

Foster Flat

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The road to Foster Flat. Looking north about 10 miles from Highway 205, western juniper covers Jackass Butte in the background. Wyoming big sagebrush dominates the flats in the foreground. Photo by Mark Armstrong.

As you travel south from Burns along State Route 205, your attention is captured by the Malheur National Wildlife Refuge along the left side of the highway and the dominating bulk of Steens Mountain on the horizon ahead. It's easy to miss the small green sign along the side of the road just past milepost 38 announcing "Foster Flat - 32 miles." Looking down the dirt road to the west, the view is sagebrush flats and juniper-covered hills. Thirty-two miles. That's a long way off the paved road, but the trip is worth it for the desert rat or the curious botanist. When you reach your destination, you find a subtle gem. Subtle, because the features that make this area so valuable are not instantly obvious. Many Research Natural Areas (RNAs) are designated for diverse vegetation, rare plants, or great elevation differences. Foster Flat differs drastically from this concept. Fewer than 20 feet of elevation are lost from the high point on the edge of the playa to its bottom. In this environment, a slight change in elevation creates a series of plant communities grading from the edge to the playa center, mainly due to alkalinity and length of inundation.

Ephemeral playa lakebeds are scattered across southeast Oregon. Because they hold seasonal water, the traditional management has been to dig a livestock waterhole in the lowest point on the playa. These waterholes typically hold water throughout the summer, attracting heavier use by cattle. On the Burns District, Foster Flat is the only large playa lakebed without a waterhole.

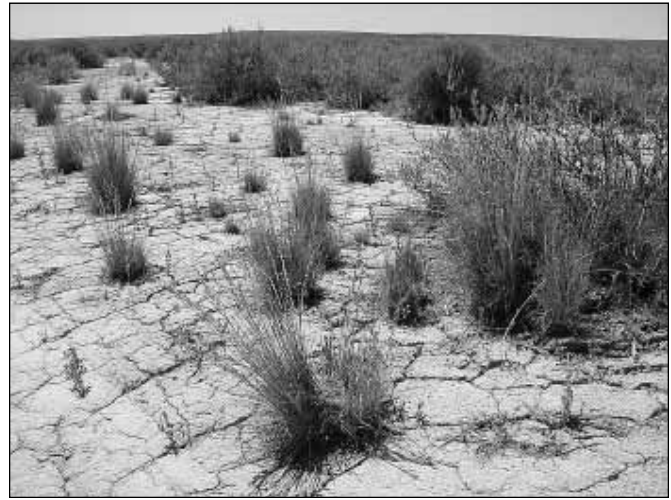
The 2,690-acre Foster Flat RNA was designated in the 1992 Three Rivers Resource Management Plan/Environmental Impact Statement (RMP/EIS). The Oregon Natural Heritage Plan of 1998 identified Foster Flat RNA as filling the cell need for silver sagebrush/Nevada bluegrass (*Artemisia canal/Poa nevadensis=Poa secunda*).

Plant Communities

Hydrology of the Foster Flat playa is natural, in that the amount of water on the playa depends entirely on local precipitation. In wet years, Foster Lake, at the north end of Foster Flat playa, may



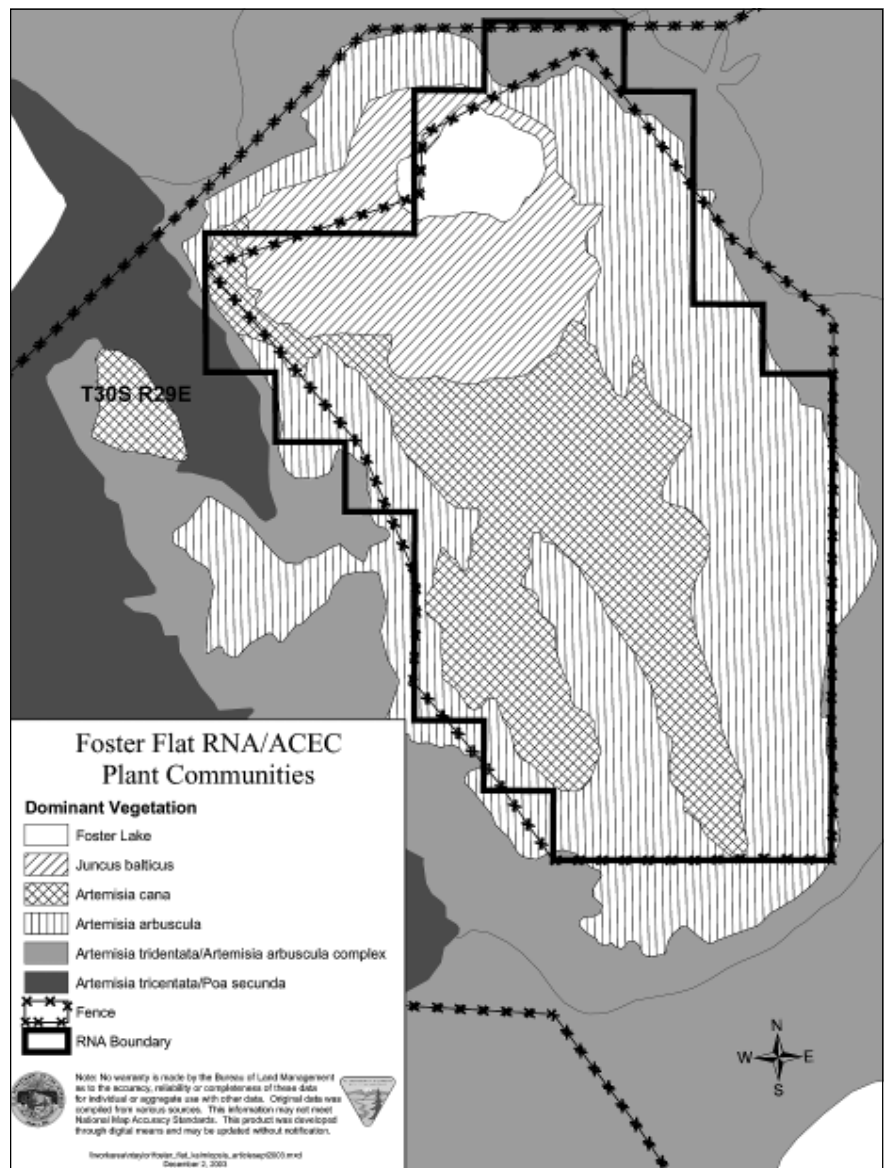
The view north across mixed big and low sagebrush toward the lower end of the playa at Foster Flat RNA. Photo by Nora Taylor.



Note cracks in the white, fine-grained soils in the silver sage/Nevada bluegrass community. During high winds, these soils contribute to dust storms. Photo by Nora Taylor.

be as large as 300 acres; however, during many years there is no water on the playa at all. The plant communities that form rings in and around the playa are primarily related to how long they are inundated in the years when there is sufficient rainfall and runoff to fill the playa. In low precipitation years, the bed of Foster Lake remains a bare, dry mudflat until late spring when tansy leaf evening primrose (*Camissonia tanacetifolia*) bursts into flower and turns the lakebed bright yellow. Flowering peaks between the beginning of June and the end of July; as with many desert species, phenology is influenced by precipitation. Although tansy leaf evening primrose tolerates moist alkaline soil, plant abundance is determined by water level. A deep rooted perennial that spreads by creeping roots, it is not known if tansy leaf evening primrose remains dormant in the soil during periods when plants are inundated year-round, or if it rapidly reestablishes from seed when water levels recede. Seeds that fall into cracks of dry soil are in an excellent position to germinate when moisture causes the soil to swell and close the cracks. The evening primrose is most abundant in the lowest part of the playa, Foster Lake, where the soil has the highest clay content, and thus, the most extreme shrink-swell cycle.

Grass-like species, primarily creeping spike rush (*Eleocharis palustris*) and Baltic rush (*Juncus balticus*) dominate the next ring around the lakebed. This community is characterized by low shrub cover. While the number of perennial and annual species is roughly equal, ground cover is dominated by perennial grass and grass-like species. Common perennials in this community include mat muhly (*Muhlenbergia richardsonis*), saltgrass (*Distichlis spicata*), bottlebrush squirreltail (*Elymus elymoides*), winged dock (*Rumex venosus*), creeping wildrye (*Elymus triticoides*), and desert combleaf (*Polyctenium fremontii*). Annuals include



Foster Flat RNA/ACEC plant communities. Map prepared by Nora Taylor.

alyssum (*Alyssum* sp.), alkali popcorn flower (*Plagiobothrys leptocladus*), spreading wallflower (*Erysimum repandum*) and least navarretia (*Navarretia leucocephala*).

As you move up from the bottom of the playa, shrubs increase in number. The first is silver sagebrush, because it tolerates the most inundation. The silver sagebrush/Baltic rush community grades into silver sagebrush/Nevada bluegrass (Franklin and Dyrness 1988). Low sagebrush/Sandberg bluegrass (*Artemisia arbuscula/Poa secunda*) grow on the highest ground within the playa. Hummocks of deeper soil found in this community are dominated by basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) and bluebunch wheatgrass (*Pseudoroegneria spicata*). Surrounding the playa is the shrub steppe community of Wyoming big sagebrush/bunchgrass (*Artemisia tridentata* ssp. *wyomingensis*). Here the dominant grasses are Sandberg's bluegrass, Thurber's needlegrass (*Achnatherum thurberianum*), and bluebunch wheatgrass.



Flowers of tansy leaf evening primrose (*Camissonia tanacetifolia*) turn the lakebed bright yellow. Photo by Steve Matson.

long and 1.5 to 2.3 mm wide. They have been likened to small sausages. The tip of the silique is rounded and the style is much shorter than .5 mm.

Climate, Geology and Soils

Foster Flat is in the high lava plains of the Northern Basin and Range Ecoregion (Allan and others 2001). In this arid climate, the area receives only 8 to 12 inches of precipitation annually. Most of this occurs in the form of snow during the winter. Air temperatures fluctuate widely, both annually and diurnally. Extreme air temperatures range from 100°F in the summer to -30°F in the winter. Plant growth generally occurs between mid-April and mid-July.

Soils of the playa are deep, poorly drained, clays and silts. They have low permeability and moderate to great shrink-swell potential. Soils of the surrounding uplands are deep, rocky, loamy clays. Over time, rocks decompose and release alkaline

Rare Plants

Desert or cone combleaf (*Polyctenium fremontii* var. *confertum*) occurs at the northern edge of the playa. This member of the mustard family occurs in only a handful of sites on the Burns district. It is a Bureau Sensitive, Federal Species of Concern. The more common variety of desert combleaf (*Polyctenium fremontii* var. *fremontii*) is abundant throughout the area. The two varieties can not be distinguished until they have ripe fruits. In *Polyctenium fremontii* var. *fremontii*, the siliques are over eight millimeters long and linear, only 1 to 1.5 mm wide. The tip of the silique is tapered and ends in a style that is .5 to 1 mm long. *Polyctenium fremontii* var. *confertum* has short, fat siliques. They are oblong, 4 to 6 mm



Looking southeast at Steens Mountain on the horizon from Foster Flat playa where tansy leaf evening primrose has dried; Wyoming big sagebrush covers the ridge at the far side of the playa. Photo by Nora Taylor.



Looking southeast across Foster Flat at low sagebrush with Sandberg bluegrass; taller shrubs are green rabbitbrush and big sagebrush. In the background, Steens Mountain is 40 miles away. Photo by Nora Taylor.

minerals, including sodium salts and calcium carbonates. When these chemicals flow into an internally drained basin, salts accumulate when the water evaporates, rather than flowing away as they would if the playa had an outlet. As these compounds concentrate, the lowest parts of the playa become too alkaline for all but the most tolerant plants.

Grazing, Wild Horses, and Hunting

Designation of the RNA formally closed the playa to grazing by livestock and wild horses. A fence was constructed around the RNA in 1994. The Burns District is fortunate to have a highly cooperative grazing permittee who has been very diligent in ensuring that livestock do not enter the fenced enclosure.



Antelope buck with two does in the Wyoming big sagebrush/bunchgrass community. Photo by Mark Armstrong.

Foster Flat provides an excellent opportunity to view the rate at which biotic crusts and vascular plants recover after cessation of grazing. Comparison of areas inside and outside the RNA show well-developed crusting within the RNA compared to less well developed crust outside the enclosure, as well as an increase in forbs, grasses, and grass-like plants inside the enclosure fence.

The RNA is surrounded by the Warm Springs Wild Horse Herd Management Area which is managed for 111 to 202 horses.

Wild horses frequent waterholes in the area. They have been seen in the RNA a few times, but they rarely stay long. Occasionally the gates have been left open (by unknown persons) after the livestock grazing season is over and horses have gone into the RNA, but they leave by the same route.

Despite the distance from population centers, Foster Flat has long



Sage grouse rooster in strutting pose. Photo by Mark Armstrong.

been a popular destination for antelope and sage grouse hunting. There are reports that during the 1970s, hunters sometimes landed small planes on the playa, and after a morning hunt, left in the afternoon. Since exclusion of livestock by fencing the RNA, the bare area has become smaller, and areas surrounding the playa have become rougher, so that a landing now would be a bumpy experience.

Wildlife

While the entire RNA is favored by pronghorn antelope (*Antilocapra americana*), the lakebed playa of Foster Lake is a particular favorite. It is not uncommon to see herds in excess of

100 animals kicking up dust clouds as they race across the flat. Sage grouse (*Centrocercus urophasianus*) can be found during most of the year in and around Foster Flat. The low vegetation on the playa surrounded by taller Wyoming big sagebrush makes this a preferred area. Within the low sagebrush zone are hummocks of basin big sagebrush where pygmy rabbits can be found. These diminutive rabbits are becoming scarce throughout their range and the RNA provides quality habitat for them.

Visiting Foster Flat RNA

To get to Foster Flat, take State Highway 205 south from Burns to 1/3 of a mile south of milepost 38. Turn right onto the dirt road indicated by the green sign on the highway. Follow this road for 32 miles and you will enter the RNA over a cattle guard at the east side of the RNA. Vehicular travel in the RNA is restricted to existing roads and trails. Camping is prohibited inside the RNA, but there are approximately 600,000 acres of public land surrounding the RNA



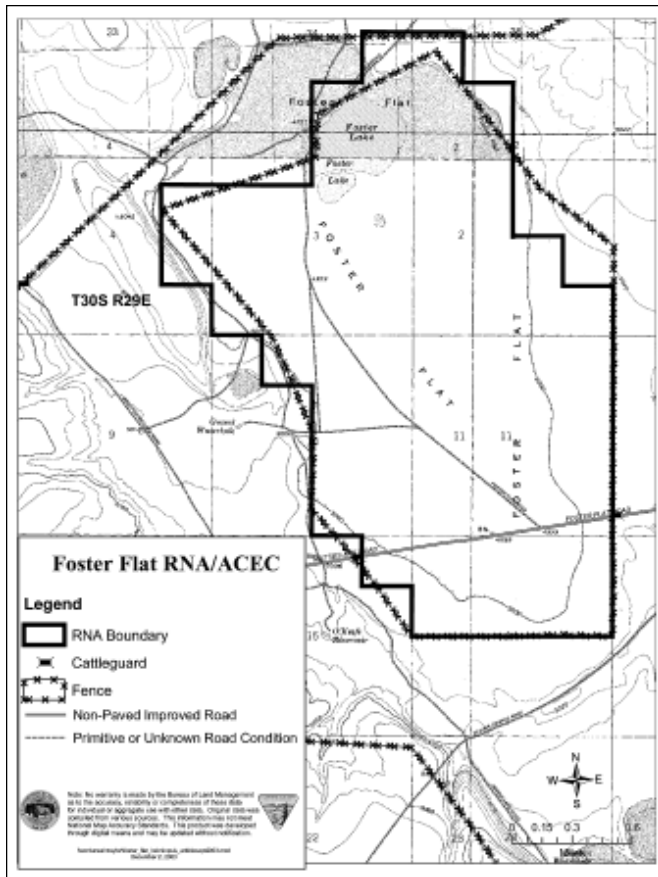
Pygmy rabbit sitting by its burrow at the base of big sagebrush. Photo by Jerry Farstvedt.

that is open to dispersed recreation. Although camping is not restricted, there may be seasonal fire restrictions in the summer. If dry camping in the middle of the desert is not to your taste, there is a historic hotel at Frenchglen, run by the Oregon State Parks Department, as well as a BLM campground. Frenchglen is 20 miles south of the Foster Flat turnoff on Highway 205.

Weather conditions are a consideration at all times of the year. When dry, the road off the paved highway is usually passable to most two-wheel drive vehicles that have a little clearance. In the



The view north across the playa in the low sagebrush community. This road along the northeast side of the RNA does not show on the map, but it is open to vehicular travel. Photo by Nora Taylor.



Map of Foster Flat RNA/ACEC. Map prepared by Nora Taylor.

spring or after a summer thundershower, the road is impassable to all vehicles. The soils are high in clay and the road is extremely slippery when muddy. Fortunately, the situation is evident immediately. If the first mile is slippery and hard to travel, simply turn around. It's only going to get worse and cell phone coverage is spotty.

The best time to visit Foster Flat is between early May and mid-July. The average peak of wildflower bloom is towards the end of June. Graminoids are green until mid-July. Tansy leaf evening primrose flowers between mid-June and mid-July. The RNA is generally inaccessible when sage grouse are strutting. If conditions do allow access, strutting sage grouse are easily observed. It is important to stay inside your vehicle as sage grouse ignore vehicles, but flush immediately when they see a person on foot. Repeated interruptions cause the grouse to abandon traditional strutting grounds. Pygmy rabbits are usually seen only for an instant as they dash to their burrows in the big sagebrush. The distinguishing feature of pygmy rabbits, other than their small size, is that they do not have a white cottontail. If you see a bunny with a cottontail, it is a mountain cottontail (*Sylvilagus nuttallii*). This late spring/early summer season is also when antelope kids can be seen running with the herds across the flat.

Books worth carrying as references on shrub steppe plants and communities include *Flora of Steens Mountain* (Mansfield 2000), *Sagebrush Country* (Taylor 1994) and *The Sagebrush Ocean* (Trimble 1989). Even when the weather is warming in the spring

and summer, conditions can still be unpredictable so it is best to be prepared for anything. Sudden thunderstorms can make a road that was passable in the morning into a muddy quagmire in the afternoon. Snow can fall and temperatures can drop below freezing during any month of the year. Nevertheless, camping out on the desert is a special treat because there is no light pollution; the stars put on a spectacular show. You feel part of the high desert as the coyotes sing you to sleep in the evening and wake you in the morning.

References

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- Franklin JF, Dyrness CT. 1988. Natural vegetation of Oregon and Washington. Corvallis (OR): Oregon State University Press. 452 p.
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- Taylor RJ. 1994. Sagebrush Country: A Wildflower Sanctuary. Missoula (MT): Mountain Press Publishing Company. 211 p.
- Trimble S. 1989. The Sagebrush Ocean. Reno (NV): University of Nevada Press. 248 p.

Vascular Plant Species List

Species that have special Federal or State status are noted by an asterisk before the scientific name. Nomenclature follows the Oregon Flora Project checklist. Names of taxa native to Oregon are printed in italic *Garamond*; alien taxa are in italic *Gill Sans*, a sans-serif type.

DICOTYLEDONS

APIACEAE (Carrot Family)

Lomatium triternatum (Pursh) J.M. Coult. & Rose (nine leaf biscuitroot)

Lomatium vaginatum J.M. Coult. & Rose (broadsheath desertparsley)

ASTERACEAE (Sunflower Family)

Achillea millefolium L. (common yarrow)

Agoseris glauca (Pursh) Raf. (pale agoseris)

Artemisia tridentata Nutt. ssp. *tridentata* (basin big sagebrush)

Artemisia tridentata Nutt. ssp. *wyomingensis* Beetle & A. Young (Wyoming big sagebrush)

Artemisia arbuscula Nutt. (low sagebrush)

Artemisia cana Pursh (silver sagebrush)

Balsamorhiza hookeri Nutt. (hairy balsamroot)

Balsamorhiza serrata A. Nelson & J.F. Macbr. (toothed balsamroot)

Crepis acuminata Nutt. (tapertip hawksbeard)

Crepis occidentalis Nutt. (western hawksbeard)

Ericameria nauseosa (Pall. ex Pursh) G.L. Nesom & G.I. Baird (rubber rabbitbrush)

Ericameria viscidiflora (Hook.) L.C. Anderson (green rabbitbrush)

Erigeron chrysopsidis A. Gray ssp. *austiniae* (Greene) G.L. Nesom (dwarf yellow fleabane)

Erigeron pumulis Nutt. (shaggy fleabane)

Iva axillaris Pursh (poverty weed)

Pyrrocoma carthamoides Hook. (large-flower goldenweed)
Senecio integerrimus Nutt. var. *exaltatus* (Nutt.) Cronquist (tall western groundsel)

Taraxacum officinale Weber ex F.H. Wigg. (common dandelion)
Tragopogon dubius Scop. (yellow salsify)

BORAGINACEAE (Borage Family)

Plagiobothrys leptocladus (Greene) I.M. Johnst. (alkali popcorn flower)

BRASSICACEAE (Mustard Family)

Alyssum alyssoides (L.) L. (pale alyssum)
Arabis holboellii Hornem. (Holboell's rockcress)
Cardaria draba (L.) Desv. (hoary cress)
Descurainia sophia (L.) Webb ex Prantl (flixweed)
Draba albertina Greene (slender whitlowgrass)
Draba verna L. (spring whitlowgrass)
Erysimum repandum L. (spreading wallflower)
Lepidium perfoliata L. (clasping pepperweed)
Phoenicaulis cheiranthoides Nutt. ex Torr. & A. Gray (daggerpod)
Polycytenium fremontii (S. Watson) Greene var. *confertum* Rollins (cone combleaf)
Polycytenium fremontii (S. Watson) Greene var. *fremontii* (desert combleaf)

CAMPANULACEAE (Bellflower Family)

Downingia elegans (Douglas ex Lindl.) Torr. (elegant downingia)

CHENOPODIACEAE (Goosefoot Family)

Chenopodium foliosum (Moench) Asch. (leafy goosefoot)
Chenopodium leptophyllum (Moq.) S. Watson (narrowleaf goosefoot)

FABACEAE (Legume Family)

Astragalus curvicaarpus (A. Heller) J.F. Macbr. (sickle milkvetch)
Astragalus filipes Torr. ex A. Gray (basalt milkvetch)
Astragalus lentiginosus Douglas ex Hook. (specklepod milkvetch)
Astragalus purshii Douglas ex Hook. (woolypod milkvetch)
Lupinus argenteus Pursh (silvery lupine)
Lupinus polyphyllus Lindl. var. *saxosus* (Howell) Barneby (rock lupine)

Trifolium gymnocarpon Nutt. (hollyleaf clover)

ONAGRACEAE (Evening Primrose Family)

Camissonia tanacetifolia (Torr. & A. Gray) P.H. Raven (tansy leaf evening primrose)

Epilobium brachycarpum C. Presl (tall annual willow-herb)
Gayophytum diffusum Torr. & A. Gray ssp. *parviflorum* F.H. Lewis & Szweyk. (spreading groundsmoke)

Gayophytum humile Juss. (dwarf groundsmoke)

POLEMONIACEAE (Phlox Family)

Collomia linearis Nutt. (narrow-leaf collomia)
Eriastrum sparsiflorum (Eastw.) H. Mason (Great Basin woolstar)
Leptodactylon pungens (Torr.) Nutt. (granite pricklygilia)
Navarretia leucocephala Benth ssp. *minima* (Nutt.) A.G. Day (least navarretia)

Phlox gracilis (Hook.) Greene (annual phlox)

Phlox longifolia Nutt. (long-leaf phlox)

Phlox hoodii Richardson (Hood's phlox)

POLYGONACEAE (Buckwheat Family)

Eriogonum ovalifolium Nutt. (cushion buckwheat)
Eriogonum sphaerocephalum Douglas ex Benth. (rock buckwheat)
Eriogonum umbellatum Torr. var. *umbellatum* (sulfur buckwheat)
Polygonum aviculare L. (prostrate knotweed)
Rumex venosus Pursh (winged dock)

PORTULACACEAE (Purslane Family)

Lewisia rediviva Pursh (bitterroot)

RANUNCULACEAE (Buttercup Family)

Delphinium andersonii A. Gray (desert larkspur)

Ranunculus testiculatus Crantz (bur buttercup)

SAXIFRAGACEAE (Saxifrage Family)

Lithophragma glabrum Nutt. (smooth fringecup)

SCROPHULARIACEAE (Figwort Family)

Collinsia parviflora Douglas ex Lindl. (small-flowered blue-eyed Mary)

Cordylanthus ramosus Nutt. (bushy bird's beak)

Penstemon cusickii A. Gray (Cusick's beardtongue)

MONOCOTYLEDONS

CYPERACEAE (Sedge Family)

Carex sp. (sedge)

Eleocharis palustris (L.) Roem. & Schult. (creeping spike rush)

JUNCACEAE (Rush Family)

Juncus balticus Willd. (Baltic rush)

LILIACEAE (Lily Family)

Allium acuminatum Hook. (tapertip onion)

Allium tolmiei Baker (flat-leaf onion)

POACEAE (Grass Family)

Achnatherum thurberianum (Piper) Barkworth (Thurber's needlegrass)

Bromus tectorum L. (cheatgrass)

Distichlis spicata (L.) Greene (inland saltgrass)

Echinochloa crus-galli (L.) P. Beauv. (large barnyard-grass)

Elymus elymoides (Raf.) Swezey (bottlebrush squirreltail)

Koeleria macrantha (Ledeb.) Schult. (prairie junegrass)

Leymus cinereus (Scribn. & Merr.) A. Löve (basin wildrye)

Leymus triticoides (Buckley) Pilg. (beardless wildrye)

Muhlenbergia richardsonis (Trin.) Rydb. (mat muhly)

Poa secunda J. Presl ssp. *juncifolia* (Scribn.) Soreng (Nevada bluegrass)

Poa secunda J. Presl (Sandberg bluegrass)

Pseudoroegneria spicata (Pursh) A. Löve (bluebunch wheatgrass)

Nora Taylor is the district botanist in the Burns BLM District. She has worked in Burns for 22 years in both the botany and grazing management program.
