

**Biological Assessment of the Flora and Fauna  
on the Schneider/Nejezchleb Properties  
Summer of 1994**

BIOLOGICAL ASSESSMENT OF THE  
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**Field Work by Junior Ranger BioEcology Crew, Session Two  
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## ABSTRACT

The Junior Ranger Bioecology Program of the City of Boulder Open Space Department spent part of their work experience qualitatively assessing plant and animal diversity on the Schneider/Nejezchleb property north of Boulder. The study primarily focused on qualitative documentation of vegetation, vertebrates (small mammals, reptiles and amphibians), and invertebrates. This report summarizes methods, results, and conclusions from the study. Six tables, three figures, and three appendices are included.

## INTRODUCTION

Since 1967 the City of Boulder has been acquiring land surrounding the city as part of its Open Space Program. The purposes for open space are multifaceted including: preservation of land for passive recreation, preservation of natural and scenic areas, preservation of agricultural uses and land suitable for agricultural production, and the utilization of land to shape urban growth.

To more effectively manage the natural resources of open space, the Junior Ranger BioEcology Crew established a Biodiversity Assessment Plot (BDAP) to fulfill the following objectives:

- 1) To describe, qualitatively and quantitatively, the natural features of the site, including: soils, vegetation, vertebrates and invertebrates;
- 2) To make observations about existing land use and management that may be influencing the natural patterns on the site; and
- 3) To teach the Junior Rangers about the concepts and elements of biodiversity and to give them experience in interpreting and evaluating the natural features of a site.

## *STUDY SITE*

The study was conducted on 22.57 hectares of land that crosses the Open Space properties of Schneider and Nejezchleb (T1N, R71W, Sec 1, NW 1/4, Boulder County, Colorado). Figure 1 shows the study site boundaries on a topographic map of the area. The study site is accessible through the driveway of the house located on the west side of Highway 36 three kilometers north of Boulder city limits. Just west of the house is the Open Space Property gate and a jeep trail that provides access to the Schneider property. Approximately 615 m west, along the jeep trail, is a pond along the drainage that marks the eastern boundary of the BDAP. The pond can also be located by traveling 200 m due north of the driveway and 700 m west of Highway 36.

## METHODS

The study was conducted from July 26 to August 8, 1994 by the Open Space Department's Junior Ranger BioEcology Crew in conjunction with Open Space Wildlife Biologist Clint Miller and Plant Ecologist Nina Williams, along with the help of Bryan McCormack from the University of Colorado Museum Entomology Section.

The general site information was recorded by observation of the current and historical land use of the site and its surrounding areas. In addition, the United States Geological Survey Boulder 7.5 minute topographic map provided general physical features including elevation, landforms and surficial water sources. Finally, the soil type was identified by the SCS Boulder County Soil Survey, 1975.

## *VEGETATION*

The vegetative analysis began by delimiting the major habitat types present and mapping them on 1993 orthophotographs. Habitat type was determined based on plant community structure and composition, with the list of Preliminary Habitat Types used for reference (Appendix II). To make a determination of habitat type, the first indicator was the dominant structure of vegetation present, for example, forest, shrubland, or grassland. Physical characteristics were also considered, such as elevation, geologic features, aspect, and proximity to water. The dominant plant species were noted and compared with the written habitat descriptions for a final determination. If a habitat type was discovered that did not fit with any of the preliminary descriptions, a new type was created. Boundaries between habitat types were drawn directly onto the orthophotographs with the following differentiations: a solid line indicated a distinct boundary, a dotted line indicated an indistinct boundary, and a zig-zag line indicated a transitional boundary.

While mapping the various habitat types, it was necessary to assign a number to delimit similar, but spatially separate, areas from each other. For example, the Mixed Grass Prairie (MGP) occurred in four different locations separated by other habitat types. Each MGP unit had slightly different dominant species, although they all shared the general characteristics of containing a mixture of short, mid, and tall grass species.

A Tamaya Technics Inc. Planix 7 electronic planimeter was used to determine the approximate area of each habitat unit polygon. Each measurement was repeated three times and averaged.

Once the habitat types were mapped, the three dominant trees, shrubs, forbs, grasses, and grasslike plants were recorded in each habitat unit. To determine the three dominant species, crew members walked each habitat unit, visually observed the area, and collaborated as to which species were dominant based on the amount of cover each provided. Some units have more than three dominants listed due to ties.

## *VERTEBRATES*

### Small Mammals

Species composition of small mammals was sampled in each of six habitat types: 1) Mixed Grass Prairie 1 (MGP1), thirty traps running east-west; 2) Ninebark Shrubland 1 (NBS1), twenty traps started on the eastern edge of the shrubland, adjacent to the stream and moving up the side hill

along an animal trail; 3) Foothills Riparian Forest (FRF), thirty traps starting at the pond and running east-west along the both sides of the stream; 4) Foothills Shrubland 3 (FSL3), thirty traps starting halfway along the eastern edge of the shrubland, 5) Ponderosa Pine Savannah 2 (PPS2), thirty traps starting just above FSL3 and moving in a zig-zag pattern up the east facing slope; and 6) the Burned Forest (BF), thirty traps running upslope in a zig-zag fashion. One hundred twenty traps were placed nightly for four consecutive nights for a total of 480 trap nights. Animals were released from Sherman Live traps between 0630 to 0800 on July 26, 27, 28 and 29, 1994. Traps were set the previous night between 1900 and 2030 hours.

### Reptiles and Amphibians

Pitfall arrays were the primary method used to census reptiles and amphibians, although we did spend two hours one day actively searching the rocky ridges for lizards. A total of three arrays were placed in three different locations and habitat types to get a broad representation of species. One array was set just west of the shale outcrop in MGP4. Another was set in the FRF right next to the stream and just upstream from the pond. The third was set on the south-facing slopes amid rocky outcrops of MGP3/FSL3. Each pitfall array consisted of two holes 45 cm deep and 25 cm across, approximately 10 m from each other. Pairs of holes were separated by a 4 m long by 20 cm tall fence of aluminum flashing held to metal fence post stakes by wire. The traps, made from PVC pipe sealed closed on one end, were placed in the holes flush with the ground. Plywood squares were then propped against the fencing and placed on small rocks above each pitfall trap to shelter captured animals.

In addition to traps and pitfall arrays, on-location sightings of larger mammals, birds, reptiles, and amphibians were recorded along with descriptions of habitat location and activity. In addition, the pond was surveyed using three passes with a siene.

### *INVERTEBRATES*

Invertebrates were collected using four different methodologies. Sweep nets, dip nets and Lepidoptera nets were used to collect in the following habitat areas: FRF, FRS, MGP3, MGP4, FSL3, BF, PPS2, and the pond (see Table 1 for abbreviation definitions). The invertebrates were stored in a freezer for 1-3 days before pinning and identification to appropriate taxonomic Order. Insects were turned over to the University of Colorado Museum Entomology Section and await positive identification and cataloging. Information will be entered in the Boulder County invertebrate database maintained by the museum. In addition, ground-dwelling invertebrates were collected by placing four pitfall trap arrays in the FRF and MGP habitats. Each array consisted of six pitfall traps set in a 10 meter square area. Pitfall traps include three pieces: 1) a 16 ounce plastic cup; 2) a small plastic collection cup that fits inside the bottom of the larger cup and is partially filled with water; and 3) a plastic funnel. Holes were dug with hand trowels and the pitfall traps placed inside with the top of the cup flush with the surface of the ground. Invertebrates were collected between 1000 and 1430, 24-26 hours after setting the traps on July 26, 27, and 28. The animals were placed in 60% ethanol and stored at the C.U. Museum.

## RESULTS

### *GEOLOGY/SOILS*

The bedrock is primarily characterized by Cretaceous sedimentary deposits (roughly 65-136 million years old). A large wind gap splits two Dakota Ridges about 1885 m elevation. These ridges are composed of sandstone, mudstone, and shales. Just east of the Dakota Formation lies a gray valley, 1635 m elevation, composed of the shallow shale topped by sandstone. On the eastern-most edge of the study site is an outcrop of Niobrara shale. These deposits are the remnants of a Cretaceous, shallow sea with several riverline and delta deposits. The fact that the deposits have moved to near vertical orientation is indicative of the considerable faulting and uplift that occurred during the Rocky Mountain orogenesis.

Several small valleys radiate off the two ridges and feed a centrally located intermittent stream which flows east. The soil profile consists of predominantly Baller Sandy Loam with some Sixmile Stony Loam (SCS Boulder County Soil Survey, 1975).

### *VEGETATION*

Eight habitat types were identified and mapped on the site, including Mixed Grass Prairie, Foothills Shrubland, Ninebark Shrubland, Ponderosa Pine Savannah, Foothills Riparian Shrubland, Foothills Riparian Forest, Pond, and Burned Forest (Table 1). The values shown in Table 1 represent an average of at least three planimeter measurements for each habitat type.

There were four units of the Mixed Grass Prairie (MGP) habitat type, which is a broad category describing a mixture of short, mid, and tall grass species generally located on relatively flat terrain. The MGP dominated the site with 9.83 hectares (43.5%). In the combined MGP habitat types, the dominant grasses included western wheat grass (*Pascopyrum smithii*), cheatgrass (*Anisantha tectorum*), Canada bluegrass (*Poa compressa*), *Poa agasizzensis*, and big bluestem (*Andropogon gerardii*). Dominant species in the forb category included pepper grass (*Alyssum alyssoides*), Louisiana sage (*Artemisia ludoviciana*), gumweed (*Grindelia squarrosa*), hairy golden aster (*Heterotheca villosa*), scurf pea (*Psoraleidum tenuiflorum*), stiff goldenrod (*Oligoneuron rigidum*), and yucca (*Yucca glauca*). In addition, there were four tree species and three shrub species scattered throughout the MGPs (Table 2).

Four units of the Foothills Shrubland (FSL) habitat type were present and constituted 3.77 hectares (16.7%) of the study site. The FSL habitats are relatively dense areas of non-riparian shrub thickets with little understory development, and were most often found on slopes at this study site. The dominant shrubs in the FSL habitats were wild plum (*Prunus americana*), three-leaf sumac (*Rhus trilobata*), chokecherry (*Padus virginiana*), and snowberry (*Symphoricarpos occidentalis*). Other plants present in the shrublands included one tree species, seven forb species, four grass species, and no grasslike species.

Two units of Ponderosa Pine Savannah (PPS) were located at the ridge tops. The PPS was the second most dominant habitat type, covering 4.85 hectares (21.5%) of the study site. This habitat type describes open stands of ponderosa pine (*Pinus ponderosa*) with grasses and a few shrubs in the understory. Dominant plants included two tree species, three shrub species, five forb species, three grass species, and no grasslike species.

The Foothills Riparian Forest (FRF) was located along the drainage and was dominated by narrowleaf cottonwood (*Populus angustifolia*), plains cottonwood (*Populus deltoides*), and peach-leaf willow (*Salix amygdaloides*). The Foothills Riparian Shrubland (FRS) was a category that combined elements of the Foothills Riparian Forest and the Plains Riparian Shrubland preliminary habitat types. It was dominated by thickets of typically riparian shrub species such as hawthorn (*Crataegus sp.*) but also had a presence of riparian trees (peach-leaf willow). Together the FRF, FRS, and the Pond (see below) defined the riparian zone of the site and covered 1.38 hectares (6.1%).

Three new habitat types were designated. The Ninebark Shrubland (NBS) habitats covered 1.56 hectares of the site (6.9%) and were very large thickets of ninebark (*Physocarpus monogynus*) on the north-facing slopes of the draw. The Burned Forest (BF) habitat type was differentiated from the Ponderosa Pine Savannah due to the presence of burnt snags remaining from the November, 1990 Old Stage Fire, and covered 1.20 hectares of the site (5.3%). The Pond was a small area of open water.

A list of all species recorded while determining the dominants in each habitat unit was compiled (Appendix I). Although this is not a complete site flora, it is evident that a number of native and non-native species are present throughout the study site. The most abundant exotic plant species were identified on the study site (Table 3). These nine exotic species include: pepper grass (*Alyssum alyssoides*), cheatgrass (*Anisantha tectorum*), smooth brome (*Bromopsis inermis*), musk thistle (*Carduus nutans*), Canada thistle (*Cirsium arvense*), bindweed (*Convolvulus arvensis*), hound's tongue (*Cynoglossum officinale*), Mediterranean sage (*Salvia aethiopsis*), and great mullein (*Verbascum thapsus*).

## VERTEBRATES

### Small Mammals

Table 4 provides a list of the small mammals caught during three nights of trapping on five transects. The trapping methods used were selected for a qualitative rather than quantitative analysis, therefore the data presents an indication of the species diversity.

A number of large herbivore and carnivore mammals have been spotted on the Schneider/Nejezchleb properties, primarily associated with the Riparian zone (FRF and PRS) and the Mixed Grass Prairies. Sightings of large mammals made by Junior Rangers were recorded in field notebooks. These sightings included the droppings of three coyote (*Canis latrans*) and one

black bear (*Ursus americanus*), indicating their presence on the property. A number of mountain lion (*Felis concolor*) caches have also been observed in the area within the year by Open Space Department staff (Clint Miller, Wildlife Biologist, and Rod Moraga, Ranger). Ten mule deer (*Odocoileus heminos*) and the remains of one prairie dog (*Cynomys gunnisoni*) were also seen.

### Reptiles and Amphibians

Random sightings of reptiles and amphibians were recorded. From July 26 to August 8, 1994, species observed included: seven Western Rattle Snakes (*Crotalus viridis viridis*); two Bull Snakes and two Bull Snake skins (*Pituophis melanoleucus sayi*); two Eastern Fence Lizards (*Sceloporus undulatus*); one juvenile Racer (*Coluber constrictor flaviventris*); and one Tiger Salamander larvae (*Ambystoma tigrinum mavoritium*). The Racer was caught in a pitfall trap, and the Salamander was found during the third of three seine net sweeps through the pond. The reptiles were primarily found in the Mixed Grass Prairie habitats, with a high association with rocky outcrops, ledges, and scree slopes.

### Birds

Table 5 represents the species of birds identified on the study site. One uncommon species and five fairly common species were sighted. All but two of these sightings occurred in the Riparian Zone (PRS and FRF).

### *INVERTEBRATES*

Invertebrate collecting was concentrated primarily on the eastern edge of the plot, with a large amount of time spent collecting in the Mixed Grass Prairie habitats and the shrubs surrounding the Foothills Riparian Forest (Table 6).

### DISCUSSION

#### *LAND USE*

This BDAP has a history rich in disturbance. In November, 1990 the Old Stage Fire burned all of the grasslands and a considerable portion of the Ponderosa Pine Savannah. The area was grazed heavily in the past as evidenced by the stock pond, a catch basin and a pipe directing spring flow, corrals and several other agricultural structures that still remain. An old railroad grading, jeep trails, and several social trails suggest other current and past uses of the land.

To the north of the Schneider/Nejezchleb BDAP lies the Open Space Beech property and 2 km northeast is the Beech Aircraft jet fueling plant. Three kilometers west of the western boundary of the BDAP are new and old houses built along the Old Stage Road. Three kilometers south along the ridge lie the Dakota Ridge and Foothills Trails. These trails receive considerable recreational traffic in the form of mountain biking, hiking and running, horseback riding, and hanggliding. Another 1.7 km further south, on the outskirts of the Boulder city limits, is a large proposed housing

development on the plateau. Approximately 570 m to the east of the BDAP lies a private home, Highway 36, and just west of the highway is a newly installed fiber optics cable. One kilometer east from the BDAP are the buildings of the Boulder Pottery company, and roughly 3.3 km east is the Open Space Boulder Valley Ranch property.

## VEGETATION

The BDAP is primarily composed of two habitat types: the Mixed Grass Prairie habitats (43.5%) and the Ponderosa Pine Savannah (21.5%) (Table 1). The existence of the PPS habitat probably represents the migration of the ponderosa pine trees into lower elevations and onto the prairie grasslands due to wildland fire suppression, since it is thought that PPSs were historically maintained by regular wildfires. Therefore, this is probably a relatively recent habitat type on the site, and one that represents the loss of the older grassland habitats.

Table 3 shows the distribution of the nine adventive species identified on the study site. One of the most dominant plants found, cheatgrass (*Anisantha tectorum*), also occurs as the most widely distributed adventive species, found in 100% of the habitats. Musk thistle (*Carduus nutans*) was found in over half of the habitats (64%) and occurred in two habitats as a dominant forb (NBS2 and FSL1). Pepper grass (*Alyssum alyssoides*) was found to be dominant in three habitat types (MGP1, MGP4, and FRS). In addition, hound's tongue (*Cynoglossum officinale*) was one of the dominant species found in the FRS habitat.

It is interesting to note that several of the dominant native species are considered to be "increasers"; that is, given a disturbance such as grazing pressure, they are able to increase their abundance. Even though they are native species, they are often considered "weedy" due to their ability to colonize disturbed areas. Examples of increasers on the study site include gumweed (*Grindelia squarrosa*), hairy golden aster (*Heterotheca villosa*), and, to a certain extent, yucca (*Yucca glauca*). Along with the presence and abundance of exotic species, the abundance of increasers indicates that this site received a significant amount of disturbance (probably grazing-related) in the past.

Several outcroppings of Niobrara shale were found on the Schneider/Nejezchleb study site. This shale is a soil that provides habitat for the endemic plant species of special concern, Bell's twinpod (*Physaria bellii*). *P. bellii* is known to grow in only three counties along the Front Range of Colorado, and those populations occur on Niobrara shale. Despite the fact that our study did not reveal any individuals, *Physaria bellii* may be present on the site. *P. bellii* may not have been observed due to the following: 1) no active searching of the shale beds was conducted, 2) Junior Rangers were primarily concerned with dominant or adventive plant species, and 3) late July and early August is considered late in the season for finding *P. bellii*.

## VERTEBRATES

### Small Mammals



*Peromyscus maniculatus* was found in all of the major habitat types studied, while one individual of an unidentifiable species of *Sorex* or *Blarina* was discovered in the pitfall trap adjacent to the stream. The habitat that had the greatest diversity was the Foothills Riparian Forest where all five small mammal species were found. Figure 2 demonstrates the relative distribution of each of the four species trapped in the Sherman live traps. This graph suggests that *P. maniculatus* does not discriminate in habitat preference. The other species appear to prefer the following general habitat areas: *Microtus pennsylvanicus* the FRF and BF habitats, *Neotoma mexicana* the FSL habitat, and *Perognathus hispidus* the FRF and MGP habitats. Similar studies conducted in May and September would serve to complete the list of small mammals present on this study site.

### Birds

Unfortunately, the relationship between where the birds were sighted and their use of that particular habitat type was not identified, and as such we do not know if the birds activities were mating, nest building, feeding, or simply resting in flight. Sightings were random; no specific time was spent on active searches.

### *INVERTEBRATES*

While trapping did occur in a variety of habitat types, more time was spent in the Mixed Grass Prairie. The data in Table 6 should not be taken as a definitive quantitative comparison, but rather as an indicator of the relative diversity of insect and arachnid orders within the habitat types studied. Figure 2 is a summary of all the arthropod orders collected throughout the study site. From this graph we can infer the relative abundance of each order during the month of July. Arthropods mature at various rates and in different seasons. A more complete survey of the arthropod diversity could be obtained by collecting during different times of the year.

### CONCLUSION

These preliminary findings suggest further research into several areas could be of value: 1) more quantitative studies on the differences between the Burned Forest and its neighboring Ponderosa Pine Savannah habitats; 2) search for *Physaria bellii*, a rare plant that warrants preservation; and 3) a more scientific study of the bird species and their relationship to the BDAP.

This study provided the Natural Resource division of the City of Boulder's Open Space Department a partial list of the biota found on 22 hectares of land on the Schneider and Nejezchleb properties. It is a starting point for further ecological studies that may be conducted when management decisions regarding these and adjacent properties are considered. The biodiversity assessment will provide some guidance for the formation of more detailed and sophisticated research projects on these Open Space lands. This survey should be complemented by similar studies conducted during different seasons, as well as a more comprehensive assessment of all the plant species located on site.

## RELEVANT LITERATURE

Borror, Donald J. and White, Richard E. 1970. A Field Guide to Insects: America north of Mexico. The Peterson Field Guide Series. Houghton Mifflin, Boston.

Brown, Alexander and Brown, Gillian. 1989. "Boulder Audubon Society Birds Of Boulder County Field Check List".

Burt, William H. and Grossenheider, Richard P. 1976. A Field Guide to the Mammals: America north of Mexico. The Peterson Field Guide Series. Houghton Mifflin, Boston.

Dale, Craig and Merritt, Dave. February, 1993. "Reptile and Amphibian Survey, City of Boulder Open Space Department".

Hammerson, Geoffrey A. 1986. Amphibians and Reptiles in Colorado. Colorado Division of Wildlife, Denver.

Milne, Lorus and Milne, Margery. 1980. National Audubon Society Field Guide to North American Insects and Spiders. Alfred A. Knopf, New York.

Robbins, Chandler S., Bruun, Bertel, and Zim, Herbert S. 1983. A Guide to Field Identification: Birds of North America. Golden Press, New York.

Weber, William A. 1976. Rocky Mountain Flora. Colorado Associated University Press, Boulder.

Weber, William A. 1990. Colorado Flora: Eastern Slope. University Press of Colorado, Niwot.

Weber, William A. and Whitmann, Ronald C. 1992. Catalog of the Colorado Flora: A Biodiversity Baseline. University Press of Colorado, Niwot.

**Table 1.** Habitat types within the Schneider/Nejezchleb study site, City of Boulder Open Space, Boulder, CO. 1994.

Habitat Types Identified	Abbreviations	Total Hectares	Percent of Total
Mixed Grass Prairie 1	MGP1	5.36	23.7%
Mixed Grass Prairie 2	MGP2	0.24	1.1%
Mixed Grass Prairie 3	MGP3	1.80	7.9%
Mixed Grass Prairie 4	MGP4	<u>2.43</u>	<u>10.8%</u>
Mixed Grass Prairie Totals		9.83	43.5%
Foothills Shrubland 1	FSL1	0.52	2.3%
Foothills Shrubland 2	FSL2	1.31	5.8%
Foothills Shrubland 3	FSL3	1.24	5.5%
Foothills Shrubland 4	FSL4	<u>0.70</u>	<u>3.1%</u>
Foothills Shrubland Totals		3.77	16.7%
Ninebark Shrubland 1	NBS1	1.40	6.2%
Ninebark Shrubland 2	NBS2	<u>0.16</u>	<u>0.7%</u>
Ninebark Shrubland Totals		1.56	6.9%
Ponderosa Pine Savannah 1	PPS 1	0.26	1.2%
Ponderosa Pine Savannah 2	PPS 2	<u>4.59</u>	<u>20.3%</u>
Ponderosa Pine Savannah Totals		4.85	21.5%
Foothills Riparian Shrubland	FRS	0.76	3.3%
Foothills Riparian Forest	FRF	0.61	2.7%
Pond	Pond	<u>0.01</u>	<u>0.1%</u>
Riparian Zone Totals		1.38	6.1%
Burned Forest	BF	1.20	5.3%
<b>Site Totals</b>		<b><u>22.57</u></b>	<b>100%</b>

Table 2. Dominant plant species found on the Schneider/Nejezchleb Study Site, vicinity of Boulder Open Space, Boulder, CO. 1994.

	Trees	Shrubs	Forbs	Grasses	Grasslike
<b>Mixed Grass Prairie 1</b>	<i>Celtis reticulata</i> <i>Pinus ponderosa</i>	<i>Rhus trilobata</i>	<i>Alyssum alyssoides</i> <i>Artemisia ludoviciana</i> <i>Grindelia squarrosa</i> <i>Psoraleidium tenuiflorum</i>	<i>Anisantha tectorum</i> <i>Pascopyrum smithii</i> <i>Poa compressa</i>	
<b>Mixed Grass Prairie 2</b>	<i>Pinus ponderosa</i> <i>Populus tremuloides</i>	<i>Crataegus sp.</i>	<i>Heterotheca villosa</i> <i>Psoraleidium tenuiflorum</i>	<i>Anisantha tectorum</i> <i>Pascopyrum smithii</i> <i>Poa compressa</i>	
<b>Mixed Grass Prairie 3</b>	<i>Pinus ponderosa</i>	<i>Rhus trilobata</i> <i>Prunus americana</i>	<i>Artemisia ludoviciana</i> <i>Oligoneuron rigidum</i> <i>Yucca glauca</i>	<i>Anisantha tectorum</i> <i>Pascopyrum smithii</i> <i>Poa agasizzensis</i>	
<b>Mixed Grass Prairie 4</b>	<i>Pinus ponderosa</i> <i>Sabina scopulorum</i>	<i>Rhus trilobata</i> <i>Prunus americana</i>	<i>Alyssum alyssoides</i> <i>Artemisia ludoviciana</i> <i>Psoraleidium tenuiflorum</i>	<i>Andropogon gerardii</i> <i>Anisantha tectorum</i> <i>Pascopyrum smithii</i>	
<b>Foothills Shrubland 1</b>		<i>Prunus americana</i> <i>Rhus trilobata</i> <i>Symphoricarpos occidentalis</i>	<i>Artemisia ludoviciana</i> <i>Carduus nutans</i> <i>Grindelia squarrosa</i>	<i>Anisantha tectorum</i> <i>Pascopyrum smithii</i> <i>Poa agasizzensis</i>	
<b>Foothills Shrubland 2</b>	<i>Pinus ponderosa</i>	<i>Padus virginiana</i> <i>Prunus americana</i> <i>Rhus trilobata</i>	<i>Grindelia squarrosa</i> <i>Verbascum thapsus</i> <i>Yucca glauca</i>	<i>Anisantha tectorum</i> <i>Pascopyrum smithii</i>	
<b>Foothills Shrubland 3</b>	<i>Pinus ponderosa</i>	<i>Padus virginiana</i> <i>Prunus americana</i> <i>Rhus trilobata</i>	<i>Artemisia ludoviciana</i> <i>Heterotheca villosa</i> <i>Opuntia macrorhiza</i> <i>Yucca glauca</i>	<i>Andropogon gerardii</i> <i>Anisantha tectorum</i> <i>Pascopyrum smithii</i>	
<b>Foothills Shrubland 4</b>	<i>Pinus ponderosa</i>	<i>Padus virginiana</i> <i>Rhus trilobata</i>	<i>Artemisia ludoviciana</i> <i>Grindelia squarrosa</i> <i>Opuntia macrorhiza</i>	<i>Andropogon gerardii</i> <i>Anisantha tectorum</i> <i>Pascopyrum smithii</i>	
<b>Ninebark Shrubland 1</b>	<i>Pinus ponderosa</i> <i>Sabina scopulorum</i>	<i>Padus virginiana</i> <i>Physocarpus monogynus</i> <i>Rhus trilobata</i>	<i>Artemisia frigida</i> <i>Artemisia ludoviciana</i> <i>Oligoneuron rigidum</i>	<i>Anisantha tectorum</i> <i>Pascopyrum smithii</i> <i>Poa compressa</i>	
<b>Ninebark Shrubland 2</b>	<i>Pinus ponderosa</i>	<i>Crataegus sp.</i> <i>Physocarpus monogynus</i> <i>Rhus trilobata</i>	<i>Artemisia ludoviciana</i> <i>Carduus nutans</i> <i>Solidago sp.</i>	<i>Anisantha tectorum</i> <i>Bromopsis inermis</i> <i>Pascopyrum smithii</i>	
<b>Ponderosa Pine Savannah 1</b>	<i>Pinus ponderosa</i>	<i>Padus virginiana</i> <i>Prunus americana</i>	<i>Grindelia squarrosa</i> <i>Oligoneuron rigidum</i> <i>Yucca glauca</i>	<i>Anisantha tectorum</i> <i>Pascopyrum smithii</i>	
<b>Ponderosa Pine Savannah 2</b>	<i>Pinus ponderosa</i> <i>Sabina scopulorum</i>	<i>Rhus trilobata</i>	<i>Artemisia ludoviciana</i> <i>Oligoneuron rigidum</i> <i>Opuntia macrorhiza</i> <i>Yucca glauca</i>	<i>Andropogon gerardii</i> <i>Anisantha tectorum</i>	

Table 2 (continued). Dominant plant species found on the Schneider/Nejezch study Site, City of Boulder Open Space, Boulder, CO. 1994.

	<b>Trees</b>	<b>Shrubs</b>	<b>Forbs</b>	<b>Grasses</b>	<b>Grasslike</b>
<b>Foothills Riparian Shrubland</b>	<i>Pinus ponderosa</i>	<i>Crataegus sp.</i>	<i>Alyssum alyssoides</i>	<i>Anisantha tectorum</i>	<i>Carex pennsylvanica</i>
	<i>Salix amygdaloides</i>	<i>Prunus americana</i> <i>Rhus trilobata</i>	<i>Artemisia frigida</i> <i>Cynoglossum officinale</i> <i>Oreocarya virgata</i> <i>Psoralidium tenuiflorum</i> <i>Vitis riparia</i>	<i>Pascopyrum smithii</i> <i>Poa compressa</i>	
<b>Foothills Riparian Forest</b>	<i>Populus angustifolia</i>	<i>Crataegus sp.</i>	<i>Glycyrrhiza lepidota</i>	<i>Anisantha tectorum</i>	<i>Carex pennsylvanica</i>
	<i>Populus deltoides</i>	<i>Padus virginiana</i>	<i>Opuntia macrorhiza</i>	<i>Pascopyrum smithii</i>	
	<i>Salix amygdaloides</i>	<i>Prunus americana</i>		<i>Poa compressa</i>	
<b>Burned Forest</b>	<i>Pinus ponderosa</i>	<i>Rhus trilobata</i>	<i>Grindelia squarrosa</i>	<i>Andropogon gerardii</i>	
	<i>Sabina scopulorum</i>	<i>Symphoricarpos occidentalis</i>	<i>Verbascum thapsus</i> <i>Yucca glauca</i>	<i>Anisantha tectorum</i> <i>Poa compressa</i>	

Table 3. Exotic plant species found on the Schneider/Nejezcl Study Site, City of Boulder Open Space, Boulder, CO. 1994.

Exotic Species	MGP1	MGP2	MGP3	MGP4	FSL1	FSL2	FSL3	NBS1	NBS2	PPS1	PPS2	FRS	FRF	BF
<i>Alyssum alyssoides</i>	X		X	X								X		
<i>Anisantha tectorum</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>Bromopsis inermis</i>									X					
<i>Carduus nutans</i>		X			X	X		X	X	X	X	X	X	
<i>Cirsium arvense</i>	X			X			X					X		X
<i>Convolvulus arvensis</i>	X													
<i>Cynoglossum officinale</i>												X		
<i>Salvia aethiopsis</i>	X													
<i>Verbascum thapsus</i>							X							X

**Table 4.** Results of small mammal trapping on the Schneider/Nejezchleb Study Site, City of Boulder Open Space, Boulder, CO. 1994.

Habitat Type	<i>Microtus pennsylvanicus</i>	<i>Neotoma mexicana</i>	<i>Perognathus hispidus</i>	<i>Peromyscus maniculatus</i>	<i>Sorex sp.</i>	TOTALS
Mixed Grass Prairie	0	4	3	2	0	9
Foothills Shrubland	0	2	0	3	0	5
Ninebark Shrubland	0	0	0	2	0	2
Ponderosa Pine Savannah	0	0	2	3	0	5
Foothills Riparian Forest	3	1	1	4	1	10
Burned Forest	<u>1</u>	<u>9</u>	<u>3</u>	<u>2</u>	<u>0</u>	<u>15</u>
TOTALS	4	16	9	16	1	46

**Table 5.** Avian species observed on the Schneider/Nejezchleb Study Site, City of Boulder Open Space, Boulder, CO, July 26 to August 8, 1994.

Scientific Name	Common Name	Habitat Type	Abundance*
<i>Pica pica</i>	Black-Billed Magpie	All	very common
<i>Aquila chrysaetos</i>	Golden Eagle **	MGP	fairly common
<i>Falco sparverius</i>	American Kestrel	MGP	common
<i>Chordeiles minor</i>	Common Nighthawk	MGP	fairly common
<i>Bubo virginianus</i>	Great Horned Owl	FRS	fairly common
<i>Selasphorus platycercus</i>	Broad-Tailed Hummingbird	FRF/FRS	common
<i>Melanerpes lewis</i>	Lewis' Woodpecker	FRF	fairly common
<i>Parus atricapillus</i>	Black-Capped Chickadee	FRF	common
<i>Cinclus mexicanus</i>	American Dipper	FRF	fairly common
<i>Turdus migratorius</i>	American Robin	FRF	very common
<i>Guiraca caerulea</i>	Blue Grosbeak	FRF	uncommon
<i>Pipiloerythrophthalmus</i>	Rufous-sided Towhee	FSL	common
<i>Salpinctes obsoletus</i>	Rock Wren	FSL	fairly common

\* Abundance determined from Boulder Audubon Society Birds of Boulder County Field Check List, Alexander and Gillian Brown, 1989.

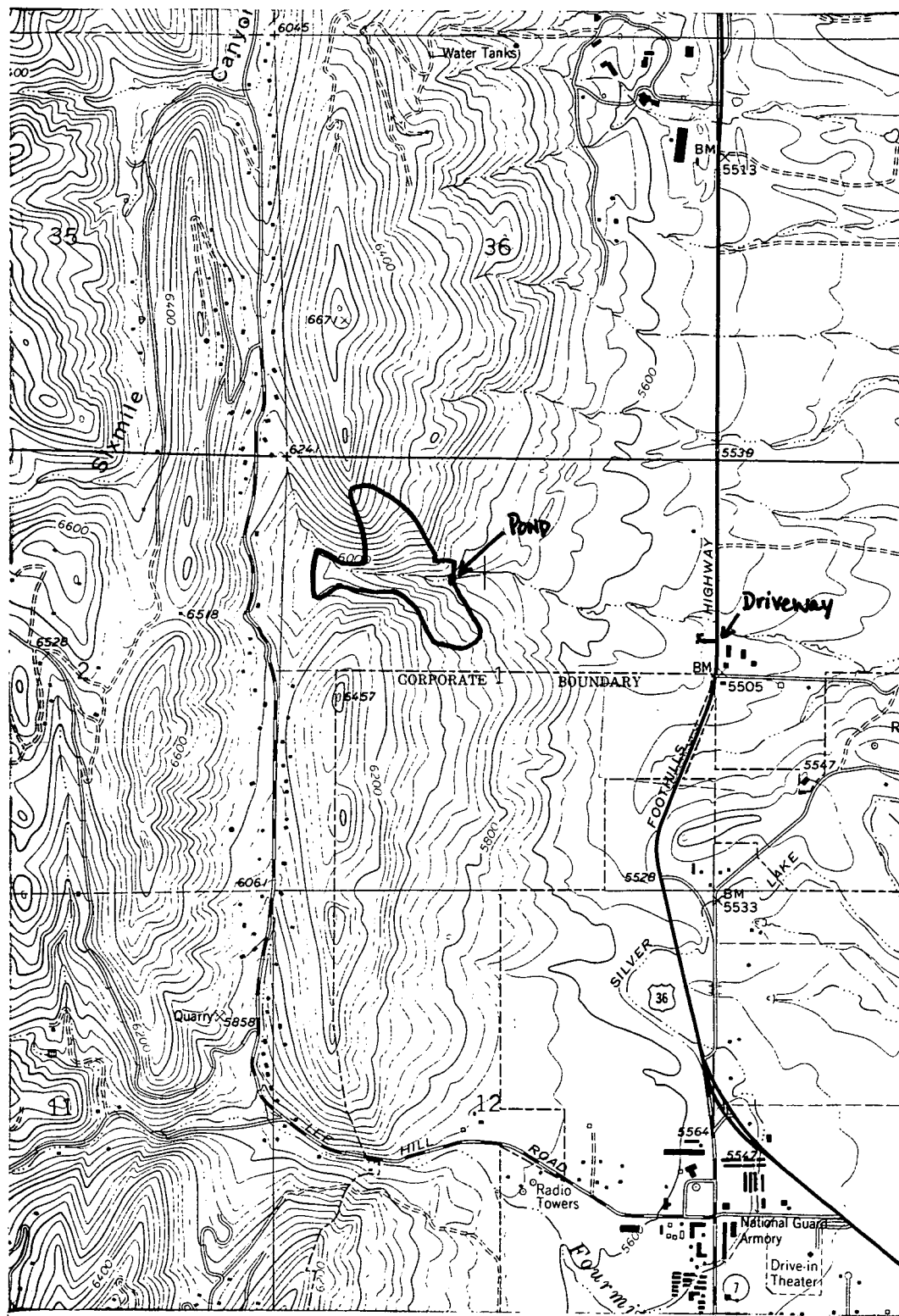
\*\* Immature.

**Table 6.** Invertebrates collected on the Schneider/Nejezchleb Study Site, City of Boulder Open Space, Boulder, CO, from 1000 to 1400 hours on July 26, 27, and 28, 1994.

<b>ORDERS</b>	<b>MGP</b>	<b>FSL</b>	<b>PPS</b>	<b>FRS</b>	<b>FRF</b>	<b>Pond</b>	<b>BF</b>	<b>Pitfall Traps</b>	<b>TOTAL INDIVIDUALS</b>
Acarina	0	0	0	0	0	2	0	0	2
Araneae	0	0	12	4	0	40	0	13	69
Coleoptera	37	0	0	0	20	4	3	7	71
Diptera	35	4	2	1	3	0	5	49	99
Hemiptera	0	0	0	0	0	15	0	0	15
Homoptera	112	6	2	1	13	0	5	0	139
Hymenoptera	33	0	0	0	10	0	26	0	69
Lepidoptera	27	0	1	0	26	11	0	0	65
Odonata	9	2	0	0	2	1	0	0	14
Opiliones	0	0	0	0	0	0	0	22	22
Orthoptera	49	0	18	0	5	1	11	0	84
Thysanura	0	0	0	0	0	0	0	1	1
Trichoptera	0	0	0	0	0	0	0	5	5
<b>TOTAL # OF INDIVIDUALS</b>	<b>302</b>	<b>12</b>	<b>35</b>	<b>6</b>	<b>79</b>	<b>80</b>	<b>50</b>	<b>91</b>	<b>655</b>



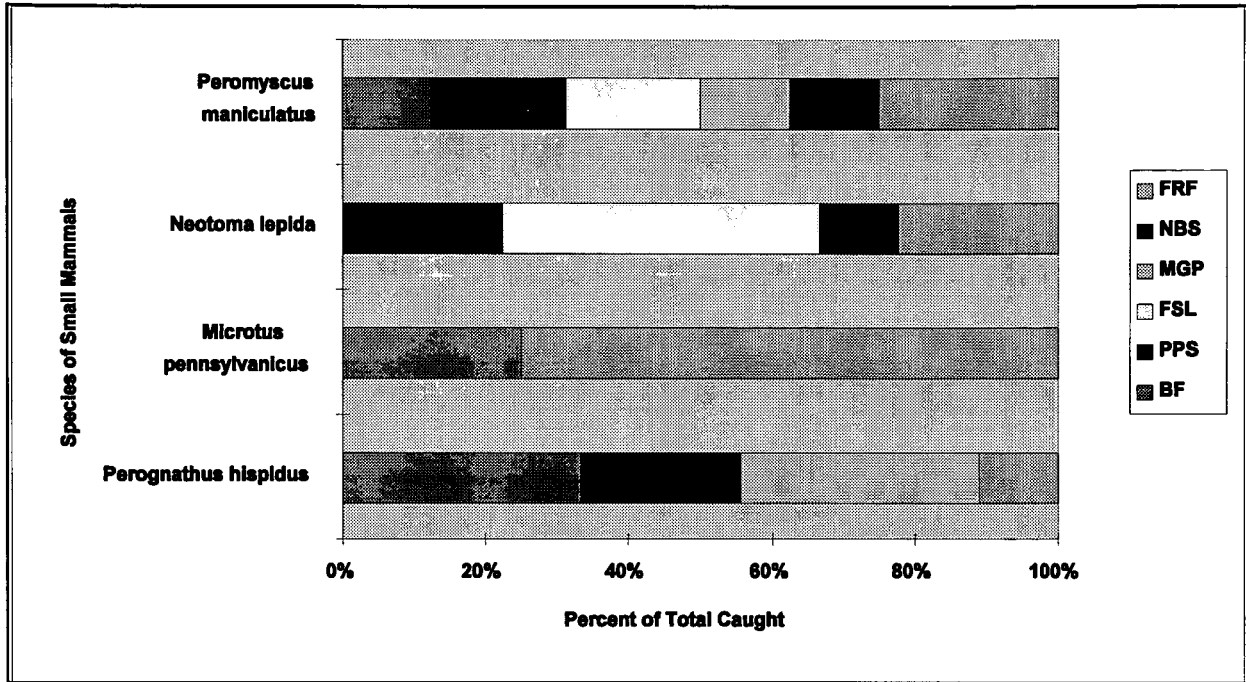
Figure 1. Map of Schneider/Nejezchleb Biological Diversity Assessment Plot Study Site, City of Boulder Open Space, Boulder, CO. 1994.



North ↑

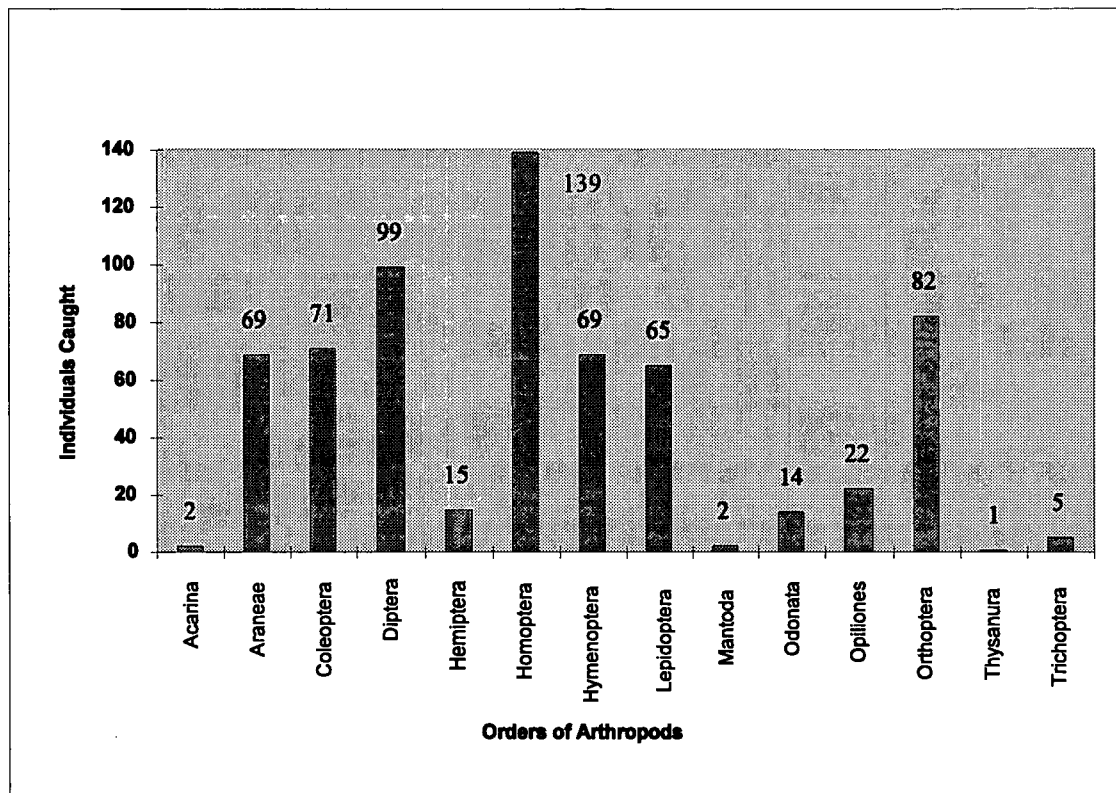
Boulder, Colo. 1966  
Photorevised 1979  
Scale 1:24000

**Figure 2.** Percent of total number of species caught in various habitat types on the Schneider/Nejezchleb Study Site, City of Boulder Open Space, Boulder, CO. 1994.



FRF = Foothills Riparian Forest  
 NBS = Ninebark Shrubland  
 MGP = Mixed Grass Prairie  
 FSL = Foothills Shrubland  
 PPS = Ponderosa Pine Savannah  
 BF = Burned Forest

**Figure 3:** Total number of invertebrates collected on the Schneider/ Nejezchleb Study Site, City of Boulder Open Space, Boulder, CO. 1994.



**Appendix I: Schneider/Nejezchleb Species List  
1994**

Nomenclature follows Weber (Weber and Wittmann, 1992). Species were observed during the second session (July 18 - August 19, 1994) of the City of Boulder Open Space Junior Ranger BioEcology Program by crew members. **Note:** This is not a complete species list. The species listed below were recorded while determining the three most dominant plants in each habitat area.

**GYMNOSPERMS**

**CUPRESSACEAE CYPRESS FAMILY**

*Sabina scopulorum* ROCKY MOUNTAIN JUNIPER

**PINACEAE PINE FAMILY**

*Pinus ponderosa* PONDEROSA PINE

**ANGIOSPERMS**

**AGAVACEAE AGAVE FAMILY**

*Yucca glauca* YUCCA

**ANACARDIACEAE SUMAC FAMILY**

*Rhus trilobata* SKUNKBUSH; THREE-LEAF SUMAC

*Toxicodendron rydbergii* POISON IVY

**ASTERACEAE/COMPOSITAE SUNFLOWER FAMILY**

*Artemisia frigida* FRINGED SAGE; SILVER SAGE

*Artemisia ludoviciana* LOUISIANA SAGE

*Carduus nutans* MUSK THISTLE Adventive

*Cirsium arvense* CANADA THISTLE Adventive

*Grindelia squarrosa* GUMWEED

*Heterotheca villosa* HAIRY GOLDEN ASTER

*Oligoneuron rigidum* STIFF GOLDENROD

*Solidago sp.* GOLDENROD

**BORAGINACEAE BORAGE FAMILY**

*Cynoglossum officinale* HOUND'S TONGUE Adventive

*Oreocarya virgata* MINER'S CANDLE

**BRASSICACEAE/CRUCIFERAE MUSTARD FAMILY**

*Alyssum alyssoides* PEPPER GRASS Adventive

**CACTACEAE CACTUS FAMILY**

*Opuntia macrorhiza* PRICKLY PEAR CACTUS

**CAPRIFOLIACEAE HONEYSUCKLE FAMILY**

*Symphoricarpos occidentalis* SNOWBERRY

**CONVOLVULACEAE MORNINGGLORY FAMILY**

*Convolvulus arvensis* BINDWEED Adventive

**CYPERACEAE SEDGE FAMILY**

*Carex pensylvanica ssp. heliophila* SUN SEDGE

**FABACEAE/LEGUMINOSAE PEA FAMILY**

*Glycyrrhiza lepidota* WILD LIQUORICE

*Psoraleidum tenuiflorum* SCURF PEA

**LAMIACEAE/LABIATAE MINT FAMILY**

*Salvia aethiopsis* MEDITERRANEAN SAGE Adventive

**POACEAE/GRAMINEAE GRASS FAMILY**

*Andropogon gerardii* BIG BLUESTEM, TURKEYFOOT

*Anisantha tectorum* CHEATGRASS Adventive

*Bromopsis inermis* SMOOTH BROME Adventive

*Koeleria macrantha* JUNEGRASS

*Pascopyrum smithii* WESTERN WHEAT-GRASS

*Poa agassizensis*

*Poa compressa* CANADA BLUE-GRASS

**ROSACEAE ROSE FAMILY**

*Crataegus macrantha* HAWTHORN

*Padus virginiana* CHOKECHERRY

*Physocarpus monogynus* NINEBARK

*Prunus americana* WILD PLUM

**SALICACEAE WILLOW FAMILY**

*Salix amygdaloides* PEACH-LEAF WILLOW

*Populus angustifolia* NARROWLEAF COTTONWOOD

*Populus deltoides* PLAINS COTTONWOOD

*Populus tremuloides* QUAKING ASPEN

**SCROPHULARIACEAE FIGWORT FAMILY**

*Verbascum thapsus* GREAT MULLEIN Adventive

**ULMACEAE ELM FAMILY**

*Celtis reticulata* HACKBERRY



*Vitis riparia*

**VITACEAE GRAPE FAMILY**  
GRAPE

Floristic Summary

Families 19  
Genera 37  
Species 41  
Adventives 9



**PRELIMINARY HABITAT TYPES FOR WILDLIFE SIGHTINGS AND TRANSECTS**  
(September 1993)

The following DRAFT classification represents major habitat types on Open Space that may be encountered while surveying wildlife. In the absence of a comprehensive plant community classification system for Open Space lands, the following habitat types have been adapted from various studies and staff's general knowledge of Open Space habitat types.

The habitat types are meant to be a broad classification of general differences in structure and composition of plant communities. Numerous plant communities and associations can be found within one habitat type.

Wildlife observers are encouraged to comment on the ease/difficulty in using these classifications in the field. Many of these habitat types overlap, and observers should select the **dominant** type associated with the sighting, plot or area surveyed.

Plains are **generally** considered to occur between 4,000 and 6,000 feet, with foothills occurring from 6,000 to 8,000 ft. Both plains and foothills communities can be found outside of these altitudinal boundaries, however. 6,000 feet is roughly the base of the flatirons and hogbacks west of Boulder. Due to the orographic effect of the foothills, plains communities generally begin to develop east of US 36, although there is no steadfast rule and topographic differences such as mesa tops can extend the eastern boundaries of foothills/montane species.

**FORESTED HABITAT TYPES**

**Ponderosa Pine Forest (PPF)**

A very broad type including the densely forested areas dominated by ponderosa pine (*Pinus ponderosa*). The understory is variable, depending on canopy cover, soil, aspect, etc. Shrubs and sparse grasses and forbs occur. Boulder's foothills ponderosa pine forests are typically closed canopy, although they were probably more savannah-like in pre fire-suppression times.

**Ponderosa Pine/Douglas Fir Forest (PDF)**

In the lower montane area, this habitat type is found on north facing slopes. These areas are dominated by ponderosa pine and Douglas fir (*Psuedotsuga menziesii*). These forests tend to occupy cool moist sites. Typical understory species include waxflower (*Jamesia americana*), wild raspberry (*Rubus ideaus* spp. *melanolasius*), as well as sedges (*Carex geyeri*), grasses (*Danthonia spicata*, *Muhlenbergia montana*, *Leucopoa kingii*). These stands have typically had complicated histories involving fire, forestry, tree-cutting and other types of disturbance both natural and human-induced.

**Ponderosa Pine Savannah/Woodland (PPS)**

Intermediate between the ponderosa pine forest and grassland, the savannah is characterized by larger, widely spaced ponderosa pine with a well-developed grassland understory and few shrubs. Typical grasses include: prairie dropseed (*Sporobolus heterolepis*), side-oats grama (*Bouteloua curtipendula*), big bluestem (*Andropogon gerardii*), Canada bluegrass (*Poa compressa*), mountain muhly (*Muhlenbergia montana*). This habitat type was historically a dynamic, fire maintained system.

**Plains Riparian Forest (PRF)**

Forested areas associated with streams, creeks or occasionally ditches along the plains. Dominated by plains cottonwood (*Populus deltoides*), peach leaf willow (*Salix amygdaloides*), narrowleaf cottonwood (*Populus angustifolia*), crack willow (*Salix fragilis*). Box elder (*Acer negundo*), Russian-olive (*Eleagnus angustifolia*) also present.

### **Foothills Riparian Forest (FRF)**

Riparian areas in the foothills are dominated by narrowleaf cottonwood (*Populus angustifolia*), box elder (*Acer negundo*), chokecherry (*Prunus virginiana*) wild plum (*Prunus americana*) and willows (*Salix sp.*) and other tree and shrub species. Shrub understory can include coyote willow (*Salix exigua*), hawthorn (*Crataegus macracantha* and *C. erythropoda*), wild plum (*Prunus americana*), leadplant (*Amorpha fruticosa*), and other species.

### SHRUB DOMINATED HABITAT TYPES

#### **Foothills Shrubland (FSL)**

A general category of foothill shrub thickets not associated with a riparian area. Smooth sumac (*Rhus glabra ssp. cismontana*), skunkbush (*Rhus trilobata*), mountain mahogany (*Cercocarpus montanus*), chokecherry (*Prunus virginiana*) can dominate these areas. Shrublands may be composed of one or more of these species. The shrub canopy is often dense with a relatively undeveloped understory.

#### **Plains Riparian Shrubland (PRS)**

Differs from the riparian forest in the absence of a dominant tree canopy. Large shrub thickets associated with streams, creeks or ditches. Coyote willow (*Salix exigua*) and hawthorn (*Crataegus erythropoda* and *C. macracantha*) are common dominants.

#### **Scarp Woodlands (SCW)**

Located on the mesa escarpments are isolated patches of woodlands dominated by ponderosa pine (*Pinus ponderosa*), skunkbush (*Rhus trilobata*), currant (*Ribes cereum*) and mountain mahogany (*Cercocarpus montanus*). Although Boulder's scarp woodlands are small in size and stature, these areas provide important wildlife habitat in areas otherwise dominated by grassland.

### GRASSLAND HABITAT TYPES

#### **Tallgrass Prairie (TGP)**

Grasslands dominated by big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), yellow Indian grass (*Sorghastrum nutans*), and prairie cordgrass (*Spartina pectinata*). Most of these areas are either irrigated or sub-irrigated and are generally associated with the South Boulder Creek floodplain.

#### **Mixed Grass Prairie (MGP)**

Plains grassland with a mix of mid, tall and shortgrass species. Similar to foothills mixed grass but the montane grasses are absent. Little bluestem (*Schizachyrium scoparium*), western wheat (*Agropyron smithii*), blue grama (*Bouteloua gracilis*), side oats grama (*Bouteloua curtipendula*).

#### **Foothills Mixed Grassland (FMG)**

Foothills grasslands with a mix of tall, mid and short grass species. This is a broad category of grasslands, and can include big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), mountain muhly (*Muhlenbergia montana*), side oats grama (*Bouteloua curtipendula*), green needlegrass (*Stipa viridula*), etc. Foothills grasslands may extend into the plains region on mesa tops or in other cooler, moister microclimates.



### **Shortgrass Prairie (SGP)**

Plains grassland dominated by blue grama (*Bouteloua gracilis*) and buffalo grass (*Buchloe dactyloides*). Western wheat present in depressions or clayey soils. Fringed sage (*Artemisia frigida*) a common forb.

### WETLAND HABITAT TYPES

#### **Cattail/Bullrush Marsh (CTM)**

This community is typically dominated by one or two of the species of cattails (*Typha latifolia* and *T. angustifolia*) and/or bullrushes (*Scirpus lacustris* and *S. acutus*). It forms dense and productive stands, where healthy, and usually leads to the formation of soils rich in organics. This is probably the most common community in the Front Range. Species diversity is usually low due to shading and possibly allelopathic effects (the inhibition of one organism by another via the release of chemicals into the environment). This community may provide many water quality functions that are important in urban, agricultural and industrial areas, including sediment retention, nutrient retention, ground water recharge and flood attenuation.

#### **Wet Meadow (WME)**

This habitat type contains several different plant communities including those:

- of open, flats with very shallow (1-6 inches) standing water in the early summer and a water table at or very near the soil surface during the entire growing season. The community is dominated by this a single species of sedge (*Carex nebraskensis*) although other sedges and rushes (*Carex lanuginosa*, *C. hystricina*, *Juncus arcticus*) may also occur.
- of loamy to clayey soils with neutral to alkali characteristics. This wet meadow community is common as a fringe around the cattails/bullrushes. These sites are dominated by canemaker's rush (*Scirpus americanus*). Although these areas may not appear as wetlands from a distance, *Scirpus americanus* is a true and abundant obligate wetland plant species.
- of seasonally wet meadows with a long grazing history, as the dominant plant, arctic rush or wire grass (*Juncus arcticus*) is an "increaser", being relatively unpalatable to cattle. The stands may have a variety of associated species.
- of areas of standing water early in the growing season, drier later in the summer. A number of rushes (*Juncus* species) may occur, including *J. arcticus*, *J. interior*, *J. dudleyi* and *J. longistylis*. These stands are usually small and are found in complexes with stands dominated by cattails and bullrushes.
- of irrigated hay meadows. Redtop (*Agrostis alba*) is usually is the dominant plant species but occurs with timothy (*Phleum pratense*) orchard grass (*Dactylis glomerata*) meadow fescue (*Festuca pratensis*) and other grasses which are all native to Eurasia and have been widely introduced into pastures in our area. A number of herbs including clover *Trifolium* spp. are typically found as well.
- of irrigated or naturally wet pastures that are either intensively grazed or mowed. These areas are usually dominated by bluegrass (*Poa pratensis*) and clover (*Trifolium* spp.). These are marginally wetlands because the soils are usually

transitional between saturated and not. The plant community is typically dominated by species that can survive in drier conditions. Nevertheless, the soils are usually saturated long enough during the growing season to call them wetlands.

- of springs, on the margins of sloughs. Prairie cordgrass (*Spartina pectinata*) *Spartina* typically thoroughly dominates this community, although it is common to find a number of other common species as well. Prairie cordgrass is typically found and in some areas may form an organic soil. The stands are usually very productive. This community probably was very common along river floodplains, on the edges of ox-bows and sloughs and in floodplain margins in presettlement times.
- of disturbed wetland sites where the water table has been artificially lowered by diverting a stream, streams downcutting into their floodplain or other reasons. These areas are usually dominated by reed canary grass (*Phalaris arundinacea*) and Canada thistle (*Cirsium arvense*). This community typically occurs These species are weedy in nature and are very rapid and powerful colonizers of damp, highly organic substrates.
- of wet spots in irrigated hay meadows dominated by the redtop community. It is very easily identified due to the broad leaf nature of the dominant smartweeds (*Persicaria lapathifolia* and *Persicaria maculata*).

OTHER HABITAT TYPES

Cliffs (CLF)

Shorelines (SHR)

Open Water (H2O)

Cropland (CRP)

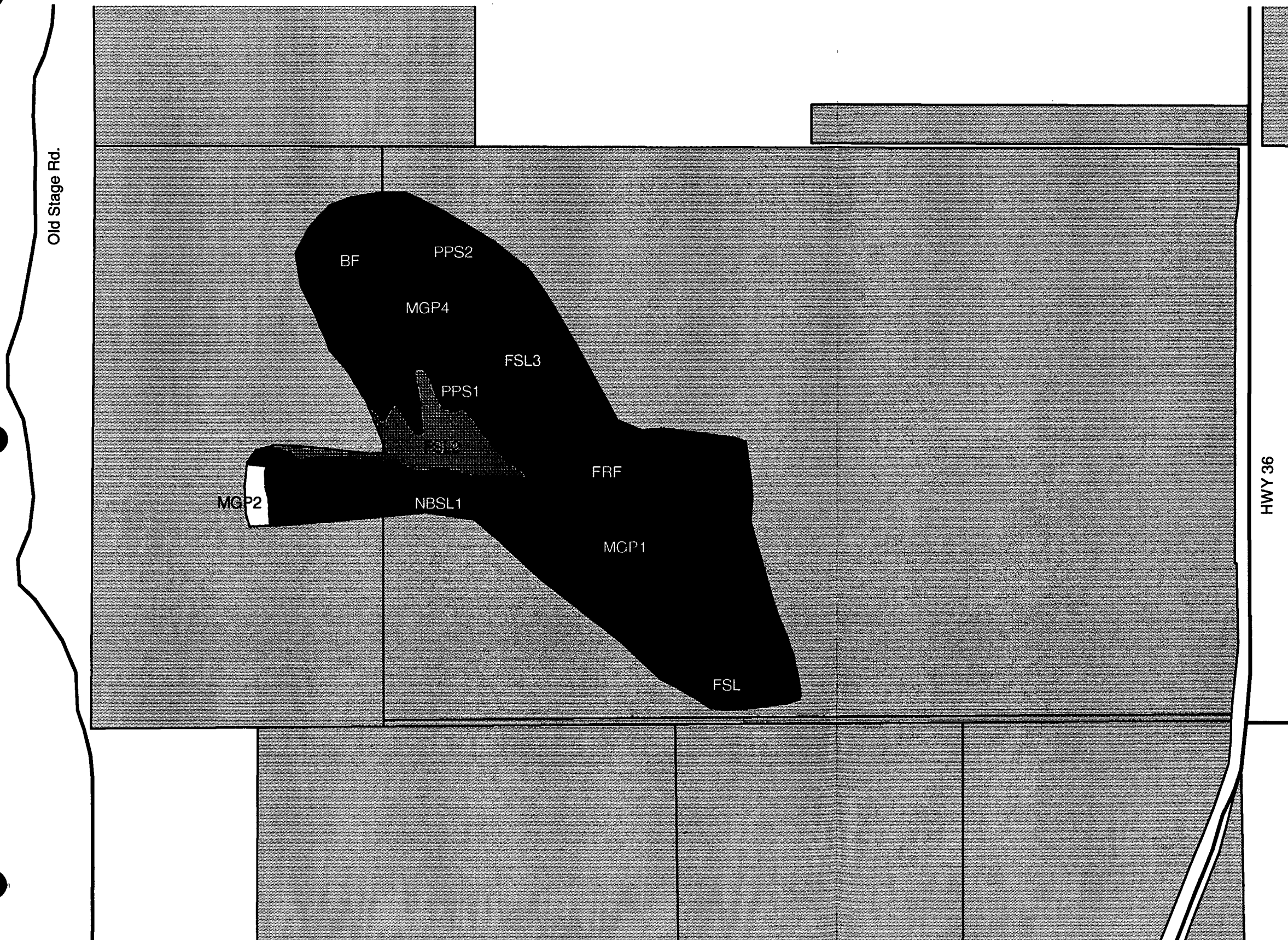
Talus -slopes formed of rock debris (TAL)

Mudflats (MUD)

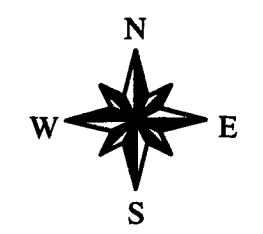
Alfalfa (ALF)

Building/Structure (BUI)

# 1994 BDAP Raw Data, Schneider Property



- Road
- Creek
- BDAP 94
- BF
- FRF
- FSL
- FSL2
- FSL3
- FSL4
- MGP1
- MGP2
- MGP4
- NBSL1
- NBSL2
- PPS1
- PPS2
- PRS
- City O.S.







# Schneider / Nejezchleb Detailed Soils

City of Boulder Open Space

Roads

Baller stony sandy loam

BoF

Colluvial land

Cu

Reno hill loam

ReD

Sixmile stony loam

SmF

Terrace escarpments

Te

Valmont cobbly clay loam

VcC

VcE



Map produced 6/13/94 by  
J. Osborne and the GIS Lab.

