1219.2 and 1524 m (4000 and 5000 ft)
<i>Eriogonum heracleoides</i> (Wyeth buckwheat)*	1219.2-1524 m and higher (4500-5000 ft)
<i>Eriogonum umbellatum</i> (buckwheat)*	1219.2; 1371.6-1828.8 m (4000; 5500-6000 ft)
<i>Lupinus sericeus</i> (silky lupine)	1219.2-1676.4 m (4000-5500 ft)
<i>Penstemon deustus</i> (scabland beardtongue)*	1219.2 m (4000 ft)
<i>Penstemon fruticosus</i> (bush penstemon)*	1371.6-1676.4 m (4500-5500 ft)
<i>Penstemon globosus</i> (globe penstemon)*	1371.6-1676.4 m (4500-5000 ft)
<i>Penstemon humilis</i> (low beardtongue)*	1371.6-1676.4 m (4500-5500 ft)
<i>Penstemon wilcoxii</i> (Wilcox's penstemon)*	all zones
<b>Graminoids-</b>	
<i>Agropyron spicatum</i> (bluebunch wheatgrass)*	all zones
<i>Bromus carinatus</i> (California / mountain brome)*	all zones
<i>Calamagrostis rubescens</i> (pinegrass)*	1371.6-1676.4 m (4500-5500 ft)
<i>Carex geyeri</i> (elk sedge)*	1371.6-1676.4 m (4500-5500 ft)
<i>Carex hoodii</i> (Hood's sedge)*	1524 m (5000 ft)
<i>Elymus glaucus</i> (blue wildrye)*	1219.2-1524 m (4000-5000 ft)
<i>Festuca idahoensis</i> (Idaho Fescue)*	all zones
Additional graminoids collected for the Bear Valley Project-	
<i>Carex utriculata</i> (beaked sedge)*	
<i>Carex aquatilis</i> (water sedge)*	
<i>Dantonina intermedia</i> (timber oatgrass)*	
<i>Koeleria cristata</i> (prairie junegrass)*	
<i>Stipa thurberiana</i> (Thurber's needlegrass)*	

An elevation zone ranges from 250 ft above and/or below targeted elevation.

\* Species that were collected at general collection sites and/or within project areas.



**Table 2.** Detailed list of species collected during the 2004 field season, weights, total weight per life form, combined total weight, and collection date.

Date collected	Targeted Species	Plot Id	Individual weights (lbs)
<b>SHRUBS</b>			
11/20/2004	<i>Artemisia tridentata vaseyana</i>	021112-1427	190.000
9/1/2004	<i>Cornus sericeus</i> <sup>2</sup>	030612-1340	14.040
7/14/2004	<i>Lonicera involucrata</i> <sup>2</sup>	030731-1514	0.340
7/22/2004	<i>Lonicera involucrata</i>	040628-1624	0.100
9/2/2004	<i>Prunus emarginata</i>	040721-0802	0.010
7/20/2004	<i>Purshia tridentata</i>	040629-1515	14.363
7/20/2004	<i>Purshia tridentata</i>	040630-0831	2.150
7/17/2004	<i>Purshia tridentata</i>	020725-0849	60.000
7/19/2004	<i>Purshia tridentata</i> <sup>1,2</sup>	020715-1247	7.888
9/3/2004	<i>Sorbus scopulina</i> <sup>2</sup>	040629-1003	11.7
9/2/2004	<i>Sorbus scopulina</i>	040720-1658	0.180
			<b>Total weight 300.770</b>
<b>FORBS</b>			
9/3/2004	<i>Achillea millefolium</i>	040629-1735	0.160
9/2/2004	<i>Achillea millefolium</i> <sup>2</sup>	040721-1110	0.030
9/2/2004	<i>Achillea millefolium</i> <sup>2</sup>	040721-1208	0.030
9/2/2004	<i>Achillea millefolium</i>	040721-1511	0.230
8/18/2004	<i>Achillea millefolium</i>	020808-1402	2.088
8/18/2004	<i>Achillea millefolium</i>	020807-1332	1.488
8/18/2004	<i>Achillea millefolium</i> <sup>2</sup>	020807-1428	1.131
6/7/2004	<i>Arnica cordifolia</i>	040607-1521	0.100
6/7/2004	<i>Arnica cordifolia</i>	040607-1001	0.044
6/24/2004	<i>Arnica cordifolia</i>	030610-1111	0.163
6/28/2004	<i>Arnica cordifolia</i>	040628-1624	0.038
6/30/2004	<i>Arnica cordifolia</i>	040630-1804	0.094
6/7/2004	<i>Balsamorhiza sagittata</i>	020628-1215	0.806
6/7/2000	<i>Balsamorhiza sagittata</i>	020628-1215	2.738
6/24/2004	<i>Balsamorhiza sagittata</i>	030616-1156	2.581
6/24/2004	<i>Balsamorhiza sagittata</i> <sup>2</sup>	030616-1354	1.781
6/25/2004	<i>Balsamorhiza sagittata</i>	040607-1257	5.980
6/25/2004	<i>Balsamorhiza sagittata</i>	040607-1521	4.900
6/29/2004	<i>Balsamorhiza sagittata</i>	040629-1735	1.031
6/29/2004	<i>Balsamorhiza sagittata</i>	040629-1603	1.125
7/20/2004	<i>Balsamorhiza sagittata</i>	040720-1658	0.075
7/21/2004	<i>Balsamorhiza sagittata</i>	040721-0802	0.225
7/21/2004	<i>Balsamorhiza sagittata</i> <sup>1,2</sup>	040721-1441	0.744
7/21/2004	<i>Balsamorhiza sagittata</i> <sup>1,2</sup>	040721-1441	0.669
8/19/2004	<i>Eriogonum heracleoides</i>	040629-1130	0.520
8/10/2004	<i>Eriogonum heracleoides</i>	040629-1130	0.756
8/10/2004	<i>Eriogonum heracleoides</i>	040628-1733	10.413
7/19/2004	<i>Eriogonum heracleoides</i> <sup>2</sup>	020725-0849	3.813
8/4/2004	<i>Eriogonum heracleoides</i>	030715-1549	4.610
8/4/2004	<i>Eriogonum heracleoides</i>	030715-1638	4.400

Date collected	Targeted Species	Plot Id	Individual weights (lbs)
<b>FORBS (cont.)</b>			
8/4/2004	<i>Eriogonum heracleoides</i>	030609-1524	0.606
8/18/2004	<i>Eriogonum heracleoides</i>	020722-1000	5.594
8/19/2004	<i>Eriogonum heracleoides</i>	040628-1733	0.900
8/31/2004	<i>Eriogonum heracleoides</i>	040721-1050	2.456
9/2/2004	<i>Eriogonum umbellatum</i>	040721-0802	0.740
8/31/2004	<i>Eriogonum umbellatum</i> <sup>2</sup>	040831-1533	1.088
9/1/2004	<i>Eriogonum umbellatum</i>	020722-1110	5.880
9/3/2004	<i>Lupinus sericeus</i>	040722-0921	0.160
8/17/2004	<i>Penstemon deustus</i>	040607-1149	6.150
9/2/2004	<i>Penstemon fruticosus</i>	040721-1110	0.530
9/2/2004	<i>Penstemon fruticosus</i>	040721-1208	0.290
8/31/2004	<i>Penstemon fruticosus</i>	030611-1519	3.863
8/31/2004	<i>Penstemon fruticosus</i>	030611-1213	1.044
8/18/2004	<i>Penstemon globosus</i>	020808-1402	0.831
8/18/2004	<i>Penstemon globosus</i>	020807-1332	0.038
8/18/2004	<i>Penstemon globosus</i> <sup>2</sup>	020807-1428	0.094
7/21/2004	<i>Penstemon humilis</i>	040721-1720	0.056
8/17/2004	<i>Penstemon humilis</i>	030610-1215	5.780
8/17/2004	<i>Penstemon humilis</i>	030610-1305	4.150
8/31/2004	<i>Penstemon humilis</i> <sup>2</sup>	040831-1533	0.350
8/31/2004	<i>Penstemon humilis</i>	030611-1519	0.825
8/31/2004	<i>Penstemon humilis</i>	030611-1213	0.325
8/20/2004	<i>Penstemon wilcoxii</i>	040616-1805	0.088
8/19/2004	<i>Penstemon wilcoxii</i>	040629-1003	0.075
8/31/2004	<i>Penstemon wilcoxii</i>	040701-1650	2.069
9/2/2004	<i>Penstemon wilcoxii</i> <sup>2</sup>	040720-1658	0.060
9/2/2004	<i>Penstemon wilcoxii</i> <sup>2</sup>	040721-1110	0.070
9/2/2004	<i>Penstemon wilcoxii</i>	040721-1208	0.050
9/2/2004	<i>Penstemon wilcoxii</i>	040721-1511	0.040
9/2/2004	<i>Penstemon wilcoxii</i>	040720-1413	0.120
8/18/2004	<i>Penstemon wilcoxii</i>	020808-1402	0.781
8/18/2004	<i>Penstemon wilcoxii</i>	020807-1332	0.363
			<b>Total weight 98.318</b>
<b>GRASSES AND SEDGES</b>			
8/3/2004	<i>Agropyron spicatum</i>	040629-1735	3.300
8/3/2004	<i>Agropyron spicatum</i> <sup>2</sup>	040629-1603	3.163
8/10/2004	<i>Agropyron spicatum</i>	040629-1130	0.825
8/19/2004	<i>Agropyron spicatum</i>	040629-1130	2.650
7/19/2004	<i>Agropyron spicatum</i>	020715-1247	0.113
7/23/2004	<i>Agropyron spicatum</i> <sup>1,2</sup>	040525-1706	0.294
7/26/2004	<i>Agropyron spicatum</i>	040525-1305	0.369
7/26/2004	<i>Agropyron spicatum</i>	040525-1315	0.275
7/26/2004	<i>Agropyron spicatum</i> <sup>1,2</sup>	040525-1705	0.288
7/26/2004	<i>Agropyron spicatum</i> <sup>1,2</sup>	040525-1706	0.294
8/17/2004	<i>Agropyron spicatum</i>	030715-1549	5.620
8/17/2004	<i>Agropyron spicatum</i>	030715-1638	3.010

Date collected	Targeted Species	Plot Id	Individual weights (lbs)
<b>GRASSES AND SEDGES (cont.)</b>			
8/4/2004	<i>Bromus carinatus</i> <sup>2</sup>	030609-1524	0.069
8/11/2004	<i>Bromus carinatus</i>	020806-1400	0.419
8/11/2004	<i>Bromus carinatus</i>	020806-1153	0.400
9/2/2004	<i>Calamagrostis rubescens</i>	040721-1340	22.500
9/2/2004	<i>Calamagrostis rubescens</i> <sup>2</sup>	040720-1413	11.000
9/3/2004	<i>Calamagrostis rubescens</i> <sup>2</sup>	040722-1159	20.000
9/3/2004	<i>Calamagrostis rubescens</i> <sup>2</sup>	040722-0921	15.000
8/20/2004	<i>Carex aquatilis</i>	CM Poker Meadow	0.106
6/24/2004	<i>Carex geyeri</i>	030610-1111	0.038
6/24/2004	<i>Carex geyeri</i>	030610-1111	9.410
7/14/2004	<i>Carex geyeri</i>	030610-1111	37.220
6/25/2004	<i>Carex geyeri</i>	040607-1001	0.414
6/25/2004	<i>Carex geyeri</i>	040607-1001	0.001
6/25/2004	<i>Carex geyeri</i>	040607-1257	0.002
6/25/2004	<i>Carex geyeri</i>	040607-1257	7.030
8/5/2004	<i>Carex geyeri</i> <sup>2</sup>	040607-1149	33.500
7/20/2004	<i>Carex geyeri</i>	040630-0831	23.106
9/2/2004	<i>Carex geyeri</i>	040721-1208	17.000
9/2/2004	<i>Carex geyeri</i> <sup>2</sup>	040721-1511	16.500
9/2/2004	<i>Carex geyeri</i> <sup>2</sup>	040721-1340	43.000
9/2/2004	<i>Carex geyeri</i> <sup>2</sup>	040720-1413	23.000
9/3/2004	<i>Carex geyeri</i>	040722-1159	77.000
9/3/2004	<i>Carex geyeri</i>	040722-0921	25.000
7/14/2004	<i>Carex hoodii</i> <sup>2</sup>	030826-1615	0.500
8/19/2004	<i>Carex hoodii</i>	040628-1733	0.310
8/20/2004	<i>Carex utriculata</i> <sup>3</sup>	CM poker meadow	0.513
8/19/2004	<i>Danthonia intermedia</i>	040713-1311	0.150
8/19/2004	<i>Danthonia intermedia</i>	040716-1449	0.031
8/20/2004	<i>Danthonia intermedia</i>	040713-1430	0.022
8/20/2004	<i>Elymus glaucus</i>	040616-1805	0.100
7/26/2004	<i>Festuca idahoensis</i> <sup>2</sup>	040525-1315	0.075
8/19/2004	<i>Festuca idahoensis</i> <sup>2</sup>	040716-1449	0.044
8/20/2004	<i>Festuca idahoensis</i> <sup>2</sup>	040713-1311	0.075
8/20/2004	<i>Festuca idahoensis</i> <sup>2</sup>	040713-1430	0.169
8/20/2004	<i>Koeleria cristata</i> <sup>2</sup>	040713-1430	0.119
8/19/2004	<i>Stipa thurberiana</i> <sup>1,2</sup>	040716-1449	0.002
			<b>Total weight 404.023</b>
			<b>GRAND TOTAL 803.092</b>

<sup>1</sup>No suitable voucher specimen collected.

<sup>2</sup>No suitable photograph taken.

**Table 3.** Detailed list of species collected during the 2003 field season, weights, total weight per life form, combined total weight, and collection date.

Date Collected	Targeted Species	Plot Id	Individual weights (lbs)
<b>SHRUBS</b>			
8/16/2003	<i>Prunus virginiana</i>	030609-1409	33.000
7/17/2003	<i>Purshia tridentata</i>	020725-0849	35.000
12/3/2003	<i>Artemisia tridentata vaseyana</i>	021112-1427	50.000
			<b>Total weight 118.00</b>
<b>FORBS</b>			
7/25/2003	<i>Balsamorhiza sagittata</i>	030725-1530	0.625
7/24/2003	<i>Penstemon fruticosus</i>	030724-1725	0.225
8/23/2003	<i>Eriogonum umbellatum</i>	020722-1110	30.000
8/23/2003	<i>Lupinus argenteus</i>	020722-1352	16.000
8/25/2003	<i>Lupinus argenteus</i>	020808-1650	5.688
7/16/2003	<i>Balsamorhiza sagittata</i>	030716-1500	0.581
			<b>Total weight 53.119</b>
<b>GRASSES AND SEDGES</b>			
6/30/2003	<i>Carex cusickii</i>	030612-1220	1.294
6/30/2003	<i>Carex cusickii</i>	030630-1514	0.894
7/25/2003	<i>Agropyron spicatum</i>	030725-1400	0.081
7/16/2003	<i>Agropyron spicatum</i>	030716-1500	0.219
7/23/2003	<i>Carex microptera</i>	030717-1011	0.538
7/17/2003	<i>Carex hoodii</i>	030717-1011	0.1
			<b>Total weight 3.125</b>
			<b>GRAND TOTAL 174.244</b>

<sup>1</sup>No suitable voucher specimen collected.

<sup>2</sup>No suitable photograph taken.

**Table 4.** A detailed list of site names. The number of ecological plots (plot id) and species collected within each area are noted. Location of sites is given by UTM coordinates and topographical map.

Site Name	Quad map	Plot id	UTM X	UTM Y	Targeted Species
Amber Project	Idaho City	040607-1001	596694	4848076	<i>Carex geyeri</i> , <i>Arnica cordifolia</i>
		040607-1149	596822	4847919	<i>Penstemon deustus</i> , <i>Carex geyeri</i>
		040607-1257	597595	4847873	<i>Carex geyeri</i> , <i>Balsamorhiza sagittata</i>
		040607-1521	597902	4849167	<i>Balsamorhiza sagittata</i> , <i>Arnica cordifolia</i>
Bear Valley Project	Bluebunch Mountain	040713-1311	633055	4921834	<i>Danthonia intermedia</i> , <i>Festuca idahoensis</i>
		040713-1430	632954	4921563	<i>Koeleria cristata</i> , <i>Festuca idahoensis</i> , <i>Danthonia intermedia</i>
		040716-1449	634123	4919511	<i>Festuca idahoensis</i> , <i>Danthonia intermedia</i> , <i>Stipa thurberiana</i>
		CM poker meadow	633125	4921121	<i>Carex utriculata</i> , <i>C. aquatilis</i>
Rock Creek Project	Pine Flat	040629-1735	609330	4880453	<i>Agropyron spicatum</i> , <i>Achillea millefolium</i> , <i>Arnica cordifolia</i> , <i>Balsamorhiza sagittata</i>
		040629-1603	608792	4879151	<i>Balsamorhiza sagittata</i> , <i>Agropyron spicatum</i>
		040630-0831	609616	4880916	<i>Carex geyeri</i> , <i>Purshia tridentata</i>
		040629-1515	608712	4878630	<i>Purshia tridentata</i>
Six Shooter Project	Sixmile Point	040720-1658	589460	4904700	<i>Balsamorhiza sagittata</i> , <i>Sorbus scopulina</i> , <i>Penstemon wilcoxii</i>
		040721-1110	587024	4904283	<i>Achillea millefolium</i> , <i>Penstemon fruticosus</i> , <i>P. wilcoxii</i>
		040721-1208	588800	4904384	<i>Carex geyeri</i> , <i>Achillea millefolium</i> , <i>Penstemon fruticosus</i> , <i>P. wilcoxii</i>
		040720-1413	590016	4905344	<i>Carex geyeri</i> , <i>Calamagrostis rubescens</i> , <i>Penstemon wilcoxii</i>
		040721-0802	589397	4904237	<i>Balsamorhiza sagittata</i> , <i>Prunus emarginata</i> , <i>Eriogonum umbellatum</i>
		040721-1340	588667	4908728	<i>Carex geyeri</i> , <i>Calamagrostis rubescens</i>
		040721-1511	586815	4908763	<i>Carex geyeri</i> , <i>Achillea millefolium</i> , <i>Penstemon wilcoxii</i>
		040721-1720	588934	4907939	<i>Penstemon humilis</i>
Silver Creek Plunge Project	Boiling Springs	040722-0921	596190	4910467	<i>Carex geyeri</i> , <i>Calamagrostis rubescens</i> , <i>Lupinus sericeus</i>
		040722-1159	595565	4909608	<i>Carex geyeri</i> , <i>Calamagrostis rubescens</i>
Deadwood Project	Pine Flat	040616-1805	607068	4882567	<i>Elymus glaucus</i> , <i>Penstemon wilcoxii</i>
Bunch Creek	Garden Valley	040630-1804	589046	589046	<i>Arnica cordifolia</i>
Rabbit Creek Project	Rabbit Creek Summit	030731-1514	604392	4852582	<i>Lonicera involucrata</i>
		030826-1615	606464	4852446	<i>Carex hoodii</i>
		030715-1549	606801	4852312	<i>Eriogonum heracleoides</i> , <i>Agropyron spicatum</i>
		030715-1638	606217	4852410	<i>Eriogonum heracleoides</i> , <i>Agropyron spicatum</i>
		030609-1524	604100	4853390	<i>Eriogonum heracleoides</i> , <i>Bromus carinatus</i>

Site Name	Quad map	Plot id	UTM X	UTM Y	Targeted Species
Rabbit Creek Project (continued)	Rabbit Creek Summit	030610-1215	603365	4852056	<i>Penstemon humilis</i>
		030610-1305	603551	4852194	<i>Penstemon humilis</i>
		030611-1519	605570	4856445	<i>Penstemon fruticosus, P. humilis</i>
		030630-1514	606598	4852463	<i>Carex cusickii</i>
		030609-1409	601427	4851217	<i>Prunus virginiana</i>
		030612-1220	605994	4852432	<i>Carex cusickii</i>
		030611-1213	605007	4854868	<i>Penstemon fruticosus, P. humilis</i>
		030612-1340	608600	4851884	<i>Cornus sericea</i>
		030610-1111	603219	4851912	<i>Carex geyeri, Arnica cordifolia</i>
		030616-1156	608214	4853777	<i>Balsamorhiza sagittata</i>
		030616-1354	608855	4855249	<i>Balsamorhiza sagittata</i>
Lime Creek	Grape Mountain	040525-1305	591783	4819626	<i>Agropyron spicatum</i>
		040525-1315	591725	4819713	<i>Agropyron spicatum, Festuca idahoensis</i>
		040525-1705	591684	4819685	<i>Agropyron spicatum</i>
		040525-1706	591566	4819756	<i>Agropyron spicatum</i>
Upper Shirts Creek	High Valley	040831-1533	565368	4887639	<i>Eriogonum umbellatum, Penstemon humilis</i>
Bad Bear Picnic Area	Sunset Mountain	040628-1733	603845	4861617	<i>Eriogonum heracleoides, Carex hoodii</i>
Little Deer Point	Robie Creek	020806-1400	573419	4843779	<i>Bromus carinatus</i>
		020806-1153	571399	4843150	<i>Bromus carinatus</i>
		020808-1402	571266	4842533	<i>Penstemon wilcoxii, P. globosus, Achillea millefolium</i>
Thorn Gulch	Boise North	020722-1000	567874	4841630	<i>Eriogonum heracleoides</i>
		020722-1110	570357	4842545	<i>Eriogonum umbellatum</i>
Sinker Creek	Boise North	020807-1332	570637	4842367	<i>Achillea millefolium, Penstemon globosus, P. wilcoxii</i>
		020807-1428	570767	4842283	<i>Achillea millefolium, Penstemon globosus</i>
Long Pine	High Valley	040721-1441	562348	4891240	<i>Balsamorhiza sagittata</i>
Dry Creek	Boise North	020628-1215	565450	4836900	<i>Balsamorhiza sagittata</i>
Ten Mile Campground	Sunset Mountain	040628-1624	603442	4861158	<i>Arnica cordifolia, Lonicera involucrata</i>
High Valley	High Valley	040721-1050	568016	4894891	<i>Eriogonum heracleoides</i>
Gold Fork	Big Owl Creek	040629-1130	611671	4871211	<i>Agropyron spicatum, Eriogonum heracleoides</i>
Highway 21 Mores Creek	Sunset Mountain	040629-1003	606089	4864588	<i>Penstemon wilcoxii, Sorbus scopulina</i>

Site Name	Quad map	Plot id	UTM X	UTM Y	Targeted Species
Dry Buck Summit	High Valley	040701-1650	567275	4888834	<i>Penstemon wilcoxii</i>
SouthFork Boise	Anderson Ranch Dam	020725-0849	624666	4799076	<i>Pushia tridentata, Eriogonum heracleoides</i>
Windy Gap	Anderson Ranch Dam	020715-1247	628205	4798482	<i>Agropyron spicatum, Purshia tridentata</i>
E. Branch Deadwood Ridge	Pine Flat	030725-1400	606598	4852463	<i>Agropyron spicatum</i>
		030725-1530	609919	4883113	<i>Balsamorhiza sagittata</i>
Little Sage Hen Basin	Sage Hen Reservoir	030717-1011	567545	4907399	<i>Carex microptera, C. hoodii</i>
Mill Creek Summit	Twin Sisters	030716-1500	556772	4921628	<i>Agropyron spicatum, Balsamorhiza sagittata</i>
Highland Summit	Lucky Peak	021112-1427	578592	4824314	<i>Artemisia tridentata vaseyana</i>
Mores Mountain	Shafer Butte	020722-1352	573441	4848458	<i>Lupinus argenteus</i>
House Mountain	House Mountain	020808-1650	622535	4809818	<i>Lupinus argenteus</i>
Cat Creek Summit	Cat Creek Summit	030724-1725	638951	4797879	<i>Penstemon fruticosus</i>

**Table 5.** Documentation of seed collected from species with < 50 plants per seed collection site.

Target Species	Plot Id	Site Name	Elev. (ft)	Total lbs	Comments
<b>SHRUBS</b>					
<i>Lonicera involucrata</i>	040628-1624	Ten Mile Campground	4875	0.100	< 50 plants
<i>Lonicera involucrata</i>	030731-1514	Rabbit Creek	5040	0.340	< 50 plants
<i>Prunus emarginata</i>	040721-0802	Six Shooter Project area	4680	0.010	< 50 plants; very little seed
<i>Sorbus scopulina</i>	040629-1003	Highway 21 Mores Creek	5920	11.700	< 50 plants
<i>Sorbus scopulina</i>	040720-1658	Six Shooter Project area	4670	0.180	< 50 plants
		<b>Total shrub lbs</b>		<b>12.330</b>	
<b>FORBS</b>					
<i>Achillea millefolium</i>	040721-1208	Six Shooter Project area	4700	0.030	< 50 plants
<i>Achillea millefolium</i>	040721-1110	Six Shooter Project area	4580	0.030	< 50 plants
<i>Penstemon globosus</i>	020808-1402	Little Deer Point	5600	0.831	< 50 plants
<i>Penstemon globosus</i>	020807-1332	Sinker Creek	5480	0.038	< 50 plants
<i>Penstemon globosus</i>	020807-1428	Sinker Creek	5445	0.094	< 50 plants
<i>Penstemon humilis</i>	040721-1720	Six Shooter Project area	4435	0.056	< 50 plants
<i>Penstemon wilcoxii</i>	040616-1805	Dead wood Project area	3880	0.088	< 50 plants
<i>Penstemon wilcoxii</i>	040720-1658	Six Shooter Project area	4670	0.060	< 50 plants
<i>Penstemon wilcoxii</i>	040721-1110	Six Shooter Project area	4580	0.070	< 50 plants
<i>Penstemon wilcoxii</i>	040721-1511	Six Shooter Project area	4800	0.040	< 50 plants
<i>Penstemon wilcoxii</i>	040721-1413	Six Shooter Project area	4200	0.120	< 50 plants
<i>Penstemon wilcoxii</i>	020808-1402	Little Deer Point	5600	0.781	< 50 plants
<i>Penstemon wilcoxii</i>	040721-1208	Six Shooter Project area	4700	0.050	< 50 plants
		<b>Total forb lbs</b>		<b>2.288</b>	
<b>SEDGES</b>					
<i>Calamagrostis rubescens</i>	040721-1340	Six Shooter Project area	5560	22.500	vegetation for plugs
<i>Calamagrostis rubescens</i>	040720-1413	Six Shooter Project area	4200	11.000	vegetation for plugs
<i>Calamagrostis rubescens</i>	040722-1159	Silver Creek Plunge Project area	4560	20.000	vegetation for plugs
<i>Calamagrostis rubescens</i>	040722-0921	Silver Creek Plunge Project area	4560	15.000	vegetation for plugs
<i>Carex aquatilis</i>	CM Poker Meadow	Bear Valley Project area	6370	0.106	< 50 plants
<i>Carex geyeri</i>	040607-1001	Amber Project	4885	6.630	vegetation for plugs
<i>Carex geyeri</i>	040607-1257	Amber Project	5100	7.030	vegetation for plugs
<i>Carex geyeri</i>	040607-1149	Amber Project	4950	33.500	vegetation for plugs
<i>Carex geyeri</i>	040630-0831	Rock Creek Project area	4240	23.106	vegetation for plugs
<i>Carex geyeri</i>	040721-1208	Six Shooter Project area	4700	17.000	vegetation for plugs
<i>Carex geyeri</i>	040721-1511	Six Shooter Project area	4800	16.500	vegetation for plugs
<i>Carex geyeri</i>	040721-1340	Six Shooter Project area	5560	43.000	vegetation for plugs
<i>Carex geyeri</i>	040720-1413	Six Shooter Project area	4200	23.000	vegetation for plugs
<i>Carex geyeri</i>	040722-1159	Silver Creek Plunge Project area	4600	77.000	vegetation for plugs
<i>Carex geyeri</i>	040722-0921	Silver Creek Plunge Project area	4560	25.000	vegetation for plugs
<i>Carex geyeri</i>	030610-1111	Rabbit Creek	5380	46.63	vegetation for plugs
		<b>Total sedge lbs</b>		<b>387.002</b>	
<b>Combined Total Lbs</b>				<b>401.620</b>	



**Table 6.** Documentation of species seed collected, plot id, elevation, slope, aspect, and associated habitat.

Targeted Species	Plot Id	Elevation ft.	Slope %	Aspect	Association
<b>SHRUBS</b>					
<i>Artemisia tridentata vaseyana</i>	021112-1427	3845	40	34	ARTRV/FEID
<i>Cornus sericeus</i>	030612-1340	4640	55	185	COSE
<i>Lonicera involucrata</i>	030731-1514	5040	14	189	ALIN/Mesic Forb
<i>Lonicera involucrata</i>	040628-1624	4875	3	284	PIEN/COST
<i>Prunus virginiana</i>	030609-1409	5360	49	175	PIPO/SYOR
<i>Prunus emarginata</i>	040721-0802	4680	49	174	PSME/PHMA
<i>Prunus virginiana</i>	03-0306-1409	5360	49	175	PIPO/SYOR
<i>Purshia tridentata</i>	040629-1515	4640		140	PSME/PHMA
<i>Purshia tridentata</i>	040630-0831	4240	50	154	PSME/SPBE, PIPO
<i>Purshia tridentata</i>	020725-0849	4840	10	250	ARTRV-PUTR/POSE
<i>Purshia tridentata</i>	020715-1247	5120	30	284	ARTRV-PUTR/AGSP
<i>Sorbus scopulina</i>	040629-1003	5920	75	96	ABLA/ACGL
<i>Sorbus scopulina</i>	040720-1658	4670	51	71	PSME/PHMA
<b>FORBS</b>					
<i>Achillea millefolium</i>	040629-1735	4360	57	191	AGSP-BASA
<i>Achillea millefolium</i>	040721-1110	4580	32	170	PSME/CAGE, PIPO
<i>Achillea millefolium</i>	040721-1208	4700	85	110	PSME/SPBE, PIPO
<i>Achillea millefolium</i>	040721-1511	4800	27	185	PSME/CAGE, PIPO
<i>Achillea millefolium</i>	020808-1402	5600	120	150	PSME/PHMA
<i>Achillea millefolium</i>	020807-1332	5480	80	230	PSME/BERE
<i>Achillea millefolium</i>	020807-1428	5445	82	122	PSME/BERE
<i>Arnica cordifolia</i>	040607-1521	5125	10	275	PSME/CAGE, PIPO
<i>Arnica cordifolia</i>	040607-1001	4885	42	261	PSME/CAGE, PIPO
<i>Arnica cordifolia</i>	030610-1111	5380	29	115	PSME/CARU
<i>Arnica cordifolia</i>	040628-1624	4875	3	284	PIEN/COSE
<i>Arnica cordifolia</i>	040629-1735	4360	57	191	AGSP-BASA
<i>Arnica cordifolia</i>	040630-1804	3360	30	62	PSME/SYAL
<i>Balsamorhiza sagittata</i>	020628-1215	3753	65	70	PUTR/FEID
<i>Balsamorhiza sagittata</i>	030758-1530	5320	74	251	PREM/AGSP
<i>Balsamorhiza sagittata</i>	030716-1500	4730	46	65	ARTRV-PUTR/AGSP
<i>Balsamorhiza sagittata</i>	030616-1156	5040	75	142	PIPO/AGSP
<i>Balsamorhiza sagittata</i>	030616-1354	5200	70	206	PSME/AGSP
<i>Balsamorhiza sagittata</i>	040607-1257	5100	25	205	PIPO/AGSP
<i>Balsamorhiza sagittata</i>	040607-1521	5125	10	275	PSME/CAGE, PIPO
<i>Balsamorhiza sagittata</i>	040629-1735	4360	57	191	AGSP-BASA
<i>Balsamorhiza sagittata</i>	040629-1603	4400	65	210	AGSP-BASA
<i>Balsamorhiza sagittata</i>	040720-1658	4670	51	71	PSME/PHMA
<i>Balsamorhiza sagittata</i>	040721-0802	4680	49	174	PSME/PHMA
<i>Balsamorhiza sagittata</i>	040721-1441	4970	29	265	ARTRV/AGSP
<i>Eriogonum heracleoides</i>	040629-1130	5260	30	172	ARTRV/AGSP
<i>Eriogonum heracleoides</i>	040628-1733	4880	6	86	PSME/CAGE, PIPO
<i>Eriogonum heracleoides</i>	020725-0849	4840	10	250	ARTRV-PUTR/POSE
<i>Eriogonum heracleoides</i>	030715-1549	4900	68	212	PIPO/AGSP
<i>Eriogonum heracleoides</i>	030715-1638	4960	54	202	PIPO/AGSP
<i>Eriogonum heracleoides</i>	030609-1524	5240	25	165	AGSP/ERHE
<i>Eriogonum heracleoides</i>	020722-1000	4800	38	268	PREM/POBU

Targeted Species	Plot Id	Elevation ft.	Slope %	Aspect	Association
<b>FORBS (continued)</b>					
<i>Eriogonum heracleoides</i>	040721-1050	4970	32	52	ARTRV/FEID
<i>Eriogonum umbellatum</i>	040721-0802	4680	49	174	PSME/PHMA
<i>Eriogonum umbellatum</i>	040831-1533	6020	43	258	ERUM-BASA
<i>Eriogonum umbellatum</i>	020722-1110	5640	45	220	PRVI/ERUM
<i>Lupinus argenteus</i>	020722-1352	6930	25	132	LUAR/PEGL
<i>Lupinus argenteus</i>	020808-1650	7645	18	85	STOC/LUAR
<i>Lupinus sericeus</i>	040722-0921	4560	33	194	PSME/CARU, PIPO
<i>Penstemon deustus</i>	040607-1149	4950	56	183	PSME/CAGE, PIPO
<i>Penstemon fruticosus</i>	040721-1110	4580	32	170	PSME/CAGE, PIPO
<i>Penstemon fruticosus</i>	030724-1725	5720	62	280	ARTRV/PEFR/OREX
<i>Penstemon fruticosus</i>	040721-1208	4700	85	110	PSME/SPBE, PIPO
<i>Penstemon fruticosus</i>	030611-1519	5538	60	185	PSME/CAGE
<i>Penstemon fruticosus</i>	030611-1213	5160	70	156	PSME/CAGE
<i>Penstemon globosus</i>	020808-1402	5600	120	150	PSME/PHMA
<i>Penstemon globosus</i>	020807-1332	5480	80	230	PIPO/PREM
<i>Penstemon globosus</i>	020807-1428	5445	82	122	PIPO/PREM
<i>Penstemon humilis</i>	040721-1720	4435	24	91	PSME/SPBE
<i>Penstemon humilis</i>	030610-1215	5200	20	128	PSME/CAGE
<i>Penstemon humilis</i>	030610-1305	5200	60	135	PSME/CAGE
<i>Penstemon humilis</i>	040831-1533	6020	43	258	ERUM-BASA
<i>Penstemon humilis</i>	030611-1519	5538	60	185	PSME/CAGE
<i>Penstemon humilis</i>	030611-1213	5160	70	156	PSME/CAGE
<i>Penstemon wilcoxii</i>	040616-1805	3880	38	131	PSME/SYAL
<i>Penstemon wilcoxii</i>	040629-1003	5920	75	96	ABLA/ACGL
<i>Penstemon wilcoxii</i>	040701-1650	5910	12	100	ABLA/BERE
<i>Penstemon wilcoxii</i>	040720-1658	4670	51	71	PSME/PHMA
<i>Penstemon wilcoxii</i>	040721-1110	4580	32	170	PSME/CAGE, PIPO
<i>Penstemon wilcoxii</i>	040721-1208	4700	85	110	PSME/SPBE, PIPO
<i>Penstemon wilcoxii</i>	040721-1511	4800	27	185	PSME/CAGE, PIPO
<i>Penstemon wilcoxii</i>	040720-1413	4200	37	180	PSME/PHMA, CARU
<i>Penstemon wilcoxii</i>	020808-1402	5600	120	150	PSME/PHMA
<i>Penstemon wilcoxii</i>	020807-1332	5480	80	230	PIPO/PREM
<b>GRASSES AND SEDGES</b>					
<i>Agropyron spicatum</i>	040629-1735	4360	57	191	AGSP/BASA
<i>Agropyron spicatum</i>	040629-1603	4400	65	210	AGSP-BASA
<i>Agropyron spicatum</i>	040629-1130	5260	30	172	ARTRV/AGSP
<i>Agropyron spicatum</i>	020715-1247	5120	30	284	ARTRV-PUTR/AGSP
<i>Agropyron spicatum</i>	040525-1706	3800	50	3	ARTRV/FEID
<i>Agropyron spicatum</i>	040525-1305	3950	65	22	ACGL/FEID
<i>Agropyron spicatum</i>	040525-1315	3960	60	349	ARTRV/FEID
<i>Agropyron spicatum</i>	040525-1705	3885	60	2	ARTRV-SYOR/FEID
<i>Agropyron spicatum</i>	030715-1549	4900	68	212	PIPO/AGSP
<i>Agropyron spicatum</i>	030716-1500	4730	46	65	ARTRV-PUTR/AGSP
<i>Agropyron spicatum</i>	030725-1400	5680	55	221	AGSP/BERE
<i>Agropyron spicatum</i>	030715-1638	4960	54	202	PIPO/AGSP
<i>Bromus carinatus</i>	030609-1524	5240	25	165	AGSP-ERHE
<i>Bromus carinatus</i>	020806-1400	6560	15	48	PSME/SYOR
<i>Bromus carinatus</i>	020806-1153	6125	59	105	PSME/SYOR
<i>Calamagrostis rubescens</i>	040721-1340	5560	27	239	PSME/CAGE, PIPO

Targeted Species	Plot Id	Elevation ft.	Slope %	Aspect	Association
<b>GRASSES AND SEDGES (continued)</b>					
<i>Calamagrostis rubescens</i>	040720-1413	4200	37	180	PSME/PHMA, CARU
<i>Calamagrostis rubescens</i>	040722-1159	4600	31	110	PSME/SYAL, PIPO
<i>Calamagrostis rubescens</i>	040722-0921	4560	33	194	PSME/CARU, PIPO
<i>Carex aquatilis</i> <sup>3</sup>	CM poker meadow	6370	< 3	167	Carex utriculata
<i>Carex cusickii</i>	030612-1220	4855	30	174	Carex cusickii
<i>Carex cusickii</i>	030630-1514	4890	40	178	Carex cusickii
<i>Carex geeyeri</i>	030610-1111	5380	29	115	PSME/CARU
<i>Carex geeyeri</i>	040607-1001	4885	42	261	PSME/CAGE, PIPO
<i>Carex geeyeri</i>	040607-1257	5100	25	205	PIPO/AGSP
<i>Carex geeyeri</i>	040607-1149	4950	56	183	PSME/CAGE, PIPO
<i>Carex geeyeri</i>	040630-0831	4240	50	154	PSME/SPBE, PIPO
<i>Carex geeyeri</i>	040721-1208	4700	85	110	PSME/SPBE, PIPO
<i>Carex geeyeri</i>	040721-1511	4800	27	185	PSME/CAGE, PIPO
<i>Carex geeyeri</i>	040721-1340	5560	27	239	PSME/CAGE, PIPO
<i>Carex geeyeri</i>	040720-1413	4200	37	180	PSME/PHMA, CARU
<i>Carex geeyeri</i>	040722-1159	4600	31	110	PSME/SYAL, PIPO
<i>Carex geeyeri</i>	040722-0921	4560	33	194	PSME/CARU, PIPO
<i>Carex hoodii</i>	030826-1615	4930	5	142	Salix/Mesic graminoid
<i>Carex hoodii</i>	040628-1733	4880	6	86	PSME/CAGE, PIPO
<i>Carex hoodii</i>	030717-1011	5930	12	217	CAHO/PEAT
<i>Carex microptera</i>	030717-1011	5930	12	217	CAHO/PEAT
<i>Carex utriculata</i>	CM poker meadow	6370	< 3	167	Carex utriculata
<i>Danthonia intermedia</i>	040713-1311	6370	1	120	FEID-HAUN
<i>Danthonia intermedia</i>	040716-1449	6400	0	0	ARTRS/FEID?
<i>Danthonia intermedia</i>	040713-1430	6400	1	122	FEID-ERSP
<i>Elymus glaucus</i>	040616-1805	3880	38	131	PSME/SYAL
<i>Festuca idahoensis</i>	040525-1315	3960	60	349	ARTRV/FEID
<i>Festuca idahoensis</i>	040716-1449	6400	0	0	ARTRS/FEID?
<i>Festuca idahoensis</i>	040713-1311	6370	1	120	FEID-HAUN
<i>Festuca idahoensis</i>	040713-1430	6400	1	122	FEID-ERSP
<i>Koeleria cristata</i>	040713-1430	6400	1	122	FEID-ERSP
<i>Stipa thurberiana</i>	040716-1449	6400	0	0	ARTRS/FEID?

**Appendix 1.** Plant associations (4 letter code, scientific and common names) documented at collection sites on and off of the Boise National Forest. Plant associations are listed alphabetically. Plant association codes and classifications follow Steele et al. 1981, Johnson and Simon 1987, Jankovsky-Jones et al. 2001, Hironaka et al. 1983, Kolvalchik 1993, Manning and Padgett 1995, and Hansen et al. 1995.

Association Code	Scientific Name	Common Name
ABLA/ACGL	<i>Abies lasiocarpa/Acer glabrum</i>	subalpine fir/Rocky Mountain maple
ABLA/BERE	<i>Abies lasiocarpa/Berberis repens</i>	subalpine fir/barberry
ACGL/FEID	<i>Acer glabrum/Festuca idahoensis</i>	Rocky Mountain maple/Idaho fescue
AGSP-BASA	<i>Agropyron spicatum-Balsamorhiza sagittata</i>	bluebunch wheatgrass-arrowleaf balsamroot
AGSP/BERE	<i>Agropyron spicatum/Berberis repens</i>	bluebunch wheatgrass/Oregon grape
AGSP-ERHE	<i>Agropyron spicatum-Eriogonum heracleoides</i>	bluebunch wheatgrass-Wheth's buckwheat
ALIN/Mesic Forb	<i>Alnus incana/Mesic forb</i>	gray alder/mesic forb
ARTRS/FEID?	<i>Artemisia tridentata spiciformis/Festuca idahoensis</i>	big sagebrush/Idaho fescue
ARTRV/AGSP	<i>Artemisia tridentata vaseyana/Agropyron spicatum</i>	mountain big sagebrush/bluebunch wheatgrass
ARTRV/FEID	<i>Artemisia tridentata vaseyana/Festuca idahoensis</i>	mountain big sagebrush/Idaho fescue
ARTRV/PEFR/OREX	<i>Artemisia tridentata vaseyana/Penstemon fruticosus/ Oryzopsis exigua</i>	mountain big sagebrush/bush penstemon/little ricegrass
ARTRV-PUTR/AGSP	<i>Artemisia tridentata vaseyana-Purshia tridentata/ Agropyron spicatum</i>	mountain big sagebrush-bitterbrush/bluebunch wheatgrass
ARTRV-PUTR/POSE	<i>Artemisia tridentata vaseyana-Purshia tridentata/Poa secunda</i>	mountain big sagebrush-bitterbrush/Sandberg bluegrass
ARTRV-SYOR/FEID	<i>Artemisia tridentata vaseyana-Symphoricarpos oreophilis/Festuca idahoensis</i>	mountain big sagebrush-mountain snowberry/Idaho fescue
Carex cusickii	<i>Carex cusickii</i>	Cusick's sedge
Carex utriculata	<i>Carex utriculata</i>	beaked sedge
CAHO/PEAT	<i>Carex hoodii/Penstemon attenuatus</i>	Hood sedge/sulfur penstemon
COSE	<i>Cornus sericea</i>	red-osier dogwood
ERUM-BASA	<i>Eriogonum umbellatum- Balsamorhiza sagittata</i>	Sulfer buckwheat- arrowleaf balsamroot
FEID-ERSP	<i>Festuca idahoensis-Eriogonum sphaerocephalum</i>	Idaho fescue-rock buckwheat
FEID-HAUN	<i>Festuca idahoensis-Haplopappus uniflorus</i>	Idaho fescue-bristleweed
LUAR-PEGL	<i>Lupinus argenteus-Penstemon globosus</i>	silvery lupine-globe penstemon
PIEN/COSE	<i>Picea engelmannii/Cornus sericea</i>	Engelmannii's spruce/red-osier dogwood
PIPO/AGSP	<i>Pinus ponderosa/Agropyron spicatum</i>	ponderosa pine/bluebunch wheatgrass
PIPO/SYOR	<i>Pinus ponderosa/Symphoricarpos oreophilus</i>	ponderosa pine/mountain snowberry
PREM	<i>Prunus emarginata</i>	bittercherry

Association Code	Scientific Name	Common Name
PREM/AGSP	<i>Prunus emarginata/Agropyron spicatum</i>	bittercherry/bluebunch wheatgrass
PRVI/ERUM	<i>Prunus virginiana</i>	chokecherry
PSME/AGSP	<i>Pseudotsuga menziesii/ Agropyron spicatum</i>	douglas fir/bluebunch wheatgrass
PSME/BERE	<i>Pseudotsuga menziesii/Berberis repens</i>	douglas fir/Oregon grape
PSME/CAGE, PIPO	<i>Pseudotsuga menziesii/Carex geyeri, Pinus ponderosa</i>	douglas fir/Geyer's sedge, ponderosa pine
PSME/CARU	<i>Pseudotsuga menziesii/Calamagrostis rubescens</i>	douglas fir/pinegrass
PSME/CARU, PIPO	<i>Pseudotsuga menziesii/Calamagrostis rubescens, Pinus ponderosa</i>	douglas fir/pinegrass, ponderosa pine
PSME/PHMA	<i>Pseudotsuga menziesii/Physocarpus malvaceus</i>	douglas fir/ninebark
PSME/PHMA, CARU	<i>Pseudotsuga menziesii/Physocarpus malvaceus, Calamagrostis rubescens</i>	douglas fir/ninebark, pinegrass
PSME/PREM	<i>Pseudotsuga menziesii/Prunus emarginata</i>	douglas fir/bittercherry
PSME/PREM/BRCA	<i>Pseudotsuga menziesii/Prunus emarginata/Bromus carinatus</i>	douglas fir/bittercherry/mountain brome
PSME/SPBE	<i>Pseudotsuga menziesii/Spiraea betulifolia</i>	douglas fir/white spirea
PSME/SPBE, PIPO	<i>Pseudotsuga menziesii/Spiraea betulifolia, Pinus ponderosa</i>	douglas fir/white spirea, ponderosa pine
PSME/SYAL	<i>Pseudotsuga menziesii/Symphoricarpos albus</i>	douglas fir/common snowberry
PSME/SYAL, PIPO	<i>Pseudotsuga menziesii/Symphoricarpos albus, Pinus ponderosa</i>	douglas fir/common snowberry, ponderosa pine
PUTR/FEID	<i>Purshia tridentata/Festuca idahoensis</i>	bitterbrush/Idaho fescue
<i>Salix/Mesic graminoid</i>	<i>Salix/Mesic graminoid</i>	willow/mesic graminoid
STOC/LUAR	<i>Stipa occidentalis/Lupinus argenteus</i>	needlegrass/silvery lupine